RJIL/TRAI/2025-26/476
2nd July 2025

To,

**Shri Akhilesh Kumar Trivedi,**
**Advisor (Networks, Spectrum and Licensing)**
**Telecom Regulatory Authority of India,**
Tower-F, World Trade Centre,
Nauroji Nagar, New Delhi – 110029.

**Subject:** **RJIL's comments on TRAI's 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.**

Dear Sir,

Please find enclosed the comments of Reliance Jio Infocomm Limited (RJIL) on the TRAI's **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** dated 28.05.2025.

Thanking you,

Yours Sincerely,
For **Reliance Jio Infocomm Limited**

KAPOOR SINGH GULIANI
Digitally signed by KAPOOR SINGH GULIANI
Date: 2025.07.02 17:27:29 +05'30'

**Kapoor Singh Guliani**
Authorized Signatory

**Enclosure:** As above

## Reliance Jio Infocomm Limited's comments on TRAI's Notice Inviting comments 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" dated 28th May 2025

### Preface:

1. Reliance Jio Infocomm Limited (RJIL) thanks the Authority for giving an opportunity to offer 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.**

### A. Auction based assignment for Microwave Spectrum (6/ 7/13/15/ 18/ 21 GHz bands) and E-Band and V-Band

2. The Authority has rightly noted in the consultation paper that '*The microwave spectrum is the lifeblood of today's cellular mobile networks. It is used for providing both cellular mobile radio access and backhaul.'* We submit that the role of these spectrum bands is evolving, and it is no longer confined to only backhaul.

3. The Authority itself has discussed various evolving usage and technological changes for the spectrum bands under discussion and demands by different hues of service providers to use these bands as access spectrum for accessing the customers. **Thus, to use the narrow definition as backhaul to pre-decide the assignment methodology as administrative assignment is neither justified nor reasonable.**

4. The Authority has heavily relied on the GSMA report, wherein it is clearly mentioned that Microwave (7-40 GHz), E-Band and V-Band are low-cost spectrum resources that are **suitable for Heterogeneous Networks for Outdoor Cell- Site/Access Network.** Further, the Authority has recognized the developments around integrated access backhaul (IAB) for E-Band and V-Band and it has discussed the use of traditional backhaul bands in Fixed Wireless Access (FWA), which is essentially an access service.

5. Evidently, the Authority is aware that the spectrum in traditional backhaul bands, E-Band and V-Band is not confined to the traditional backhaul role, thus, we do not agree with the view in consultation paper that as under the Telecommunications Act 2023, backhaul spectrum is proposed to be assigned administratively, then there is no need for consulting the assignment methodology for traditional backhaul spectrum.

6. We submit that the settling of allocation methodology for the spectrum in backhaul band for Microwave Access and Microwave Backbone (MWB) is also a long pending crucial decision that needs to be settled. Further, the current administrative assignment methodology of temporary assignments at a high percentage of AGR as spectrum charge has not worked and a large amount of spectrum remains idle with the Government, while the TSPs have shortage of backhaul capacities. **Thus, it is imperative that the administrative mechanism should be dropped and instead the time-tested Indian success story of fair and transparent auctions should be brought in assignment of this spectrum as well.**

7. Therefore, all traditional backhaul bands should be assigned through auction in a technology and service agnostic manner and this spectrum can be used in both access and backhaul networks.

8. Further, E-Band and V-Band are key 5G spectrum bands with usage as Access, Backhaul and IAB, thus, there is no case of any administrative assignment of this spectrum.

9. Therefore, considering the importance of these spectrum bands, the Authority should focus on delivering a legally tenable, predictable and investor friendly mode of spectrum assignment for these bands. In compliance with the Hon'ble Supreme Court's order in 2012, India has used the most beneficial mode of Auction to assign spectrum for use in commercial public networks in the country and there is no reason or justification to abandon this path for MWA, MWB carriers and spectrum in E-Band and V-Band.

10. **We submit that the administrative assignment of spectrum is not a prudent or legally tenable policy, especially when the spectrum bands cannot be termed as purely backhaul. We understand that the Authority is also aware of this, and it has repeatedly mentioned these bands as traditional backhaul bands and has also discussed the possibility of auction of these bands albeit for specific use cases.**

11. We submit that spectrum auction, besides being the only legally tenable mean of assigning spectrum that is usage for access service, is also the only mode of spectrum assignment that delivers the full promise of technology to the actual owners of the spectrum i.e., consumers. The auctions promote efficient utilization and put spectrum in hands of those most suitable to use the spectrum. Auction brings the much-wanted competition and innovation in services and pricing and helps deliver services at their most affordable levels. Auction is the only blemish free mode of assignment as it delivers fairness, transparency and prevents hoarding and leads to additional infrastructure creation that has a trickle-down effect on the economy, especially in rural areas.

12. Unlicensed access to spectrum usable for IMT services distorts the level playing field and impacts the investments in the sector, besides being technically ineffective. For instance, the usability of unlicensed V-Band and E-Band as access mediums for public Wi-Fi using un-licensed service providers in dense urban areas will create an alternative high speed data service, as Wi-Fi 6 offers comparable speeds, consistency, and reliability with 5G-like "beamforming" capability.

13. This will enable dense carrier-grade networks for unlicensed entities without accountability for national security, QoS, tariffs, or consumer interests. Which will result into revenue cannibalization that would negatively impact the Indian telecom sector and further shake investor confidence. **Therefore, all spectrum usable in commercial public/private networks should always be auctioned, in compliance with Hon'ble Supreme Court mandate.**

14. **In view of the above, we request the Authority to include all the spectrum band under discussion in the scope for the next auction of spectrum.**

15. The license exempt use either for low-power indoor devices or some part of spectrum in V Band for outdoor use should be completely rejected **as it is not only legally untenable but also encourages favoritism, non-level playing field, violates "Same Service Same Rule" principle apart from coming at a great loss to the exchequer; causing technical issues like interference; bringing in inherent inefficiencies and is detrimental to investor's confidence.**

## B. Role and current lack of uptake of Microwave Spectrum (6/ 7/13/15/ 18/ 21 GHz bands)

16. As noted by the Authority, for wireless backhaul, Microwave 'line-of-sight' wireless communication technology is critical to provide high speed wireless connections that can send and receive voice, video, and data information. Both Microwave Access (MWA) Carriers and Microwave Backbone (MWB) carriers are used to connect the network nodes for backhauling the traffic generated by the access network. The data centric technologies like 5G, 6G and beyond support higher rates of data transmissions and consequently, higher bandwidths are required to meet the traffic backhauling requirement. 5G has led to massive increase in the need for increasing the wireless backhaul capacity. The Government is aware of the same and the spectrum in E-Band as well as additional MWA carriers were provided to the TSPs on a temporary basis to meet these requirements.

17. The only substitute for microwave backhauling is fiberization of towers. We submit that over the years, **RJIL has been doing its best to fiberize its cell sites**, however, the difficulties in laying fibre across the country are well known to the Authority and we are not repeating the same. We submit that despite all our efforts, a large proportion of our **eNodeBs are still dependent only on Microwave carriers, this proportion will be much higher for other Telecom Service Providers, as RJIL has the densest fiberization.**

18. Notwithstanding the fiberization efforts, it is evident from global analysis that high-capacity microwave backhaul will remain very relevant in the near and mid-term future. The GSMA-AIB Research report on "Wireless Backhaul Evolution-Delivering next-generation connectivity" of February 2021, also referred by the Authority in consultation paper providers evidence for the same. The report notes that wireless backhaul will have 65% share of all backhaul traffic till 2027. It goes on to highlight the need to make available more and more spectrum for wireless backhaul services.

