

June 29, 2021

Planning for WLAN use in the 6 GHz band
Radio Spectrum Management Policy and Planning
Ministry of Business, Innovation and Employment
PO Box 2847 WELLINGTON 6140
NEW ZEALAND
Radio.Spectrum@mbie.govt.nz

Re: DSA Comments to the Public Consultation on “WLAN use in the 6 GHz band”.

Dear Sir/Madam,

The Dynamic Spectrum Alliance (DSA¹) respectfully submits its comments in response to the Public Consultation on “WLAN use in the 6 GHz band”.²

DSA supports RSM’s proposal to make the 6 GHz band available for license-exempt WLAN use and respectfully suggests that RSM consider: (1) dedicating the entire 1200 MHz (5925-7125 MHz) of the 6 GHz band for license-exempt use, taking advantage of the full potential of this band; and (2) authorizing the three categories of license-exempt devices: (i) Very Low Power (VLP) devices, (ii) Low Power Indoor (LPI) devices, and (iii) Standard Power (SP) devices that can operate both outdoors and indoors. The arguments in support of these recommendations will be explained below in our answers to the questions raised in the consultation.

DSA appreciates the opportunity to participate in the consultation and to present our views and comments on the reference document. We are available to discuss these comments and provide any additional information.

Respectfully submitted,



Martha SUAREZ
President
Dynamic Spectrum Alliance

¹ The DSA is a global, cross-industry, not for profit organization advocating for laws, regulations, and economic best practices that will lead to more efficient utilization of spectrum, fostering innovation and affordable connectivity for all. Our membership spans multinationals, small-and medium-sized enterprises, as well as academic, research and other organizations from around the world all working to create innovative solutions that will benefit consumers and businesses alike by making spectrum abundant through dynamic spectrum sharing. A full list of DSA members is available on the DSA’s website at www.dynamicspectrumalliance.org/members

² Available online at <https://www.rsm.govt.nz/projects-and-auctions/consultations/planning-for-wlan-use-in-the-6-ghz-band/>

DSA COMMENTS

1. Do you agree with RSM’s proposal on making the 5925 - 6425 MHz available for WLAN use?

DSA believes that making the 6 GHz band available on a license-exempt basis via General User Radio Licence for Short Range Devices (GURL-SRD) is an important opportunity for New Zealand to support broadband connectivity in the country.

The RSM should proceed in making the entire 5925-7125 MHz frequency range available for WLAN, and other (unlicensed or license-exempt) uses now on a technology neutral basis. Making just 500 MHz available under a GURL is insufficient to meet the identified demand for WLANs even in the mid-term. As New Zealand is in ITU Region 3, there is no good reason to defer such action. New Zealand residents and business would miss out on the benefit of having 1200 MHz for WLAN.

2. What are your views on the potential future use of 6425 - 7125 MHz for new applications (e.g. Wi-Fi or IMT)?

RSM should consider inclusion of the upper 6 GHz band (6425-7125 MHz) in the GURL-SRD license concurrent with its consideration of the lower 6 GHz band (5925-7125 MHz). There are several reasons for why RSM should pursue this approach.

(1) The entire 1200 MHz of spectrum in the 6 GHz band is required to meet the projected demand for mid-band WLANs and other uses. It would also support future Wi-Fi 7 devices feature 320 MHz wide channels. Only one 320 MHz channel is possible if only the lower 500 MHz is made available for a WLAN use. Alternatively, three non-overlapping 320 MHz channels will be supported if the entire 1200 MHz of the 6 GHz band is made available for WLAN. DSA believes that the highest and best use for this band is for Wireless Access Systems including Radio Local Area Networks (WAS/RLAN). WLAN/RLAN are expected to carry offload from cellular 5G technologies (total data offload to unlicensed going from 74%

to 79% in 2022).³ This will lower the costs of network deployment for mobile operators and for edge investment by neutral host and third-party providers. Importantly, it will also lower costs for consumers.

By every measure, the demand for spectrum for RLAN use continues to grow unabated, driven largely by mobile video. RLANs have many unique uses in residential and enterprise settings but also support licensed use. In fact, “Wi-Fi” offloading has increased with each generation of mobile wireless service. According to the Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2017–2022 White Paper, Wi-Fi offloading has increased from 30 percent of the traffic for 2G phones to 40 percent of the traffic on 3G phones, 59 percent of the traffic on 4G phones, and is expected to transport 71 percent of the traffic on 5G phones. Even an additional 500 MHz in the 6 GHz will not fully address this demand.

