Testimony of
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Before
The U.S. House of Representatives Committee on Energy and Commerce
Subcommittee on Communications and Technology

"Challenges and Opportunities in the 5 GHz Spectrum Band"

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10:30 a.m.
2123 Rayburn House Office Building
Washington, D.C.

Good morning Chairman Walden, Ranking Member Eshoo, and Members of the Subcommittee. Thank you for this opportunity to provide you with a status report of the Federal Communication Commission's efforts to provide more access to unlicensed spectrum in the 5 GHz frequency band. As the very title of this hearing notes, this process presents numerous engineering challenges. But increased access to unlicensed spectrum in this band could greatly accelerate the growth and expansion of new Wi-Fi technology – offering faster speeds, increasing overall capacity, and reducing congestion at hot spots.

In my role as the Chief of the FCC's Office of Engineering and Technology (OET), I advise the Commission concerning a broad range of engineering issues. Among other responsibilities, OET's mission is to create new opportunities for competitive technologies and services for the American public. As part of this work, OET has the responsibility for overseeing unlicensed spectrum, as governed by Part 15 of the Commission's rules.

Unlicensed spectrum has been a phenomenal success story. Innovations that utilize these airwaves affect virtually every aspect of our daily lives, including the Wi-Fi networks that we use in our homes and at public hot-spots, Bluetooth technology for connecting mobile devices with wireless headsets and speakers – and for connecting computer tablets with keyboards, electronic keys for opening car doors, identification badges for secure access to buildings, and

many other products too numerous to mention. Unlicensed technologies have spurred creation of entire new industries and jobs, to the benefit of businesses, consumers, and our overall economy.

And if the past is any indicator of the future, the opportunities for innovative unlicensed products and services are almost limitless. Unlicensed spectrum is already playing a vital role in meeting our nation's broadband needs. Earlier this year, Cisco estimated that 47% of all mobile traffic in the United States is offloaded onto Wi-Fi, and projects that offloading will grow to 66% by 2017. Cisco also predicts that by 2017, 62% of all Internet traffic will be carried over Wi-Fi networks.

Congress recognized the importance of providing additional spectrum for both licensed and unlicensed use in the Middle Class Tax Relief and Jobs Creation Act. This law specifically directs the National Telecommunications and Information Administration (NTIA) and FCC to examine the potential for expanded unlicensed use in the 5 GHz frequency band. In February of this year, the Commission adopted a Notice of Proposed Rulemaking (NPRM) that satisfies the requirements of Section 6406 (a) of the Act. The proposal would modify existing FCC rules to make some unlicensed 5 GHz spectrum more usable, and provide access to additional, new unlicensed spectrum in that band.

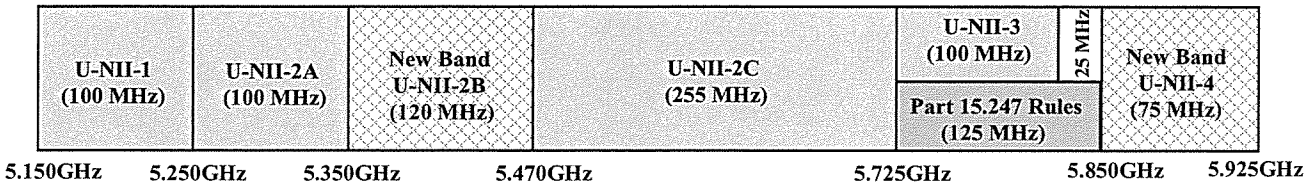
Unlicensed National Information Infrastructure (U-NII) devices today operate in 555 megahertz of spectrum in the 5 GHz band, and are used for Wi-Fi enabled local area networks to connect smart phones, tablets, and laptops to the broadband network. This spectrum also supports broadband services offered by Wireless Internet Service Providers (WISPs), particularly in rural areas.

The Commission proposed making up to 195 megahertz of additional spectrum in the 5 GHz band (a 35% increase) available to unlicensed wireless devices. It also proposed a more robust use of 100 megahertz of the existing unlicensed spectrum, and streamlining existing rules and equipment authorization procedures for devices throughout the 5 GHz band. The proposed modifications would provide access to additional contiguous spectrum with consistent technical requirements, allowing unlicensed devices to use wider bandwidth channels, leading to faster speeds.

