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Radio Regulatory Technical Advisory Group (RR-TAG)

Proposed response to South Africa ICASA's consultation on Draft Regulations on Dynamic Spectrum Access				
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This document drafts a proposed response to the South Africa Independent Communications Authority of South Africa (ICASA)'s consultation "Draft Regulations on Dynamic Spectrum Access".

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Re: Consultation "Draft Regulations on Dynamic Spectrum Access"

Dear Ms. Pumla Ntshalintshali and Mr. Manyaapelo Richard Makgotlho,

IEEE 802 LAN/MAN Standards Committee (LMSC) thanks the Independent Communications Authority of South Africa (ICASA) on its ongoing work in the area of spectrum management. The draft regulations on the dynamic spectrum access and opportunistic spectrum management in the innovation spectrum frequency ranges 3800 MHz to 4200 MHz and 5925 MHz to 6425 MHz ("the Draft Regulations") is a valuable tool to inform the public of the areas in which ICASA expects to focus and to solicit feedback that will provide the ICASA with the information necessary to proceed.

IEEE 802 LMSC is a leading consensus-based open standards development committee for networking standards that are used by industry globally. It produces standards for networking devices, including wired and wireless local area networks ("LANs" and "WLANs"), wireless specialty networks ("WSNs"), wireless metropolitan area networks ("Wireless MANs"), and wireless regional area networks ("WRANs"). Technologies produced by implementers of our standards are a critical element for all networked applications today.

IEEE 802 LMSC is a committee of the IEEE Standards Association and of Technical Activities, two of the Major Organizational Units of the IEEE. IEEE has over 460,000 members in more than 190 countries and its core purpose is to foster technological innovation and excellence for the benefit of humanity. IEEE is also a major accredited standards development organization whose standards are recognized worldwide. In submitting this document, IEEE 802 LMSC acknowledges that other components of IEEE Organizational Units may have perspectives that differ from, or compete with, those of IEEE 802 LMSC[1].

The Draft Regulations come at a pivotal time in the development of Wi-Fi ecosystem. In 2024, Wi-Fi Alliance introduced the latest generation of Wi-Fi technology, Wi-Fi 7, based on IEEE Std 802.11be-2024. Wi-Fi 7 devices are now available to support applications that require higher levels of interactivity and reliability. In 2024, over 269 million Wi-Fi 7 devices were shipped into the global market[2]. By 2028, the annual shipments of the 6 GHz enabled Wi-Fi devices are projected to exceed 2.1 billion. Global harmonization of Wi-Fi regulations in the 6 GHz band (i.e., 5925 MHz to 7125 MHz) creates economies of scope and scale and enables a robust equipment market, benefitting South Africa's businesses, consumers, and economy.

[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] NetworkWorld: Wi-Fi 7 in 2025: Will this be the year?, https://www.networkworld.com/article/3806086/wi-fi-7-in-2025-will-this-be-the-year.html [Last accessed: 29 May 2025]

Please find below the responses of IEEE 802 LMSC on the Draft Regulations with a focus on the 5925 MHz to 6425 MHz band.

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

IEEE 802.11 based Wi-Fi technologies bring affordable wireless connectivity to the internet as well as to a host of other applications and is a great complement to the fiber upgrades in South Africa. A study by OpenSignal found that South Africa is leading Africa's adoption of Wi-Fi connectivity where smartphone users are more likely to connect to Wi-Fi than the mobile-only internet[3]. In addition, significant economic value is provided by Wi-Fi to South Africa's economy: the economic value reached USD $31.0 billion in 2021 and is expected to increase to USD $44.2 billion by 2025[4].

According to the South Africa Country Commercial Guide published by the US Department of Commerce International Trade Administration, as of 2024, the South Africa 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 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 8,241 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. The 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% growth[5]. 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. The studies also demonstrate the importance of Wi-Fi connectivity for South African's economy and indicate that enhanced Wi-Fi spectrum access will strongly support public needs and economic growth goals.

The process for designating Unified Spectrum Switch Provider(s) can be aligned with existing international regulatory frameworks

IEEE 802 LMSC supports ICASA's proposal to designate specific entities as Unified Spectrum Switch system service Providers (USSPs). Similar 6 GHz systems have already been successfully implemented in other countries, notably the United States and Canada, where they have proven

[3] 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 [Last accessed: 29 May 2025].
[4] 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 [Last accessed: 29 May 2025].
[5] 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 [Last accessed: 29 May 2025].

effective in managing coexistence with incumbent services, including fixed links. These international precedents demonstrate that a well-designed USSP can enable reliable spectrum sharing while safeguarding existing users in the band. We respectfully encourage ICASA to leverage these existing regulatory frameworks as much as possible to accelerate the 6 GHz USS implementation in South Africa.

