# BIF's Comments on the Consultation Paper on Assignment of the Microwave Spectrum in 6 GHz (lower), 7 GHz, 13 GHz, 15 GHz, 18 GHz, 21 GHz Bands, E-Band, and V-Band

At the outset, Broadband India Forum wishes to laud TRAI for coming out with an important Consultation Paper on the method of assignment of Microwave Spectrum in lower 6GHz/7/13/15/18/21 Ghz and E & V bands.

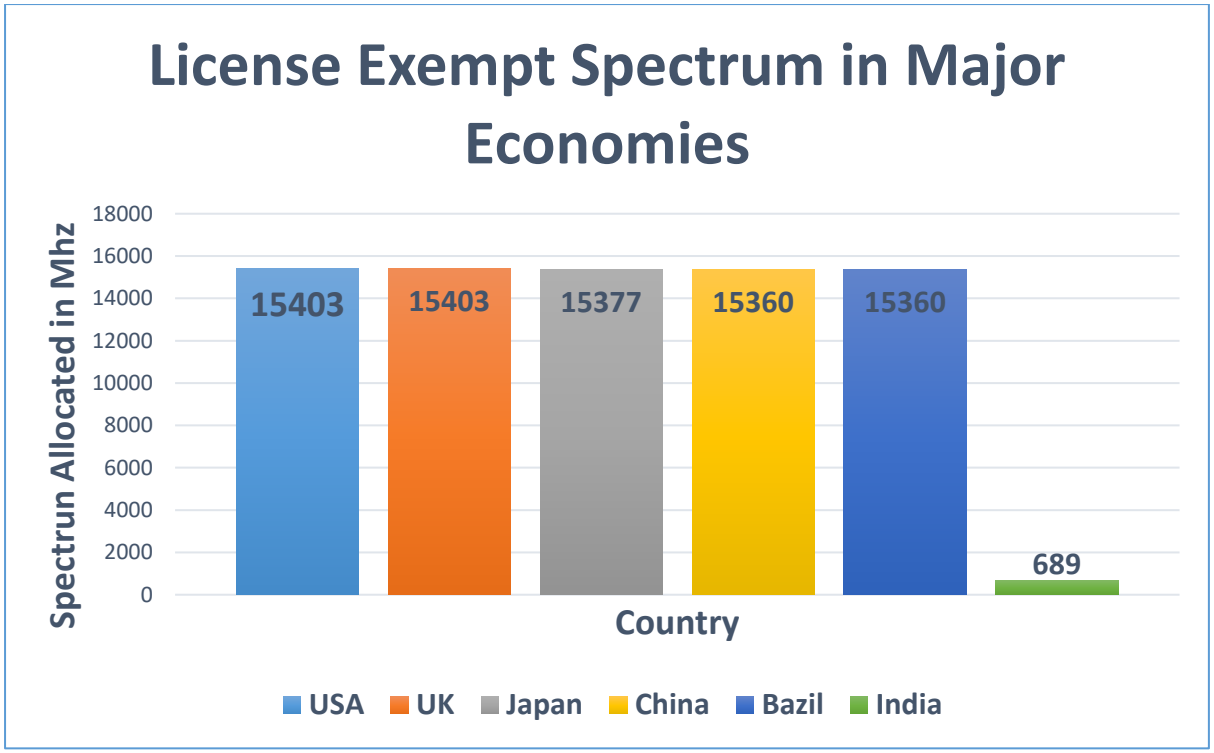
As a part of the Preamble, BIF wishes to submit a Background Note highlighting how India compares with leading and developed economies, when it comes to availability of quantum of delicensed spectrum. One of the major components of the huge quantum of delicensed spectrum in advanced and developed economies comes from the V band -57 TO 71GHz (quantum of spectrum being 14GHz or 14000 MHz).

**Background Note:**

BIF wishes to place on record that unlike more than 100 countries all over the world who have delicensed the entire or portion of the V band for innovation and growth of the digital ecosystem, India has yet to do so. This is despite the fact that TRAI itself had made some pathbreaking recommendations as early as 2014 itself on this matter. By placing this graph ( as below ) we are showing how far we are lagging behind when it comes to overall quantum of delicensed spectrum- as compared to other developed economies .One of the principal reasons for this is that most of the developed nations have delicensed the entire 14000 MHz in the V band-a decision that is pending in India.

Graph below compares the International Position on delicensing of spectrum

**Comparative Position of India vs other Countries as regards quantum of Unlicensed Spectrum**




From the above it is evident that India is lagging behind other developed economies in terms of quantum of delicensed spectrum. India has one twentieth of the unlicensed spectrum that leading economies have. The two primary bands that India is yet to delicense are

a) The entire 1200 MHz in the 6GHz band (5925-7125MHz). Though Draft Rules for delicensing 500 MHz in lower 6GHz band have been issued on May16th, 2025 , the same is pending public notification.

b) The entire 14000 Mhz (or 14GHz) in the V band (57-71GHz)

- **In India, vide Section 3 ( 1) , Schedule 1 of the Telecommunications Act 2023, Backhaul Spectrum is to be assigned administratively.**

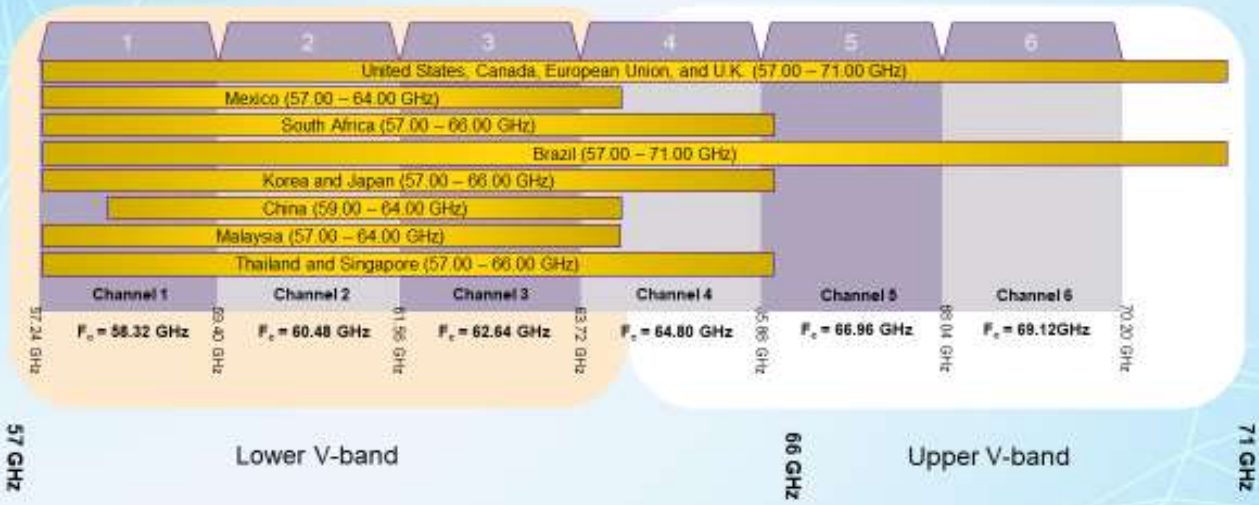
**Global Regulatory Position for Countries around the World as regards Regulatory Approach for Backhaul Spectrum**

1. Regulators typically allocate spectrum on based on administrative methodology

[The link to the Report is available here :**https://www.gsma.com/spectrum/wp-content/uploads/2022/04/wireless-backhaul-spectrum.pdf**]

**Global Regulatory Status - Countries around the World Are Adopting a License-Exempt Approach in the V-Band**

# 60 GHZ BAND WIDELY AVAILABLE



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# EU MANDATE (27 MEMBER STATES)

| Band no | Frequency band | Category of short-range devices | Transmit power limit/field strength limit/power density limit | Additional parameters (channelling and/or channel access and occupation rules) | Other usage restrictions | Implementation deadline |
|---|---|---|---|---|---|---|
| 75 | 57-71 GHz | Wideband data transmission devices | 40 dBm e.i.r.p. and 23 dBm/MHz e.i.r.p. density | Requirements on techniques to access spectrum and mitigate interference apply [7]. | Fixed outdoor installations are excluded. | 1 January 2020 |
| 75a | 57-71 GHz | Wideband data transmission devices | 40 dBm e.i.r.p., 23 dBm/MHz e.i.r.p. density and maximum transmit power of 27 dBm at the antenna port or ports | Requirements on techniques to access spectrum and mitigate interference apply [7]. | | 1 January 2020 |
| 75b | 57-71 GHz | Wideband data transmission devices | 55 dBm e.i.r.p., 38 dBm/MHz e.i.r.p. density and a transmit antenna gain ≤ 30 dBi | Requirements on techniques to access spectrum and mitigate interference apply [7]. | This set of usage conditions is only available to fixed outdoor installations. | 1 January 2020 |

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*See SRD 7th update Decision (EU) 2019/1345 adopted on 2 August 2019 and published at https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1567676305871&uri=CELEX:32019D1345*



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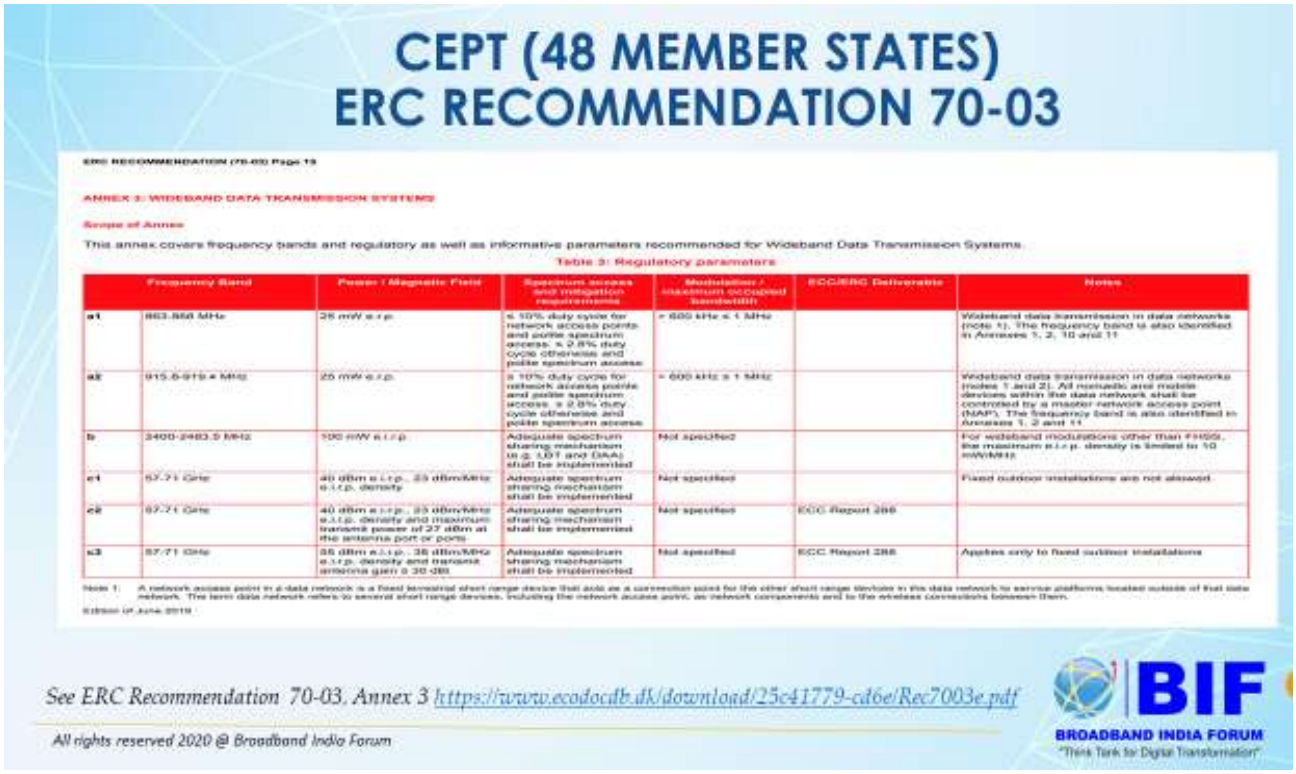



**Why is the Lower V Band required to be Delicensed ?**

The entire Lower V band (57-66GHz i.e. a total of 9 GHz) is required to **support contactless ports, device to device data transfer, and motion sensing.**

***Contactless ports***

**The full lower V band is required to support the very high data rates of USB3 and USB4.**

***Device to device data transfer***

**The full lower V band is required to achieve very high data rates to transfer large volumes of data quickly**

***Motion sensing***

**Range resolution is proportional to the spectrum bandwidth; the full lower V band is required to achieve precise sensing.**

**System Parameters for V band**

**(i)** a)57-66GHz - ECC Recommendation 70-03, Annex 1: n1.
b)ETSI EN 305 550, 20 dBm avg EIRP and 13 dBm/MHz EIRP PSD

(ii) and 57-71GHz - ECC Recommendation 70-03 Annex 3: c1

**Allocation Methodology for E-Band**

- Spectrum in the E-band should be allocated using administrative method of allocation.
- The TRAI CP itself indicates that a large number of developed economies have opted for administrative method of allocation for E-band.

**RESPONSE TO QUESTIONS OF THE CP**

**Q1. What is the level of demand of the spectrum in the traditional microwave backhaul bands [viz. 6 GHz (lower), 7 GHz, 13 GHz, 15 GHz, 18 GHz, and 21 GHz bands] for radio backhaul purposes? Kindly provide a detailed response with justifications.**

**BIF RESPONSE**

The digital ecosystem is rapidly evolving with the rapid deployment of new age technologies like IoT, AR, VR, etc., and transforming all the sectors – from education to banking to health services to entertainment by enabling them to move online. This can only be achieved with the availability of high-quality, high-speed mobile broadband services.

Enhancing access networks to maximise throughput is vital to keep up with the rapid technological evolution. It is also crucial to support these advancements for robust and capable backhaul networks. Only when access and backhaul networks work in harmony with each other that mobile broadband services will be able to effectively meet the demands of customers in this fast-paced digital age.

