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Ref No: RP/FY 17-18/062/407

Dated: 06<sup>th</sup> November, 2017.

To,  
**Shri Syed Tausif Abbas,**  
**Advisor (Networks, Spectrum and Licensing),**  
Telecom Regulatory Authority of India,  
Mahanagar Doorsanchar Bhawan,  
Jawahar Lal Nehru Marg,  
New Delhi - 110 002.

**Subject: Response to Consultation Paper on "Auction of Spectrum in 700 MHz, 800 MHz, 900 MHz, 1800 MHz, 2100 MHz, 2300 MHz, 2500 MHz, 3300-3400 MHz and 3400-3600 MHz bands".**

**Reference: TRAI Consultation paper dated 28<sup>th</sup> August, 2017.**

Dear Sir,

This is with reference to your above mentioned consultation paper. 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 'R. Gandhi', is written over a horizontal line.

**Ravi P. Gandhi**  
Chief Regulatory Officer

**Enclosed: As mentioned above**

## **Consultation Paper on Auction of Spectrum in 700 MHz, 800 MHz, 900 MHz, 1800 MHz, 2100 MHz, 2300 MHz, 2500 MHz, 3300-3400 MHz and 3400-3600 MHz bands**

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We are grateful to the Authority for providing us with an opportunity to give our comments on the consultation paper “Auction of Spectrum in 700 MHz, 800 MHz, 900 MHz, 1800 MHz, 2100 MHz, 2300 MHz, 2500 MHz, 3300-3400 MHz and 3400-3600 MHz bands”.

At the outset, it is important to take a note of the ongoing shake-up in the Indian telecom sector. The Indian Telecom Industry has come a long way from having abysmally low spectrum holding of approx. 9-10 MHz (unpaired) per service area per licensee prior to 2010. The holding has gradually increased to approx. 35 MHz (unpaired) spectrum per service area per licensee. During this intervening period, there had been 6 auctions wherein the Industry has spent Rs. 3.26 Lakh Crores.

The last one year has been eventful post the launch of 4G services by the new operator, which led the industry to register significant drop in voice and data revenues accompanied with surge in data usage and compete upheaval in the sector. Presently, the industry is under severe financial stress as the industry revenue declined by approx. 20% over last 5 quarters. The current return on capital employed (ROCE) of Indian telecom operators is abysmally low – even lower than Cost of Capital i.e. Industry ROCE is estimated at 1%. The significant low Return on Capital demonstrates the severely poor financial condition that the industry is facing at this moment.

This severe financial stress has triggered a series of consolidation in the industry i.e. companies are divesting distressed assets in an effort to reduce debt. The companies are in the process of executing the Mergers and Acquisitions (M&A), which in itself is a long drawn process with associated complexities. In the interim, the financial standing of TSPs in terms of revenue market share and spectrum holding would keep on fluctuating. The process of mergers is still on and the final approval of the proposed M&As and subsequent transition may last till December, 2018. For the aforesaid events, the industry is not in a position to take major financial decisions in the interim period while the process of mergers is going on.

In view of prevailing consolidation in the Industry, it is recommended that an opportune time for conducting this spectrum auction will be towards the end of year 2018-19 i.e. when the Industry is settled with the completion of consolidation phase and recovers from the financial distress.

For the aforesaid reasons, we believe that the consultation process for auction and pricing of spectrum be initiated during Sep-Dec, 2018 wherein the operators will be in a better position to assess their future requirements.

Nevertheless, we remain firmly committed to support Government of India's campaign of 'Digital India', which is launched to ensure that Government services are made available to citizens electronically by improved online infrastructure. In present financial stress of the telecom industry, it is required to reduce the reserve prices in order to avoid any additional financial burden on the industry. Eventually, the reduction in reserve prices will allow TSPs to make investments in right direction and to focus on supporting the objectives of 'Digital India'.

The prevailing Spectrum Usage Charges (SUC) results into the additional financial burden on the industry. The industry has paid significant amount on SUC, which has been increased at a CAGR of 13.2% from Rs. 3,602 Crore to Rs. 7573 crores during 2010 to 2016. At present, the Industry is under debt of around 4.5 Lakh Crores, where SUC has added substantial financial burden on TSPs. Thus, we request TRAI to recommend for the reduction of SUC charge to a uniform 1% of AGR across all the Spectrum Bands. Also, presently the operators have to make advance payments for SUC - it is submitted that the same should be payable at the end of the quarter like in the case of license fees.

