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SACF SUBMISSION- DRAFT REGULATIONS ON DYNAMIC SPECTRUM ACCESS AND OPPORTUNISTIC SPECTRUM MANAGEMENT IN THE INNOVATION SPECTRUM 3800-4200 MHz AND 5925-6425 MHz

1. INTRODUCTION

1.1 The South African Communications Forum (the SACF) is a voluntary member-funded industry association and represents members across the ICT ecosystem. We primarily participate in advocacy in the policy and regulatory environment to contribute an inclusive sector that is capable of attracting and sustaining investment.

1.2 We thank ICASA for the additional opportunity to provide comments on the Draft Regulations on Dynamic spectrum Access and Opportunistic Spectrum Management in the Innovation Spectrum 3800-4200 MHz and 5925 – 6425 MHz ("Draft Regulations").

1.3 The SACF would like to confirm that the positions set out below are based on our members' understanding of ICASA's request for their general position on the subject matter in this particular request. Should ICASA institute any further specific processes and procedures our members reserve their rights to respond as appropriate to the circumstances.

2. BACKGROUND:

2.1. We recognise that the increasing demand for wireless services, coupled with the finite nature of radio frequency spectrum, necessitates more efficient and flexible spectrum management approaches than traditional exclusive licensing. In this context, Dynamic Spectrum Access (DSA) and Opportunistic Spectrum Management (OSM) have emerged as critical strategies to maximize spectrum utilization and address connectivity gaps.

2.2. It is understood that these Draft Regulations is in response to South Africa's spectrum policy, representing Phase 2 of ICASA's broader DSA strategy. It is noted

that the specific frequency bands, 3800-4200 MHz and 5925-6425 MHz, are designated as "Innovation Spectrum," with a view to potentially unlock new digital radio technologies, services, and applications.

2.3. The SACF's input to these regulations is centred around our understanding that the core purpose of the regulations is to (1) facilitate the use of innovation spectrum by secondary users and (2) to mitigate harmful interference to existing incumbent users. We therefore focus our feedback on the authorisation process for electronic communications equipment, the categorisation of Innovation Spectrum Devices (ISDs), the pivotal roles of the Unified Spectrum Switch (USS) and Unified Spectrum Switch Provider (USSP) as well as the access and registration requirements and ultimately interference management.

2.4. After consideration of these regulations, the SACF and its members are left with a significant number of questions. We highlight the areas where clarity is required in our submission, and implore ICASA to consider these before progressing any further with these regulations.

2.5. There are five critical components to the regulations and our understanding of these are set out below:

2.5.1. **Spectrum:** The framework delineates two distinct frequency ranges as "Innovation Spectrum": ISFR1 (3800-4200 MHz) and ISFR2 (5925-6425 MHz). Applicable radio frequency channel widths are specified as 10 MHz, 20 MHz, 30 MHz, and 40 MHz for ISFR1, and 20 MHz, 40 MHz, 80 MHz, and 160 MHz for ISFR2 [, Section 4(1)]. We note the critical distinction is made in the pricing structure: ISFR1 operations require spectrum license fees, whereas ISFR2 is explicitly license-exempt [, Section 20(2), 20(3)].

2.5.2. **Devices:** The regulations provide for two primary types of Innovation Spectrum Devices: Master and Client devices. Master devices are proposed to be fixed or Function Virtualized Devices (FVDs) equipped with internal geo-location capabilities and internet access. Their primary role is understood to be to communicate with the USS to request Operational Parameters (OPs) for themselves and their associated Client devices. Client devices, which can seemingly be fixed, nomadic, mobile, or FVDs, may or may not have geo-location capability. They are understood to obtain OPs from their associated Master device or a Database Proxy (DbP) and operate strictly under the Master's direction.

2.5.3. **Facilitation:** The Unified Spectrum Switch (USS) is central to the framework, defined as a database system authorised by ICASA to

calculate and generate OPs for ISDs and provide spectrum switch services. The Unified Spectrum Switch Provider (USSP) as the entity designated by the Authority to operate and manage the USS, will be functioning as the linchpin of the dynamic spectrum assignment process.