> *In developed markets, it was found that new backhaul technologies and traditional microwave backhaul bands alone were not sufficient to meet traffic demands, so new bands, such as the E-band and, eventually, the D-band and W-band, will be vital, especially toward the end of the period. In developing markets, new backhaul technologies and traditional microwave backhaul bands were again also unable to meet increasing traffic alone, so the E-band will be crucial to addressing increasing traffic and*

*speeds*.

19. We further submit that unavailability of sufficient backhaul impacts on the utilization and Quality of Service (QoS) leading to poor customer experience for both voice and data services. **Notwithstanding the same, currently only 391 out of a total 1699 available MWA (18.7%) carriers are assigned, and remaining carriers do not generate any revenue to exchequer. The TSPs are wary of acquiring more carriers administratively due to very high revenue share implications and the cost benefit analysis does not make a business case. Auction based assignment at market price is the only way out of this jeopardy, where you need the spectrum but cannot acquire it due to high-cost implications.**

20. It is no doubt that Microwave will remain the backbone for communication needs of a large portion of Indian population and making available all possible spectrum for wireless backhaul at reasonable charge will be critical for developing a robust broadband backbone for the country. Thus, it is imperative that sufficient backhaul spectrum is made available at reasonable and market driven prices to facilitate high quality services and to maximize spectrum utilization and benefits, these bands should only be auctioned.

## C. Role of spectrum in V-band (52.6 GHz to 71 GHz) and E-band (71GHz - 76 GHz paired with 81 GHz-86 GHz)

21. As noted by the Authority, the spectrum in V & E bands serves both roles– Backhaul and Access. 3GPP Rel-16 offers backhaul / relay service under the Integrated Access Backhaul (IAB) umbrella. In currently developed NR-IAB, some nodes serve both backhaul and access. In absence of a wired connection, wireless technologies are used to offer backhaul / relay service. In IAB, a single node can offer broadband services/ relay services or a combination thereof. The expected coverage range is approximately 300m to 500m.

22. The Authority is aware of demand by one ISP licensee to assign this spectrum to access the customers through FWA and related technologies. Thus, clearly the demand is evolving from different types of stakeholders including the ISPs seeking delicensing. However, whichever way we look at this, the spectrum is invaluable for wireless communications in the country and should be treated as any other 5G spectrum band for valuation and auction.

23. It is pertinent to point out here that the demand for delicensing these bands for use in public Wi-Fi networks is unreasonable, without any technical or financial justification and should be rejected at the very outset. We submit that no Regulator would pilfer the in demand and monetizable spectrum resources to delicensing, especially when the aim of the delicensed use is to cannibalize a revenue generating service exploiting regulatory arbitrage.

24. As the Authority is aware, public Wi-Fi, even without full mobility and only hotspot coverage is directly competing with 5G and **would be a substitutable broadband service and thus should only be provided through licensed spectrum only following principle of "Same Service Same Rule".**

25. Already large spectrum in 2.4 GHz and 5 GHz bands is lying waste and there is no authoritative analysis of the utilization of this spectrum. Further 500 MHz of spectrum in lower 6 GHz band is already being considered for license exempt usage. In this background, the demand for more delicensed spectrum appears frivolous.

26. Further, due to widespread and indiscriminate adoption of delicensed spectrum, even if a part of spectrum is delicensed will cause serious interference issues thus rendering these bands technically unusable for 5G. The Authority should also bear in mind that de-licensing of spectrum is a one-way irreversible process encouraging first come first serve principle denounced by Hon Supreme Court in 2G case apart from causing loss to the exchequer. While upper part-of the band is already identified for IMT in WRC-19, **in the event balance part also get identified for IMT – it cannot be implemented if the spectrum is already delicensed. This is established by the fact that countries which have delicensed entire 6 GHz band for Wi-Fi services are now not able to reverse it when 6.425 – 7.025 GHz is being considered for IMT in WRC-23.**

## D. Technical limitations and issues with link-to-link allocations.

27. We submit that **link-by-link allocation would result in inefficient utilization of spectrum resource.** The interference caused by link-to-link allocations would be difficult to manage and timely mitigation of such issues on a daily basis would be nearly an impossible and herculean task for the WPC.

28. We submit that link-to-link allocation has also proved to be an inadequate arrangement in the long run. We submit that MWA spectrum was also initially allocated on link-to-link basis, however, with increasing number of BTS, administration of such allocation became a herculean task and effectively compelled the Government to migrate to exclusive allocation with license fee as percentage of AGR. Further, with high frequency in E and V band, the number of links are expected to be in multiples MWA links making such an allocation unfeasible.

29. Allocating the spectrum on a regional/ circle level basis through auction will enable exclusive access to spectrum resources, **thereby giving the much-needed flexibility for usage of the spectrum based on the evolving requirement by the operators and smaller players.**

## E. Spectrum leasing to accommodate smaller players operating at regional/district level:

30. As submitted in our response to the previous consultation on the subject, direct licensing of spectrum in MWA, MWB and E&V band to the smaller entities requiring such spectrum in a smaller area will lead to huge fragmentation and inefficient use of the spectrum. Leaving the spectrum unsold in the remaining areas of the LSA in which some spectrum has been assigned to a smaller operator will lead to huge wastage of spectrum. Further, assignment of same frequencies in the LSA to multiple operators with smaller boundaries will lead to huge number of disputes which would need resolution by Government on day-to-day basis, thereby making such spectrum non-usable.

31. Therefore, an optimum mode to address the spectrum needs for smaller or niche players is the **decentralizing the spectrum usage** to cater to all types of use cases by means of spectrum leasing. As submitted earlier in our response to consultation paper on "Auction of Spectrum in frequency bands identified for IMT/5G", and to "Telecommunication Infrastructure Sharing, Spectrum Sharing, and Spectrum Leasing", this can be done by **permitting the Unified license holders to lease the auction acquired spectrum to other unified license holders with appropriate authorization.**

32. We submit that with this innovative approach, the entities desirous of using this spectrum to build public/private communication networks in smaller geographical units can bid directly for spectrum in auction, while the entities interested in further smaller geographical units for spectrum use can avail the same through spectrum leasing.

33. Leasing arrangement will also ensure that the Licensee will be responsible to ensure **optimum and interference free use of this spectrum and all interference issues will be managed and mitigated effectively by the licensees,** without any requirement of WPC intervention.

34. We submit the possible revenue through leasing would ensure greater competition for right to use this spectrum, as these measures will provide **viable business models for small and niche players.** This measure will ensure that spectrum requirements of all types of service providers can be met in an equitable manner.

## F. License exempt use of lower 6 GHz band

35. The Government has taken an important initiative to propose delicensing of spectrum in the lower 6 GHz band. While the telecom industry had requested identification of the entire 6 GHz band (5.925 GHz to 7.125 GHz) for IMT to meet India's growing broadband needs, the Government, in its wisdom, has chosen to split the band—allocating 700 MHz (6.425 GHz to 7.125 GHz) for IMT and 500 MHz (5.925 GHz to 6.425 GHz) for unlicensed use.