For perspective, the volume of total wireless data usage in India increased from ~8.1 EB during QE Mar 18 to ~57 EB during QE Dec 24. It is estimated to grow to 62 EB per month by 2028. In order to facilitate this, the requirement of backhaul capacity per site is also required to grow at the same pace. Per Capita Mobile Data per Consumer per month has increased from 256KB in September 2016 to 21GB as on March'2025 and will need to continue to increase as data traffic continues to explode.

**Microwave backhaul is indispensable:**

TSPs have two options – increasing fiberisation and using microwave spectrum for backhaul, to deliver such massive capacity. Although fiber offers better data carrying capacity, India has only reached a suboptimal ~44% fiberisation at sites, owing to the various geographical, technical as well as financial challenges involved in the laying of fiber.

The Right of Way (RoW) policy which was gazette notified in December 2024 and is now operational since January 1, 2025 has been substantially simplified and streamlined by the Government and TSPs are also making every effort to fiberise their networks. The growth in fiberisation will continue at its own pace. Therefore, the backhaul spectrum is essential if they are to overcome the challenge of rapidly growing network rollouts and traffic generation.

**Present demand for MWA/MWB carriers:**

**Demand for MWA carriers**: The current guidelines allow a TSP with Access Service Authorisation to hold a maximum of 8 MWA carriers in each of the metros and Category A LSAs, and 6 carriers in each of the Category B and C LSAs. This is sufficient to meet the industry demand at present and in the near future.

**Demand for MWB carriers**: MWB carriers are currently assigned on a P2P link basis to all user categories. While microwave backbone (MWB) technology is suitable for longer links (over 15km), its limited bandwidth and the availability of fiber optic (OFC) infrastructure, especially on major roads, have significantly reduced its necessity for many applications. Many base stations within a 15km radius have high bandwidth demands that MWB cannot adequately fulfill. Moreover, OFC is available on most NH's, SH's and even many rural areas, makes it a more cost-effective and higher-capacity alternative for backhaul. Consequently, the need for MWB has considerable reduced

However, we submit that assignment for MWB carriers should be done for the entire LSA on an exclusive basis to TSPs with Access Service Authorisation, similar to MWA carriers.

**Future demand for MWA/MWB carriers:**

The assessment of future demand for MWA/MWB carriers is difficult since it depends upon subscriber base, the access technology, and the amount of radio access spectrum holding of the TSP. The backhaul requirement per site has increased in the recent years due to explosion in the volume of traffic and will continue to rise significantly.

In addition, factors such as backhaul capacity required per site, microwave link capacity, mobile network density, hub density, existing fiber penetration and planned fiber deployment, evolution of existing network, suboptimal angular separations, line of sight availability and infrastructure limitations also influence the backhaul requirement.

Thus, instead of static values, future demand should be dynamically evaluated and reviewed in 2-3 years.

**Requirements of TSPs with authorization other than Access Service and non-TSPs:**

They may require the carriers only on a point-to-point ("P2P") link basis, as these entities do not have wide densified networks. Thus, the existing P2P assignment policy should continue in case of TSPs with other than Access Service Authorisation and non-TSPs.

Therefore, we recommend the following:

a) In the case of MWA carriers, the existing policy of assigning a maximum of 8 carriers in each of the metros & Category A LSAs and 6 carriers in each of the Category B & C LSAs, should be continued with for TSPs with Access Service Authorisation.
b) MWB carriers should be assigned to TSPs with Access Service Authorisation for the entire LSA on an exclusive basis.
c) For TSPs holding other than Access Service Authorisation and non-TSPs, MWA/MWB carriers should continue to be assigned on a P2P link basis, in line with the extant policy.
d) While the current ceilings may effectively cater to current needs, the Government may review the same in the next 2-3 years, taking into account technological advancements and changes in the market landscape.
e) MWA & MWB carriers are required also by TSPs with non-access authorisation and non-Telcos (TSPs). Some of these traditional/legacy spectrum bands are now being used and some more are likely to be used for other mobile/Wi-Fi/satellite services. Hence it may be required not only by TSPs but also for other entities viz. Satcom Service Providers, Wifi Service Providers, Research Institutions & Academia for fuelling innovation.

**Q2. For which commercial telecommunication services should the spectrum in traditional microwave backhaul bands be assigned for radio backhaul purposes? Kindly provide a detailed response with justifications.**

**BIF RESPONSE**

Kindly refer to Response in Q1 above.

**Q3. Which of the following methods should be used for the assignment of the spectrum in traditional microwave backhaul bands for radio backhaul purposes for various commercial telecommunication services:**

**(a) Block-basis in LSA,**

**(b) Point-to-point link-basis, or**

**(c) Any other?**

**Please provide a detailed response with justifications in respect of the relevant commercial telecommunication services.**

**BIF RESPONSE**

Currently, the MWA carriers are assigned to TSPs with Access Service Authorisation for the entire LSA on an exclusive basis, and to TSPs with other than Access Service Authorisation on a P2P link basis.

On the other hand, MWB carriers are assigned to all users on a P2P link basis. However, it is our contention that **both MWA and MWB carriers should be assigned to TSPs with Access Service Authorisation for the entire LSA on an exclusive basis.**

The advantages of exclusive assignment to TSPs with Access Service Authorisation are given below**:**

1. Faster rollout: Exclusive assignment reduces the time required for deployment of network.
2. Easier network planning: The whole set of microwave carriers will be known in advance, making it easier to plan microwave network with optimal loading, minimum network outages and enhanced customer satisfaction levels.
3. Cost-effective operations: The right topology and plan will help operators to avoid frequent re-engineering, which wastes hardware and site material.

Further, the disadvantages of P2P link-based assignment to TSPs with Access Service Authorisation are as given below:

1. Logistical challenge: The microwave links per operator run into the thousands in each LSA. P2P link-based assignments would put the onus of interference management on MW carriers. This would require that extensive interference analysis with the existing operating links of other TSPs be carried out. This will be a huge challenge for WPC. Therefore, exclusive assignment is the only practical way forward. Even TRAI 2014 Recommendations recommended exclusive assignments for all MWA carriers.
2. Not in line with the charging mechanism: The spectrum charges for both MWA and MWB carriers are currently charged for the entire LSA, even though MWB carriers are assigned on a P2P link basis. In the interests of fairness and keeping the spectrum assignment in line with spectrum charging, MWA and MWB carriers should be assigned on an exclusive basis for the entire LSA.

**P2P Assignment to TSPs with other than Access Service Authorisation and non-TSPs:**
Please refer to the response to Q1. MWA/MWB carriers should continue to be assigned to them on a P2P link basis, in line with the extant policy.

Therefore, **we recommend that the spectrum for MWA and MWB should be assigned to TSPs with Access Service Authorisation for the entire LSA on an exclusive basis. For TSPs holding other than Access Service Authorisation and non-TSPs, MWA/MWB carriers should continue to be assigned on a P2P link basis, in line with the extant policy.**

As noted by TRAI, few of these frequency bands are shared with space-based communication services like the FSS. Ka-band satellite systems rely on the 17.7-19.7 GHz frequencies for space-to-Earth communications to gateways and customer terminals. Ka-band is very important for delivering high speed Space-based communication wherein 17.7-19.7Ghz is

used for space-to-earth communication. We urge TRAI to ensure that the assignment and licensing procedures for MWA permit the continued coexistence with space-based communication services. Furthermore, TRAI can rely on well-established international provisions and recommendations that enable operational certainty for both terrestrial and space services that have shared the 17.7-19.7 GHz band for decades. Appendix 7 of the ITU Radio Regulations describes methods for determining the coordination area around earth station which can be used as a baseline. The channel modelling of the terrestrial path between an earth station and fixed station can be further refined using Recommendation ITU-R P.452.

We urge TRAI to ensure earth stations operating with space-based communication services can continue to be sited within an LSA. These procedures could rely on the international coordination provisions viz, those in Article 9 of the Radio Regulations, to allow earth stations/gateways, to obtain interference protection within the LSA while not unduly constraining the Access Service Provider.

**Space-based communication services are essential infrastructure for bridging the digital divide.**

For satellite specific bands viz. 18GHz, we encourage TRAI to recognize the role of space-based communication services and their spectrum requirements. NGSO fixed-satellite service (FSS) systems will bring about an exponential change to telecommunications services by delivering satellite-based broadband connectivity to customers in unserved and underserved areas, as well as providing essential backhaul medium for the rollout of terrestrial mobile services throughout India. These space-based communication services can offer rapid deployment of connectivity across remote areas where terrestrial broadband or backhaul solutions are impractical. To do this effectively, satellite systems require unhindered access to globally harmonized spectrum.

There is spectrum overlap with these space-based communication services and MWA and MWB services in the 17.7-19.7 GHz band frequencies, as discussed in the Consultation Paper. Some satellite systems plan to use these frequencies for space-to-Earth (downlink) transmissions to gateways and customer terminals—including those used for broadband and backhaul services. Internationally, these frequencies are allocated to the FSS and also allowed to be used for microwave services and have successfully coexisted for decades. We urge the TRAI to adopt a balanced approach and specify technical conditions that ensure access and harmonious co-existence between the FSS and MWA and MWB services. Such an approach will provide connectivity diversity that will benefit Indian businesses and citizens.

**TRAI should adopt procedures for uncoordinated earth stations in the 17.7-19.7 GHz frequencies.**

Another important consideration for spectrum assignment in the 17.7-19.7 GHz frequencies is the operation of uncoordinated earth stations with space-based communication services. This concept allows receiving earth stations to be deployed anywhere without constraining the operations and future development of P2P services. The Consultation Paper reports that the 18 GHz band is largely unutilized by Access Service Providers. This is evidence that uncoordinated earth stations associated with space-based communication services in the 17.7-19.7 GHz band will not (1) experience a high likelihood of interference from MWA systems and (2) not constrain future deployment of Access Service Providers in the twenty-two LSAs. Accordingly, TRAI should ensure any new procedures for MWA services will facilitate coexistence with uncoordinated earth stations operating with space-based communication services by adopting a non-interference, non-protected mechanism for ubiquitous deployment of satellite customer terminals in the 17.7-19.7 GHz band where both the fixed service (FS) and FSS have co-primary allocation status. Such an approach extends existing blanket licensing procedures to the 17.7-19.7 GHz frequency band, allowing quick and ubiquitous deployment of satellite customer terminals throughout India's national territory without imposing constraints on the MWA service.

For lower 6GHz spectrum band, the band should be made license exempt for Wi-Fi services and for applications in research and innovation. Government has already issued Draft Rules for delicensing of 500MHz in the lower 6GHz on 16th May, 2025.

**Q4. In case it is decided to use different methods (block-based, link-based, or any other) for the assignment of the spectrum in traditional microwave backhaul bands for radio backhaul purposes for different types of commercial telecommunication services, what quantum of spectrum, and in which of 6 GHz (lower), 7 GHz, 13 GHz, 15 GHz, 18 GHz, and 21 GHz bands should be earmarked for point-to-point link-based assignments? Kindly provide a detailed response with justifications.**

**BIF RESPONSE**

Microwave backhaul is indispensable.

There should be no change in method of assignment as specified below to ensure optimum utilization of the spectrum and to ensure efficient and streamlined network operations.

We recommend that the spectrum for MWA and MWB should be assigned to TSPs with Access Service Authorisation for the entire LSA on an exclusive basis. For TSPs holding other than Access Service Authorisation and non-TSPs, MWA/MWB carriers should continue to be assigned on a P2P link basis, in line with the extant policy.

Additionally, the lower 6 GHz band (5925–6425 MHz), the upper 6 GHz band (6425–7125 MHz) or parts thereof, plus the adjacent 7 GHz band (7125–7250 MHz) should not be assigned for traditional microwave radio backhaul purposes. Instead, India should prioritise the allocation of these bands for services that will maximise public benefit and spectrum efficiency: namely, licence-exempt use for WAS/RLAN (e.g. Wi-Fi) in the 6 GHz band and licensed use for IMT in the 7 GHz band.

Should a full licence-exempt designation for the 6 GHz band not be feasible, a harmonised band-split approach i.e. 5925–6585 MHz for licence-exempt use (WAS/RLAN), and 6585–7250 MHz for licensed mobile broadband (IMT) maybe considered. This balanced strategy would enable continued innovation in both licence-exempt wireless technologies and next-generation mobile networks, while avoiding spectrum fragmentation and ensuring effective coexistence between services.

7GHz band should be excluded from P2P assignment as this band is under study for Access spectrum identification in WRC-27.

**Q5. What should be the terms and conditions for the assignment of spectrum in traditional microwave backhaul bands for radio backhaul purposes of various commercial telecommunication services, such as -**

**(a) Carrier size;**

**(b) Carrier aggregation;**

**(c) Validity period of the assignment;**

**(d) Renewal mechanism;**

**(e) Roll-out obligations; and**

**(f) Surrender of spectrum etc.?**

**Kindly provide a detailed response with justifications. along with the international scenario on the matter.**

**BIF RESPONSE**

1. MWA/MWB spectrum should be assigned administratively. For TSPs with Access Service Authorisation, it should be assigned on an exclusive basis for the entire LSA. For TSPs with other than Access Service Authorisation and non-TSPs, it should be assigned on P2P link basis.

2. We submit that assigning MWA/MWB carriers to the TSPs with Access Service License/ Authorisation through auction and continuing the existing P2P assignment of MWA/MWB carriers for TSPs without Access Service License/Authorisation would be prejudicial and lead to the creation of a non-level playing field. Further, prescribing any threshold in terms of number of links, beyond which the TSPs with other than

Access Service License/ Authorisation should also be required to acquire MWA/MWB carriers through auction, would be artificial.

3. Both TSPs with Access Service Authorisation and those without, intend to use MWA/MWB carriers for commercial purposes. Different approaches cannot be followed for two users intending to monetise the same resource. Hence, the methodology of assignment of MWA/MWB carriers must be uniform for all service providers – whether having Access Service Authorisation or not.

**Precedence of uniform approach:**

4. A similar situation presented itself in 2010, when the 3G and BWA auctions were conducted. Both UASL and ISP licensees were eligible for the spectrum. However, both types of licensees had to participate in the auction process and make a payment under uniform terms and conditions, even though the usages of the spectrum by the licensee groups were significantly different (one for voice/data and the other for data only). Thus, we believe that there is no need to formulate different policies for different user groups when the resource to be allocated is the same. The policy framework should be simple and maintain a level playing field in a non-discriminatory manner.

