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Our Ref: IAFI-MOC/V-21

Shri Ashwini Vaishnaw,
Hon'ble Minister of Communications and IT,
Sanchar Bhawan
New Delhi - 110001

Sub: V band Spectrum

Dear Sir,

We congratulate your leadership and vision and acknowledge the telecom reforms announced by the government last week. These reforms are beginning of a new era for the telecom sector and demonstrate the government's firm commitment to ensuring healthy growth of the telecom industry. These reforms will bring alive the digital aspirations of 1.3 billion people and accelerate India's journey to a digitally powered economy as envisaged by our Honourable Prime Minister.

In the above context, we would also like to highlight another critical issue which is pending a decision by the Government since 2015. TRAI has been recommending delicensing of V band since 2015. Various economists have pointed out that de-licensing of E-V band could unleash an economic growth of over 1.5 Lakh crores. The E-V band spectrum has mostly been sitting idle in the country while most developed countries are enjoying increased economic development by using these frequency bands.

Our summary proposal for delicensing of V band is enclosed herewith.

Majority of rural India still do not have access to the internet. Broadband penetration in rural India is limited to a mere 29.2 per cent, as on 31 March 2020, as mentioned by the former Minister of State for Communications, in a reply to a Rajya Sabha question. A fully delicensed V band and a hybrid E band (part delicensed and part light licensed) could help create the necessary innovation by our young engineers and scientists in rural and remote area to overcome these challenges provided DOT helps in delicensing the needed spectrum.

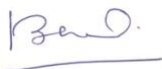
Prime Minister's Wi-Fi Access Network Interface (PM-WANI) is a critical initiative by the government to elevate wireless internet connectivity in the country which will completely revolutionise the innovation and will also substantially improve the wireless connectivity of the country as well as boost the "ease of doing" business and also "ease of living". "The scheme would enable our small shopkeepers to provide Wi-Fi service. This will boost incomes as well as ensure

our youth gets seamless internet connectivity. It will also strengthen our Digital India mission," said the Prime Minister in a tweet recently. Delicensing of V band is a critical input to meet this aspiration of small shopkeepers in rural and suburban areas and a CRITICAL REQUIREMENT OF PM-WANI.

The E- and V-bands, offer a wireless solution that can speedily help meet the aspirations of PM-WANI as these bands can be deployed as an alternative solution to backhaul the large traffic in urban, suburban and rural environments while considerably reducing right-of-way hurdles. The V-band (60 GHz) is considered as the ideal solution in providing high-capacity wireless links needed for PM-WANI. This band has short link lengths due to oxygen absorption characteristics of these frequencies that make it almost interference free and ideal for deploying large number of short links. Considering its utility, many countries such as Australia, Brazil, Canada, China, Japan, New Zealand, South Africa, Sweden, the United Kingdom, and the United States have already delicensed the 60 GHz band. TRAI had already recommended that both the V- and E-bands should be opened up for acceleration of broadband penetration.

We strongly recommend that the Ministry of Communications should immediately delicense the V band and implement hybrid regulation of E Band (part delicensed and part light licensed) in line with other developing and developed countries of the world to support innovation by our own engineers in line with the global ecosystem for low-cost outdoor WI-FI and fixed wireless networks based on global IEEE standards (such as WiGig or "Wireless Fiber" or others) for providing high capacity links to meet the needs of Hon'ble Prime Minister Shri Modi vision of connecting all the villages with high speed broadband. V band delicensing offers such an important opportunity to meet the dream of our beloved Prime minister.

Accordingly, and in line with what is happening in most other countries, we recommend that the lower V band (57-66 GHz) should be immediately delicensed without specifying any channel bandwidth in line with relevant IEEE standards. We further recommend that a part of the E Band to be delicensed without specifying any channel bandwidth and rest of the E Band with a simple on-line registration scheme without any further delay.



