

Telecom Regulatory Authority of India

TRAI releases recommendations on ‘Auction of spectrum in frequency bands identified for IMT/5G’

New Delhi, 11th April 2022 – The Telecom Regulatory Authority of India (TRAI) has today released recommendations on **‘Auction of spectrum in frequency bands identified for IMT / 5G’**.

2. The Department of Telecommunications (DoT), through its letter dated 13th September 2021, had, inter-alia, requested TRAI, under section 11(1)(a) of the TRAI Act of 1997, to furnish its recommendations on “*Auction of spectrum in the frequencies identified for International Mobile Telecommunications (IMT) / 5G*”. The recommendations were sought on applicable reserve price, band plan, block size, quantum of spectrum to be auctioned and associated conditions for auction of spectrum in 526-698 MHz, 700 MHz, 800 MHz, 900 MHz, 1800 MHz, 2100 MHz, 2300 MHz, 2500 MHz, 3300-3670 MHz and 24.25 – 28.5 GHz bands for IMT/5G. Further, recommendations were sought on quantum of spectrum / bands, if any, to be earmarked for private captive / isolated 5G networks, competitive / transparent method of allocation, and pricing, for meeting the spectrum requirements of captive 5G applications of industries for machine / plant automation purposes / M2M in premises.

3. In this regard, TRAI issued a Consultation Paper on ‘Auction of spectrum in frequency bands identified for IMT/5G’ on 30th November 2021 providing the background information and seeking inputs from the stakeholders. Through this Consultation Paper, stakeholders were requested to furnish their comments on various issues raised in the consultation paper. The comments and counter comments were sought by 10th January 2022 and 24th January 2022 respectively from the stakeholders.

4. In response to the Consultation Paper, Comments and Counter Comments were received from 41 (forty-one) and 18 (eighteen) stakeholders respectively.

The comments and counter comments received from the stakeholders were placed on TRAI's website www.traigov.in. The comments received from the stakeholders were very extensive. Open House Discussion (OHD) was conducted on 8th February 2022 through online mode, which was participated by stakeholders including TSPs, Industry Associations – Indian and Global, Satellite operators, Solution providers, Consultants, and Individuals.

5. Based on the comments/inputs received from the stakeholders and on its analysis, TRAI has finalized its Recommendations on '**Auction of spectrum in frequency bands identified for IMT/5G**'. The recommendations made by TRAI include recommendations related to Auction of Spectrum for 5G/IMT such as Quantum of Spectrum to be auction, Band Plan, Block Size, Eligibility Conditions for participation in Auction, Interference mitigation in TDD bands, Roll-out obligations, Spectrum Cap, Surrender of Spectrum, and Valuation and Reserve Price of Spectrum. In addition, considering the importance of 5G in Industry verticals, recommendations relating to spectrum for Captive wireless private networks and Identification, Development & Proliferation of 5G Use Cases have been made.

6. The key recommendations are listed below:

Auction of Spectrum

- i. All available spectrum in existing bands viz. 700 MHz, 800 MHz, 900 MHz, 1800 MHz, 2100 MHz, 2300 MHz, 2500 MHz and new spectrum bands viz. 600 MHz, 3300-3670 MHz and 24.25-28.5 GHz, be put to auction.
- ii. For 600 MHz band, APT 600 (Option B1) band should be adopted. By adopting this band plan, additional 10 MHz of spectrum will be made available for IMT. This band will provide total 40 MHz (paired) spectrum. It is also proposed that entire 40 MHz (paired) spectrum [612-652 MHz/663-703 MHz] should be put to auction in the forthcoming auction.
- iii. In the frequency range 3300-3670 MHz, both the band plans i.e., n77 and n78 should be permitted and flexibility be given to the TSPs to adopt any band plan i.e., n77 or n78, based on their business/commercial considerations.

- iv. In the frequency range 24.25-28.5 GHz MHz, flexibility be given to the TSPs to adopt any band plan i.e., n257 or n258, based on the frequencies assigned to them and other business/commercial considerations.
- v. To provide flexibility to the TSPs, block size of 10 MHz for 3300-3670 MHz band and 50 MHz for 24.25-28.5 GHz band recommended. Spectrum to be assigned in a contiguous manner.
- vi. Considering the facts that presently (i) band plan(s) for the frequency range 526-612 MHz is yet to be defined by 3GPP/ITU, (ii) development of ecosystem for IMT in 526-612 MHz frequency range will take some time and (iii) MIB is using 526-582 MHz band extensively across the country for TV transmitters; the 526-612 MHz frequency range should not be put to auction in the forthcoming auction.
- vii. DoT should come out with a plan for refarming 526-582 MHz band to be utilized for IMT deployments. To make 526-582 MHz band available for IMT, DoT should work with MIB to prepare a plan for an early migration from Analogue to Digital Transmission, so that the frequency band from 526-582 MHz can be vacated for IMT services.
- viii. DoT should carry out harmonization exercise in 800 MHz, 900 MHz and 1800 MHz bands immediately after conducting the auction so that frequencies assigned to the TSPs are in contiguous manner.