**Risk of misuse in different approaches:**

5. Many TSPs holding Access Service Authorisation may also hold other service authorisations like NLD, ISP, etc. Having a differential approach of spectrum assignment for different service authorisations would only prompt TSPs to bypass the regime by acquiring MWA/MWB carriers through authorisations other than Access Service. In that scenario, a TSP with only Access Service Authorisation will be forced to participate in the auction whereas a TSP with other service authorisations will be able to continue the existing administrative assignment.

6. TRAI itself in its consultation paper has recognized that the Government is assigning MWA and MWB carriers to operators holding different service authorizations, based on their requirements. Further, it is also a fact that the operator holding NLD authorization can provide the backhaul to the operator holding Access Service Authorization. So, an operator can choose to acquire the backhaul spectrum administratively under NLD service authorization and can offer the same network to the Access Service Provider instead of acquiring the same through auction under Access service authorization and build under the same service authorization.

7. Therefore, a differential assignment methodology will incentivize the operators to buy the spectrum other than the access spectrum, creating a non-level playing field. Any

differential assignment policy, along with a differential charging mechanism, will prompt various stakeholders to create arbitrage opportunities. Such devious situations must be avoided.

8. **Therefore, we recommend that MWA/MWB carriers must be assigned to all user categories through a uniform methodology, i.e., administrative assignment.** We are not in favour of assignment of spectrum to anyone in these bands through an auction based mechanism.

**Q6. Is there a need to prescribe ceilings on the number of carriers that can be assigned to a commercial telecommunication service provider in each frequency band [6 GHz (lower)/ 7 GHz/ 13 GHz/ 15 GHz/ 18 GHz/ 21 GHz] or in a group of frequency bands for radio backhaul purposes? Kindly provide a detailed response with justifications.**

**BIF RESPONSE**

Yes -there is a need to maintain the prevailing ceilings for both MWA & MWB carriers as mentioned in response to Q4 above. This will ensure spectrum is optimally utilised to backhaul mobile networks in a efficient manner. There is no need to have separate ceilings for each frequency bands. The current methodology of ceiling per TSP per LSA for MWA & MWB is adequate and there is no need for a change.

Additionally, the 6 GHz (5925–7125 MHz) or 7 GHz (7125–7250 MHz) frequency ranges should not be assigned for traditional microwave radio backhaul purposes. These bands represent a critical opportunity to enable high-capacity wireless connectivity through next-generation licence-exempt (WAS/RLAN) and licensed mobile broadband (IMT) services. Allocating them for conventional point-to-point backhaul would significantly underutilise their potential and risk foreclosing valuable use cases that support digital innovation, economic growth, and public benefit. India should prioritise spectrum frameworks that maximise flexibility, technology neutrality, and alignment with evolving global broadband ecosystems.

a) In the case of MWA carriers, the existing policy of assigning a maximum of 8 carriers in each of the metros & Category A LSAs and 6 carriers in each of the Category B & C LSAs, should be continued with for TSPs with Access Service Authorisation.
b) MWB carriers should be assigned to TSPs with Access Service Authorisation for the entire LSA on an exclusive basis, with a ceiling of 2 carriers per LSA in all categories of LSAs.

**Q7. In case it is decided to prescribe ceilings on the number of carriers that can be assigned to a commercial telecommunication service provider (TSP) for each frequency band or each group of frequency bands, -**

**(a) Should there be any criterion for the ceiling on the number of carriers that may be assigned to a TSP? If yes, what should be the criteria?**

**(b) In case of group of frequency bands, how should the bands be grouped?**

**(c) What should be the respective ceilings for each frequency band, or each group of frequency band(s)?**

**(d) Should there be any provision for assignment of spectrum above the ceiling limit on a case-by-case basis? If yes, what criterion should be prescribed, based on which, additional spectrum above the ceiling limit may be assigned to a telecom service provider?**

**Kindly provide a detailed response with justifications.**

**BIF RESPONSE**

**Demand for MWA/MWB Carriers** :

1. In the case of MWA carriers, the existing policy of assigning a maximum of 8 carriers in each of the metros & Category A LSAs and 6 carriers in each of the Category B & C LSAs, should be continued with for TSPs with Access Service Authorisation.
2. MWB carriers should be assigned to TSPs with Access Service Authorisation for the entire LSA on an exclusive basis, with a ceiling of 2 carriers per LSA in all categories of LSAs. However, with the rapid increase in data traffic, the current ceiling is not adequate to meet the constantly growing requirements especially considering the network densification requirements for 5G and perhaps needs to be reviewed after 2-3 years.

3. Since the demand for MWA/MWB spectrum is dependent on a variety of factors, which are in a state of constant change, the carrier count suggested above will be subject to reviews, taking into account specific requirements and spectrum availability.

4. **Yes**, **different ceilings based on service area categories,** i.e., Metro/Category 'A' Circles/Category 'B' Circles/Category 'C' Circles, need to be prescribed. This is because the subscriber base, volume of traffic, network density and other parameters affecting the requirement of MWA carriers are different in different categories of circle.

5. Considering the presence of 4 TSPs and the fact that there has been no discernible shortage in the demand-supply dynamics of the available backhaul spectrum, the requirements of the industry are adequately met by the existing ceiling on MWA carriers. Thus, there is no need to review the same.

6. It is pertinent to mention that some of the TSPs have not fully utilised their allocated capacity and, in some cases, have even surrendered their MWA/MWB carriers based on their fiber deployment progress. Therefore, the current ceiling is adequate at this stage. However, as highlighted earlier, the numbers are subject to change in the future with the growth in the volume of traffic and a variety of other factors.

**Therefore, we recommend that the existing ceiling on the number of MWA carriers for TSPs with Access Service Authorisation, as prescribed by the Addendum dated 25.07.2022, should be continued with.**

1. In line with the extant policy, there is **no requirement to prescribe a separate ceiling for each band** (6/11/ 13 GHz/15 GHz/18 GHz/21 GHz). An **overall ceiling** for MWA carriers, taking all bands together, should be prescribed.

2. The existing networks have evolved over the last 2 decades within a framework where there was no distinct band-wise limitation. Furthermore, operators have been assigned frequencies in specific bands over time based on the availability of backhaul spectrum in a particular band at that point in time.

3.For instance, an operator was assigned 2 carriers in the 13 GHz band in a metro in 2016, followed by an additional 2 carriers in the same 13 GHz band in 2018. Now, if an individual band-wise ceiling is introduced, such as limiting carriers to 2 per band, the operator would be required to surrender 2 of its carriers in 13 GHz band and instead acquire carriers in other bands. However, as previously explained, legacy networks are incompatible with frequency changes. Consequently, the introduction of an individual band-wise ceiling would effectively entail the operator giving up its existing spectrum holdings, leading to a complete disruption in services.

4.The existing overarching ceiling has proven effective for the last 2 decades. Therefore, it will be proper to maintain continuity with the same policy.

**5. Yes**, **different ceilings based on service area categories,** i.e., Metro/Category 'A' Circles/Category 'B' Circles/Category 'C' Circles, need to be prescribed. This is because the subscriber base, volume of traffic, network density and other parameters affecting the requirement of MWA carriers are different in different categories of circle.

6.Thus, in line with the extant policy, the ceiling should be as follows:

- 8 carriers in each of the Metros and Category-A LSAs
- 6 carriers in each of the Category-B and C LSAs

7.There is **no need for a band-wise ceiling on MWA carriers**. An overall ceiling per LSA, in line with the extant policy, is sufficient.

**8. For TSPs with Access Service Authorisation**, the overall ceiling, in terms of number of carriers of 28 MHz per licensee, should be as follows:

- 8 carriers in each of the Metros and Category-A LSAs
- 6 carriers in each of the Category-B and C LSAs

**9.For TSPs with other than Access Service Authorisation**, MWA/MWB carriers should continue to be assigned to them on a **P2P link basis**, in line with the extant policy.

**Q8. In the new policy regime for the assignment of spectrum, whether there is a need to grant an option to telecom service providers already holding carriers in traditional microwave backhaul bands to retain the existing carriers with them? Kindly provide a detailed response with justifications.**

**BIF RESPONSE**

Yes- they should be allowed to retain the current carriers allotted to them because the operators would have already procured and deployed a lot of equipment working on these spots Any change in the carriers (spots), would lead to replacement of equipment at many BTS sites which would result in disruption in network performance and service to the customers.

**Q9. As the 7125-8400 MHz range in the 7 GHz band and the 14.8-15.35 GHz range in the 15 GHz band are being considered for IMT in WRC-27, whether there is a need to review the usage of 7 GHz and 15 GHz microwave backhaul bands at this stage itself, or should the review be undertaken after considering the outcome of WRC-27? Kindly provide a detailed response with justifications.**

**BIF RESPONSE**

We are of the firm opinion that it may be done after the outcome of WRC-27.

Additionally, we support an IMT identification in the 7125–7250 MHz portion of the 7 GHz band under WRC-27 Agenda Item 1.7, recognising its potential to contribute to the development of the future 6G ecosystem. At the same time, we underscore the importance of protecting the continued use and global ecosystem development of Ultra-Wideband (UWB)

technologies, particularly Channel 9 (7700–8400 MHz), which plays a critical role in enabling precise location and spatial awareness features in consumer and enterprise applications.

Given these dual considerations, it is recommended that any national review of microwave backhaul usage in the broader 7125–8400 MHz band be postponed until after WRC-27. This approach will ensure that any changes to backhaul allocations are informed by final international regulatory decisions, enable harmonised spectrum use, and avoid premature reassignments that could limit flexibility for both IMT and UWB coexistence.

**A post-WRC-27 review would be best positioned to balance emerging mobile broadband needs with the preservation of innovation-enabling technologies like UWB.**

India's long-term spectrum strategy must prioritize reserving the 7 GHz band (7.125–8.4 GHz) for IMT services and safeguarding the continued use of the 15 GHz band for microwave backhaul, especially in light of global developments under WRC-27. The 7 GHz band is emerging as a critical mid-band candidate for future IMT/6G use, with active global studies underway under ITU-R Agenda Item 1.7. Allocating this spectrum for IMT in India would not only align the country with global harmonization efforts but also unlock economies of scale in equipment and devices, ensure international interoperability, and reduce deployment costs. This band is uniquely positioned to support wide-channel bandwidths of up to 400 MHz, crucial for meeting the demands of high-throughput, low-latency 6G applications. Moreover, with India's current IMT allocations heavily skewed toward high-frequency mmWave bands like 26 GHz, which have limited coverage, incorporating 7 GHz into the IMT portfolio would offer a more balanced mix of capacity and coverage, especially valuable in both urban and rural deployments.

Equally important is the continued availability of the 15 GHz band for microwave backhaul beyond the outcomes of WRC-27. India's fiber footprint, while growing, still stands at roughly 46%, leaving a substantial portion of the mobile network reliant on wireless backhaul—particularly in areas where fiber deployment is economically or logistically unviable. As mobile data consumption continues to surge with increased smartphone usage, video streaming, and cloud adoption, the pressure on backhaul infrastructure is intensifying. The 15 GHz band, with its optimal propagation characteristics and well-established equipment ecosystem, serves as a cornerstone for medium- to long-distance point-to-point microwave links. Removing or repurposing this band would severely impact network scalability and the efficient utilization of access spectrum. Therefore, while 7 GHz offers a future-ready solution for IMT and 6G growth, preserving the 15 GHz band for backhaul is equally vital to ensure end-to-end connectivity and the resilience of India's digital infrastructure.

**Q10. In case it is decided to review the usage of 7 GHz and 15 GHz bands at this stage itself, what should be the policy framework for the assignment of the spectrum in**

**7 GHz and 15 GHz microwave backhaul bands to take care the possible outcomes of AI 1.7 of the WRC-27? Kindly provide a detailed response with justifications.**

**BIF RESPONSE**

**We are of the firm view that both the bands ( 7 & 15GHz) be reviewed after WRC-27.**

**Justification:**

India's long-term spectrum strategy must prioritize reserving the 7 GHz band (7.125–8.4 GHz) for IMT services and safeguarding the continued use of the 15 GHz band for microwave backhaul, especially in light of global developments under WRC-27. The 7 GHz band is emerging as a critical mid-band candidate for future IMT/6G use, with active global studies underway under ITU-R Agenda Item 1.7. Allocating this spectrum for IMT in India would not only align the country with global harmonization efforts but also unlock economies of scale in equipment and devices, ensure international interoperability, and reduce deployment costs. This band is uniquely positioned to support wide-channel bandwidths of up to 400 MHz, crucial for meeting the demands of high-throughput, low-latency 6G applications. Moreover, with India's current IMT allocations heavily skewed toward high-frequency mmWave bands like 26 GHz, which have limited coverage, incorporating 7 GHz into the IMT portfolio would offer a more balanced mix of capacity and coverage, especially valuable in both urban and rural deployments.

Equally important is the continued availability of the 15 GHz band for microwave backhaul beyond the outcomes of WRC-27. India's fiber footprint, while growing, still stands at roughly 46%, leaving a substantial portion of the mobile network reliant on wireless backhaul—particularly in areas where fiber deployment is economically or logistically unviable. As mobile data consumption continues to surge with increased smartphone usage, video streaming, and cloud adoption, the pressure on backhaul infrastructure is intensifying. The 15 GHz band, with its optimal propagation characteristics and well-established equipment ecosystem, serves as a cornerstone for medium- to long-distance point-to-point microwave links. Removing or repurposing this band would severely impact network scalability and the efficient utilization of access spectrum. Therefore, while 7 GHz offers a future-ready solution for IMT and 6G growth, preserving the 15 GHz band for backhaul is equally vital to ensure end-to-end connectivity and the resilience of India's digital infrastructure.

**Q11. Whether there is a need to earmark certain quantum of spectrum in traditional microwave backhaul bands for the last-mile connectivity (Fixed Wireless Access) to the customer equipment of commercial telecommunication services? Please provide a detailed response with justifications.**

**BIF RESPONSE**

No . Backhaul and Access Bands should not be mixed up and kept separate. Access Spectrum is not a part of this consultation and must be treated separately.

