Re: ‘Draft Regulations on Dynamic Spectrum Access and Opportunistic Spectrum Management in the Innovation Spectrum 3800-4200 MHz and 5925-6425 MHz’ Public Consultation

Tarana Wireless, Inc. (“Tarana”) is a U.S. company whose mission is to accelerate the deployment of fast, affordable internet access around the world. Through more than $400M of R&D investment over a decade, Tarana has created a unique Next Generation Fixed Wireless Access (“ngFWA”) technology. The core innovation relies on novel, antenna-array enabled radio architectures and unique spatial processing and interference cancellation methodologies, with a focus on delivering a) extended range and high non line of sight (NLoS) performance, b) very high spectral efficiency at the link, sector, tower and network level, and c) highly reliable service even in high interference environments.

Tarana appreciates the opportunity to provide its comments to the Independent Communications Authority of South Africa’s (“ICASA”) ‘Draft Regulations on Dynamic Spectrum Access and Opportunistic Spectrum Management in the Innovation Spectrum 3800-4200 MHz and 5925-6425 MHz’ Public Consultation and looking forward to the success of the Innovation Spectrum 3800-4200 MHz and 5925-6425 MHz.

Harmonized Standards for ISFR 1 and ISFR 2

We recommend that ICASA specify a harmonized radio standard for ISFR 1 and ISFR2. A harmonized standard is extremely useful because it provides essential technical guidance for equipment design and testing. While the specific output power limits are defined in the draft regulation, the harmonized standard defines the full suite of technical requirements—beyond just output power and emission limits—including receiver performance, out-of-band emissions, and test procedures. This alignment would ensure regulatory consistency and accelerate market availability.

If this approach is adopted, it is critical that the selected standard be technology-neutral, enabling mobile and fixed radios, WLAN radios, and proprietary systems to be certified and coexist. For fixed applications, we believe that ETSI EN 302 326 is well-suited, and has broad international acceptance, and hence we would like to recommend it as one of the standards acceptable in the band.

Channel Assignment Restrictions in ISFR 1

We seek clarification on the rationale behind restricting ISFR 1 to a maximum of two contiguous 10 MHz channels in urban areas and a maximum of four contiguous 10 MHz channels in rural areas.

Modern radios, including 3GPP 5G-NR systems, WiFi6E and WiFi7 devices, are all designed to support carrier bandwidths of 100 MHz or more, and can aggregate multiple such carriers. This allows these radio systems to achieve much higher link speeds (the speed of a radio link is directly proportional to the channel bandwidth it utilizes), and much higher aggregate capacities per base-station or access point, which in turn allows serving many more users. Limiting aggregate channel bandwidth to only 20 MHz in urban areas and 40 MHz in rural areas preempts these radio systems from taking advantage of their increased channel bandwidth capabilities.

The channel bandwidth restriction is also not harmonized with other 3.8 to 4.2 GHz spectrum regulations, or with other shared spectrum regulatory frameworks in similar bands. For example:

- The newly released European Mandate ("Harmonised technical conditions for the shared use of the 3800-4200 MHz frequency band by low/medium power terrestrial wireless broadband systems (WBB LMP) providing local-area network connectivity") does not propose a channel bandwidth limitation

- Ofcom has a more generous 100 MHz per operator limit in its 3.8 to 4.2 GHz spectrum regulations
- CBRS (3.55 GHz to 3.7 GHz) shared spectrum regulations in the US also do not impose a maximum channel bandwidth, even though the amount of spectrum is lower (only 150 MHz)

From a practical perspective, we believe that these channel bandwidth limitations may lead to spectrum underutilization or inefficient radio deployment. Most of the equipment expected to operate in ISFR 1 will be 3GPP or proprietary (such as the systems provided by Tarana, Cambium, etc.), and these solutions are designed and capable to operate with frequency reuse of 1 (FR=1), allowing multiple sectors on the same tower to operate in the same channel. Thus, restricting operators to 20 MHz per site, when the full band offers 400 MHz, would either require 20 independent operators to co-deploy on the same tower in order to fully utilize the spectrum, which is clearly very unlikely, or would require operators to use many co-deployed radios, each operating below its capabilities (20 MHz each), rather than deploying fewer devices, each operating at a higher bandwidth.

In conclusion, we believe that imposing a narrow channel bandwidth limit in South Africa may lead to a range of negative outcomes, including lower link speeds, reduced capacity, poorer quality of service, spectrum underutilization, and the need to deploy a very large number of radios per tower in order to meet service requirements and fully utilize the spectrum.

We recommend either a more flexible channel assignment policy, managed by the Unified Spectrum Switch (USS), or a larger channel bandwidth restriction (e.g. 100 MHz) per operator, rather than per device. Either of these would better support optimal spectrum utilization and network performance.

