

Dynamic Spectrum Alliance Limited

21 St Thomas Street
Bristol BS1 6JS
United Kingdom
<http://www.dynamicspectrumalliance.org>

3855 SW 153rd Drive
Beaverton, OR 97003
United States



November 9, 2015

Mr. Jonathan Pinifolo
Director of Spectrum
MACRA House, Salmin Amour Road, Private Bag 261
Blantyre, Malawi

By EMAIL

Cc. Llyod Momba

RE: Dynamic Spectrum Alliance Comments on MACRA Proposed TVWS Regulations

Dear Jonathan,

On behalf of the Dynamic Spectrum Alliance¹, I write in support of the Malawi Communications Regulatory Authority's (MACRA) proposed technical rules for operating license-exempt wireless devices in the VHF and UHF spectrum bands in locations where that spectrum has not been assigned to licensed broadcast television services. As MACRA recognizes, the proposed action meets two important goals: (1) By authorizing the use of additional low-frequency license-exempt spectrum, it will expand access to broadband services while protecting incumbent users; (2) Authorizing license-exempt wireless devices to operate on vacant channels enables more efficient use of otherwise fallow spectrum.²

The proposed rules for accessing these television white spaces (TVWS) establish a strong regulatory framework for the provision of white space services. In particular, they allow devices to operate at power levels high enough to offer meaningful broadband coverage, and they accurately protect broadcasters through use of databases and accurate, terrain-based propagation modeling.

In order to optimize use of this spectrum and foster additional innovation and investment in white space devices and services, the DSA recommends several adjustments and clarifications to the proposed framework. Specifically, MACRA should limit the amount of TVWS spectrum available on a licensed basis, and clarify four technical requirements set forth in the rules.

1. MACRA should ensure that a significant amount of TVWS spectrum is available on a license-exempt basis.

An approach to spectrum policy that balances licensed and license-exempt uses, has fueled the wireless connectivity revolution. Exclusive access to licensed spectrum provides the certainty major operators need to make large investments in their wide-area networks, while broad eligibility for access to license-exempt spectrum fosters widespread contributions to innovation and investment in emerging

¹ The Dynamic Spectrum Alliance's over forty members span multinational companies, small- and medium-sized enterprises, academia, research, and other organizations from around the world, all working to create innovative solutions that will increase the utilization of available spectrum to the benefit of consumers and businesses alike. A full list of members is available at <http://www.dynamicspectrumalliance.org/members/>

² MACRA, *Proposed Technical Rules For Operating TVWS In Malawi* (Introduction) at 1 (Proposed Technical Rules).

technologies. Other regulators have found that allowing licensing-exempt access to TVWS is an important way to achieve that balance, especially because many jurisdictions have little, if any, access to license-exempt spectrum below 1 GHz outside of TVWS. If MACRA decides to adopt a hybrid licensing model for TVWS, as opposing to limiting use of TVWS exclusively to license-exempt devices, it should pursue a similarly balanced approach by ensuring that most of the TVWS spectrum is available for license-exempt use. In addition to fostering a diversity of uses and business models, preserving a nationwide minimum of license-exempt spectrum will provide companies economic incentives and the certainty they need to invest in and deploy license-exempt TVWS technologies.

In addition to preserving most of TVWS spectrum for license-exempt use, MACRA should clarify several aspects of the licensing framework. First, the draft regulation does not explicitly state whether licensed TVWS devices would enjoy protection against harmful interference from license-exempt devices. Second, the regulation should clarify the technical rules that apply to licensed devices. For example, MACRA may want to consider allowing TVWS licensees to operate at the same power levels and emission limits as do mobile licensees whose operations are based on cellular technology. Third, Section (d)(1)(ii) of the *TVWS Regulations, 2014* appears to suggest that TVWS licensees could be assigned one or more TVWS channels. MACRA should clarify how those channels will be assigned and how licensees will have to register its coverage footprint with either MACRA or a TV White Space database administrator. Fourth, MACRA should clarify the coverage areas available for licensed TVWS devices.

2. MACRA Should Make Modest Adjustments to the Proposed Technical Rules for Operating TVWS Devices in Malawi.

a. Emission limit restrictions

MACRA should clarify and expand its approach to out-of-band emissions. MACRA's proposed emissions limits restrictions, as set forth in Section (6)(b) of the Proposed Technical Rules, appear to be based on the US Federal Communication Commission's (FCC) values for conducted adjacent channel emission limits. While we support MACRA's proposal to allow devices to access additional spectrum by offering improved out-of-band emissions characteristics,³ MACRA should consider allowing devices that operate in conformance with the emission restriction approach taken by Ofcom. This approach is based on the five device emission classes established under ETSI 301 598⁴. Under this framework, devices with poorer emissions characteristics are still permitted to operate, but they are granted access to spectrum in fewer areas to ensure protection of primary users.

