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TRAI/FY23-24/58

Dated: 13.12.2023

To,
Shri Akhilesh Kumar Trivedi,
Advisor (Network, Spectrum and Licensing)
Telecom Regulatory Authority of India,
Mahanagar Door Sanchar Bhawan,
JawaharLal Nehru Marg,
New Delhi – 110 002.

Subject: Response to Consultation Paper on “Assignment of Spectrum in E&V Bands, and Spectrum for Microwave Access (MWA) & Microwave Backbone (MWB)”

Dear Sir,

This is in reference to TRAI’s Consultation Paper on “Assignment of Spectrum in E&V Bands, and Spectrum for Microwave Access (MWA) & Microwave Backbone (MWB)” dated 27.09.2023 (22/2023)

In this regard, please find enclosed our response for your kind consideration.

Thanking You,

Yours’ Sincerely,
For **Bharti Airtel Limited**

A handwritten signature in blue ink, appearing to read 'Rahul Vatts', is written over a light blue horizontal line.

Rahul Vatts
Chief Regulatory Officer

Encl: a.a

**Response to CP on Assignment of Spectrum in
E&V Bands, and Spectrum for Microwave Access (MWA) & Microwave Backbone (MWB)**

Preamble:

At the outset, Airtel thanks the Authority for giving it the opportunity to provide its input on such a critical topic, i.e., the assignment of MWA/MWB carriers and E/V band spectrum.

Over the last decade, with growing digitalisation, the socio-economic landscape of the country has undergone a complete transformation. The ever-escalating digital traffic growth has necessitated continuous movement towards ever-larger bandwidths and higher speeds which have, in turn, required the Telecom Services Providers (TSPs) to create sufficient capacity not only at access level but also at the backhaul level to carry traffic *inter se*, i.e., from access to core or vice versa.

All of this has only been made possible by the reliable, resilient and huge traffic-carrying telecom networks that are the enabling backbone at the heart of this remarkable digital transformation. And what has become abundantly clear is that a **robust backhaul is essential for complementing the new age access technologies**.

There are two modes of establishing backhaul connectivity — fiber and wireless. Although fiber offers better data carrying capacity, levels of fiberisation in India at present are untenably low at 35%. What is more, they are not going to improve in the foreseeable future because of various techno-economic limitations. This makes wireless backhaul the only meaningful mechanism by which to roll out these all-important services — and to roll them out within a reasonable timeframe. Indeed, **it is only because of the availability of adequate backhaul spectrum, especially E-band, that India has even been able to achieve one of the fastest 5G rollouts globally**.

While the TRAI has raised some extremely pertinent questions in this Consultation Paper which have been answered exhaustively later, it is Airtel's view and submission that the Authority needs to consider certain fundamental premises when framing its recommendations. Those are submitted as follows:

A. Backhaul spectrum is not the same as access spectrum

1. While access spectrum gives 'access' to the subscriber/market, backhaul spectrum only indirectly enables service delivery by carrying internal traffic, i.e., carrying traffic within the telecom network from one end point (i.e., access level/tower sites) to another (i.e., core network).
2. Thus, as part of the telecom network, backhaul spectrum **serves as only supporting infrastructure** to the access network. There is no benefit that a standalone backhaul spectrum will offer to a TSP network.
3. Hence, in its true techno-economic sense, backhaul spectrum is not the same as access spectrum. Therefore, **treating both as identical is a logical fallacy**.

B. A complex equation - massive scale driven by the tight coupling of backhaul equipment with backhaul frequencies: *Any disruption will be highly detrimental to legacy networks and hundreds of millions of subscribers*

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1. The traditional microwave backhaul equipment currently deployed in the networks of legacy TSPs is tightly coupled with the specific frequency spots in which they operate. This is unlike access spectrum where a particular piece of equipment can be deployed for the entire spectrum band range. This can be understood from the following illustration:

Table 1: Frequencies supported in backhaul radios supplied by different OEM partners

OEM A					OEM B					OEM C							
15 Ghz		Lower Sub band		Upper Sub band		15 Ghz		Lower Sub band		Upper Sub band		15 Ghz		Lower Sub band		Upper Sub band	
Sub-bands	Start freq	Stop Freq	Start freq	Stop Freq	Sub-bands	Start freq	Stop Freq	Start freq	Stop Freq	Sub-bands	Start freq	Stop Freq	Start freq	Stop Freq	Sub-bands	Start freq	Stop Freq
01L/01H	14495.8	14774	15055.8	15348	1W8	14515	14711	14935	15131	A	14400	14725	14921	15145			
02L/02H	14604.3	14739	14919.3	15061	8W15	14711	14907	15131	15327	B	14718	14928	15138	15358			
03L/03H	14698.8	14828.5	15006.8	15145													
04L/04H	14795	14933.5	15117	15248.5													
18 Ghz		Lower Sub band		Upper Sub band		18 Ghz		Lower Sub band		Upper Sub band		18 Ghz		Lower Sub band		Upper Sub band	
Sub-bands	Start freq	Stop Freq	Start freq	Stop Freq	Sub-bands	Start freq	Stop Freq	Start freq	Stop Freq	Sub-bands	Start freq	Stop Freq	Start freq	Stop Freq	Sub-bands	Start freq	Stop Freq
11L/11H	17706.5	18236.5	18600	19246.5	Band-L	17727.5	18167.5	18737.5	19177.5	A	17685	18230	18695	19240			
13L/13H	18002.25	18676.5	19094.75	19686.5	Band-H	18195	18676.5	19205	19686.5	B	18180	18700	19190	19710			
23 Ghz		Lower Sub band		Upper Sub band		23 Ghz		Lower Sub band		Upper Sub band		23 Ghz		Lower Sub band		Upper Sub band	
Sub-bands	Start freq	Stop Freq	Start freq	Stop Freq	Sub-bands	Start freq	Stop Freq	Start freq	Stop Freq	Sub-bands	Start freq	Stop Freq	Start freq	Stop Freq	Sub-bands	Start freq	Stop Freq
01L/01H	21200	21824.75	22400	23044.25	Band-L	21238	21770	22470	23002	A	21200	21786	22432	23018			
02L/02H	21784	22600	22996.25	23600	Band-H	21798	22330	23030	23562	B	21779	22386	23011	23618			

2. Today, close to ~5 lakh links are running in Indian TSP networks, the majority of which are legacy like above. Any change in the current assignment of MWA/MWB carriers will instantly leave all such legacy equipment redundant, requiring replacement.
3. As evident, this **change of backhaul radios would be a massive and deeply complex operation, and services to hundreds of millions of subscribers would be affected or put at risk.** Instead of investing in improving and providing coverage, TSPs would have to expend their resources (capital, human, network and time) on totally avoidable issues to manage and mitigate the disruption caused.
4. **Thus, prevention of disruption in network and services must be the topmost consideration for the Authority while framing its recommendations.**

C. Auctioning backhaul spectrum: Risk of winner's curse & destruction of (multiplier effect of) public good element of spectrum

1. First, there is absolutely no reason to even consider adopting an auction approach for complementary backhaul spectrum since it does not confer any (market) access rights.
2. Second, **in the scenario of an auction for backhaul spectrum, there are likely to be attempts at destructive bidding** or hoarding by competition to hurt the interests of competitive legacy operators who will have no option but to somehow secure their currently assigned carriers (due to the tight coupling of spots and equipment and avoiding risks to customer service). This could very well become a **'winner's curse'** for legacy TSPs, forcing them, as it will, to incur substantial financial costs or go out of the market.
3. Third, this winner's curse and/or failure to secure the same spots (at reasonable cost) would thus give (an undue) competitive edge to other operators while increasing the overall cost of operations for TSPs with legacy networks.

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4. Fourth, since backhaul is an indirect enabler/multiplier of public good, **auctioning the same would destroy the value of the public good element in this**. In economic terms, it would take away (an indirect) producer surplus that would have led (indirectly) to consumer surplus.
5. In any case, a prerequisite for (the success of) an auction is that the resource being auctioned is scarce, is in high demand and that it will outstrip supply. It does not meet any of these prerequisites since it is **available in ample quantity**.
6. **Auctioning ancillary/complementary resources like backhaul spectrum will put at risk the huge investments** (lakhs of crores) made by TSPs in obtaining access spectrum via auctions over the years (including 5G). Any risk or uncertainty to the backhaul will have an adverse impact on the auctioned access spectrum.

D. Auction of backhaul spectrum: neither relevant to the 2G Judgment, nor in line with international practices, and, against TRAI's own precedent on the same issue

1. **The Authority itself favoured an administrative approach in its 2014 Recommendations**. It had based its decision on a variety of factors, like ample availability of backhaul spectrum, its supporting role in telecom infrastructure, international best practices, etc. There have been no changes in those parameters in 2023 either.
2. It is also pertinent to note that **the 2G Judgement predates the TRAI 2014 Recommendations**, and it did not act as a bar for TRAI recommending administrative assignment of backhaul spectrum then. In any case, **the 2G Judgment was applicable in case of allocation of access spectrum** and no relation to backhaul which only (indirectly) supports the access network by backhauling the traffic to the core network.
3. A study of international practices on the assignment of backhaul spectrum suggests that **administrative assignment is the preferred mode the world over**. Even the Authority has not provided any instance of auction in the present CP.
4. Airtel submits that since there has been no material change in these factors that may warrant an auction now, the only appropriate way forward for the Authority would be to reiterate its stand and continue with the method that has served it so well thus far.

Thus, conclusively, the administrative assignment of backhaul spectrum is the right (only) and better approach to consider. It is this approach that has already served the networks and government policy objectives admirably. It is the **least disruptive method** for transitioning from the current provisional allotments to the final allotments based on the assignment methodology decided by the Government. It will safeguard the existing spots of legacy operators, thus ensuring continuity of operations and seamless services to subscribers.

The Government should allocate the MWA/MWB spectrum bundled with the access spectrum, as the latter is already auctioned. This would also ensure faster roll outs.

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Having said the above, there is another critical aspect of charging of backhaul spectrum that requires the Authority's attention.

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

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

Further, there are many other equally critical aspects of backhaul spectrum that have a significant impact on legacy TSPs networks as well as competition dynamics. Some of these aspects include carrier sizes for MWA/MWB and E/V bands, eligibility for assignment (e.g., which UL authorisation entity should have access to them), exclusive assignment or on a link-by-link basis. We have provided detailed comments on each of these areas in our responses to these specific questions raised in the consultation paper.

In conclusion, Airtel urges the Authority to take into consideration the context and background elaborated upon in this Preamble and make appropriate recommendations vis-à-vis an administrative assignment of backhaul spectrum. A one-size-fits-all approach without contextualising the diverse scope, needs and nuances of the telecommunications sector will not be prudent. Rather, a balanced and well-considered approach that incorporates a variety of allocation methods to accommodate the sector's myriad requirements while promoting serviceability, competition and orderly growth will best serve all stakeholder objectives.

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In Summary:

- *The existing MWA/MWB assignments should not be disturbed as legacy backhaul equipment is incompatible to change in frequencies due to technical restrictions.*
- *Administrative assignment is the best method to ensure minimal disruption.*
- *The logic of the auction does not apply in the case of backhaul spectrum as there is no market access conferred in this. Further, the supply of backhaul spectrum significantly outstrips its demand.*
- *Both international best practices and TRAI 2014 Recommendations favour an administrative approach.*
- *MWA/MWB carriers and E/V band spectrum should be assigned on an exclusive basis for the entire LSA.*
- *The carrier size(s) and ceiling(s) should be as follows:*

S. No.	Spectrum	Carrier Size	Ceiling
1.	MWA Carriers	28 MHz	8 carriers per LSA in Metros & Category A circles and 6 carriers per LSA in Category B & C circles
2.	MWB Carriers	28 MHz	2 carriers per LSA in all categories of circles
3.	E-band	250 MHz	4 carriers per LSA in all categories of circles
4.	V-band	50 MHz	40 carriers per LSA in all categories of circles

- *MWA/MWB carriers should be assigned to TSPs with Access Service Authorisation for the entire LSA on an exclusive basis, and to TSPs with other than Access Service Authorisation and non-TSPs on a P2P link basis.*
- *E/V band spectrum should be assigned to TSPs with Access Service Authorisation holding IMT spectrum for the entire LSA on an exclusive basis, and to TSPs with Access Service Authorisation but not holding IMT spectrum on a P2P link basis if required. There is no need at all to assign this spectrum to TSPs with other than Access Service Authorisation and non-TSPs.*
- *In case of assignment of new MWA/MWB carriers, an effort should be made to maintain the contiguity of a TSP's holdings, wherever feasible.*
- *For already assigned MWA/MWB carriers, harmonisation exercises must be made completely voluntary.*
- *In E-band, four contiguous carriers should be reserved for each TSP in order to avoid frequent harmonisation in the future.*
- *Validity of administratively assigned backhaul should be co-terminus with licenses.*

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- *There should be no separate rollout obligations in cases of backhaul spectrum.*
- *The spectrum charging mechanism for MWA/MWB carriers and E/V band spectrum should continue to be based on a percentage of AGR, but with the current rates significantly rationalised.*
- *The rates should not escalate with the increase in the number of carriers; they should be kept uniform.*

In the remainder of this document, please find Airtel's question wise response to the TRAI Consultation Paper.