Antenna Height Limitations

The current proposal limits antenna heights to 20 meters in urban areas and 30 meters in rural areas for both ISFR 1 and ISFR 2 bands. These restrictions could impede the deployment of Fixed Wireless Access (FWA) solutions, particularly in rural and underserved areas where taller installations are often necessary to overcome terrain challenges and provide reliable coverage. This would be a shame, given that South Africa features a very large area, and many very tall towers have been built, at great expense, specifically to cover these sparse large areas. We recommend that ICASA remove the height restriction in rural areas and instead allow the USS to manage antenna heights and/or radio EIRP based on dynamic interference assessments.

Database-driven frequency coordination systems, such as the AFC systems deployed in the US and Canada, can automatically estimate the level of interference caused to all incumbents by considering tower height and EIRP, terrain, clutter, incumbent location and incumbent antenna characteristics. Using this information, the Automatic Frequency Coordination systems can adjust the maximum EIRP of newly installed devices accordingly. This approach provides a much more robust level of protection to incumbents, while also allowing the flexibility to use higher tower installations, and hence much better coverage, in all the locations where incumbents are not affected. This approach has already been proven very effective in many AFC deployments to date.

Assuming that the USS system will feature similar capabilities, we recommend using this more flexible approach instead of imposing fixed height limitations.

Flexible EIRP Limits in Urban Environments

We propose that the transmit power level limits in urban environments for both ISFR 1 (27 dBm/20 MHz EIRP per carrier) and ISFR 2 (30 dBm) are reconsidered.

Assuming that the USS will be coordinating spectrum access and mitigating interference to incumbents (as described in the section above), we advocate for a more flexible approach of limiting EIRPs for new radio installations only when it is determined by the USS that they have the potential to cause interference to incumbents. This would allow the use of higher EIRP limits in ISFR 1 and ISFR 2, which would allow operators to improve coverage and network performance in urban areas without compromising spectrum efficiency.

ICASA is planning to implement the USS, which will include a comprehensive database of incumbent users. Rather than applying power limits in urban environments, power levels should be dynamically determined by the USS, allowing higher EIRP (up to 47 dBm in urban areas without incumbents in ISFR 1 and up to 36 dBm in urban areas without incumbents in ISFR 2) and lower EIRP near incumbents. This flexible approach has been validated in the US and Canada, where AFC systems support standard power operations up to 36 dBm without causing harmful interference in 6 GHz band, and where the SAS system supports up to 47 dBm/10 MHz in CBRS 3.6 GHz band in the US.

Allowing multi-carrier radio operation

Most equipment likely to be deployed in either ISFR1 (e.g. 3GPP 5G-NR base-stations) or in the ISFR 2 (e.g. WiFi7 access points) can operate across multiple non-contiguous carriers, and supports carrier aggregation. In order to take advantage of these capabilities, we would recommend that multi-carrier operation in both these bands is allowed, and that the EIRP limits in both of these bands apply per carrier (not per device). Given that there is no difference, from an emissions perspective, between a single radio operating in 2 carriers, versus two side-by-side radios operating in one carrier each, we would recommend that regulation incentivizes the former deployment over the latter, because it reduces the number of radios per tower, hence the overall power consumption, CAPEX deployed, etc.

Emission Mask Consistency and Clarification

We request clarification on whether the out-of-block and out-of-band emission limits outlined in the draft regulation apply to both ISFR 1 and ISFR 2. The current in-band emission requirements (which is called “out-of-block” in this draft), particularly for the ISFR 2, are too stringent for virtually all existing Wi-Fi devices to meet without modification.

This requires the development of custom, high cost and low-volume hardware for the South African market, significantly reducing availability and increasing prices. To promote efficient deployment, emission mask rules should be more flexible for mobile and fixed wireless applications. For fixed applications, we suggest harmonizing the emission masks with ETSI EN 302 326-2 to maintain international alignment. For ISFR 2 specifically, consideration could also be given to adopting the FCC emission mask for 6 GHz standard power devices, which helps many existing products to take advantage of this band.

Conclusion

We support ICASA's efforts to open up the 3800–4200 MHz and 5925–6425 MHz bands for innovative and efficient spectrum use. To ensure optimal deployment, we encourage ICASA to adopt technology-neutral harmonized standards, provide flexibility in channel assignments, reconsider restrictive antenna height and EIRP limits, and clarify the emission mask requirements. These adjustments will help accelerate broadband rollout, especially in underserved and rural areas, promote equitable access to spectrum, and enable more effective spectrum management through the Unified Spectrum Switch.