

Independent Communications Authority of South Africa
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Centurion
South Africa Private Bag X10,
Highveld Park 0169
Centurion,
Pretoria

Re: Consultation “Draft National Radio Frequency Plan”

Dear Mr. Davis Kgosimolao Moshweunyane and Mr Manyaapelo Richard Makgotlho

IEEE 802 LAN/MAN Standards Committee (LMSC) thanks the Independent Communications Authority of South Africa (ICASA) for issuing the consultation “Draft National Radio Frequency Plan” (“the Frequency Plan”) and for the opportunity to provide feedback on this draft frequency plan.

IEEE 802 LMSC is a leading consensus-based industry standards body, producing standards for wireless networking devices, including wireless local area networks (“WLANs”), wireless specialty networks (“WSNs”), wireless metropolitan area networks (“Wireless MANs”), and wireless regional area networks (“WRANs”). We also produce standards for wired Ethernet networks, and technologies produced by implementers of our standards are critical for all networked applications today.

IEEE 802 LMSC is a committee of the IEEE Standards Association and Technical Activities, two of the Major Organizational Units of the Institute of Electrical and Electronics Engineers (IEEE). IEEE has about 460,000 members in over 190 countries. IEEE’s core purpose is to foster technological innovation and excellence for the benefit of humanity. In submitting this document, IEEE 802 LMSC acknowledges and respects that other components of IEEE Organizational Units may have perspectives that differ from, or compete with, those of IEEE 802 LMSC. Therefore, this submission should not be construed as representing the views of IEEE as a whole¹.

Please find below the responses of IEEE 802 LMSC on Section 4.12.41 of “the Frequency Plan”.

Wi-Fi provides significant societal and economic value to South Africa

IEEE 802.11 based Wi-Fi technologies bring unique and almost exclusive improvements to access and affordability measures as the suitable complement to full-fibre upgrades in South Africa. A study by OpenSignal found that South Africa is leading Africa’s pace on Wi-Fi connectivity where smartphone users are more likely to connect to Wi-Fi than the mobile-only internet². In addition, significant economic value is provided by Wi-Fi to the South Africa’s economies: the economic

¹ This document solely represents the views of IEEE 802 LMSC and does not necessarily represent a position of either the IEEE or the IEEE Standards Association.

² See iTWeb: South Africa sets Africa’s pace on WiFi connectivity, <https://www.itweb.co.za/article/south-africa-sets-africas-pace-on-wifi-connectivity/dgp45qaBx8wvX9l8> [accessed: 12 May 2025].

value reached USD \$31.0 billion in 2021, and is expected to increase to USD \$44.2 billion by 2025³.

According to the South Africa Country Commercial Guide by the US Department of Commerce International Trade Administration, as of 2024, the South Africa Connect (SA Connect) initiative has made substantial progress toward increasing broadband coverage nationwide. During Phase 1, the initiative connected 970 government facilities (including schools and healthcare centers) to broadband, particularly in rural areas. With the beginning of Phase 2, which began in late 2023, the government reportedly aims to connect over 42,000 government buildings across multiple industries, including schools, healthcare facilities, police stations, and community centers, by 2026. In addition, 5 million households and 32,000 community Wi-Fi hotspots are scheduled to be connected during this phase, considerably enhancing internet accessibility and cost, especially in rural areas. The SA Connect initiative also aims to connect 18,520 schools, 5,731 healthcare facilities, 949 libraries and Thusong centers, 567 South African Police Service (SAPS) sites, and 8241 tribal authorities as part of the project's social commitments. A total of 14,742 government sites are also targeted to improve the delivery and administration of government services. Digital economy relies on reliable and seamless connectivity. The digital economy is projected to account for 15% to 20% of South Africa's GDP by 2025, an increase from approximately 8% to 10% in 2020. As internet penetration rises from 68% in 2023 to over 75% by 2025, more people will have access to digital platforms, stimulating additional expansion in online services. As of January 2024, South Africa had 45.34 million active Internet users, representing 74.7% of the population. Internet users increased by 409,000 from January 2023 to January 2024, a 0.9% growth⁴. The studies demonstrate that Wi-Fi plays a fundamental role in complementing mobile and fixed broadband networks, particularly in regional areas where infrastructure challenges can limit connectivity and demonstrate the importance of Wi-Fi connectivity for South African economy and enhanced spectrum access will strongly support the public needs and economic growth goals.

Wi-Fi access to the 6425 MHz to 7125 MHz is needed to support the Gigabit connectivity

In regards to allocation on the 6425 MHz to 7125 MHz frequency band, IEEE 802 LMSC respectfully asks ICASA to reconsider its decision based on the following points.