**Response to CP on Assignment of Spectrum in
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Q1. What quantum of spectrum in different MWA and MWB frequency bands is required to meet the demand of TSPs with Access Service License/Authorization? Whether MWA/MWB spectrum is also required by TSPs having authorizations other than Access Service License/ authorization, and other entities (non-TSP, for non-commercial/captive/isolated use)? Information on present demand and likely demand after five years may kindly be provided as per the proforma given below with detailed justification:

(i) Present demand

Band	Quantum of Spectrum required (per entity per LSA)		
	TSPs with Access Service License/ Authorization	TSPs with other than Access Service License/ Authorization	Other entities (non-TSP, for non-commercial/captive/ isolated use)
6 GHz (5.925-6.425 Ghz)			
7 GHz (7.125-7.425 Ghz)			
7 GHz (7.425-7.725 Ghz)			
13 GHz (12.750-13.250 Ghz)			
15 GHz (14.5-15.5 Ghz)			
18 GHz (17.7-19.7 Ghz)			
21 GHz (21.2-23.6 Ghz)			

(ii) Likely demand after five years

Band	Quantum of Spectrum required (per entity per LSA)		
	TSPs with Access Service License/ Authorization	TSPs with other than Access Service License/ Authorization	Other entities (non-TSP, for non-commercial/captive/ isolated use)
6 GHz (5.925-6.425 GHz)			
7 GHz (7.125-7.425 GHz)			
7 GHz (7.425-7.725 GHz)			
13 GHz (12.750-13.250 GHz)			
15 GHz (14.5-15.5 GHz)			
18 GHz (17.7-19.7 GHz)			
21 GHz (21.2-23.6 GHz)			

Airtel Response:

With the rapid deployment of new age technologies like IoT, AR, VR, etc., digital space is continuously evolving. Everything – from education to banking to health services to entertainment – is moving online. This necessitates high-quality, high-speed mobile broadband services.

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While enhancing access networks so as to maximise traffic/data-carrying capacity is vital in keeping up with the rapid technological evolution, it is equally crucial that these advancements are ably supported by robust and capable backhaul networks. It is only when access and backhaul networks work in harmony with each other that mobile broadband services will be able to effectively meet the demands of customers in this fast-paced digital age.

To put things in perspective, the **volume of total wireless data usage in India increased from ~8.1 EB during QE Mar 18¹ to ~42 EB during QE Mar 23²**. Further, it is estimated that it will grow to 58 EB per month by 2028³. To cater to this huge traffic at access network, the requirement of backhaul capacity per site has also grown apace from 4 Mbps to 400 Mbps and will need to continue being increased as data traffic continues to explode.

Microwave backhaul – an indispensable requirement:

To deliver such massive capacity, TSPs have two options – ① increasing fiberisation and ② using microwave spectrum for backhaul. While fiber offers better data carrying capacity, India has only reached a suboptimal ~36% fiberisation at sites⁴, owing to the various geographical, technical as well as financial challenges involved in the laying of fiber.

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

Even if the general trend towards a gradual increase in the share of sites connected via fiber were taken into account, this would mean a 50-50 split in fiber and microwave as backhaul media by 2030⁵. This is because the rollout of new sites would continue apace in rural and remote areas, some of which are especially dependent on microwave backhaul.

Present demand for MWA/MWB carriers:

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

Demand for MWB carriers: MWB carriers are currently assigned on a P2P link basis to all user categories. Having said that, Airtel submits that **MWB carriers should also be assigned for the entire LSA on an exclusive basis to**

¹ [PIReport27062018_0.pdf \(tra.gov.in\)](#)

² [QPIR_21082023_0.pdf \(tra.gov.in\)](#)

³ [Ericsson Mobility Report June 2023](#)

⁴ [Initial MoT Eng AR 22-23.pmd \(dot.gov.in\)](#)

⁵ [Ericsson Microwave Outlook Report – October 2023](#)

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TSPs with Access Service Authorisation, similar to MWA carriers (please refer to the detailed response to Q2 in this regard).

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

In summary, Airtel recommends that the following ceiling should be considered:

Microwave carriers	Present demand
MWA (13/15/18/21 GHz)	8 MWA carriers in each of Metros & Category A LSAs 6 MWA carriers in each of the Category B & C LSAs
MWB (6/7 GHz)	2 MWB carriers per each LSA

Future demand for MWA/MWB carriers:

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

In addition, other drivers likely to influence the demand assessment are backhaul capacity required per site, microwave link capacity, mobile network density, hub density, existing fiber penetration and planned fiber deployment, evolution of existing network, suboptimal angular separations, line of sight availability and infrastructure limitations.

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

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

As far as the requirement of MWA/MWB carriers for TSPs holding other than Access Service Authorisation and other entities (non-TSP, for non-commercial/captive/isolated use) is concerned, they may require the carriers only on a point-to-point ("**P2P**") link basis, as these entities do not have wide densified networks. Thus, the existing P2P assignment policy should continue in case of TSPs with other than Access Service Authorisation and non-TSPs.

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Therefore, Airtel recommends the following:

- (i) In the case of MWA carriers, the existing policy of assigning a maximum of 8 carriers in each of the metros and Category A LSAs and 6 carriers in each of the Category B and C LSAs, should be continued with for TSPs with Access Service Authorisation.**
- (ii) MWB carriers should be assigned to TSPs with Access Service Authorisation for the entire LSA on an exclusive basis, with a ceiling of 2 carriers per LSA in all categories of LSAs.**
- (iii) For TSPs holding other than Access Service Authorisation and non-TSPs, MWA/MWB carriers should continue to be assigned on a P2P link basis, in line with the extant policy.**
- (iv) While these ceilings may effectively cater to current needs, the Government may consider reviewing the same in the next 2-3 years, taking into account technological advancements and changes in the market landscape.**

Q2. Whether spectrum for MWA and MWB should be assigned for the entire LSA on an exclusive basis, or on Point-to-Point (P2P) link basis? Response may be provided separately for (i) TSPs with Access Service License/Authorization, (ii) TSPs having authorizations other than Access Service License/authorization, and (iii) Other entities (non-TSP, for non-commercial/captive/isolated use) in the table given below with detailed justification:

Microwave bands	Spectrum should be assigned for the entire LSA on an exclusive basis, or on PTP link basis for –		
	TSPs with Access service License/ Authorization	TSPs with other than Access Service License/ Authorization	Other entities (non-TSP, for non-commercial/captive/ isolated use)
MWB (6/7 GHz)			
MWA (13/15/18/21 GHz)			

&

Q19. What should be the eligibility conditions and associated conditions for assignment of spectrum in 6/7/13/15/18/21 GHz bands? Response may kindly be given for each user category viz. (i) TSPs with Access Service License/Authorization, (ii) TSPs with other than Access Service License/Authorization, and (iii) Other entities (non-TSP, for non-commercial/captive/isolated use) with detailed justification.

Airtel Response:

Currently, the MWA carriers are assigned to TSPs with Access Service Authorisation for the entire LSA on an exclusive basis, and to TSPs with other than Access Service Authorisation on a P2P link basis. By contrast, MWB carriers are assigned to all users on a P2P link basis. However, it is Airtel’s contention that **both MWA and MWB carriers should be assigned to TSPs with Access Service Authorisation for the entire LSA on an exclusive basis.**

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Advantages of exclusive assignment to TSPs with Access Service Authorisation:

1. **Faster rollout:** Exclusive assignment reduces the time required for deployment of network since it cuts out the cumbersome process of interference management.
2. **Easier network planning:** The whole set of microwave carriers will be known in advance, making it easier to plan microwave network in such a way that each carrier is optimally loaded. This would ensure minimum network outages in cases of major and critical outage scenarios and, in turn, enhance customer satisfaction levels.
3. **Cost-effective operations:** Implementing the right topology and plan will help operators to avoid frequent re-engineering, resulting in less wastage of hardware and site material.

Disadvantages of P2P link-based assignment to TSPs with Access Service Authorisation:

1. **Logistical challenge:** The microwave links per operator run into the thousands in each LSA. P2P link-based assignments would put the onus of interference management on MW carriers assigned to different links on WPC. This would require that extensive interference analysis with the existing operating links of other TSPs be carried out, requiring simulation tools, the geo-coordinates of connected sites, complete details of all links (viz. antenna height, antenna gain, antenna radiation pattern power transmitted, etc.) and other details like nearby buildings, terrain, etc. This will be a huge challenge for WPC. Therefore, exclusive assignment is the only practical way forward. **Even TRAI 2014 Recommendations took note of this and recommended exclusive assignments for all MWA carriers.**
2. **Not in line with the charging mechanism:** The spectrum charges for both MWA and MWB carriers are currently charged for the entire LSA (even though MWB carriers are assigned on a P2P link basis). In the interests of fairness, the assignment methodology should be in line with the spectrum charging mechanism. Accordingly, both MWA and MWB carriers should be assigned on an exclusive basis for the entire LSA.

P2P Assignment to TSPs with other than Access Service Authorisation and non-TSPs:

With regard to the assignment of MWA/MWB carriers to TSPs holding other than Access Service Authorisation and non-TSPs, please refer to the response to Q1 earlier. MWA/MWB carriers should continue to be assigned to them on a P2P link basis, in line with the extant policy, as P2P links are sufficient to meet their requirements.

Therefore, Airtel recommends the following:

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

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Q3. Keeping in view the provisions of ITU’s Radio Regulations on coexistence of terrestrial services and space-based communication services for sharing of the same frequency range, do you foresee any challenges in ensuring interference-free operation of terrestrial networks (i.e., MWA/MWB point to point links in 6 GHz, 7 GHz, 13 GHz, and 18 GHz bands) and space-based communication networks using the same frequency range in the same geographical area? If so, what could be the measures to mitigate such challenges? Suggestions may kindly be made with justification.

Airtel Response:

As captured in TRAI’s Consultation Paper on “Assignment of Spectrum for Space-based Communication Services” dated 06.04.2023, DoT has stated that, “Coexistence of satellite networks or satellite-based communication within the country is ensured through various provisions in RR, ITU recommendations, WRC Resolutions, NFAP and License conditions for the satellite and MW services.... Moreover, as per the current practice to assign spectrum administratively, all frequency assignments/operations are issued on non-interference/non-protection basis.”

Airtel concurs with DoT in this regard.

To mitigate interference, ITU prescribes varying measures in ITU-RR which have been duly captured in the said Consultation Paper dated 06.04.2023 as well.

In view of the above, there are sufficient mechanisms and processes that exist under the ITU framework⁶ and global best practices that should be leveraged. Airtel does not foresee any concerns at this stage that may warrant any ex-ante measures.

Q4. What should be the carrier size for MWA and MWB carriers in each band viz. 6/7/ 13/15/18/21 GHz bands? Whether there is a need to prescribe a different carrier size based on different LSA categories or different user categories viz. (i) TSPs with Access Service License/Authorization, (ii) TSPs with other than Access Service License/ Authorization and (iii) other users (non-TSP, for non-commercial/captive/isolated use)? If yes, suggestions may be made in the table given below with detailed justification.

Microwave bands	Carrier size (in MHz) for –		
	TSPs with Access service License/ Authorization	TSPs with other than Access Service License/ Authorization	Other entities (non-TSP, for non-commercial/captive/ isolated use)
MWB (6/7 GHz)			
MWA (13/15/18/21 GHz)			

Airtel Response:

Airtel proposes that the present carrier size should be continued with, i.e., 28 MHz for both MWA and MWB in each band viz. 6/7/13/15/18/21 GHz bands.

⁶ For detailed coordination of terrestrial stations operating in the bands shared with space service, visit <https://www.itu.int/en/ITU-R/terrestrial/fmd/Pages/coordination.aspx>.

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Consequences of altering the carrier size:

The reason for continuing with the same carrier size is that the radios currently in operation are already compatible with the carrier size of 28 MHz. In case the size is altered, say, if it is made smaller, there is a high likelihood of the TSP in question not being able to acquire contiguous carriers totalling up to 28 MHz, thereby rendering the existing radios unusable and disturbing the entire network. Similarly, if the size is increased beyond 28MHz, it may render the spectrum under-utilised as all operators would compulsorily have to acquire a higher-sized carrier even if they did not need them.

International practices support the carrier size of 28 MHz:

The channelling plan defined by the ITU, for MWA and MWB carriers, permits the use of carrier sizes in the multiples of 28 MHz in each band.

Nevertheless, while the carrier size is standardised at 28 MHz, TSPs can even currently utilise carrier bandwidths of higher sizes, i.e., 56/84/112 MHz, within their allocated spectrum, as per their requirements. This is in line with the ITU-R Recommendations and international practices and hence carrier size must continue to be the same. And if any TSPs require a larger carrier size, they have the option of obtaining two or more contiguous carriers to maintain the required spectral efficiency for increasing the same.

For example, in the context of access spectrum, although block sizes are standardised in each band, TSPs frequently acquire multiple blocks, amalgamating their entire allocation into a unified spectrum chunk or multiple chunks based on their network deployment strategy. For example, in the 900 MHz band with a 0.2 MHz block size, a TSP might procure 50 blocks, deploying its entire 10 MHz holding as a singular spectrum chunk or two in the ratio of 5MHz each.

No need for different carrier sizes for different LSAs/user categories:

Airtel also believes that there is no need to prescribe different carrier sizes based on different LSA categories or different user categories as it will only create unnecessary complications. It will make network planning significantly more complex, particularly for pan-India operators. For instance, TSPs operating in multiple LSAs usually have a centralised system for procurement of equipment – for cost saving and efficiency. Having different carrier sizes in different LSAs would impose an unwarranted financial burden on such TSPs.

Even in the case of access spectrum, carrier sizes are uniform across different LSAs and user categories. Thus, the carrier size should be kept uniform across all LSAs and user categories.

Therefore, Airtel recommends that the carrier size in each of the MWA/MWB bands should be 28 MHz as per prevailing practice.

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Q5. Whether there is a need to assign MWA and MWB carriers in such a way that if a TSP acquires more than one carrier in a band, all assigned carriers are contiguous, and assigned frequency range(s) can be catered through a single equipment? If yes, kindly provide details of the frequency range(s) supported by the available equipment in each band. Any other suggestion(s) may kindly be made with detailed justification?

Airtel Response:

Yes, there is a need to assign MWA and MWB carriers in such a way that if a TSP acquires more than one carrier in a band, all new assigned carriers are contiguous as far as possible based on availability. Further in continuation we submit that the MWA and MWB carriers should continue to be assigned on an administrative basis only.

