

## VIL Counter comments to the TRAI's Consultation Paper on "Assignment of Spectrum in E&V Bands, and Spectrum for Microwave Access (MWA) & Microwave Backbone (MWB)" dated 27.09.2023

At the outset, we are thankful to the Authority for giving us the opportunity to provide our comments and counter-comments to the Consultation Paper on "Assignment of Spectrum in E&V Bands, and Spectrum for Microwave Access (MWA) & Microwave Backbone (MWB)" dated September 27, 2023.

Vodafone Idea Limited (VIL) has submitted its comments to the questions raised in the above-said consultation paper. Further, we have also gone through the submissions of various stakeholders on the above-said consultation paper and would like to submit our counter-comments for Authority's kind consideration, as given below:

### 1. Importance of Backhaul Spectrum to telecom networks

- a. Almost all stakeholders have unequivocally emphasized the importance of backhaul spectrum for telecom networks. Stakeholders have rightly highlighted that while optical fibre may be the optimal solution but, it faces challenges and has external dependencies linked to RoW permissions and terrain thereby, resulting into wireless backhaul being the sole viable alternative.

- b. It has been mentioned by a stakeholder that:

*To deliver such massive capacity, TSPs have two options – ① increasing fiberisation and ② using microwave spectrum for backhaul. While fiber offers better data carrying capacity, India has only reached a suboptimal ~36% fiberisation at sites, owing to the various geographical, technical as well as financial challenges involved in the laying of fiber.*

*There is no doubt that the Right of Way (RoW) policy has been substantially simplified and streamlined by the Government and that TSPs are also making every effort to fiberize their networks. However, the growth in fiberisation will continue at its own pace. Therefore, the requirement of backhaul spectrum continues to be the only practical choice for TSPs if they are to overcome the challenge of rapidly growing network rollouts and traffic generation.*

*Even if the general trend towards a gradual increase in the share of sites connected via fiber were taken into account, this would mean a 50-50 split in fiber and microwave as backhaul media by 2030. This is because the rollout of new sites would continue apace in rural and remote areas, some of which are especially dependent on microwave backhaul.*

- c. It has been mentioned by another stakeholder that:

*4. New data centric technologies like 5G, 6G and beyond support or will support higher and higher rates of data transmissions and consequently, higher, and higher bandwidth of spectrum is required to meet the traffic backhauling requirement. 5G has led to massive increase in the need for increasing the backhaul capacity which can ideally be met with the optical fiber. However, the rollout of fiber to each location is not techno-economically feasible and is time consuming due to RoW permissions and external dependencies. Therefore, wireless backhaul becomes the only feasible alternative for many of the sites in India. The Government is aware of the same, therefore, upto two carriers of spectrum in E-*

*Band and additional MWA carriers were offered to the TSPs on temporary basis to meet the capacity requirements.*

*5. We submit that unavailability of sufficient backhaul spectrum will impact the Quality of Service (QoS) leading to poor customer experience and reduced speed in 5G & upcoming 6G networks. Therefore, it is critical that the more and more backhaul spectrum is made available at affordable price.*

- d. **VIL agrees with the above comments of the stakeholders and submit that Backhaul spectrum is as integral part of telecom networks as is the access spectrum and fiber.**

## 2. **MWA-MWB spectrum scope**

- a. Many of the stakeholders have commented that MWA and MWB spectrum bands are primarily to be used only for backhaul spectrum.
- b. Extract of comments from one of the stakeholder is given as follows:

*3. The valuation of spectrum in MWA and MWB bands would also require consideration of **the fact that backhaul is the only current use case of this spectrum**, making it unidimensional, which would offset the possible advantage of better spectral efficiency. Another consideration would be low utilization of this spectrum.*

- c. Extract of comments from another stakeholder mentions :

***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.** <xxx> believes that this is sufficient to meet the industry demand both 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. Having said that, **MWB carriers should also be assigned for the entire LSA on an exclusive basis to TSPs with Access Service Authorisation, similar to MWA carriers...***

