

14 March 2023

Ms. Aileen Chia
Director-General (Telecoms and Post)
Deputy CE (Connectivity Development & Regulation)
Infocomm Media Development Authority
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Via electronic filing to Consultation@imda.gov.sg

SUBJECT: Public Consultation on Proposed Allocation of 6 GHz Band

Dear Ms. Chia:

Wireless Broadband Alliance (WBA) is a not-for-profit organization and has been active in Wi-Fi space since its inception in 2003. WBA's vision is to drive the seamless and interoperable services experience via Wi-Fi within the global wireless ecosystem for carriers, consumers, enterprises and cities. WBA is highly supportive of IMDA's radio spectrum planning initiatives in Singapore. As stated in IMDA's 6 GHz consultation, 30-40% annual growth in Wi-Fi traffic¹ for several years to come, is the very reason we are excited about Wi-Fi and the value it delivers. WBA will like to share our views on how we think Wi-Fi can continue to grow and keep Singapore at the forefront of connectivity to benefit all Singaporeans. Note that positions stated in these comments represent majority of the WBA members. Not all WBA members support all stated positions in these comments.

Summary of Major Points

- i) Additional radiofrequency spectrum is needed to enable higher Wi-Fi data rates and higher deployment density
- ii) Opening up lower half of the 6 GHz band (5925 - 6425 MHz) is a great step forward, but it is not a complete solution. All 1200 MHz (5925 - 7125 MHz) are needed to maintain higher data rate in high density environments Lower half of the 6 GHz band can accommodate only one 320 MHz channel, and that is not sufficient to create a resilient network
- iii) Wi-Fi 6E with 160 MHz channels is available today with over 1200 products already available or announced as noted in IMDA's consultation. Wi-Fi 7 with up to 320 MHz channels will more than double the data rate per channel achievable versus Wi-Fi 6E, and Wi-Fi 7 products are already being announced

¹ IMDA Public Consultation on Proposed Allocation of 6 GHz Band in Singapore.- <https://tinyurl.com/2p84k5e8> - Page 2, 14 Feb 2023

- iv) Low Power Indoor (LPI), Very Low Power (VLP), Standard Power (SP), and client-to-client connectivity rules are needed to enable all product types
- v) A typical Wi-Fi Client employs two antennas (2x2 MIMO), and a 160 MHz channel can enable up to 2 Gb/s data rate. Singapore fibre infrastructure can deliver up to 10 Gb/s², and it ultimately needs Wi-Fi 7 to deliver up to 5 Gb/s to 2x2 MIMO Clients
- vi) Wi-Fi in the upper half of 6 GHz band is better suited for coexistence with fixed satellite services (FSS) versus IMT
- vii) Upper half of the 6 GHz band should be left as 'no change' in World Radiocommunication Conference 23 (WRC-23)
- viii) Economics favors Wi-Fi, and Wi-Fi continues to be central to next generation use cases. A leading industry analyst's recent survey points to Wi-Fi as a solution of choice for next generation applications³
- ix) Wi-Fi is better suited for various green energy initiatives by enabling connectivity at a lower per data bit of energy⁴

Statement of Interest

Wi-Fi has served the needs in connectivity and data communication growth economically and ubiquitously for Singapore consumers and enterprises. It is not a surprise that radio spectrum needs for Wi-Fi have to be increased even for the current generation of Wi-Fi (Wi-Fi 6E) to serve this need. WBA has published best practices for Wi-Fi deployment for homes, public arenas, and enterprises. The message is clear: Wi-Fi is synonymous to connectivity, and its ubiquity makes it the preferred connectivity technology.

WBA members include network operators, service providers, and technology enablers who come together to recommend best practices for ease of deployment and use of various connectivity technologies. To serve this purpose, WBA has published whitepapers and enabled Wi-Fi technology trials around the world. Singapore is an important regional leader, and WBA seeks to recommend policy objectives that will help pave the way for current and future connectivity in Singapore, and following the earlier example at Wireless at SG,⁵ and also help set it as a model for other regulators in the region to follow.

² IMDA Public Consultation on Proposed Allocation of 6 GHz Band in Singapore.- <https://tinyurl.com/2p84k5e8> - Page 3, 14 Feb 2023

³ "Not surprisingly, the CES show floor was awash in all kinds of glasses, headsets and goggles. However, most such gadgets rely on wired, or Wi-Fi, connections. 5G remains too expensive, and too power hungry, for such gadgets. After all, they're primarily used in the home rather than outdoors." – Mike Dano, Editorial Director, 5G and Mobile Strategies, LightReading - <https://tinyurl.com/3vrd44w5>, January 6, 2023

⁴ "Energy Efficiency in Wireless Networks" - Oswald Jumira & Sherali Zeadally, Wiley - <https://tinyurl.com/mujet2dd>, December 2012

⁵ <https://www.imda.gov.sg/How-We-Can-Help/Wireless-At-SG>

Comments

With the increases in the number of users and uses, higher data rates are needed to keep up with modern apps. While Wi-Fi has grown from a niche technology in the early 2000s to the predominant wireless local connectivity technology now, radio spectrum allocation has not kept up. Access to the 6425-7125 MHz bands means that up to seven 160 MHz channels can be enabled in the 5925 - 7125 MHz frequency range, which are critical for enabling high-data rates in dense deployments, both in enterprises and in multi-dwelling living. For enterprise deployments, it is not only the very wide channels that are important but also (a) the large number of channels that only allocation of the entire 1200 MHz of spectrum makes available, and (b) the diversity of channel widths (from 20 MHz to 160 MHz) that allows enterprises to allocate channels (or groups of channels) to applications and services consistent with their QoS requirements. (e.g., data rate, latency, and availability.)

License-exempt 6 GHz can also coexist with fixed satellite service links (FSS), permitting both services. This, however, is not understood as possible if an IMT allocation is designated in the upper half of the 6 GHz band. There will be no opportunity for coexistence with the license-exempt use cases and IMT based services, and if and when deployed, it will represent a very different economic reality.

Also, mobile allocation for the entire 6425-7125 MHz band already exists. An IMT identification of the 6425-7025 MHz and 7025-7125 MHz bands is therefore not required. The status quo provides administrations with absolute freedom of choice of the future use of the 6425-7125 MHz band. An IMT identification, to the contrary, if implemented in Singapore, would pre-determine the future use of the band to be licensed as has been the case for many other bands that have been previously identified for IMT.

Studies by 6 GHz IMT proponents such as Coleago have highlighted, it would probably take some years⁶ for IMT deployments in the 6425-7125 MHz band to be realized. Even then, it will come at a cost and lack of license exempt options. On the other hand, Wi-Fi devices, supporting the entire 6 GHz band, are ready to be deployed immediately and deliver economic benefits for all Singapore users.

Conclusion

WBA strongly believes that IMDA should allocate the entire 1200 MHz in the 6 GHz band (5925 - 7125 MHz) for license exempt use to ensure that Singapore users will have the highest performing connectivity, and that is balanced with fibre and other broadband connectivity. Ability to support multiple non-overlapping 160 MHz and 320 MHz channels will ensure high data rates in dense multi-dwelling units, enterprises, and public spaces.

Respectfully,
Policy & Regulatory Affairs Work Group
Wireless Broadband Alliance

⁶ PolicyTracker reported from Mobile World Congress (MWC) 2023 that it takes 10 years from harmonization within the ITU to implementation - <https://www.imda.gov.sg/How-We-Can-Help/Wireless-At-SG> (requires subscription)