As broadband speeds to a residence continue to increase, a bottleneck is starting to appear in the link from the home’s Wi-Fi access point to the user’s Wi-Fi enabled device, especially in households where there are multiple Wi-Fi enabled devices in operation at the same time. This has become more evident globally during the time of the COVID pandemic. As parents work from home and children learn remotely, there are often multiple video conference applications open on multiple devices concurrently. This can amount to a considerable amount of RLAN bandwidth. If RSM makes available the entire 5925-7125 GHz band for WLAN, it would allow it to get out in front of this issue and ensure that the link from the homes access point to the Wi-Fi enabled device does not become the bottleneck in New Zealand’s residences.

The effect of enabling additional spectrum for Wi-Fi will also be relevant for launching IoT services. GURL-SRD license in the entire band brings the opportunity for more effective spectrum use allowing support for new applications and laying the foundations for innovation.⁴

(2) Meeting the increased demand for Internet access in light of the COVID-19 situation. The importance of WAS/RLAN use and substantial amount of Wi-Fi carried traffic has been exemplified during the

³ See Cisco Systems, Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2017-2022. ([link](#))

⁴ See “The crucial decision of enabling better and affordable connectivity through Wi-Fi and spectrum sharing”, December 2020 ([link](#))

COVID-19 lockdowns worldwide. The flexibility of Wi-Fi and the benefits it brings to digital economies have proven to be essential during the COVID-19 pandemic.⁵

(3) More efficient use of the spectrum. WAS/RLAN can operate in the band while ensuring that existing incumbent services can continue to thrive in the band. The 6 GHz band is allocated to a range of services, including fixed satellite services, fixed services and mobile service with some applications, such as electronic news gathering. Permitting WLANs and other devices under a GURL-SRD license in the entire 6 GHz band will not only open the door to innovation by offering extra capacity but can be introduced while protecting and still allowing the incumbent services to grow. Introduction of license-exempt devices will not necessitate a spectrum clearance process which would likely be complex and expensive. The GURL-SRD devices will be able to share the band with the incumbents and this will significantly increase spectrum efficiency. In the U.S. there was a request of making portions of the 6 GHz band available for new licensed services.⁶ The FCC declined that request of repurposing significant portions of the 6 GHz band for exclusive, flexible use licenses and relocating affected incumbent services to other frequency bands, because such an approach would undermine their goal of creating significant new opportunities for license-exempt operations across the 6 GHz band, and would run contrary to their approach in ensuring that existing incumbent services can continue to thrive in the 6 GHz band.

This comments in the FCC docket show the traditional IMT entry in a band approach, which usually leads to the clearing of the band, wherever possible, and relocation of the incumbents. Sharing occurs where and when there is no alternative. As IMT identification would always come with primary mobile

⁵ See “Covid-19 and the economic value of Wi-Fi. Katz”, Jung and Callorda, December 2020.

⁶ See FCC R&O, 203-205: “204. CTIA requests that the “upper portion” of the 6 GHz band be repurposed for new licensed services, while Ericsson specifically requests that both the proposed U-NII-7 band (6.525 6.875 GHz) and U-NII-8 band (6.875-7.125 GHz) be repurposed”... “they suggest that other bands may be available as a new home for incumbent operations that would need to be relocated.” ... “Representatives of incumbent services that would be affected, including the Fixed Wireless Communications Coalition, the Critical Infrastructure Coalition, NPSTC, Intelsat and SES Americom, and Sirius XM, also strongly oppose repurposing that would affect their operations.”

“205. We decline the requests that we repurpose substantial portions of the 6 GHz band for new licensed services in place of new unlicensed operations and existing incumbents.”, available online at <https://www.fcc.gov/document/fcc-opens-6-ghz-band-wi-fi-and-other-unlicensed-uses-0>

allocation, the future growth of the other remaining primary services in the band will be constrained at a minimum.

