India Cellular & Electronics Association
7th Floor, Le-Meridien Commercial Tower,
Windsor Place, New Delhi-110001

Tel +91 11 4934 9900
Email icea@icea.org.in **Website** www.icea.org.in
CIN : U74999DL2017NPL327140

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Shri Akhilesh Kumar Trivedi,
Advisor (Networks, Spectrum and Licensing),
Telecom Regulatory Authority of India (TRAI)
Government of India
New Delhi

Subject: ICEA's submission on TRAI's Consultation Paper on Assignment of Microwave Spectrum in GHz (lower), 7 GHz, 13 GHz, 15 GHz, 18 GHz, 21 GHz Bands, E-Band, and V-Band

Dear Shri Akhilesh Kumar Trivedi,

Greetings from India Cellular & Electronics Association **(ICEA)**.

ICEA, the apex industry body representing the mobile, IT hardware and electronics ecosystem in India, appreciates TRAI's continued efforts to strengthen spectrum management and the growth of India's telecommunications ecosystem.

We are pleased to submit ICEA's response to TRAI's **Consultation Paper on the Assignment of Microwave Spectrum in the 6 GHz (Lower), 7 GHz, 13 GHz, 15 GHz, 18 GHz, 21 GHz Bands, E-Band, and V-Band.**

The enclosed document outlines our views and recommendations on spectrum allocation and utilization, with a focus on enabling robust, efficient, and future-ready telecom infrastructure.

These inputs reflect our perspectives on optimizing spectrum allocation to enhance connectivity, promote innovation, and address the growing demands of the telecommunications sector.

We hope our submission will contribute constructively to the ongoing consultation process and support decision-making.

Thank you for considering our inputs.

With my best regards,

Rajesh Sharma
Executive Director & Principal Advisor

Enclosure: ICEA Comments to TRAI Consultation paper on assignment of microwave spectrum in 6 GHz (Lower), 7 GHz, 13 GHz, 15 GHz, 18 GHz, 21 GHz Bands, E-Band, and V-Band.

S.No	Questions	Comments
1	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.	
2	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.	
3	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.	
4	In case it is decided to use different methods (block-based, linkbased, 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.	The lower 6 GHz band (5925–6425 MHz), the upper 6 GHz band (6425–7125 MHz) or parts thereof, plus the adjacent 7 GHz band (7125–7250 MHz) should not be assigned for traditional microwave radio backhaul purposes. Instead,India should prioritise the allocation of these bands for services that will maximise public benefit and spectrum efficiency: namely, licence-exempt use for WAS/RLAN (e.g. Wi-Fi) in the 6 GHz band and licensed use for IMT in the 7 GHz band. Should a full licence-exempt designation for the 6 GHz band not be feasible, a harmonised band split approach: 5925–6585 MHz for licence-exempt use (WAS/RLAN), and 6585–7250 MHz for licensed mobile broadband (IMT). This balanced strategy would enable continued innovation in both licence-exempt wireless technologies and next-generation mobile networks, while avoiding spectrum fragmentation and ensuring effective coexistence between services.
5	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.	
6	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.	The 6 GHz (5925–7125 MHz) or 7 GHz (7125–7250 MHz) frequency ranges for traditional microwave radio backhaul purposes should not be assigned These bands represent a critical opportunity to enable high-capacity wireless connectivity through next-generation licence-exempt (WAS/RLAN) and licensed mobile broadband (IMT) services. Allocating them to conventional point-to-point backhaul would significantly underutilise their potential and risk foreclosing valuable use cases that support digital innovation, economic growth, and public benefit. India should prioritise spectrum frameworks that maximise flexibility, technology neutrality, and alignment with evolving global broadband ecosystems.