36. We believe that the lower 6 GHz band (5.925 GHz to 6.425 GHz) is as critical as the upper 6 GHz (6.425 GHz to 7.125 GHz) in expanding broadband access and can play a significant role in enhancing fixed broadband penetration across the country.

37. In light of the crucial role this spectrum can play in broadband proliferation, it is essential to ensure that no portion of it remains underutilized due to overly restrictive technical limitations. In this regard, we would like to draw attention to the draft notification G.S.R. 316(E) dated May 16, 2025, which proposes a very low outdoor power limit of just 14 dBm (25 mW). We submit that such restrictive limits may significantly hamper the potential use of this band for meaningful broadband deployment including public Wi-Fi hotspots, PM-Wani, Point to Point and Point to Multi Point Links etc.

38. We have already submitted to the DoT and would request Authority's support in emphasizing that the proposed restrictive power limit risks undermining the potential benefits of the Government's initiative to open up the lower 6 GHz spectrum for public Wi-Fi use. The currently proposed limit of 14 dBm EIRP for outdoor deployments effectively renders the valuable 500 MHz spectrum unusable for any meaningful broadband deployment.

39. Imposing such a low power threshold may lead to gross underutilization of this critical spectrum—neither being harnessed for IMT (5G/6G) nor being effectively deployed for outdoor public Wi-Fi based broadband expansion, including key initiatives like the National Broadband Mission 2.0 (NBM 2.0) and PM-WANI. We urge that the draft rules be suitably amended to facilitate national objectives of providing affordable and widespread broadband connectivity to households and small enterprises.

40. In line with global best practices and the power levels already permitted in the 5 GHz band in India, we recommend that the outdoor EIRP limits under the draft rules be revised to:
    - 36 dBm EIRP for Point-to-Multipoint (P2MP) links, and
    - 53 dBm EIRP for Point-to-Point (P2P) links.

41. These revised limits will enable complementary Wi-Fi infrastructure to support connectivity across urban, semi-urban, and rural areas, thereby furthering the goals of the National Broadband Mission 2.0.

42. We further submit that concerns around aggregate uplink interference (Earth-to-Space) to satellites currently using this band are largely unsubstantiated. Deployments using 36 dBm (P2MP) and 53 dBm (P2P) EIRP are designed with highly directional antennas aligned parallel to the ground, resulting in negligible emissions toward space. Also, prior technical studies have clearly shown that the outdoor Wi-Fi deployments in the 6 GHz band do not cause harmful interference to satellite services.

43. **International Best Practices**: Many countries have delicensed the lower 6 GHz band for standard power outdoor use (up to 36 dBm EIRP for Point-to-Multipoint) even in the presence of incumbent users such as broadcasters and defence. Rather than allocating the band to high-power IMT use (which can go up to 82 dBm or 160 kW), they have successfully enabled Wi-Fi-based deployments at moderate power levels that do not pose interference risks to satellite services.

44. For instance, the United States—despite having a far higher density of teleport and broadcast links than India—has permitted 36 dBm standard power for outdoor Wi-Fi in the 6 GHz band for over five years without any reported cases of harmful interference.

45. We submit that, unlike Outdoor WIFI APs/Devices with Omni Directional antennas, P2P and P2MP Radios with Highly Directional beams covering homes and buildings on the ground, hardly have any energy radiated beyond the 30degree elevation angle. The Radiation patterns meet the specification of <14dBm at higher elevation in line with the proposed EIRP suggested in the draft gazette.

46. We request the Authority to intercede with the DoT to adopt the same and mandate that Telecommunication Engineering Centre (TEC) will certify all outdoor radios for 6GHz operation that will have Antenna patterns and EIRP levels that limit radiation beyond 30 degrees elevation (towards the sky) to be within the proposed 14dBm EIRP. While allowing the overall EIRP below 30-degree elevation to be up to 36dBm for any channel BW. Enabling TSPs to use such TEC certified outdoor Radios with Directional Antennas can ensure efficient usage of this highly valuable 500MHz of Spectrum.

47. As an additional layer of protection, DoT may also implement an Automated Frequency Coordination (AFC) like system to manage outdoor AP's that are non-compliant to TEC specs in 6GHz. In the US, FCC has agreed to 36 dBm EIRP for P2MP & P2P WITHOUT any mandate for compliance to directional antenna. But with ISPs/TSPs in India using only directional antennas approved by TEC, the need for such AFC system to protect the incumbent Satellite operators may be unnecessary.

48. Countries such as Canada, Brazil, Colombia, and Japan have also allowed higher EIRP levels for outdoor Wi-Fi use in the 6 GHz band, reinforcing the feasibility of this approach.

49. **In line with these international benchmarks, we propose that the lower 6 GHz band be delicensed for outdoor use with standard power limits—36 dBm EIRP for Point-to-Multipoint (P2MP) links and 53 dBm EIRP for Point-to-Point (P2P) links.**

50. Notably, India's own experience with the 5 GHz band provides a relevant precedent. Initially delicensed with low power limits due to interference concerns, the band was later upgraded to allow 36 dBm (P2MP) and 53 dBm (P2P) as no interference was observed in practice. Based on this experience, similar cautionary delays in utilizing the 6 GHz band can be avoided, allowing immediate effective use.

51. Multiple studies conducted in India, including by the Broadband India Forum and IIT Kanpur, have found that outdoor Wi-Fi deployments in the 6 GHz band do not cause harmful interference to satellite services.

52. The primary concern of interference from Wi-Fi to satellite receivers stems from the assumption that Wi-Fi antennas are omni-directional. However, outdoor P2MP/P2P Wi-Fi systems operating at 36 dBm typically use highly directional antennas with narrow, parallel-to-ground beams, resulting in negligible upward emissions.

53. As mentioned above, the TEC can be entrusted with certifying Wi-Fi equipment for compliance with power limits, and directional antenna use. These certifications can be integrated into the existing MTCTE (Mandatory Testing and Certification of Telecom Equipment) framework. A joint technical study involving DoS, DoT, MHA, MoD, MIB, and industry stakeholders can be completed within 2–3 months. Final rules should be notified ONLY after this study is completed, and implementation with restrictive outdoor limits should be avoided to ensure policy certainty and avoid market fragmentation.

54. We reiterate that the lower 6 GHz band is critical for enabling scalable and affordable broadband access across India. Imposing artificially low outdoor power limits will result in underutilization of this valuable resource. Therefore, consistent with international practices and India's 5 GHz spectrum policy, the lower 6 GHz band should be delicensed for both indoor and outdoor use with full power support—36 dBm EIRP for P2MP and 53 dBm EIRP for P2P.

55. To further mitigate any interference concerns, outdoor use of this band can be restricted to licensed TSPs/ISPs, using fixed, directional Wi-Fi devices. This approach ensures efficient spectrum utilization, encourages investment in indigenous high-performance equipment, and accelerates access to affordable, high-speed broadband for all Indians.