Assignment of new carriers should be contiguous wherever feasible:

As stated in the response to Q4, the carrier size for MWA and MWB should be 28 MHz and, in line with the prevailing practice, TSPs should be allowed the flexibility to utilise carrier bandwidths of varying sizes, ranging from 28 MHz to 112 MHz, within their allocated spectrum, as per requirements. This approach will help to significantly enhance spectral and spatial efficiency.

It is possible for a TSP to increase the carrier bandwidth from 28 MHz to 56/84/112 MHz only if it has contiguous carriers. Thus, to the extent feasible, attempts must be undertaken to ensure that new carriers are assigned to TSPs in such a way that every TSP's holding is contiguous, without adversely affecting the existing network of legacy operators, imposing unnecessary financial burdens on them or impacting the quality of services being offered by them.

Harmonisation exercise in MWA/MWB must be voluntary:

In the case of access spectrum, achieving harmonisation is much easier since access to radio equipment can fully support the entire frequency range within the band. However, in legacy networks, the availability of such backhaul radios, where a single piece of equipment is capable of supporting multiple MWA/MWB frequency carriers in a band or sub-band, may vary among different OEMs. This can be understood from the table below:

Table 1: Frequencies supported in backhaul radios supplied by different OEM partners

OEM A					OEM B					OEM C				
15 Ghz		Lower Sub band		Upper Sub band	15 Ghz		Lower Sub band		Upper Sub band	15 Ghz		Lower Sub band		Upper Sub band
Sub-bands	Start freq	Stop Freq	Start freq	Stop Freq	Sub-bands	Start freq	Stop Freq	Start freq	Stop Freq	Sub-bands	Start freq	Stop Freq	Start freq	Stop Freq
01L/01H	14495.8	14774	15055.8	15348	1W8	14515	14711	14935	15131	A	14400	14725	14921	15145
02L/02H	14604.3	14739	14919.3	15061	8W15	14711	14907	15131	15327	B	14718	14928	15138	15358
03L/03H	14698.8	14828.5	15006.8	15145										
04L/04H	14795	14933.5	15117	15248.5										
18 Ghz		Lower Sub band		Upper Sub band	18 Ghz		Lower Sub band		Upper Sub band	18 Ghz		Lower Sub band		Upper Sub band
Sub-bands	Start freq	Stop Freq	Start freq	Stop Freq	Sub-bands	Start freq	Stop Freq	Start freq	Stop Freq	Sub-bands	Start freq	Stop Freq	Start freq	Stop Freq
11L/11H	17706.5	18236.5	18600	19246.5	Band-L	17727.5	18167.5	18737.5	19177.5	A	17685	18230	18695	19240
13L/13H	18002.25	18676.5	19094.75	19686.5	Band-H	18195	18676.5	19205	19686.5	B	18180	18700	19190	19710
23 Ghz		Lower Sub band		Upper Sub band	23 Ghz		Lower Sub band		Upper Sub band	23 Ghz		Lower Sub band		Upper Sub band
Sub-bands	Start freq	Stop Freq	Start freq	Stop Freq	Sub-bands	Start freq	Stop Freq	Start freq	Stop Freq	Sub-bands	Start freq	Stop Freq	Start freq	Stop Freq
01L/01H	21200	21824.75	22400	23044.25	Band-L	21238	21770	22470	23002	A	21200	21786	22432	23018
02L/02H	21784	22600	22996.25	23600	Band-H	21798	22330	23030	23562	B	21779	22386	23011	23618

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Consequently, compared to access spectrum, achieving complete and non-disruptive harmonisation for microwave spectrum will not be possible because of the restrictions posed by sub-bands in legacy backhaul radios. Imposing a mandatory requirement of harmonisation in the case of MWA/MWB carriers would render the legacy equipment redundant, necessitating an overhaul of the entire network. This would not only put unwarranted financial costs on legacy operators, but also disturb the quality and continuity of services for the customers. Such outcomes must be prevented at all costs.

Thus, any **harmonisation of currently assigned MWA/MWB carriers must remain strictly voluntary**, if disruptions of all kinds (especially forced) to the services of existing TSPs are to be avoided and service continuity ensured. Accordingly, **harmonisation may be considered in case there are any vacant spots available with the Government or in case TSPs are willing to swap**. In no case should a TSP be mandated to give up its existing spot.

Therefore, Airtel recommends the following:

- (i) **Any endeavour towards maintaining contiguity in carriers or any harmonisation exercise must adhere to the principles of prioritising the stability of existing networks, safeguarding legacy networks, preventing unnecessary financial burdens on TSPs and upholding the requisite standards for the quality of services being offered to customers.**
- (ii) **New MWA and MWB carriers should be assigned in such a way that in situations where a TSP acquires more than one carrier in a band, all assigned carriers are contiguous as much as possible, and assigned frequency range(s) can be catered to through a single piece of equipment, wherever feasible.**
- (iii) **In the case of already assigned carriers, any harmonisation exercise must be voluntary and not mandatory.**
- (iv) **Under no circumstances should the existing legacy networks be compelled to relinquish their current assignments or substitute them with assignments in other bands or frequency spots. Such an approach will ensure the continuity of network stability, protection of legacy infrastructure and massive investments made in backhaul network, and prevent unnecessary disruptions that may arise from imposing changes to existing assignments.**

Q6. For the existing service licensees holding MWA/MWB carriers, whether there is a need to create some specific provisions (as discussed in para 2.38 of this CP) such that if the licensee is successful in acquiring the required number of carriers through auction/assignment cycle, its services are not disrupted? If yes, kindly provide a detailed response with justification.

&

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Q10. Which methodology should be used for assignment of MWA carriers? Response may be provided in the table given below:

User category	Assignment methodology [Auction/Administrative/Any other (please specify)]	Justification
(i) TSPs with Access Service License/Authorization		
(ii) TSPs with other than Access Service License/Authorization		
(iii) Other entities (non-TSP, for non-commercial/captive/isolated use)		

&

Q12. Which methodology should be used for assignment of MWB carriers? The response may be provided in the table given below:

User category	Assignment methodology [Auction/Administrative/Any other (please specify)]	Justification
(i) TSPs with Access Service License/Authorization		
(ii) TSPs with other than Access Service License/Authorization		
(iii) Other entities (non-TSP, for non-commercial/captive/isolated use)		

Airtel Response:

Airtel submits that the fundamental purpose of assignment methodology should be to prioritise network stability, cost-effectiveness for existing users and the preservation of high quality of service (QoS) without causing network disruption. Administrative assigning of backhaul spectrum will achieve better policy outcomes and support public interest better than an auction will.

Therefore, MWA/MWB carriers should be assigned on an administrative basis rather than auctioned. Further, existing TSPs must be allowed to continue with the spots currently assigned to them. Our detailed submissions in this regard are as follows:

Critical for service rollout: As elaborated in the Preamble and response to Q1 earlier, the volume of mobile data traffic has not just been growing by leaps and bounds but is expected to grow even faster with access technologies constantly evolving to cater to requirements. This in turn requires that backhaul systems and capacities are also sufficiently bolstered so that they are able to support access aggregation.

Due to backhaul spectrum being quickly scalable, highly reliable and rapidly deployable at relatively lower costs than fiber (which also takes a much longer time to rollout), wireless backhaul is the only practical solution available – more so in certain rural and remote areas and even congested urban areas where fiber is infeasible or too costly. Indeed, it is due to the availability of adequate backhaul spectrum that India has succeeded in achieving one of the fastest and most cost-effective 5G rollouts globally.

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No flexibility for introducing change in vast legacy networks: In India, presently, in the existing backhaul bands, a vast number of microwave hops, estimated to be ~5 lakh links, are already deployed. The legacy backhaul equipment has inherent limitations related to ‘occupied bandwidth’ (“OBW”) and ‘instantaneous bandwidth’ (“IBW”). The designs of these systems are optimised for performance within specific frequency bands and sub-bands. Attempting any modifications to these systems could render existing backhaul equipment obsolete, necessitating a complete overhaul of the backhaul network. Therefore, practically, there is no flexibility to change the currently assigned spots.

If such an exercise were undertaken, it would not only be a huge costly affair for TSPs, but also a colossal and time-consuming undertaking – as new links would have to be commissioned in place of existing links, followed by a change-over, and finally the withdrawal of the old links.

Moreover, there may be two scenarios in case of change in frequency: (1) the operator is assigned a different sub-band within the same band, and (2) the operator is assigned a different band altogether. While a different sub-band would require a change in radios (which itself would be a massive exercise), a different band (especially when the bands are widely separated) would disturb the entire link planning that the operator’s network would be based on.

For instance, in case an operator currently has spots in the 13 GHz band, it would have planned its network, including the number of links, their locations, etc., on the basis of the capacity of the 13 GHz band and its radiation and penetration characteristics. These factors would be very different for the 21 GHz band and would essentially require the operator to re-plan its network from scratch, in case it is assigned spots in the 21 GHz band instead of the 13 GHz band.

Apart from the above, a lot of existing inventory will go waste as new equipment hardware will be required. To prevent such adverse consequences, it is essential that each TSP re-obtains the same frequencies in the same band and sub-band – which is only possible in the case of an administrative assignment.

Adverse impact on consumers: As explained above, any change in the existing frequency spots assigned to MWA/MWB carriers would require the overhauling of the entire legacy backhaul systems. This would potentially cause service disruptions for hundreds of millions of subscribers of legacy operators.

As per the latest TRAI data, Airtel alone has over 380 million wireless subscribers. The interests of this huge customer base would be adversely affected in case of any service disruption.

Since the prime objective of any policy has to be protection of the interests of consumers and public at large, the Government would do well to avoid taking the mammoth risk of auctioning the backhaul spectrum at all costs.

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

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Risk to massive investments in access network (access spectrum): TSPs have sunk lakhs of crores into obtaining access spectrum through auctions over the years (including recent 5G auctions). To provide context, a prominent TSP of the country has acquired spectrum worth 1.78 Lakh Crores till date. In the interests of investment stability and sustenance of business operations, it is imperative to ensure that TSPs are able to monetise their access spectrum. Such certainty is possible only with continued administrative allocation of backhaul spectrum.

Further, in addition to affecting the investments already made, any risk or uncertainty about the backhaul will also have an adverse impact on the auction of access spectrum going forward. This would represent a regressive move for the telecom sector, just as the Cabinet has initiated a slew of reforms to bolster and stabilise the industry following years of instability. Furthermore, it would run counter to the Government's vision of enhancing the ease of doing business in the country.

Supporting role of backhaul spectrum: Backhaul spectrum is only a complementary infrastructure resource to the auctioned access spectrum. The backhaul spectrum does not generate any revenue on its own and, hence, there is no rationale for auctioning the same.

Additionally, auctioning access spectrum is fundamental from a market access and competition perspective. However, that is not the case with backhaul. Access and backhaul spectrum cannot be equated and should not be treated in a similar way.

A one-size-fits-all approach that does not take into account the diverse scope, needs and nuances of the telecommunications sector is neither apposite, nor prudent. Rather, a balanced and well-considered approach that incorporates the vast variety of allocation methods employed to accommodate the sector's myriad requirements while promoting serviceability, competition and orderly growth would be the best way forward.

Adverse consequences of auctioning backhaul spectrum: The operators with legacy backhaul allocations do not have any flexibility to change their currently assigned spots. Given that relinquishing their existing spectrum allocations will be very difficult, such operators will be at significant risk of getting disturbed/disrupted by destructive bidding during auction.

In such a situation, TSPs will be obliged to acquire the same spectrum that has already been invested in since they will, otherwise, face various risks, including (but not limited to) substantial costs of replacing equipment, potential network disruptions and deteriorated QoS for the public. Such a situation might also result in inadvertently conferring an unwarranted competitive advantage to competitors.

Even if existing spectrum holders were to be granted the right of first refusal (RoFR) in auctions, it would still become a winner's curse for the legacy operators as they would have to outbid the other bidders. An auction may also potentially see attempts at spectrum hoarding and this would hurt the interests of TSPs with legacy networks.

No supply constraints in MWA/MWB carriers that justify an auction approach: As is evident from Table 2.4 of the Consultation Paper, there is no dearth of MWA carriers with 76% of carriers already lying vacant with the government. Even in the case of MWB carriers, there is no instance of shortage or limited availability. Even

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with the current assignment methodology, it is evident that 53% of carriers in the 13GHz band, 22% in the 15GHz band, 83% in the 18GHz band, and 93% in the 21GHz band remain unutilised.

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

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

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

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

In fact, the TRAI Act provides that the objectives of establishment of the Authority is to protect the interests of both the service providers and the consumers and ensure orderly growth of the telecom sector. However, as explained earlier, backhaul spectrum auctions would be in conflict with each of these objectives. Thus, in case the Authority now takes a view contrary to its 2014 Recommendations, it would go contrary to its mandate under the TRAI Act itself.

The 2G Judgment did not mandate auction as the sole method in every case: The Hon’ble Supreme Court Order in the 2G matter was in the context of arbitrary grant of access spectrum. It neither extends to allocation of all natural resources in general nor prohibits administrative allocation of natural resources.

The Hon’ble Supreme Court had specifically observed that the submission that the mandate of Article 14 requires that *disposal of a natural resource for commercial use must be for revenue maximisation and thus by auction* is based neither on law nor logic. Even the mandate of 39(b) imposes no restrictions on the means adopted to subserve the public good and uses the broad term ‘distribution’, suggesting that the methodology of distribution is not fixed.

The economic logic of alienation/allocation of natural resources to the highest bidder may not necessarily be the only way to subserve the common good and, at times, may even run counter to the public good. Hence, it needs little emphasis that the disposal of all natural resources through auctions is clearly not a constitutional

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mandate. There is no directive under the 2G Judgement that natural resources can be allocated only through auctions.

