



BIF counter comments on TRAI CP on Auction of Spectrum in Frequency Bands for IMT/5G

At the outset, we wish to thank the Authority for giving us an opportunity to submit our Counter-Comments to the aforesaid CP. In the submitted responses below to certain important questions, we have reemphasised and clarified some of our positions and responses made in the earlier submission as well as provided additional responses to some of the questions which we felt need to be taken into account while finalising the Recommendations.

Q.1 Whether spectrum bands in the frequency range 526-617 MHz, should be put to auction in the forthcoming auction? Kindly justify your response.

And

Q.4 Do you agree that 600 MHz spectrum band should be put to auction in the forthcoming auction? If yes, which band plan and duplexing configuration should be adopted in India? Kindly justify your response.

BIF RESPONSE

We wish to reiterate our response made earlier

526-582Mhz should not be put to auction now as the ecosystem is still developing across this band globally and it maybe prudent to wait till it is fully developed. Also, due to current use by the incumbent, it can only be allocated in coordination with the Public Broadcaster –Prasar Bharti

582-612 Mhz maybe put to auction. However, in absence of cogent and harmonised band plan, it maybe decided to allocate administratively as well.

612-698/703 Mhz should certainly be put to auction, depending on the two options of the suggested Band Plans viz.

- a) 3GPP Option B1 or
- b) Band Plan n71 which is globally harmonised

Q.6 Do you agree that TDD based configuration should be adopted for 24.25 to 28.5 GHz frequency range? Kindly justify your response

and

Q.7 In case your response to Q6 is in affirmative, considering that there is an overlap of frequencies in the band plans n257 and n258, how should the band plan(s) along with its frequency range be adopted? Kindly justify your response.

BIF RESPONSE

We wish to reiterate that

- 1) the choice of spectrum in the mmWave bands (24.25-28.5Ghz) is quite unique to India
- 2) No single globally harmonised band plan fits into this range. There is an overlap of frequencies in multiple band plans (n257 & n258)
- 3) WRC-19 has identified 24.25 – 27.5 GHz globally for IMT purpose.
- 4) The Ka-band 27.5-30.0 GHz frequency range (uplink), paired with the 17.3-20.2 GHz frequency range downlink is used for satellite gateway earth stations and customer terminals in current satellites designs and access to the full bandwidth is a business and operation continuity requirement for such satellite operators in India and throughout South Asia, which support a wide variety of offerings, including aeronautical and maritime broadband, mobile backhaul connectivity, fixed broadband services, and government universal service programs among others.
- 5) However, some ITU Member States, e.g., USA, Japan, Korea, etc., in the world have already deployed 5G services in the 28 GHz band (Ka Band) also.

BIF is unable to make any clear Recommendations in this case and wishes to leave it to the Authority to kindly decide whatever is most appropriate as regards whether the entire spectrum or part of the spectrum in the proposed mmWave bands needs to be auctioned or not.

Q.16 Is there a need to prescribe any measure to mitigate possible interference issues in 3300-3670 MHz and 24.25-28.5 GHz TDD bands or it should be left to the TSPs to manage the interference by mutual coordination and provisioning of guard bands? Kindly provide justification to your response.

BIF RESPONSE

As provided in our response, we wish to reiterate that

Adjacent Band Coordination Issues

1. Several Countries have adopted interference mitigation strategies in the C-band by prescribing adjacent band protection criteria for FSS earth stations vis a vis 5G/IMT, e.g. a guard band in the IMT portion of the band, and an out-of-band PFD limit for IMT transmitters to protect FSS earth stations in the adjacent band.
2. In view of the above, some experts are of the opinion that to mitigate interference from provision of IMT upto 3670Mhz in C-band, it is desired that the 5G operators use special filters to restrict any out of band emissions which may affect satellite signals in adjacent bands. Additionally, it has been suggested that appropriate high quality Band Pass Filters can be made available by the authorized body, to be used by the DPOs

(Cable TV, IPTV and HITs operators) for per downlink chain for receiving the satellite TV signals. These experts feel that for the specific case of protection of FSS services in the 3700-4200 MHz, it is important that a process be defined by the Authority to ensure that defined adjacent band protection levels are respected thereby ensuring that there is ample frequency separation for the FSS filters to efficiently mitigate any interference from 5G/IMT in the band 3300-3670 MHz and ensuring that key FSS earth station sites are protected through the implementation of exclusion zones.