*Further, it is estimated that the operators with limited fiber infrastructure would need to acquire **2 MWB carriers initially**, in order to meet their backhaul requirements. Thus, a ceiling of **2 MWB carriers per LSA**, in all categories of LSAs, should be sufficient.*

- d. **Considering all above, we reiterate that the scope of use spectrum in MWA and MWB spectrum bands should be restricted for backhaul usage only.**

## 3. **Legacy Networks and Consequences of losing existing MWA-MWB carriers**

- a. Indian telecom networks have evolved over the period of time basis administratively assigned MWA-MWB spectrum and there are multiple OEM and equipment deployed in the administratively assigned frequencies.
- b. Equipment deployed in existing network does not support the entire range of frequencies available in a particular band. Hence, allocation of different frequencies even in the same band

would lead to two huge issues (i) heavy disruption of services during changeover and (ii) huge capex requirements and sunk costs of existing equipment.

- c. Also, if the TSP is unable to get the frequencies in the same band as being deployed presently (e.g 15 GHz), it would cause humungous challenges of change in network design and planning, service disruption and capex requirements, because there would also be change in propagation characteristics of different bands besides equipment not being compatible. Such huge changes are technically not recommended for evolved and stable networks, as are available in India.
- d. Table given below illustrates the complexity of frequencies supported by various equipment types for different OEMs.

Frequency Band	Frequency Spot	OEM (A)_Type1	OEM (A)_Type2	OEM (A)_Type3	OEM (B)_Type1	OEM (C)_Type1	OEM (C)_Type2
15 GHz	14515/14935	0-21/25	N-A11/A15	11L/11H	Type 1	Sub band_A	Sub band_A
15 GHz	14543/14963	0-21/25	N-A11/A15	11L/11H	Type 1	Sub band_A	Sub band_A
15 GHz	14571/14991	0-21/25	N-A11/A15	11L/11H	Type 1	Sub band_A	Sub band_A
15 GHz	14599/15019	0-21/25	N-A11/A15	11L/11H	Type 1	Sub band_A	Sub band_A
15 GHz	14627/15047	0-22/26	N-A11/A15 & N-A12/A16	11L/11H & 12L/12H	Type 1	Sub band_B	Sub band_A
15 GHz	14655/15075	0-22/26	N-A11/A15 & N-A12/A16	11L/11H & 12L/12H	Type 1	Sub band_B	Sub band_A
15 GHz	14683/15103	0-22/26	N-A12/A16	12L/12H	Type 1	Sub band_B	Sub band_A
15 GHz	14711/15131	0-22/26	N-A12/A16	12L/12H	Type 1 & Type 2	Sub band_B	Sub band_A
15 GHz	14739/15159	0-23/27	N-A13/A17	13L/13H	Type 2	Sub band_C	Sub band_B
15 GHz	14767/15187	0-23/27	N-A13/A17	13L/13H	Type 2	Sub band_C	Sub band_B
15 GHz	14795/15215	0-23/27	N-A13/A17	13L/13H	Type 2	Sub band_C	Sub band_B
15 GHz	14823/15243	0-23/27	N-A13/A17	13L/13H	Type 2	Sub band_C	Sub band_B
15 GHz	14851/15271	0-24/28	N-A13/A17	13L/13H	Type 2	Sub band_D	Sub band_B
15 GHz	14879/15299	0-24/28	N-A13/A17	13L/13H	Type 2	Sub band_D	Sub band_B
15 GHz	14907/15327	0-24/28	N-A13/A17	13L/13H	Type 2	Sub band_D	Sub band_B

**Note:**

- i. To ensure support across the entire frequency band, different types of outdoor units (ODUs) are required, as no OEM provides a single ODU covering the entire spectrum.
  - ii. Example 1: OEM (A) Type 1 ODU can support frequency range of 4 spots only from entire 15GHz. If the frequency spots change, the specific type of ODU installed in a circle arrangement may not function with different spots.
  - iii. Example 2: OEM (C) has provided 2 different variant of ODUs across time frame in Network, Each variant have different set up Frequency spot support.
  - iv. Above scenario and example also applicable for 18 GHz and 21 GHz.
- e. **Therefore, VIL strongly urge the Authority that the existing carrier assignments of TSPs should be protected and should continue on administrative basis only.**