Moreover, and importantly, as already highlighted previously, backhaul spectrum is there to complement the access spectrum, not to replace it/compete with it in the access market. Therefore the logic of auctions does not hold in the case of backhaul spectrum. It is also pertinent to note that the 2G Judgement came much before the TRAI 2014 Recommendations, and it did not act as a bar for TRAI recommending administrative assignment of backhaul spectrum then. Therefore, Airtel contends that the same approach should continue to be followed even now.

If for argument's sake, it is assumed that the 2G Judgment does bar the assignment of spectrum through any methodology other than auction, then even delicensing of spectrum would fall foul of it. However, even after the 2G Judgment, TRAI has recommended for and DoT has actually delicensed various spectrum bands, for use cases like short-range devices, tracking and telemetry, etc. Hence, it follows that 2G Judgment does not mandate auction as the only methodology for assignment of spectrum.

In view of the foregoing, Airtel recommends that MWA/MWB carriers should be assigned on an administrative basis.

Bundling Approach:

TSPs have invested lakhs of crores in acquiring access spectrum to manage the surging network traffic. For instance, just between 2022 and 2021, close to ~2.2 lakh crores were invested by TSPs to acquire access spectrum through auctions.

Backhaul spectrum plays a critical and essential role with regard to utilisation of access spectrum. Any uncertainty about the availability of backhaul spectrum not only jeopardises the significant investments already made but also raises questions about future investments in access spectrum. Therefore, when TSPs acquire access spectrum by paying substantial amounts at auctions, they must be assured of backhaul spectrum availability for network rollout using the acquired access spectrum. This assurance can only be guaranteed through administrative assignment.

Thus, it would be prudent to continue with the current policy of backhaul spectrum assignment. Hence, the Government should allocate the MWA/MWB spectrum bundled with the access spectrum, as the latter is already auctioned. This would also assure faster roll outs.

Going forward, Airtel recommends the following:

- (i) **MWA & MWB carriers must be assigned on an administrative basis following a well-defined process.**
- (ii) **Legacy operators should not be compelled to give up their existing MWA/MWB spots or change carriers.**

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(iii) The Government should allocate the MWA/MWB spectrum bundled with the access spectrum, as the latter is already auctioned. This would also assure faster roll outs.

By adhering to these principles, a fair and balanced approach that benefits all stakeholders in the industry can be ensured.

Q7. Whether there is a need to review the existing ceiling on number of MWA carriers that can be held by a licensee? In case it is decided to review the ceiling on the number of MWA carriers that a licensee can hold,

- (a) Whether a separate ceiling for each band (13 GHz/15 GHz/18 GHz/21 GHz) should be prescribed or an overall ceiling for MWA carriers taking all bands together?
- (b) Whether different ceilings based on the service area category i.e., Metro/Category 'A' Circles/Category 'B' Circles/Category 'C' Circles, needs to be prescribed?
- (c) What should be the ceiling in terms of the number of carriers of 28 MHz per licensee in each case i.e., band-wise ceiling and overall ceiling for each service area category for –
 - (i) TSPs with Access Service License/Authorization, and
 - (ii) TSPs with other than Access Service License/Authorization?
- (d) Any other relevant suggestion may be made with justification.

Kindly justify your response.

Airtel Response:

No, there is no need to review the existing ceiling on the number of MWA carriers that can be held by a licensee.

As per the Addendum dated 25.07.2022 to the Guidelines dated 16.10.2015 regarding allotment of MWA/MWB carriers to TSPs with Access Service Authorisation/License, the maximum number of MWA carriers that can currently be assigned to a TSP with Access Service Authorisation is as follows:

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

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

It is not the case that each TSP has obtained the maximum number of carriers allowed in each of the circles. In some cases, TSPs have even relinquished their MWA/MWB carriers based on their fiber deployment progress. Therefore, the current ceiling is adequate at this stage. However, as highlighted earlier, the numbers are subject to change in the future with the growth in the volume of traffic and a variety of other factors.

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

- (a) Whether a separate ceiling for each band (13 GHz/15 GHz/18 GHz/21 GHz) should be prescribed or an overall ceiling for MWA carriers taking all bands together?**

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

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

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

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

- (b) Whether different ceilings based on the service area category i.e., Metro/Category 'A' Circles/Category 'B' Circles/Category 'C' Circles, needs to be prescribed?**

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

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

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

- (c) What should be the ceiling in terms of the number of carriers of 28 MHz per licensee in each case i.e., band-wise ceiling and overall ceiling for each service area category for –**

- (i) TSPs with Access Service License/Authorisation, and**
- (ii) TSPs with other than Access Service License/Authorisation?**

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Please refer to the response to points (a) and (b) above. There is **no need for a band-wise ceiling on MWA carriers**. An overall ceiling per LSA, in line with the extant policy, is sufficient.

- (i) **For TSPs with Access Service Authorisation**, the overall ceiling, in terms of number of carriers of 28 MHz per licensee, should be as follows:
- **8 carriers in each of the Metros and Category-A LSAs**
 - **6 carriers in each of the Category-B and C LSAs**
- (ii) **For TSPs with other than Access Service Authorisation**, please refer to the responses to Q1 and Q2 earlier. MWA/MWB carriers should continue to be assigned to them on a **P2P link basis**, in line with the extant policy.

Q8. In case it is decided to assign MWB carriers exclusively on LSA basis to the TSPs, whether there is a need to prescribe any ceiling on the maximum number of MWB carriers that can be held by a TSP? Kindly justify your response.

Airtel Response:

Please refer to the responses to Q1 and Q2. MWB carriers should be assigned to TSPs with Access Service Authorisation for the entire LSA on an exclusive basis. Further, **yes, there should be a ceiling on the maximum number of MWB carriers that can be held by such a TSP.**

It is necessary to prevent hoarding of spectrum by any TSP. It is estimated that TSPs with limited fiber infrastructure would need 2 MWB carriers initially to meet their backhaul requirements – hence a ceiling of 2 MWB carriers per LSA per TSP should be prescribed in all categories of LSAs.

Therefore, Airtel recommends that MWB carriers should be assigned for the entire LSA on an exclusive basis, with a ceiling of 2 carriers per LSA in all categories of LSAs.

Q9. In case it is decided to prescribe a ceiling on the number of MWB carriers that a TSP can hold,

- (a) Whether separate ceiling for each band (6 GHz, 7 GHz (7.125-7.425 GHz) and 7 GHz (7.425-7.725 GHz)) should be prescribed or an overall ceiling for MWB carriers should be prescribed?
- (b) Whether different ceiling based on the service area category i.e., Metro/Category 'A' Circles/Category 'B' Circles/Category 'C' Circles, needs to be provided?
- (c) What should be the ceiling in terms of number of carriers of 28 MHz per licensee in each case i.e., band-wise ceiling and overall ceiling for each service area category for
- (i) TSPs with Access Service License/Authorization, and
- (ii) TSPs with other than Access Service License/Authorization?
- (d) Any other relevant suggestion may be made with justification.

Airtel Response:

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Please refer to the responses to Q1, Q2 and Q8. MWB carriers should be assigned to TSPs with Access Service Authorisation for the entire LSA on an exclusive basis, with a ceiling of 2 carriers per LSA in all categories of LSAs.

- (a) Whether separate ceiling for each band (6 GHz, 7 GHz (7.125-7.425 GHz) and 7 GHz (7.425-7.725 GHz)) should be prescribed or an overall ceiling for MWB carriers should be prescribed?**

No. There is **no need to prescribe a separate band-wise ceiling** [6 GHz, 7 GHz (7.125-7.425 GHz) and 7 GHz (7.425-7.725 GHz)]. An **overall ceiling** for MWB carriers will suffice.

As highlighted in the response to Q7, the prevailing Guidelines prescribe only an overall ceiling on the number of MWA carriers that can be held by a TSP with Access Service Authorisation. And there is no separate/bandwise individual ceiling for each MWA band (13 GHz/15 GHz/18 GHz/21 GHz).

Airtel recommends that a similar approach be adopted in the case of MWB carriers, i.e., an overall ceiling of 2 MWB carriers per LSA, in all categories of LSAs. There is no need to set distinct limits for each MWB band separately.

In summary, Airtel recommends that MWB carriers should be assigned to TSPs with Access Service Authorisation for the entire LSA on an exclusive basis, with an overall ceiling of 2 carriers per LSA in all categories of LSAs.

- (b) Whether different ceiling based on the service area category i.e., Metro/ Category 'A' Circles/ Category 'B' Circles/ Category 'C' Circles, needs to be provided?**

No, there is no need to provide different ceilings based on service area category, i.e., Metro/Category 'A' Circles/Category 'B' Circles/Category 'C' Circles.

The requirement of MWB carriers is estimated to be similar in all categories of LSAs. Therefore, the ceiling on the number of MWB carriers that can be held by a TSP should be uniform across all categories of LSAs.

In summary, Airtel recommends that MWB carriers should be assigned to TSPs with Access Service Authorisation for the entire LSA on an exclusive basis, with an overall ceiling of 2 carriers per LSA in all categories of LSAs.

- (c) What should be the ceiling in terms of number of carriers of 28 MHz per licensee in each case i.e., band-wise ceiling and overall ceiling for each service area category for**
- (i) TSPs with Access Service License/Authorization, and**
 - (ii) TSPs with other than Access Service License/Authorization?**

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Please refer to the responses to points (a) and (b) above. There is **no need for a band-wise ceiling on MWB carriers**. An overall ceiling per LSA should be prescribed and it should be **uniform across all categories of LSAs**.

- (i) **For TSPs with Access Service Authorisation**, the overall ceiling, in terms of number of carriers of 28 MHz per licensee, should be 2 carriers per LSA in all categories of LSAs.
- (ii) **For TSPs with other than Access Service Authorisation**, please refer to the responses to Q1 and Q2. MWA/MWB carriers should continue to be assigned to them on a **P2P link basis**, in line with the extant policy. Accordingly, there is **no need for prescribing any ceiling** in case of TSPs holding other than Access Service Authorisation.

Q11. In case you are of the opinion that certain user categories should be assigned MWA carrier P2P links by any methodology other than auction, should some MWA carriers be earmarked for such users? If yes, how many carriers should be earmarked for each of such user category? Kindly justify your response.

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Q13. In case you are of the opinion that certain user categories should be assigned MWB carrier by any methodology other than auction, should some MWB carriers be earmarked for such users? If yes, how many carriers should be earmarked for such users? Kindly justify your response.

Airtel Response:

Please refer to the Preamble and Airtel's responses to Q1, Q2, Q6, Q10 and Q12.

The administrative assignment of MWA/MWB spectrum is crucial if colossal disruption to legacy networks is to be avoided and uninterrupted continuity of services for hundreds of millions of customers ensured. Furthermore, holding an auction will cause significant disruption to legacy networks and impose a substantial and unwarranted financial burden (leading to a winner's curse situation) on legacy operators.

Given that backhaul spectrum is only a complementary resource that does not generate revenue of its own, and given that its supply far exceeds its demand, the logic of an auction does not even apply here. Furthermore, TRAI, in 2014, itself recommended the administrative assignment of MWA/MWB. International best practices also favour administrative assignment. Thus, **MWA/MWB spectrum should only be assigned administratively**.

Further, for TSPs with Access Service Authorisation, it should be assigned for the entire LSA on an exclusive basis. For TSPs with other than Access Service Authorisation and non-TSPs, the existing policy of P2P assignment should be continued with.

It may be appreciated that MWA spectrum is assigned, even currently, to TSPs with other than Access Service Authorisation and non-TSPs on a P2P link basis, simultaneously while it is assigned on an exclusive basis to TSPs

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with Access Service Authorisation. Since this approach has served the purposes of all users well thus far, Airtel suggests that the same should be continued with and adopted in the case of MWB spectrum as well.

In summary, Airtel recommends the following:

- (i) The extant policy of assigning MWA spectrum on an administrative basis, such that TSPs with Access Service Authorisation are assigned the spectrum on an exclusive basis for the entire LSA and TSPs with other than Access Service Authorisation and non-TSPs are assigned P2P links, should be continued with.**

- (ii) The same approach should be adopted in the case of MWB spectrum as well.**

Q14. In case it is decided to assign MWA/MWB carriers to the TSPs with Access Service License/Authorization through auction and to continue the existing P2P assignment of MWA/MWB carriers for TSPs other than Access Service License/Authorization, who may be requiring to establish only a few links, what threshold limit in terms of number of links, may be prescribed, beyond which, the TSPs with other than Access Service License/ Authorization should also be required to acquire MWA/MWB carriers through auction? Kindly justify your response.

Airtel Response:

Please refer to the Preamble and our responses to Q1, Q2, Q6, Q10 and Q12.

The administrative assignment of MWA/MWB spectrum is crucial if colossal disruption to legacy networks is to be avoided and uninterrupted continuity of services for hundreds of millions of customers ensured. Furthermore, holding an auction will cause significant disruption to legacy networks and impose a substantial and unwarranted financial burden (leading to a winner's curse situation) on legacy operators.

Given that backhaul spectrum is only a complementary resource that does not generate revenue of its own, and given that its supply far exceeds its demand, the logic of an auction does not even apply here. Furthermore, TRAI, in 2014, itself recommended the administrative assignment of MWA/MWB. International best practices also favour administrative assignment. Thus, **MWA/MWB spectrum should only be assigned administratively.**

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

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

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Same resource – same approach:

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

Precedence of uniform approach:

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

Risk of misuse in different approaches:

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

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

Therefore, a differential assignment methodology will incentivise operators to buy spectrum other than the access spectrum, creating a non-level playing field. Any differential assignment policy, along with a differential charging mechanism, will prompt various stakeholders to create arbitrage opportunities. Such devious situations must be avoided.

Therefore, Airtel recommends that MWA/MWB carriers must be assigned to all user categories through a uniform methodology, i.e., administrative assignment.

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Q15. In case it is decided to assign MWA/MWB carriers to all types of licensed TSPs through auction, should such TSPs be permitted to lease their spectrum acquired through auction, on P2P link basis, to other TSPs and other entities (non-TSP, for non-commercial/captive/isolated use) who may be requiring establishing only a few links? If yes,

- (a) suggest a mechanism and regulatory framework for such leasing arrangement.
- (b) Do you foresee any regulatory issues and potential misuse of such a regime? If yes, what measures could be put in place to mitigate the concerns?