In the backdrop of above submissions, our detailed issue-wise response is as follows:

**Q.1 (a) In your opinion when should the next access spectrum auction be held?**

**Bharti Airtel's Response:**

In our views, prevailing consolidation in telecommunication industry is the result of poor financial health of Telecom Service Providers (TSPs). We believe, if auction is conducted in near future, then it would not result in realization of full value of proposed spectrum put to auction. Therefore, we recommend that the consultation process for auction, pricing and timing of spectrum be initiated during Sep-Dec, 2018 wherein the operators will be in a better position to assess their future requirement.

**(b) If the spectrum auction is held now, should the entire spectrum be put to auction or should it be done in phased manner i.e. auction for some of the bands be held now and for other bands later based on development of eco system etc? Please give your response band wise and justify it.**

**Bharti Airtel's Response:**

Due to the reasons enunciated in our response to Q1(a), we believe that the very discussion on pricing and timing of auction should be discussed at the later date most likely during Sep-Dec, 2018.

It is further submitted that principally the entire spectrum should be put to auction whenever the auction is being conducted by DoT.

**Q.2 Do you agree that in the upcoming auction, block sizes and minimum quantity for bidding in 700 MHz, 800 MHz, 900 MHz, 1800 MHz, 2100 MHz, 2300 MHz and 2500 MHz bands, be kept same as in the last auction? If not, what should be the band-wise block sizes? Please justify your response.**

**Bharti Airtel's Response:**

During the spectrum auction conducted in 2016, the following block sizes and minimum quantity for bidding in 700 MHz, 800 MHz, 900 MHz, 1800 MHz, 2100 MHz, 2300 MHz and 2500 MHz was prescribed subject to specified spectrum caps.

Band	Block Size (MHz)	Existing licensee		New Entrant		Additional Quantity beyond Min Bid Quantity
		Quantity (MHz)	No of Blocks	Quantity (MHz)	No of Blocks	
700 MHz	5 MHz (paired)	NA	NA	5	1	One block or multiple thereof
800 MHz	1.25 MHz (paired)	1.25		5, 3.75 (where only 3.75 MHz is available), 2.5 (where only 2.5 is available).	4 Blocks, 3 (where only 3 are available), 2 (where only 2 are available).	One block or multiple thereof
900 MHz**	0.2 MHz (paired)	0.6	3	5	25	One block or multiple thereof
1800 MHz	0.2 MHz (paired)	0.6	3	5	25	One block or multiple thereof
2100 MHz	5 MHz (paired)	5	1	5	1	One block or multiple thereof
2300 MHz	10 MHz (un-paired)	10	1	10	1	One block or multiple thereof
2500 MHz	10 MHz (un-paired)	10	1	10	1	One block or multiple thereof

\*\* The existing holder of spectrum only in 1800 MHz band, has to bid as a new entrant in 900 MHz band

We agree majorly with the block sizes and minimum quantity of spectrum for bidding in 700 MHz, 800 MHz, 900 MHz, 1800 MHz, 2100 MHz, 2300 MHz and 2500 MHz bands, should be kept same as in the last auction.

However, the minimum quantity of spectrum for 900 MHz band may require some changes if DoT considers the industry proposal of harmonizing spectrum in this band, which will result in some additional spectrum made available across service areas for auction.

900 MHz band in India ranges from 890-915 MHz paired with 935-960 MHz i.e. 25 MHz paired spectrum. However, on an average 20 MHz band paired is made available to the operators. Even the said 20 MHz is fragmented. It is learnt that the 900 MHz band is sparingly assigned to some Government users for establishing point to point links, which can be migrated. Harmonization of 900 MHz is likely to release a total of 110.80 MHz of paired spectrum across 22 LSAs (details as per table below).