**4. MWA-MWB spectrum allocation methodology**

- a. Many stakeholders have supported continuation of administrative allocation of MWA-MWB spectrum.
- b. One of the stakeholder has commented as follows:

*<xxx> submits that the fundamental purpose of assignment methodology should be to prioritise network stability, cost-effectiveness for existing users and the preservation of high*

*quality of service (QoS) without causing network disruption. Administrative assigning of backhaul spectrum will achieve better policy outcomes and support public interest better than an auction will.*

*Therefore, MWA/MWB carriers should be assigned on an administrative basis rather than auctioned. Further, existing TSPs must be allowed to continue with the spots currently assigned to them.*

**Competition Issues:** *The scale of fiberization in India is very low, and the situation is not going to change materially for the next few years. In case backhaul spectrum is auctioned, only the TSP with the largest fiber footfall and without a legacy network will benefit. The networks of all other TSPs will be massively disrupted. This would give the competitive advantage to only one TSP, at the expense of others. Hence, making backhaul spectrum available to TSPs administratively is vital.*

**No supply constraint in MWA/MWB carriers that justify an auction approach:** *As is evident from Table 2.4 of the Consultation Paper, there is no dearth of MWA carriers with 76% of carriers already lying vacant with the Government. Even in the case of MWB carriers, there is no instance of shortage or limited availability. Even with the current assignment methodology, it is evident that 53% of carriers in the 13 GHz band, 22% in the 15 GHz band, 83% in the 18 GHz band, and 93% in the 21 GHz band remains unutilised.*

*Considering this, there does not seem to be any logic to auctioning MWA/MWB carriers where supply is in abundance, demand limited and less than supply.*

c. Another stakeholder has commented as follows:

*Administrative assigning of backhaul spectrum will achieve better policy outcomes and support public interest better than an auction will and thus MWA/MWB carriers should be assigned on an administrative basis.*

**International precedents:** *MW carriers are assigned administratively in most jurisdictions – as either a bundle or mandatory allocation (with nominal charge), whenever access spectrum is assigned. TRAI Consultation Paper has also not provided any instances where backhaul spectrum has been auctioned. It is therefore fair to argue that India should also follow international practices in this regard.*

**TRAI favoured administrative assignment in 2014:** *Even TRAI in its earlier Recommendations in 2014 on this issue after due consideration concluded that “...(a) the assignment of spectrum for MW fixed point-to-point links is done administratively in most countries; (b) there is no shortage of MWA/MWB carriers; (c) MW carriers are essential for the roll-out of network; and, (d) since the access spectrum is being assigned through auction, there seems to be no justification for another auction for the assignment of MW carriers as these will be used by only those TSPs who have got the access spectrum...”*

*Accordingly, the Authority recommended that assignment of MWA and MWB carriers should continue on an administrative basis. Since the situation has not changed materially since 2014 and the rationale given by the TRAI stands true even today, it is only appropriate that TRAI continue in its recommendation of administrative assignment of MWA/MWB carriers.*

*In fact, the TRAI Act provides that the objectives of establishment of the Authority is to protect the interests of both the service providers and the consumers and ensure orderly growth of the telecom sector. However, as explained above, backhaul spectrum auctions would be in conflict*

*with each of these objectives. Thus, in case the Authority now takes a view contrary to its 2014 Recommendations, it would go contrary to its mandate under the TRAI Act itself.*

- d. Most importantly, the Government has notified The Telecommunications Act 2023 in the official Gazette on 24.12.2023, extract of which are given as follows:

Section 4(4)

*The Central Government shall assign spectrum for telecommunication through auction except for entries listed in the First Schedule for which assignment shall be done by administrative process.*

.....

