Dynamic Spectrum Alliance Limited
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The Malaysian Communications and Multimedia Commission (MCMC)
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Re: REVIEW OF SPECTRUM LANDSCAPE – GUIDING QUESTIONS FOR FIXED SERVICE (FWA, Backhaul, RLAN and HAPS)

Dear Sir/Madam

The Dynamic Spectrum Alliance[1] (DSA) welcomes the opportunity to provide comments to the Malaysian Communications and Multimedia Commission (MCMC) in response to its Review of the Spectrum Landscape and the associated guiding questions on Fixed Services, including Fixed Wireless Access (FWA), backhaul, Radio Local Area Networks (RLAN), and High-Altitude Platform Systems (HAPS).

As a global organisation dedicated to advancing dynamic spectrum access and efficient licence-exempt spectrum policy, the DSA strongly supports Malaysia's efforts to modernise its spectrum framework in line with international best practice. MCMC's forward-looking approach to spectrum planning is pivotal in enabling Malaysia's digital economy, expanding broadband access, fostering innovation, and advancing national priorities under initiatives such as MyDIGITAL, JENDELA, and Industry4WRD.

Access to sufficient licence-exempt spectrum—particularly in the 6 GHz band—is increasingly vital to support high-capacity Wi-Fi connectivity across residential, enterprise, industrial, and public-sector environments. RLAN technologies underpin Malaysia's fibre broadband investments, facilitate mobile traffic offload, and provide the connectivity foundation for emerging applications including smart manufacturing, digital healthcare, education, smart cities, and immersive technologies. Establishing an enabling regulatory framework for RLAN, while safeguarding incumbent services through appropriate mitigation measures, will be essential to sustaining Malaysia's competitiveness and digital transformation.

Through the responses below, the DSA offers evidence-based perspectives on the role of RLAN and the importance of the 6 GHz band in meeting growing connectivity demand. Drawing on international experience, technical studies, and real-world deployments, the DSA highlights how modern spectrum-sharing

[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: https://www.dynamicspectrumalliance.org/members.

frameworks—such as low-power indoor use, very-low-power devices, and Automated Frequency Coordination (AFC)—can safely enable innovation while protecting incumbent operations.

The DSA commends MCMC's commitment to transparent, consultative, and evidence-driven spectrum policy development, and looks forward to continued engagement in support of Malaysia's connectivity, industrial, and digital economy objectives.

Sincerely,

Dr. Martha Suárez
President
Dynamic Spectrum Alliance

21. How is RLAN (e.g. Wi-Fi) currently utilised within your network and service offerings?

RLAN technologies, particularly Wi-Fi, are a foundational component of modern connectivity ecosystems, enabling fixed and nomadic broadband access across residential, enterprise, industrial, and public environments. Wi-Fi serves as the primary last-meter access technology for fixed broadband users and is widely deployed in enterprise and campus networks to support high device densities, mission-critical applications, unified communications, and broader digital transformation initiatives. Public Wi-Fi deployments further extend broadband availability in transport hubs, public venues, and community access points, supporting inclusion, resilience, and service continuity.

In parallel, RLAN has become increasingly critical to smart infrastructure and IoT deployments, providing scalable and cost-effective connectivity for applications across healthcare, education, manufacturing, logistics, and smart city services. These deployments support use cases such as real-time monitoring, automation, location-based services, and data-driven operational optimisation, positioning RLAN as a key enabler of advanced digital services and productivity growth across the wider economy.

22. What are the primary use cases currently supported by RLAN (e.g. indoor broadband, enterprise networks, public Wi-Fi, industrial applications, offloading of mobile traffic)?

RLAN technologies, most notably Wi-Fi, support a wide range of use cases across residential, enterprise, industrial, and public environments. In residential settings, RLAN provides reliable indoor broadband connectivity and functions as the primary last-meter access technology for fixed broadband services. In enterprise and campus networks, it enables high-capacity, low-latency connectivity to support unified communications, collaborative applications, and high-density device deployments.

