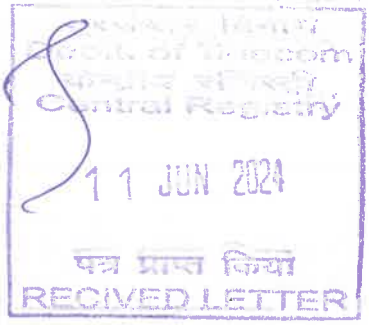
TATA

06 June 2024



Shri N K Bhola
Joint Wireless Adviser and Chairman WG-2
Wireless Planning Coordination Wing, 6th Floor
Department of Telecommunications
Ministry of Communications
Sanchar Bhawan,20, Ashoka Road
New Delhi – 110001

Subject: Tata Communications Ltd comments / inputs for Frequency bands 1 GHz to 6 GHz under Working Group-2 (WG-02) constituted for review/ revise NFAP 2022

Dear Sir,

This is with reference to the WPC office Memorandum No. T-11012/03/2024-ISR dated 14-03-2024 and 01-05-2024 regarding constitution of various working groups under the committee formed to review and revise National Frequency Allocation Plan (NFAP) -2022.

In this regard, please find attached Tata Communication Limited's application inputs / comments for frequency band 1 GHz to 6 GHz for your perusal as Annexure- I, II, III & IV.

We request you to kindly consider our inputs while finalizing WG-2 recommendations to review / revise NFAP 2022 and would be happy to provide any additional information, if required.

With kind regards

Alka Selot Asthana
Vice President and Head – Regulatory Affairs
Tata Communications Limited
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Encl: As above

Annexure-I

Proforma for Inputs / Comments (for frequency bands 1 GHz to 6 GHz Band): 2.7 -2.9 GHz for updating National Frequency Allocation Table – 2022		
SOURCE DETAILS		
1	**Name of the Organization**	Tata Communications Ltd.
2	**Correspondence Address**	VSB Bangla Sahib Road, New Delhi – 110 001
3	**Name and Designation of Authorised Signatory**	Ms. Alka Selot Asthana, Vice President and Head Regulatory
4	**Email Address of Signatory**	alka.asthana@tatacommunications.com
5	**Phone / Mobile No. of Signatory**	+91 9871010884
6	**Nature of Business / Category of Organization**	Telecom Services & ICT Services / Service Provider
TECHNICAL DETAILS		
1	**Frequency band (GHz)**	**2.7 -2.9 GHz**
2	**Applications in the frequency band**	Fixed Wireless Applications (FWA), Enterprises Use cases and Last mile connectivity purposes
3	**Minimum and Maximum transmit power with unit (dBm/Watts)**	Transmit power up to 1W per Radio Unit (30 dBm)
4	**Purpose**	Presently, the 2.7 -2.9 GHz frequency band in India has been earmarked for Aeronautical Radionavigation purposes and used for navigation purposes across Airports in India by Airport Authority of India, in accordance with the National Frequency Allocation Plan 2022. In the purview of that globally 2.7 GHz (2.7-2.9 GHz) band is not an IMT band, it is recommended DoT to earmark the band (2.7GHz - 2.9GHz) for **Enterprise services.** It is requested to administratively allocate the spectrum for Enterprise applications considering the fact that Enterprise use cases would be point to point and for Enterprise customers. Similarly, this frequency band can also be used for last mile connectivity purposes for Enterprises. Further, FWA for Enterprise services will be key enabler to bridge the digital divides by providing reliable, high-speed services to underserved areas cost-effectively which are commercially unfeasible to deploy fiber infrastructure.
5(a)	**Countries in Which Similar applications are used along with web link (If Known)**	This is more specific to India centric requirement.