Regulatory frameworks and TV white space databases can accommodate both the FCC and Ofcom approaches, and allowing both approaches provides operators and users with additional flexibility. For this reason, the TVWS rules adopted by the Government of Singapore earlier this year allow for either approach⁵. By allowing for both approaches to emission limit restrictions, Singaporeans

³ Proposed Technical Rules, Section 6(b)(1).

⁴ Final Draft ETSI 501 398 v1.0.9 (2014-02), Section 4.2.4.2.

⁵ IDA Singapore, Telecommunications Standards Advisory Committee, Technical Specifications, Television White Spaces, Issue 1, March 2015, Section 5.3.

can use devices associated with either the ETSI standard or the FCC rule, taking advantage of devices manufactured for the U.S. or European markets.

MACRA should also clarify the emissions limits on non-adjacent channels, as the proposed rules appear to contain a drafting error. At frequencies beyond the television channels immediately adjacent to the channel in which a device is operating, the FCC rules call for the radiated emissions from a white space device to operate at a field strength of no greater than 200 microvolts per meter.⁶ Accordingly, our expectation is that emissions limits for operation on a *non-adjacent* channel to a broadcaster would be at a higher level than the -42.8 dBm emissions limit for fixed devices operating on an adjacent channel rather than being at the more stringent value called out in Section (6)(b)(1)(ii) of -52.8 dBm conducted power per 100 kHz. For simplicity sake, MACRA should consider setting the out-of-band emission limits for fixed TVWD at -42.8 dBm, regardless of whether a fixed TVWD is operating on channel adjacent to TV broadcast operations.

b. Location accuracy

Rather than adopting a static approach to geolocation accuracy, where devices are required to establish their position within 50 meters,⁷ MACRA should consider allowing devices to report their location-accuracy capabilities to the device. Both the FCC and Ofcom have adopted such an approach, which allows devices with more accurate geolocation capabilities access to greater spectrum resources.⁸ Although a static geolocation accuracy requirement may be simpler from MACRA's perspective, it does not provide an incentive for device manufacturers to improve geolocation capability, and it does not take into account the fact that devices are able to determine their location more accurately in outdoor settings. Equally importantly, using location accuracy as an input to the database is straightforward for devices and databases to implement.

c. Database requirements

MACRA should clarify what it means in requiring databases to “be designed as specified in the Cape Town TVWS trial.”⁹ To the extent that MACRA simply intends to require databases to use point-to-point, terrain-based propagation modeling in calculating spectrum availability, DSA supports this requirement. However, MACRA indicates it may designate multiple private entities to administer geolocation databases, and each of these private entities might have its own approach to implementing MACRA's requirements. No specific implementation approach should be prescribed; rather, MACRA should evaluate whether databases meet the criteria specified in the regulations. MACRA should also

⁶ United State Code of Federal Regulations, Title 47, Part 15, Section 209.

⁷ Proposed Technical Rules, Section 8(b).

⁸ Ofcom, *Implementing TV White Spaces 37* (2015), available at <http://stakeholders.ofcom.org.uk/binaries/consultations/white-space-coexistence/statement/tvws-statement.pdf>; *Promoting Spectrum Access for Wireless Microphone Operations*, GN Docket No. 14-166; *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, GN Docket No. 12-268, Report and Order, 2015 FCC LEXIS 2065, ¶ 75-78 (2015).

⁹ Proposed Technical Rules, Section 9(a).

clarify that even if only one commercial database operator seeks to offer service in Malawi, it will be permitted to do so.¹⁰

d. Radiated Power of Fixed Devices

For greater clarity, section 6(a)(1)(i) of the Proposed Technical Rules should be modified to read *“10 Watts EIRP at the output of the antenna of a fixed TVWD, taking into account the transmit power of the TVWD’s radio, loss from cable and connectors, and the directional gain of the antenna.”*

On behalf of the Dynamic Spectrum Alliance, please accept my gratitude for the opportunity to comment on Malawi’s proposed technical rules and regulations for TVWS operations in the VHF and UHF spectrum bands. With the modest changes discussed above, MACRA will create new opportunities for network operators to leverage TV white space technologies and increase digital and social inclusion in Malawi. Please do not hesitate to contact me if you or your staff would like to further discuss any of the points raised in this letter.

Respectfully submitted,



H. Sama Nwana
Executive Director
Dynamic Spectrum Alliance

¹⁰ *Id.*, Section 10(a) (suggesting that *one* public entity or *multiple* private entities will be permitted to offer database services).