**Q12. In case it is decided to earmark certain quantum of spectrum in traditional microwave backhaul bands for the last-mile connectivity (Fixed Wireless Access) to the customer equipment of commercial telecommunication services, -**

**(a) What quantum of spectrum, and in which of 6 GHz (lower), 7 GHz, 13 GHz, 15 GHz, 18 GHz, and 21 GHz bands should be earmarked for such purposes?**

**(b) What should be the eligibility conditions to obtain the spectrum in traditional microwave backhaul bands for such purposes?**

**(c) What should be the terms and conditions for the assignment of spectrum in traditional microwave backhaul bands for such purposes through auction such as-**

**(i) Block size;**

**(ii) Minimum quantity for bidding;**

**(iii) Spectrum cap;**

**(iv) Validity period of the assignment;**

**(v) Roll-out obligations;**

**(vi) Surrender of spectrum etc.?**

**(d) Whether flexible use i.e., both backhaul connectivity, and last mile connectivity (fixed wireless access) to the customer equipment should be permitted in the frequency ranges earmarked for such purposes? If yes, should the terms and conditions of the auction of spectrum be the same as those applicable for the "access spectrum"?**

**Kindly provide a detailed response with justification and international practice.**

**BIF RESPONSE**

No . Backhaul and Access Bands should not be mixed up and kept separate. Access Spectrum is not a part of this consultation and must be treated separately.

In view of the services for which these bands have been assigned/operational, the lower 6GHz band needs to be delicensed , aligned to the Draft rules for delicensing that have been put out by DoT on 16th May.

**Q13. Should a certain quantum of the spectrum in traditional microwave backhaul bands be earmarked for fulfilling point-to-point connectivity requirements of captive (non-commercial/ non-TSP) users? If yes -**

**(a) What quantum of spectrum, and in which of 6 GHz (lower), 7 GHz, 13 GHz, 15 GHz, 18 GHz, and 21 GHz bands should be earmarked for such purposes?**

**(b) What should be the terms and conditions for the assignment of spectrum for such purposes, such as-**

**(i) Carrier size;**

**(ii) Carrier aggregation;**

**(iii) Ceiling on the number of carriers;**

**(iv) Validity period of the assignment;**

**(v) Renewal mechanism;**

**(vi) Criteria for the assignment of additional spectrum above the ceiling limit;**

**(vii) Roll out obligations; and**

**(viii) Surrender of the spectrum, etc.?**

**Kindly provide a detailed response with justifications.**

**BIF RESPONSE**

The bands should be available for assignment to all categories of service providers including those setting up Captive Networks (CNPNs) and Private Networks and for meeting point-to-point connectivity requirements of Captive users.

The lower 6 GHz band (5925–6425 MHz), the upper 6 GHz band (6425–7125 MHz) or parts thereof, plus the adjacent 7 GHz band (7125–7250 MHz) should not be assigned for traditional microwave radio backhaul purposes.

Please see response to questions 4, 6, and 9.

**Q14. In case your response to Q13 is 'no', in what manner should the point-to-point connectivity requirements of captive (non-commercial/ non-TSP) users be fulfilled? Kindly provide a detailed response with justifications.**

**BIF RESPONSE**

The bands should be available for assignment to all categories of service providers including those setting up Captive Networks (CNPNs) and Private Networks and for meeting point-to-point connectivity requirements of Captive users.

The lower 6 GHz band (5925–6425 MHz), the upper 6 GHz band (6425–7125 MHz) or parts thereof, plus the adjacent 7 GHz band (7125–7250 MHz) should not be assigned for traditional microwave radio backhaul purposes.

Please see response to questions 4, 6, and 9.

**Q15. In case it is decided to assign the spectrum in traditional microwave backhaul bands on a point-to-point link basis to cater to point-to-point connectivity requirements of commercial telecommunication service providers as well as captive (non-commercial/ Non-TSP) users, whether there is a need to prescribe minimum link**

**lengths (path lengths) in these bands? If yes, what should be the minimum link length for each of the traditional microwave backhaul bands? Kindly provide a detailed response with justifications.**

**BIF RESPONSE**

Yes, prescribing minimum link lengths (path lengths) is likely needed if assigning spectrum in traditional microwave backhaul bands on a point-to-point basis, especially for captive (non-commercial) users. This is because captive users often have specific connectivity requirements, including the distance and type of location they need to connect between. For commercial Telecom services , existing infrastructure and regulations may already address these considerations.

Captive users, often enterprises or institutions, may have unique connectivity needs that extend beyond commercial telecommunications. They might require links of specific lengths or across specific geographical areas, which could be accommodated through the assignment of spectrum in microwave bands.

Minimum link lengths can help prevent the hoarding of spectrum by non-users, ensuring that it is used efficiently. Knowing the minimum required link lengths can help in efficient planning of network infrastructure and placement of devices. Minimum link lengths can provide a level playing field for all users, ensuring that no one is unfairly disadvantaged due to their location or specific needs.

**Q16. Considering that the Government has decided to delicense the 6 GHz (lower) band (5.925-6.425 GHz) for low power applications, whether there is any need to prescribe certain measures to provide necessary protection to incumbent users such as Fixed Microwave (backhaul) Services, Fixed Satellite Service (FSS) etc. operating in the 6 GHz (lower) band? If yes, which specific measures should be prescribed for this purpose? Kindly provide a detailed response with justifications.**

**BIF RESPONSE**

The Draft Rules Notified by the Government for the lower 6GHz band already have factored in the WiFi/RLAN applications to be deployed primarily indoors with usage of low power /very low poor. This is based on international best practices and also takes into account findings of spectrum sharing studies -both locally as well as globally.

Extensive studies in CEPT as reported in ECC Report 302 and ECC Report 316 demonstrate that low-power indoor (LPI) and very low power (VLP) portable WAS/RLAN (Wi-Fi) deployments can coexist with incumbent FS and FSS systems without causing harmful interference when basic coexistence measures are observed. BIF-RKF Coexistence studies for RLANs wirth FS & FSS services ( 2021) conclusively show likewise.

Hence no additional protection for incumbent users is required.

**Q17. Any other suggestions relevant to the assignment of spectrum in 6 GHz (lower), 7 GHz, 13 GHz, 15 GHz, 18 GHz, and 21 GHz bands may kindly be provided with detailed justifications.**

**BIF RESPONSE**

Please see response to questions 4, 6, 9, and 16.

In addition, India should consider adopting a regulatory framework for the 6 GHz band (5925–7125 MHz) that closely aligns with the successful model implemented by the U.S. Federal Communications Commission (FCC). The FCC framework authorizes licence-exempt use of the entire 6 GHz band for licence-exempt devices, such as Wi-Fi 6E, while ensuring protection for incumbent services through appropriate technical rules.

As an option, India may also consider the band split for the upper 6 GHz. Before proceeding with the allocation of the Upper 6 GHz band for mobile (IMT), we encourage India to give further thoughtful consideration to the future spectrum requirements for licence-exempt use in this band. In particular, we recommend evaluating this in conjunction with the licence-exempt spectrum already made available in the Lower 6 GHz band, to ensure a balanced, forward-looking approach that maximises long-term benefits for connectivity, innovation, and consumer access.

India has a unique opportunity to take a balanced and forward-looking approach to the Upper 6 GHz band by enabling both licensed (e.g., IMT) and licence-exempt (e.g., Wi-Fi) use through a practical band-split approach. Rather than making an exclusive allocation to mobile (IMT), India could adopt a shared framework enabling both licensed and licence-exempt access to the Upper 6 GHz. This would ensure the spectrum is used efficiently while supporting the rapidly growing demand for wireless connectivity, innovation, and digital inclusion.

India should not delay progress while awaiting global consensus, especially given the maturity of Wi-Fi 6E and Wi-Fi 7 products already available in the market. A band-split at 6585 MHz would provide at least 160 MHz of additional licence-exempt spectrum, suitable for both Low Power Indoor (LPI) and Very Low Power (VLP) indoor and outdoor use. This approach would complement access to the Lower 6 GHz band and would help meet increasing connectivity

needs across homes, enterprises, and public spaces, especially in India's high-density urban environments.

Finally, a shared approach to the Upper 6 GHz band ensures early access for licence-exempt innovation, while preserving flexibility for future licensed mobile expansion. We strongly encourage India to seize this opportunity to lead in global spectrum policy with a balanced and inclusive strategy**.**

**Q18. What is the level of demand of the spectrum in the E-band (71-76 GHz, and 81-86 GHz) for each of the service/ usage viz. "Backhaul", "Access" and "Integrated Access & Backhaul (IAB)"? Kindly provide a detailed response in respect of each service/ usage with justification including availability of technical standards and eco-system.**

**BIF RESPONSE**

**<u>E Band (71-76 GHz paired with 81-86 GHz)</u>**

1. This Band is meant to be used for high capacity (Multi-Gigabit) backhaul in dense urban/congested areas, in non-feasible areas and also in semi-urban and rural areas where laying of fiber is a huge challenge and/or traffic requirements are very high
2. It should be assigned in a light licensed manner on a link-by-link basis with carrier /channel size of 250Mhz. Anyone desirous of wanting more spectrum maybe given 2 or more contiguous carriers. This is to be determined by the spectrum manager/administrator and should be based on demand. This is aligned to the international best practices being followed in over 100 countries. TRAI itself has quoted examples of several countries following this methodology in the CP itself.
3. The assignment of the links should be done through self-registration by users on an online web portal, responsibility for which should lie with WPC wing of DoT. Responsibility for interference analysis should rest with the seeker of the spectrum, who needs to check the WPC link database prior to link registration. Links should be assigned and protected on a 'first come, first served' basis.
4. This Band should be permitted to be used by all- TSPs, ISPs and any other registered entity who would require P2P dedicated links to connect their establishments eg. Private networks, etc.
5. The link charges should be suitably determined by the regulator through due process of public consultation and should be reasonable.

**<u>Methodology of Spectrum Allocation for E-Band</u>**

- Since spectrum in this band is solely meant for backhaul purposes, in accordance with Section 3(1) , Schedule 1 of the Telecommunications Act, all backhaul Spectrum is to be assigned/allocated administratively only.
- Spectrum in the E-band should be allocated using administrative method of allocation.
- TRAI CP itself indicates that a large number of developed economies have opted for administrative method of allocation for E-band.

**Importance of E band:**

6. It is undisputed that the overall mobile data consumption and, consequently, the backhaul requirement per site, has grown by leaps and bounds in manifold different ways. The conventional microwave spectrum can barely keep up with the current needs of 200-300 Mbps per site for even 4G, leave aside 5G. Simply put, the volume of traffic the access network is expected to witness necessitates a multifold capacity augmentation at the backhaul level – possible only with high-capacity bands like E band. In fact, it would be fair to say, that India would not have been able to achieve one of the fastest 5G rollouts in the world were it not for the availability of the E-band spectrum.

**Quantification of demand for E band:**

7. As in the case of MWA/MWB carriers, the exact quantification of demand for E band has to take into account multiple factors, like the present (and future) subscriber base, the access technology deployed, the required backhaul capacity per site, mobile network density, hub density, existing fiber penetration & planned fiber deployment, evolution of existing network, suboptimal angular separations, line of sight availability, infrastructure limitations, etc.

8. As mobile networks are in a continuously evolving stage, most of these parameters cannot be evaluated on static ground. The demand for backhaul carriers will keep changing as these parameters undergo change, making it difficult for TSPs to predict specific backhaul carrier requirements for the long term. Therefore, determining the precise requirement for E band spots and coming up with an exact number is a challenging task.

9. **Demand for E-band**: Currently, there is a ceiling of 2 carriers per LSA in E-band. However, with the rapid increase in internet traffic, the current ceiling is not adequate

to meet the constantly growing requirements and should immediately be increased to **4 carriers per LSA**.

10. As stated previously, since the demand for E band spectrum is dependent on a variety of factors, which are in a state of constant change, the carrier count suggested above will be subject to reviews, taking into account specific requirements and spectrum availability.

**Requirements of TSPs with other than Access Service Authorisation and non-TSPs:**

11. Telecom operators holding access spectrum are using E-band to provide high-speed backhaul services. The assignment of E-band has enabled the Indian telecom companies to rollout one of the fastest 5G network rollout in the world.
12. Even the extant policy for assignment of E-band is limited to TSPs with Access Service Authorization. However, there is need to assign E band spectrum to Service providers with other than Access Service Authorization and non-TSPs. CNPNs or Private Networks should also be given the same.

**Therefore, we recommend the following:**

**(i) For E-band, the current ceiling of 2 carriers should be increased to 4 carriers per LSA immediately.**

**(ii) There is need to assign E band spectrum to TSPs with other than Access Service Authorization and non-TSPs viz. CNPNs.**

**Q19. What is the level of demand of the spectrum in the V-band (57-64/ 66 GHz) for each of the service/ usage viz. Backhaul, Access and IAB? Kindly provide a detailed response in respect of each service/ usage with justification including availability of technical standards and eco-system.**

**BIF RESPONSE**

1. The V band due to its shorter propagation characteristics can help connect the street furniture together, which are essential part of the 5G urban infrastructure. Street

furniture would include electricity poles, bus shelters, and other public infrastructure located ubiquitously over short distances to help provide 5G coverage.

2. New services and applications require larger bandwidths to support the consumer demand for data-intensive applications. In addition, the splitting of frequency bands increases the costs and thus causes delay in manufacturing and bringing new devices to market because of regulatory uncertainty.
3. While we note that the WRC-19 amended the Radio Regulations to include an IMT identification in the 66-71 GHz frequency range, it is clearly stated that "This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations". It is important to avoid fragmenting 57-71 GHz. This would effectively create a hard-border splitting the 57-71 GHz with IEEE technologies in 57-66 GHz and 3GPP technologies in 66-71 GHz. The footnote in the Radio Regulations for 66-71 GHz addresses this point nicely.
4. That said, we support licence-exempt use in the 57-66 GHz since it provides greater market certainty, because it avoids the IMT identified bands in 66-71 GHz and provides a valuable guard band.