Kindly justify your response.

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Q16. In case MWA/MWB carriers are decided to be assigned through auction,

- (a) Should the auction be conducted based on Simultaneous Multiple Rounds Ascending Auction (SMRA) method as adopted for IMT spectrum auction? Any other auction method may be suggested with detailed justification.
- (b) what quantum of spectrum in each band (6/7/13/15/18/21 GHz) should be put to auction? Kindly justify your response.

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Q17. In case it is decided to assign MWA and MWB carriers through auction,

- (a) What should be the validity period of the assigned spectrum?
- (b) Whether there is a need to create a provision for surrender of MWA/MWB carriers? If yes, what should be the lock-in period and other associated terms and conditions?

Response may be given for each user category viz. (i) TSPs with Access Service License/ Authorization, (ii) TSPs with other than Access Service License/Authorization, and (iii) Other entities (non-TSP, for non-commercial/captive/isolated use) with detailed justification.

Airtel Response:

Please refer to the Preamble and our responses to Q6, Q10 and Q12.

The administrative assignment of MWA/MWB spectrum is crucial to avoid colossal disruption to legacy networks and ensure the uninterrupted continuity of services for hundreds of millions of our customers. On the other hand, an auction will cause significant disruption to legacy networks and impose substantial unwarranted financial implications (leading to a winner's curse situation) on legacy operators.

Given that backhaul spectrum is only a complementary resource that does not generate revenue of its own, and its supply far exceeds its demand, the logic of an auction does not even apply here. Furthermore, TRAI, in 2014, itself recommended the administrative assignment of MWA/MWB. International best practices also favor administrative assignment. Thus, **MWA/MWB spectrum should only be assigned administratively.**

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Q18. In case it is decided to continue with the existing methodology of assignment of MWA/MWB carriers, whether any change in the validity period, or process for augmentation/surrender of carriers is required to be made? If yes, suggestions may be made with detailed justification.

Airtel Response:

Please refer to the Preamble and our responses to Q1, Q2, Q6, Q10 and Q12.

The administrative assignment of MWA/MWB spectrum is crucial to avoid colossal disruption to legacy networks and ensure the uninterrupted continuity of services for hundreds of millions of our customers. On the other hand, an auction will cause significant disruption to legacy networks and impose substantial unwarranted financial implications (leading to a winner's curse situation) on legacy operators.

Given that backhaul spectrum is only a complementary resource that does not generate revenue of its own, and its supply far exceeds its demand, the logic of an auction does not even apply here. Furthermore, TRAI, in 2014, itself recommended the administrative assignment of MWA/MWB. International best practices also favor administrative assignment. Thus, **MWA/MWB spectrum should only be assigned administratively.**

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

No change is required to be made in the validity period or process for augmentation/ surrender of carriers if the existing methodology of assignment of MWA/MWB carriers is persisted with.

Currently, the validity period of the MWA/MWB carriers assigned to a TSP is co-terminus with its license. For augmentation, a TSP has to submit a request to DoT, who evaluates the requirement and decides whether it falls within the spectrum cap. Further, as per the extant guidelines, a TSP may surrender an MWA/MWB carrier assigned to it by serving an advance notice of 30 days to DoT. The same should be continued with.

Therefore, Airtel recommends that the existing methodology of assigning MWA/MWB carriers administratively should be continued with. Accordingly, there is no need for any change in the extant validity period and augmentation process as well as the surrender guidelines.

Q20. Whether there is a need to prescribe any roll out obligations for MWA/MWB carrier assignment? Should the roll out obligations be linked to the number of carriers assigned to a TSP? Kindly justify your response.

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Q21. In case it is decided to prescribe roll out conditions, what should be the roll-out obligations associated with the assignment of spectrum in 6/7/13/15/18/21 GHz bands? What provisions should be prescribed for non-fulfilment of the prescribed roll-out obligations? Response may kindly be given for each user category viz. (i) TSPs with Access Service License/Authorization, (ii) TSPs with other than Access Service License/ Authorization, and (iii) Other entities (non-TSP, for non-commercial/captive/isolated use) with detailed justification.

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Airtel Response:

No, there is no need to prescribe any roll out obligations for MWA/MWB carrier assignment.

TSPs holding access spectrum are already subject to **rollout obligations specific to access services**. These rollout obligations are designed to ensure that TSPs extend their network coverage to provide services to end-users within a defined timeframe and geographic area. This involves deploying cell sites, base stations and infrastructure to provide coverage to subscribers.

Backhaul spectrum, on the other hand, is not meant to provide coverage at the access level; rather, its primary purpose is to establish high-capacity data links among various network elements. It only plays a supporting (and complementary) role in the telecommunications ecosystem by facilitating the efficient transport of network traffic between access points (e.g., cell towers) and the core network. Hence, there is no logical reason for having separate roll out obligations for MWA/MWB carriers.

Accordingly, Airtel recommends that there should not be any (separate) roll out obligations towards MWA/MWB carrier assignment for TSPs holding access spectrum.

Q22. Any other suggestions relevant to assignment of spectrum for MWA and MWB in 6/7/13/15/18/21 GHz frequency bands, may kindly be made with detailed justification.

Airtel Response:

No comment.

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Q23. What quantum of spectrum in E-band (71-76/81-86 GHz) and V-band (57-64 GHz) is required to meet the demand of TSPs with Access Service License/Authorization? Whether spectrum in E-band and V-band is also required by the TSPs other than Access Service License/Authorizations, and other entities (non-TSP, for non-commercial/ captive/isolated use)? Information on present demand and likely demand after five years may kindly be provided as per the proforma given below:

(i) Present demand

Band	Quantum of spectrum required (per entity per LSA)		
	TSPs with Access Service License/ Authorization	TSPs with other than Access Service License/Authorization	Other entities (non-TSP, for non-commercial/captive/ isolated use)
E-band (71-76/81-86 GHz)			
V-band (57-64 GHz)			

(ii) Likely demand after five years

Band	Quantum of spectrum required (per entity per LSA) –		
	TSPs with Access Service License/ Authorization	TSPs with other than Access Service License/Authorization	Other entities (non-TSP, for non-commercial/captive/ isolated use)
E-band (71-76/81-86 GHz)			
V-band (57-64 GHz)			

Airtel Response:

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

Importance of E/V bands:

It is undisputed that overall mobile data consumption and, consequently, backhaul requirement per site, has grown by leaps and bounds in a myriad different ways. Conventional microwave spectrum can barely keep up with the current needs of 200-400 Mbps per site for even 4G, leave aside 5G. Simply put, the volume of traffic the access network is expected to cope with necessitates multifold capacity augmentation at the backhaul level – possible only with high-capacity bands like E/V bands. In fact, it would be fair to say, that India would not have been able to achieve one of the fastest 5G rollouts in the world were it not for the availability of the E-band spectrum which allows for the much needed scalability of backhaul capacity to 1 Gbps and beyond.

Quantification of demand for E/V bands:

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

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

Demand for E-band: Currently, there is a ceiling of 2 carriers per LSA in E-band. However, with the rapid increase in internet traffic, the current ceiling is not adequate to meet the constantly growing requirements and should immediately be increased to **4 carriers per LSA**.

Demand for V-band: Currently, there is no policy for assignment of V-band. Airtel believes that a ceiling of **40 carriers per LSA** would be reasonable for meeting industry requirements at this stage.

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

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

Telecom operators holding access spectrum are using E-band to provide high-speed backhaul services. The assignment of E-band has enabled Indian telecom companies to rollout one of the fastest 5G network rollouts in the world with much needed scalability of backhaul capacity to 1 Gbps and beyond. Neither TRAI nor DoT have outlined any use case or instance where TSPs holding non-access service authorisation or non-TSPs require the E band at all.

Even the extant policy for assignment of E-band is limited to TSPs with Access Service Authorisation. Hence, there is no need to assign E band spectrum to TSPs with other than Access Service Authorization and non-TSPs. It should be assigned only to TSPs with Access Service Authorisation.

Therefore, Airtel recommends the following:

- (i) For E-band, the current ceiling of 2 carriers should be increased to 4 carriers per LSA immediately.**
- (ii) For V-band, a ceiling of 40 carriers per LSA should be prescribed.**
- (iii) There is no need to assign E/V band spectrum to TSPs with other than Access Service Authorisation and non-TSPs.**

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Q24. Whether spectrum in E-band and V-band should be assigned exclusively on an LSA-basis, or on P2P link basis? Response may be provided separately for (i) TSPs with Access Service License/Authorization, (ii) TSPs other than Access Service License/Authorization, and (iii) other users (non-TSP, for non-commercial/captive/isolated use) in the table given below with detailed justification.

Microwave bands	Spectrum should be assigned for the entire LSA on exclusive basis, or on P2P link basis for –		
	TSPs with Access Service License/ Authorization	TSPs with other than Access Service License/ Authorization	Other entities (non-TSP, for non-commercial/captive/ isolated use)
E-band (71-76/81-86 GHz)			
V-band (57-64 GHz)			

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Q37. In case it is decided to assign spectrum in E-band (71-76/81-86 GHz) and V-band (57-64 GHz) on an exclusive basis, should the spectrum be assigned on an LSA basis, or pan-India basis or for any other geographic area should be defined? Kindly justify your response.

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Q42. What should be the eligibility conditions and associated conditions for assignment of spectrum in E-band (71-76/81-86 GHz) and V-band (57-64 GHz)? Response may be given for each user category viz. (i) TSPs with Access Service License/authorization, (ii) TSPs with other than Access Service License/authorization, and (iii) Other entities (non-TSP, for non-commercial/captive/isolated use) with detailed justification.

Airtel Response:

Currently, E-band carriers are assigned to TSPs with Access Service Authorisation for the entire LSA on an exclusive basis, while there is no policy for assignment of V-band carriers. It is Airtel’s suggestion that **spectrum in E-band and V-band should be assigned to TSPs with Access Service Authorisation exclusively on an LSA-basis.**

Exclusive assignment to TSPs with Access Service Authorisation:

As also submitted in the context of MWA/MWB carriers in the response to Q2 earlier, exclusive assignment considerably reduces the time required for deployment of network, enabling faster rollout of services. In fact, India witnessing one of the fastest 5G rollouts in the world has been possible only because of the availability of E-band spectrum on an exclusive basis. Exclusive assignment helps WPC to avoid the huge logistical challenges involved in the same.

P2P assignment on the other hand would require carrying out extensive interference analysis among the specific links assigned to various TSPs. Hence, the spectrum in E/V bands should be assigned to TSPs with Access Service Authorisation on an exclusive basis for the entire LSA.

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No need of assignment of E/V bands to TSPs with other than Access Service Authorisation and non-TSPs:

With regard to the assignment of spectrum in E/V bands to other entities/non-TSPs, please refer to the response to Q23 earlier. There is no need to assign E/V band spectrum to TSPs with other than Access Service Authorisation and non-TSPs, as there is no case for its use by such entities.

Therefore, Airtel recommends the following:

- (i) **The spectrum in E/V bands should be assigned to TSPs with Access Service Authorisation for the entire LSA on an exclusive basis.**
- (ii) **There is no need to assign E/V band spectrum to TSPs with other than Access Service Authorisation and non-TSPs.**

Q25. Do you agree that the issues relating to the assignment of E-band and V-band for space-based communication services and its coexistence with terrestrial networks may be taken up at a later date? If not, the concerns and measures to overcome such concerns may kindly be suggested with relevant details.

Airtel Response:

Please refer to the response to Q3 with respect to the co-existence of MWA/MWB carriers with space-based communication services.

As captured in TRAI's Consultation Paper on "Assignment of Spectrum for Space-based Communication Services" dated 06.04.2023, DoT has stated that, "Coexistence of satellite networks or satellite-based communication within the country is ensured through various provisions in RR, ITU recommendations, WRC Resolutions, NFAP and License conditions for the satellite and MW services. ... Moreover, as per the current practice to assign spectrum administratively, all frequency assignments/operations are issued on non-interference/non-protection basis."

Airtel concurs with DoT in this regard.

To mitigate interference, ITU prescribes varying measures in ITU-RR which have been duly captured in the said Consultation Paper dated 06.04.2023 as well.

In view of the above, there are sufficient mechanisms and processes that exist under the ITU framework⁷ and global best practices that should be leveraged. Airtel does not foresee any concerns at this stage that may warrant any ex-ante measures.

⁷ For detailed coordination of terrestrial stations operating in the bands shared with space service, visit <https://www.itu.int/en/ITU-R/terrestrial/fmd/Pages/coordination.aspx>.

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Q26. Whether it will be appropriate to continue with the Frequency Division Duplexing (FDD) based configuration as adopted for the provisional assignment of E-band carriers or Time Division Duplexing (TDD) based configuration should be adopted? Kindly justify your response.

Airtel Response:

It will be appropriate to **continue with the Frequency Division Duplexing (FDD) based configuration** as adopted for the provisional assignment of E-band carriers.

Current equipment ecosystem – only supports FDD based usage:

The ITU-R Recommendation F.2006 mentions both FDD and TDD as potential frequency arrangements for E-band. However, it is to be noted that E-band is primarily suited for high-capacity, low-latency mobile backhaul and fronthaul applications, where the FDD arrangement is considered mandatory.

Moreover, it is clear from the OEMs' extensive global experience that commercial equipment currently available for E-band primarily supports only the FDD configuration, particularly when considering mobile transport services. Hence, FDD based configurations must be persisted with.

Disadvantages of TDD configuration:

While the TDD configuration is theoretically feasible, there are some disadvantages when compared to FDD. TDD configurations prevent TSPs from using adjacent channels, leading to reduced spectral efficiency – up to 50% reduction in net throughput. This, in turn, results in increased latency.