## G. Valuation of spectrum and reserve price

56. The valuation of spectrum is the **most relevant aspect of any spectrum assignment related consultation exercise.** We submit that for these new bands to be put to auction, the valuation requires paradigm shift in approach being followed at present. The new approach should delink the spectrum valuation from maximization of one-time spectrum auction proceeds and instead link it with **national objectives, proliferation goals, societal and economic impact on all spheres of life and to regenerate demand of spectrum and competition in sector and to ensure that no spectrum remains unsold.**

57. **National Objectives:** This spectrum is key to meet the declared objectives of proliferation of broadband technologies and digital inclusion. Therefore, the valuation exercise should result in optimum valuation that should be neither prohibitive for new entrants nor lead to a substantial loss to Exchequer. Considering the evolving usage of these spectrum bands and the fact that these are being auctioned for the first time, we should ensure that the valuation is transparent, non-discriminatory, pro-utilization and promotes efficiently and consumer benefit. As the efficient utilization of spectrum many times fails due to revenue maximization objectives, the valuation should be sufficiently low.

58. **Past Auction Results:** We submit that past spectrum auction has been an important measure for spectrum valuation. However, as this spectrum is being auctioned for the first time, we may need to measure the spectral efficiency with a band nearest to propagation characteristic. In this regard the auction determined price (ADP) of spectrum in mmWave should be useful for spectrum in E-band and V-Band. We submit that considering the coverage and propagation, 50% of mmWave ADP would be optimum for this spectrum.

59. **International Benchmarking:** We submit that for new bands, international benchmarking is generally considered to be the more suitable mode. However, as per the GSMA-AIB Research report referred above, there is wide disparity in the backhaul spectrum costs globally. The E-Band cost varies from $0.02/MHz/year in Japan to $71.41/MHz/year in UK. Whereas variance in backhaul bands are even more stark, as evident from below data.

**Figure 27. Global Spectrum PPP Adjusted Spectrum Pricing by Frequency Segmentation (US$/MHz/Year)**

| Frequency Segmentations | Country | Low (US$/MHz) | Country | Mid (US$/MHz) | Country | Max (US$/MHz) |
|---|---|---|---|---|---|---|
| **Sub-5.x GHz** | Spain | 16.73 | Italy | 44.62 | Bangladesh | 996.24 |
| **6 GHz to 13 GHz** | Spain | 14.64 | Nigeria | 42.07 | Bangladesh | 626.90 |
| **14 GHz to 25 GHz** | Spain | 10.46 | Italy | 33.46 | Bangladesh | 376.14 |
| **26.5 GHz to 56 GHz** | Czech | 3.29 | Jordan | 28.04 | Bangladesh | 313.45 |
| **E-Band (71 GHz to 86 GHz)** | Japan | 0.02 | Poland | 2.25 | U.K. | **71.41*** |

*Source: ABI Research*
***UK: Double regime approach, which reflects the UKP50 fixed fee per wireless backhaul link***

60. On the other hand, the Hong Kong example shared by the Authority is more relevant wherein the 6/7 GHz (6570-7025 MHz) band was auctioned for mobile services with auctioned determined price at HK$ 2.1 million per MHz. This global ADP seems to indicate that Indian mmWave price is also high, thus there is a case for rationalizing the valuation of spectrum in E-Band, V-Band and traditional backhaul bands.

61. In addition, as submitted multiple times the spectrum awards in India have already been on the higher side. We had previously shared the GSMA report of September 2021, which clearly depicted that spectrum awards in India have always exceeded the international benchmarks by multiples and the Authority should take the same into consideration.

62. In view of this, we submit that the **valuation of spectrum should be brought down, and the valuation of V-Band and E-band should be kept at 50% of mmWave, considering low ARPU, purchasing Power in India and International benchmarks.**

63. **Impact of proliferation on national economy**: The NDCP-2018 notes that ***"It has been broadly estimated that a 10% increase in broadband penetration in a country could potentially lead to an over 1% increase in GDP. However, studies in India estimate that the impact could be significantly higher for the country, given the increased productivity and efficiency gains that are likely to accrue to the economy"***. Thus, the policy makers need to keep the overall economic benefits of broadband penetration in mind, while carrying out the pricing exercise for spectrum, especially as the spectrum under discussion will be primarily used for backhauling and IAB.

64. **Cost benefit analysis of one-time revenue against the long-term gains through license fee:** Another important consideration is to cost benefit analysis where along with the long-term economic gains, the long-term gains from license fee due to deployment of spectrum outweighs the one-time revenue. As per GSMA report[1] many countries are carefully considering wider economic goals rather than short-term monetary gains.

65. **Reserve Price:** We submit that while consideration of the above points will lead us to optimum valuation of the spectrum, the most critical factor in increasing the competitive

intensity and to discover true market value of the spectrum would be optimum reserve price. **We submit that 70% of the valuation as reserve price is too steep and not conducive of wider participation in auction and throttle competition. It has resulted in selling the spectrum at reserve price and does not lead to discovery of market determined price with competition. Besides obviating the possibility of true market price discovery, it also acts as a deterrent for new entrants, which is evident from past experience. Therefore, we request the Authority to reduce the reserve price to 50 % of the spectrum valuation.** We submit this may help in discovery of true market price and will be beneficial in longer run as it will increase spectrum uptake, reduce the wastages due to unsold spectrum, maximize the overall return instead of maximizing the unit price and will also help in meeting proliferation goals while at the same time increasing the overall license fee proceeds.

## H. Auction Payment Methodology

66. We submit that the Union Cabinet's liberalizing approach should also be reflected in the payment methodology for the auction dues of TSPs. **The deferred payment scheme should be treated as a financing scheme for building vital national infrastructure and not as a monetization option.** Therefore, we submit that there should be **a 10% upfront payment requirement to ensure TSP's commitment, followed by a 5 year moratorium in payments. The remaining part of the payment should be spread over the remaining 15 years of spectrum validity. Further, the interest on these EMIs should be charged the same as RBI Repo rate.** This will not only support the TSPs in faster roll-out but will also increase auction participation. We further submit that this deferred payment formula should be uniformly applied to all spectrum bands being put to auction.

67. **Conclusions**

1. **The only mode for assignment of spectrum in E-Band, V-Band, MWA and MWB bands should be auction.**
2. **All spectrum available with the Government should be put to auction.**
3. **All auctioned spectrum should be assigned in a technology and service agnostic manner for its usage either in access network or backhaul network.**
4. **The proposals of spectrum delicensing and unlicensed use of spectrum in V / E band should be rejected.**
5. **Spectrum leasing should be promoted for niche users or users requiring restricted spectrum as well as for Captive networks (except Indian Railways and Defence).**
6. **No point-to-point allocation of spectrum should be done.**
7. **The valuation of spectrum should be rational and consistent with national goals and should promote maximum uptake of the spectrum.**
8. **The valuation of spectrum in E-band and V-band should be 50% of the of ADP of spectrum in mmWave spectrum.**
9. **The valuation of spectrum in MWA and MWB band should be determined with an analysis of current use cases and the fact that a large amount of spectrum**

**is unutilized. Further following the Hong Kong example this valuation should not be more than 1 Crore/Per MHz pan-India, alternatively, it can be kept at 50% of valuation of E-Band and V-Band.**
**spectrum.**

10. **Only the Unified License holders with appropriate authorization should be eligible to acquire the spectrum.**
11. **For E-band and V-band spectrum, access/internet services authorization should be required.**
12. **The roll-out obligations for E-band and V-band spectrum should be as per those for mmWave spectrum.**
13. **There should be no roll-out obligations for MWA and MWB spectrum bands.**
14. **The spectrum surrender provisions should be the same for all spectrum.**
15. **The reserve price should be kept at 50% of the spectrum valuation.**
16. **All band in MWA/MWB shall be taken as one band for the purpose of bidding. However, for the purpose of assignment and harmonization, the bands should be treated as different bands.**
17. **The successful bidders should be allowed to retain their existing frequencies.**
18. **Successful bidder should have the first right of refusal to get the frequencies in the same band of their existing assignment.**
19. **Harmonization of MWA frequencies shall be done with minimal requirement of any change in hardware and software.**

**Issue wise comments**

**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.**
**And**
**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 ecosystem.**
**And**
**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.**

**RJIL Comments:**

1. **Spectrum is a scarce natural resource, and all available spectrum should be made available to serve the public.** Wireless communication is a fast-paced evolving domain, and the spectrum demand would keep on increasing and irrespective of any fluctuations in demand at a particular time, no assumptions can be made about future demand.