Service Area	900 MHz Band	Unsold from Last Auction	Spectrum which can be made available consequent to Harmonization exercise #
Andhra Pradesh	20.20		4.40
Assam	18.60		6.00
Bihar	14.00	4.60	6.00
Delhi	22.20		2.40
Gujarat	17.20	3.00	4.40
Haryana	18.40		6.20
Himachal Pradesh	18.60		6.00
Jammu & Kashmir	18.60		6.00
Karnataka	20.00		4.60
Kerala	18.60		6.00
Kolkata	20.20		4.40
Madhya Pradesh	18.60		6.00
Maharashtra	20.20		4.40
Mumbai	22.20		2.40
North East	19.40		5.20
Orissa	18.60		6.00
Punjab	21.80		2.80
Rajasthan	18.60		6.00
Tamil Nadu	20.20		4.40
Uttar Pradesh (East)	18.00	0.60	6.00
Uttar Pradesh (West)	17.40	1.20	6.00
West Bengal	19.40		5.20
<b>Pan India</b>	<b>421.00</b>	<b>9.40</b>	<b>110.80</b>

Note:

# Assuming 24.6 MHz (paired) becoming available consequent to auction. 0.4 MHz may be required for guard band

It can be seen that the spectrum becoming available consequent to the harmonization exercise will be less than 5 MHz paired. In such an instance, we recommend that the minimum quantity of spectrum allotted/ available in case of new entrant in 900 MHz paired be revised as per table below:-

Band	Block Size (MHz)	Existing licensee		New Entrant		Additional Quantity beyond Min Bid Quantity
		Quantity (MHz)	No of Blocks	Quantity (MHz)	No of Blocks	
900 MHz**	0.2 MHz (paired)	0.6	3	5 or entire quantum of spectrum in 900 MHz band in case total available spectrum is less than 5 MHz	25 or entire blocks in in case total available spectrum is less than 25 blocks	One block or multiple thereof

\*\* The existing holder of spectrum only in 1800 MHz band has to bid as a new entrant in 900 MHz band.

The above change in minimum quantity of spectrum for a new bidder will allow them to bid for spectrum in 900 MHz band even when the quantum that becomes available consequent to harmonization is less than 5 MHz.

**Q.3 What should be optimal block sizes and minimum quantity for bidding in (a) 3300-3400 MHz and (b) 3400-3600 MHz bands, keeping in mind both the possibilities i.e. frequency arrangement could be FDD or TDD? Please justify your response.**

**Bharti Airtel's Response:**

As per recent deployments, TDD arrangement (3GPP Band 42) is being implemented in the entire 3400-3600 MHz band, which is consistent with the global trends. It would be a natural outcome of global trends that eco-system in 5G technology will be developed in a gradual manner. But harmonization is found to be vital for achieving the economies of scale in end-user devices, to facilitate national/ international roaming and to deploy/re-farm to 5G in future. Below are few international experiences;

- In Europe, the 48 Pan-European member countries of the CEPT/ECC passed the ECC Decision (11) 06 resolution (amended March 14, 2014)<sup>1</sup> harmonising arrangements for 3400-3800MHz across the wider European continent. This decision designates this spectrum to

<sup>1</sup> <http://www.erodocdb.dk/docs/doc98/official/pdf/ECCDec1106.pdf>

Mobile/Fixed Communications Networks (MFCN) with TDD as the preferred duplex mode for 3400-3600MHz and compulsory for 3600-3800MHz.

- In US, FCC opened 150 MHz of spectrum (3550MHz to 3700MHz) with the use for 'Citizens Broadband Radio Service (CBRS)<sup>2</sup>' i.e. to accommodate a variety of commercial uses on a shared basis, which offers tangible benefits to consumers, businesses, and government users. The channel arrangement is unpaired (i.e. TDD) and the CBRS is governed by a three-tiered spectrum authorization framework.
- In Japan, the Ministry of Internal Affairs and Communications issued TDD 3.5 GHz licenses to SoftBank, Docomo and KDDI in 2014<sup>3</sup>. SoftBank, Docomo and KDDI will each obtain 40 MHz spectrum.

In summary, **3.3 GHz to 4.2 GHz band has been considered globally for deployments using TDD mode**. Therefore, we recommend that TDD arrangement may be adopted as the preferred option for spectrum in 3300-3400 MHz & 3400-3600 MHz.