Therefore, Airtel recommends that FDD based configuration, as adopted for the purposes of provisional assignment of E-band spectrum, should be continued with.

Q27. Whether Frequency Division Duplexing (FDD) or Time Division Duplexing (TDD) based configuration should be adopted for V-band carriers? In case you are of the opinion that FDD based configuration should be adopted, detailed submissions may be made with band plan, ecosystem availability, and international scenario.

Airtel Response:

Time Division Duplexing (TDD) based configuration should be adopted for V-band carriers as V-band spectrum is not a paired spectrum and the equipment ecosystem available currently is also compatible only with TDD based backhaul.

In the alternative, the Authority may wait for future developments before deciding on the policy, since the usage of V-band for telecom services is still a novel concept and studies regarding the same are still underway for applications beyond 5G.

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Therefore, Airtel recommends the following:

- (i) **TDD based configurations should be adopted for the V-band spectrum.**
- (ii) **Alternatively, the Authority may wait for future developments emerging out of technical studies and research before finalising the policy regarding configuration in the V-band spectrum.**

Q28. What should be the carrier size for assignment of spectrum in E-band (71-76/81-86 GHz) and V-band (57-64 GHz)? Whether there is a need to prescribe a different carrier size based on different LSA categories or different user categories viz. (i) TSPs with Access Service License/Authorization, (ii) TSPs other than Access Service License/Authorization and (iii) other users (non-TSP, for non-commercial/captive/isolated use)? If yes, suggestions may be made with detailed justification.

Airtel Response:

The carrier size for assignment of spectrum in E-band (71-76/81-86 GHz) and V-band (57-64 GHz) should be 250 MHz and 50 MHz, respectively.

Even under the extant regime, the carrier size for E-band is 250 MHz, as per TRAI's 2014 Recommendations. Further, while there is no policy for assignment of V-band currently, TRAI had recommended a carrier size of 50 MHz for V-band in 2014, after taking into account international standards. There is no reason to deviate from the same.

In addition, there is **no need to prescribe a different carrier size based on different LSA categories or different user categories**. As also submitted in the context of MWA/MWB carriers in response to Q4, carrier size should be uniform across all LSAs and user categories. Different carrier sizes will only add to the complications in network planning as well as impact the cost efficiency of operations, especially for pan-India operators; and there is no need to introduce additional complexity in the regulatory framework.

Therefore, Airtel recommends that the carrier size for E-band and V-band should be 250 MHz and 50 MHz respectively, as per prevailing practice and TRAI's Recommendations.

Q29. Whether there is a need to assign spectrum in E-band and V-band in such a way that if a TSP acquires more than one carrier, all the assigned carriers to a TSP are contiguous? Kindly justify your response.

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Q30. Since E-band carriers will be reassigned as per the assignment methodology that will be finalized, to avoid any disruption of services to the consumers of the existing TSPs holding E-band carriers, whether there is a need to create a provision such that the TSP is given a choice to retain the same frequency carrier as long as such TSP is able to acquire the carriers in the new regime? Kindly justify your response.

Airtel Response:

Yes, there is a need to assign spectrum in E-band and V-band in such a way that if a TSP acquires more than one carrier, all the assigned carriers to a TSP are contiguous.

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Importance of Contiguity in Carriers:

As stated in the response to Q28 above, the carrier size for E-band and V-band should be fixed at 250 MHz and 50 MHz, respectively. Further, in line with prevailing practice in the case of MWA/MWB carriers, TSPs must be allowed to utilise carrier bandwidths of different sizes within their allocated spectrum in E/V bands as well, to enable them to enhance spectral and spatial efficiency. In order to achieve this, it is crucial to ensure that TSPs are assigned contiguous carriers for them to expand their carrier bandwidth without disruption in existing networks.

Recognising the importance of contiguity, the E-band carriers assigned at present have been assigned in such a way that the 2 carriers of a TSP are contiguous (the extant policy allows for the assignment of a maximum of 2 E-band carriers per TSP).

Harmonisation in E-band:

In the response to Q5 earlier, Airtel has submitted that there is no flexibility in cases of currently assigned MWA/MWB carriers because of the restrictions posed by sub-bands in legacy microwave backhaul radios. However, this is not the case for E-band since backhaul radios in this band are new generation and they support entire frequency ranges and, hence, are compatible with harmonisation. Thus, harmonisation exercises may be carried out in E-band, if required, as has been done in the case of access spectrum for the past several years.

Accordingly, while E-band carriers will be reassigned as per the assignment methodology that will be finalised, there is no need to create a provision such that the TSP is given a choice to retain the same frequency carrier as long as such a TSP is able to acquire the carriers in the new regime. There is an alternative suggestion in this regard, which is discussed in the subsequent paras.

Provision for future requirements:

As submitted in the response to Q23 previously, the current ceiling of 2 E-band carriers is not adequate to meet the rapidly rising demands of the industry, and it should be increased to 4 carriers per LSA.

In this regard, even though it is easier to carry out harmonisation in E-band as compared to MWA/MWB carriers, such exercises still lead to a disruption in the network – however brief that might be. In order to ensure minimal network disruptions in the future, 4 contiguous carriers should be reserved for each TSP at this initial stage itself, which would help to avoid frequent harmonisation exercises.

Therefore, Airtel recommends the following:

- (i) Spectrum in E/V bands should be assigned in such a way that if a TSP acquires more than one carrier in a band, all assigned carriers are contiguous and assigned frequency range(s) can be catered through a single equipment.**
- (ii) To avoid frequent harmonisation in the future, 4 contiguous carriers should be reserved for each TSP at this initial stage itself.**

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Q31. Whether there is a need to prescribe the maximum number of carriers that can be held by a TSP in E-band and V-band? Kindly justify your response.

Airtel Response:

Please refer to the response to Q23. Spectrum in E/V bands should only be assigned to TSPs with Access Service Authorisation. Further, **yes**, there is a **need to prescribe the maximum number of carriers that can be held by a TSP with Access Service Authorisation in E-band and V-band** to prevent any type of hoarding of spectrum by any single TSP.

Currently, there is a ceiling of 2 carriers per LSA in E-band. However, with the rapid increase in internet traffic, the current ceiling is not adequate to meet the constantly growing requirements, especially considering the level of network densification required in the case of 5G. Hence, the ceiling for E-band should be increased to 4 carriers per LSA.

For V-band, there is currently no policy for assignment of V-band. A ceiling of 40 carriers per LSA would be sufficient to meet industry requirements at this stage.

Therefore, Airtel recommends the following:

- (i) For E-band, the current ceiling of 2 carriers should be increased to 4 carriers per LSA.**
- (ii) For V-band, a ceiling of 40 carriers per LSA should be prescribed.**
- (iii) There is no need to assign E/V band spectrum to TSPs with other than Access Service Authorisation and non-TSPs.**

Q32. In case it is decided to prescribe a ceiling on the number of carriers that a licensee can hold in E-band and V-band,

- (a) Whether different ceilings based on the service area category i.e., Metro/Category 'A' Circles/Category 'B' Circles/Category 'C' Circles, need to be prescribed?
- (b) Considering a carrier of 250 MHz (paired) spectrum for E-band, and 50 MHz (unpaired) spectrum for V-band, what should be the ceiling in terms of the number of carriers per licensee for each service area category for
 - (i) TSPs with access service License/authorization holding IMT spectrum,
 - (ii) TSPs with access service License/authorization not holding IMT spectrum, and
 - (iii) TSPs with other than Access Service License/Authorization?
- (c) Any other relevant suggestion may be made with justification.

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Airtel Response:

Please refer to the response to Q32. **The current ceiling of 2 carriers in E-band should be increased to 4 carriers per LSA and a ceiling of 40 carriers per LSA should be prescribed in the case of V-band.**

- (a) **Whether different ceilings based on the service area category i.e., Metro/Category 'A' Circles/Category 'B' Circles/Category 'C' Circles, need to be prescribed?**

No, there is **no need to prescribe different ceilings based on the service area category**, i.e., Metro/Category 'A' Circles/Category 'B' Circles/Category 'C' Circles.

The requirement of the E/V band spectrum is estimated to be similar in all categories of LSAs. Therefore, the ceiling on the number of E/V band carriers that can be held by a TSP should be uniform across all categories of LSAs.

Therefore, Airtel recommends that the ceiling for E-band and V-band should be the same in all categories of LSAs – at 4 carriers and 40 carriers per LSA, respectively.

- (b) **Considering a carrier of 250 MHz (paired) spectrum for E-band, and 50 MHz (unpaired) spectrum for V-band, what should be the ceiling in terms of the number of carriers per licensee for each service area category for**
- (i) **TSPs with access service License/authorization holding IMT spectrum,**
 - (ii) **TSPs with access service License/authorization not holding IMT spectrum, and**
 - (iii) **TSPs with other than Access Service License/Authorization**

Please refer to the response to point (a) earlier. The ceiling on the number of E/V band carriers should be kept **uniform across all categories of LSAs**.

Please also refer to the responses to Q23 and Q31. There is no need to assign E/V band spectrum to TSPs with other than Access Service Authorisation and non-TSPs.

As far as the requirement of E/V band spectrum for TSPs with Access Service Authorisation but without IMT spectrum is concerned, neither DoT nor TRAI have outlined any specific use cases where such operators may require E/V band spectrum. In any case, even if there is some requirement, it may be minor and the same may be served through a P2P link-based assignment.

Thus, Airtel submits that E/V band spectrum should be assigned to TSPs with Access Service Authorisation holding IMT spectrum on an exclusive basis for the entire LSA. On the other hand, for TSPs with Access Service Authorisation but no IMT spectrum, a P2P link-based assignment approach should be used.

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Accordingly, considering a carrier of 250 MHz (paired) spectrum for E-band, and 50 MHz (unpaired) spectrum for V-band, **the ceiling in terms of the number of carriers for each service area category should be 4 E-band carriers and 40 V-band carriers per TSP with Access Service Authorisation holding access spectrum.**

Therefore, Airtel recommends the following:

- (i) E/V band spectrum should only be assigned to TSPs with Access Service Authorisation.**
- (ii) For TSPs with Access Service Authorisation holding IMT spectrum, it should be assigned on an exclusive basis for the entire LSA.**
- (iii) In case of any requirement by TSPs with Access Service Authorisation but no IMT spectrum, a P2P link-based assignment may be gone with.**
- (iv) For TSPs with Access Service Authorisation holding IMT spectrum, the ceiling for E-band and V-band should be 4 carriers and 40 carriers per LSA, respectively.**

Q33. Which methodology should be used for assignment of spectrum in E-band and V-band? Response may be provided in the table given below:

User category	Assignment methodology [Auction/Administrative/Any other (please specify)]	Justification
(i) TSPs with Access Service License/ Authorization		
(ii) TSPs with other than Access Service License/Authorization		
(iii) Other entities (non-TSP, for non-commercial/captive/isolated use)		

Airtel Response:

Please refer to the responses to Q23, Q24 and Q37. The spectrum in E/V bands should be assigned only to TSPs with Access Service Authorisation.

Further, Airtel does not support the auction methodology for E/V bands. **E/V bands should be assigned on an administrative basis only.**

Administrative Assignment for TSPs with Access Service Authorisation:

As also submitted in the context of MWA/MWB carriers in the responses to Q6, Q10 and Q12, conducting auctions for assignment of backhaul spectrum will give rise to multiple challenges. Most importantly, it could lead to competition issues, as the requirements of operators with lower fiber footprint would be greater than TSPs with a high level of fiberisation. Since there is no certainty in cases of auction, the former would be in a

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more vulnerable position, giving a competitive advantage to the latter. This vulnerability could end up being leveraged with the auction witnessing attempts at destructive bidding or spectrum hoarding.

Auctions for E/V band spectrum could even have a fallout over the massive investments in access spectrum since monetisation of access spectrum is dependent on the availability of adequate and robust backhaul. As highlighted earlier, E/V bands are critical for serving the backhaul requirements of new age access technologies. Thus, there has to be a level of certainty in that regard.

Further, backhaul spectrum is only a complementary infrastructure resource to the auctioned access spectrum. Backhaul spectrum does not generate any revenue on its own and, hence, there is no rationale for auctioning the same. It would only add to the share of spectrum costs in the overall network costs, leaving fewer resources for the deployment, maintenance and upgradation of network infrastructure.

Further, the success of an auction is premised on the scarcity of supply rather than demand for the resource being auctioned, and this is not the case with E/V band spectrum. The world over, administrative assignment is the standard practice for assigning E/V bands, an aspect that is acknowledged even in the TRAI consultation paper. TRAI, in its 2014 recommendations, had recommended in favour of the administrative assignment of E/V bands. What is more, even the 2G Judgment did not mandate auctions as the only assignment methodology for spectrum.

Therefore, E/V band spectrum should be assigned administratively and not through auction.

Bundling Approach:

TSPs have invested lakhs of crores in acquiring access spectrum to manage the surging network traffic. For instance, just between 2022 and 2021, close to ~2.2 lakh crores were invested by TSPs to acquire access spectrum through auctions.

Backhaul spectrum plays a critical and essential role with regard to utilisation of access spectrum. Any uncertainty about the availability of backhaul spectrum not only jeopardises the significant investments already made but also raises questions about future investments in access spectrum. Therefore, when TSPs acquire access spectrum by paying substantial amounts at auctions, they must be assured of backhaul spectrum availability for network rollout using the acquired access spectrum. This assurance can only be guaranteed through administrative assignment.

Thus, it would be prudent to continue with the current policy of backhaul spectrum assignment. Hence, the Government should allocate the E/V band spectrum bundled with the access spectrum, as the latter is already auctioned. This would also assure faster roll outs.

No need of assignment of E/V band spectrum to TSPs with other than Access Service Authorisation and non-TSPs:

There is no need to assign E/V band spectrum to TSPs with other than Access Service Authorisation and non-TSPs, as there is no case for its use by such entities.