7	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.	
8	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.	
9	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.	We support an IMT identification in the 7125–7250 MHz portion of the 7 GHz band under WRC-27 Agenda Item 1.7, recognising its potential to contribute to the development of the future 6G ecosystem. At the same time, we underscore the importance of protecting the continued use and global ecosystem development of Ultra-Wideband (UWB) technologies, particularly Channel 9 (7700–8400 MHz), which plays a critical role in enabling precise location and spatial awareness features in consumer and enterprise applications. Given these dual considerations, it is recommended that any national review of microwave backhaul usage in the broader 7125–8400 MHz band be postponed until after WRC-27. This approach will ensure that any changes to backhaul allocations are informed by final international regulatory decisions, enable harmonised spectrum use, and avoid premature reassignments that could limit flexibility for both IMT and UWB coexistence. A post-WRC-27 review would be best positioned to balance emerging mobile broadband needs with the preservation of innovation-enabling technologies like UWB.
10	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.	Please see response to questions 4, 6, and 9.
11	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.	

12	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.	The lower 6 GHz band (5925–6425 MHz), the upper 6 GHz band (6425–7125 MHz) or parts thereof, plus the adjacent 7 GHz band (7125–7250 MHz) should not be assigned for traditional microwave radio backhaul purposes. Please see response to questions 4, 6, and 9.
13	Should a certain quantum of the spectrum in traditional microwavebackhaul bands be earmarked for fulfilling point-to-pointconnectivity requirements of captive (non-commercial/ non-TSP)users? If yes - (a) What quantum of spectrum, and in which of 6 GHz (lower), 7GHz, 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 ofspectrum 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 abovethe ceiling limit; (vii) Roll out obligations; and (viii) Surrender of the spectrum, etc.? Kindly provide a detailed response with justifications.	The lower 6 GHz band (5925–6425 MHz), the upper 6 GHz band (6425–7125 MHz) or parts thereof, plus the adjacent 7 GHz band (7125–7250 MHz) should not be assigned for traditional microwave radio backhaul purposes. Please see response to questions 4, 6, and 9.
14	In case your response to Q13 is ‘no’, in what manner should the point-to-point connectivity requirements of captive (noncommercial/ non-TSP) users be fulfilled? Kindly provide a detailed response with justifications.	The lower 6 GHz band (5925–6425 MHz), the upper 6 GHz band (6425–7125 MHz) or parts thereof, plus the adjacent 7 GHz band (7125–7250 MHz) should not be assigned for traditional microwave radio backhaul purposes. Please see response to questions 4, 6, and 9.
15	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.	

16	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.	The government's decision to licence-exempt 5925–6425 MHz for low-power applications such as Wi-Fi 6E will deliver significant socio-economic and digital inclusion benefits. However, recognising the continued operation of incumbent services, particularly Fixed Services (FS) and Fixed Satellite Services (FSS), certain coexistence measures are appropriate to ensure a harmonious spectrum environment. Extensive studies in within CEPT as reported in ECC Report 302 and ECC Report 316 demonstrate that low-power indoor (LPI) and very low power (VLP) portable WAS/RLAN (Wi-Fi) deployments can coexist with incumbent FS and FSS systems without causing harmful interference when basic coexistence measures are observed. These findings are likely directly applicable to India, where similar incumbent usage conditions apply.
17	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.	Please see response to questions 4, 6, 9, and 16. In addition, India should consider adopting a regulatory framework for the 6 GHz band (5925–7125 MHz) that closely aligns with the successful model implemented by the U.S. Federal Communications Commission (FCC). The FCC framework authorizes licence-exempt use of the entire 6 GHz band for licence-exempt devices, such as Wi-Fi 6E, while ensuring protection for incumbent services through appropriate technical rules. As an option, India may also consider the band split for the upper 6 GHz. Before proceeding with the allocation of the Upper 6 GHz band for mobile (IMT), we encourage India to give further thoughtful consideration to the future spectrum requirements for licence-exempt use in this band. In particular, we recommend evaluating this in conjunction with the licence-exempt spectrum already made available in the Lower 6 GHz band, to ensure a balanced, forward-looking approach that maximises long-term benefits for connectivity, innovation, and consumer access. India has a unique opportunity to take a balanced and forward-looking approach to the Upper 6 GHz band by enabling both licensed (e.g., IMT) and licence-exempt (e.g., Wi-Fi) use through a practical band-split approach. Rather than making an exclusive allocation to mobile (IMT), India could adopt a shared framework enabling both licensed and licence-exempt access to the Upper 6 GHz. This would ensure the spectrum is used efficiently while supporting the rapidly growing demand for wireless connectivity, innovation, and digital inclusion. India should not delay progress while awaiting global consensus, especially given the maturity of Wi-Fi 6E and Wi-Fi 7 products already available in the market. A band-split at 6585 MHz would provide at least 160 MHz of additional licence-exempt spectrum, suitable for both Low Power Indoor (LPI) and Very Low Power (VLP) indoor and outdoor use. This approach would complement access to the Lower 6 GHz band and would help meet increasing connectivity needs across homes, enterprises, and public spaces, especially in India’s high-density urban environments. Finally, a shared approach to the Upper 6 GHz band ensures early access for licence-exempt innovation, while preserving flexibility for future licensed mobile expansion. We strongly encourage India to seize this opportunity to lead in global spectrum policy with a balanced and inclusive strategy.
18	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	