5(b)	**Provision in frequency allocation table along with footnote of the country along with web link (If Known)**	NFAP-2022 (Inclusion of 2.7-2.9GHz as FWA applications)
6(a)	**Radio Regulations Provisions (If Existing)**	NA
6 (b)	**Radiocommunications Services in Region 3 as per Radio Regulations 2020**	Aeronautical Radionavigation, Radiolocation
6(c)	**Relevant ITU Reports and Recommendations**	NA
7	**Combatable Wireless Standards for the device likely to work in the proposed band (ETSI, 3GPP, IEEE, EC, FCC, TEC etc. or any proprietary standard)**	NA
8	**Benefits for Public**	To ensure meeting the Enterprise grade service level agreements (SLAs) and QoS to the customers, it is required to have licensed spectrum band for network rollout. It will facilitate: • High Reliability and Performance • Increased coverage & capacity • Enhanced Quality of Service • Connectivity to remote areas The given recommendation is crucial for robust communication systems and High performance to deliver enterprise-grade service levels and uphold customer satisfaction.
	PROPOSAL DETAILS	
1	**Frequency band (MHz/GHz)**	**2.7 -2.9 GHz**
2	**Required modifications in NFAP 2022**	NA
3	**Suggested text for IND footnote**	NA
4	**Remarks, if any**	The 2.7 GHz band being a non-IMT band, there is no viable ecosystem available in this band as on date. There is less possibility of mass ecosystem development in the future owing to the non-inclusion of this band in IMT bands by the WRC-23. Consequently, there is not much interest being shown for this band by the mobile service operators globally, and hence, there is a lack of interest in development of devices ecosystem. In view of this, Tata Communications recommends assigning this 2.7 -2.9 GHz band for Fixed Wireless Access enterprise applications, last mile connectivity for Enterprises and Enterprises centric use cases.

Seal/ Signature of Authorized Signatory:

Place: New Delhi

Annexure-II

Proforma for Inputs / Comments (for frequency bands 1-6 GHz Band): 3.7-3.8 GHz & 4.88-4.9 GHz band, for updating National Frequency Allocation Table – 2022		
SOURCE DETAILS		
1	Name of the Organization	Tata Communications Ltd.
2	Correspondence Address	VSB Bangla Sahib Road, New Delhi – 110 001
3	Name and Designation of Authorised Signatory	Ms. Alka Selot Asthana, Vice President and Head Regulatory
4	Email Address of Signatory	alka.asthana@tatacommunications.com
5	Phone / Mobile No. of Signatory	+91 9871010884
6	Nature of Business / Category of Organization	Telecom Services & ICT Services / Service Provider

Technical Details

1	Frequency band (GHz)	3.7-3.8 GHz & 4.88-4.9 GHz band
2	Applications in the frequency band	International Mobile Telecommunications (IMT-5G) services. Globally, many countries carving out some part of the spectrum in these bands for private 5G network deployments either directly to the Enterprises for their captive use and/or to the non-MNOs Entities/ System Integrators to either acquire spectrum in its present licensing capacity from other TSPs or direct administrative spectrum may be allocated to deploy CNPNs for its own captive purposes and for other Enterprises on their behalf. In India, by allocating spectrum to CNPN Service providers / System Integrators to deploy CNPN for its captive use as well as for multiple Enterprises and / or allocating spectrum for deployment of CNPN services for Enterprises on an administrative basis, will create necessary ecosystem for taking-off of Industry 4.0 revolution by way of CNPN Services in India to enable Industrial applications and specific use cases instead of only relying on the MNOs having Access Spectrum.
3	Minimum and Maximum transmit power with unit (dbM/Watts)	Ranging from 1W to 40W per Radio Unit depending upon indoor or outdoor area deployment. since the deployment is expected within the captive premises, it could be indoor as well as outdoor, but coverage expected to be restricted within the specific geography of the Enterprise.
4	Purpose	IMT-5G services – Private 5G networks and Industry 4.0 adoption. Global trends indicate that up to around 100Mhz is being carved out of different IMT bands including 3.7 GHz & 4.9GHz (which is sub 6GHz band identified for 5G).
5a	Countries in Which Similar applications are used along with web link (If Known)	In South Korea, Ministry of Science and ICT (MSIT), Government of South Korea had started offering private 5G frequencies (100MHz@4.7GHz, 600MHz@28GHz) effective October 2021. In this Model, Private Network Service Providers get the required spectrum to provide services to their enterprise customers, and that MNOs are not permitted to offer these services directly to enterprise customers to avoid conflict of interest. With the availability of these private 5G frequencies,

		enterprises in Korea can now deploy private 5G networks independently from the public 5G networks of mobile operators. The German Telecoms Regulator, BNetzA[1], reserved 100MHz of spectrum in the 3.7 GHz-3.8 GHz band to private companies. In United Kingdom, Telecom Regulator - Ofcom[2] will dedicate the 3.8-4.2 GHz band for local deployments, requiring national operators to hand over unused licensed spectrum to enterprises. In Japan[3] 4.8 GHz bands is reserved for captive private network use. US[4] has already allowed use of C-Band for terrestrial wireless (IMT) communications.