In addition, contiguous and broad channel bandwidths in 3.5GHz band is required to support higher data rate and future developments. This is also recommended in ITU-R M.2083-0 "IMT Vision - Framework and overall objectives of the future development of IMT for 2020 and beyond". Furthermore, "Draft new Report ITU-R M. [IMT-2020.TECH PERF REQ] - Minimum requirements related to technical performance for IMT-2020 radio interface(s)" specifies the requirement for bandwidth to be at least 100 MHz for frequency below 6 GHz.

Channel bandwidth for future technologies is being planned in increment of 10MHz upto 60 MHz & by 20 MHz beyond 60 MHz. A block size of 5 MHz has a risk of fragmenting the spectrum and making it non-efficient for usage. **Hence, the block size of 10 MHz is recommended for the auction.**

Further, 20 MHz spectrum should be defined as minimum amount of spectrum for bidding considering the quantum of spectrum available in these bands and the requirement of contiguous large blocks for delivering better performance on wireless broadband networks.

In view of above submission, we recommend that block size and minimum quantity for bidding for spectrum in 3300-3400 MHz and 3400-3600 MHz as mentioned below:

- **Block size: 10 MHz**
- **Minimum quantum of spectrum: at least 20 MHz.**

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<sup>2</sup> [https://apps.fcc.gov/edocs\\_public/attachmatch/FCC-15-47A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/FCC-15-47A1.pdf)

<sup>3</sup> <http://www.gtigroup.org/news/ind/2014-12-25/5208.html>

**Q.4 Do you think that the roll-out conditions for 700 MHz, 800 MHz, 900 MHz, 1800 MHz, 2100 MHz, 2300 MHz and 2500 MHz stipulated in the last auctions held in October 2016 are appropriate? If no, what changes should be made in the roll out obligations for these bands?**

**Bharti Airtel's Response:**

We are of the view that the roll-out obligations for 700 MHz, 800 MHz, 900 MHz, 1800 MHz, 2100 MHz, 2300 MHz and 2500 MHz stipulated in the last auctions held in October 2016 are appropriate and may be continued with.

The Notice Inviting Application for spectrum auction held in October 2016 also allows for fulfillment of rollout obligations using any technology in any band. This ensures that while the operator has the due flexibility to meet the rollout obligations using any technology and band, the objectives of the Government for coverage are also met.

**Q.5 Should there be any rollout obligations in 3300-3400 MHz and 3400-3600 MHz bands? If yes, what should these be? Please justify your response.**

**Bharti Airtel's Response:**

We recommend that there should not be any mandatory roll-out obligations in 3300-3400 MHz and 3400-3600 MHz bands for the reasons below:

- **Network & Device Ecosystem:**

As far as, 3300-3400 MHz and 3400-3600 MHz bands are concerned, the maturity of network ecosystem would play an important role in availability of network and user equipment for commercial rollout of 5G networks. 3GPP release 15<sup>4</sup> is the first standard for 5G, which is expected to be released by mid-2018. Based on these specifications, network equipment and commercial devices are expected to be made available in 2019. Also, the first global network in Japan is likely to be based on 3GPP standards and be commercially deployed in 2020. With no certainty with regards to standards, network and device ecosystem, we believe that recommending any rollout obligations while auctioning spectrum at this stage will not be prudent.

- **3300-3400 MHz and 3400-3600 MHz bands are likely to be deployed as capacity bands:**

It is evidently known that the coverage radii of spectrum in higher bands are limited. For the said reasons, spectrum in 3300-3400 and 3400-3600 MHz is likely to be majorly used for capacity rather than for coverage. The operators are likely to use the spectrum in 3300-3400 MHz and 3400-3600 MHz band for deployment and management of overlay networks.

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<sup>4</sup> <http://www.3gpp.org/release-15>



For the aforesaid reasons, we recommend that there should be no roll-out obligations for spectrum to be assigned in 3300-3400 MHz and 3400-3600 MHz bands.

**Q.6 Is there a need to prescribe spectrum cap in bands 3300-3400 MHz and 3400-3600 MHz? What spectrum cap provisions should be kept for 3300-3400 MHz and 3400-3600 MHz spectrum bands? Should these bands be treated as same or separate bands for the purpose of calculation of spectrum cap?**

**Bharti Airtel's Response:**

The current intra-band cap of 50% has been effective in serving the interest of customers, boosting competition and overall welfare of the Industry. This not only avoids spectrum concentration in a particular band with a single operator but also enables other TSPs to acquire adequate spectrum in every band.