3. The Process should also clearly define that costs associated with installation of such filters shall be the responsibility of the IMT/5G Operator.
4. Some other experts are of the view that C band and extended C band above 3705 MHz is extensively used by Satellite Broadcasters and to avoid any possible interference to them, it may be advisable to use the band till the upper limit of 3670 MHz while keeping a guard band of 35 MHz on the upper side between the IMT Networks and the Broadcasters who are using 3705 MHz spectrum band and upwards.

For in-band coordination issues:

Interference issues between operators could be solved through consultation and coordination and this has been proven to work effectively in India from past experiences. It is desired that an approach of mutual coordination amongst operators should be adopted.

BIF is unable to make any clear Recommendations in this case and wishes to leave it to the Authority to kindly decide whatever is most appropriate.

Q.34 Which factors are relevant in the spectrum valuation exercise and in what manner should these factors be reflected in the valuation of spectrum? Please give your inputs with detailed reasoning.

and

Q.37 Whether the auction determined prices of March 2021 auction be taken as the value of spectrum in the respective band for the forthcoming auction in the individual LSA? Should the prices be indexed for the time gap (even if less than one year or just short of one year)? If yes, please indicate the basis/ rate at which the indexation should be done, with reasons.

and

Q.38 If the answer to the above question is in negative, whether the valuation for respective spectrum bands be estimated on the basis of the various valuation approaches/methodologies being followed by the Authority in the previous recommendations, including for those bands (in an LSA) for which either no bids were received, or spectrum was not offered for auction?

and

Q.39 Whether the method followed by the Authority in the Recommendations dated 01.08.2018 of considering auction determined prices of the auctions held in the previous two

years be continued, or the prices revealed in spectrum auctions conducted earlier than two years may also be taken into account? Kindly justify your response.

and

Q.41 Whether there is a need to bring any change in the valuation approaches/ methodologies followed by the Authority for spectrum valuation exercises in view of the changing dynamics in the telecom sector largely due to the usage of various spectrum bands by the TSPs in a technologically neutral manner? If yes, please provide suggestions along with a detailed justification about the methodology.

and

Q.49 Whether the valuation of the 3300-3670 MHz spectrum band 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, which other method(s) should be used for its valuation? Please justify your response with rationale and supporting documents, if any.

and

Q.60 Is there any valuation approach other than those discussed above or any international auction experience/ approach that could be used for arriving at the valuation of spectrum for 700 MHz/ 800 MHz/ 900 MHz/ 1800 MHz/ 2100 MHz/ 2300 MHz/ 2500 MHz/ 3300-3670 MHz/ 24.25 - 28.5 GHz/ 526 - 698 MHz bands? Please support your suggestions with a detailed methodology and related assumptions.

And

Q.61 Should the reserve price be taken as 80% 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?

BIF RESPONSE

We would like to re-emphasize that a reviewed and well-defined auction system based on sound assumptions will provide transparency and make spectrum auctions more robust, thereby motivating greater participation - leading to better network coverage and connectivity – and enhancing consumer interests. This assumes critical importance given the Covid 19-impacted environment, the imminent adoption of 5G and the urgent need to move to Industry 4.0. There appear to be significant difficulties, challenges & inaccuracies posed as a result of the current methodology for valuing spectrum in India. These may have arisen at different points in time and in different circumstances over several years. While these might have been relevant or required at those times, many legacy issues and environmental factors have changed significantly since then. Over a period of time, various circumstances have led to the Rules governing the Auction getting affected. Hence a comprehensive review of the rules governing price determination, etc. is required. Hence, it would be advantageous for India to revisit the methodology followed and make appropriate revisions.