(4) As RLANs can work with any backhaul – mobile network, cable, fibre, fixed wireless access, satellite, having all 1200 MHz available will support competition across platforms and providers. There have been important public programs and initiatives to increase Wi-Fi hotspots like it is the case of the WiFi4EU⁷ in Europe, the WiFi4EU initiative aims to provide high-quality Internet access to citizens and visitors across the EU via free of charge Wi-Fi hotspots in public spaces such as parks, squares, administrations, libraries, and health centres. It has revealed a strong and local demand for the expansion of Wi-Fi services in order to foster the local e-commerce economy, support tourism, and increase the availability of local public services to citizens. This type of initiatives occurs not only in Europe or in urban areas. If we refer to remote areas, connectivity and cost-efficiency is best achieved by benefiting from scale inherent in globally adopted Wi-Fi standards, which mean lower cost of coverage for low-population density areas and lower cost of terminals.

The ITU-D Study Group on Broadband development and connectivity solutions for rural and remote areas, in its annual deliverable 2019-2020 has recognized that “Wi-Fi hot spots and local area networks, which can be installed at rural points of community activities, including shopping centers and university campuses, can serve a variety of users. These are also suitable for homes, where all family members can access Wi-Fi connectivity. Wi-Fi technologies are very effective if the backbone landing is not far from the locality and can be used to create a mesh network.”⁸ According to the report, in India,⁹ several rural areas have been connected using Wi-Fi, as a last-mile connectivity solution. In Zimbabwe,¹⁰ the

⁷ See <https://ec.europa.eu/digital-single-market/en/wifi4eu-free-wi-fi-europeans>

⁸ Annual deliverable: "Broadband development and connectivity solutions for rural and remote areas". Question 5/1 Telecommunications/ICTs for rural and remote areas. ITU-D ([link](#)).

⁹ Presentation by Mohit Bansal at the workshop on broadband development in rural areas hosted by the Question 5/1 Rapporteur Group, 25 September 2019 ([link](#)).

¹⁰ Presentation by Batsirayi Mukumba at the workshop on broadband development in rural areas hosted by the Question 5/1 Rapporteur Group, 25 September 2019 ([link](#)).

community information centers constructed by the universal services fund of the country use Wi-Fi technology.

(5) Allowing Wireless Internet Service Providers (WISPs) to deploy gigabit class networks. If all 1200 MHz is made available under a GURL-SRD license, WISPs can either provide additional bandwidth to each of its customers served by a single base station or cover mover residential customers with each base station.

(6) WRC-23 is considering an IMT identification for 6425-7025 MHz in ITU Region 1 only and 7025-7125 MHz globally. New Zealand is in ITU Region 3. First, there is no way of knowing in advance whether WRC-23 will identify the 6425-7025 MHz band for IMT in Region 1 or 7025-7125 MHz globally. Previous studies conducted between IMT and the Fixed Satellite Service in the 6 GHz did not support coexistence. Whether Advanced Antenna Systems turns out to be the elixir that allows previous views to be significantly changed, is to be determined. Additionally, not all sub-regions and Administrations within ITU Region 1 were supportive of studying the 6425-7025 MHz band for potential IMT identification heading into WRC-19. The DSA expects some of these Administration to pursue making the entire 1200 MHz available for RLAN, 5G NR-U, and other license exempt uses, prior to WRC-23.

On the other hand, there is considerable global momentum to make the entire 6 GHz band available for license-exempt use. In the Americas, the United States, Brazil, Canada, Chile, Peru, Costa Rica, Honduras, and Guatemala have already permitted license-exempt use across the entire 6 GHz band. Mexico, and Colombia had consultations that proposed to make the entire 1200 MHz available for license-exempt use. Other Administrations that have permitted license-exempt use across the entire 6 GHz band include the Republic of Korea and Saudi Arabia.

(7) Wi-Fi 6E chipsets and products are already available with more than 30 certified devices operating in the 1200 MHz of the 6 GHz band. Last December, the U.S. Federal Communications Commission (FCC)

certified the first Wi-Fi 6E chipset¹¹ and its first 6 GHz Wi-Fi device.¹² In early January of 2021, the Wi-Fi Alliance began certifying Wi-Fi 6E devices, paving the way for new gadgets that can transmit across the entire 6 GHz band.¹³ Wi-Fi 6E products have been announced at this year's (virtual) Consumer Electronics Show.¹⁴ On January 14th, Samsung announced a new mobile phone that incorporated a Wi-Fi 6E client.¹⁵ In light of this momentum, the research firm IDC has forecast that more than 316 million Wi-Fi 6E devices will enter the market in 2021 and shipments will rise rapidly over the next three years.¹⁶ So clearly the Wi-Fi 6E ecosystem is ready and will continue to grow at an accelerated pace in the coming months.