2.5.4. **Process:** The proposed process for Network Operators to gain access to the Innovation Spectrum is multi-step and complex. It involves applying for registration with the USSP via a secure online form, submitting comprehensive company and technical details, and obtaining a preliminary digital spectrum availability certificate. For ISFR1, operators must then secure spectrum authorization from ICASA and pay applicable fees. The regulations also detail the process for Master devices and IS-CPE Cat 2 to communicate with the USS for OPs, including geo-location requirements and periodic validity checks. The proposed framework places the USS and its operator (USSP) at the absolute core of all spectrum operations. The USS is furthermore not merely a registry; it actively calculates OPs, enforces protection criteria for incumbents, and manages channel assignments dynamically. Furthermore, Master devices are mandated to communicate with the USS, provide real-time geo-location data, and crucially, cease transmission immediately if OPs are invalid or contact is lost. This proposed process leaves very little room for error and introduces a single point of critical dependency on the robustness, security and responsiveness of the USS/USSP system. This means it must be meticulously managed to prevent systemic failures or bottlenecks.

2.5.5. **Interference:** The regulations specify maximum permitted transmit power levels (Equivalent Isotropic Radiated Power - EIRP or Total Radiated Power - TRP) and associated antenna height restrictions for ISDs across different deployment scenarios (urban outdoor, rural outdoor, and indoor) for both ISFR1 and ISFR2. It proposes a requirement for incumbent users (Fixed Satellite Services – FSS and Fixed Service – FS) to register their accurate and up-to-date technical details with ICASA to prevent harmful interference. The USSP is responsible for calculating OPs to ensure a low probability of harmful interference, adhering to specific legal frameworks such as the Astronomy Geographic Advantage Act 21 of 2007, the National Radio Frequency Plan 2021, applicable International Telecommunication Union (ITU) recommendations, and intergovernmental bilateral cross-border harmonization agreements [Section 11(4)]. The proposal includes specific protection criteria for FSS receivers (Interference-to-Noise (I/N) ratio of -10.5 dB, not to be

exceeded for 20% of the time) and FS receivers (I/N ratio of -6dB for ISFR2) which are defined, including considerations for coordination distances and frequency offsets [Section 11(5)]. It contains strict out-of-block and out-of-band emission limits, along with the enforcement of 5 MHz guard bands above 3800 MHz and below 4200 MHz, which are put forward to serve as crucial technical safeguards [Section 11(6), 11(8), 11(9), 11(10)]. Furthermore, it is understood that ISDs must be installed by a professional installer to ensure adherence to type approval specifications and prevent unauthorized alterations [Section 11(3)]. The regulations also proposes a protocol to report harmful interference, which includes the USSP's immediate suspension of spectrum assignments to offending operators and the mandatory cessation of transmission by any ISD causing interference within 60 seconds of receiving an instruction from the USS.

3. DETAILED COMMENTS

3.1. Practicality:

3.1.1. Although the concept of a centralised, automated database (USS) operated by a designated USSP is in line with some international practices seen in models like the Spectrum Access System in the US Citizens Broadband Radio Service (CBRS), the operational success and integrity of the entire Dynamic Spectrum Access (DSA) framework are critically dependent on the capabilities and reliability of the Unified Spectrum Switch Provider (USSP).

3.1.2. The regulations explicitly mandate the USSP to "maintain a secure database," "synchronize and acquire necessary technical information from the Authority's systems at least once a week," and "implement propagation algorithms and interference parameters prescribed by the Authority to calculate and provide accurate OPs" [Section 13(2)]. Any failure in ensuring data accuracy, maintaining robust cybersecurity, or guaranteeing system responsiveness could lead to widespread interference, inefficient spectrum utilization, or a breakdown of trust within the ecosystem. Cybersecurity threats are a growing concern globally, and regulatory bodies are not immune. For instance, in early 2024, the U.S. Cybersecurity and Infrastructure Security Agency (CISA) experienced a breach due to vulnerabilities in Ivanti products, leading to the temporary shutdown of two systems.

