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Independent Communications Authority of South Africa (ICASA)

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Centurion

Attention: Pumla Ntshalintshali

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Dear Ms Ntshalintshali,

**Draft regulations on Dynamic Spectrum Access and Opportunistic Spectrum Management in the Innovation Spectrum in the 3800 – 4200 MHz and 5925 – 6425 MHz**

**1) Introduction and General Comments**

On behalf of our clients, which represent an important cross-section of the world's leading silicon vendors, system manufacturers, and application providers, Policy Impact Partners (PIP) welcomes the opportunity to comment on Independent Communications Authority of South Africa (ICASA or the Authority) draft regulations on Dynamic Spectrum Access and Opportunistic Spectrum Management in the Innovation Spectrum 3800 – 4200 MHz and 5925 – 6425 MHz, also known as the "Innovation Spectrum."

We applaud the Authority's decision to implement dynamic spectrum access (DSA) in the Innovation Spectrum. The introduction of DSA will expand broadband access to rural, underserved and remote communities. It will also reduce barriers to entry and promote equitable access to spectrum by a wide range of users, including consumers, small, medium and large enterprises, as well as competitive broadband service providers. DSA solutions implemented by other countries around the world in these same frequency bands have already proven to be a resounding success, supporting new technologies and innovative wireless services enjoyed by millions, while simultaneously protecting incumbent services that continue to have access to critical spectrum resources.

PIP further commends ICASA for allowing standard power (SP) operation of Wi-Fi devices in 5925–6425 MHz ("L6 GHz band") or Innovation Spectrum Frequency Range 2 (ISFR 2), which

complements already approved<sup>1</sup> licence-exempt very low power (VLP) and low power (LP) operations in this band. Wi-Fi has become indispensable to broadband connectivity. More than 21.1 billion Wi-Fi devices are in use worldwide, with 4.1 billion shipped annually, according to research firm IDC<sup>2</sup>. The technology has consistently enabled affordable internet access and facilitated business operations. The latest Wi-Fi standards, such as Wi-Fi 6E and Wi-Fi 7, expand these benefits further, driving social and economic progress in South Africa.

SP Wi-Fi, at power levels up to 4W, is useful both indoors and outdoors. To cover a large physical footprint, a Wi-Fi network may well require power levels higher than those available for LP devices. When coverage of large indoor spaces is required, SP enables network designers to locate access points (APs) to maximise the usable signal strength for the projected number of client devices, whilst streamlining the number of network nodes. Large spaces, such as logistics centres, manufacturing facilities, university lecture halls, conference centres, transportation hubs, and indoor arenas can benefit from the availability of higher-power devices.

Outdoors, it can be a challenge to provide APs with electricity and wired connectivity, particularly as there is no physical ceiling on which to mount equipment. By reducing the number of APs required, SP can make it easier to deploy Wi-Fi networks outdoors in urban centres, recreation centres, university campuses, stadiums, ports and many other facilities. For such facilities, deploying SP Wi-Fi at 6 GHz is a straightforward means to enhance their existing Wi-Fi networks at 2.4 GHz and 5 GHz. Further, users are already well-acquainted with accessing the technology. Deploying a SP Wi-Fi network also means that facility managers will not have to depend on mobile operators to deliver the consistent and reliable coverage and performance that users need. In the United States and Canada, where SP Wi-Fi has been available for some time, there is strong demand from enterprises, with notable networks deployed by the University of Notre Dame<sup>3</sup> and the San Francisco Giants,<sup>4</sup> and many more on the way.

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<sup>1</sup> Notice to amend Annexure B of the Radio Frequency Spectrum Regulations, 2023.

<sup>2</sup> Source: <https://www.wi-fi.org/ beacon/the-beacon/wi-fi-by-the-numbers-technology-momentum-in-2023>.

<sup>3</sup> <https://news.nd.edu/news/notre-dame-stadium-becomes-first-outdoor-university-venue-to-move-to-wi-fi-6e-standard/>.

<sup>4</sup> <https://www.sportsvideo.org/2024/04/24/san-francisco-giants-oracle-park-byus-lavell-edwards-stadium-tap-6-ghz-wi-fi-connectivity/>.

SP Wi-Fi operations are supported by multiple automated frequency coordination (AFC) systems in the United States and Canada. The Open AFC Project,<sup>5</sup> founded and managed by Broadcom, CableLabs, Cisco, Wireless Broadband Alliance, and Wi-Fi Alliance Services, has been authorised for operation in the United States and Canada. The Open AFC Project software is completely open and available to any party. In addition, there are eight authorised operators of AFC databases for SP networks in the United States: Broadcom, Comsearch, Federated Wireless, Qualcomm, Sony, Wireless Broadband Alliance, Wi-Fi Alliance Services, and 3CSpectra. Canada has authorised several AFC operators, with others in the queue for approval. PIP anticipated that these existing AFC providers are likely to be interested in becoming unified spectrum switch providers (USSPs) in South Africa. And with Open AFC, new local AFC/USSP firms could also easily participate in the market.