**Present demand:**

5. Present applications in other countries include high data rate short range communications and high-resolution field disturbance sensors. Other typical uses include telemetry, tele command, alarms, data transmissions in general and other applications.

**<u>Likely demand after five years:</u>**

6. We believe that demand will increase and further expansion of communications and sensing applications are projected in this entire band of lower 9 GHz (57 - 66 GHz) under a license-exempt regulatory regime.

(i) Quantum of Spectrum in both E band and V band that should be made available is as follows:
(a): **E band**: Entire 5+5 Ghz should be offered. However, this should be allocated on a shared basis to all service providers (TSPs and non-TSPs and others), based on a first come first serve principle through a transparent web portal
(b) **V band:** 5GHz (66-71Ghz) should be exclusively allocated to TSPs for backhaul purposes, while the lower V band (57-66GHz) should be delicensed for use by all

(ii) Spectrum in both E & V bands is required by TSPs –both with Access Authorisation as well as those with non-Access authorisations as well as non-TSPs. However, access to the bands should be permitted as mentioned in response to (i) above

7. With 5G while the access networks support high data rates and higher capacities, the backhaul networks which are dependent on legacy microwave systems are getting choked. It is a reality that while all stakeholders are trying to deploy more and more fiber, getting fiber everywhere is a huge challenge both in terms of costs as well as deployment challenges.

8. This is where the E band and also the upper V band (66-71GHz) would become very useful. As is known popularly, they are known as 'Wireless Fiber'. The E band helps plug the backhaul connectivity gaps. It provides Fiber like connectivity across streets in dense urban areas where laying Fiber is next to impossible and also across large expanses of Rural areas in a cost effective manner and that too in much shorter timeframes than laying of fiber.

9. The V band due to its shorter propagation characteristics can help connect the street furniture together, which are essential part of the 5G urban infrastructure. Street furniture would include electricity poles, bus shelters, and other public infrastructure located ubiquitously over short distances to help provide 5G coverage.

10. New services and applications require larger bandwidths to support the consumer demand for data-intensive applications. In addition, the splitting of frequency bands increases the costs and thus causes delay in manufacturing and bringing new devices to market because of regulatory uncertainty.

11. While we note that the WRC-19 amended the Radio Regulations to include an IMT identification in the 66-71 GHz frequency range, it is clearly stated that "This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations". It is important to avoid fragmenting 57-71 GHz. This would effectively create a hard-border splitting the 57-71 GHz with IEEE technologies in 57-66 GHz and 3GPP technologies in 66-71 GHz. The footnote in the Radio Regulations for 66-71 GHz addresses this point nicely.

12. **That said, we support licence-exempt use in the 57-66 GHz since it provides greater market certainty, because it avoids the IMT identified bands in 66-71 GHz**

**Present demand**:

13. Present applications in other countries include high data rate short range comunications and high-resolution field disturbance sensors. Other typical uses include telemetry, tele command, alarms, data transmissions in general and other applications.

**Likely demand after five years:**

14. We believe that demand will increase and further expansion of communications and sensing applications are projected in this entire band of lower V band (57 - 66 GHz) under a license-exempt regulatory regime.

**Q20. For which commercial telecommunication services should the spectrum in E-band and V-band be assigned for radio backhaul purposes? Responses with detailed justifications may kindly be provided for E-band and V-band separately.**

**BIF RESPONSE**

In case of E band, the entire 19GHZ ( 71-76GHz ) paired with 81-86GHz should be assigned for backhaul purpose

In case of V band, while the lower 9GHz in the V band ( 57-66GHz) should be delicensed , the upper 6GHz maybe assigned for radio backhaul purpose

**Background Note on the Frequencies under Consideration in BIF's Response**

(i) In several countries across the world, V band has been considered from 57-71GHz. This includes several countries like USA, UK, Korea, China, Brazil besides several others.

(ii) In all the aforementioned countries and leading economies of the world, the entire V band (14GHz from 57-71GHz) has been delicensed

(iii) BIF accordingly recommends that the entire V band (57-71GHz) may be considered for the scope of this Consultation.

(iv) BIF recommends that the band be treated in two distinct parts viz. Lower V band (57-66GHz) and Extended/Upper V band (66-71GHz)

**Characteristics of the V band (57-66GHz) and extended V band (66-71GHz)**

1. Unique propagation characteristics: Hence needs to be treated differently than other spectrum bands
2. Suffers from oxygen molecular absorption across 86% of the band
3. Unsuitable for traditional multi-kilometer fixed backhaul links but suitable for higher capacity, lower coverage applications
4. Very low probability of interference between 60 GHz band systems
5. Potential for ultra-high capacity (2-20 Gbps) point to point, and point to multipoint links

**Deployment use cases:** (57-66GHz)

1. In-building and in-campus Wi-Fi solutions
2. SRDs (Short Range Devices) i.e. medical diagnostics, RFID, telemetry, radar, etc
3. Research & innovation

**Deployment for extended V band ( 66-71GHz)**

Fronthaul and Backhaul Connectivity to 5G base stations

**Spectrum Assignment -Global Scenarios**

1. Over 80 countries have delicensed use of V band
2. Leading countries include Australia, Brazil, Canada, China, Europe, Japan, Mexico, New Zealand, South Africa, Sweden, UK and US , have all delicensed the V band
3. US, UK, EU, Brazil and Canada have delicensed entire band (57-71 GHz)
4. China, Korea, Japan, Malaysia, Singapore, Australia – have delicensed the band (57-64/66 GHz)

**Auction of V band is not recommended as it will:**

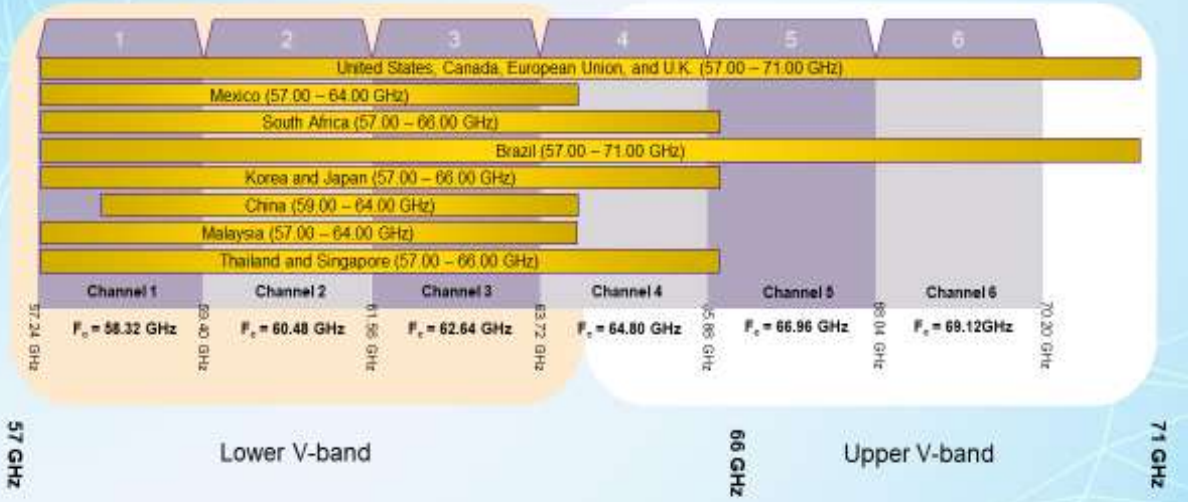
1. Go against international best practices and globally harmonized framework,
2. Go against TRAI Recommendations of August 2014
3. Will lead to inefficient utilization of spectrum, if allocated only to a few ( if auctioned)
4. If allocated to only a few, it will not facilitate innovations,
5. Will decrease the economic value/utility of this band.

**Recommendation for assignment of V band**

- Lower V band (57-66GHz) should be delicensed at par with international best practices
- Extended V band (66-71GHz) -may be assigned to TSPs for backhaul as it does not have oxygen absorption characteristics associated with lower V band.

**Global Regulatory Status - Countries around the World Are Adopting a License-Exempt Approach in the V-Band**

# 60 GHZ BAND WIDELY AVAILABLE



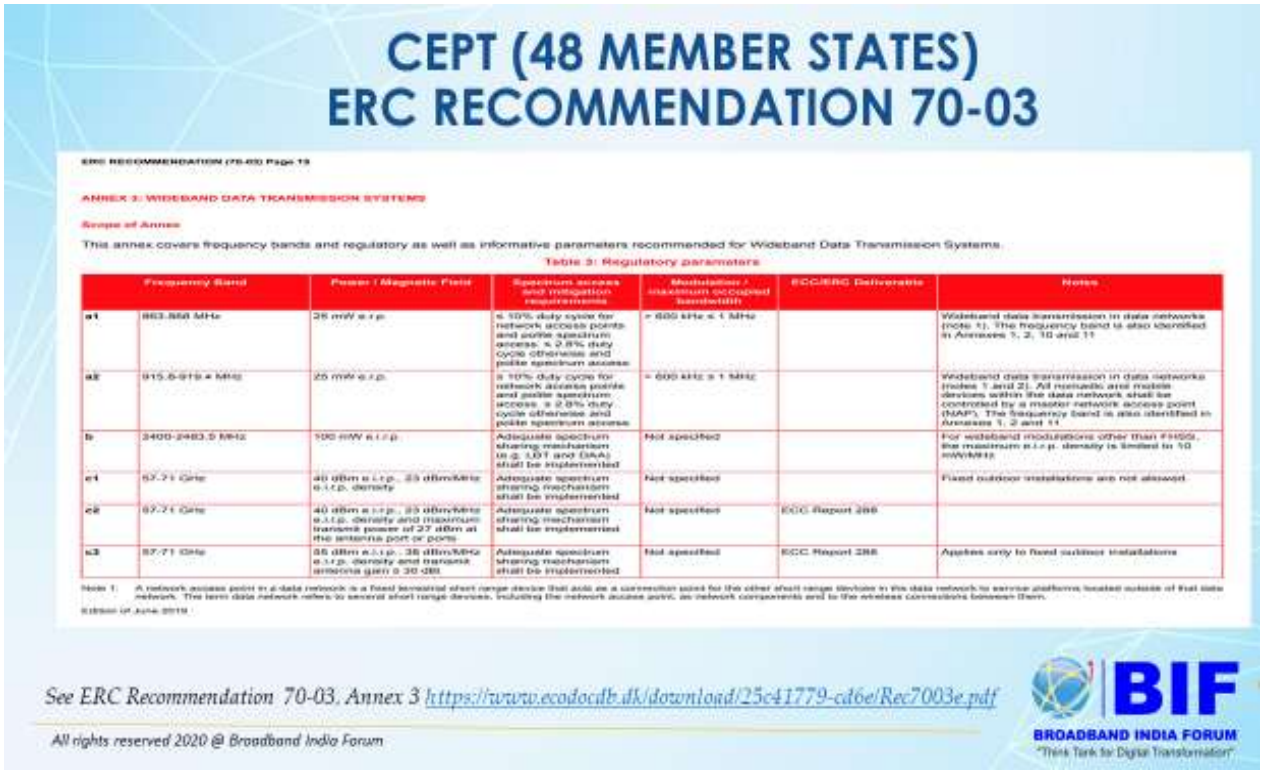



# EU MANDATE (27 MEMBER STATES)

| Band no | Frequency band | Category of short-range devices | Transmit power limit/field strength limit/power density limit | Additional parameters (channelling and/or channel access and occupation rules) | Other usage restrictions | Implementation deadline |
|---|---|---|---|---|---|---|
| 75 | 57-71 GHz | Wideband data transmission devices | 40 dBm e.i.r.p. and 23 dBm/MHz e.i.r.p. density | Requirements on techniques to access spectrum and mitigate interference apply [7]. | Fixed outdoor installations are excluded. | 1 January 2020 |
| 75a | 57-71 GHz | Wideband data transmission devices | 40 dBm e.i.r.p., 23 dBm/MHz e.i.r.p. density and maximum transmit power of 27 dBm at the antenna port or ports | Requirements on techniques to access spectrum and mitigate interference apply [7]. | | 1 January 2020 |
| 75b | 57-71 GHz | Wideband data transmission devices | 55 dBm e.i.r.p., 38 dBm/MHz e.i.r.p. density and a transmit antenna gain ≤ 30 dBi | Requirements on techniques to access spectrum and mitigate interference apply [7]. | This set of usage conditions is only available to fixed outdoor installations. | 1 January 2020 |

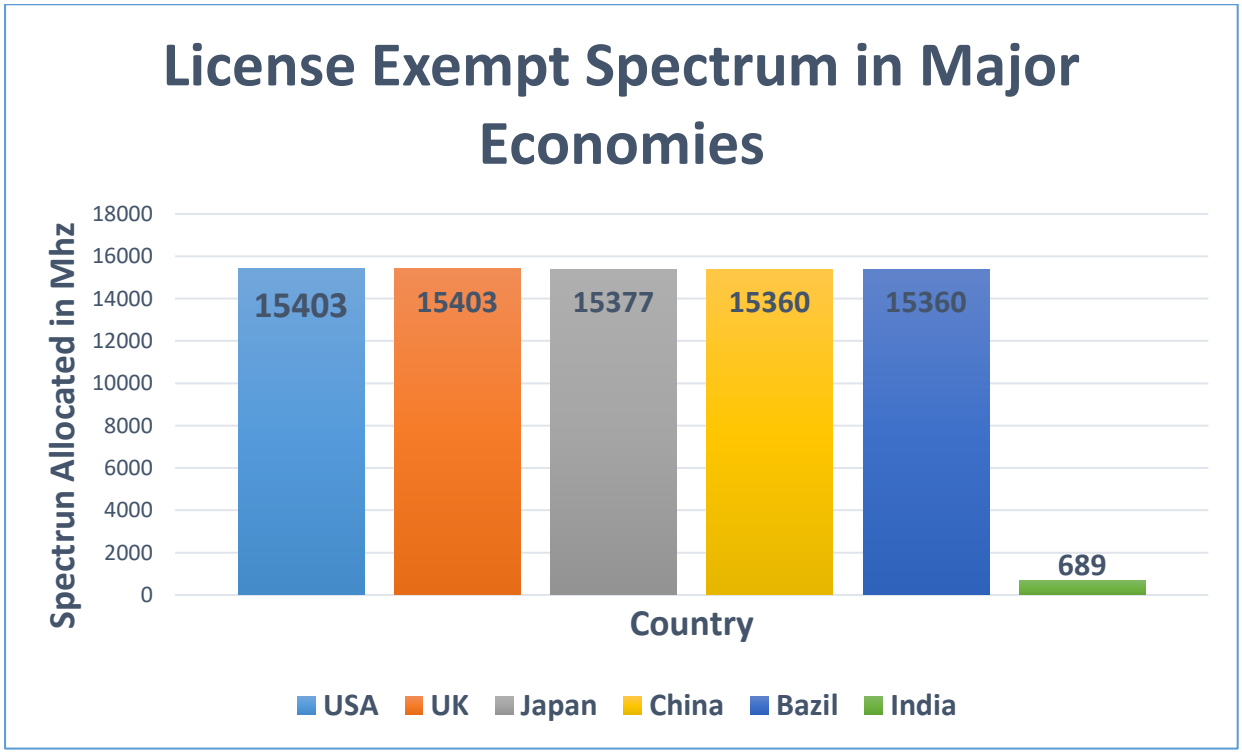
L 212/70 EN Official J

*See SRD 7th update Decision (EU) 2019/1345 adopted on 2 August 2019 and published at https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1567676305871&uri=CELEX:32019D1345*




A Graph comparing the International Position on delicensing of spectrum is given below

**Comparative Position of India vs other Countries as regards quantum of Unlicensed Spectrum**



From the above it is evident that India is lagging behind other developed economies in terms of quantum of delicensed spectrum. India has one twentieth of the unlicensed spectrum that leading economies have. The two primary bands that India is yet to delicense are

a) The entire 1200 MHz in the 6GHz band (5925-7125MHz)
b) The entire 14000 Mhz (or 14GHz) in the V band (57-71GHz)

**Specific Response to Q23:**

- Please refer to the response to Q1 above in the context of MWA/MWB carriers and regarding the increasing demand for high-speed telecom services, leading to enhanced demands for backhaul spectrum, in the present and future.