Reserve Price and Easy Payment Options

- ix. Recommended Reserve Price for various spectrum bands (for 20 years) is as per table given below:

Reserve Price of spectrum per MHz for 20 years										
Service Area	600 MHz band	700 MHz band	800 MHz band	900 MHz band	1800 MHz band	2100 MHz band	2300 MHz band	2500 MHz band	3300-3670 MHz band	24.25-28.5 GHz band
	(Paired)						(Unpaired)			
	(in Rs. Crore)									(in Rs.)
Delhi	509	509	479	436	270	224	104	86	40	89 lakh
Kolkata	173	173	153	153	97	80	32	28	15	32 lakh
Mumbai	470	470	468	389	236	196	103	81	35	78 lakh
Andhra Pradesh	318	318	292	288	172	142	59	51	26	57 lakh
Gujarat	282	282	262	399	150	125	NA	44	23	50 lakh
Karnataka	220	220	198	204	121	100	64	47	18	40 lakh

Maharashtra	359	359	338	317	190	158	NA	53	29	63 lakh
Tamilnadu	253	253	225	222	141	NA	81	58	21	46 lakh
Haryana	71	71	62	68	41	34	NA	NA	6	13 lakh
Kerala	110	110	103	213	58	48	NA	NA	9	19 lakh
Madhya Pradesh	156	156	136	156	88	73	NA	NA	13	29 lakh
Punjab	112	112	101	104	61	51	NA	14	9	20 lakh
Rajasthan	146	146	142	135	75	NA	NA	NA	11	25 lakh
U. P. (East)	171	171	160	166	91	NA	NA	NA	14	30 lakh
U.P. (West)	154	154	133	152	87	72	NA	NA	13	29 lakh
West Bengal	102	102	89	99	58	37	NA	NA	9	19 lakh
Assam	57	57	50	56	32	24	NA	NA	5	10 lakh
Bihar	145	145	126	147	82	68	NA	15	12	27 lakh
Himachal Pradesh	26	26	22	26	14	12	NA	3	2	5 lakh
Jammu & Kashmir	16	16	14	16	9	8	NA	2	1	3 lakh
North East	15	15	13	14	8	5	NA	NA	1	3 lakh
Orissa	62	62	54	64	35	29	NA	NA	5	12 lakh

- x. The reserve price of spectrum allocation in case of 30 years should be equal to 1.5 times the reserve price of spectrum allocation for 20 years for the respective band.
- xi. For the long-term growth and sustainability of the telecom sector, infusing liquidity and encouraging investment, the Telecom Service Providers should be allowed easy payment options including part payment with flexibility of moratorium.

Easy Roll out Obligations

- xii. Unlike existing coverage-based rollout obligations, considering deployment of 5G network in 3300-3670 MHz and 24.25-28.5 GHz bands, easy network deployment-based roll-out conditions have been recommended for these bands.
- xiii. The roll-out obligations and associated conditions for 600 MHz band shall be same as that applicable for 700 MHz band.
- xiv. To facilitate the new entrants, in respect of roll out obligations for 700 MHz, 800 MHz, 900 MHz and 1800 MHz bands, the time period of 1 year for meeting the MRO for Metros LSAs (coverage of 90% of the LSA within one year from the effective date of license or the date of assignment of spectrum won in this auction process, whichever is later), should be

enhanced to 2 years (40% coverage by the end of 1st year and 90% coverage by the end of 2nd year).

Rational Spectrum Cap

- xv. Spectrum caps have been rationalized
 - a. Cap of 40% on combined spectrum holding in sub-1 GHz bands
 - b. Cap of 40% on combined spectrum holding in 1800 MHz, 2100 MHz, 2300 MHz and 2500 MHz bands.
 - c. Individual band specific cap of 40% for 3300-3670 MHz and 24.25-28.5 GHz spectrum bands.
 - d. Overall cap across all bands has been done away with.

Easy Surrender of Spectrum at Nominal Fee

- xvi. For ease of doing business, easy and transparent spectrum surrender guidelines with a spectrum surrender fee of Rs. 1 lakh per spectrum band per LSA has been recommended.