If South Africa adopts rules that are consistent with those in other countries, it will benefit from the economies of scale for the latest generations of Wi-Fi and AFC technology. For example, if the South African market can be accessed by commercial AFC system operators using their existing technology, with software code that has already been tested and proven in the field, it will be easier for AFC providers to serve the South African market as USSPs. The systems used by Canada and the United States are remarkably similar, differing primarily in the spectrum frequencies that each supports. We recommend that ICASA carefully evaluate the United States FCC rule on AFCs [47 CFR Part 15.407(k)(l)(m)<sup>6</sup>], along with OET KDB 987594,<sup>7</sup> and Canada's RSS 248,<sup>8</sup> in order to align as closely as possible with these established frameworks.

We also recommend that ICASA develops a light-touch approval for AFC/USS operators that have already been certified by the U.S., Canadian, or other competent national regulatory authority. Such entities have already been thoroughly vetted and have a proven track record of compliance capability. However, ICASA will also need to ensure the AFC/USS operator can access and retrieve data concerning incumbent operations and that this data is updated regularly.

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<sup>5</sup> <https://github.com/open-afc-project>.

<sup>6</sup> <https://www.ecfr.gov/current/title-47/chapter-I/subchapter-A/part-15/subpart-E/section-15.407>.

<sup>7</sup> Note the FCC lab has broken its guidance document into 5 parts – KDB 987594 DO1 through DO5.

<sup>8</sup> <https://ised-isde.canada.ca/site/spectrum-management-telecommunications/en/devices-and-equipment/radio-equipment-standards/radio-standards-specifications-rss/rss-248-radio-local-area-network-rlan-devices-operating-5925-7125-mhz-band>.

## 2) Access to the Full 6 GHz Band Will Accelerate Adoption and Meet Increasing Demand

The widespread availability of compatible equipment means most Wi-Fi users will see an immediate benefit from licence-exempt access to the 6 GHz band. Even users without 6 GHz compatible equipment will benefit from the availability of the new spectrum, as legacy bands become less congested with traffic moving to the 6 GHz band. However, to take advantage of these economic and societal benefits, Wi-Fi needs access to a minimum of 1200 MHz of spectrum, not merely the L6 GHz frequencies. The L6 GHz band on its own will be insufficient to meet the fast-rising demand for indoor wireless connectivity. In countries where only the L6 GHz band has been made available, there are only five 160 MHz channels available for licence-exempt usage, two of which are in the 5 GHz band and have dynamic frequency selection (DFS) restrictions making them less available for certain services. With access to only the L6 GHz band, Wi-Fi can only support gigabit coverage for approximately 50-60% of a residential building area<sup>9</sup>. While access to seven 160 MHz channels in the 6 GHz band would deliver a significant improvement, Wi-Fi needs access to sufficient spectrum to support 320 MHz channels to maximise in-building gigabit coverage.

To cope with the greatly increasing demand for local wireless broadband connectivity, organisations have been upgrading their networks with Wi-Fi 6E and Wi-Fi 7 equipment. And, in countries that have opened the full 6 GHz band, there has been enormous interest from universities, hospitals, manufacturing and logistics to upgrade their Wi-Fi infrastructure with 6 GHz capable equipment. In South Africa, there are more than 1.7 million students enrolled in university and higher education institutions, which could greatly benefit from an upgraded full-6 GHz Wi-Fi infrastructure.

With access to the full 6 GHz band, Wi-Fi 6E and Wi-Fi 7 can support industrial applications, such as factory robots and sensors, AR, healthcare monitors and wireless medical equipment, that have stringent QoS (quality of service) requirements. Unlike previous generations of Wi-Fi, Wi-Fi 6/6E and Wi-Fi 7 are based on OFDMA technology and are thereby able to achieve very high QoS levels, particularly in managed networks.

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<sup>9</sup> Source: a [study](#)<sup>9</sup> by Plum Consulting

For enterprise applications (such as large public venues, healthcare, education, hospitality, logistics, and manufacturing), a large number of available channels and a wide range of channel widths (from 20 MHz to 320 MHz) enable performance enhancements and the realisation of new services and architectures. Examples include multi-layer operation, service segmentation and prioritisation, context-aware wireless networks, and hyper-aware access points. If a sufficient additional spectrum in the 6 GHz band is not made available, the business case for these types of networks and use cases will be less cost effective than in countries where 1200 MHz has been made available. And, in some instances, a cost/benefit analysis may show that it isn't economically viable to upgrade an existing Wi-Fi network.

With access to 320 MHz channels, Wi-Fi can reliably support a wide range of demanding use cases, from telesurgery and haptic applications to controlled vehicles and augmented reality. Wide channels also enable Wi-Fi to identify the position of a connected asset within one meter, enabling enterprises to better track and monitor their equipment and inventory.

### **3) Specific Comments on the Draft Regulations**

#### **1. S1 - Definitions**

- a. The definition of Communication Protocol to Access Unified Spectrum Switch (CPAUSS) states that this standard will be defined by the Council for Industrial and Scientific Research (CSIR). We are aware that the South African Bureau of Standards (SABS) is mandated to develop standards in South Africa and has a Technical Committee (TC) that develops technical standards for the Communications Industry, which are sometimes referenced by the Authority e.g. in the Revised official list of Regulated Standards for Technical Equipment and Electronic Communications Equipment Regulations, Government Gazette 39182 of 9 September 2015.