Calculating reserve prices correctly is crucial for ensuring a properly designed auction. It must be such that it is able to steer the auction “price discovery system” to reflect the optimal value of the “band” and the “circle” in question. The formula for calculating reserve price must be declared in advance, which can help in:

1. Avoiding/minimizing bidding distortions
2. promoting responsible bidding
3. ensuring optimal prices

The present methodologies need to be corrected for the following:

1. We argue that the last auction determined market price of any product is not relevant as a basis of reserve price in subsequent auction, especially if spectrum is acquired at a value that equals the reserve price at the last auction and invariably obtained through a single bidder. The current methodology of calculating reserve prices is unreasonable as it does not rely much on a fresh valuation of spectrum. Reserve prices can be referenced back to winning bids from prior auctions only if the auction was held no more than a year ago, and in all other cases, must be valued afresh to consider prevailing market structures and conditions.
2. We find that amongst the many approaches used for valuing radio spectrum, the revenue surplus approach is most suitable for and analogous to the current conditions and is therefore a more appropriate method for Reserve Price determination given the Indian market & its structure. In cases where limited data is available from the Indian context, such as the upcoming 5G spectrum auctions, we recommend the use of international benchmarks, suitably adjusted (ARPU adjusted) for the Indian market.
3. Index is not required as we have recommended that reserve price should not be referenced back to the last auction price. However, if the need arises then the closest surrogate index for a time series for Reserve Price indexation that may be applied is the consumer price index of (Transport and) telecom services.
4. The need for averaging of various valuation methodologies does not arise since we recommend Revenue Surplus Approach for valuation of 1800 MHz. But if at all averaging is required in case multiple valuation approaches are used, median should be used for aggregating the prices emanating out of various models.

We summarize our recommendations on spectrum valuation and reserve price as follows:

S. No.	Item	Recommendation
1	Valuation of 1800 MHz	Revenue Surplus Approach is most suitable for and analogous to the current conditions and is therefore a more appropriate method.
2	Reserve Price to Valuation Ratio for 1800 MHz	Reserve price to be set at 50% of the valuation.
3	Reserve Price of 700-900 MHz	2 times the Reserve price for the 1800 MHz band.
4	Reserve price of 2100, 2300, and 2500 MHz bands	Agree with regulatory recommendation on weightage of 0.83 times the Reserve Price of 1800 MHz.

5	Reserve Price of 3300-3600 MHz	<ul style="list-style-type: none"> • Agree with regulatory recommendation on weightage of 0.30 times the Reserve price of the 1800 MHz. • For mid-band - Since this is a new band where no past experience is available, it is recommended to take into account the international experience and set reserve prices which are in line with international norms.
6	Reserve Price of 24.25-28.5 GHz	We agree with many other stakeholders that should not be more than 1-2% of 3300-3670 MHz.

Q.68 To facilitate the TSPs to meet the demand for Private Cellular Networks, whether any change(s) in the licensing/policy framework, are required to be made. If yes, what changes are required to be made? Kindly justify your response.

Q.69 To meet the demand for spectrum in globally harmonized IMT bands for private captive networks, whether the TSPs should be permitted to give access spectrum on lease to an enterprise (for localized captive use), for a specific duration and geographic location? Kindly justify your response.

Q.70 In case spectrum leasing is permitted, i. Whether the enterprise be permitted to take spectrum on lease from more than one TSPs? ii. What mechanism may be prescribed to keep the Government informed about such spectrum leasing i.e., prior approval or prior intimation? iii. What timeline should be prescribed (in number of days) before the tentative date of leasing for submitting a joint request by the TSPs along with the enterprise, for approval/intimation from/to the Government? iv. Whether the spectrum leasing guidelines should prescribe duration of lease, charges for leasing, adherence of spectrum cap provisions, roll out obligations, compliance obligations. If yes, what terms and conditions should be prescribed? v. What other associated terms and conditions may be prescribed? vi. Any other suggestion relevant to leasing of spectrum may also be made in detail. (Kindly justify your response)

Q.71 Whether some spectrum should be earmarked for localized private captive networks in India? Kindly justify your response

Q.72 In case it is decided to earmark some spectrum for localized private captive networks, whether some quantum of spectrum be earmarked (dedicatedly) from the spectrum frequencies earmarked for IMT services and/or spectrum frequencies earmarked for non-IMT services on location-specific basis (which can coexist with cellular-based private captive networks on shared basis)? Kindly justify your response with reasons