Section 4(8)

*Any spectrum assigned through the administrative process prior to the appointed day, shall continue to be valid on the terms and conditions on which it had been assigned, for a period of five years from the appointed day, or the date of expiry of such assignment, whichever is earlier.*

*First Schedule*

*'ASSIGNMENT OF SPECTRUM THROUGH ADMINISTRATIVE PROCESS'*

*12. Radio Backhaul for telecommunication services.*

- e. **VIL agrees with the above comments from various stakeholders that MWA-MWB spectrum should continue to be assigned on administrative basis for backhaul purposes. Further, given the provisions of The Telecommunications Act 2023, the backhaul spectrum can only be given through administrative process only.**
- f. A stakeholder has commented that:

*6. While the TSPs requires more backhaul spectrum, only 345 out of a total 1699 available MWA (20%) carriers are offered to existing TSPs, and remaining carriers do not generate any revenue to exchequer. The TSPs are wary of acquiring more carriers on administrative basis due to prohibitively high cost in the form of revenue share. Such high cost does not make acquisition of additional spectrum for backhaul economically viable.*

*7. It is no doubt that Microwave will remain the backbone for communication needs of a large portion of Indian population and it is imperative that sufficient backhaul spectrum is made available at reasonable and market determined prices to facilitate high quality services and to maximize spectrum utilization and benefits in transparent manner. Accordingly, these bands should only be assigned through auction.*

- g. **VIL does not agree with the above comment of the stakeholder. While the present pricing of MWA-MWB spectrum bands certainly need rationalisation however, that cannot be the reason that these bands should only be assigned through auction.**

5. **MWA-MWB prices**

- a. The backhaul spectrum is neither a spectrum for coverage/service to consumer nor a revenue generating spectrum. Therefore, the pricing of MWA-MWB carriers have to be reasonable and affordable so that, the operators can take adequate carriers and create a world class backhaul network.

- b. The existing administrative prices of MWA and MWB spectrum bands as a % of AGR, were fixed at a time when access spectrum use to be assigned on administrative basis. For more than a decade now, the access spectrum is assigned through auction process whereby market price is already being taken, and accounts for the service and revenue potential.
- c. The present pricing of carriers in MWA-MWB spectrum is exorbitantly high and needs rationalisation.

d. One of the stakeholder has mentioned that:

*The current charges of MWA/MWB carriers and E, V band need significant rationalisation:*

- *The charging of MWA/MWB carriers and E-band spectrum is presently based on a percentage of AGR. <xxx> recommends that the same should continue.*
- *However, the current charges are exorbitantly high. They continue to escalate (and aggregate) with the increase in the number of carriers, leading to substantially increased costs. It may be noted that the quantum of SUC being paid in respect of backhaul spectrum is about 3x that of access spectrum.*
- *Considering that standalone spectrum does not generate any revenue on its own, and in the interests of expanding the reach of telecom services, <xxx> recommends that this escalation matrix (of rates) should be done away with and only a flat and low rate applies, irrespective of carriers held.*
- *The rates of backhaul spectrum are significantly lower in other jurisdictions. For instance, the rates of an E-band carrier in India are approximately 1400 and 3000 times those of Saudi Arabia and Iraq, respectively, the top 2 positions in the list of countries analysed by TRAI for E-band pricing.*
- *Rationalised charges will still benefit the exchequer as adequate availability of backhaul spectrum will lead to more efficient utilisation of access spectrum and a consequent increase in the TSPs' revenue leading to higher LF and SUC payouts, even when the spectrum itself would not be generating any revenue.*

e. Another stakeholder has also pointed out that:

*3. The valuation of spectrum in MWA and MWB bands would also require consideration of the fact that backhaul is the only current use case of this spectrum, making it unidimensional, which would offset the possible advantage of better spectral efficiency. Another consideration would be low utilization of this spectrum.*

*4. An important consideration in the valuation exercise is the apparent lack of uptake of these backhaul bands despite availability. This is certainly due to high current administrative cost. Thus, in order to ensure optimum utilization of this backhaul spectrum, the valuation would need to be necessarily at levels that make it an attractive buy through auction.*