Client devices should not be subjected to USS requirements

Regarding the Client devices in Innovation Spectrum Frequency Range 2 (ISFR 2), IEEE 802 LMSC recommends removing requirements in Section 7(15) due to the typically nomadic/portable nature of the Client devices operating in the ISFR 2 band and operating under the control of the Innovation Spectrum Devices (ISDs) (i.e., Master devices) which ensures full compliance with the Operational Parameters (OPs) received from USS.

ISD should not require professional installation

Section 11(3) of the Draft Regulations prescribes the use of professional installation for all ISDs. IEEE 802 LMSC respectfully submits that requiring professional installation for ISDs would be unnecessarily burdensome. Modern ISD manufacturers are fully capable of integrating a range of reliable location-determination technologies, including GPS and other low-cost solutions, directly into devices. These technologies can ensure accurate location information without the need for costly and logistically complex professional installations. This approach maintains the integrity of the ICASA's spectrum management objectives while supporting broader, more scalable deployment of Wi-Fi infrastructure.

Flexibility for ISD Antenna Height in the USS can be considered

Section 7.4(f) of the Draft Regulations specifies that ISDs must report antenna height to the USS in meters above ground level (AGL). IEEE 802 LMSC recommends allowing devices to report antenna height in either AGL or above mean sea level (AMSL), as both are commonly supported. The USS can perform the necessary conversions between these units. This flexibility would ease implementation for device manufacturers without compromising the accuracy of spectrum coordination. Additionally, IEEE 802 LMSC advises against imposing a fixed limit on antenna height (c.f., Sections 10(2) and 10(3) of the Draft Regulations). The USS is designed to account for the specific height of a device and can enable safe, interference-free operation, even in high-rise buildings. This approach ensures regulatory efficiency while supporting broader device deployment and use cases.

Therefore, IEEE 802 LMSC recommends to revise the table in Section 10(3) to remove the restrictions on the antenna heights as the three dimensional location of the ISD antennas, irrespective of the morphologies, will be reported to the USS and the OPs for that specific location will be precisely calculated based on the ICASA -6 dB I/N protection criteria for the 36 dBm max permitted transmit power.

A separate operator licensing and registration requirement is not needed

While the Draft Regulations appropriately exempt 6 GHz devices from licensing fees, they require network operators to register with ICASA and obtain a license that must be renewed every three

years (c.f., Section 6 of the Draft Regulations). IEEE 802 LMSC believes this requirement introduces an unnecessary administrative burden that could hinder broad deployment of devices in the 6 GHz band. Given that USSPs already have the necessary operator contact details and device location data, IEEE 802 LMSC recommends removing the separate operator licensing and registration requirement from the regulation. This would streamline deployment while maintaining effective oversight through the USS framework.

Explicit USS instructions for ISD Shutdown ("kill-switch") requirements are not necessary

Sections 7(13) and 7(14) of the Draft Regulations require the USS to have the ability to instruct an ISD to cease operation within a defined time frame, for example, within 60 seconds as specified in Section 12(3). IEEE 802 LMSC notes that such a near-instantaneous shutdown requirement implies the need for a persistent, active connection between the USS and each ISD. This is neither practical nor aligned with the approach taken in other countries. In the United States and Canada, effective coexistence protection is achieved by requiring ISDs to contact the coordination system periodically, typically once per 24 hours. Section 11(17) of the Draft Regulations already incorporates a similar daily communication requirement. This mechanism is sufficient to manage changes in operating characteristics and to address any interference concerns. Devices can be deauthorized or adjusted during the next scheduled contact. IEEE 802 LMSC therefore recommends removing the requirement for immediate device shutdown ("kill-switch") functionality, as it imposes unnecessary complexity and does not materially improve interference protection beyond what daily updates already provide.

Requirements for channel bandwidth can be generalized

Section 4(1)(b) of the Draft Regulations currently restricts the ISFR 2 devices to operation with channel bandwidth up to 160 MHz. IEEE 802 LMSC recommends updating this provision to reflect the evolving capabilities of latest generation technologies such as Wi-Fi 7, which supports channel bandwidth up to 320 MHz. Moreover, rather than statically defining maximum channel bandwidth in regulation, IEEE 802 LMSC recommends allowing devices to operate with flexible bandwidths, provided that:

- The spectrum is determined to be available by the USS, and
- Devices comply with the power spectral density (PSD) and/or total power limits authorized by the USS.