5(b)	Provision in frequency allocation table along with footnote of the country along with web link (If Known)	IND16 (Inclusion of 3.7-3.8GHz & 4.8-4.99GHz as IMT band)
6(a)	Radio Regulations Provisions (If Existing)	NA
6(b)	Radiocommunications Services in Region 3 as per Radio Regulations 2020	
6(c)	Relevant ITU Reports and Recommendations	Same as 5(b)
7	Combatable Wireless Standards for the device likely to work in the proposed band (ETSI, 3GPP, IEEE, EC, FCC, TEC etc. or any proprietary standard)	3GPP Releases
8	Benefits for Public	India has vast presence of Industries across various sectors ranging from Manufacturing, Transportation, Mining, Land & Sea Ports, Automotive, Steel, Pharma, Education, Health, Agricultural, Food processing etc. where true potential of this futuristic technology can be exploited eventually contributing to the national GDP. Given the global momentum towards adoption and deployment of Private 5G networks in view of the benefits and advantages and India should not left behind, we recommend to DoT for making available sufficient bandwidth in 3.7 GHz & 4.8 GHz bands and is quite apt for in-campus kind of deployments for Private 5G Networks. We also of the view that as more and more bands would get harmonized for 5G

[1] https://www.bundesnetzagentur.de/SharedDocs/Downloads/EN/Areas/Telecommunications/Companies/TelecomRegulation/FrequencyManagement/FrequencyAssignment/LocalBroadband3.7GHz.pdf?__blob=publicationFile&v=1

[2] https://www.ofcom.org.uk/manage-your-licence/radiocommunication-licences/shared-access

[3] https://www.tele.soumu.go.jp/resource/e/search/myuse/use0303/batch.pdf

[4] https://docs.fcc.gov/public/attachments/DOC-352520A1.pdf

		Technology in the near future; some part of the same should also be considered for allocation for private and localized network deployments in line with global trends.

PROPOSAL DETAILS		
1	Frequency band (MHz/GHz)	3.7-3.8GHz & to 4.8-4.99 GHz (Sub-6GHz)
2	Required modifications in NFAP 2022	For the respective bands indicated above for India Region apart from "Mobile" category comment as "Captive Networks" should also be included.
3	Suggested text for IND footnote	
4	Remarks, if any	

Seal/ Signature of Authorized Signatory:
Place: New Delhi

Annexure-III

Proforma for Inputs / Comments (for frequency bands 1 GHz to 6 GHz Band): 5.725-5.875 GHz & 5.150 GHz – 5.250 GHz, for updating National Frequency Allocation Table – 2022		
SOURCE DETAILS		
1	**Name of the Organization**	Tata Communications Ltd.
2	**Correspondence Address**	VSB Bangla Sahib Road, New Delhi – 110 001
3	**Name and Designation of Authorised Signatory**	Ms. Alka Selot Asthana, Vice President and Head Regulatory
4	**Email Address of Signatory**	alka.asthana@tatacommunications.com
5	**Phone / Mobile No. of Signatory**	+91 9871010884
6	**Nature of Business / Category of Organization**	Telecom Services & ICT Services / Service Provider
TECHNICAL DETAILS		
1	**Frequency band (GHz)**	5.725 GHz -5.875 GHz & 5.150 GHz – 5.250 GHz
2	**Applications in the frequency band**	Fixed Wireless Applications (FWA)
3	**Minimum and Maximum transmit power with unit (dBm/Watts)**	• Transmit power upto 1W per Radio Unit (30 dBm for BS & CPE). • Suggestion to Enhance PMP CPE EIRP to 47 dBm in the frequency bands 5.725 to 5.875 GHz and 53 dBm in the 5.150 to 5.250 GHz respectively.
4	**Purpose**	Tata Comm. recommends maintaining the same EIRP level which is allowed for PTP radios for **the PMP subscriber unit (CPE). U**pto 47 dBm in the frequency bands 5.725 to 5.875 GHz and 53 dBm in the 5.150 to 5.250 GHz respectively. The given recommendation would safeguard the link performance necessary to deliver enterprise-grade service levels and uphold customer satisfaction.
5(a)	**Countries in Which Similar applications are used along with web link (If Known)**	*NA*
5(b)	**Provision in frequency allocation table along with footnote of the country along with web link (If Known)**	NA
6(a)	**Radio Regulations Provisions (If Existing)**	NA
6 (b)	**Radiocommunications Services in Region 3 as per Radio Regulations 2020**	Fixed/land/Mobile/Space
6(c)	**Relevant ITU Reports and Recommendations**	NA