Bharat B Bhatia,

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1. **Shri Devusinh Chauhan, Hon'ble Minister of State for Communications.**
2. **Shri Anshu Prakash, IAS, Secretary DoT**
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4. **Shri P K Sinha Member, Finance, DOT**
5. **Shri Deepak Chaturvedi Member, Services, DOT**
6. **Shri Sukhpal Singh Joint Wireless Advisor to the Government of India**

Enclosed: Summary Proposal (Attachment 1

IAFI Proposal on V Band Delicensing

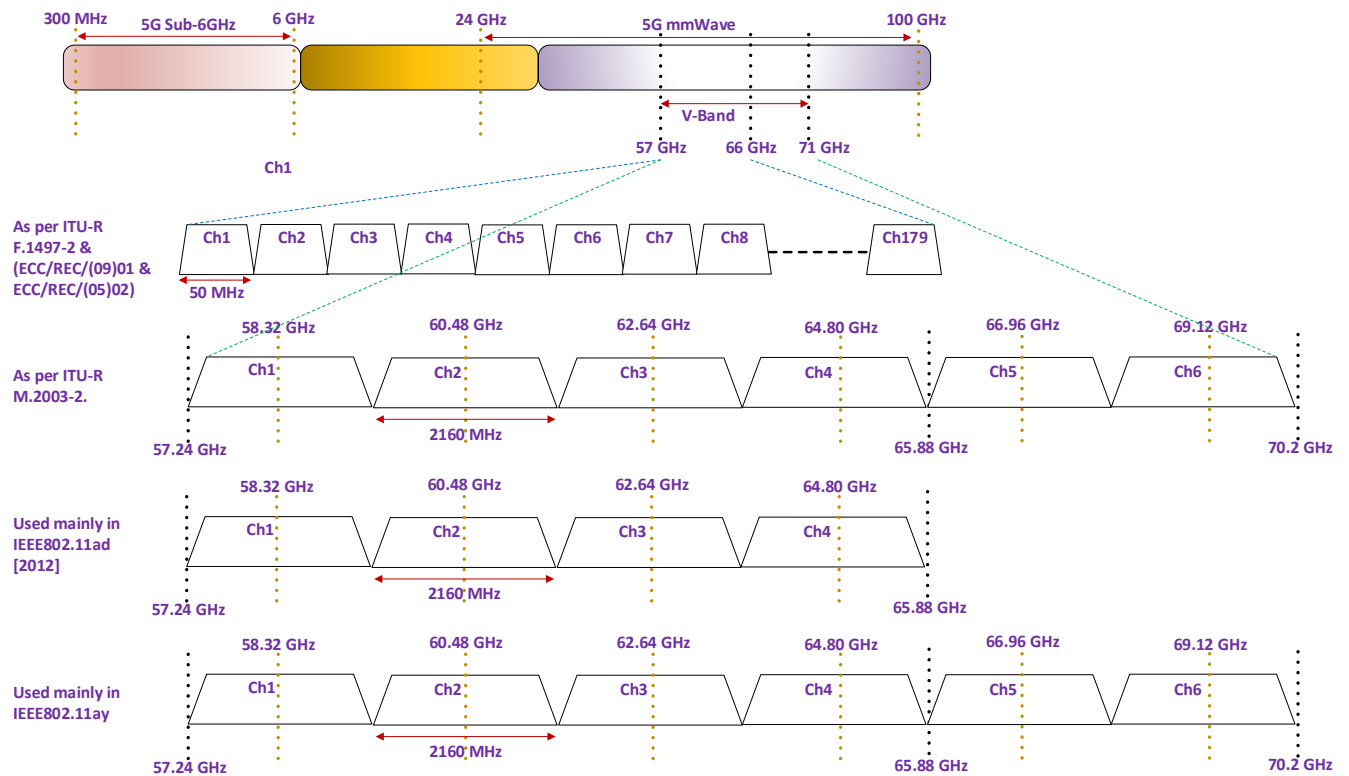
1. The TRAI in its recommendations on 'Delivering Broadband Quickly: at para 3.19 mentioned that most countries have already de-licensed the 60 GHz band(V-band or WiGig band using 802.11ad) and this band has a good device ecosystem and that India should also de-license the 60 GHz band immediately and make it available for consumers. Again, in response to a DOT request in 2015, TRAI recommended that V-band (57-64GHz) should be delicensed for indoor and outdoor based access applications like Wi-Fi hotspots etc.
2. There are three possible approaches to utilize this important spectrum that could help India deliver broadband to its citizens quickly:
 - a. Delicense the V band for lower power use up to specific power limit
 - b. Limited license through on line registration and fees payment
 - c. fully license the band through spectrum auctions
3. The license-exempt or delicensed approach is critical for expanding broadband services to enterprises, industries, villages, schools and gram panchayats
4. Licensed approach is applicable to the mobile operators for peer to peer devices as they need a reliable access and backhaul networks protected under licence. This can be done in the E band rather than V band which is best for delicensed use.
5. Most developed countries in the world have already delicensed V band for Wi-Fi type of usage:

60 GHZ GLOBAL ALLOCATIONS

REGION	ALLOCATION (GHZ)	LICENCE STATUS	INDOOR/ OUTDOOR
Australia	57-71	Exempt	Both
European Union	57.00 - 71.00	Exempt	Both
Japan	57.00 - 66.00	Exempt	Both
South Korea	57.00 - 66.00	Exempt	Both
USA	57.00 - 71.00	Exempt	Both
UK	57-71	Exempt	Both
Israel	57-71	Exempt	Both
Saudi Arabia	57-71	Exempt	Both
Sweden	57-71	Exempt	Both
Canada	57-71	Exempt	Both
Brazil	57-71	Exempt	Both

6. Being very highly directional beam both delicense having limited power and backhaul approach can coexist in same network criteria.

7. The following figure from TSDSI technical Report on 1V-Band Spectrum and its associated Channelization across the Globe



The Report concludes that the “regulatory bodies can consider enabling the 2.16Ghz channels in India ...the maximum possible number of 2.16Ghz channels be made available to deal with possible interference issues”

8. In line with TSDSI recommendations, the Channel bandwidth for V-band (57-64 GHz) should be 2.16 GHz. More than one channel can be allowed and allocated for aggregation.
9. IEEE 802.11ad and its successor, 802.11ay, are wireless networking standards developed to provide a Multiple Gigabit Wireless System (MGWS), and is a networking standard for Wi-Gig networks. Because it uses the V band of milli-meter wave (mmW) frequency, the range of IEEE 802.11ad and 802.11ay communication would be rather limited (just a few hundred meters and difficult to pass through obstacles/walls) compared to other conventional Wi-Fi systems. However, the high frequency allows it to use more bandwidth which in turn enables the transmission of data at high data rates up to multiple gigabits per second, enabling usage scenarios like transmission of uncompressed UHD video over the wireless network.

1 TSDSI Technical Report, TSDSI TR 6004 V1.0.0, “Channel Characteristics of 60GHz for 4G/5G Backhaul” (2019)

10. This Wi-Gig has become popular as Wi-Fi band in new handsets being launched in world which uses 60 GHz carrier. This Wi-Fi band is used for high bandwidth applications to customers mobile handset devices. Provision for this Wi-Fi band needs to be made in India to enable use of such handsets by mobile customers.
11. The 802.11ad and new 802.11ay Wi-Fi utilizes a radio module of up to 32 small antennas on the device and access point (i.e., hotspot), and dynamically creates very narrow beams that focus towards specific users. This beam forming is designed to work with a wide swatch of spectrum (up to 2 GHz) to provide multi-gigabit speeds to users. One of the main forms of modulation used is OFDM. This is a key element of the overall modulation and RF signal format, providing the capability for high data rates while supplying good resilience against multiple paths.
12. The WiGig standard covers the frequency of 57 to 71 GHz. The frequency band is subdivided into 6 different channels in IEEE 802.11ad, each of them occupy 2160 MHz of space and provide 1760 MHz of bandwidth:

13.