2. Therefore, we believe that the demand studies for all bands of spectrum be it traditional access bands, traditional backhaul bands, new IAB bands like E-Band and V-Band are meaningless and should not be conducted as the demand will only increase with evolving use cases. Therefore, all spectrum should be made available for assignment to TSPs.

3. It is also not out of place to mention here that the Authority has maintained a position over the years that all spectrum identified for IMT and related usage and available for assignment should be put to auction. **This is an outcome to the fact that in spectrum market economics there can never be a perfect balance of demand and supply.** There will be cases where the demand will be far outstripping the supply, as was seem in auctions in 2010, 2014 etc. In other cases, the availability of spectrum and newer technologies will generate or re-generate demand for instance the spectrum in 700 MHz band and other sub-1-GHz bands.

4. **Only one thing is certain that the spectrum demand will be endless, and all spectrum needs to be made available for optimum utilization and to foster new technologies. Therefore, we reiterate that all available spectrum should be put to auction as even if not utilized now, the demand will be generated sooner than later.**

5. We also submit that in view of evolving technologies and shortening technology cycles, **all spectrum should be made available in a technology-neutral or service neutral manner, through auction-based assignment.** The successful bidder should be allowed to use the acquired spectrum flexibly for any type of network, be it access, carrier, terrestrial or satellite and any type of service, as per the scope of their respective authorizations.

6. We submit that it is imperative to maintain this advantageous approach, without deviating on the basis of current/future estimated service requirements. Making accurate estimations in this regard is challenging, as spectrum needs will inevitably evolve with technological advancements. Hence, there is no necessity to gather data as per the prescribed table, and instead, all available spectrum should be included in the upcoming auction.

**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.**

**RJIL Comments:**

We reiterate our submissions that there is no need to put technology and usage related restrictions on the spectrum for access and backhaul services. The Authority should appreciate that the technologies are evolving and there will always be some new usage coming up. **Thus, as long as market price has been paid for a spectrum through a fair and transparent auction, there should not be any service or usage type restrictions on the spectrum. Therefore, all traditional backhaul bands should be assigned through auction in a technology and service agnostic manner and this spectrum can be used in both access and backhaul networks.**

**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.**

**RJIL Comments:**

1. In order to ensure optimum use of interference free harmonized spectrum, it is critical that all aspects of assignment methodology are also optimum. As also noted by the Authority, the MWA carriers are already assigned to access service providers on a block basis in LSA, which facilitates the TSP to use that MWA carrier on any number of radio backhaul links within the LSA.

2. Whereas point-to-point assignment of MWB carriers to all services providers and point to point assignment of MWA spectrum to non-TSP service providers creates unnecessary red-tape wherein new permission is required to use that MWB carrier on any other radio backhaul link in the LSA.

3. **Clearly, block base assignment is service provider and QoS friendly and the same should be followed all across. In our view auction is the most suitable option for spectrum assignment and block basis LSA wise assignment is optimum.**

**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.**

**RJIL Comments:**

1. We do not support spectrum fragmentation by different types of commercial telecommunication services. As submitted above, an optimum mode to address the spectrum needs for smaller or niche players and for other communication services is the decentralization of the spectrum usage to cater to all types of use cases by means of spectrum leasing.

2. This can be done by permitting the Unified license holders to lease the auction acquired spectrum to other unified license holders with appropriate authorization. Thus, other service

providers or smaller players will have two options viz. acquire spectrum in auction for LSA and lease the spectrum if the requirements is less than LSA.

3. Leasing arrangement will also ensure that the Licensee will be responsible to ensure optimum and interference free use of this spectrum and all interference issues will be managed and mitigated effectively by the licensees, without any requirement of WPC intervention.

4. We submit the possible revenue through leasing would ensure greater competition for the right to use this spectrum, as these measures will provide viable business models for small and niche players.

**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.**

**RJIL Comments:**

**(a) Carrier size**

1. We believe that the carrier sizes should be aligned to meet the requirements of new technologies rather than legacy requirements. **We understand the predicament of changing the status quo, however, is required to provide wider channel sizes to support data technologies like 5G and beyond, as is also evident from the GSMA report referred by the Authority. Therefore 56 MHz carrier size is optimum for traditional microwave backhaul bands.**

2. GSMA has rightly noted that wider backhaul channel size is required to support higher data throughput under new technologies. However, in case the current channel size is to be maintained due to considerations pertaining to non-access service providers, we request the Authority to ensure that access service providers are assigned contiguous spectrum and are accorded preference in assignment. The proposed carrier size as below:

| **Microwave bands** | **Carrier Size (in MHz) for-** | |
|---|---|---|
| | **TSPs with Access Service License/ Authorization** | **TSPs other than Access Service License/ Authorization** |

| | | |
|---|---|---|
| **MWB (6/7 GHz)** | 56 MHz | 28 MHz |
| **MWA (13/15/18/21 GHz)** | 56 MHz | 28 MHz |

**(b) Carrier aggregation.**

1. Carrier Aggregation (CA) is a technology related feature of wireless communications to increase the bandwidth and thereby bit rate. This was first introduced through 3GPP release 9 and is now widely used in systems like LTE (4G) and 5G. Radio-link bonding is analogous method used in microwave backhaul like CA.

2. We submit that these are technology specific features and will depend upon the TSPs requirements for implementation and need not be regulated. **Further, there is no global precedence of regulating CA as long barring ensuring compliance with spectrum usage rules, EMF limits and RF exposure limits. We submit that the TRAI should follow the same.**

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

The validity period of MWA and MWB spectrum assignment should be 20 years, in line with all other IMT spectrum being put to auction. The validity should be increased to 30 years, as and when the validity of IMT spectrum assignment is done so

**(d) Renewal mechanism.**

There is no need for a renewal mechanism for auctioned spectrum as the renewal is through auction only.

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

There is no need for roll-out obligations for traditional backhaul bands. There is already a shortage of this spectrum and mere market-based assignment will ensure optimum utilization of spectrum. Further, there is no precedent of mandating roll-out for backhaul, and the status quo should be maintained.

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

The prevailing terms and conditions for surrender of spectrum should be applicable for these bands as well.

**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.**
**And**
**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.**

**RJIL Comments:**

1. We submit that the role of ceiling on the number of carriers is to ensure and maintain sufficient competition in the market and prevent monopolization of valuable national resources. We submit that monopolization is not possible when large amount of spectrum remains unassigned. Thus, there is no case for ceiling.