Additionally, the CSIR may be appointed as the only, or one of multiple USSPs, which could result in a conflict of interest since it would in effect become a referee and player in the USSP space. Even if the CSIR is the only USSP it could still be considered a conflict of interest if it developed the CPAUSS and then administered it since it is not the Authority. The concern is that the CSIR may include provisions in the standard that serve to limit competition in the USSP space, or that introduce unnecessary country-specific requirements that deviate from widely accepted standards that are in use elsewhere in the

world e.g. Wi-Fi Alliance protocol (WFA system to device interface specification<sup>10</sup>) – thereby increasing the cost of devices.

We therefore recommend that the CPAUSS should be developed under the auspices of SABs to ensure neutrality and that it is revised when appropriate to keep up with developments in the field.

2. The current draft regulation does not contain any provision regarding how an entity can apply to become a USSP. Further, we recommend that more than one USSP should be appointed in order to encourage competition. We recommend that the regulations should include the application procedure and qualification criteria for appointment of USSPs.
3. S4(1)(b) determines that the approved radio frequency channel bandwidths in ISFR 2 are 20 MHz, 40 MHz, 80 MHz and 160 MHz. 160 MHz is the largest radio frequency channel bandwidth in Wi-Fi 6, while Wi-Fi 7 has a maximum bandwidth of 320 MHz, which has multiple benefits (as discussed above). The larger channel bandwidth of Wi-Fi 7, coupled with other technological enhancements, allows throughput speeds that can be up to 2.4 times that of Wi-Fi 6.

We therefore recommend that the Authority should facilitate the higher throughput speed of Wi-Fi 7 by adding 320 MHz to the list of channel bandwidths that are allowed in ISFR 2.

4. S4(5) requires a Secondary User to operate in the Innovation Spectrum exclusively through the USS. The Innovation Spectrum includes ISFR 2 (5925 – 6425 MHz band), where Wireless Access Systems/Radio Local Area Network (WAS & RLAN) are authorised to operate on a licence exempt basis in terms of Annexure B of the Radio Frequency Spectrum Regulations, 2015 (Government Gazette 48643 of 23 May 2023) and in line with African Telecommunications Union (“ATU”) Recommendation ATU-R 005, SS4-1(3).

Enforcing the provisions of S4(5) on ISFR 2 would nullify licence exempt operation of WAS/RLAN in this band, which we believe is not the Authority’s intention. We therefore suggest that the provisions of S4(5) should explicitly exclude licence exempt WAS/RLAN in the ISFR 2.

5. S10(3) contains a table (below) showing the maximum permitted innovation spectrum device (ISD) transmit power level in ISFR 2.

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<sup>10</sup> Available: <https://www.wi-fi.org/discover-wi-fi/6-ghz-afrc-resources>

Maximum permitted ISD transmit power level in ISFR 2

ISD Deployment Area	Max Permitted Antenna Height AGL	Max Permitted Transmit Power
Urban outdoor	20 m	30 dBm
Rural outdoor	30 m	36 dBm

SP Wi-Fi is likely to be used in underserved areas, which probably have low population density and difficult terrain. In such areas, the network operator will try to maximise coverage by using the highest antenna height and transmit power as possible.

We recommend that –

- 5.1 There should be no maximum antenna height in the regulation since the USS can make use of the actual antenna height of the ISD (and associated uncertainty) to ensure protection of incumbent primary services; and
- 5.2 The maximum transmit power in urban outdoor areas should be the same as for rural outdoor areas i.e. 36 dBm since the USS can make use of the combination of parameters e.g. antenna height/transmit power etc. to ensure protection of incumbent primary services.
6. S12(2) requires the immediate suspension of spectrum assignments to all ISDs associated with an operator found to be causing harmful interference to incumbent users. This provision seems very harsh, especially if the interference originates from a single ISD of an operator that has several hundreds or thousands of ISDs spread across the ISFR 1 and ISFR 2 sub bands. The current provision will require the shutdown of all ISDs of the operator, irrespective of whether they are in the affected Innovation Spectrum sub-band (ISFR 1 or ISFR 2) or geographical area.

We recommend that this subsection should be revised to require the immediate suspension of spectrum assignments to those ISDs that are likely to be the source of the harmful interference to incumbent users, taking into account operational parameters such as geographical location and operating frequency.

#### 4) Conclusion

PIP and our clients are committed to supporting the Authority in its efforts to ensure spectrum is managed in an efficient and flexible manner and to enable different users and industries to take

advantage of technological advancements, including the latest generations of Wi-Fi and DSA technologies. We look forward to working with the Authority on the successful and sustainable deployment of DSA in the Innovation Spectrum and strengthening South Africa's position in the global digital economy.

PIP would welcome the opportunity to make an oral presentation, if the Authority decides to hold public hearings.

/s

Herman Schepers

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Policy Impact Partners