

## SUMMARY

The [Dynamic Spectrum Alliance](#) (DSA) appreciates the opportunity to comment on the New Zealand Ministry of Business, Innovation, and Employment, Radio Spectrum Management's (RSM) Television White Space Devices Certification and Licensing Rules Draft for Consultation. The DSA supports the adoption of an interim framework that enables the testing of white space technologies, but we encourage RSM to move expeditiously to adopt a permanent framework enabling operation of unlicensed (license-exempt) wireless devices in the television white spaces (TVWS). Because TVWS technology has been proven in multiple pilot projects around the globe and is generally authorized in the United States (and soon will be in other countries), extensive trials that would slow deployment in New Zealand are unnecessary.

Deployment of TVWS devices can improve broadband access across a number of dimensions:

- It can provide broadband access to homes, schools, libraries, and health providers in remote areas.
- Fixed TVWS devices can be part of a network that provides a wireless canopy over an urban public park or a campus. For example, Microsoft has pursued commercial pilots of this type with local partners in Ghana and Tanzania.
- TVWS can also improve the utility of residential broadband Internet service delivered over fiber by delivering high-speed nomadic broadband access across multiple devices from a single fixed access point in the home.

Although the technical analysis and licensing regime proposed by RSM takes a very conservative approach, the interim licensing scheme moves the process forward and will provide RSM with greater visibility into the operation of TVWS devices and further confirmation that such devices can operate effectively without causing harmful interference to the incumbent primary service, Digital Terrestrial Television (DTT). The DSA urges the RSM to follow the lead of other regulators around the world, which are permitting limited commercial deployment of TVWS networks while a more permanent regulatory regime is developed. Below, DSA offers some suggestions to improve the utility of the licenses and expedite the licensing process.

## INTRODUCTION

**Among New Zealanders, the use of mobile and nomadic devices to access the Internet is skyrocketing.** New Zealanders increasingly rely on wireless broadband access both 'on the go' (mobile use) and within range of a fixed broadband connection at home, work, café, outdoors, etc. (nomadic use). According to World Internet Project New Zealand report "Internet Trends in New Zealand 2007-2013", 69% of survey respondents accessed the Internet wirelessly in 2013 over smart phones and tablets, up from 8% in 2007.<sup>1</sup> Moreover, "Almost four out of five (79%) internet users in New Zealand

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<sup>1</sup> Gibson, A., Miller, M., Smith, P., Bell, A. Crothers, C (2014). *Internet Trends in New Zealand 2007-2013*. Auckland, New Zealand: Institute of Culture, Discourse & Communication. Auckland University of Technology.

have accessed the internet through a laptop in the last year, slightly (but significantly) more than the proportion having accessed the internet through a desktop computer (74%)”<sup>2</sup>.

**These trends are mirrored in the broader landscape.** Each year, Cisco Systems, Inc. (Cisco) releases a white paper that examines major global mobile data traffic projections and growth trends. In its most recent paper, Cisco notes that in 2013, global mobile data traffic grew 81 percent from the previous year, with mobile video traffic exceeding 50 percent<sup>3</sup>. Looking ahead, Cisco forecasts that global mobile data traffic will increase nearly 11-fold between 2013 and 2018 and that over two-thirds of the world’s mobile data traffic will be video by 2018<sup>4</sup>. There is no reason to believe that these trends will be any different in New Zealand. Consumers will want to access video over mobile and nomadic connections to the Internet across multiple devices. The expected skyrocketing increase in the use of wireless networks to access the Internet will increase the demand for both licensed and unlicensed spectrum and thus drive the need for active spectrum management on the part of RSM.

## **ROLE OF TELEVISION WHITE SPACES IN MEETING INCREASED DEMAND**

**Access to Unlicensed Spectrum Plays a Significant Part in Meeting Growing Consumer Demand.** Access to unlicensed spectrum allows licensed wireless and wireline broadband providers to increase the reach of their networks and improve network management in congested urban areas through techniques such as cellular offloading. “Globally, 45 percent of total mobile data traffic was offloaded onto the fixed network through Wi-Fi<sup>5</sup> or femtocell in 2013. . . . Without offload, mobile data traffic would have grown 98 percent rather than 81 percent in 2013.”<sup>6</sup> In a 2012 publication,<sup>7</sup> Cisco cites that “Two-thirds of all smartphone activities are typically ‘nomadic,’ such as email, web browsing, gaming, using productivity tools, and making video calls,” and identifies unlicensed devices such as Wi-Fi as “ideal for these pursuits.”

An additional benefit is that innovators creating new products and services operating in unlicensed spectrum bands do not need to seek permission from spectrum licensees such as mobile broadband network operators. In the United States, for example, all that is required is that the devices conform to Part 15 of the Federal Communications Commission’s rules.<sup>8</sup> Other jurisdictions are exploring the possibility of allowing devices access to the TVWS frequencies without a license, but subject to technical rules and device type approval procedures to ensure interference protection.