19	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.	We strongly recommend for the establishment of a licence-exempt regulatory framework within the 57–71 GHz spectrum band. We do not support band fragmentation through different licensing mechanisms of the Mobile service, therefore for 57-64/66 GHz, we believe that a licence-exempt approach is appropriate. New services and applications require larger bandwidths to support the consumer demand for data-intensive applications. In addition, the splitting of frequency bands increases the costs and thus causes delay in manufacturing and bringing new devices to market because of regulatory uncertainty. The European Conference of Postal and Telecommunications Administrations (CEPT) has established a harmonised regulatory framework for licence-exempt use of the 57–71 GHz frequency band through ERC Recommendation 70-03. This framework facilitates the deployment of Short Range Devices (SRDs), particularly Wideband Data Transmission Systems (WDTS), across CEPT member countries. Key Provisions of ERC Recommendation 70-03 for the 57–71 GHz Band: 1) Licence-Exempt Operation: Devices operating within this band can do so without an individual licence, provided they adhere to specified technical parameters. 2) Power Limits: The recommendation stipulates a maximum Effective Isotropic Radiated Power (EIRP) of 40 dBm and an EIRP density limit of 23 dBm/MHz for devices operating in this band. 3) Application Scope: The band is designated for wideband data transmission systems, supporting applications such as high-speed wireless networks and data links. 4) Harmonised Standards: Compliance with harmonised European standards, such as EN 302 567, is recommended to ensure interoperability and conformity across devices. This harmonised approach under ERC Recommendation 70-03 aims to promote innovation and the development of high-capacity wireless communication systems by providing a consistent regulatory environment across Europe.
20	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.	Please see response to question 19.
21	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.	Please see response to question 19.
22	In case it is decided to use different methods (block-based, linkbased, 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 Eband and V-band should be earmarked for the point-to-point linkbased assignment for radio backhaul purposes for commercial telecommunication services? Responses with justifications may kindly be provided for E-band and V-band separately.	Please see response to question 19.

23	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.	
24	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.	Please see response to question 19.
25	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	Please see response to question 19.
26	In case it is decided to earmark a few carriers in E-band and/ or Vband 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.	Please see response to question 19.