The Commission's proposed rules also would enable greater use of the latest industry Wi-Fi standard, IEEE 802.11ac, that uses wider channel bandwidths of up to 160 megahertz to provide data rates of 1 Gbit/s or more. This new standard presents exciting opportunities for growth of unlicensed devices and services in the 5 GHz band.

Importantly, the Commission recognized the numerous challenges to making additional spectrum available in the 5 GHz band. Because the band is already used for other purposes by both federal and non-federal users, permitting additional shared use requires significant collaboration with stakeholders to enable non-interfering shared use of the spectrum.

The Commission focused its NPRM on three separate portions of the 5 GHz band, each of which I describe briefly below. This chart illustrates the location and size of the bands.



U-NII-1

Currently, the 100 megahertz U-NII-1 band from 5150-5250 MHz is available for unlicensed use only indoors, and at relatively low power levels. Because of those restrictions, it is not heavily used for Wi-Fi.

The Commission asked whether it should harmonize the power and use conditions across the lower 200 megahertz of U-NII spectrum to permit the introduction of a wide-range of new broadband products capable of operating at higher data rates than is now possible.

In its ongoing work to examine the potential use of other frequency bands for broadband purposes, NTIA and the Department of Defense (DoD) had also considered new uses for some of the 5 GHz spectrum, including relocating certain DoD systems that currently operate in the 1755-1850 MHz band into the 5150-5250 MHz band. Recently, however, DoD has proposed an alternative approach that would not require additional DoD access to the 5150-5250 MHz band.

U-NII-2B

Today, the proposed 120 megahertz U-NII-2B band from 5350-5470 megahertz is primarily used by DoD radars for various purposes in both terrestrial and airborne configurations. Many of these radar applications are similar to those in the adjacent frequency bands where sharing is accomplished through use of Dynamic Frequency Selection (DFS) technologies. Unlicensed devices use DFS monitor channels to detect the presence of a radar within that channel. When a radar is detected, the unlicensed device will cease using that channel, and move to another frequency in order to avoid interfering with the radar.

Initial studies have indicated that interference mitigation in addition to DFS may be necessary to protect all of the radar types used in the 5350-5470 MHz band. NTIA is currently studying compatibility between proposed U-NII equipment and the incumbent radar users. Both federal agencies and industry representatives have been continuing their efforts to complete these analyses.

U-NII-4

The proposed 75 megahertz U-NII-4 band from 5850-5925 MHz is currently used by DoD radars, Amateur Radio Service, and Intelligent Transportation Systems such as the Dedicated Short Range Communications Systems (DSRC) for vehicle to vehicle technology. We understand that an extensive amount of research and investment has gone into developing the

DSRC over the past decade, and that the automotive industry and proponents of unlicensed use have recently begun evaluating viable sharing scenarios in the 5 GHz band. A considerable amount of work remains to examine the compatibility between unlicensed devices and these incumbent uses. We are hopeful that all parties will work together to come to technical solutions that will permit unlicensed operations in this band to coexist with DSRC and other systems.

Conclusion

Because of the existing incumbent users in the three 5 GHz bands, making the spectrum more usable – or usable at all – for unlicensed use, will be challenging. But the importance of the 5 GHz band, and the benefits of unlicensed spectrum generally are clear, and the Commission has indicated its strong desire to move forward in seeking to resolve those challenges.

Many others share the Commission's interest in this band. The Commission received 65 comments and 32 replies during the comment period that closed on July 24, 2013. Ex parte comments also continue to be filed, as the FCC meets with the interested parties from the Wi-Fi industry, wireless internet service providers, the cable industry, the transportation industry, and others.

Finally, I want to emphasize that the Commission has not proposed to take away any incumbent user's right to operate as a licensed service in the 5 GHz band. As with all unlicensed services, U-NII devices may not cause harmful interference to licensed services, and must accept any harmful interference that they receive. It is my hope that all parties will work together in good faith to overcome these technical and policy challenges, and that we will be able to find a way to effectively share all 295 megahertz of the spectrum I described today.

Thank you and I look forward to your questions.