Dynamic Spectrum Alliance Limited
21 St Thomas Street
Bristol BS1 6JS
United Kingdom
http://www.dynamicspectrumalliance.org

3855 SW 153rd Drive
Beaverton, OR 97006
United States

DSA
DYNAMIC • SPECTRUM • ALLIANCE

To: House Energy and Commerce Committee

From: Dynamic Spectrum Alliance

Date: April 25, 2014

Re: **White Paper: Modernizing U.S. Spectrum Policy**

About the Dynamic Spectrum Alliance

The Dynamic Spectrum Alliance (DSA) is a global, cross-industry alliance focused on increasing dynamic access to unused radio frequencies and creating innovative solutions to benefit consumers and businesses alike. The membership spans multinational companies, small-and-medium-sized enterprises, academic, research, and other organizations from around the world. A list of members is available at www.dynamicspectrumalliance.org.

Introduction

Usage of wireless networks both in the United States and globally is skyrocketing. The Cisco Visual Networking Index predicts that mobile IP traffic globally will increase eleven-fold over the next five years, and traffic from wireless devices will constitute the majority of all IP traffic by 2016.[1] Meeting this wireless demand is essential to promoting technological innovation and economic growth. To enable the next wave of innovation in the wireless sector and in the broader U.S. economy and to address growing consumer demand for voice, video, and data applications, the House Energy and Commerce Committee (Committee) should support policies that enable robust access to hundreds more megahertz of both unlicensed and licensed spectrum both above and below 1 GHz and that enable dynamic spectrum sharing as a way of improving spectrum utilization.

1. Congressional policies should enable robust access to both licensed and unlicensed spectrum.

[1] *See* Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update: Forecast and Methodology, 2013–2018, http://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/white_paper_c11-520862.html; Cisco Visual Networking Index: Forecast and Methodology, 2012–2017 at 1-2 (May 29, 2013), *available at* http://www.cisco.com/c/en/us/solutions/collateral/service-provider/ip-ngn-ip-next-generation-network/white_paper_c11-481360.pdf.

Enabling access to both licensed and unlicensed spectrum is key to meeting increasing spectrum demands. In the past, a balanced approach has fueled the wireless economy, benefiting consumers, innovators, and investors. 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 unlicensed spectrum fosters widespread contributions to innovation and investment in emerging technologies. For instance, because unlicensed devices are "free from the burden of normal delays associated with the licensing process," manufacturers can design equipment to "fill a unique need [that can] be introduced into the market quickly."[2] Thousands of new unlicensed devices are certified each year. Wi-Fi devices are the best known, but Bluetooth,[3] Zigbee,[4] and RFID[5] devices have all also experienced rapid growth in the last several years. Machine-to-machine technologies, which often rely on unlicensed spectrum, represent a large and growing market as well.

Unlicensed use also complements licensed use. For example, "the availability of Wi-Fi networks in many locations . . . enable[s] users to take much of their data off of a licensed network," benefiting users by enabling faster service and reducing congestion for licensed operators.[6] For smartphones and tablets in particular, Cisco has found that "daily data consumption over Wi-Fi is four times that of cellular."[7] This ability to offload data from cellular networks to Wi-Fi has saved mobile network operators billions of dollars in network deployment costs.[8] The Wi-Fi experience also makes clear that greater availability of unlicensed spectrum increases both demand for and the utility of licensed spectrum. Wi-Fi availability has enabled consumers to use their phones and tablets more intensively to access online content and services. Use and development of these online services in turn drives demand for licensed and unlicensed network access, creating a virtuous cycle of investment in content, services, and applications.

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[2] Kenneth R. Carter, Ahmed Lahjouji, & Neal McNeil, FCC, *Unlicensed and Unshackled: A Joint OSP-OET White Paper on Unlicensed Devices and Their Regulatory Issues*, OSP Working Paper Series at 5 (May 2003).

[3] Bluetooth is a standard facilitating hands-free operation of music players, mobile phones, and other devices.

[4] Zigbee powers technologies that benefit from ad hoc and mesh networking solutions, such as home automation.

[5] Radio Frequency Identification (RFID) technologies are used in a variety of industries to track inventory or other objects.

[6] Federal Communication Commission, *The National Broadband Plan* 95 (2010), *available at* www.broadband.gov.

[7] *Id.* at 20.

[8] Mark Cooper, Efficiency Gains and Consumer Benefits of Unlicensed Access to the Public Airwaves, at iii, 15-18 (Jan. 2012) (finding that offloading lowers operator costs by approximately $26 billion per year); European Commission, *Study on the Importance of Wi-Fi & the Socioeconomic Benefits of Using Small Cell Infrastructures*, Aug. 1, 2013, *available at* http://ec.europa.eu/digital-agenda/en/news/study-importance-wi-fi-socioeconomic-benefits-using-small-cell-infrastructures, at 5 (finding that offloading reduced the network costs of European network operators by 35 billion euros in 2012, with savings expect to rise to as much as 200 billion euros in 2016).