While, on one hand the band-wise spectrum-cap of 50% is very liberal as it allows any operator to have sizable quantum of spectrum in a band as per his business case and on the other hand it also works effectively to prevent a monopoly situation in any band and ensures that a band is available to at least two operators.

It is also important to understand that each spectrum band has a different strategic and financial value for telecom operators. This is mainly due to different characteristics of spectrum bands such as - (i) propagation characteristics (ii) device/network ecosystem and (iii) different incumbency factors. The 3300-3400 MHz and 3400-3600 MHz bands are completely new and supposed to be allocated for evolving services such as 5G, M2M, IoT etc. Not prescribing any in-band spectrum cap may result in consequent acquisition of all spectrum in that band by one operator, which would create a monopoly of that operator in a particular service segment. Therefore, it would result in creating an non-level playing field in the telecom industry.

We therefore recommend the present intra-band spectrum caps of 50% should be continued and same should be extended to new bands as well i.e. 3300-3400 MHz and 3400-3600 MHz.

**Q.7 Whether the prices revealed of various spectrum bands in the October 2016 auction can be taken as the value of spectrum in the respective band for the forthcoming auction in the individual LSA? If yes, would it be appropriate to index it for the time gap since the auction held in October 2016. If indexation is to be done then at what rate?**

**Q.8 If the answer to above question is negative then, whether as per the practice adopted by TRAI in the previous valuation exercise, the valuation for respective spectrum bands be estimated on the basis of various valuation approaches/methodologies (Referred in Annexure 3.3) including those bands (in a LSA) for which no bids were received or spectrum was not offered for auction?**

**Q.11 Whether the value of October 2016 auction determined prices be used as one possible valuation for 2300 MHz spectrum for the current valuation exercise? If yes, would it be appropriate to index it for the time gap since the auction held in October 2016? Please justify your response with supporting documents/ report(s), if any.**

**Q.12 Whether the value of the 2300 MHz spectrum should be derived by relating it to the value of any other spectrum band by using technical efficiency factor? If yes, which band and what rate of efficiency factor should be used? If no, then which alternative method should be used for its valuation? Please justify your response with rationale and supporting documents.**

**Bharti Airtel's Response:**

We recommend that the discussion with regards the pricing and timing of auction be discussed later in Sep-Dec, 2018.

In the interim, we would like to state that the market valuation of spectrum is dependent up on various factors such as demand and supply, business continuity, propagation characteristics, availability of network & device ecosystem, market size and revenue potential. It is difficult to factor in all the relevant parameters in any model that may be used for determining valuation of spectrum.

Therefore, we believe that the prices discovered in last auction should be taken as the valuation of spectrum for the future auctions as they are the best estimates available considering all other factors. Further, it is not necessary that the value of spectrum will always increase with the passage of time. It is therefore also recommended that there is no requirement to index the said values for the time gap.

**Q.9 Whether the value of 700 MHz spectrum should be derived by relating it to value of other bands by using technical efficiency factor? If yes, with which spectrum band this band be related and what efficiency factor or formula should be used? Please justify your views with supporting documents.**

**Q.10 Else, what valuation approach should be adopted for the valuation of 700 MHz spectrum band? Please support your valuation approach with detailed methodology and related assumptions.**

**Bharti Airtel's Response:**

In our views, 700MHz spectrum has same technical efficiency with respect to coverage & capacity as compared to 800 MHz band. Both the spectrum bands can be used for LTE & LTE

advanced services. 800 MHz band is better as compared to 700 MHz on account of following aspects;

- 800 MHz is being used for multiple technologies -CDMA, 3G & LTE. On the other hand, 700MHz can only be used for 4G/ LTE network
- 800 MHz has better maturity and scale of ecosystem with more than 70% of the LTE devices in India supporting this band. 700MHz support is currently limited to only 10% of the LTE devices.
- Existing network deployment in 800 MHz (such as CDMA / EVDO) can be evolved to LTE with software upgrade. On other hand, 700 MHz band network requires completely new investment.
- No antenna change is required in case of evolution of 800 MHz band from legacy networks to LTE, while 700 MHz would need completely the new set of antenna ports.