As pointed out by the proposed footnote 5.457E in the consultation, the ITU World Radiocommunications Conference 2023 (WRC-23) explicitly recognized that the 6425 MHz to 7125 MHz frequency band is used for the implementation of wireless access systems (WAS), including radio local area networks (RLANs). Many countries and regions including the USA, Canada, South Korea, and Saudi Arabia have already allocated the entire 6 GHz band (i.e., 5925 MHz to 7125 MHz band) for license-exempt operation. Availability of the entire 6 GHz band for license-exempt use will create economies of scale and produce a robust equipment market, benefitting South Africa's businesses, consumers, and economy, while providing societal benefits.

³ See Wi-Fi Alliance: Global economic value of Wi-Fi® to reach \$5 trillion in 2025, https://www.wi-fi.org/system/files/Economic_Value_of_Wi-Fi_HIGHLIGHTS_202305.pdf [accessed: 12 May 2025].

⁴ South Africa Country Commercial Guide by the US Department of Commerce International Trade Administration, <https://www.trade.gov/country-commercial-guides/south-africa-digital-economy> [accessed: 12 May 2025].

In January 2024, Wi-Fi Alliance introduced⁵ Wi-Fi CERTIFIED 7™ based on IEEE Std 802.11be-2024 technology⁶. With Wi-Fi 7 products already in the market, Wi-Fi deployments are going through a second generation upgrade in the entire 6 GHz band globally⁷. The global 6 GHz channelization in IEEE Std 802.11be-2024 is designed to accommodate multiple 160 MHz and 320 MHz channels throughout the 5925 MHz to 7125 MHz band, if available. ICASA's current designation of 500 MHz of the 6 GHz band from 5925 MHz to 6425 MHz for license-exempt operation provides for only one 320 MHz channel, while the entire 5925 MHz to 7125 MHz band would allow three such channels to support the Gigabit connectivity in South Africa.

With only the lower 500 MHz available for Wi-Fi, there will not be enough 80 MHz channels in the 6 GHz band to enable deployments of dense networks that will require at least 7 to 9 non-overlapping channels. As a result, many dense Wi-Fi network deployments utilizing the 6 GHz band will still be limited to 40 MHz channels. Without larger channel sizes, gigabit speeds in Wi-Fi connections cannot be achieved in South Africa.

Figure 1 illustrates a 7-channel plan which minimizes co-channel interference between APs. With 500 MHz in the 5 GHz and 6 GHz bands, there are less than seven 80 MHz channels, which limits the use of those wider channels. Wider channels equate to higher throughput and lower latency.

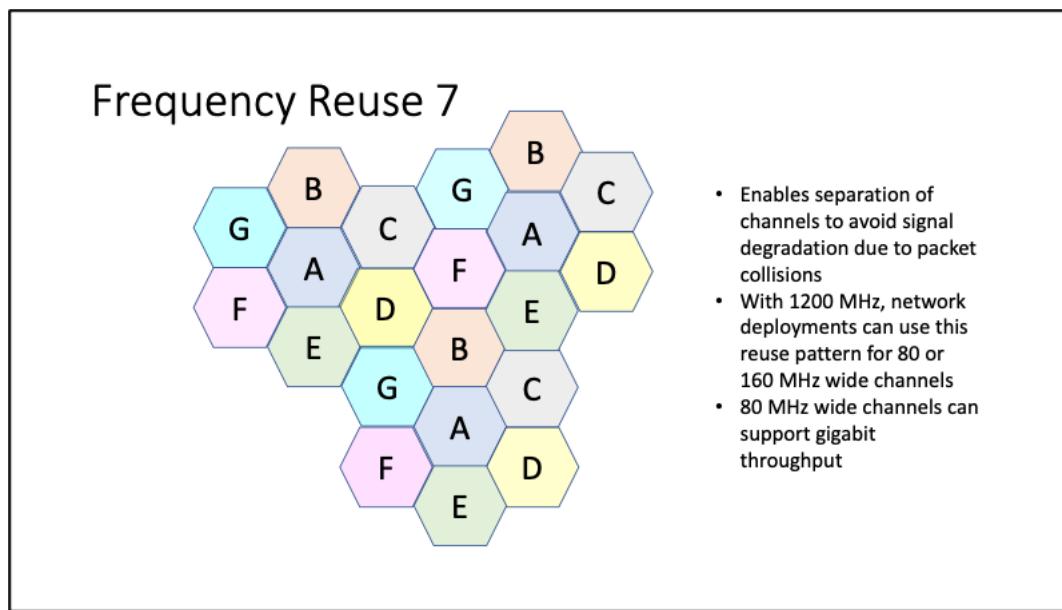


Figure 1: Frequency Reuse 7 Channel Plan

⁵ See Wi-Fi Alliance: Wi-Fi Alliance® introduces Wi-Fi CERTIFIED 7™, <https://www.wi-fi.org/news-events/newsroom/wi-fi-alliance-introduces-wi-fi-certified-7> [accessed: 12 May 2025].