- With the onset of 5G while the access networks support high data rates and higher capacities, the backhaul networks which are dependent on legacy microwave systems are getting choked. It is a reality that while all stakeholders are trying to deploy more and more fiber, getting fiber everywhere is a huge challenge both in terms of costs as well as deployment challenges.

- This is where the E band and also the upper V band (66-71GHz) would become very useful. As is known popularly, they are known as 'Wireless Fiber'. The E band helps plug the backhaul connectivity gaps. It provides Fiber like connectivity across streets in dense urban areas where laying Fiber is next to impossible and also across large expanses of Rural areas in a cost effective manner and that too in much shorter timeframes than laying of fiber.
- The V band due to its shorter propagation characteristics can help connect the street furniture together, which are essential part of the 5G urban infrastructure. Street furniture would include electricity poles, bus shelters, and other public infrastructure located ubiquitously over short distances to help provide 5G coverage.
- New services and applications require larger bandwidths to support the consumer demand for data-intensive applications. In addition, the splitting of frequency bands increases the costs and thus causes delay in manufacturing and bringing new devices to market because of regulatory uncertainty.
- While we note that the WRC-19 amended the Radio Regulations to include an IMT identification in the 66-71 GHz frequency range, it is clearly stated that "This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations". It is important to avoid fragmenting 57-71 GHz. This would effectively create a hard-border splitting the 57-71 GHz with IEEE technologies in 57-66 GHz and 3GPP technologies in 66-71 GHz. The footnote in the Radio Regulations for 66-71 GHz addresses this point nicely.

- That said, we support licence-exempt use in the 57-66 GHz since it provides greater market certainty, because it avoids the IMT identified bands in 66-71 GHz and provides a valuable guard band.

**Present demand:**

Present applications in other countries include high data rate short range communications and high-resolution field disturbance sensors. Other typical uses include telemetry, tele command, alarms, data transmissions in general and other applications.

**Likely demand after five years:**

We believe that demand will increase and further expansion of communications and sensing applications are projected in this entire band of lower 9 GHz (57 - 66 GHz) under a license-exempt regulatory regime.

1. For cellular backhaul purpose, 5GHz in the upper V band ( 66-71GHz) should be exclusively allocated to TSPs , while the lower V band (57-66GHz) should be delicensed for use by all Spectrum in both E & V bands is required by TSPs –both with Access Authorisation as well as those with non-Access authorisations as well as non-TSPs. However, access to the bands should be permitted as mentioned.
2. With the onset of 5G while the access networks support high data rates and higher capacities, the backhaul networks which are dependent on legacy microwave systems are getting choked. It is a reality that while all stakeholders are trying to deploy more and more fiber, getting fiber everywhere is a huge challenge both in terms of costs as well as deployment challenges.
3. This is where the E band and also the upper V band (66-71GHz) would become very useful. As is known popularly, they are known as 'Wireless Fiber'. The E band helps plug the backhaul connectivity gaps. It provides Fiber like connectivity across streets in dense urban areas where laying Fiber is next to impossible and also across large expanses of Rural areas in a cost effective manner and that too in much shorter timeframes than laying of fiber.
4. The V band due to its shorter propagation characteristics can help connect the street furniture together, which are essential part of the 5G urban infrastructure. Street furniture would include electricity poles, bus shelters, and other public infrastructure located ubiquitously over short distances to help provide 5G coverage.
5. New services and applications require larger bandwidths to support the consumer demand for data-intensive applications. In addition, the splitting of frequency bands increases the costs and thus causes delay in manufacturing and bringing new devices to market because of regulatory uncertainty.

6. We support licence-exempt use in the 57-66 GHz since it provides greater market certainty, because it avoids the IMT identified bands in 66-71 GHz and provides a valuable guard band.

**Present demand**:

7. Present applications in other countries include high data rate short range communications and high-resolution field disturbance sensors. Other typical uses include telemetry, tele command, alarms, data transmissions in general and other applications.

**Likely demand after five years:**

8. We believe that demand will increase and further expansion of communications and sensing applications are projected in this entire band of lower 9 GHz (57 - 66 GHz) under a license-exempt regulatory regime.

**Q21. Which of the following methods should be used for the assignment of the spectrum in E-band and V-band for radio backhaul purposes for various commercial telecommunication services:**

**(a) Block-basis in LSA;**

**(b) Point-to-point link-basis; or**

**(c) Any other?**

**Responses with detailed justifications may kindly be provided for E-band and V-band separately in respect of the relevant commercial telecommunication services.**

**BIF RESPONSE**

As mentioned earlier, E -band should be assigned on point-to-point link basis, while lower V band should be delicensed ( 57-66GHz) , the upper part of the V band may be assigned on block basis in LSA for multiple backhaul links.

**Q22. In case it is decided to use different methods (block-based, link-based, or any other) for the assignment of the spectrum in E-band and/ or V-band for radio backhaul purposes for different types of commercial telecommunication services, how much spectrum in E-band and V-band should be earmarked for the point-to-point link-based assignment for radio backhaul purposes for commercial telecommunication services? Responses with justifications may kindly be provided for E-band and V-band separately.**

**BIF RESPONSE**

While the entire E band may be opened up for radio backhaul purpose ( entire 10GHz), in case of the V band, 5GHz in the upper V band maybe opened up for the same for radio backhaul purpose. We recommend that the entire 9 GHz of the lower V band maybe delicensed.

**Q23. What should be the terms and conditions for the assignment of the spectrum in the E-band for radio backhaul purposes of commercial telecom services such as-**

**(i) Band plan;**

**(ii) Carrier size;**

**(iii) Carrier aggregation;**

**(iv) Validity period of the assignment;**

**(v) Renewal mechanism;**

**(vi) Surrender of the spectrum;**

**(vii) Ceiling on the number of carriers (spectrum cap);**

**(viii) Criteria for the assignment of additional spectrum above the ceiling limit; and**

**(ix) Roll-out obligations etc.?**

**Kindly provide a detailed response with justifications.**

**BIF RESPONSE**

1. **The carrier size for assignment of spectrum in E-band (71-76/81-86 GHz) should be 250 MHz**.Even under the extant regime, the carrier size for E-band is 250 MHz, as per TRAI's 2014 Recommendations. There is no reason to deviate from the same.

2. In addition, there is no need to prescribe a different carrier size based on different LSA categories or different user categories. As also submitted in the context of MWA/MWB carriers, carrier size should be uniform across all LSAs and user categories. Different carrier sizes will only add to the complications in network planning as well as impact the cost efficiency of operations, especially for Pan-India operators; and there is no need to introduce additional complexity in the regulatory framework.

   **Therefore, we recommend that the carrier size for E-band should be 250 MHz( paired ) , as per prevailing practice and existing TRAI's Recommendations.**

3. BIF advocates delicensing of the lower V band (57-66 GHz). Choice of Carrier/channel bandwidth may be left to the service provider.
4. WiGig, alternatively known as 60 GHz Wi-Fi, refers to a set of 60 GHz wireless network protocols. It includes IEEE 802.11ad standard and also the IEEE 802.11ay standard. The WiGig specification allows devices to communicate at multi-gigabit speeds and access the 60 GHz frequency band with wide channels (of channel size of 2.16 GHz) to transmit data efficiently at multi-gigabit per second speeds.

**Q24. What frequency range (57-64 GHz, or 57-66 GHz) in the V-band should be adopted for radio backhaul purposes? In case you are of the opinion that the 57-66 GHz range should be adopted for radio backhaul purposes, considering that the 66-71 GHz range is already identified for IMT, whether there is a need for provisioning a guard band between the 57-66 GHz range (for the backhaul purposes) and the 66-71 GHz range (for IMT)? If yes, what should be the guard band? Kindly provide a detailed response with justifications.**

**BIF RESPONSE**

The frequency range 57-66GHz should comprise of the lower V band. The lower V band ( 57-66GHz ) is recommended to be delicensed. This is aligned to what has been done in a majority of over 80 countries in the world as due to oxygen absorption characteristics, the lower part of the band does not lend itself to propagation over more than a few tens of metres , making it unsuitable for radio backhaul purposes.

We recommend that the upper V band ( 66-71GHz) which has already been earmarked for IMT in WRC-19 and has not seen any traction over the years for access use, may be conveniently used for radio backhaul by the IMT players.

There is no need to provision a guard band for licensed /delicensed use cases, due to inherent propagation characteristics of the lower V band which lends itself to zero or negligible interference, due to ultra-short distances, which the signal can travel.

**Q25. What should be the terms and conditions for the assignment of the spectrum in the V-band for radio backhaul purposes of commercial telecom services including the following aspects:**

- **(i) Band plan;**
- **(ii) Carrier size;**
- **(iii) Carrier aggregation;**
- **(iv) Validity period of the assignment;**
- **(v) Renewal mechanism;**
- **(vi) Surrender of the spectrum;**
- **(vii) Ceiling on the number of carriers (spectrum cap);**
- **(viii) Criteria for the assignment of additional spectrum above the ceiling limit; and**
- **(ix) Roll-out obligations etc.?**

**Kindly provide a detailed response with justifications**

**BIF RESPONSE**

1. BIF advocates delicensing of the lower V band (57-66 GHz). Choice of Carrier/channel bandwidth may be left to the service provider**/OEM/Manufacturer.**

2. WiGig, alternatively known as 60 GHz Wi-Fi, refers to a set of 60 GHz wireless network protocols. It includes IEEE 802.11ad standard and also the IEEE 802.11ay standard. The WiGig specification allows devices to communicate at multi-gigabit speeds and access the 60 GHz frequency band with wide channels (of channel size of 2.16 GHz) to transmit data efficiently at multi-gigabit per second speeds.
3. 5GHz in the upper V band (66-71Ghz) should be exclusively allocated to TSPs for backhaul purposes. This should be allocated again on a P2P link by link basis. The lower V band (57-66GHz) which has different propagation characteristics, should be delicensed for use by all stakeholders (TSPs and non-TSPs)
4. Spectrum in lower V band should be delicensed and the upper V band maybe exclusively assigned to TSPs on a link-by-link or on LSA basis.
5. As mentioned earlier, due to specific characteristics of the lower V band (57-66GHz) on account of oxygen absorption, the signal only travels for very short distances (less than 100 mtrs or so). Hence it is not useful for point to point backhaul links for the TSPs. However, this part of the band is very useful for use for large Public Wi-fi networks and Short Range Consumer devices (also known as SRDs).
6. We are supportive in making the 57-66 GHz available under a licence-exempt regulatory regime without the application of light-licensing.
7. **V-band** is already allowed on license-exempt basis world-wide except for a few countries. If V-band continues to be restricted and licensed, innovative new technologies and products would be unable to see the light of the day and consumers in the Indian market would be deprived of the latest and innovative solutions. Additionally, the de-licensed band would make possible to replace wired cables with new technologies. Some examples are cited:

   a) Contactless ports: USB3, Ethernet, DisplayPort
      https://www.molex.com/en-us/news/molex-introduces-mx60-series-of-contactless-connectivity-solutions
   b) Radar/motion sensing: Google Soli, and in-vehicle children sensors,
   c) home security
   d) health care

   https://blog.research.google/2020/03/soli-radar-based-perception-and.html
   https://www.fcc.gov/document/fcc-permits-hot-car-sensors-save-children
   https://www.federalregister.gov/documents/2023/07/24/2023-15367/fcc-empowers-short-range-radars-in-the-60-ghz-band

   Co-existence between unlicensed applications and licensed services in the same band is generally not possible. We therefore recommend band segmentation i.e. license exempt use cases in the lower part of the V band (57-66GHz) and licensed use cases in the upper part of the V band (66-71GHz) Since the lower part of the V band suffers from oxygen absorption characteristics, the signals travel over very short distances and hence chances of interference are likely to be minimal. Hence there is no need to

define any specific use cases-outdoor or indoor and hence no need to define any parameters like power, EIRP limits, etc.

A) We are supportive in making the 57-66 GHz range available under a licence-exempt regulatory regime without the application of light-licensing.

The Full Lower V band (57-66GHz i.e. a total of 9 GHz) is required to support contactless ports, device to device data transfer, and motion sensing.

*Contactless ports*

The full band is required to support the very high data rates of USB3 and USB4.