Coexistence of IMT and Satellite Earth Station – Ensuring efficient utilization of spectrum

- xvii. Frequency range 27.5-28.5 GHz should be used for IMT as well as Satellite Earth Station Gateway (Earth to space) on coexistence basis.
- xviii. The Satellite Earth Station Gateway should be permitted to be established in frequency range 27.5-28.5 GHz at uninhabited or remote locations on case-to-case basis, where there is less likelihood of 5G IMT services to come up.
- xix. DoT should prescribe the exclusion zone requirement for co-existence of IMT and satellite earth stations (Earth to space) in 27.5-28.5 GHz frequency range.
- xx. DoT should create a software defined automated process on a portal having database of coordinates of the IMT base stations in mmWave. The geofencing coordinates of the proposed earth station in 27.5-28.5 GHz can provide the feasibility results through the portal for establishing the earth station.
- xxi. Access to 27.5-28.5 GHz should also be allowed for Earth Stations In Motion (ESIMs) for In-flight and maritime terminals, with appropriate

sharing conditions, as in such cases, the operation would be geographically separated from terrestrial IMT.

- xxii. As the IMT emissions in the 3300-3670 MHz may saturate the Low Noise Block (LNB) of the FSS earth station which traditionally operates in the 3400-4200 MHz, there is a need to make use of high-quality bandpass filters operating in 3700-4200 MHz range. Therefore, DoT should ask the Ministry of Information and Broadcasting (MIB) to take appropriate action and sensitize the MSOs, DTH operators, and other users to ensure the use of high-quality bandpass filters operating in 3700-4200 MHz range to avoid interference from IMT stations.

Spectrum Roadmap

- xxiii. Additional bands which are already identified by ITU for IMT services and additional bands under consideration in WRC-23 for IMT identification, be explored for possibility to make these bands available for IMT services at the earliest and DoT should come out with a spectrum roadmap for opening up of new bands for IMT to meet the future demand.
- xxiv. At least a 5-year roadmap on spectrum likely to be made available for IMT in each year and likely date/month of auction should be made public. Such a spectrum roadmap will provide certainty, enable the bidders to take informed decisions and may also encourage new entrants.

Private Network – Enabling Framework proposed

- xxv. Enabling framework created for private networks: all options to be opened for uptake of captive wireless private networks, as below:
- a. Private network through TSPs using a Network Slice from TSP's PLMN network.
 - b. Enterprise may request TSPs to establish an independent isolated private network in enterprise's premises using the TSP's spectrum.
 - c. Enterprise may obtain the spectrum on lease from TSPs and establish their own isolated Captive Wireless Private Network.
 - d. Enterprise may obtain the spectrum directly from the Government and establish their own isolated Captive Wireless Private Network.
- xxvi. For establishing captive wireless private network using IMT spectrum, the entity/enterprise should have a permission/license under Section 4 of the

Indian Telegraph Act, 1885. Very light touch online portal based regime for acquiring permission/license for 'Captive Wireless Private Network (CWPN)' has been recommended.

- xxvii. TSPs permitted to lease their spectrum to Captive wireless Private Network permission holder/Licensees. Key elements to be included in the Guidelines for leasing of access spectrum by Telecom Service Providers to the Captive Wireless Private Network Permission holder/Licensees have been recommended.
- xxviii. Certain spectrum be earmarked for Captive wireless private networks to be assigned directly by DoT to Captive Wireless Private Network Permission holders/Licensees.
- xxix. For assessment of demand of spectrum for private networks, DoT should create a portal, seeking demand for spectrum from companies.
- xxx. Key elements to be included in the Guidelines for Spectrum Assignment to Captive Wireless Private Network Permission holder/Licensee have been recommended.
- xxxi. Captive Wireless Private network should not be connected to public network in any manner. The public network includes PSTN, PLMN, GMPCS and public internet

Development of 5G Use Cases and Applications – Proposed the Ecosystem for widespread adoption of 5G Technology and Digital Inclusion

- xxxii. For uptake of 5G use cases in different verticals, A 5G-dedicated Inter-Ministerial Working Group (IMWG), under the Chairmanship of Member (Technology), DoT should be formed comprising Ministry of Electronics and Information Technology, Department for Promotion of Industry and Internal Trade, Ministry of Information and Broadcasting, Department of Space, Ministry of Finance, Ministry of Education, Department of Science & Technology, Ministry of Micro, Small and Medium Enterprises (MSME) and Niti Ayog as members, which should be represented by JS Level officers.
- xxxiii. Telecom Innovation Centres to be formulated in alliance with different academic institutions and ministries, specialized for development of

innovative solutions for 5G use cases and applications in different verticals / sectors.

6. The recommendations have been placed on TRAI's website www.trai.gov.in. For clarification/ information, if any, Shri S. T. Abbas, Advisor (Network Spectrum & Licensing), TRAI may be contacted at Telephone Number +91-11-23210481 or email at advmn@traigov.in.

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