Public Wi-Fi and hotspot services extend broadband access in transport hubs, public venues, and community spaces, improving accessibility and user experience. At the same time, mobile network operators rely extensively on Wi-Fi offloading to manage traffic growth, alleviate congestion on licensed spectrum, and enhance overall network efficiency.

Beyond traditional broadband use cases, RLAN is increasingly central to industrial automation, smart buildings, and IoT deployments, providing scalable and cost-effective connectivity for real-time monitoring, control systems, and data-driven optimisation. In high-density environments such as stadiums, airports, and convention centres, RLAN enables seamless connectivity for large numbers of concurrent users. Collectively, these use cases underscore RLAN's role as a core component of modern connectivity ecosystems, complementing mobile networks and enabling advanced digital services across the wider economy.

23. To what extent is RLAN relied upon to complement or offload traffic from mobile networks?

The fiber broadband revolution in the Asia-Pacific region is accelerating, supported by nationwide backbone projects and significant investments from leading internet service providers in expanding fiber-optic infrastructure. By the end of 2024, fiber had become the dominant fixed broadband technology across most Asia-Pacific markets, connecting approximately 577.4 million households and accounting for 87.4% of the fixed broadband subscriber base.[2] This rapid expansion has delivered substantial improvements in internet speed, reliability, and digital innovation.

[2] https://www.spglobal.com/market-intelligence/en/news-insights/research/2025/08/apac-fiber-homes-passed-increases-user-adoption-still-lags-behind

Within this ecosystem, RLAN technologies—particularly Wi-Fi—play a critical role in complementing mobile networks. Wi-Fi offloading enables mobile operators to reduce congestion on licensed spectrum, improve overall network efficiency, and deliver a better user experience by providing high-capacity local connectivity. In practice, RLAN serves as the primary access layer for fixed broadband households and is extensively used in enterprise, campus, and public environments to absorb traffic that would otherwise burden mobile networks. This reliance on Wi-Fi offloading ensures that mobile networks can focus on wide-area coverage and mobility, while RLAN delivers cost-effective, high-bandwidth connectivity at the edge.

24. What use cases are expected to be prioritised for 6 GHz RLAN (e.g. high-capacity indoor broadband, enterprise and campus networks, industrial applications, immersive media)?

RLAN access to the full 6 GHz band enables cutting-edge applications in enterprise, industrial, and smart-city environments:

- **Smart Glasses & AR/VR for Training:** Meta (in partnership with Ray-Ban) has integrated upper 6 GHz Wi-Fi connectivity for its next-gen smart glasses, enabling advanced AI interactions such as live translation, real-time speech translation, contextual visual assistance, and remote collaboration. A Wi-Fi Alliance-led trial at Thailand's Ramathibodi Hospital deployed AR/VR devices over the full 6 GHz band to support remote medical training and live HD video transmission. The hospital's pilot showed the need for 7×160 MHz channels (only available across the full 6 GHz band) to maintain optimal AR/VR user experience under load.[3] With public hospitals and hundreds of private healthcare facilities across Malaysia, access to the full 6 GHz band will be critical to enabling innovative digital health solutions. Wider spectrum availability will support advanced patient care systems, immersive medical training, and real-time emergency response services, ensuring that Malaysia's healthcare sector can fully leverage next-generation connectivity to improve outcomes and expand access nationwide.
- **Public Wi-Fi in Smart Cities:** At Extreme Connect 2024,[4] Pharr, TX became one of the first U.S. cities to activate outdoor Wi-Fi 6E using the full 6 GHz band using Extreme Networks' AP5050 access points. This network provides high-capacity public Wi-Fi, citywide video surveillance, and supports future AR navigation apps in parks and other public spaces. Doubled bandwidth capacity and reduced interference support smart city applications such as license plate recognition systems. For Smart Cities like Tokyo, Barcelona and others, a seamless transition between networks enables reliable, continuous connectivity for citizens and devices alike, supporting applications like real-time traffic monitoring, public safety systems, and IoT-based services. Municipalities and public Wi-Fi providers are expected to prioritize Open Roaming to enhance user experience, simplify network management, and foster more data-rich urban environments.[5] Malaysia will need access to the full 6 GHz band to deliver improved digital services to its citizens and support national objectives such as the MyDIGITAL blueprint, smart city development, and broader economic transformation goals.
- **Sports and entertainment:** Notre Dame Stadium, with over 1,100 access points for its 80,000 seats, the University of Tennessee's Neyland Stadium, which also uses HPE Networking to enable over 102,000 fans, and many more arenas around the world take advantage of increased capacity, wider