This approach ensures future proofing of the regulatory framework and allows innovation and performance to scale with advancements in Wi-Fi technology, without compromising coexistence or interference protection.

Established international industry protocols for accessing the USS should be considered

Section 7(1) of the Draft Regulations mandates that communication between ISDs and the USS must follow the latest version of the communications protocol for accessing USS (CPAUSS) developed by a South African research organization. IEEE 802 LMSC respectfully recommends that the regulation avoids mandating a single protocol and instead allows flexibility for industry stakeholders, including device manufacturers and USS operators, to determine the appropriate communication protocol.

Wi-Fi Alliance has developed a widely adopted System-to-Device Interface Specification[6] currently used by all certified Automated Frequency Coordination system operators in the United States and Canada. This protocol has been proven in large-scale deployments and supports secure, reliable coordination of unlicensed devices. Permitting the use of established industry protocols will promote international alignment, reduce implementation costs, and support faster time to market without compromising the ICASA's core objectives of spectrum management.

Requirements for Inter-USS and ISD Coordination are not necessary

Section 7(11) of the Draft Regulations requires ISDs to report their use of Innovation Spectrum (IS) channels as feedback to the USS. Additionally, Sections 11(7) through 11(10) impose coordination obligations among ISDs to manage potential interference, effectively requiring USS systems to communicate with each other and track channel usage on a per-device basis. IEEE 802 LMSC believes these requirements are unnecessarily burdensome and go beyond what is technically necessary for effective spectrum management. In established implementations such as those in the United States and Canada, Automated Frequency Coordination systems operate successfully without requiring aggregate interference calculations or inter-system coordination of individual device usage. These systems rely on conservative propagation models and protections that ensure coexistence with incumbents without adding undue complexity. IEEE 802 LMSC recommends removing these requirements to align with proven international practices and enable a more scalable, efficient deployment of USS-controlled ISDs in the 6 GHz band.

Out-of-Block and Out-of-Band emission limits should be aligned with international standards and regulations

The Out-of-Block emission limits table provided in Section 11(6) of the Draft Regulations lacks sufficient clarity and detail. IEEE 802 LMSC recommends aligning these limits with those established by IEEE Std 802.11-2024[7] and the United States FCC[8] for 6 GHz operations, which are well defined and widely adopted. Utilizing a spectrum emission mask as defined in EN 303 687 V1.1.1 section 4.3.4.3, also widely adopted, potentially in combination with additional out-of-band emission requirements is another example. Note the -27 dBm/MHz Out-of-Band emission requirement that applies to frequencies below 5925 MHz as defined in FCC Part 15 rules[9]. Adopting this approach would enhance regulatory clarity, promote international harmonization, and ease compliance for manufacturers.

Mandatory Spectrum Access Mechanism for devices in ISFR 2 is recommended

IEEE 802 LMSC respectfully asks ICASA to establish an appropriate spectrum access mechanism as this provides the necessary conditions to protect and enable the efficient use of the spectrum. Without such a mechanism, WAS/RLANs and other IS-CPE Cat 2 technologies operating in the 5925 MHz to 6425 MHz band risk a "race to the bottom," where spectrum could become congested and potentially unusable in many scenarios. IEEE 802 LMSC further encourages ICASA to recognize the effectiveness of mandatory spectrum access mechanisms in enabling coexistence

[6] Wi-Fi Alliance System-to-Device Interface Specification, https://www.wi-fi.org/discover-wi-fi/6-ghz-afc-resources [Last accessed: 29 May 2025]
[7] See Annex D and E of 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, https://standards.ieee.org/ieee/802.11/10548/ [Last accessed: 29 May 2025]
[8] FCC Part 47 CFR 15.407(b), https://www.ecfr.gov/current/title-47/part-15/subpart-E#p-15.407(b) [Last accessed: 29 May 2025]
[9] FCC § 15.407 General technical requirements, https://www.ecfr.gov/current/title-47/chapter-I/subchapter-A/part-15/subpart-E/section-15.407 [Last accessed: 29 May 2025]

among multiple technologies. These protocols have been proven to facilitate efficient spectrum sharing, helping to preserve the integrity and usability of the band for all stakeholders.

Conclusion

IEEE 802 LMSC thanks ICASA for the opportunity to provide this submission and respectfully requests to consider our responses provided in this document.

Respectfully submitted

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