Re: DSA Comments to the Consultation Paper on Creation of a Class Licence for Regulating the Use of and Trade in 6 GHz Devices for Wireless Local Area Network and Variation to the Class Licence for Provision of Public Wireless Local Area Network Services.

Dear Sir/Madam,

The Dynamic Spectrum Alliance (“DSA”)\(^1\) respectfully submits its comments in response to the Consultation Paper on the “Creation of a Class Licence for Regulating the Use of and Trade in 6 GHz Devices for Wireless Local Area Network and Variation to the Class Licence for Provision of Public Wireless Local Area Network Services” published by the Communications Authority (“CA”), the 26\(^{th}\) of November, 2021.\(^2\)

DSA respectfully suggests CA consider: (1) extending the proposal to the entire 1200 MHz (5925-7125 MHz) of the 6 GHz band, taking advantage of the full potential of this band; and in addition to the indoor and outdoor authorized apparatus, authorize Standard Power (“SP”) devices that can operate both outdoors

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\(^1\) 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

\(^2\) The consultation paper is available at: https://www.coms-auth.hk/filemanager/en/content_711/cp20211126_e.pdf
and indoors with a maximum power of 36 dBm under control of an automated frequency control (“AFC”) systems.

DSA appreciates the opportunity to participate in the consultation and to present our views and comments on the reference document. Additional to these comments, we attach the recently published whitepaper “6 GHz band: Why 1200 MHz and Why Now?”. We are available to discuss these comments and provide any additional information.

Respectfully submitted,

Martha SUAREZ
President
Dynamic Spectrum Alliance
Part A – Creation of the Device Class Licence

24. Taking into account the above considerations given in paragraphs 16 to 23 above, the CA proposes to create a new WLAN Device Class Licence under section 7B(2) of the TO to regulate the use of WLAN devices operating in the designated 6 GHz band. The draft WLAN Device Class Licence is given at Appendix 2.

DSA Comments:

DSA strongly supports the CA’s proposal to create a class licence (hereinafter referred to as the “WLAN Device Class Licence”) pursuant to section 7B(2) of the Telecommunications Ordinance (Cap. 106) (“TO”), regulating the use/possession of and trade in WLAN devices operating in the designated 6 GHz band (“6 GHz Devices”).

Frequency Band

25. As mentioned in paragraph 16 above, the CA proposes to make available the 5925 – 6425 MHz band for WLAN use in Hong Kong. Compared with the 663.5 MHz spectrum now provided in the existing 2.4 GHz and 5 GHz licence-exempted bands for WLAN use, the additional 500 MHz of spectrum in the 5925 – 6425 MHz band represents a significant increase (about 75%) in the supply of spectrum for supporting the development of WLAN applications.

DSA Comments:

DSA believes that the entire 1200 MHz of spectrum in the 6 GHz band is required to provide more capacity for innovative applications and meet the projected demand for mid-band WLANs and other uses such as 5G NR-U. With the full 6 GHz band, the RLAN industry can continue to play its important role in delivering broadband access, facilitating the IoT, and enriching experiences at work, home, and play.
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 the CA 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 Hong Kong’s residences.

The effect of enabling additional spectrum for Wi-Fi will also be relevant for launching IoT services. License exempt access to the entire band brings the opportunity for more effective spectrum use allowing support for new applications and laying the foundations for innovation.3

Additionally, there has been an 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 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.4

Over the past year, DSA working with a company named ASSIA Inc. has collected data from mobile, fixed line, and home connections in North America and Europe. ASSIA is in a unique position to leverage the data that they gather globally from internet-access links, which are processed by their systems and used by their customers: 40 tier-1 ISPs representing approximately 100 million subscriber homes. The data largely emanate from access networks—both broadband to the home and Wi-Fi in the home. Our research shows that Wi-Fi traffic has steadily increased in the last few months and is poised to double every three years, pushing demand beyond the limits of today’s Wi-Fi networks.5 Hence, in the whitepaper