[3] https://www.wi-fi.org/news-events/newsroom/wi-fi-alliance-and-faculty-medicine-ramathibodi-hospital-drive-6-ghz-wi-fi
[4] https://statetechmagazine.com/article/2024/04/extreme-connect-2024-agencies-can-use-wi-fi-6e-connectivity-outdoors
[5] https://wballiance.com/wi-fi-predictions-for-2025

channels, and significantly reduced signal interference of 6 GHz when live streaming and uploading recorded content at games.[6] With hundreds of sports venues across Malaysia—including stadiums, arenas, and community facilities—access to the full 6 GHz band will be essential to modernize how fans experience events and transform how venues operate. Wider spectrum availability will enable high-capacity Wi-Fi to support immersive fan engagement, seamless digital ticketing, real-time streaming, and smart venue management, ensuring Malaysia's sports infrastructure can meet the demands of next-generation connectivity.

- **Education:** The University of Michigan deployed the world's largest Wi-Fi 6E education deployment with more than 16,000 Wi-Fi 6E APs across two campuses to provide the ability to move an enormous amount of data, enabling 500 students in a classroom to connect via Zoom, share screens, record videos, and support projects simultaneously.[7] With higher education institutions across Malaysia, access to high-speed connectivity through robust Wi-Fi campus networks will be essential to meet the growing demand from students, faculty, and researchers. Expanding access to the full 6 GHz band will enable universities and colleges to deliver seamless digital learning, support advanced research collaboration, and enhance campus services, ensuring Malaysia's higher education sector remains competitive in the digital era.
- **Robotics & Factory Automation:** AT&T, CommScope (RUCKUS Networks), and Intel, together with the Wireless Broadband Alliance (WBA), have conducted real-world Wi-Fi 7 trials in enterprise environments to compare its performance with Wi-Fi 6E. The results highlight Wi-Fi 7's ability to power mission-critical applications, including XR, AI, cloud computing, and industrial IoT. Results show that, using the full 6 GHz band, Wi-Fi 7 delivers sustained 1 Gbps+ speeds at 40 ft, ultra-low latency and improved efficiency for AR/VR, video conferencing and automation, and greater network reliability for industrial IoT.[8] With manufacturing establishments across Malaysia, access to the 6 GHz band for RLAN will be critical in accelerating industrial automation and digital transformation. High-capacity, low-latency Wi-Fi connectivity enables greater flexibility, scalability, and operational efficiency on the factory floor, supporting advanced use cases such as real-time monitoring, robotics, predictive maintenance, and smart manufacturing systems. Ensuring sufficient and reliable access to 6 GHz spectrum will allow Malaysia's manufacturing sector to adopt Industry 4.0 technologies at scale, improve productivity and resilience, and remain competitive in global value chains. Expanded WAS/RLAN access in the 6 GHz band therefore represents a key enabler of Malaysia's broader industrial and digital economy objectives.

25. What emerging applications or technologies (e.g. Wi-Fi 6/6E/7, private networks, industrial automation, XR) are likely to drive future RLAN spectrum requirements?