Q.73 In case it is decided to earmark some quantum of spectrum for private captive networks, either on exclusive or shared basis, then a) Spectrum under which band(s) (or

frequency range) and quantum of spectrum be earmarked for Private Network in each band? Inputs may be provided considering both dedicated and shared spectrum (between geographically distinct users) scenarios. b) What should be the eligibility conditions for assignment of such spectrum to private entities? c) What should be the assignment methodology, tenure of assignment and its renewal, roll-out obligations? d) What should be the pricing mechanism for assignment of spectrum in the band(s) suggested for private entities for localized captive use and what factors should be considered for arriving at valuation of such spectrum? e) What should be the block size and spectrum cap for different spectrum band(s) suggested in response to point (a) above. f) What should be the broad framework for the process of (i) filing application(s) by enterprise at single location, enterprise at multiple locations, Group of companies. (ii) payment of spectrum charges, (iii) assignment of frequencies, (iv) monitoring of spectrum utilization, (v) timeline for approvals, (vi) Any other g) Any other suggestion on the related issues may also be made with details. (Kindly justify your response with reasons)

BIF RESPONSE

We would like to re-emphasize as well as provide additional inputs to this section on Pvt. Cellular Networks.

1. As pointed out by a reputed responder, there could be 3 different use cases of Private Networks which is also termed as Non-Public Networks
2. First one is a long term use case for Enterprise Networks wherein an enterprise purchases spectrum directly under its own name and gets the network infrastructure built to run the enterprise for a specific application. We suggest that for such use cases, direct spectrum allocation be made to enterprise (w/o auction) through a light-touch regulatory framework.
3. The Second use case is for Special Services viz. PPDR /Emergency Services through a ' Network Slice ' of the Public 5G (PLMN) Network with Licensing Conditions to dissuade spectrum misuse viz. ' squatting'
4. The Third Use Case is for short term ' events' or temporary networks which are set up for short duration -again served through a 5G Network slice of a PLMN Network
5. In the last two use cases viz. at point No. 3 & 4 above, we recommend that spectrum leasing be permitted between a TSP which purchases the spectrum through auctions and the enterprise. However, the terms and cost of obtaining spectrum in all the cases should be such that it is affordable. Regulatory oversight to ensure suitable leasing framework and its implementation must be ensured to make it happen successfully.
6. To implement successfully and scale up PN/NPNs, the role of an Enterprise National Level Aggregator /SPV (Indigenous) must be identified in the Policy & Regulatory Framework for Private Networks/Non-Public Networks.
7. We wish to suggest that there should be dedicated spectrum for Captive Private Networks/Non-Public Networks
8. Suggested Spectrum Bands are:
 - a) sub-Ghz supporting wide area coverage e.g., wide area logistics and sensor networks. (582-612Mhz). Bandwidth range 200kHz to 1.4MHz.

b) mid-Bands e.g., in the core 2.5GHz, 3.3 GHz to 3.8 GHz range, delivering expanded device capacity and bandwidth, e.g., Public Safety & Security / Healthcare. Bandwidth range 20-100MHz and

c) High frequency bands known as "millimeter wave", e.g., 26 GHz, 28 GHz and 40 GHz which enable maximum 'traffic volume densities to be delivered. This is of particular importance to streaming video applications, image/ video processing, virtual reality/ augmented reality, and more general wireless networking for flexible production lines, AGVs, machine vision and supply chain management. Bandwidth range 50-800MHz.

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We notice that one responder has commented on the use of the upper part of the 6 Ghz band (5425-7125Mhz) for IMT purpose. We wish to place our views in this regard as given below:

1. Based on global best practices in over 40 countries, the entire 6 Ghz band has been delicensed. US was one of the first countries to do so, with the FCC announcing the delicensing of the entire 1200Mhz in this band in April 2020.
2. Based on market trends available, more countries are currently in the process of delicensing the entire 6 Ghz band.
3. The global ecosystem developing in this band suggests that new and innovative applications around SRDs (Short Range Devices) , AR/VR and also multi-gigabit and low latency capabilities through use of New Technologies like Wi-Fi 6E and Wi-Fi 7 are likely to make use of the unique characteristics of this band.
4. The delicensing of the entire band (1200MHz) from 5925-7125Mhz lends itself to a unique carrier size of 160 and 320 Mhz which new and modern technologies based on the IEEE standards 802.11 ax (Wi-Fi 6E) and 802.11be (Wi-Fi 7) can use to provide ultra-high capacity and ultra-high speeds with extremely low latencies which can enable unique and innovative applications and help boost the startup ecosystem.
5. Hence the entire 6Ghz band needs to be delicensed as it is being done in all progressive regimes.