International & Indian scope of channels				
Channel	Center (GHz)	Min. (GHz)	Max. (GHz)	BW (GHz)
1*	58.32	57.24	59.40	2.16
2*	60.48	59.40	61.56	
3*	62.64	61.56	63.72	
4	64.80	63.72	65.88	
5	66.96	65.88	68.04	
6	69.12	68.04	70.20	

14. Recommendation ITU-R M.[2003-2](#) recommends the use of six channels, each of 2.16 GHz wide with centre frequencies of 58.32, 60.48, 62.64, 64.80, 66.96 and 69.12 GHz. It can therefore be seen that channel 1-6 are globally available.
15. In NFAP-2018 as per IND 37: The band 57-64 GHz may be used for high-density point to point / multipoint links and other access applications also taking care of other services identified as Primary in band. In India V Band allocation is from 57 GHz to 64 GHz. V Band has a good potential for following applications:
 - a. Last mile connectivity for fixed wireless access broadband CPE
 - b. Broadband access to adjacent structures in commercial facilities
 - c. Extending the reach of fibre-optic networks
 - d. Front haul and backhaul Mobile network rollout
 - e. Backhaul for Wi-Fi Hotspots
 - f. Very high capacity (e.g. 100Mbps ~ 1Gbps Ethernet systems) RLANS
 - g. Wi-Gig for high bandwidth indoor connectivity for CPE
16. With 2.16 GHz channels, as recommended by TSDSI above, most of the applications can now be deployed by a variety of players, in addition to TSPs.

17. Emission limits may be permitted as below:

EXCEPT FIXED OUTDOOR	INDOOR & OUTDOOR	ONLY FIXED OUTDOOR
40 dBm e.i.r.p., 23 dBm/MHz e.i.r.p. density	40 dBm e.i.r.p., 23 dBm/MHz e.i.r.p. density and maximum transmit power of 27 dBm at the antenna port or ports	55 dBm e.i.r.p., 38 dBm/MHz e.i.r.p. density and transmit antenna gain \geq 30 dBi
Fixed outdoor installations are not allowed.		Applies only to fixed outdoor installations

18. The V band has unique features, such as gigabit speeds, short range, and a lack of interference because of Oxygen absorption in its frequency range. This make V band ideal for shared unlicensed use. Such use can contribute more to the economy than regulatory levies on spectrum. Global regulators are therefore increasingly delicensing V band for links in indoor and outdoor environments. An unlicensed V band can be a significant boost to the India economy. Prof Rekha Jain² has recently estimated that the unlicensed V band spectrum could support increased economic activities which is valued at as high as 1,52,703 crores. The Supreme Court has also clarified its judgement to say that spectrum auctions are not a constitutional principle and a matter of government policy. There is no barrier to India following global best practices to exploit new V band opportunities.

Proposal :

There is a strong case for India to unleash the potential of the V band. India has much to gain directly and indirectly from delicensing the V band, like its peers already do.

19. The best option to exploit the full potential of the V band is to delicense slots 1,2,3 of V Band of 2.16 GHz for indoor and outdoor Wi-Gig, as most leading global regulators are doing. (see para 5 above)

20. This option will boost the economy far beyond the revenue ‘lost’, by not auctioning V spectrum. It is also worth bearing in mind that an auction is increasingly of academic interest since the sector has too few players. The auction proceeds too may be low, since the revenues from the use of unlicensed V band spectrum will not be limited to licensed telecom players who might bid for the spectrum. They will, importantly, be spread across several ‘non-telecom’ sectors and players.

² Rekha Jain, “The Current and Potential Economic Value of Unlicensed Spectrum in the Existing Wi-Fi, V and 6Ghz Bands in India”, Broadband india Forum, 2021