Regulation Cell,
Corporate Office,
5th Floor, Bharat Sanchar Bhawan,
Harish Chandra Mathur Lane,
Janpath, New Delhi-110001

भारत संचार निगम लिमिटेड
(भारत सरकार का उपक्रम)
BHARAT SANCHAR NIGAM LIMITED
(A Govt. of India Enterprise)

No. BSNLCO-RGLN/25/3/2021-REGLN/ E-162024/ **1272923** dated 02.07.2025

To,

Shri Akhilesh Kumar Trivedi,
Advisor (Networks, Spectrum and Licensing),
TRAI, New Delhi.

Sub: 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 -reg.

With regard to 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", please find the comments of BSNL, as below:

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**.

   Microwave backhaul is prominently used in telecom networks particularly to connect base stations to the Core network layer. Traditional MW bands viz. 6 GHz , 7 GHz, 13 GHz, 15 GHz, 18 GHz, and 21 GHz bands are used for long in cellular backhaul. These bands have good propagation characteristics and ecosystem is matured. With growing deployment of 4G & 5G networks the demand for high data rate backhaul is also increasing. Such demand can be met with deployment of licensed microwave as backhaul at the quickest possible time.

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**.

   MWA assignment is for backhauling of wireless services. However, MWB assignment in 6/7 GHz bands have long distance transport medium for connecting exchanges and other networks.

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.

MWA spectrum for TSPs with Access Service License/ authorization should be assigned for the entire LSA on an exclusive basis as these are only supporting resources to make its network presence in whole LSA and this helps telecom service providers (TSPs) to deliver its services efficiently to the customers.

The entities other than access service providers TSPs where the MWA spectrum should be assigned on P2P link basis as the requirement of such entities in limited area and P2P links may be the optimal use of MWA carriers.

4. **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.**

TRAI consultation paper has provided the existing band wise utilisation of MWA carriers assigned to the TSPs. Out of the various MWA Bands 15 GHz band is almost saturated and has very little BW to offer. Another most utilised band is 13 GHz with almost 50% of utilisation. Both 13 GHz and 15 GHz bands should be exclusively assigned to the TSPs having access service authorisation. PTP link requirement must be fulfilled from the 18 GHz and 21 GHz bands. Both these bands carry sufficient carriers available for allocation. As such, 25% carriers in 18 GHz and 21 GHz bands can be reserved for allocation to Captive/ Non- telecom/ Non Access service requirements on PTP link basis allocations.
Similarly 25% of carriers in 6/7 GHz MWB band can be reserved for exclusive use of non- telecom/ captive uses.

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; (f) and Surrender of spectrum etc.? Kindly provide a detailed response with justifications. along with the international scenario on the matter.**

The issue of MW backhaul for telecommunication services has been addressed in the Telecommunications Act, 2023. The Act provides an explanation under entry 12 of Schedule I.
With the enactment of the Telecommunications Act, 2023, the spectrum for MWA/MWB has to be assigned on administrative basis.

a. Carrier size: 28 MHz (paired) spectrum provide the adequate flexibility and better planning. Therefore, assignment of 28 MHz (paired) as per the existing channelling plan should continue.
b. Carrier aggregation: Carrier aggregation 4x28 MHz should be allowed for a TSP, in

case such allocation in there.

c. Validity period of the assignment: The validity of the spectrum assignment should be for 20 years otherwise explicitly mentioned and should co-terminus with the validity of UL (AS) authorisation, whichever is earlier.
d. Renewal: There should be option and preference for renewal by the incumbent assignee.
e. Rollout obligations: The rollout obligations should be for minimum 12 months and minimum number of 100 hops in the LSA.
f. Surrender of spectrum: Surrender of the carrier or entire allocation shall be permitted with the 30 days notice.

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 group of MWB frequency bands i.e 6/7 GHz should be treated as one. Similarly, frequencies of 13 GHz & 15 GHz and 18 GHz & 21 GHz be grouped as these groups demonstrate similar characteristics. There are 23 carriers combining 13 GHz and 15 GHz bands. These bands are generally more in demand due to propagation characteristics. Grouping of 18 GHz and 21 GHz bands also gives sufficient number of carrier which can cater for the requirement of TSPs and non TSPs/ Captive users. Non TSP / captive users in these bands 25% carriers can be reserved.

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.

   13 GHz & 15 GHz and should be assigned to TSPs only. In 18 GHz and 21 GHz bands 25% carriers can be reserved for non TSPs/ Captive users.

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.**

   It is obvious that a TSP would prefer to retain existing assignments because change of carriers create temporary service disruption and QoS issues. In the changed regime as well TSP would require backhaul spectrum as a virtue of it's

requirements. Therefore in change of regime only consent of TSP should be sufficient for continuation of allocations otherwise explicitly the TSP wish to surrender or change the allocation to other bands.

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.**

   It is evident that 15 GHz band is highly occupied and utilised band for backhaul. TSPs have build their network over these bands and made huge investments. Therefore, review of usage of 15 GHz microwave backhaul band is not warranted. Any review of 7 GHz band should also be taken after the outcome of WRC-27.

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**.

    As per reply to Q9.

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.

No band as per the list should be allowed for flexible use i.e. both backhaul and last mile connectivity. First of all, there should be feasibility study of the bands for co-exitance of services i.e. backhaul and access services in Indian context. Any decision should be taken thereafter and further terms and conditions can be defined for the said purpose.