⁶ See “IEEE Approved Draft Standard for Information technology--Telecommunications and information exchange between systems Local and metropolitan area networks--Specific requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications Amendment: Enhancements for Extremely High Throughput (EHT),” <https://standards.ieee.org/ieee/802.11be/7516/> [accessed: 12 May 2025]. With introduction of 320 MHz channel bandwidth, Wi-Fi 7 doubles throughputs relative to Wi-Fi 6E and significantly improves latency for Extended Reality (XR), bringing determinism through enablement of Multi-Link Operation (MLO) over multiple bands in 2.4 GHz, 5 GHz, and 6 GHz bands. Wi-Fi 7 also provides higher efficiency, relative to Wi-Fi 6E, through offering of 4096 QAM. In addition, spectrum puncturing improves flexibility in utilizing spectrally efficient wide channel bandwidth, e.g., 160 MHz and 320 MHz, while protecting incumbent operation in the band.

⁷ See Wi-Fi Alliance: Wi-Fi 7 market momentum: Wi-Fi 7 is here – is your network ready?, <https://www.wi-fi.org/beacon/chris-hinsz/wi-fi-7-market-momentum-wi-fi-7-is-here-is-your-network-ready> [accessed: 12 May 2025].

If RLAN were given access to the 6425 MHz to 7125 MHz band however, it would allow 80 MHz channels, but would provide seven 160 MHz channels supporting the high throughput requirements of high density networks such as those in universities, hospitals, schools and shopping centres. In addition, 1200 MHz is needed to support novel applications which would benefit from three 320 MHz channels. This includes technologies such as augmented, virtual and mixed reality, which require wider channels to ensure lower latency as recently shown by a medical school training use case demonstration⁸. Similarly, local processing of artificial intelligence workloads will require higher throughput to support the large datasets.

Additionally, with access to additional 320 MHz channels, Wi-Fi devices can build upon IEEE Std 802.11az-2022⁹ to offer sub-1 meter positioning accuracy, which results in new innovative use cases such as micro-targeting for retail and warehouse asset tracking.

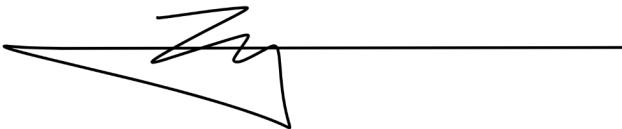
Conclusion

IEEE 802 LMSC thanks ICASA for the opportunity to provide this submission and respectfully requests to consider our responses to authorize license-exempt operation in the 6425 MHz to 7125 MHz band given Wi-Fi contribute significant societal, economic, and sustainability value to South Africa.

Respectfully submitted

By: /ss/.
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IEEE 802 LAN/MAN Standards Committee Chairman
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Submitted by Edward Au (edward.ks.au@gmail.com)
on behalf of James Gilb.

A handwritten signature in black ink, appearing to read "James Gilb", is placed above a horizontal line. The signature is written in a cursive style with a distinct "J" at the beginning.

⁸ See Wi-Fi Alliance: Wi-Fi Alliance® demonstrates the impact of 6 GHz Wi-Fi® for advanced AR/VR in healthcare, <https://www.wi-fi.org/beacon/the-beacon/wi-fi-alliance-demonstrates-the-impact-of-6-ghz-wi-fi-for-advanced-arvr-in> [accessed: 12 May 2025]

⁹ "IEEE Standard for Information Technology--Telecommunications and Information Exchange between Systems Local and Metropolitan Area Networks--Specific Requirements Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications Amendment 4: Enhancements for Positioning," in IEEE Std 802.11az-2022 (Amendment to IEEE Std 802.11-2020 as amended by IEEE Std 802.11ax-2021, IEEE Std 802.11ay-2021, IEEE Std 802.11ba-2021, and IEEE Std 802.11-2020/Cor 1-2022) , vol. no., pp.1-248, 3 March 2023, doi: 10.1109/IEEESTD.2023.10058117.