2. **However, if the Authority is keen on recommending a ceiling, then the overall ceiling should be 40%. Further, we understand the Authority's view of different levels of utility of different spectrum bands.** Therefore, in case ceiling is proposed, it should be group wise ceiling of 40% for following groups

   **Group 1- 6 GHz, 7 GHz;**
   **Group 2- 13 GHz/ 15 GHz/ 18 GHz/ 21 GHz;**
   **Group 3- E-Band and**
   **Group 4- V-Band**

**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.**

**RJIL Comments:**

1. The DoT has already made it amply clear that the MWA/MWB assignment is temporary in nature, the assignees would have contingency plans in place to prevent disruption of services. Therefore, principally, we do not support the proposal to ensure that the newly assigned frequency carriers to a TSP are supported by the existing equipment of the TSP.

2. However, if it is decided to provide an option to telecom service providers already holding carriers in traditional microwave backhaul bands to retain the existing carriers, then there should be no permission to add new links.

3. Additionally, the TSPs should be permitted to swap their assignment basis mutual agreement. Further, in case serious service disruption is envisaged, the Government may provide a 3-month timeline to recalibrate or replace the equipment for new frequencies before effecting the change in assignment for existing users.

**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.**
**And**
**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.**

**RJIL Comments:**

1. As per the data shared by the Authority there is extensive usage in 15 GHz band under consideration. Thus, any decision at the WRC study stage may have wide ramifications on the wireless networks and should be avoided.

2. Of course, if the spectrum is earmarked for IMT in India post WRC outcome, there will be a need for a migration path for users in these bands, however, there is no need to effect any changes at this stage.

3. Therefore, we submit that existing assignment should not be affected by WRC review, and we can change if required post WRC decision. However, as a precaution, no new assignments are to be done in these bands. If existing assignees seek / acquire additional carriers, incremental or all assignment, at the option of assignee, to be done in the new bands. Further auctions will anyways ensure technology neutral use.

**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.**
**And**
**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.**

**RJIL Comments:**

1. Fixed Wireless Access is a technology option under access services that leverages 4G, 5G to connect with the switch fixed at users building with the Core network. The Authority has itself noted that one of the TSPs has requested for assignment in traditional backhaul bands to offer FWA services, thus clearly use of traditional microwave bands is one of the emerging use cases of FWA technology.

2. Further, we agree with the Authority's view that the licensed spectrum for this service should be assigned only through auction. We are extracting and reproducing TRAI's view as herein below:

> *"Section 4(4) read with the First Schedule of the Telecommunications Act, 2023 provides that the assignment of spectrum for radio backhaul purposes shall be through an administrative process. Further, Section 4(4) of the Telecommunications Act, 2023 provides that the Central Government shall assign spectrum for telecommunication through auction except for entries listed in the First Schedule. Therefore, the assignment of the spectrum for the last mile connectivity (fixed wireless access) to the customer equipment in telecommunication networks will be made through auction in terms of Section 4(4) of the Telecommunications Act, 2023."*

3. **However, irrespective of the spectrum band being used, FWA is an access service and there is no need to provide separate terms and conditions and other rules and obligations for this service. The NIA terms for various spectrum (including traditional backhaul bands) being auctioned will suffice for this service as well.**

**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.**

**RJIL Comments:**

None as all spectrum in traditional backhaul spectrum should be assigned block wise for entire LSA. We reiterate our submissions regarding assignment of spectrum to captive or niche users that these users should avail spectrum resources using spectrum leasing policy or opt for managed services mode.

**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.**

**RJIL Comments:**

As mentioned above, the captive users should be permitted to take spectrum on lease from the TSPs to meet their requirements. Otherwise, these users can go for managed services option, where the TSPs will set up captive networks for these users.

**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.**

**RJIL Comments:** Not Applicable in view of our above submissions.

**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.**

**RJIL Comments:**

1. We submit that the delicensing of lower 6 GHz band is at draft stage. While we believe that entire 6 GHz band (5.925 GHz to 7.125 GHz) should have been assigned for IMT to meet India's growing broadband needs, the Government, in its wisdom, has chosen to split the band—allocating 700 MHz (6.425 GHz to 7.125 GHz) for IMT and 500 MHz (5.925 GHz to 6.425 GHz) for unlicensed use.

2. However, as submitted above, once the lower 6 GHz band (5.925 GHz to 6.425 GHz) is decided by the Government for unlicensed use, its key role in expanding broadband access should not be undermined by the sub-optimum outdoor power limits. The draft notification provides a very low outdoor power limit of just 14 dBm (25 mW), which can significantly hamper the potential use of this band for meaningful broadband deployment including public Wi-Fi hotspots, PM-Wani, Point to Point and Point to Multi Point Links etc.

3. We have already submitted to the DoT and would request Authority's support in emphasizing that the proposed restrictive power limit risks undermining the potential benefits of the Government's initiative to open up the lower 6 GHz spectrum for public Wi-Fi use. The currently proposed limit of 14 dBm EIRP for outdoor deployments effectively renders the valuable 500 MHz spectrum unusable for any meaningful broadband deployment.

4. We submit that in line with global best practices and the power levels already permitted in the 5 GHz band in India, we recommend that the outdoor EIRP limits under the draft rules be revised to:
   - 36 dBm EIRP for Point-to-Multipoint (P2MP) links, and
   - 53 dBm EIRP for Point-to-Point (P2P) links.

5. These revised limits will enable complementary Wi-Fi infrastructure to support connectivity across urban, semi-urban, and rural areas, thereby furthering the goals of the National Broadband Mission 2.0.

6. We further submit that concerns around aggregate uplink interference (Earth-to-Space) to satellites currently using this band are largely unsubstantiated. Deployments using 36 dBm (P2MP) and 53 dBm (P2P) EIRP are designed with highly directional antennas aligned parallel to the ground, resulting in negligible emissions toward space. Also, prior technical studies have clearly shown that the outdoor Wi-Fi deployments in the 6 GHz band do not cause harmful interference to satellite services.

7. We reiterate that, unlike Outdoor WIFI APs/Devices with Omni Directional antennas, P2P and P2MP Radios with Highly Directional beams covering homes and buildings on the ground, hardly have any energy radiated beyond the 30degree elevation angle. The Radiation patterns meet the specification of <14dBm at higher elevation in line with the proposed EIRP suggested in the draft gazette.

8. We request the Authority to intercede with the DoT to adopt the same and mandate that Telecommunication Engineering Centre (TEC) will certify all outdoor radios for 6GHz operation that will have Antenna patterns and EIRP levels that limit radiation beyond 30 degrees elevation (towards the sky) to be within the proposed 14dBm EIRP. While allowing the overall EIRP below 30 degree elevation to be up to 36dBm for any channel BW. Enabling TSPs to use such TEC certified outdoor Radios with Directional Antennas can ensure efficient usage of this highly valuable 500MHz of Spectrum.

9. Notably, India's own experience with the 5 GHz band provides a relevant precedent. Initially delicensed with low power limits due to interference concerns, the band was later upgraded to allow 36 dBm (P2MP) and 53 dBm (P2P) as no interference was observed in practice. Based on this experience, similar cautionary delays in utilizing the 6 GHz band can be avoided, allowing immediate effective use.