- f. **Above establishes a general point of view of stakeholders that the pricing of administrative assigned backhaul spectrum is very high and needs rationalisation.**
- g. **In 2014, TRAI has recommended AGR based pricing for MWA carriers, with linear increments for additional carriers.**
- h. **It is also known that higher pricing would always discourage TSPs to take less number of carriers and lead to sub-optimal networks.**
- i. **Considering that the Backhaul spectrum is not a direct revenue generating spectrum and supply of spectrum in MWA-MWB bands far exceeds demand at present levels, it is**

imperative that pricing must be rationalised and as a general principle, the additional carriers should invite lower pricing and not higher pricing.

- j. Therefore, we highly recommend that pricing of MWA and MWB carriers should have non-linear reducing increments (at 75% of previous increment) for additional carriers. An illustration is given as follows:

Number of Carriers	Pricing of the additional carrier as % to AGR	Cumulative Pricing (as % to AGR)
1	0.15%	0.15%
2	0.11%	0.26%
3	0.08%	0.34%
4	0.06%	0.40%
5	0.05%	0.45%
6	0.04%	0.49%
7	0.03%	0.52%
8	0.02%	0.54%

## 6. MWA-MWB spectrum demand and ceilings

- a. One of the stakeholder has mentioned that:

*In summary, <xxx> recommends that the following ceiling should be considered:*

<b>Microwave Carriers</b>	<b>Present Demand</b>
<b>MWA (13/15/18/21 GHz)</b>	<b>8 MWA carriers in each of Metros &amp; Category A LSAs</b>  <b>6 MWA carriers in each of Category B &amp; C LSAs</b>
<b>MWB (6/7 GHz)</b>	<b>2 MWB carriers per each LSA</b>

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

*The assessment of future demand for MWA/MWB carriers, as required by TRAI, is difficult since it depends upon multiple complex factors, such as subscriber base, the access technology deployed, and the amount of radio access spectrum allocated to the TSP. As already highlighted earlier, the backhaul requirement per site has grown manifold in recent years due to an explosion in the volume of traffic and will continue to rise significantly.*

*In addition, other drivers likely to influence the demand assessment are 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.*

*In such multi-variate situations, any static values of these parameters cannot be measured empirically, making determination of future demand challenging. Future demand has to be dynamically evaluated. Thus, the ceilings suggested above can be reviewed, in another 3 years, perhaps.*

- b. Considering the above comments, we would also like to reiterate that it may not be possible to predict backhaul demand in future. It would be fair to estimate that there could be a demand of atleast 8 MWA carriers and 2 MWB carriers in few years from now. The Authority/DoT can review this after few years.
- c. **Thus, we agree that there should be an overall carrier ceiling of 8 MWA carriers and 2 MWB carriers in each LSA.**
- d. **We would further like to mention that certain LSAs in B/C category have market potential (subscribers/revenue) equivalent or even more than some of the Metro/A-category LSAs e.g. Bihar, Kerala etc. Similarly, demand of backhaul spectrum (MWA-MWB spectrum bands) would not be less in such B/C category LSAs as compared to Metro/A-category LSAs.**
- e. **Therefore, we highly recommend that the maximum numbers of carriers in MWA should be 8 carriers and in MWB should be 2 carriers, irrespective of the category of LSAs.**

- f. One of the stakeholder has mentioned that:

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

- g. Comments from another stakeholder mention that:

*We do not support in-band spectrum caps or carrier ceilings as with increased focus on fiberization, there is no case of hoarding this MWA/MWB spectrum procured through auction, as post fiberization this will be required for redundancy purposes only.*

*Nevertheless, in order to ensure that sufficient spectrum is available for all service providers, an overall cap of 40% of total spectrum available for MWA & MWB be considered, if deemed necessary.*