A range of emerging applications and technologies are expected to drive increased RLAN spectrum requirements over the coming years. These include the deployment of Wi-Fi 6E, Wi-Fi 7, and future Wi-Fi generations such as Wi-Fi 8,[9] which are designed to deliver significantly higher throughput, lower latency, and more deterministic performance through features such as wider channel bandwidths, multi-link operation, and advanced modulation techniques. Recent market analysis indicates that enterprise adoption of Wi-Fi 7 is

[6] https://www.wi-fi.com/podcast/deploying-wi-fi-6e
[7] https://michigan.it.umich.edu/news/2022/06/28/u-m-first-in-nation-to-offer-wifi-6e-universitywide-accomplishment-is-an-investment-in-the-future
[8] https://wballiance.com/resource/wi-fi-7-trials-for-enterprise-scenarios-tt-commscope-and-intel
[9] https://www.broadcom.com/blog/wi-fi-8-the-foundation-for-the-secure-intelligent-enterprise-ai-edge

accelerating more rapidly than previous Wi-Fi generations, driven in part by declining equipment costs[10] and growing performance requirements such as high-capacity and low-latency connectivity. This trend is expected to further increase demand for wider contiguous channels in the 6 GHz band, particularly within enterprise and high-density environments.

Industrial automation and Industry 4.0 use cases, including robotics, process control, and machine-to-machine communications, are accelerating demand for reliable, low-latency wireless connectivity within factories, logistics hubs, and critical infrastructure. Similarly, the growth of private and enterprise wireless networks is increasing demand for dedicated, high-performance RLAN capacity to support business-critical applications.

Emerging XR and immersive media services, AI-driven applications, and real-time cloud-based computing place substantial demands on bandwidth, latency, and reliability, particularly in enterprise, education, and collaborative environments. In parallel, the expansion of high-density IoT ecosystems and smart city infrastructure requires scalable spectrum resources to support large numbers of connected devices and real-time data exchange.

Collectively, these developments are driving sustained growth in RLAN capacity requirements and reinforcing the need for access to sufficient contiguous spectrum, particularly in the 6 GHz band, to support next-generation wireless innovation.

26. Over the next 3–5 years, how significant do you expect traffic growth on 6 GHz RLAN to be relative to other RLAN bands?

Over the next 3–5 years, traffic growth on 6 GHz RLAN in Malaysia is expected to be significantly higher than in legacy RLAN bands such as 2.4 GHz and 5 GHz. As device ecosystems supporting Wi-Fi 6E and Wi-Fi 7 mature and become more widely adopted, the 6 GHz band will increasingly carry a growing share of high-capacity and latency-sensitive traffic, particularly in residential fibre-connected homes, enterprise networks, and industrial environments.

Malaysia's continued expansion of fibre broadband, coupled with rising data consumption driven by cloud services, video, enterprise collaboration tools, and Industry 4.0 applications, will accelerate the shift of traffic toward the 6 GHz band. While the 2.4 GHz and 5 GHz bands will remain important for legacy devices and broad coverage, they are already heavily congested in many environments and are less suited to supporting emerging high-performance use cases.

As a result, the 6 GHz band is expected to experience the fastest growth in RLAN traffic over the medium term, serving as the primary capacity layer for next-generation Wi-Fi deployments in Malaysia. Ensuring sufficient access to the 6 GHz band will therefore be essential to manage traffic growth efficiently, maintain quality of service, and support the country's digital economy and Industry 4.0 objectives.

27. What channel bandwidths (e.g. 80 MHz, 160 MHz, 320 MHz) are critical for your anticipated 6 GHz RLAN deployments?

Wide channel bandwidths are fundamental to the success of anticipated 6 GHz RLAN deployments, particularly in enabling the advanced performance capabilities of Wi-Fi 7 and future generations. Channel widths of 80 MHz and 160 MHz will continue to be vital for mainstream enterprise, campus, and

[10] https://www.delloro.com/news/wi-fi-7-to-be-adopted-by-over-90-percent-of-market-with-prices-at-an-unusual-low/

high-performance residential networks, ensuring high throughput and reliable service in dense user environments.