**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.**

**RJIL Comments:** None at present.

**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.**

**RJIL Comments:**

1. As submitted before, E-Band (71-76 & 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 with the use of outdoor CPE (ODCP). It is already identified as backhaul for 5G and is also deemed useful for Integrated Access Backhaul (IAB) under 5G.**

2. V-Band (52.4 - 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 both for 5G and Wi-Fi and can also be used for connecting enterprise building with high-capacity access links. WRC-19 has already identified the upper portion of V**

**band (66-71 GHz) for IMT / 5G services, and no country has delicensed this band post that.**

3. **3GPP has already identified 52.6-71 GHz for 5G NR (New Radio).** With passages of time, therefore, the lower portion of spectrum will also be considered for IMT (5G/6G) services. **Further, V-Band and Integrated Access Backhaul (IAB) are an integral part of the 3GPP study for 5G under Release 17 and V-Band has been deemed to be highly suitable for IAB deployments especially where high throughput is required and laying Fiber is not feasible.**

4. It is submitted that spectrum in V & E bands serve both – Backhaul and Access purposes. 3GPP Rel-16 offers backhaul / relay service under the IAB umbrella. In currently developed NR-IAB, some nodes serve both backhaul and access. In absence of a wired connection, wireless technologies are used to offer backhaul / relay service. In IAB, a single node can offer broadband services/ relay services or a combination thereof. The expected coverage range is approximately 300m to 500m.

**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.**

**RJIL Comments:**

We reiterate our submissions to the response to Question no. 3 and submit that all the arguments and justification provided therein is equally applicable for E-Band and V-Band and the assignment should be on block basis through auction

**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.**

**RJIL Comments:**

1. None, there should be no earmarking of the spectrum basis the services and entire spectrum in E-Band and V-Band should be put to auction. We further reiterate that we do not support spectrum fragmentation for different types of commercial telecommunication services.

2. As submitted above, an optimum mode to address the spectrum needs for smaller or niche players and for other communication services is the decentralization of the spectrum usage to cater to all types of use cases by means of spectrum leasing. We are not repeating other benefits of this arrangement mentioned in response to question no. 4 for the sake of brevity and request the Authority to consider the same for these bands as well.

**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.**
**And**
**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**

**RJIL Comments:**

1. **Band Plan:**

   We submit that the ITU recommendations give flexibility to the administration to decide about deployment in TDD, FDD or their mixed use of the band. Thus, both FDD and TDD configuration arrangements are possible. However, globally, FDD configuration with duplex separation of 10 GHz has been preferred. Indian assignment in E-band is also on global lines. Further, the contiguous FDD assignment is less interference prone and has been successfully tested with the provisional assignment of spectrum in E-Band to the

service providers and the same should be continued for E-Band. However, in the case of V-Band, TDD band plan should be followed in line with global practice.

2. **Carrier Size:**

   We reiterate our submissions under the previous consultation paper and submit that for optimum utilization, the typical channel size for E-band is 500/1000 MHz and for V-band it is 100 MHz. As the existing assignment for E-Band is on a block size of 250 MHz, the same should be continued with, while for V-band this can be kept at 100 MHz, in order to provide sufficient flexibility to the TSPs.

   We reiterate our submission in response to question no. 5 on other parts of this question:

3. **Carrier aggregation: There is no need to provide conditions for carrier aggregation.**

4. **Validity period of the assignment; 20 years**

5. **Renewal mechanism:** Auction based assignment and renewal.

6. **Surrender of the spectrum;** As per prevailing conditions for access spectrum.

7. **Ceiling on the number of carriers (spectrum cap):** 40% in-band ceiling as mentioned above.

8. **Criteria for the assignment of additional spectrum above the ceiling limit; -** DoT may examine the request on case to case basis.

9. **Roll-out obligations:**

   We submit that in order to promote effective utilization of finite natural resource, there should be roll-out obligations for all access spectrum bands, however, the same should be consistent with the current policy on roll-out obligations wherein compliance with minimum roll out obligations with one technology and spectrum band should suffice for any additional spectrum bands acquired by the TSP. Thus, the roll out obligations should not be applied to TSPs that have already complied with the roll-out of 5G services with mmWave spectrum.

   For stand-alone operators in the 5G bands of E-Band and V-Band, the roll-out compliance requirement should be same as that of mmWave spectrum.

**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.**

**RJIL Comments:**

We reiterate our submissions that there should be no usage or technology-wise fragmentation of spectrum, and all spectrum should be put to auction and the successful bidder will have the option to use it as per its requirements.

**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.**
**And**
**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.**

**RJIL Comments:**

As mentioned above, we do not agree with the proposal of reserving spectrum in E-Band and V-Band for different technology options. The spectrum should be available to the TSP for usage as per its requirements. Further, as this spectrum is to be auctioned, the regular NIA conditions will be applicable.

**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.**

**RJIL Comments:**

As mentioned above, the captive users should be permitted to take spectrum on lease from the TSPs to meet their requirements. Otherwise, these users can go for managed services option, where the TSPs will set up captive networks for these users.

**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.**
**And**
**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.**

**RJIL Comments:**

1. No, it is not 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 V-band, as there will be interference related issues that will undermine QoS of both sets of services. Therefore, we are firmly against this proposal.

2. Further, as is evident from the international examples shared by the Authority, there will be a requirement of multiple levels of monitoring and control on device powers etc. which is not possible and will overwhelm the monitoring apparatus in the country.

3. As mentioned above, there is sufficient spectrum available license exempt low- power indoor and outdoor usage. This spectrum has been further bolstered by the addition of lower 6 GHz band, thus clearly there is no need to create unnecessary complications and QoS issues in a key 5G band.

**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.**
**And**
**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.**
**And**
**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.**

**RJIL Comments:**

1. We do not agree with the concept of license exempt use of V-Band, which by the Authority's own analysis is an access band and should be assigned through auction. As mentioned above, the public Wi-Fi, even without full mobility and only hotspot coverage will be directly competing with 5G and would be a substitutable broadband service and thus should only be provided through licensed spectrum only following principle of "Same Service Same Rule".

2. Further, wide and indiscriminate adoption of delicensed spectrum will cause serious interference issues thus rendering these bands technically unusable for 5G. The Authority

should also bear in mind that de-licensing of spectrum is a one-way irreversible process encouraging first come first serve principle denounced by Hon Supreme Court in 2G case apart from causing loss to the exchequer. While upper part-of the band is already identified for IMT in WRC-19, in the event balance part also get identified for IMT – it cannot be implemented if the spectrum is already delicensed. This is established by the fact that countries which have delicensed entire 6 GHz band for Wi-Fi services are now not able to reverse it when 6.425 – 7.025 GHz is being considered for IMT in WRC-23.

**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.**

**RJIL Comments:** None at the moment

**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.**
**And**
**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.**

**RJIL Comments:**

1. As mentioned above, we oppose the point-to-point assignment and submit that all traditional backhaul bands i.e. 7/13/15/18/21 GHz should be assigned on block basis. However, in case the Authority and Government decide to assign these bands on administrative basis then they need to completely overhaul the current charging mechanism, which is exorbitant leading to a situation where the TSPs avoid seeking more carriers in view of the exponentially escalating spectrum charge.

2. The Authority has understood the enormity of current charges and had suggested a much rational approach in its earlier Recommendations on "Allocation and Pricing of Microwave Access (MWA) and Microwave Backbone (MWB) RF carriers" dated 29.08.2014. However, the AGR percentage suggested in these recommendations is also too high.