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In view of the foregoing, Airtel recommends the following:

- (i) Spectrum in E/V bands should be assigned on an administrative basis, and it should be assigned only to TSPs with Access Service Authorisation.**
- (ii) The Government should allocate the E/V band spectrum bundled with the access spectrum, as the latter is already auctioned. This would also assure faster roll outs.**

Q34. In case you are of the opinion that certain user categories should be assigned spectrum in E-band and V-band for P2P links by any methodology other than auction, should some carriers be earmarked for such users? If yes, how many carriers should be earmarked for such users? Kindly justify your response.

Airtel Response:

Please refer to the Preamble and Airtel's responses to Q23, Q24, Q37 and Q33.

The administrative assignment of E/V band spectrum is not just crucial, it is the sole method of guaranteeing the continued and continuous availability of sufficient backhaul, especially vital for deploying cutting-edge technologies like 5G, 6G and beyond. This becomes even more critical when you consider operators with limited fiber infrastructure, placing them at a significant competitive disadvantage if subjected to auction dynamics.

Given that backhaul spectrum is only a complementary resource that does not generate revenue of its own, and that its supply far exceeds its demand, the logic of an auction does not even apply here. Furthermore, TRAI, in 2014, itself recommended the administrative assignment of E band. International best practices also favour administrative assignment. Therefore, **E/V band spectrum should only be assigned administratively.**

Further, it should be assigned for the entire LSA on an exclusive basis, and only to TSPs holding Access Service Authorisation.

Neither DoT nor TRAI have outlined any specific use cases where TSPs with other than Access Service Authorisation and non-TSPs may require E/V band spectrum. Thus, there is no need to assign E/V band spectrum to TSPs with other than Access Service Authorisation and non-TSPs. Consequently, there is no need to earmark E/V band carriers for them.

Additionally, any kind of earmarking of E/V band carriers for TSPs with other than Access Service Authorisation and non-TSPs will lead to the creation of artificial scarcity and subsequently lead to the under-utilisation of spectrum.

Therefore, Airtel recommends that no E/V band carriers need to be earmarked for TSPs with other than Access Service Authorisation and non-TSPs.

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Q35. In case it is decided to assign spectrum in E & V bands to the TSPs with Access Service License/Authorization through auction and adopt P2P links assignment for TSPs other than Access Service License/Authorization, who may be requiring to establish only a few links, what threshold limit in terms of number of links, may be prescribed, beyond which, the TSPs with other than Access Service License/Authorization should be required to acquire spectrum in E-band and V-band bands through auction? Kindly justify your response.

Airtel Response:

Please refer to the Preamble and our responses to Q23, Q24, Q37 and Q33.

The administrative assignment of E/V band spectrum is not just crucial, it is the sole method of guaranteeing the continued and continuous availability of sufficient backhaul, especially vital for deploying cutting-edge technologies like 5G, 6G and beyond. This becomes even more critical when you consider operators with limited fiber infrastructure, placing them at a significant competitive disadvantage if subjected to auction dynamics.

Given that backhaul spectrum is only a complementary resource that does not generate revenue of its own, and that its supply far exceeds its demand, the logic of an auction does not even apply here. Furthermore, TRAI, in 2014, itself recommended the administrative assignment of E band. International best practices also favour administrative assignment. Therefore, **E/V band spectrum should only be assigned administratively.**

Further, it should be assigned on an exclusive basis for the entire LSA; and it should be assigned only to TSPs holding Access Service Authorisation.

To reiterate, there is no need to assign E/V band spectrum to TSPs with other than Access Service Authorisation and non-TSPs, as there is no case for its use by such entities.

Therefore, Airtel recommends that E/V band spectrum should be assigned only to TSPs with Access Service License/Authorisation; and it should be assigned administratively – on an exclusive basis for the entire LSA.

Q36. In case it is decided to assign spectrum in E & V bands to all the TSPs through auction, should such TSPs be permitted to lease their spectrum acquired through auction, on P2P link basis, to the TSPs and other entities for non-commercial/captive/ isolated use, who may be requiring to establish only a few links? What could be the regulatory issues and potential misuse of such a regime? What measures could be put in place to mitigate the concerns? Kindly justify your response.

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Q40. In case it is decided to assign spectrum in E & V bands through auction,

- (a) What should be the validity period?
- (b) Whether there is a need to create a provision for surrender of E & V band? If yes, what should be the lock-in period and other terms and conditions?

Response may be given for each user category viz. (i) TSPs with Access Service License/ authorization, (ii) TSPs with other than Access Service License/authorization, and (iii) Other entities (non-TSP, for non-commercial/captive/isolated use) with detailed justification.

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Airtel Response:

Please refer to the Preamble and our response to Q33.

The administrative assignment of E/V band spectrum is not just crucial, it is the sole method of guaranteeing the continued and continuous availability of sufficient backhaul, especially vital for deploying cutting-edge technologies like 5G, 6G and beyond. This becomes even more critical when you consider operators with limited fiber infrastructure, placing them at a significant competitive disadvantage if subjected to auction dynamics.

Given that backhaul spectrum is only a complementary resource that does not generate revenue of its own, and that its supply far exceeds its demand, the logic of an auction does not even apply here. Furthermore, TRAI, in 2014, itself recommended the administrative assignment of E band. International best practices also favour administrative assignment. Therefore, **E/V band spectrum should only be assigned administratively.**

Q38. What should be the scope of services/usages for spectrum in E-band (71-76/81-86 GHz) and V-band (57-64 GHz) assigned through auction or any other assignment methodology? Kindly justify your response.

Airtel Response:

Please refer to the Preamble and our response to Q33.

The administrative assignment of E/V band spectrum is not just crucial, it is the sole method of guaranteeing the continued and continuous availability of sufficient backhaul, especially vital for deploying cutting-edge technologies like 5G, 6G and beyond. This becomes even more critical when you consider operators with limited fiber infrastructure, placing them at a significant competitive disadvantage if subjected to auction dynamics.

Given that backhaul spectrum is only a complementary resource that does not generate revenue of its own, and that its supply far exceeds its demand, the logic of an auction does not even apply here. Furthermore, TRAI, in 2014, itself recommended the administrative assignment of E band. International best practices also favour administrative assignment. Therefore, **E/V band spectrum should only be assigned administratively.**

The scope of services/usages for spectrum in E-band (71-76/81-86 GHz) and V-band (57-64 GHz) should be restricted to **backhaul only.**

Critical role of E-band in 5G rollout:

India has witnessed one of the fastest 5G rollouts in the world mainly because of its seminal Cabinet reforms, path-breaking TRAI recommendations and, most critically, the decision of the DoT to assign E-band spectrum for backhaul. It is a known fact that the rollout of 5G services is intrinsically linked to availability of robust backhaul through fiber and, in its absence, E-band is essential. By making E-band available to operators, the DoT ensured the rapid rollout of 5G services.

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Competitive issues likely to arise if scope of E/V bands usage is expanded beyond backhaul:

The level of fiberisation in the country is very limited currently, and the situation is not about to change materially in the near future. Most TSPs are largely dependent on backhaul spectrum as they expand their fiber networks. In such a scenario, **any proposal to expand the usage of E/V bands and to use them for IMT access services would disrupt the telecom ecosystem and establish a near monopoly in the 5G space of the only TSP with a vast fiber footprint.** Had the Government subscribed to such a viewpoint earlier, India would not have witnessed one of the fastest rollouts of 5G services in the world.

Growing backhaul requirement cannot be met by traditional microwave backhaul alone:

Over the last decade, the overall mobile data consumption and, consequently, the backhaul requirement per site, has grown manifold. Conventional microwave spectrum can barely keep up with the current bandwidth requirements for 4G, let alone 5G. Simply put, the amount of traffic surge that the access network is expected to witness will necessitate a multifold capacity augmentation at the backhaul level.

Therefore, although all TSPs are making every effort to fiberise their networks as rapidly as possible, using E/V bands for backhaul remains the only practical choice for TSPs given the fast pace of network rollout.

Having said that, it is also true that the clubbing of E/V bands for backhaul with access will deny backhaul rollout, creating a monopoly in 5G – the very reason that E-band was given. **Even internationally, as many as 86 countries have identified E-band for providing only backhaul services to cater to the increase in data demands for 5G.**

International developments – support backhaul only usage:

The use of E/V bands for access services along with backhaul is not supported even internationally:

- E-band has been defined by 3GPP as appropriate neither for access services nor for integrated access and backhaul (IAB). Consequently, the ecosystem for E-band-compatible radios/handsets/FWA, based on 3GPP technologies does not even exist currently. In such a scenario, access connectivity to customers through E-band is completely out of the question.
- The ultra-high frequency bands are unsuitable for access use cases due to multipath propagation's high losses. Due to Line-of-Sight propagation requirements, these frequency channels are more suitable for backhaul. Consequently, 3GPP has not specified a band plan for E-band. Allowing access to these bands will result in the waste of scarce resources that are crucially required for constructing the high capacity backhaul for 5G and mitigating the challenges associated with fiber deployment.
- Also, in the previous WRC-19 cycle, spectrum access requirements from 2020 to 2027 were analysed, as were subranges spanning 24 GHz to 95 GHz. E/V bands were excluded from identification for IMT. Even in the National Frequency Allocation Plan (NFAP) 2022, E/V bands have not been defined for IMT in line with WRC resolutions.

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Adequate mmWave spectrum already available:

Moreover, there is sufficient spectrum already available in the mmWave spectrum bands, which have been auctioned for IMT thus far. Out of 62,700 MHz of spectrum which was put to auction, about 17,350 MHz of spectrum remains unsold. Also, DoT has identified additional mmWave bands in 37-43 GHz, i.e., about 4,000 MHz of spectrum per circle.

Currently, there is hardly any usage of mmWave bands, and TSPs have only deployed a handful of sites to comply with MRO requirements. In this context, there is no compelling reason to expand the scope of E/V bands beyond backhaul. Other mmWave bands, which are already assigned, can very well be used for providing the same service.

Therefore, Airtel recommends the following:

- (i) **E/V bands should be used only for backhaul purposes. Deploying these critical bands for any other usage will destabilise the existing networks of TSPs, in addition to impacting the new rollouts.**
- (ii) **There is currently no case for use of E/V bands for purposes other than backhaul, and there is not likely to be any need for such usage in the near future as well.**

Q39. In case spectrum in E-band and V-band is decided to be assigned through auction,

- (a) Should the auction be conducted based on Simultaneous Multiple Rounds Ascending Auction (SMRA) method as adopted for IMT spectrum auction? Any other auction method may be suggested with detailed justification.
- (b) What quantum of spectrum in each band should be put to auction? Kindly justify your response.

Airtel Response:

Please refer to the Preamble and our response to Q33.

The administrative assignment of E/V band spectrum is not just crucial, it is the sole method of guaranteeing the continued and continuous availability of sufficient backhaul, especially vital for deploying cutting-edge technologies like 5G, 6G and beyond. This becomes even more critical when you consider operators with limited fiber infrastructure, placing them at a significant competitive disadvantage if subjected to auction dynamics.

Given that backhaul spectrum is only a complementary resource that does not generate revenue of its own, and that its supply far exceeds its demand, the logic of an auction does not even apply here. Furthermore, TRAI, in 2014, itself recommended the administrative assignment of E band. International best practices also favour administrative assignment. Therefore, **E/V band spectrum should only be assigned administratively.**

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Q41. In case it is decided to assign spectrum in E-band and V-band through any methodology other than auction, what should be the validity period, process for augmentation/surrender of carriers, and other terms and conditions? Suggestions may be made with detailed justification.

Airtel Response:

Please refer to the Preamble and our response to Q33.

The administrative assignment of E/V band spectrum is not just crucial, it is the sole method of guaranteeing the continued and continuous availability of sufficient backhaul, especially vital for deploying cutting-edge technologies like 5G, 6G and beyond. This becomes even more critical when you consider operators with limited fiber infrastructure, placing them at a significant competitive disadvantage if subjected to auction dynamics.

Given that backhaul spectrum is only a complementary resource that does not generate revenue of its own, and that its supply far exceeds its demand, the logic of an auction does not even apply here. Furthermore, TRAI, in 2014, itself recommended the administrative assignment of E band. International best practices also favour administrative assignment. Therefore, **E/V band spectrum should only be assigned administratively.**

For this purpose, **the validity period, process for augmentation/surrender of carriers, and other terms and conditions, should be the same as those currently prescribed in the case of MWA carriers** (as also submitted in the context of MWA/MWB carriers in the response to Q18).

Q43. Whether there is a need to prescribe any roll out obligations for spectrum in E-band and V-band? Should the roll out obligations be linked to the number of carriers assigned to a TSP? Kindly justify your response.

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Q44. In case it is decided to prescribe roll out conditions, what should be the roll-out obligations associated with the assignment of spectrum in E-band and V-band? What provisions should be prescribed for non fulfilment of the prescribed roll-out obligations? Response may kindly be given for each user category viz. (i) TSPs with Access Service License/Authorization, (ii) TSPs with other than Access Service License/Authorization, and (iii) Other entities (non-TSP, for non-commercial/captive/isolated use) with detailed justification.

Airtel Response:

No, there is no need to prescribe any roll out obligations for spectrum in E-band and V-band.

As also submitted in the context of MWA/MWB carriers in the response to Q20 earlier, TSPs holding access spectrum are already subject to rollout obligations specific to access services, which are designed to ensure that services reach end-users within defined timelines. **Backhaul spectrum, however, is not directly linked to providing coverage at the site level.** It only plays a supporting role by facilitating high-capacity data links between various network elements. Hence, there is no logical reason for having separate roll out obligations for the E/V band spectrum.

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Therefore, Airtel recommends that there should not be any (separate) roll out obligations in case of assignment of E/V band spectrum.

Q45. Whether it is feasible to allow low powered indoor consumer device-to-consumer device usages on license-exempt basis in V-band (57-64 GHz), in parallel to use of the auction acquired spectrum by telecom service providers for establishment of terrestrial and/or satellite-based telecom networks? If yes, whether it should be permitted? Kindly justify your response.