3.1.3. Therefore the importance of substantial and ongoing investment in the USSP's technical infrastructure, including robust hardware, secure software, and advanced cybersecurity measures cannot be over

emphasised. Equally important is the investment in highly skilled operational and technical personnel capable of managing such a complex system. ICASA's oversight role of the USSP will be paramount, requiring regular performance audits, security assessments, and clear service level agreements. The "non-discrimination" clause [Section 13(2)(j)] is also crucial to prevent the USSP from exhibiting anti-competitive behaviour or favouring certain operators, which could undermine the objective of equitable access.

3.1.4. ICASA has publicly acknowledged its limited financial and human resources, which hamper full digital transformation. This has been raised in its annual reports and parliamentary briefings. The sector is therefore uncertain how the proposed approach set out in the draft regulations would be successfully implemented, and we would require access to the SEIA to understand how all these factors were considered and mitigated.

3.2. **Reliability of approach**

3.2.1. It is noted that the simulations demonstrated a generally low probability of harmful interference from BWA systems to FSS receivers, with the probability further reduced when combining protection mechanisms like I/N ratio and protection distance. However, Appendix A does contain crucial observations involving instances where the I/N threshold was exceeded. This indicates that more dynamic adjustments or highly localised find-tuning of Operational Parameters (OPs) would be required in complex real-world scenarios.

3.2.2. This highlights the ongoing need for the USSP's algorithms to be continuously refined and updated, potentially incorporating real-world performance data and feedback. It underscores the importance of the USSP's ability to dynamically adjust OPs in response to actual interference events, rather than relying solely on pre-calculated models. This also suggests that while the simulations provide a strong baseline, continuous monitoring and adaptive regulation will be essential to manage edge cases and ensure consistent incumbent protection.

3.3. **Level Playing Field:**

3.3.1. The Draft Regulations explicitly state their alignment with the National Radio Frequency Plan 2021 [Section 11(4)(b)] and the Electronic Communications Act , ensuring legal and policy consistency. However, a friction point lies in the "non-market-based, non-competitive pricing" framework for ISFR1 [Section 2(g)]. This contrasts sharply with the high-

demand spectrum licensing processes, which involve multi-billion Rand auctions, as evidenced by past and upcoming licensing processes. This disparity creates an unequal playing field, as incumbent network operators have invested heavily in exclusive spectrum.

3.3.2. The simultaneous pursuit of traditional high-demand spectrum licensing and the introduction of a non-market-based, non-competitive Dynamic Spectrum Access (DSA) framework creates a dual-track approach to spectrum allocation. While the DSA framework is said to be designed to lower barriers for new entrants and promote digital inclusion [Section 2(b), 2(g)], incumbent operators who have paid significant sums for exclusive licenses in other frequency bands regards this as a devaluation of their existing spectrum assets. The ongoing court case regarding spectrum sharing/pooling arrangements further underscores the existing legal and commercial complexities surrounding spectrum sharing, even outside this specific DSA framework.

3.3.3. It is submitted that this process cannot be seen to undermine or devalue existing investments. Clear and consistent communication on the distinct purposes, characteristics (e.g., primary vs. secondary use, innovation vs. high-capacity mobile broadband), and regulatory frameworks of different spectrum bands are crucial.

3.4. **Compliance Burden:**

3.4.1. In accordance with the proposed regulations, incumbent operators (FSS, FS) are required to register their systems with ICASA, and to provide accurate and up-to-date technical details for protection [Section 11(1), 11(2)]. This introduces an onerous new, ongoing compliance burden.

3.4.2. The DSA framework proposes to introduce secondary users into frequency bands previously considered "exclusive" for incumbents, necessitating a reliance on an external entity - the USS's automated interference mitigation capabilities, without any guarantees of its capabilities.