3 See “The crucial decision of enabling better and affordable connectivity through Wi-Fi and spectrum sharing”, December 2020 (link)
5 Full report available online at http://dynamicspectrumalliance.org/wp-content/uploads/2021/06/ASSIA-DSA-Summit-Presentation-v7.8.pdf. The detailed presentation of this study is available by watching or downloading the DSA 2021 Global Summit presentation.
entitled “Lessons from the Assia Report on Wi-Fi and Broadband Data”⁶, it was concluded that the recent FCC 6 GHz Wi-Fi-spectrum allocation was already necessary for North America to keep pace with the expected quality of experience of video entertainment, remote work, telehealth, distance learning, and more. Wi-Fi spectrum use rapidly approaches an inflection point where demand for in-home bandwidth exceeds demand for to-home bandwidth. This fact challenges the ISPs' infrastructure-investment justification on fiber-to-the-home because the culprit behind subscriber-performance problems is the Wi-Fi spectrum-allocation limitations.

Now, on the enterprise applications, Wi-Fi 6E supports an evolving enterprise environment characterized by increased employee mobility within the premises, flexible workspaces, and distributed teams utilizing cloud-based storage and collaboration tools. Wi-Fi 6 technology was designed to handle heavy traffic environments with many different connected devices, providing greater capacity to enable more demanding and mission-critical applications requiring higher throughput and low latency.

DSA members have identified that a large and contiguous allocation of spectrum in the 5925-7125 MHz will support the wireless industry’s need to migrate to multiple wide channels. Just as the cellular industry is migrating to 80 and 100 MHz channels of mid-band spectrum per operator to support 5G services, the next generations of license-exempt technologies (e.g., Wi-Fi 6E, Wi-Fi 7, and 5G NR-U) also utilize wider channel bandwidths. The additional 1.2 GHz of spectrum for Wi-Fi 6E would provide a roughly equivalent number of 80 MHz channels in 6 GHz band spectrum as there are 40 MHz channels in the 5 GHz band. For the first time, 80 MHz channel plans would be possible from a “best practices” perspective in dense deployments. Contiguous spectrum would also support seven 160 MHz wide channels and three non-overlapping 320-MHz wide channels, which are expected with the next generation of Wi-Fi now going through the IEEE standardization process (i.e., IEEE 802.11be). On the other side, 500 MHz in the 5925-6425 MHz would support only three 160 MHz wide channels and only one 320 MHz wide channel.

Wi-Fi 7, which is currently being standardized in IEEE as 802.11be, relies on access to the greenfield spectrum of the entire 6 GHz band to deliver its greatest innovations. Intel has recently demonstrated that

network performance for emerging delay-sensitive residential, enterprise, and industrial applications of Wi-Fi 7, such as AR/VR and industrial IoT, is impacted by the amount of available spectrum\(^7\). In isolated and lightly loaded scenarios with a single 320 MHz channel, the end-to-end delay of AR/VR packets can stay below the level of 10ms for 99.9% of the time. However, in environments characterized with moderate to high traffic load, e.g., enterprises, homes, hotspots, it is demonstrated that a single 320 MHz channel would not be able to maintain the end-to-end delay and reliability requirement of AR/VR applications. Only the availability of three non-overlapping 320 MHz channels would be able to cope with the increase in demand and keep the performance at acceptable levels even for highly loaded scenarios.

Other Wi-Fi 7 innovations are also important. This new generation of technology will operate at 4096 QAM and permit “multi-link operation” that can use the 2.4 GHz, 5 GHz, and 6 GHz spectrum bands simultaneously. Once standards are complete, these improvements will enable lower latency, higher throughput, and more deterministic networking capability (e.g., higher reliability or QoS) relative to Wi-Fi 6E. These features provide a step function increase in terms of enabling Wi-Fi to address immersive services with demanding QoS requirements for a larger number and diversity of applications, devices, and use cases, in particular those of industrial IoT. In addition, these improvements scale throughput capability to future upgrades in access network capacity (e.g., 10G Fiber, DOCSIS 4.0, Fixed Wireless) allowing the RLAN wireless network to evolve with the broadband access connections. However, if there is insufficient spectrum available to make Wi-Fi 7 capabilities compelling to someone purchasing a new AP, Wi-Fi 7 may not see widespread use.