Looking forward, the ability to deploy 320 MHz channels—introduced with Wi-Fi 7—will be increasingly critical to achieving multi-gigabit speeds, ultra-low latency, and deterministic performance. These characteristics are essential for supporting advanced applications such as immersive AR/VR, real-time collaboration, industrial automation, and telemedicine. To realize these benefits, sufficient contiguous spectrum across the 6 GHz band must be available, allowing wider channels to be deployed at scale without fragmentation or harmful interference.

Ensuring access to the full 6 GHz band is therefore a strategic priority. It preserves adequate contiguous channel availability, safeguards efficient spectrum utilization, and supports long-term innovation. This approach will enable Malaysia to scale next-generation RLAN technologies effectively, positioning the country to meet growing connectivity demands and remain competitive in the digital economy.

28. Are mitigation measures such as power limits, indoor-only restrictions, or Automated Frequency Coordination (AFC) considered adequate to protect incumbent services?

Extensive technical studies and real-world deployment experience demonstrate that mitigation measures such as power limits, indoor-only restrictions, and Automated Frequency Coordination (AFC) are effective in protecting incumbent fixed and satellite services while enabling WAS/RLAN operations across the 6 GHz band. Compatibility assessments conducted by organisations including CEPT[11], FCC[12], ISED[13]confirm that, when appropriately applied, these measures allow safe and reliable coexistence.

- **Indoor-only operation**: Restricting devices to indoor use ensures significant building attenuation, which limits emissions escaping into outdoor environments and protects incumbent systems.
- **Transmit Power Control (TPC)**: Adjusts device transmit power to the minimum required for reliable connections, minimizing interference risk to adjacent services.
- **Automated Frequency Coordination (AFC)**: Enables standard power devices to access available channels safely, based on incumbents geolocation databases and spectrum availability. AFC systems are already successfully operating on a commercial basis in countries such as the U.S. and Canada providing a model to protect incumbent services while unlocking significant additional capacity for licence-exempt use.

Taken together, these mitigation techniques provide a robust and flexible framework for enabling RLAN access to the 6 GHz band. Leveraging these measures supports high-performance enterprise connectivity, public services, regional broadband deployment, and innovation, while maintaining appropriate safeguards for incumbent spectrum users.

29. How do developments such as Wi-Fi 7 and beyond influence long-term demand for the 6 GHz band? Do you foresee a need for further expansion or adjustment of 6 GHz RLAN access in the future?

Developments such as Wi-Fi 7 and subsequent generations are expected to substantially increase long-term demand for the 6 GHz band. These technologies rely on wide contiguous channels, multi-link operation, and

[11]ECC Report 366: https://docdb.cept.org/document/28650
[12]https://docs.fcc.gov/public/attachments/FCC-20-51A1.pdf
[13]https://ised-isde.canada.ca/site/spectrum-management-telecommunications/en/spectrum-allocation/radio-local-area-network-rlan-6-ghz-band/decision-technical-and-policy-framework-licence-exempt-use-6-ghz-band

advanced modulation techniques to deliver higher throughput, lower latency, and more predictable performance. Such capabilities are essential to support emerging applications that demand deterministic connectivity, including immersive media, industrial automation, mission-critical enterprise services, and real-time cloud and edge computing.

Looking ahead, the continued rise in device density, data consumption, and performance-sensitive applications will reinforce the role of the 6 GHz band as a critical capacity layer for licence-exempt access. To meet this demand, maintaining flexible and sufficiently expanded access to the band will be vital. Ensuring adequate contiguous spectrum will enable scalable deployment of next-generation RLAN technologies, safeguard efficient spectrum utilisation, and sustain ongoing innovation. Over the long term, regulators may need to consider further expansion or adjustments to 6 GHz RLAN access to accommodate evolving requirements, ensuring that Wi-Fi can continue to complement mobile networks and fiber broadband as a cornerstone of digital connectivity.

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