*Device to device data transfer*

The full band is required to achieve very high data rates to transfer large volumes of data quickly

*Motion sensing*

Range resolution is proportional to the spectrum bandwidth; the full band is required to achieve precise sensing.

b) We believe that there is no need to define "indoor-use" for licence-exempt deployments in the V-band. Indoor use restriction would greatly limit the types of innovative devices allowed on the market and restrict growth.

c) 57-64GHz - ECC Recommendation 70-03, Annex 1: n1.

ETSI EN 305 550, 20 dBm avg EIRP and 13 dBm/MHz EIRP PSD

and 57-71GHz - ECC Recommendation 70-03 Annex 3: c1

A study conducted in 2021 by Prof. Rekha Jain, formerly of IIMA and TCOE and visiting faculty, ICRIER estimated the Economic Value of Delicensed Spectrum in India as 12.7 Lakh Crores by 2025. This presumed that the 6GHz band and the lower V band would be delicensed in 2023**.** This study report emphasises the importance of delicensing of the lower V band for socio-economic good and growth of GDP of the country. (Copy of the Report is available at https://broadbandindiaforum.in/wp-content/uploads/2022/01/Rekha-Jain-PresentationWi-Fi-annual-Summit-Jan-20-2022-_V1.pdf

DoT has through its reference letter to TRAI L-14035/10/2022-BWA has acknowledged that the device/chip ecosystem for supporting various technologies for data transfer

between consumer devices in the V band has developed and license exempt basis would serve greater public interest and realizing significant socio-economic gains.

**Q26. In case it is decided to earmark a few carriers in E-band and/ or V-band for services/ usages as "Access" and/ or "Integrated Access & Backhaul (IAB)", -**

**(a) What quantum of spectrum in E-band and V-band should be earmarked for such services/ usages?**

**(b) What should be the eligibility conditions to obtain the spectrum in E-band and V-band for such services/ usages?**

**(c) What should be the terms and conditions for the assignment of spectrum in E-band and V-band through auction such as-**

**(i) Block size;**

**(ii) Minimum quantity for bidding;**

**(iii) Spectrum cap;**

**(iv) Validity period of the assignment;**

**(v) Roll-out obligations; and**

**(vi) Surrender of spectrum etc.?**

**(d) Should flexible use [i.e., radio backhaul, and last mile connectivity (fixed wireless access) to the customer equipment] be permitted in frequency ranges earmarked in E-band and/ or V-band for such services/ usages? If yes, should the terms and conditions of the auction of spectrum be the same as those applicable for "access spectrum"?**

**Responses with detailed justifications and international practices may kindly be provided for E-band and V-band separately.**

**BIF RESPONSE**

E band should be exclusively earmarked for backhaul purpose while lower V band ( 57-66GHz ) be fully delicensed for WiFi, innovation, SRD, R & D, etc

**Q27. Whether there is a need for earmarking certain quantum of spectrum in E-band and V-band for point-to-point connectivity requirements of captive (non-commercial/ non-TSP) users? If yes,-**

**(a) What quantum of spectrum in E-band and V-band should be earmarked for such purposes?**

**(b) What should be the terms and conditions for the assignment of spectrum such as:**

**(i) Carrier size;**

**(ii) Carrier aggregation;**

**(iii) Ceiling on the number of carriers;**

**(iv) Validity period of the assignment;**

**(v) Renewal mechanism;**

**(vi) Criteria for the assignment of additional spectrum above the ceiling limit;**

**(vii) Roll out obligations; and**

**(viii) Surrender of the spectrum etc.?**

**Responses with detailed justifications may kindly be provided for E-band and V-band separately.**

**BIF RESPONSE**

E band spectrum should be assigned administratively.

Accordingly, the eligibility condition for assignment of spectrum in E-band (71-76/81-86 GHz) should be that the assignee must hold a valid Access Service License or UL with Access Service Authorisation issued by DoT or any other authorization viz. ISP, CNPNs, etc

Since we advocate no auction of spectrum in either of these bands, hence the bands should be available for assignment to all categories of service providers including those setting up Captive Networks (CNPNs) and Private Networks.

All users- OEMs, Start-ups should have access to the de-licensed V band to bring innovative technologies and solutions to the market.

**Q28. In case your response to Q27 is 'no', in what manner should the point-to-point connectivity requirements of captive (non-commercial/ non-TSP) users be fulfilled? Kindly provide a detailed response with justifications.**

**BIF RESPONSE**

Not applicable as Response to Q27 is Yes

**Q29. Whether it is feasible to allow low power indoor consumer device-to-consumer device usages on a license-exempt basis in the V-band in parallel to the use of the spectrum by telecom service providers for the establishment of terrestrial networks in a part or full V-band? Kindly provide a detailed response with justification and international scenario.**

**BIF RESPONSE**

We are supportive in making the 57-66 GHz frequency range available under a licence-exempt regulatory regime without the application of light-licensing. We do not believe that other licensed services should have access to 57-66 GHz but if there is a desire to licence then this should be in the 66-71 GHz band.

Unrestricted access to the V-band for short-range applications would create a level playing field for Indian manufacturing and E-SDM (Electronic System Design and Manufacturing) companies, enabling them to produce products for global markets without additional hurdles.

In essence, the V-band offers a potential space for both licensed telecom infrastructure and unlicensed consumer devices, provided that appropriate regulatory measures are in place to ensure coexistence and avoid interference.

**Q30. In case it is decided to allow low power indoor consumer device-to-device usages on a license-exempt basis in the V-band (57-64/66 GHz), -**

**(a) Should it be permitted in the entire V-band or only in a portion of the V-band? If it should be permitted only in a portion of the V-band, please specify the frequency range.**

**(b) In case it is decided to permit low power indoor consumer device-to-device usages on a license-exempt basis in the entire V-band, whether the 57-64 GHz range, or the 57-66 GHz range should be considered for such usages?**

**(c) What should be the carrier size/ channel bandwidth?**

**(d) What should be the definition of indoor usages?**

**(e) What technical parameters should be prescribed, including EIRP limits for low power indoor consumer device-to-device usages?**

**Kindly provide a detailed response with justifications and international scenario.**

**BIF RESPONSE**

For low-power, indoor, license-exempt device-to-device usage in the V-band, the most likely part of the V band to consider is the 57-66 GHz band. This is based on regulations and discussions around allowing such usage in this frequency range. The V-band (57-66 GHz) is for various applications, including low-power, short-range wireless communications.

Allowing low-power, indoor consumer device-to-device usage on a license-exempt basis can be considered in the V-band, potentially mirroring similar regulations in the US and EU. If allowed, specific technical parameters, including EIRP (Equivalent Isotropically Radiated Power) limits, would need to be defined. **Potential applications** could include short-range sensors, motion detection, and other low-power applications.

a & b) We are supportive in making the 57-64 /66GHz frequency range available under a licence-exempt regulatory regime without the application of light-licensing.

Full 7 GHz band is required to support contactless ports, device to device data transfer, and motion sensing.

Contactless ports

The full band is required to support the very high data rates of USB3 and USB4.

Device to device data transfer

The full band is required to achieve very high data rates to transfer large volumes of data quickly

Motion sensing

Range resolution is proportional to the spectrum bandwidth, the full band is required to achieve precise sensing

b) The range 57-66 GHz should be for de-licensed usage.

c) We would recommend that carrier sizes in the V-band should be dictated by the applications utilized under a license-exempt regime on a technology neutral basis and do not need to be mandated in regulation The entire V-band should be available for all user categories.

d) We believe that there is no need to define "indoor-use" for licence-exempt deployments in the V-band.

Indoor use restriction would greatly limit the types of innovative devices allowed on the market and restrict growth.

e) 57-64GHz - ECC Recommendation 70-03, Annex 1: n1.

ETSI EN 305 550 , 20 dBm avg EIRP and 13 dBm/MHz EIRP PSD

and 57-71GHz - ECC Recommendation 70-03 Annex 3: c1

**Q31. Whether there is a need for permitting "outdoor" usages of V-band on a license-exempt basis? Kindly provide a detailed response with justification and international scenario.**

**BIF RESPONSE**

Yes -the lower V band can be deployed outdoors through WiFi Mesh Technology, which can power outdoor Public WiFi hotspots with multi gigabit throughputs and increased speed and low latencies.

**Q32. If the response to the Q31 is in the affirmative, whether it is feasible to allow outdoor usages on a license-exempt basis in the V-band in parallel to the use of the spectrum by telecom service providers for the establishment of terrestrial networks in a part or full V-band? Kindly provide a detailed response with justification and international scenario.**

**BIF RESPONSE**

While outdoor usage in the lower V band maybe permitted as mentioned in Response to Q31, by doing band segmentation, the use of spectrum by TSPs in the upper V band ( 66-71Ghz ) is not likely to cause any interference.

**Q33. In case it is decided to allow outdoor usages on a license-exempt basis in the V-band (57-64/ 66 GHz), -**

**(a) Should it be permitted in the entire V-band or only in a portion of the V-band? If it should be permitted only in a portion of the V-band, please specify the frequency range.**

**(b) In case it is decided to permit outdoor usages on a license-exempt basis in the entire V-band, whether the 57-64 GHz range, or the 57-66 GHz range should be considered for such usages?**

**(c) What should be the carrier size/ channel bandwidth?**

**(d) What technical parameters should be prescribed, including EIRP limits for low power indoor consumer device-to-device usages?**

**Kindly provide a detailed response with justifications and international scenario.**

**BIF RESPONSE**

Please refer to Response to Q 31 & 32 above

**Q34. Any other suggestions relevant to the assignment of the spectrum in E-band (71-76/ 81-86 GHz) and V-band (57-64/ 66 GHz) may kindly be made with detailed justifications.**

**BIF RESPONSE**

Not Applicable

**Q35. In case the 6 (lower)/7/13/15/18/21 GHz bands for radio backhaul of various commercial telecom services are assigned on a Point-to-Point (P2P) Link basis, should the spectrum charges be levied:**

**i. As a percentage of Adjusted Gross Revenue (AGR), or**

**ii. On a per carrier/link basis, or**

**iii. Through any alternative mechanism (please specify)?**

**Kindly provide a detailed justification for the approach considered most suitable, along with the suggested percentage of AGR or the applicable per link/per carrier charge.**

**BIF RESPONSE**

1. The spectrum in E band should be assigned administratively, for the entire LSA on an exclusive basis. Further, MWA/MWB carriers should also be assigned administratively. For TSPs with Access Service Authorisation, MWA/MWB carriers should be assigned

on an exclusive basis for the entire LSA; and for TSPs with other than Access Service Authorisation and non-TSPs, they should be assigned on P2P link basis.

2. At present, for TSPs with Access Service Authorisation, MWA/MWB carriers and E-band are charged based on a percentage of AGR. However, the rates prescribed currently are quite high.
3. In fact, the data relating to SUC payouts reveals that only 25% of the total SUC payout of the industry relates to access spectrum. The remaining 75%, i.e., the lion's share, relates to SUC for the backhaul spectrum. This is an alarming pattern, considering that backhaul spectrum does not generate any revenue on its own and is merely a complementary resource for access spectrum.
4. The spectrum charging mechanism for assignment of spectrum for E band, MWA carriers and MWB carriers should be based on the present formula, but with the current rates significantly rationalised.
5. Backhaul spectrum is only a supporting infrastructure for the access network and a tool to facilitate the TSPs to use the radio access network and spectrum efficiently. It facilitates the spread of mobile services in a more cost-effective manner. In addition, with the more efficient use of access spectrum, the TSPs' revenue – and consequently, the LF & SUC payout to the Government – automatically increase.
6. Hence, it is in the interests of the Digital India mission as well as the Government exchequer that backhaul spectrum is made available as cheaply as possible. By using this approach, a conducive environment to rapid network expansion, improved service quality, and cost-effective utilisation of available resources can be created. This will benefit not only TSPs but also end-users, ultimately fostering the orderly growth of the telecommunications sector in India.
7. The benefits of rationalization of levies have already been recognised by both the Government and TRAI. Several initiatives have been taken by both towards ease of doing business and proliferating telecom services in the country; and rationalization of backhaul spectrum charges will only further that objective.

**Significantly lower rates around the globe:**

8. TRAI has rightly captured the international examples of E-band pricing. It can be observed that among them, Saudi Arabia has the maximum pricing at about INR 7.1 lakhs per carrier per annum and Iraq holds the second position at about INR 3.2 lakhs per carrier per annum. Similar pricing structures can be observed in countries like Italy and Indonesia.

9. Meanwhile, with a rate of 0.15% of the AGR, the TSPs in India end up paying approximately INR 96 Cr. for a single E-band carrier. When compared to the prices in other jurisdictions, the prices paid by a TSP in India come out to be nearly 1400 and 3000 times of Saudi Arabia and Iraq, respectively. It is also important to highlight that the prices in India, being AGR-based, are dynamic and are bound to increase significantly as the quantum of AGR increases.
10. Thus, the pricing of backhaul spectrum in India is clearly exorbitant and does not match global trends in this regard. In order to promote enhanced connectivity and ease of doing business in the telecom sector, India must follow international best practices. Accordingly, **the extant rates must be significantly rationalised.**

**Need to do away with the SUC escalation matrix:**

11. The current spectrum charging mechanism of MWA/MWB carriers is such that the rate escalates with the increase in number of carriers, with the rate for a single carrier being 0.15% and the cumulative rate ranging from 0.35% for 2 carriers to as high as 1.45% and 2.30% for 6 and 8 carriers, respectively. It may be appreciated that such high cumulatively incremental rates result in substantially increased costs – for a mere supporting architecture.

12. Hence, we suggest that there should be no escalation matrix like the one prevailing currently. The rates should be kept uniform – irrespective of the number of carriers held by a TSP. For carriers more than 1, it should be a multiplication of No of Carriers X %age charge for1 carrier.

**Q36. In case the 6 (lower)/7/13/15/18/21 GHz bands for radio backhaul of various commercial telecom services are assigned on a block basis for the entire Licensed Service Area (LSA), should the spectrum charges be levied:**

**i. As a percentage of Adjusted Gross Revenue (AGR), or**
**ii. On a per MHz or per carrier basis, or**
**iii. Through any alternative mechanism (please specify)?**

**Kindly provide a detailed justification for the approach considered most suitable, along with the suggested percentage of AGR or the applicable per carrier/ MHz charge.**

**BIF RESPONSE**

It should be provided in carrier size basis as 28 MHz in 6 to 21 GHz and whatever is the carrier size for other bands.