**Frequency Band**

25. ... As for the 6425 – 7125 MHz band, the CA will consider the use of this band, or parts thereof, for 5G services in Hong Kong subject to the outcome of WRC-23 and other considerations including co-existence with the incumbent services and frequency coordination with the neighbouring regions.

DSA Comments:

DSA believes that the highest and best use for the 6425-7125 MHz 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). 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 5925-6425 MHz will not fully address this demand.

Now, regarding WRC-23 preparation, as indicated by CA in the consultation paper, WRC-23 is considering an IMT identification for 6425-7025 MHz in ITU Region 1 only and 7025-7125 MHz globally. This study question of agenda item 1.2 is probably most noteworthy as another marker of the regulatory direction of the band, because Regions 2 and 3 specifically explicitly declined to join in on the Region 1 coexistence study at the WRC-19.

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, and even some of them are making studies

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or have decided to make the entire 1200 MHz available for RLAN, 5G NR-U, and other license exempt uses, prior to WRC-23.

It is unnecessary for CA to wait for the outcome of WRC-23 – especially because Hong Kong is in ITU Region 3 where 6425-7025 MHz is not even being considered. With a high opportunity cost for failing to open the band to market-ready, license-exempt RLAN technologies, no obvious corresponding benefit to the public for reserving part of the band for yet-to-be-defined future IMT use, and serious and unresolved questions about the ability for IMT to coexist with 6 GHz incumbents (or, alternatively forcing the band to be cleared of incumbents) – opening the full 6 GHz band to license-exempt technologies immediately is the right policy decision.

Finally, as indicated by the CA, at the 6 GHz band there is no New Radio specification for standard FDD or TDD 3GPP technology. Under a class assignment, enabling license exempt access in Hong Kong, in addition to Wi-Fi 6E, operators can deploy 3GPP license-exempt technology – 5G NR-U – to extend their networks into unlicensed spectrum. Operators can use a 3GPP platform to take advantage of the 6 GHz band under a class assignment while delivering 5G services to their subscribers. NR-U was standardized in 3GPP Release 16 for 5925-7125 MHz and is available today. Technology-neutral rules would allow both technologies in the band.

*Power Limits*

*Having regard to the technical standards and specifications being adopted or developed for Wi-Fi 6E devices on an international or regional level, the CA proposes to set out the power limits for WLAN use which are maximum equivalent isotropically radiated power of 24 dBm (250 mW) for indoor use; and 14 dBm (25 mW) for outdoor use. Such power limits are compatible with that of developed economies like Australia, the EU, New Zealand, and the UK, among others, which also open the designated 6 GHz band or parts thereof for WLAN use. With such arrangement, end-users in Hong Kong could benefit from more potential choices of 6 GHz Devices.*
DSA Comments:

As recognized by the CA, 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. In Europe, ECC Decision 20(01): on the harmonised use of the frequency band 5945-6425 MHz for Wireless Access Systems including Radio Local was adopted and the Commission Implementing Decision - C(2021)4240 was published in June this year. Furthermore, recently the ECC adopted a new work item to study possible technical conditions under which Wireless Access Systems including Radio Local Area Networks (WAS/RLAN) could operate and coexist with existing services in the 6425-7125 MHz band, recognizing that the work in preparation for WRC-23 agenda item 1.2 will run independently from the work conducted under this work item. Saudi Arabia in region 1 has permitted license-exempt use across the entire 6 GHz band in the Kingdom and other administrations in the Middle East have had consultations on the future of the entire band or parts thereof for WLAN use. Finally, in Region 3, the Republic of Korea enabled license-exempt usage of the band, and other administrations like Australia, New Zealand and Malaysia have had consultations and are considering the entire band or parts thereof for WLAN use.