7	**Combatable Wireless Standards for the device likely to work in the proposed band (ETSI, 3GPP, IEEE, EC, FCC, TEC etc. or any proprietary standard)**	NA
8	**Benefits for Public**	Due to the constantly increasing trend in signal noise levels in FWA unlicensed band network across Telco Industry and to ensure meeting the Enterprise grade service level agreements (SLAs), it is required to radiate the PMP **subscriber unit** to the limit defined for the PTP radio, it will facilitate: • Enhanced connectivity • Increased capacity • High Reliability • Enhanced Quality of Service The given recommendation would safeguard the link performance necessary to deliver enterprise-grade service levels and uphold customer satisfaction.
	PROPOSAL DETAILS	
1	**Frequency band (MHz/GHz)**	5.725 GHz -5.875 GHz & 5.150 GHz – 5.250 GHz
2	**Required modifications in NFAP 2022**	NA
3	**Suggested text for IND footnote**	NA
4	**Remarks, if any**	PTP radios act as a PMP subscriber unit (CPE) in the UBR network which have similar hardware characteristics. We believe that the same EIRP levels upto 47 dBm and 53 dBm which is permissible for Point-to-Point (PTP) radios can be applied to PMP subscriber unit (CPE) in the frequency bands 5.725 to 5.875 GHz and 5.150 to 5.250 GHz respectively.

Seal/ Signature of Authorized Signatory:

Place: New Delhi

Annexure -IV

Proforma for Inputs / Comments (for frequency bands 1 GHz to 6 GHz Band): 5.925 GHz -7.125 GHz, for updating National Frequency Allocation Table – 2022		
SOURCE DETAILS		
1	Name of the Organization	Tata Communications Ltd.
2	Correspondence Address	VSB Bangla Sahib Road, New Delhi – 110 001
3	Name and Designation of Authorised Signatory	Ms. Alka Selot Asthana, Vice President and Head Regulatory
4	Email Address of Signatory	alka.asthana@tatacommunications.com
5	Phone / Mobile No. of Signatory	+91 9871010884
6	Nature of Business / Category of Organization	Telecom Services & ICT Services / Service Provider
TECHNICAL DETAILS		
1	**Frequency band (GHz)**	5.925GHz -7.125GHz
2	**Applications in the frequency band**	Fixed Wireless Applications
3	**Minimum and Maximum transmit power with unit (dBm/Watts)**	Transmit power up to 1W per Radio Unit (30 dBm)
4	**Purpose**	Delicensing of 6 GHz Band critical for global harmony, emergence of new Standards like Wi-Fi 6E and proliferation of FWA network in underserved area. This is in line with the Global regulations.
5(a)	**Countries in Which Similar applications are used along with web link (If Known)**	Globally, many countries have delicensed the 6 GHz frequency band. These include the United States, UK, Canada, Korea, Brazil, UAE, Saudi Arabia. It is being adopted globally in all the three regions viz Region 1, 2 & 3. *Web Link: https://www.wi-fi.org/countries-enabling-wi-fi-in-6-ghz-wi-fi-6e*
5(b)	**Provision in frequency allocation table along with footnote of the country along with web link (If Known)**	NA
6(a)	**Radio Regulations Provisions (If Existing)**	NA
6 (b)	**Radiocommunications Services in Region 3 as per Radio Regulations 2020**	Fixed/land/Mobile/Space
6(c)	**Relevant ITU Reports and Recommendations**	NA
7	**Combatable Wireless Standards for the device likely to work in the proposed band (ETSI, 3GPP, IEEE, EC, FCC, TEC etc. or any proprietary standard)**	NA

8	**Benefits for Public**	Delicensing the 6 GHz band will act as a catalyst for exponential and transformational inclusive growth of the Telecom sector. It will contribute to global harmony in operating frequency bands. By making affordable spectrum available, it will facilitate: • Enhanced connectivity • Increased capacity • Technological advancements • Economic growth • High Reliability • Enhanced Quality of Service Additionally, expanding network coverage in rural and remote areas will play a crucial role in bridging the digital divide and opening new markets for telecom services.
	PROPOSAL DETAILS	
1	**Frequency band (MHz/GHz)**	5.925GHz -7.125GHz
2	**Required modifications in NFAP 2022**	NA
3	**Suggested text for IND footnote**	NA
4	**Remarks, if any**	Delicensing of entire 1200 MHz of 6 GHz band