27	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.	No. Please see response to question 19.
28	In case your response to Q27 is 'no', in what manner should the point-to-point connectivity requirements of captive (noncommercial/ non-TSP) users be fulfilled? Kindly provide a detailed response with justifications.	Please see response to question 19. The lower 6 GHz band (5925–6425 MHz), the upper 6 GHz band (6425–7125 MHz) or parts thereof, plus the adjacent 7 GHz band (7125–7250 MHz) should not be assigned for traditional microwave radio backhaul purposes.
29	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.	Please see response to question 19. We are supportive in making the 57-64 GHz frequency range available under a licence-exempt regulatory regime without the application of light-licensing. We do not believe that other licensed services should have access to 57-64 GHz but if there is a desire to licence then this should be in the 64-71 GHz band. V-band is already allowed on license-exempt basis world wide except for a few countries. If V-band continues to be restricted and licensed, innovative new technologies and products would be unable to see the light of the day and consumers in the Indian market would be deprived of the latest and innovative solutions. Additionally, the de-licensed band would make possible to replace wired cables with new technologies. Some examples are cited: a) Contactless ports: USB3, Ethernet, DisplayPort https://www.molex.com/en-us/news/molex-introduces-mx60-series-of-contactless-connectivity-solutions b)Radar/motion sensing: Google Soli, and in-vehicle children sensors, c) home security d) health care https://blog.research.google/2020/03/soli-radar-based-perception-and.html https://www.fcc.gov/document/fcc-permits-hot-car-sensors-save-children https://www.federalregister.gov/documents/2023/07/24/2023-15367/fcc-empowers-short-range-radars-in-the-60-ghz-band"""
30	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.	a & b) We are supportive in making the 57-64 /66GHz frequency range available under a licence-exempt regulatory regime without the application of light-licensing. Full 7 GHz band is required to support contactless ports, device to device data transfer, and motion sensing. Contactless ports The full band is required to support the very high data rates of USB3 and USB4. Device to device data transfer The full band is required to achieve very high data rates to transfer large volumes of data quickly Motion sensing Range resolution is proportional to the spectrum bandwidth, the full band is required to achieve precise sensing b) The range 57-66 GHz should be for de-licensed usage. c) We would recommend that carrier sizes in the V-band should be dictated by the applications utilized under a license-exempt regime on a technology neutral basis and do not need to be mandated in regulation The entire V-band should be available for all user categories. d) We believe that there is no need to define "indoor-use" for licence-exempt deployments in the V-band. Indoor use restriction would greatly limit the types of innovative devices allowed on the market and restrict growth. e) 57-64GHz - ECC Recommendation 70-03, Annex 1: n1. ETSI EN 305 550 , 20 dBm avg EIRP and 13 dBm/MHz EIRP PSD and 57-71GHz - ECC Recommendation 70-03 Annex 3: c1

31	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.	Yes. Kindly refer to the response to Question no 19.
32	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.	Kindly refer to the response to Question no 19.
33	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 licenseexempt 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.	Kindly refer to the response to Question no 19.
34	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.	DoT has through its reference letter to TRAI L-14035/10/2022-BWA dated 12/08/2022 has acknowledged that the device/chip ecosystem for supporting various technologies for data transfer between consumer devices in the V band has developed and license exempt basis would serve greater public interest and realizing significant socio-economic gains.
35	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.	Please see response to questions 4, 6, 9, and 16.
36	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.	Please see response to questions 4, 6, 9, and 16.

37	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.	Please see response to questions 4, 6, 9, and 16.
38	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.	Please see response to questions 4, 6, 9, and 16.
39	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	
40	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.	Please see response to questions 4, 6, 9, and 16. The lower 6 GHz should be for de-licensed usage only
41	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.	Please see response to questions 4, 6, 9, and 16.

42	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.	
43	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.	
44	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.	
45	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.	
46	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.	

47	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 Eband (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 Eband (71-76/ 81-86 GHz) and/or V-band (57-64/66 GHz)? Please provide detailed information.	Please see response to Q19
48	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-topoint 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.	Please see response to Q19
49	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 Eband (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	The lower 6 GHz should be for de-licensed usage only. Please see response to Q19

50	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.	The lower 6 GHz should be for de-licensed usage only. Please see response to Q19
51	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 Eband (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.	Please see response to questions 4, 6, 9, and 16.
52	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.	Please see response to questions 4, 6, 9, and 16.
53	Any other suggestions relevant to the subject may be submitted with detailed justification.	