(8) Economic benefits even if there are no licensing fees. Wi-Fi is a highly cost-effective wireless access technology due to ease of installation and user control over the network. According to Intel, the cost of licensing the necessary intellectual property for cellular 5G alone is 3x that of a Wi-Fi chipset, and the entire 5G cellular modem cost is 50x the cost of a Wi-Fi chipset.¹⁷ Support for a cellular connection can add as much as U.S. \$130 to the retail price of a tablet device.

Given that Wi-Fi service providers do not need to participate in auctions to license the spectrum, the technology is a very cost-effective form of connectivity. Thanks in part to spectrum harmonization, the

¹¹ See FCC, "Grant of equipment authorization QDS-BRCM1095 ([link](#))".

¹² See "Chairman Pai Statement on FCC Authorization of First 6 GHz Wi-Fi Device" (December 7, 2020). [DOC-368593A1.pdf \(fcc.gov\)](https://www.fcc.gov/document/doc-368593a1)

¹³ See "Wi-Fi Alliance® delivers Wi-Fi 6E certification program" (January 7, 2021). [Wi-Fi Alliance® delivers Wi-Fi 6E certification program | Wi-Fi Alliance \(wi-fi.org\)](https://www.wi-fi.org/news-events/newsroom/wi-fi-alliance-delivers-more-value-from-wi-fi-in-6-ghz)

¹⁴ See "Linksys Introduces Fastest and Most Powerful Wi-Fi 6E Mesh System and Enhanced Motion Detection" (January 11, 2021). <https://www.prnewswire.com/news-releases/linksys-introduces-fastest-and-most-powerful-wi-fi-6e-mesh-system-and-enhanced-motion-detection-301205475.html>; See "Nighthawk® Tri-Band WiFi 6E Router (up to 10.8Gbps) with new 6GHz band, NETGEAR Armor™" (January 11, 2021). [AXE11000 WiFi Router \(netgear.com\)](https://www.netgear.com/products/axeh1000); See "TP-Link Unveils New Networking Offerings, Bringing a Blazing-Fast, Ultra-Secure Broadband Experience to Consumers and Businesses" (January 11, 2021). <https://www.tp-link.com/us/press/news/19331/>; .

¹⁵ Samsung Press Release, "Samsung Galaxy S21 Ultra: The Ultimate Smartphone Experience, Designed To Be Epic In Every Way". <https://news.samsung.com/global/samsung-galaxy-s21-ultra-the-ultimate-smartphone-experience-designed-to-be-epic-in-every-way>

¹⁶ See <https://www.wi-fi.org/news-events/newsroom/wi-fi-alliance-delivers-more-value-from-wi-fi-in-6-ghz>

¹⁷ Source: Eric McLaughlin, General Manager Wireless Solutions Group, Intel during the WBA Congress in Frankfurt in September/October 2019.

global Wi-Fi ecosystem benefits from enormous economies of scale, enabling manufacturers to produce very cost-effective products.

The timing when spectrum is made available is critical in spectrum management and determines the success of public policies in the telecommunications sector. DSA carried out a study on the economic value of the license exempt use of spectrum in the 6 GHz band in Brazil¹⁸ and found that accumulated economic value between 2021 and 2030 associated with allowing license exempt access to 1200 MHz in the 6 GHz band amounts to 112.14 billion U.S. dollars in contribution to the GDP, 30.03 billion U.S. dollars in producer surplus (a benefit for Brazilian companies) and 21.19 billion U.S. dollars in consumer surplus (a benefit for Brazilian population). The most interesting aspect is not only this result, which is clearly very specific to the Brazilian case, but the fact that this study shows that not taking actions to open the band in the short term, but for example waiting to do so until 2024, in the case of Brazil, would lead to the loss of this economic contribution and would have an opportunity cost of 16.94 billion dollars.

Furthermore, a recent study commissioned by the Wi-Fi Alliance confirms that New Zealand will benefit from opening the full 6 GHz band to license-exempt use, and that those benefits will arrive expeditiously. New Zealand places high importance on their Wi-Fi infrastructure. Ninety percent of households with broadband access in New Zealand include Wi-Fi access, and the country is transforming their educational system with Wi-Fi. New Zealand ranks seventh in the Asia Pacific region in terms of internet speed, and 27th globally. A major contributor to Wi-Fi value comes from New Zealand's enterprise sector: 71 percent of telecommunications traffic is transported through Wi-Fi networks and IoT applications. Wi-Fi value in New Zealand in 2021 is \$6.7 billion and is expected to grow to \$9.8 billion by 2025.¹⁹

(9) Enabling wireless innovation and new use cases for people and companies (ex. AR/VR).