Further, during the last auction, price of 700 MHz was kept at 4 times the value of 1800 MHz band. However, the entire spectrum in 700 MHz band went unsold which clearly indicate that the reserve price of 700 MHz band was kept at an abnormally high value.

For the aforesaid reasons, we recommend that the value of 700 MHz band be kept equal or lower than the price of 800 MHz band spectrum.

**Q.13 Whether the valuation of the 2500 MHz spectrum should be equal to value of similarly placed spectrum band? If no, then which alternative method should be used for its valuation? Please justify your response with rationale and supporting documents /report(s)/ detailed methodology, if any.**

**Bharti Airtel's Response:**

We recommend that the prices discovered in last auction should be taken as the valuation of spectrum for the upcoming auction. In those LSAs wherein price has not been discovered, the valuation of the 2500 MHz spectrum should be equal to value of similarly placed spectrum band i.e. 2300 MHz band.

**Q.14 Whether the valuation of the 3300-3400 MHz spectrum bands and 3400-3600 MHz spectrum bands should be derived from value of any other spectrum band by using technical efficiency factor? If yes, what rate of efficiency factor should be used? If no, then which alternative method should be used for its valuation? Please justify your response with rationale and supporting documents.**

**Bharti Airtel's Response:**

Following factors merit consideration before we discuss any valuation of spectrum in 3300-3400 MHz and 3400-3600 MHz band:

- Coverage of the spectrum band compared to other TDD bands such as 2.3 GHz or 2.5 GHz band - reduced coverage would mean higher CAPEX for network rollout. These bands requires extensive fiber network to have comparable coverage of bands such as in 2.3 GHz or 2.5 GHz.
- These bands are like Wi-Fi bands which can be predominantly be used for short distance or last mile connectivity etc.
- The use of spectrum in hotspot locations i.e. instead of Pan-LSA coverage, will restrict the monetization of spectrum to hotspot locations only.
- Availability of commercial products/ solutions is expected to be in market from 2020 onwards. This would mean any commercial use of the spectrum would only happen post 3 years of spectrum auction (assuming spectrum auction in FY'18).
- Cost of solution would be on a higher side during initial phase till the economies of scale are achieved in the band, which is expected only after 3-4 years of availability of the spectrum.
- Device penetration in this band is only expected to scale up from 2022 onwards.

We recommend on account of above mentioned factors and propagation characteristics of 3300-3400 MHz and 3400-3600 MHz, the valuation of spectrum bands should be 25% of the reserve price of 2300 MHz/ 2500 MHz band.

**Q.15 Is there any other valuation approach than discussed above or any international auction experience/ approach that could be used for arriving at the valuation of spectrum for 700/800/900/1800/2100/2300/2500/3300-3400/3400-3600 MHz bands? Please support your suggestions with detailed methodology and related assumptions.**

**Q.16 Whether value arrived at by using any single valuation approach for 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 justify your response.**

**Q.17 In case your response to Q16 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, as adopted by the Authority since September 2013 recommendations? Please justify your response.**

#### **Bharti Airtel's Response:**

We believe that no other valuation method is required, as the market prices derived from auction process is appropriate methodology.

**Q.18 Is it appropriate to recommend Reserve price as 80% of the value? If not, then what should be the ratio adopted between the reserve price for the auction and the valuation of the spectrum in different spectrum bands and why?**

**Q.19 Whether the realized / auction determined prices achieved in the October 2016 auction for various spectrum bands can be taken as the reserve price in respective spectrum bands for the forthcoming auction? If yes, would it be appropriate to index it for the time gap since the auction held in October 2016? If yes, then at which rate the indexation should be done?**

**Bharti Airtel's Response:**

The reserve price may be set basis the outcome status of spectrum band in previous auction in the LSA as below:

- a) **Spectrum band with market discovered auction price in the LSA** - the same reserve price without any indexation.
- b) **Spectrum band which remained unsold in the LSA:** TRAI shall take 80% valuation as the reserve price. This methodology has been consistently adopted by TRAI in the last many recommendations on Spectrum pricing.

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