**Unlicensed Access to Television White Spaces Provides Unique Benefits.** As RSM has recognized, dynamic spectrum access allows “access to frequencies at a certain time or in a certain geographic location on a relatively temporary basis, even where the frequencies have already been

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<sup>2</sup> Gibson, A., Miller, M., Smith, P., Bell, A. Crothers, C (2014). *The Internet in New Zealand 2013*. Auckland, New Zealand: Institute of Culture, Discourse & Communication, AUT University.

<sup>3</sup> Cisco Visual Networking Index (VNI) Global Mobile Data Traffic Forecast Update 2014.

<sup>4</sup> Ibid.

<sup>5</sup> Trademark of the Wi-Fi Alliance.

<sup>6</sup> Cisco Visual Networking Index (VNI) Global Mobile Data Traffic Forecast Update 2014.

<sup>7</sup> Cisco IBSG Service Provider FastFacts – “A New Chapter for Mobile: How Wi-Fi Will Change the Mobile Industry as We Know It” (2012).

<sup>8</sup> U.S. Code of Federal Regulations, Title 47, Part 15.

assigned to another user (who is not using it at the particular time or location).” The benefits of enabling dynamic spectrum access are clear: It allows use of otherwise fallow spectrum, increasing spectrum utilization without going through the challenges of clearing spectrum and relocating incumbents.

The benefits of enabling shared access to television band spectrum are particularly significant. Radio waves operating in different spectrum bands have varying atmospheric propagation characteristics and interact with materials differently, and spectrum below 1 GHz -- such as in the broadcast television bands – can carry signals greater distances in free space without requiring equipment to repeat the original signal. Additionally, these lower-frequency radio waves are able to penetrate many structural materials considerably better than those operating in higher frequency spectrum, while also allowing for non-line of sight applications.

For these reasons, the availability of substantial new sub-1 Gigahertz (GHz) spectrum in TVWS on an unlicensed basis may provide an affordable wireless solution to extending the reach of broadband networks serving rural consumers and priority users, enable high speed indoor and outdoor wireless local area networks, and network the millions of devices that will compose the coming Internet of Things. TVWS devices that will use the 802.11af Wi-Fi standard might not have as much data capacity as in other bands, but exhibit a much greater range of operations.

**TVWS Devices Have Been Tested and Deployed In Many Other Jurisdictions.** A number of jurisdictions have allowed deployments of TVWS devices. In all cases, access to the Internet was improved without causing interference to incumbent users. In particular, deployments have improved Internet access in schools, facilitated the delivery of government services, and established communication channels in the wake of earthquakes and typhoons. These deployments have taken place in locations as diverse as the United States, Namibia, the United Kingdom, South Africa, Singapore, Japan, South Korea, Ghana, the Philippines, Kenya, Tanzania, Uruguay, and Malawi.

## COMMENTS ON THE CONSULTATION

**DSA Encourages RSM to Pursue Permanent Authorization of the License-Exempt Use of TVWS Devices As Exeditiously As Possible.** Experiences throughout the world demonstrate that unlicensed TVWS devices conforming to the rules generally similar to those adopted in the United States can operate without causing harmful interference to licensed services. Therefore, we hope that RSM will adopt technical rules that enable dynamic, unlicensed access to the television white spaces as soon as possible. In particular, we urge RSM to move toward a regulatory approach that relies on either databases or sensing for interference protection. The proposed interim approach – which gives licensees access to particular channels upon their request – should be just that: a temporary measure.

With that said, we appreciate RSM’s approach in its interim licensing arrangement as an opportunity for it to gain experience and build confidence in the utility of TVWS technologies for different use cases throughout New Zealand. Much of the responsibility during this interim licensing period appears to fall on the shoulders of Approved Radio Engineers. DSA believes that the lessons learned from this process can contribute to discussions regarding how to automate and scale access to television white spaces.

The interim licensing arrangement is timely in that commercially produced fixed TVWS equipment is now available in increasing volumes and commercially produced mobile TVWS equipment used for coverage licenses is expected to be available within two years. The interim licensing arrangement will provide New Zealand companies interested in providing commercial services that utilize TVWS a window for planning, capital expenditure, and implementation in small-scale deployments.

**DSA Suggests A Number of Technical Improvements to the Interim Rules.** With respect to the details of the Interim Rules, DSA offers the following suggestions:

- Fixed licenses should not be restricted to the Height-Above-Average-Terrain and power levels found in the US FCC rules – especially when deploying in rural areas. Under the interim process, an ARE can determine the parameters that can be supported without causing harmful interference to DTT service.
- RSM should consider supporting related research at local universities that would include collecting actual measurements of DTT signals to refine any further propagation modeling, particularly in more densely populated areas where there are lots of buildings and other structures.
- RSM should assist Territorial Local Authorities (TLAs) in developing a method for processing license applications. Such a process could include the following elements: (1) a template for licensing TVWS devices; (2) a limited time for processing license application, and (3) a mechanism enabling applicants to appeal to RSM if their license is not granted. If a TLA fails to take action before the shot clock expires, the prospective licensee’s application should be deemed granted.

## CONCLUSION

The Dynamic Spectrum Alliance welcomes RSM’s action in improving access to the television white spaces and looks forward to working with RSM on the development of permanent rules for the unlicensed use of this spectrum.

Respectfully submitted,



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