Seal/ Signature of Authorized Signatory:

Place: New Delhi

Format

Contribution for updating National Frequency Allocation Table-2022 for 3.8-4.2GHz (upto1-6 GHz band)		
1	Name of Individual/Organization etc	Ms. Alka Selot Asthana, Vice President and Head Regulatory Tata Communications Ltd.
2	Address	VSB Bangla Sahib Road, New Delhi – 110 001
3	Mail ID	alka.asthana@tatacommunications.com
4	Phone/Mobile no.	+91 9871010884
5(a)*	Nature of business	Telecom Services & ICT Services
5 (b)	Type of Organisation (Pvt industry, Association, academia, PSU, government departments etc.)	Pvt. Industry – Telecom Service Provider

6	Frequency band (kHz/MHz)	3800MHz-4200MHz
7*	Applications of service	CNPN (Captive Non-Public Network), International Mobile Telecommunications (IMT-5G) services. Globally many countries carving out some part of these spectrums for private 5G deployments directly to the Enterprises for their captive use and enabling faster adoption of Industry 4.0 transformation. Some countries are allocating spectrum directly to the CNPN Service providers / System Integrators to deploy CNPNs for Enterprises on their behalf (South Korea model).
8	Minimum & Maximum power with unit	Ranging from 1W to 40W per Radio Unit depending upon indoor or outdoor area deployment. since the deployment is expected within the captive premises, it could be indoor as well as outdoor, but coverage expected to be restricted within the specific geography of the Enterprise.
9	Purpose	IMT-5G services – Private 5G networks and Industry 4.0 adoption. Global trends indicate that up to around 100Mhz is being carved out of different IMT bands including 3.8 GHz – 4.2GHz
10 (a)	Countries in which similar applications are used along with web link (if known)	• In United Kingdom, Telecom Regulator - Ofcom will dedicate the 3.8-4.2 GHz band for local deployments, requiring national operators to hand over unused licensed spectrum to enterprises. Source • Norway has provisioned availability of 3.8-4.2GHz for captive non public network. Source. • Canada has provisioned 3.9-3.980 GHz for captive non-public network. Source • Behrain has made similar provisions in 3.8-4.2GHz. Source
10 (b)	Provisions in frequency allocation table along with footnote of the country along with web link (if known)	IND16 (Inclusion of 3.8-4.2GHz as IMT band)
11	Radio Regulations provisions (if known)	NA

12*	Type of Radiocommunication service	Private Networks
13	Combatable Wireless Standard for the device likely to work in the proposed band (ETSI, 3GPP, IEEE, EC, FCC ,TEC etc or any proprietary standard)	3GPP Releases
14	Benefit for public	India has vast presence of Industries across various sectors ranging from Manufacturing, Transportation, Mining, Land & Sea Ports, Automotive, Steel, Pharma, Education, Health, Agricultural, Food processing etc. where true potential of this futuristic technology can be exploited eventually contributing to the national GDP. Given the global momentum towards adoption and deployment of Private 5G networks in view of the benefits and advantages and India should not left behind, we recommend to DoT for making available sufficient bandwidth in 3.7 GHz & 4.8 GHz bands and is quite apt for in-campus kind of deployments for Private 5G Networks. We also of the view that as more and more bands would get harmonized for 5G Technology in the near future; some part of the same should also be considered for allocation for private and localized network deployments in line with global trends.
15	If modification in NFAP-2022 footnote then quote relevant footnote no. of NFAP-22	For the respective bands indicated above for India Region apart from “Mobile” category comment as “Captive Networks” should also be included.
16	Remarks	

Note.
5* . Construction service / Manufacturing service/ Shipping Service/Aeronautical Service etc
7*. Specify the operation of service (e.g Hand held radio/ Vehicle mobile radio/ point to point links/FM/Community Radio/Aeromobile/Short Rang Device etc
12* Amateur/Fixed/Land mobile/Aeronautical mobile/Maritime Mobile/Aeronautical radio navigation/FM broadcast/Community Radio Service etc

Date and Signature