3. We request the Authority to further rationalize these figures by making the same applicable for new carrier size i.e. the same AGR percentage should be applicable on a carrier of 56 MHz. Accordingly, the following table is suggested.

| No. of MWA carriers assigned to a TSP | Applicable Percentage of AGR as spectrum charge for MWA carriers (with 56 MHz block) | |
|---|---|---|
| | 7/13/15 GHz | 18/21 GHz |
| 1 | 0.17% | 0.12% |
| 2 | 0.34% | 0.24% |
| 3 | 0.51% | 0.36% |
| 4 | 0.68% | 0.48% |
| 5 | 0.85% | 0.60% |

**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.**

**And**

**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.**

**RJIL Comments:**

1. 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, this also includes the ADP in other countries as well.

2. In case of non-availability of ADP, the normal practice is to go for an ADP of a band similar in propagation characteristics and benchmark it with efficiency factor to determine the optimum valuation. However, we agree with the Authority that there are no such relevant factors readily available for traditional backhaul bands and there has to be a new approach in the mix to determine the valuation.

3. The Hong Kong ADP of approximately Rs.2.3 Crore per MHz for mobile use of spectrum in 6 and 7 GHz is much lower that Indian price of Rs. 7 Crore per MHz for mmWave. This indicates that the price of 6/7 GHz i.e. the lowest frequency bands in traditional backhaul bands for mobile usage in Hong Kong, a territory with dense population is around 3 times lower than the ADP of mmWave.

4. Further, considering the fact that the access use case is still evolving in these bands, the initial valuation can be much lower than mmWave. We suggest that this should be around 1 Crore per MHz pan India, to account for technical efficiency and time required in developing new use cases and device ecosystem in these bands.

**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.**

**RJIL Comments:**

The valuation in this case will be same as discussed in previous response.

**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.**
**And**
**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.**

**RJIL Comments:**

1. The primary consideration for an effective charging mechanism is to ensure fairness, transparency, compliance, and revenue optimization for the Government, while simultaneously ensuring optimum utilization and provide sufficient monetization opportunity to users.

2. Such optimum charging mechanisms are generally market driven. The M x C x W formula specified in the DoT's order No. P-11014/34/2009-PP dated 11.12.2023 makes the spectrum very expensive and needs to be replaced by a market driven charging mechanism and as India's auction story amply demonstrates there is no better option than auction for the same. Accordingly, we submit that market price discovery through auction is the only feasible auction.

**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.**
**And**
**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.**

**RJIL Comments:**

As submitted above, E-Band is highly useful for access, backhaul and IAB and can be used interchangeably and there is demand for different type of service providers for different usage of this band. Thus, evidently, there is ample competition for this band and therefore there is no case for not auctioning this band. Any other approach than auction would amount to pilfering this valuable band and would be in violation of legal principles set forth by the Hon'ble Supreme Court judgement and would also be in violation of Telecommunications Act 2023. Therefore, we request the Authority to nip such proposals in the bud and assign this spectrum through auction for full LSA.

**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.**
**And**
**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.**

**RJIL Comments:**

Our response to the questions 42 and 43 is equally applicable in case of V-Band. We reiterate the submissions and are not repeating the same for sake for brevity.

**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.**
**And**
**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.**

**RJIL Comments:**

1. We reiterate 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 Government 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, it is submitted that the valuation of spectrum in E-Band and V-Band should be at 50% of ADP for mmWave spectrum.

3. International benchmarking is a very important parameter for determining the relative value of spectrum with respect to other IMT bands, especially when the band is being auctioned for the first time and not much data is available for other modes of valuation of spectrum. International benchmarking with either auctioned valuation or administrative charges for a spectrum has been a go to mode of valuation in the past when there was insufficient data on new spectrum bands to be auctioned.

4. However, in this case we have an ADP of recently auctioned spectrum in mmWave available with us, and the international data, which incidentally has wide variations, may be useful only to the extent of applying the normalization techniques for finding value of spectrum in E-Band and V-Band.

5. Further, a broader consideration should be the role of this spectrum in meeting national proliferation goals. In addition, the cost of laying network should also be juxtaposed against the revenue potential of a spectrum band to arrive at an optimum valuation.

6. It may also be kept in mind that this spectrum will be used majorly to provide high speed data capacities in dense locations, to perform the role of backhaul spectrum wherever required under IAB and is unlikely to be used to provide uniform coverage, therefore the valuation cannot be like any other IMT band except for mmWave.

**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.**

**RJIL Comments:**

No, we do not think that either of these approaches are optimum as these approaches assume that the spectrum allocation will be administrative basis only and have accordingly proposed relatively much higher charges. We submit that these approaches are too expensive for even administrative assignment. The valuation of spectrum should be done in such a manner that maximum spectrum is utilized for public good and these high valuations will defeat that purpose.

**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**
**And**
**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.**

**RJIL Comments:**

1. We submit that optimum valuation technique can be a single valuation approach for a particular spectrum band and can be taken as the appropriate value of that band if it gives the optimum result. For instance, in the current exercise, the ADP of mmWave, along with ADP of 6/7 GHz band in Hong Kong can be single valuation approach for

spectrum in E-Band and V-Band as well as MWA, MWB spectrum, based on the propagation characteristics and spectral efficiency. Thus, the focus should be on deriving the optimum valuation benchmark irrespective of the number of techniques used.

2. Average valuation of multiple valuation methodologies can be too simplistic an approach if the valuations are widely disparate and/or one methodology appears to the apt from all aspects and should be avoided in such scenarios.

**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.**

**RJIL Comments:**

1. We submit that in reserve price formula of 70% of valuation of spectrum is not optimum for the objective of discovering efficient and optimum price of spectrum. The reserve price should be decided in such a manner that there is greater participation in auction leading to more competitive bidding and thereby discovery of market price. In order to achieve the same, it is important that the reserve price is not kept at artificially high levels that can act as barrier and discourages TSPs from participation in the auction. Therefore, a reserve price at 50% of the valuation is recommended.

2. It is pertinent to point out that the reduction in reserve price does not necessarily lead to loss to the Exchequer. The auction discovered price will be reflective of the current market price of that particular spectrum band and the Government will receive license fee from that particular spectrum, which may have remained unsold and unused due to unreasonable reserve price. There will also be the wider benefit from utilization of scarce natural resource. We reiterate that the optimum value of spectrum is derived from its usage rather than from the one-time auction revenues.

3. Consequently, we reiterate that the reserve price formula needs to be revisited, and the reserve price should be kept at 50% of the valuation of the spectrum.

**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.**

**RJIL Comments:**

1. We reiterate our submission to the Government and the Authority during the previous consultation exercise for valuation of 5G spectrum that in order to provide initial impetus to the emerging technologies and give sufficient time for laying the networks or additional layers in network and monetizing the spectrum, there is a need to considerably relax the payment terms.

2. **We submit that the upfront payment should be kept only at 10% of the bid amount and thereafter a minimum 5 year moratorium without any interest cost should be provided.**

3. Further, the deferred payment for auction discovered spectrum price, should be spread over the remaining 15 years by way of annual payments. **These annual payments should be charged with reasonable interest rates at par with RBI Repo rate.**

4. Further, the TSPs should be permitted pre-payment of deferred payment obligations and should be incentivized by waiving the interest charges on exercising this option.

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

**RJIL Comments:** None