In addition, unlicensed spectrum has proven essential to enable Wireless Internet Service Providers (WISPs) to provide fixed and nomadic voice, video, and data services to consumers located remote areas of the country.[9] Wireless backhaul will also play a major role in the deployment of new LTE small cell services nationwide.[10]

For all these reasons, federal policy should support robust access to both licensed and unlicensed spectrum at a variety of high, medium, and low frequencies. Just as licensed and unlicensed access are complementary means of meeting growing spectrum demand, access to spectrum at different frequency ranges is essential to meeting users' varied needs. Lower frequencies enable non-line-of-sight transmission over longer distances, through walls, foliage, and other obstructions. Higher frequencies are ideal for greater transmission capacity over short distances. With a variety of licensing approaches over a range of frequencies, hardware developers and service providers can better and more cost-effectively meet the needs of businesses and consumers, and use spectrum more efficiently.

2. Congress should encourage dynamic spectrum sharing to meet increased demand.

Given the rapidly increasing demand for spectrum to support wireless services, policymakers will not be able to meet urgent needs solely through clearing and repurposing spectrum.

Spectrum sharing is an attractive supplement to spectrum clearing for several reasons. First, spectrum sharing allows efficient use of spectrum. For example, as the FCC has recognized through its efforts to open up the television white spaces for unlicensed use and its proposal to enable spectrum sharing in the 3.5 GHz band,[11] sharing does not displace existing users; it allows new devices and services to take advantage of spectrum that otherwise would be unused. Spectrum sharing strategies, such as dynamic frequency sensing, geo-location databases, and other techniques, thus make the most of a limited resource.

Second, spectrum sharing can make additional spectrum for wireless services available relatively quickly. The process of clearing incumbents and auctioning exclusive licenses can be lengthy and complicated. Spectrum sharing minimizes delays by leaving incumbent operations in place. Further, spectrum sharing can be utilized in times of transition between clearing and auctioning—for example, databases can enable temporary access to available spectrum before

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[9] *See* Comments of the Wireless Internet Service Providers Association, *Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act*, GN Docket No. 12-228 (filed Sept. 20, 2012), *available at* http://apps.fcc.gov/ecfs/document/view?id=7022017891

[10] David Chambers, *Using Unlicensed Spectrum for Small Cell Backhaul*, Mar. 13, 2014, http://www.thinksmallcell.com/Backhaul/using-unlicensed-spectrum-for-small-cell-backhaul.html.

[11] *See generally* Economic and Innovation Opportunities of Spectrum Through Incentive Auctions, Docket No. 12-268, *Notice of Proposed Rulemaking*, 27 FCC Rcd 12357 (2012) (Incentive Auction NPRM); Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band, GN Docket No. 12-354, *Notice of Proposed Rulemaking*, 27 FCC Rcd 15594 (2012).

new licensed services become operational.[12] This flexibility has been demonstrated recently in the Philippines, where the Philippine Government has deployed TV white space radios and connectivity in aid of earthquake and typhoon recovery in Bohol and Tacloban, respectively.[13]

Third, spectrum sharing is proven. Networks relying on shared spectrum have been deployed successfully in the United States.[14] In South Africa, Google's Cape Town trial delivered broadband over vacant broadcast spectrum with a minimum data rate of 2.5 Mbps and peak data rates of 10 Mbps to 10 secondary schools at distances between 3 and 6 kilometers of a base station, without causing harmful interference to incumbent services. Similar and even better performance measurements have been observed in other trials around the world, in locations as diverse as the United States, the United Kingdom, Singapore, Japan, Korea, the Philippines, Kenya, Tanzania, and Malawi. Importantly, these spectrum sharing trials and pilots around the world have achieved excellent performance without causing any harmful interference to incumbent licensees.

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As the Committee considers potential updates to its spectrum policies, it should consider those policies' long-term economic impact. Spectrum policies will remain with us for years to come, while technology and innovation are constantly changing. Over the course of the last several decades, there are abundant examples of the tremendous economic growth created through innovation and entrepreneurship when new unlicensed spectrum is made available. The best policies are those that invite and enhance such innovation, economic growth, and competition across wireless applications, devices, and services.[15]

In summary, in order to enable continued growth and innovation in wireless technologies and in the U.S. economy as a whole, we urge the Committee to support policies that increase the amount of unlicensed and licensed spectrum available for wireless use. In particular, the Committee should enable unlicensed and licensed spectrum both above and below 1 GHz and support dynamic spectrum sharing as a way to make the most of this finite resource. We look forward to working together on policies that power tomorrow's wireless economy.

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[12] *See* Michael Calabrese, *Use it or Share it: Unlocking the Vast Wasteland of Fallow Spectrum* (2011), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1992421; *see also* Incentive Auction NPRM at ¶ 405.

[13] *See, e.g.*, Pia Ranada, *TV White Space connects Bohol fisherfolk to the Net*, Rappler, Apr. 7, 2014, *available at* http://www.rappler.com/nation/54742-tv-white-space-fisherfolk-bohol.

[14] Amar Toor, *North Carolina launches FCC-approved TV White Space network in Wilmington*, Engadget, Jan. 30, 2012, http://www.engadget.com/2012/01/30/north-carolina-launches-fcc-approved-tv-white-space-network-in-w/

[15] In making policy, the Committee should also recognize that sufficient access to shared or unlicensed spectrum is a critical precondition for successful deployment, just as sufficient access to spectrum is a precondition for the development of licensed services. Device and chip manufacturers hesitate to commit resources to new bands and technologies until there is certainty that sufficient spectrum will be available.

Respectfully submitted,

H. Sama Nwana
Executive Director
Dynamic Spectrum Alliance