The DSA recommends CA to set out the power limits for WLAN use which are maximum equivalent isotropically radiated power of 30 dBm (1 W) for indoor use; and 17 dBm (50 mW) for outdoor use. Such power limits are compatible with the findings of the comprehensive studies of coexistence between Wi-Fi and incumbent users of the 5925-7125 MHz band conducted in the United States and Europe, with

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specific consideration given to the conditions specified by Ofcom in the UK\textsuperscript{11} and the FCC in the United States.\textsuperscript{12} These values enable improved performance for RLAN operation and protect incumbent services in the band.

Finally, DSA respectfully suggests CA consider in addition to the indoor and outdoor authorized apparatus, authorize Standard Power (‘‘SP’’) devices that can operate both outdoors and indoors with a maximum power of 36 dBm under control of an automated frequency control (‘‘AFC’’) system.

There are unique high-power indoor and outdoor RLAN operations that can benefit from this category of device. Since its founding in 2013, the DSA has been at the forefront of advancing automated dynamic shared spectrum technology and regulatory frameworks - from Television White Spaces to the Citizens Broadband Radio Service to the 6 GHz AFC – DSA has worked with regulators and industry around the world to drive adoption of proven shared spectrum techniques. In 2019, the DSA published \textit{Automated Frequency Coordination: An Established Tool for Modern Spectrum Management} that describes this spectrum management continuum in greater detail.\textsuperscript{13} The DSA would like to highlight that fourteen different Automated Frequency Coordination system initial proposals were submitted last month to the Federal Communications Commission in the United States, including several by members of the DSA. This strong showing of interest demonstrates industry’s commitment to making the 6 GHz band available for new innovative applications while protecting incumbents. DSA members are well positioned to provide additional information or have further discussions with the CA about AFC adoption in Hong Kong.

\textit{Area Networks (WAS/RLAN)}, Annex 1, A1.2, Nov. 20, 2020, \url{https://docdb.cept.org/document/16737} (listing technical conditions for LPI and VLP in Europe) (\textit{ECC Decision 20(01)}).

\textsuperscript{11} Ofcom, \textit{Statement: Improving spectrum access for Wi-Fi}, Statement, 4.51, (July 24, 2020), \url{https://www.ofcom.org.uk/consultations-and-statements/category-2/improving-spectrum-access-for-wi-fi} (confirming that radiated power limits of 25 mW for VLP are “sufficient to manage the risk of interference”).


\textsuperscript{13} \textit{Automated Frequency Coordination: An Established Tool for Modern Spectrum Management}, Dynamic Spectrum Alliance, March 2019 (\url{link}).
Certification Requirement

28. In view of the considerations given in paragraphs 18 to 21 above, the CA proposes to impose the compulsory certification requirement on APs covered by the WLAN Device Class Licence with a view to ensuring that such devices to be used in Hong Kong should comply with the relevant specification (i.e. HKCA 1081), in particular that they do not operate in the 6425 – 7125 MHz band which may be used for 5G services in Hong Kong in the future. It is the responsibility of manufacturers, suppliers or dealers to seek for certification of their concerned APs before they are launched in the Hong Kong market.

29. It should be emphasised that the compulsory certification requirement does not apply to client devices, thus reducing the burden of the industry. As most smartphones, tablets and etc. may be in-built with 6 GHz Device for WLAN use, certification of such client devices remains voluntary following the same current practice for the 2.4/5 GHz Devices and it is incumbent on manufacturers, suppliers or dealers to ensure that their client devices of 6 GHz Devices comply with HKCA 1081.