3.4.3. The Draft Regulations explicitly place the responsibility for protecting incumbent users on the Unified Spectrum Switch Provider (USSP) [Section 11(4)]. However, the effectiveness of this protection is contingent on two key factors: the accuracy and completeness of the data submitted by incumbents [Section 11(2)], and the flawless operation of the USSP's algorithms and systems. The regulations state that *"The incumbent user shall bear sole responsibility for resolving interference incidents if the*

conditions specified under regulation 11(1) and (2) have not been met" [Section 12(6)]. This provision shifts a portion of the responsibility for interference resolution back to the incumbent if they fail to comply with registration requirements. Section 11 (2) is seen as a wholly unfair shift of responsibility, especially considering that incumbent operators are already overburdened with compliance requirements moreover if the USSP's system lacks sufficient transparency, this approach would be inappropriate.

3.4.4. Lastly, regulation 12(3) of the Draft Dynamic Spectrum Regulations provides that: "In the case of harmful interference, the Authority may facilitate resolution of disputes between licensees and users of dynamic spectrum, taking into consideration the applicable spectrum etiquette and priority usage rights." This provision does not require, ICASA to act. It lacks enforceable timeframes or formal dispute-handling procedures. Furthermore, there is no express obligation to intervene or provide active technical support (e.g., spectrum trace analysis or interference source identification).

4. **Questions of clarity:**

4.1. The regulations state that "The Authority shall designate a USSP" [Section 13(1)], implying a single or limited number of USSPs. This could potentially create a single point of failure or a bottleneck if not meticulously managed.

4.1.1. What process will be followed to designate a USSP?

4.1.2. What would qualify a USSP to be designated?

4.1.3. Will a single or multiple USSPs be designated (considering the benefits of redundancy and competition, the comprehensive governance framework to ensure accountability, non-discrimination and long-term financial sustainability of the USSP's operations)? (There are examples specifically from the CBRS which seemed to have influenced the content of these Draft Regulations – where the CBRS framework benefits from multiple, competing SAS administrators.)

4.1.4. Will the USS be in a position to dynamically adjust protection criteria and Operational Parameters based on real-time environmental factors, specific incumbent operational modes, or observed interference patterns, moving beyond static I/N thresholds?

4.1.5. Will there be regular, independent technical and security audits of the USSP's algorithms, database integrity, and overall operational performance.

4.1.6. Would ICASA consider publishing anonymized data on spectrum availability, usage trends, and interference incidents to build trust and ensure fairness among all participants?

4.1.7. Does ICASA have the necessary skills, funds and capacity to implement the proposed system?

4.2. Other models such as the European Licensed Shared Access model focusses on licensed sharing between a limited number of operators and incumbents which are often facilitated by direct commercial agreements.
   4.2.1. Was this model considered?
   4.2.2. Why does ICASA believe regulatory enforcement is a more appropriate approach?
   4.2.3. Would commercial agreements with secondary users be allowed?

4.3. As discussed in paragraph 3.4.3, the Draft Regulations shifts a portion of the responsibility for interference resolution back to the incumbent if they fail to comply with registration requirements.
   4.3.1. Has ICASA considered the compliance burden on incumbent operators in the drafting of these regulations?
   4.3.2. How will ICASA support incumbents and how will ICASA processes be streamlined?
   4.3.3. How will deficiencies in the USSP system be dealt with?
   4.3.4. Does ICASA expect incumbent operators to invest in their own spectrum monitoring capabilities to detect potential interference?
   4.3.5. How will confidentiality be balanced with the transparency required for operators to understand potential interference sources or spectrum availability?

4.4. A 60-second cease transmission rule is proposed [Section 12(3)].
   4.4.1. Will ICASA define clear, aggressive, and enforceable timelines for its own investigation and resolution of reported interference issues [Section 12(4)] to minimize operational downtime for affected parties?

4.5. The "non-market-based, non-competitive pricing framework" for ISFR1 [Section 2(g)] is a significant departure from the auction based model currently used.
   4.5.1. How will ICASA ensure a level playing field?
   4.5.2. Will there be regular reviews of the pricing framework?

The SACF thanks ICASA for the opportunity to make this submission and trusts that its contribution would be taken into consideration. Should there be public hearings, the SACF herewith confirms its participation.

Sincerely,

Katharina Pillay
Managing Director

SACF Comments

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