**Q37. In case it is decided to assign some frequency spectrum in 6 (lower)/7/13/15/18/21 GHz spectrum bands for last mile connectivity (Fixed Wireless Access) of commercial telecom services through auction, then:**

**i. Should the auction determined price of other bands by using spectral efficiency factor serve as a basis of valuation for the above bands? If yes, which spectrum bands be related, what efficiency factor or formula should be used and what is the basis for the same? Please justify your suggestions.**

**ii. If response to question (i) above is no, what other methodology may be used. Please justify your suggestions.**

**BIF RESPONSE**

This is a Consultation Paper for Backhaul Spectrum and not for Access or Last Mile Connectivity Spectrum. There should be no mixing of the two and there should be no reference/ mention to mixed use or dual use spectrum bands.

BIF is of the Firm opinion that Lower 6GHz band should be delicensed in accordance with the Draft rules that were notified for the same on 16th May, 2025. Hence there is no question of assignment of that portion of the spectrum band for FWA. Additionally, BIF is of the opinion that the entire 6GHz band should be delicensed

As regards MW bands, they should all be assigned administratively as they are meant for backhaul purpose. This is in accordance with Schedule 1 of Section 3 of the Telecommunications Act, 2023

**Q38. In case it is decided to assign some frequency spectrum in 6 (lower)/7/13/15/18/21 GHz spectrum bands for last mile connectivity (Fixed Wireless Access) of commercial telecom services through auction, then:**

**i. Should the auction determined price of other countries in 6/7/13/15/18/21 GHz spectrum bands for last mile connectivity and/or IMT services serve as a basis of valuation of microwave bands for last mile connectivity? What methodology should be followed for using this auction determined price as a basis for valuation? Support your suggestions with justifications and country-wise auction data.**

**ii. If the above approach is considered appropriate, should the international auction-determined prices be normalized to account for cross-country differences such as population, GDP, purchasing power parity (PPP), subscriber base, and other relevant factors? If so, should normalization be carried out by using the ratio of auction prices of spectrum bands within the same country to neutralize the impact of cross country differences? Alternatively, please suggest any other suitable normalization methodology that may be adopted in this context.**

**iii. Apart from the approaches highlighted above which other valuation approaches may be adopted for the valuation of 6(lower)/7//13/15/18/21 GHz spectrum bands? Please provide detailed information.**

**BIF RESPONSE**
Please see Response to Q37 above.

**Q39. What valuation methodology should be followed if it is decided to assign frequency spectrum in traditional microwave backhaul bands for flexible use (i.e. both backhaul connectivity and last mile connectivity) of commercial telecom services through auction? Please provide detailed justification.**

**BIF RESPONSE**

This is a Consultation Paper for Backhaul Spectrum and not for Access or Last Mile Connectivity Spectrum. There should be no mixing of the two and there should be no reference/ mention to mixed use or dual use spectrum bands.

BIF is of the Firm opinion that Lower 6GHz band should be delicensed in accordance with the Draft rules that were notified for the same on 16th May, 2025. Hence there is no question of assignment of that portion of the spectrum band for FWA. BIF is of the opinion that the entire 6GHz band should be delicensed
As regards MW bands, they should all be assigned administratively as they are meant for backhaul purpose. This should not be used for Access at purpose. This is in accordance with Schedule 1 of Section 3 of the Telecommunications Act, 2023

**Q40. Should the spectrum charges for 6 (lower)/ 7/ 13/ 15/ 18/ 21 GHz bands for non-commercial/ captive backhaul use continue to be levied as per the M x C x W formula specified in the DoT's order No. P-11014/34/2009-PP dated 11.12.2023? Is there a need to revise this formula by inclusion of additional factors, modifying slab/factor values etc.? If yes, please specify which additional factors should be included and what should be the revised slab/factor values? Please provide detail of the same alongwith justification.**

**BIF RESPONSE**
For captive use, it should be given at a much reduced rate-at a discount of 50% from the rates for commercial purposes.

**Q41. If the answer to above question is no, whether an alternative charging mechanism should be adopted for levying spectrum charges for 6 (lower)/ 7/ 13/ 15/ 18/ 21 GHz bands for non-commercial/ captive backhaul use? Please provide detailed justification.**

**BIF RESPONSE**

Since answer to Q40 is Yes, hence this is Not Applicable

**Q42. In case the E-band (71-76/ 81-86 GHz) is assigned for Radio backhaul purpose for various commercial telecommunication services and on a Point-to-Point (P2P) link basis, should the spectrum charges be levied:**

**i. As a percentage of Adjusted Gross Revenue (AGR), or**

**ii. On a per carrier/link basis, or**

**iii. Through any alternative mechanism (please specify)?**

**Kindly provide a detailed justification for the approach considered most suitable, along with the suggested percentage of AGR or the applicable per carrier/link charge.**

**BIF RESPONSE**

It should be charged on a per Carrier/link by link basis

**Q43. In case the E-band (71-76/ 81-86 GHz) is assigned for Radio backhaul purpose for various commercial telecommunication services and on a block basis for the entire Licensed Service Area (LSA), should the spectrum charges be levied:**

**i. As a percentage of Adjusted Gross Revenue (AGR), or**

**ii. On a per MHz or per carrier basis, or**

**iii. Through any alternative mechanism (please specify)?**

**Kindly provide a detailed justification for the approach considered most suitable, along with the suggested percentage of AGR or the applicable per MHz/per carrier charge.**

**BIF RESPONSE**

Per Block of 250 MHz ( paired ) -single carrier

**Q44. In case the V-band (57-64/66 GHz) is assigned for Radio backhaul purpose for various commercial telecommunication services and on a Point-to-Point (P2P) link basis, should the spectrum charges be levied:**

**i. As a percentage of Adjusted Gross Revenue (AGR), or**

**ii. On a per carrier/link basis, or**

**iii. Through any alternative mechanism (please specify)?**

**Kindly provide a detailed justification for the approach considered most suitable, along with the suggested percentage of AGR or the applicable per carrier/ link charge.**

**BIF RESPONSE**

57-66GHz ( Lower V band ) should be delicensed. Hence this Question does not apply.

**Q45. In case the V-band (57-64/66 GHz) is assigned for Radio backhaul purpose for various commercial telecommunication services and on a block basis for the entire Licensed Service Area (LSA), should the spectrum charges be levied:**

**i. As a percentage of Adjusted Gross Revenue (AGR), or**

**ii. On a per MHz or per carrier basis, or**

**iii. Through any alternative mechanism (please specify)?**

**Kindly provide a detailed justification for the approach considered most suitable, along with the suggested percentage of AGR or the applicable per MHz/per carrier charge.**

**BIF RESPONSE**

57-66GHz ( Lower V band ) should be delicensed. Hence this Question does not apply.

**Q46. In case it is decided to assign some frequency spectrum in E-band (71-76/ 81-86 GHz) and/or V-band (57-64/66 GHz) for Access (last mile connectivity)/ Integrated Access Backhaul (IAB) through auction, then:**

**(i) Should the auction determined price of other bands serve as a basis of valuation for the above bands using spectral efficiency factor? If yes, which spectrum bands be related, what efficiency factor or formula should be used and what should be the basis for the same? Please justify your suggestions**

**(ii) If response to question (i) above is no, what other methodology may be used? Please justify your suggestions.**

**BIF RESPONSE**

E band should be assigned administratively on a P2P link basis but charges should be per carrier block of 250 MHz . It should not be put to auction. Nowhere in the world is backhaul spectrum put to auction . India should not do the same either. Also as per Schedule 1 of Section 3 (1) of the Telecommunications Act 2023, backhaul spectrum is to be assigned administratively and not auctioned.

**Q47. In case it is decided to assign some frequency spectrum in E-band (71-76/ 81-86 GHz) and/or V-band (57-64/66 GHz) for Access (last mile connectivity)/ Integrated Access Backhaul (IAB) through auction, then:**

**i. Should the auction determined price of other countries in E-band (71-76/ 81-86 GHz) and/or V-band (57-64/66 GHz) serve as a basis of valuation of these bands? If yes, what methodology should be followed for using this auction determined price as a basis for valuation? Support your suggestions with justifications and country-wise auction data.**

ii. **If the above approach is considered appropriate, should the international auction-determined prices be normalized to account for cross-country differences such as population, GDP, purchasing power parity (PPP), subscriber base, and other relevant factors? If so, should normalization be carried out by using the ratio of auction prices of spectrum bands within the same country to neutralize the impact of cross country differences? Alternatively, please suggest any other suitable normalization methodology that may be adopted in this context.**

iii. **Apart from the approaches highlighted above which other valuation approaches should be adopted for the valuation of E-band (71-76/ 81-86 GHz) and/or V-band (57-64/66 GHz)? Please provide detailed information.**

**BIF RESPONSE**

E band should be assigned administratively on a P2P link basis but charges should be per carrier block of 250 MHz . It should not be put to auction. Nowhere in the world is backhaul spectrum put to auction. India should not do the same either. Also, as per Schedule 1 of Section 3 (1) of the Telecommunications Act 2023, backhaul spectrum is to be assigned administratively and not auctioned.

**Q48. In case it is decided to assign some frequency spectrum in E-band (71-76/ 81-86 GHz) and/or V-band (57-64/66 GHz) for point-to-point connectivity requirements of captive (non-commercial/ non-TSP) users, then:**

**(i) Should the spectrum charges for E-band (71-76/ 81-86 GHz) and/or V-band (57-64/66 GHz) for point-to-point connectivity requirements of captive (non-commercial/ non-TSP) users may be levied as per the M x C x W formula as specified in the DoT's order No. P-11014/34/2009-PP dated 11.12.2023? Is there a need to revise this formula by inclusion of additional factors, modifying slab/factor values etc.? If yes, please specify which additional factors should be included and what should be the revised slab/factor values. Please provide detail of the same along with justification.**

**(ii) If the answer to above question is no, whether an alternative charging mechanism such as link to link charges as recommended in 2014 for levying spectrum charges for E and V bands for non - commercial/ captive backhaul use, should be adopted? Please provide detailed justification.**

**BIF RESPONSE**

Yes. Charging may be done as per TRAI's own formula as recommended in 2014.

**Q49. In case it is decided to assign some frequency spectrum in 6 (lower)/ 7/13/15/18/21 GHz spectrum bands for last mile connectivity (Fixed Wireless Access) of commercial telecom services and in E-band (71-76/ 81-86 GHz) and/or**

**V-band (57-64/66 GHz) for Access (last mile connectivity)/ Integrated Access Backhaul(IAB) through auction, then:**
**Should the value of:**

**(a) 6 (lower)/7/13/15/18/21 GHz bands (for last mile connectivity)**

**(b) E-band (71–76/81–86 GHz) and V-band (57–64/66 GHz) (for Access (last mile connectivity)/IAB)**

**be determined using a single valuation approach? If yes, please indicate which single valuation approach or method should be adopted in each case and provide detailed justification**

**BIF RESPONSE**

No spectrum shall be assigned /given through auction. All backhaul spectrum is to be assigned administratively in accordance with provisions in the Telecommunications Act 2023.

**Q50. 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 the above spectrum bands, or some other approach like taking weighted mean etc. should be followed? Please support your answer with detailed justification.**

**BIF RESPONSE**

BIF is of the firm opinion that spectrum for backhaul in all the bands should be assigned only administratively and not through an auction. BIF also requests the authority to rationalize the rates to make broadband more affordable to the end consumer. All backhaul spectrum is to be assigned administratively in accordance with provisions in the Telecommunications Act 2023.

**Q51. In case it is decided to assign some frequency spectrum in 6 (lower)/ 7/13/15/18/21 GHz spectrum bands for last mile connectivity (Fixed Wireless Access) of commercial telecom services and in E-band (71-76/ 81-86 GHz) and/or V-band (57-64/66 GHz) for Access(last mile connectivity)/ Integrated Access Backhaul (IAB) through auction, then:**
**What ratio should be adopted between the reserve price for the auction and the valuation of the spectrum in:**

**(a) 6 (lower)/7/13/15/18/21 GHz bands (for last mile connectivity)**

**(b) E-band (71–76/81–86 GHz) and V-band (57–64/66 GHz) (for Access (last mile connectivity)/IAB)**

**and why? Please support your answer with detailed justification.**

**BIF RESPONSE**

BIF is of the firm opinion that spectrum for backhaul in all the bands should be assigned only administratively and not through an auction. All backhaul spectrum is to be assigned administratively in accordance with provisions in the Telecommunications Act 2023. BIF also requests the authority to rationalize the rates to make broadband more affordable to the end consumer.

**Q52. In case it is decided to assign some frequency spectrum in 6 (lower)/ 7/13/15/18/21 GHz spectrum bands for last mile connectivity (Fixed Wireless Access) of commercial telecom services and in E-band (71-76/ 81-86 GHz) and/or V-band (57-64/66 GHz) for Access(last mile connectivity)/ Integrated Access Backhaul (IAB) through auction, then:**

**What should the payment terms and associated conditions for the assignment of**

- **(a) 6 (lower)/7/13/15/18/21 GHz bands (for last mile connectivity)**
- **(b) E-band (71–76/81–86 GHz) and V-band (57–64/66 GHz) (for Access (last mile connectivity)/IAB)**

**relating to:**

- **i. Upfront payment**
- **ii. Moratorium period**
- **iii. Total number of instalments to recover deferred payment**
- **iv. Applicable interest rate for protecting the NPV of bid amount Please support your answer with detailed justification.**

**BIF RESPONSE**

BIF is of the firm opinion that spectrum for backhaul in all the bands should be assigned only administratively and not through an auction. All backhaul spectrum is to be assigned administratively in accordance with provisions in the Telecommunications Act 2023. BIF also requests the authority to rationalize the rates to make broadband more affordable to the end consumer.

**Q53. Any other suggestions relevant to the subject may be submitted with detailed justification.**

**BIF RESPONSE**

No Comments