DSA Comments:

DSA insists on the opinion that the CA should make available the 5925 – 7125 MHz band for WLAN and other uses such 5G NR-U under this Device Class Licence in Hong Kong. With such approach, end-users could benefit from more potential choices of 6 GHz Devices that operate in the entire band and from the global ecosystem of existing equipment that is already available on the market. Indeed, 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. More than one year ago, the U.S. Federal Communications Commission (FCC) certified the first Wi-Fi 6E chipset\(^{14}\) and its first 6 GHz Wi-Fi device.\(^{15}\) 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.\textsuperscript{16} Wi-Fi 6E products have being announced at this year’s (virtual) Consumer Electronics Show.\textsuperscript{17} On January 14\textsuperscript{th}, Samsung announced a new mobile phone that incorporated a Wi-Fi 6E client.\textsuperscript{18} According to the Wi-Fi Alliance there are more than 60 Wi-Fi 6E certified devices, so clearly the Wi-Fi 6E ecosystem is ready and will continue to grow at an accelerated pace in the coming months.\textsuperscript{19} The DSA believes that this proposed certification requirement on Access Points is unnecessary, and that a voluntary certification scheme would suffice. Furthermore, we agree with the CA that the certification requirement should not apply to client devices.

\textit{Labelling Requirement}

\textbf{30.} \textit{In order to enable consumers to have an easy means of differentiating compliant APs from non-compliant APs, the CA proposes to impose the compulsory labelling requirement on the sale, including demonstration in the course of sale, of APs.} That is, traders must ensure that their APs on sale have been certified and affixed with the CA Label. As in the past, OFCA would undertake enforcement actions against the sale of non-compliant APs, among others.

\textbf{31.} \textit{Upon the creation of the WLAN Device Class Licence, OFCA would conduct education campaigns to provide information to the general public for better understanding of the WLAN Device Class Licence, and to procure and use only those compliant APs of 6 GHz Devices affixed with the CA Label.}

\textsuperscript{16} See “Wi-Fi Alliance® delivers Wi-Fi 6E certification program” (January 7, 2021). \url{Wi-Fi Alliance® delivers Wi-Fi 6E certification program | Wi-Fi Alliance (wi-fi.org)}


\textsuperscript{19} \url{https://www.wi-fi.org/product-finder-results?sort_by=certified&sort_order=desc&certifications=1335}
**DSA Comments:**

DSA agrees with the note that indicates that the compulsory labelling requirement does not apply to the use of 6 GHz Devices (APs or client devices) by the end-users for which labelling (after certification) remains voluntary, i.e. the same as the current practice for 2.4/5 GHz Devices. Furthermore, DSA believes that a labelling requirement for 6 GHz access point equipment as proposed by the CA should not be mandatory, but voluntary. Market-specific requirements for labelling add logistic complexity and do not necessarily address challenges of non-compliant products.

**The WLAN Device Class Licence**

33. According to the proposed WLAN Device Class Licence given at Appendix 2, a person is authorised to establish, maintain, possess, use, deal in the course of trade or business in or demonstrate, with a view to sale in the course of trade or business, 6 GHz Devices, without the need to apply for an individual licence. The major licence conditions and technical requirements set out in the proposed WLAN Device Class Licence are summarised below...

**DSA Comments:**

For the reasons exposed previously, DSA believes that items d) and e) should be removed.

**Part B – Variation to the Existing PWLAN Service Class Licence**

**The Varied PWLAN Service Class Licence**

34. Along with the creation of the proposed new WLAN Device Class Licence, the CA also proposes to vary the existing PWLAN Service Class Licence to add the designated 6 GHz band as a consequential change to authorise the provision of public WLAN services using the designated 6 GHz band.
DSA Comments:

DSA strongly supports the CA’s proposal, pursuant to sections 7C(1) and 7C(2) of the TO, to vary the existing Class Licence for Provision of Public Wireless Local Area Network Services to allow the provision of public WLAN services in the designated 6 GHz band as well. Furthermore, DSA believes that this proposal should be extended to the entire 6 GHz band (5925 – 7125 MHz) and that it is unnecessary to request certification, i.e. type approval, of the radiocommunications apparatus in the band for provision of public WLAN services;

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