- h. **We disagree with both the above comments. It is important that every TSP has a fair availability of spectrum in each band of MWA spectrum bands i.e. 13 GHz, 15 GHz, 18 GHz, and 21 GHz. Due to huge number of carriers availability in higher bands, it would be a clear possibility that one TSP may get disproportionate access to one of the premium MWA band, let's say 15 GHz.**
- i. **Therefore, to avoid monopolisation of spectrum bands, it is crucial to have in-band spectrum caps. Ceiling on number of carriers should be fixed at 35% for each of MWA spectrum bands i.e. 13 GHz, 15 GHz, 18 GHz and 21 GHz.**

## 7. E-band and V-band scope

- a. One of the stakeholder has commented that E-band and V-band can be used for access services as well. Extract of the comments of the said stakeholder is given as follows:

*E-Band (71-76 GHz & 81-86 GHz) is a paired spectrum used in FDD mode. It is suitable for high capacity backhaul for 4G/5G, 6G and beyond mobile networks and also suitable as access*



*spectrum for delivering broadband services to the end users. It can be used for connecting enterprise buildings with high-capacity links. It is already identified as backhaul for 5G and is also deemed useful for Integrated Access Backhaul (IAB) under 5G.*

*V-Band (52.6 - 71 GHz) is un-paired spectrum used in TDD mode and is suitable as high capacity backhaul spectrum for mobile 4G/5G mobile network and also suitable as Access Spectrum.*

- b. While 5G and upcoming access technologies provide wireless broadband experience to end users with huge data quantum consumption, backhaul of such huge data is a challenge in today's era. E band and V Band is a ray of hope to enable faster and meaningful rollout of 5G connectivity.
- c. Since there is a very limited spectrum available in E band spectrum, sharing it for Access will further lead to reduction of spectrum for Backhaul purposes and subsequently, will limit effective utilisation of acquired Access spectrum with congested backhails.
- d. Besides, there is ample spectrum available for access including mmWave spectrum which was bought during last auction. TSPs have not been able to garner much deployments and use-cases in mmWave spectrum presently. As such, it is advised to refrain from utilizing E-band for access purposes, preserving its current value as well as avoiding potential pricing complications.
- e. The argument of bringing access aspect into E-band and V-band utilisation is indirectly meant to bypass provisions of The Telecommunications Act, 2023 ('Act') which allows radio backhaul to be provided through administrative assignments. If E-band and V-band is considered for both access as well as backhaul, it would inflate its valuation manifold. This will make the adequate number of carriers for backhaul purposes, beyond the reach of financially stressed operator(s) thereby, hurting 5G deployments/expansions and would end up benefitting only the deep pocketed players. It will defeat the very objective of the provisions of Act providing radio backhaul on administrative basis.
- f. Currently as per DoT guideline, there is clear bifurcation of Access and Backhaul spectrum which is working absolutely fine and hence, this framework should continue going forward as well.
- g. Further, global evidence of deployments also shows that E-band is used for backhaul purposes only. Also, equipment availability globally with various OEMs is also for backhaul purpose only.
- h. Therefore, VIL strongly recommends that E-band and V-band which provide an evolved and reliable backhaul solution, should be designated exclusively for backhaul of Access technologies (for example 5G, 4G, 2G and upcoming 6G).**

#### **8. E-band and V-band spectrum assignment methodology**

- a. Through our comments dated 14.12.2023, VIL has recommended that the E-band and V-band should be considered only for backhaul purposes. We also preferred assignment of E-band and V-band through auction only.

- b. However, given the provisions laid by the Government through The Telecommunications Act 2023, we recommend that all backhaul spectrum including E-band, V-band and MWA-MWB spectrum bands should be assigned only through administrative process.