Harnessing the 6 GHz band will improve indoor connectivity and enable the emergence of a new generation of advanced applications and services based on the Wi-Fi 6 standard. It would support demanding personal area network applications, such as transferring data between a smartphone and an AR

¹⁸ See <http://dynamicspectrumalliance.org/wp-content/uploads/2020/11/1-DSA-Valor-Economico-Usado-Licenciado-6-GHz-Brasil-1.pdf>

¹⁹ See Wi-Fi Alliance, Global Value of Wi-Fi, at <https://www.wi-fi.org/discover-wi-fi/value-of-wi-fi>

or VR headset to the benefit of providers of entertainment (gaming, content), industrial applications, eHealth and other services.

With access to the 6 GHz band, Wi-Fi is also set to play a pivotal role in the further automation of manufacturing plants and other parts of industry. In South Korea, Taiwan, the US and other advanced manufacturing hubs, businesses increasingly regard Wi-Fi as an effective and efficient way to both monitor and remotely control machinery and other assets. To remain competitive, companies in other parts of the world are set to follow suit once the 6 GHz band is available on a license exempt basis.

(10) Immediately realizable benefits. Making the entire 5925-7125 MHz band license-exempt will provide benefits for end users in New Zealand immediately. Wi-Fi 6E deployments could start as soon as the regulations are approved.

(11) The more license-exempt channels at a location spreads the RLAN's (and other devices) energy across more frequencies, which improves incumbent protections.

3. Do you agree that RSM should include 5925 - 6425 MHz in the GURL-SRD for WLAN low power indoor and very low power use?

The DSA supports three categories of WLAN devices. These are low power indoor (LPI) devices, very low power devices (VLP), and standard power devices under control of an automated frequency control ("AFC") systems. For that reason, DSA supports the RSM's inclusion of 5925-7125 MHz in the GURL-SRD for WLAN Low Power Indoor and Very Low Power use. In addition, we respectfully recommend the creation of a third device class for Standard Power devices with AFC.

The DSA encourages the RSM to adopt EIRP limit of 30 dBm for LPI access points, with a 11 dBm / MHz PSD limit. Such value will enable high throughput, low latency applications on the 80- and 160 MHz wide channels without the need to add repeaters of additional equipment, depending on whether the operator is a resident or at a business. Additionally, we suggest that RSM adopt 17 dBm EIRP limit for VLP devices (indoor and outdoor).

5. What are your views on using a licensing approach to support 30 dBm EIRP WLAN devices?

A total power level of 30 dBm EIRP will not cause harmful interference for LPI access point devices.

6. What are your views on supporting 36 dBm EIRP standard power devices using Automatic Frequency Coordination (AFC) system? Do you have any proposals to provide AFC systems to New Zealand?

New Zealand should consider adopting rules permitting standard power operations operating under an automated frequency coordination system (AFC). There are unique high-power indoor and outdoor RLAN operations that can benefit from this category of device. The DSA believes that standard power access points (and client devices) could operate throughout the band under AFC control.

An example of outdoor standard power access point use case is a WISP providing broadband access to residential consumers in less densely populated areas of the country. The WISP provisions the capacity of each access point across several home. If RSM permit outdoor standard power access points, WISP can either provides greater bandwidth capacity to each home served by a local network or can serve more homes on the same network with the current bandwidth capacity.

The AFC falls somewhere in the continuum of automated spectrum management systems. The AFC is considerably simpler than the TV White Space Database and the Spectrum Access System used to manage access to the Citizens Broadband Radio Service in the United States. In 2019, the DSA published *Automated Frequency Coordination: An Established Tool for Modern Spectrum Management* that describes this spectrum management continuum in greater detail.²⁰

There are AFC prototype available in the United States. Transforming the regulation to protect incumbent into software that is operated in the cloud is not technically difficult. The key is that the United States

²⁰ *Automated Frequency Coordination: An Established Tool for Modern Spectrum Management*, Dynamic Spectrum Alliance, March 2019.

regulator, the Federal Communications Commission, has a highly reliable set of data on fixed links operating within the country and as there is no Federal users of the 6 GHz band, all the information is available to the public.