13. **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) (ii) Carrier size; 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.**

Please see reply of Q6 & Q7. Carrier size for the Captive/ non TSP users can be kept at minimum 7 MHz and multiple of it. Maximum 8 carriers of 7 MHz should be allowed to such users. The user should commence the link within 6 months of the assignment and renewal should be required after every 5 years. Charging for such links should be on formula basis.

14. **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.**
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.**

Path length should not be a restriction for such links. The charging should be on KM basis, as already being done. The formula (MCW) of Bandwidth, Link length and number of carriers should be reworked.

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.**

6 GHz (lower) band (5.925-6.425 GHz) can be delicensed for low power applications. This will give more spectrum to Wi-Fi and other application which

has its own socio economic benefits. Protection mechanism for the incumbent users should be there in case the band is (5.925-6.425 GHz) opened for low power applications.

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.**

As per 16.

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 eco system.**

High throughput 4G & 5G networks require high capacity backhaul for the base stations. Optical fiber is the most preferred media for the TSP, however, due to issues of ROW permissions, high cost of laying OFC and densification of the network, microwave backhaul is the next choice for the TSPs. E-band in the range of 71-76 GHz / 81-86 GHz is preferred and suitable connectivity for dense urban and short distance hop length. BSNL is also rolling out the 4G network on E- band in some of the LSAs particularly in the cities where laying of fibre is unviable/ not feasible.

Allowing Integrated Access and backhaul in the E-band must be seen with the availability of device ecosystem. In future with densification of 5G network, the usability of IAB will be prominent and efficient. IAB can be allowed on trial basis to the TSPs having access service authorisation. As the usage and scope with IAB will be different, so it will be treated as access spectrum. The set of rules for allowing IAB should be different than the current usage of E- band spectrum. The rules to be set only after trial and feasibility study is completed. For the time being a part of the spectrum say 500 MHz can be considered for study and trial of IAB.

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.**

Demand of V-band spectrum is not seen as compared to E-band. The reason perhaps could be numerous. The demand of V-band can be explored for FWA services and low power indoor applications. BSNL presently has no roadmap for V-band utilisation. TRAI in it's recommendations 2014 has prescribed the allocation criteria of carrier size of 50 MHz at the nominal price.

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.**

Refer reply of 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.**

Any spectrum for backhaul purposes should be assigned through administrative allocations only. E-band per se should be assigned on LSA basis similar to the criteria followed in 13 GHz/ 15 GHz/ 18 GHz & 21 GHz bands. PTP allocation of E-band will be cumbersome and will require further coordination among the stakeholders.

22. **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.**
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**);
24. **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), (ii) or On a per carrier/link basis, (iii) or 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**.

The appropriate method for allocation of MWA carriers in 13/15/18/21 GHz bands is LSA basis. The PTP allocation of bands under consideration should be only for MWB links in 6/7 GHz bands. For other users such as non- telecom/ captive/ telecom (excluding access service such as ISPs). The charges should be on formula basis and payable at annual basis for the 6 /7/13/15/18/21 GHz bands.

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), (ii) or On a per MHz or per carrier basis, (iii) or 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.**

While the MWA carriers are assigned block basis for the entire LSAs, the

charging of such carriers should be done based on AGR as per the ensuing policy. The spectrum charges prescribed as per TRAI recommendations 2014 holds valid. It is suggested that the rate of AGR per link should be revised downward to .10% per carrier and multiple of it. MWB spectrum allocation should be on PTP basis and charging should formula basis as per the prevailing practices.

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.**

    TRAI has already set reserve price in the past for 3.5 GHz band and mmWave band for which there was no historical data available in the country. The principal can be applied in this case also. There is no definite method for determining the reserve price, however, certain parameters such as spectral efficiency, propagation characteristics, device ecosystem are important parameters those needs to be taken into consideration.

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.**

    Reply as per Q37.

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.

The M x C x W formula specified in the DoT OM under reference should be reviewed. There should be following slabs:-

1. <= 2 KM to >= 25 KM
2. < 25 KM to >= 60 KM
3. < 60 KM to >= 120 KM
4. < 120 KM to >= 500 KM
5. < 500 KM

Denominator to the W factor needs revisit. Now a days the data consumption and bandwidth demand has increased. The denominator should be revised to 125 KHz.

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.**
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), ii. or On a per carrier/link basis, iii. or 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 141 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), (ii) or On a per MHz or per carrier basis, (iii) or 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.**

As per the Provisional policy of DoT, the E-band carriers are assigned on block basis for the entire LSAs on AGR based charging. In continuation the provisional policy it is suggested that TSPs should be assigned maximum 4 carriers of 250 MHz (paired) and he charging of such carriers should be done based on AGR. It is suggested that the rate of AGR per link should be kept .075% per carrier upto 1st & 2nd links and thereafter the % of AGR should be .15% per carrier upto 4th carrier. There should also be rollout obligation attached to the allocation. The rollout should be minimum 100 hops in a year within 12 months of the allocation of at least 1 carrier otherwise the links must be surrendered.

Digitally signed by
Ved Prakash Verma
Date: 02-07-2025
09:46:48

DGM (Regulation-II)