&

Q46. In case it is decided to allow low powered indoor consumer device-to-consumer device usages on license-exempt basis in V-band (57-64 GHz),

- (a) Whether it should be permitted in entire band or part of the band? Kindly provide detailed response including the frequency carriers, which should be considered for license exemption with justification.
- (b) Whether there is a need to define such indoor use? If yes, what should be the definition for such indoor use?
- (c) What technical parameters should be prescribed including EIRP limits? Suggestions may kindly be made with supporting justification and international scenario.

Airtel Response:

No, it is not feasible to allow low-powered indoor consumer device-to-consumer device usages on a license-exempt basis in V-band (57-64 GHz). The reasons for the same are discussed in the subsequent paras.

Unique features of V-band: V band offers high data throughput, millimeter-wave technology, small form factor, low interference and line-of-sight communication capabilities and plays a pivotal role in 5G networks and smart city infrastructure. It is an efficient and effective solution for delivering high-capacity, low-latency wireless connectivity in urban environments while maintaining the aesthetic and functional requirements of street furniture. The V-band, being crucial for new-age telecom networks, must not be delicensed or reserved for any users other than TSPs.

Technological development: V-band has already been defined under 3GPP's Band Plan n263 for IMT deployment with NR bandwidth along with usage for backhaul/fixed services. Efforts are already underway for the development of a compatible ecosystem. Delicensing at this juncture may disrupt these efforts and go contrary to international standards.

Irreversibility of delicensing: Once a spectrum band is delicensed and the ecosystem around it is established, reversing the process can be highly challenging, disruptive and, often, impractical. If V-band is delicensed now, it would be very difficult to leverage it for future use cases in the licensed space.

Loss to exchequer: Introducing delicensing at this stage could deprive the government of realising the true economic value of the spectrum, which may not be in the best interests of the Indian economy.

Therefore, Airtel recommends that low powered indoor consumer device-to-consumer device usages should not be permitted on a license-exempt basis in V-band (57-64 GHz).

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Q47. Any other suggestions relevant to assignment of spectrum in E-band (71-76/81-86 GHz) and V-band (57-64 GHz) may kindly be made with detailed justification.

Airtel Response:

No comment.

Q48. In case it is decided for assignment of spectrum on administrative basis, what should be the spectrum charging mechanism for assignment of spectrum for

- i) E band
- ii) V band
- iii) MWA carriers and
- iv) MWB carriers

separately for each of the following three categories:-

- a) TSPs with Access Service Authorization
- b) TSPs with other than Access Service Authorization
- c) Other entities (non-TSP, for non-commercial/captive/isolated use)

&

Q49. Should the auction determined prices of spectrum bands for IMT/5G services be used as the basis for valuation of:

- i) E band
- ii) V band
- iii) MWA carriers and
- iv) MWB carriers

Please justify your response.

&

Q50. Whether the value of spectrum in

- i) E band
- ii) V band
- iii) MWA carriers and
- iv) MWB carriers

be derived by relating it to the value of other bands by using spectral efficiency factor? If yes, with which spectrum band, should this band be related and what efficiency factor or formula should be used? Please justify your suggestions.

&

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Q51. Should the current method of levying spectrum fees/charges for E band, MWA carriers and MWB carriers on AGR basis as followed by DoT, serve as a basis for the purpose of valuation of

- i) E band
- ii) V band
- iii) MWA carriers and
- iv) MWB carriers

If yes, please specify in detail what methodology is to be used in this regard.

&

Q52. Should the International administrative annual spectrum charges estimated based on specific channel case (250 MHz/Year) of E-Band serve as a basis for the purpose of valuation of

- i) E band
- ii) V bands

Please provide detailed justification. If the answer to the question is yes, should the administrative annual spectrum charges be normalized for cross country differences? Please specify in detail the methodology to be used in this regard?

&

Q53. Should international benchmarking by comparing the auction determined price in countries where auctions have been concluded in E and V bands, if any, be used for arriving at the value of

- i) E band
- ii) V band

If yes, then what methodology can be followed in this regard? Please provide detailed information.

&

Q54. Whether any fixed administrative annual spectrum charges/auction determined prices are available for other jurisdictions in case of MWA and MWB links? If yes, whether these charges/prices can serve as a basis for the purpose of valuation of

- i) MWA
- ii) MWB carriers

Please provide with detailed justification.

&

Q55. Should the methodology, as adopted by the Authority in 2014 Recommendations for calculating spectrum charges for MWB links, be used as one of the valuation approach for MWB links? If yes, please provide detailed methodology for arriving at the valuation along with justification.

&

**Response to CP on Assignment of Spectrum in
E&V Bands, and Spectrum for Microwave Access (MWA) & Microwave Backbone (MWB)**

Q56. Whether the valuation for spectrum in E-band (71-76/81-86 GHz) and V-band (57-64 GHz), MWA (13 GHz/15 GHz/18 GHz/21 GHz), MWB (6 GHz/7 GHz) be done separately for each LSA, or pan-India basis, or any other geographic area/link basis? Kindly justify your response.

&

Q57. Apart from the approaches highlighted above which other valuation approaches should be adopted for the valuation of

- i) E band
- ii) V band
- iii) MWA carriers and
- iv) MWB carriers

Please support your suggestions with detailed methodology, related assumptions and other relevant factors, etc.

&

Q58. Whether the value arrived at by using any single valuation approach for a particular spectrum band should be taken as the appropriate value of that band? If yes, please suggest which single approach/method should be used. Please support your answer with detailed justification.

&

Q59. 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 a particular spectrum band, or some other approach like taking weighted mean, median etc. should be followed? Please support your answer with detailed justification.

&

Q60. Should the reserve price be taken as 70% of the valuation of spectrum? If not, then what ratio should be adopted between the reserve price for the auction and the valuation of the spectrum in different spectrum bands and why? Please support your answer with detailed justification.

&

Q61. In case of auction-based assignment of

- i) E band
- ii) V band
- iii) MWA carriers and
- iv) MWB carriers

what should the payment terms and associated conditions relating to:

- i. Upfront payment
- ii. Moratorium period
- iii. Total number of installments to recover deferred payments
- iv. Rate of interest in respect of deferred payment and prepayment

Please support your answer with detailed justification.

**Response to CP on Assignment of Spectrum in
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Airtel Response:

Please refer to the Preamble and our responses to Q1, Q2, Q6, Q10, Q12, Q23, Q24, Q37 and Q33.

The administrative assignment of MWA/MWB spectrum is crucial if colossal disruption to legacy networks is to be avoided and uninterrupted continuity of services for hundreds of millions of our customers ensured. Furthermore, holding an auction will cause significant disruption to legacy networks and impose substantial unwarranted financial burden (leading to a winner's curse situation) on legacy operators.

Similarly, the administrative assignment of E/V band spectrum is not just crucial; it is the sole method to guarantee the continued and continuous availability of sufficient backhaul, especially vital for deploying cutting-edge technologies like 5G, 6G, and beyond. This becomes even more critical when you consider operators with limited fiber infrastructure, placing them at a significant competitive disadvantage if subjected to auction dynamics.

Given that backhaul spectrum is only a complementary resource that does not generate revenue of its own, and given that its supply far exceeds its demand, the logic of an auction does not even apply here. Furthermore, TRAI, in 2014, itself recommended the administrative assignment of MWA/MWB as well as E band. International best practices also favor administrative assignment. Thus, **E/V band spectrum and MWA/MWB carriers should only be assigned administratively.**

Further, the spectrum in E/V bands should be assigned for the entire LSA on an exclusive basis; and it should be assigned only to TSPs with Access Service Authorisation. On the other hand, MWA/MWB carriers should be assigned on an exclusive basis for the entire LSA for TSPs with Access Service Authorisation; and for TSPs with other than Access Service Authorisation and non-TSPs, they should be assigned on a P2P link basis.

For TSPs with Access Service Authorisation, the spectrum charging mechanism for assignment of spectrum for E band, V band, MWA carriers and MWB carriers should be based on a **percentage of AGR, but with the current rates significantly rationalised.**

Exorbitant rates under the current regime:

At present, for TSPs with Access Service Authorisation, MWA/MWB carriers and E-band are charged based on a percentage of AGR, while there is no policy for assignment of V-band. However, the rates prescribed currently are quite high.

In fact, the data relating to SUC payouts reveals that only 25% of the total SUC payout of the industry relates to access spectrum. The remaining 75%, i.e., the lion's share, relates to SUC for backhaul spectrum. This is an alarming pattern, considering that backhaul spectrum does not generate any revenue of its own and is merely a complementary resource for access spectrum.

Need for rationalising the current rates:

Backhaul spectrum is only supporting infrastructure for the access network and a tool to facilitate the TSPs to use the radio access network and spectrum efficiently. It facilitates the spread of mobile services in a cost-

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effective manner. In addition, with the more efficient use of access spectrum, the TSPs' revenue – and consequently, the LF & SUC payout to the Government – automatically increase.

Hence, **it is in the interests of the Digital India mission as well as the Government exchequer that backhaul spectrum is made available as cheaply as possible.** By using this approach, a conducive environment to rapid network expansion, improved service quality and cost-effective utilisation of available resources can be created. This will benefit not only TSPs but also end-users, ultimately fostering the orderly growth of the telecommunications sector in India.

The benefits of rationalisation of levies have already been recognised by both the Government and TRAI. As part of the SATCOM reforms, DoT removed multiple regulatory charges/ fees – NOCC charges for usage of Space Segment, MPVT Charge and Annual Licence Fee for M2M/IoT devices for Captive VSAT Licences. Further, TRAI has recommended that fixed line broadband services should be exempted from LF, for at least a period of 5 years. All these efforts are aimed towards expanding telecom services in the country; and rationalisation of backhaul spectrum charges will only further that objective.

With ample backhaul spectrum being available, there is no reason why it cannot be offered at reasonable rates to TSPs, especially when it is in the larger public interest to do so as highlighted above.

Significantly lower rates around the globe:

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

Meanwhile, with a rate of 0.15% of the AGR, the TSPs in India end up paying approximately INR 96 Cr. for a single E-band carrier. When compared to the prices in other jurisdictions, the prices paid by a TSP in India come out to be nearly 1400 and 3000 times that paid by Saudi Arabia and Iraq, respectively. It is also important to highlight that the prices in India, being AGR-based, are dynamic and are bound to increase significantly as the quantum of AGR increases.

Thus, the pricing of backhaul spectrum in India is clearly exorbitant and does not match global trends in this regard. In order to promote enhanced connectivity and ease of doing business in the telecom sector, India must follow international best practices. Accordingly, **while the AGR-based spectrum charging mechanism may be continued with, the extant rates must be significantly rationalised.**

Need to do away with the SUC escalation matrix:

The current spectrum charging mechanism of MWA/MWB carriers is such that the rate escalates with the increase in number of carriers, with the rate for a single carrier being 0.15% and the cumulative rate ranging from 0.35% for 2 carriers to as high as 1.45% and 2.30% for 6 and 8 carriers, respectively. It may be appreciated

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that such high cumulatively incremental rates result in substantially increased costs – for a mere supporting architecture.

Hence, **Airtel suggests that there should be no escalation matrix like the one prevailing currently. The rates should be kept uniform – irrespective of the number of carriers held by a TSP.**

Backhaul spectrum & access spectrum are very different and should not be compared for valuation:

The valuation of E/V bands or MWA/MWB carriers should not be calculated based on the auction determined prices of spectrum bands for IMT/5G services or by using the spectral efficiency factor on the value of other bands. It is a totally flawed approach as a spectrum that is used for backhaul purposes cannot be equated with access spectrum.

As per Article 1.20 of the International Telecommunication Union’s Radio Regulations (“**ITU-RR**”), ‘fixed service’ is defined as “*A radiocommunication service between specified fixed points*”. In addition, as per Article 1.24 of the ITU-RR, ‘mobile service’ is defined as “*A radiocommunication service between mobile and land stations, or between mobile stations (CV)*”.

E/V bands and MWA/MWB carriers are used for backhaul/backbone applications between fixed points, which are categorised as ‘fixed services’ under the ITU-RR. On the other hand, access spectrum bands are used for IMT services (IMT, IMT-2000, IMT-2020, IMT-2030 – mainly services that are commonly known as 2G/3G/4G/5G/6G – as defined by 3GPP), which are categorised as ‘mobile services’ under the ITU-RR.

It is clear from the above that use cases and characteristics of the spectrum allocated for IMT/5G services are very different from those of the spectrum in E/V bands or MWA/MWB. Hence, a comparison between the two would never yield any meaningful results. Therefore, there is no rationale for linking them for purposes of valuation.

Spectrum charging in case of P2P assignment:

Without prejudice to the above, this AGR-based mechanism cannot be used in the cases of MWA/MWB carriers and E/V bands that are assigned on a P2P link basis. **In the case of P2P assignment, the spectrum charging mechanism must be on a per link basis with nominal rates.**

Currently, MWB carriers are assigned on a P2P basis and the same carriers are utilised by various users across different locations within the same circle. This situation results in a double burden where TSPs are required to pay SUC based on a percentage of AGR for the entire circle, even when the same spectrum is being used by multiple users. In order to correct the situation, **the spectrum charging mechanism needs to be in line with the scope of assignment.** Thus, in case of P2P assignment, spectrum charges need to be levied on a per link basis, and the rates for the same have to be made nominal.

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Therefore, Airtel recommends the following:

- (i) MWA/MWB carriers and E/V bands should be assigned administratively for the entire LSA on an exclusive basis. The spectrum charging mechanism should be based on a percentage of AGR, in line with prevailing practice.**
- (ii) Additionally, the current rates must be significantly rationalised. Further, the rates should be kept uniform, irrespective of the number of carriers held by a TSP.**
- (iii) Without prejudice to the above, in the case of P2P assignment, the spectrum charging mechanism must be on a per link basis with nominal rates.**