#### 9. E-band and V-band prices

- a. One of the stakeholder has mentioned in their comments that:

*1. We submit that the auction determined prices (ADP) are a good and relevant factor for the bands that have been already auctioned and sold, all other things remaining unchanged. Further, in case of non-availability of ADP, this value for a band similar in propagation characteristics can be an equally important valuation measure.*

*2. As the Authority has recently discovered ADP of mmWave band available with it and spectrum in E Band and V Band is similar in nature to mmWave, though with reduced spectral efficiency, therefore, it is submitted that the valuation of spectrum in E-Band and V-Band should be at 50% of ADP for mmWave spectrum.*

- b. The above-mentioned pricing is wrong, huge and inflated as well as it wrongly considers both access and backhaul as use case for E-band and V-band.
- c. Considering the reduced spectral efficiency, the E-band and V-band pricing can be maximum 25% of the mmWave band pricing. The pricing has to be further reduced considering that the scope of E-band and V-band is pure backhaul, whereas scope for mmWave was both access and backhaul.
- d. Taking into account both these factors, a reasonable level of pricing of E-band could be maximum 5% of the ADP of mmWave band. Further, V-band pricing could only be 50% of the E-band pricing.
- e. However, as per The Telecommunications Act, 2023, the Radio backhaul spectrum has to be assigned on administrative basis. Considering that the Backhaul spectrum is not a direct revenue generating spectrum, it is imperative that pricing must be rationalised.
- f. Therefore, we strongly urge that the E-band and V-band be assigned administratively, with its pricing being derived on the basis of point 9d given above. Based on this, the pricing of E-band carrier would be ~0.05% of AGR. Similarly, the pricing of V-band carrier would be ~0.025% of AGR.

#### 10. E-band and V-band spectrum demand and ceiling

- a. One of the stakeholder has mentioned in their comments that:

*1. As mentioned above, we do not support in-band spectrum caps or carrier ceilings case. We believe that there is no possibility of hoarding this spectrum with use case in IAB and 5G densification at market price. Therefore, no in-band cap is recommended.*

*2. Further, in order to ensure that sufficient spectrum is available for all service providers, an overall cap of 40% of total carriers available for E Band and V Band be considered, if deemed necessary.*

- b. In this regard, we would like to mention that the number of carriers available for assignment in E-band are 19 and in V-band are 138. As per above comment of the stakeholder the 40% of total carriers (157) available for E-band and V-band would be ~63 carriers. With this logic, any deep pocketed player would be able to get hold of entire 19 carriers of E-band and monopolize the band. It would leave the TSPs to have only V-band for backhaul of Access technologies (for example 5G, 4G, 2G and upcoming 6G).
- c. Both E-band and V-band would serve as backhaul in different use case scenarios, providing complementary deployments and not substitutable deployments.
- d. Therefore, such overall caps of 40% of all carriers in E-band and V-band, with no in-band caps, would be catastrophe for Indian telecom industry, eventually leading to monopoly in the access market as well.
- e. We strongly urge the Authority that there is crucial need of in-band spectrum caps in both E-band and V-band spectrum and the ceilings should be fixed as 4 carriers/TSP in E-band and 20 carriers/TSP in V-band, at this stage.

#### 11. Coexistence with Satellite networks

- a. One of the stakeholder has mentioned in their comments that:

*15. We submit that Microwave spectrum use for terrestrial and space-based communication service is already co-existing and no major issues are observed. This is due to Fixed service is being shared on co-primary basis with other services, including Satellite. Further, with the LSA wise allocation of the spectrum, we do not foresee any risk of interference. Whatever, minimal interference is observed, can be managed by mutual negotiations between the parties and WPC help can be sought in case of unresolvable issues.*

- b. Another stakeholder has also pointed out that:

*...there are sufficient mechanisms and processes that exist under the ITU framework and global best practices that should be leveraged. <xxx> does not foresee any concerns at this stage that may warrant any ex-ante measures.*

- c. In this regard, we would like to reiterate that the traditional microwave (MW) frequencies as well as E/V Bands have been used for backhaul only, and there is no such example of allocation of the same channel in the same LSA for terrestrial and Satellite communication.
- d. Presently satellite communication in India is not fully matured and still in the developing phase. While it grows multi-fold, chances of interference may further increase if the same frequency is allocated.
- e. **Since telecom networks are widely dependent on wireless backhaul, co-existence of the same spots in both types of communication may create interference, degradation in Quality of Services, etc in both networks and hence, should be avoided.** However, there is ample spectrum available in the unallocated MW backhaul spectrum, which can be explored instead of hampering the current set of allocation.