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HEARING ON "OUR WIRELESS FUTURE: BUILDING A COMPREHENSIVE APPROACH TO SPECTRUM POLICY"

BEFORE THE
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COMMITTEE ON ENERGY AND COMMERCE

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Chairman Doyle, Ranking Member Latta, and Members of the Subcommittee, thank you for holding this hearing. I appreciate this opportunity to provide you with an update on the Federal Communications Commission's activities on spectrum.

Spectrum management is woven into the fabric of the FCC across virtually all of its various bureaus and offices. I have the privilege of leading the terrific staff of the Office of Engineering and Technology, where I have served as an engineer for 45 years. My office works closely with the other FCC bureaus and offices to ensure that our recommendations to the Chairman and Commissioners on spectrum matters are based on sound engineering and efficient use of the airwaves.

The FCC also works closely with the National Telecommunications and Information Administration (NTIA) and the various federal agencies to coordinate use of the spectrum. Under a Memorandum of Understanding that dates back to the late 1930s, the FCC coordinates spectrum matters that may affect federal users through the Interdepartment Radio Advisory Committee.

Our actions on spectrum are guided by the Communications Act and the various laws passed by Congress. In particular, we are laser-focused on implementing the various spectrum provisions of the MOBILE NOW Act.

The radio frequency spectrum is a national resource that serves a diverse array of services—public safety, defense, broadcasting, satellite, transportation, commercial and private wireless, and amateur radio, just to name a few. The job of managing this spectrum resource in a way that provides access to the airwaves for all of these services, ensures licensees are protected against harmful interference, and allows for the introduction of new and innovative services is quite challenging from an engineering standpoint.

The Commission is hard at work implementing a balanced spectrum policy that is responsive to the many demands for spectrum access—for 5G, new satellite services, unlicensed, advanced spectrum sharing, rural use, and so forth. I'd like to highlight some of the things we have been working on.

A top priority for the Commission is to ensure the U.S. maintains and advances its leadership in 5G, the next generation of wireless connectivity. Each generation of wireless services has brought with it new opportunities for innovation, enhanced the safety of our citizens, new businesses and job creation, and improved our overall quality of life. If you ask 5 people what 5G is, you will probably get 6 different answers. Yet most seem to agree on certain important aspects of 5G's potential—speeds 100 times faster than today's networks, much greater capacity, and lag-times one-tenth of what they are today that enable real-time interactions with people and the Internet of Things.

What is perhaps most exciting about 5G is that nobody knows for sure what new services will emerge. What we do know is that we can expect the unexpected. When 4G arrived, we knew it offered

faster speeds, greater capacity, and much improved connectivity with the Internet. Nobody anticipated that 4G would spark the app economy, the explosive growth of social media services, and the creation of new businesses for ride sharing, home sharing, bicycle and scooter rentals, and more. Cell phones have become an indispensable part of our everyday lives. The one thing I would highlight about 5G is that its capabilities will reach far beyond cell phones. It will enable new types of connectivity that will be essential for virtually every segment of our economy—transportation, energy, manufacturing, healthcare, agriculture, and others.

To realize this potential, Chairman Pai developed and we are executing the 5G FAST plan—a comprehensive strategy that will "Facilitate America's Superiority in 5G Technology." It consists of three central components: freeing up much more spectrum for the commercial marketplace, promoting wireless infrastructure deployment, and modernizing our regulations to promote more fiber deployment.

Today, I'd like to focus on what the FCC is doing to make more of our nation's airwaves available for the commercial marketplace.

5G networks will be woven together using a combination of low-, mid-, and high-band spectrum. Low-band spectrum is important for coverage, particularly in rural areas. Mid-band spectrum provides a great mix of coverage and capacity. And high-band spectrum provides much greater capacity, delivers the fastest speeds, and is well-suited for urban areas.

On low-band spectrum, the Commission conducted a successful broadcast television incentive auction thanks to Congress's leadership that yielded 84 MHz of spectrum for wireless broadband services, including 70 MHz of licensed spectrum. Carriers are already deploying networks using this spectrum, and we are well along in the process of repacking the TV broadcast spectrum.

The Commission is also taking several actions to make mid-band spectrum available for 5G. Last week, for example, the Commission revised its rules for the 2.5 GHz band to make this valuable spectrum available for 5G, much of which currently lies fallows in rural areas. This will be accomplished by allowing incumbents greater flexibility in their use of the spectrum, providing a priority window for Tribal Nations to obtain unassigned spectrum to address the communications needs in rural areas of their communities, and introducing a spectrum auction that will ensure that this public resource is finally devoted to its highest-valued use. We anticipate holding this spectrum auction next year.

The Commission has also made 150 MHz of spectrum available in the 3.5 GHz band under a state-of-the-art dynamic spectrum sharing technique that protects Department of Defense radars against harmful interference and provides shared access for broadband services with elements of both the licensed and unlicensed models. We have worked closely with NTIA, the Department of Defense, and industry stakeholders to develop this spectrum sharing system. The spectrum sharing system relies on use of Spectrum Access Systems that manage access to the airwaves and prevent interference. We are in the final stages of approval of the Spectrum Access Systems and expect to move forward with initial commercial deployments soon. And Chairman Pai has announced that the FCC intends to hold an auction of the 3.5 GHz band next year. Last year, the Commission revised its rules for the 3.5 GHz spectrum that will be auctioned so that the private sector will have the incentive to use it to deploy 5G services.

The Commission has also moved forward with a rulemaking proceeding in which it proposed to reallocate spectrum for 5G in the 3.7-4.2 GHz band, commonly called the C-band, and to make part or all of that band available for flexible use. The Commission is considering a number of proposals for how we might go about repurposing this spectrum, including through market mechanisms and auctions. This is a very complicated proceeding. But Chairman Pai has indicated that we will have results to show on this front this fall.

Turning to high-band spectrum, the Commission has conducted successful auctions of spectrum at 24 GHz and 28 GHz. Last week, we also voted on final rules for an auction of the upper 37 GHz, 39

GHz and 47 GHz bands for 5G, with the auction to begin on December 10, 2019. This auction will be the largest in American history, releasing 3,400 megahertz of spectrum into the commercial marketplace. Taken all together, the FCC's auctions this year will free up for the commercial marketplace almost 5,000 megahertz of spectrum for flexible wireless use, including 5G.

Unlicensed use is another key component of our overall spectrum strategy. We recently updated our rules for unlicensed use in the TV White Spaces and are planning to initiate a rulemaking later this year to make these rules better suited for rural deployment of wireless broadband and for the Internet of Things.

Last year, the Commission proposed to open up as much as 1,200 megahertz of spectrum in the 5.925–7.125 GHz band for unlicensed use on a shared basis with incumbent services. This spectrum is particularly well positioned for the expansion of the Wi-Fi spectrum that is already available in the 5 GHz region. This spectrum is heavily used by utilities, public safety, and commercial wireless providers for point-to-point microwave services, as well as by others. We're working through some complex technical issues, both internally and with outside stakeholders.

The Commission earlier this year also took action to make a total of 21.2 gigahertz of spectrum available for unlicensed use above 95 GHz. This region of the spectrum had long been the outermost horizon of spectrum usable for consumer applications. Technology has been developed that is opening up new opportunities to make use of this spectrum.

The spectrum at 5850–5925 MHz, referred to as the 5.9 GHz band, is another place where the Commission has been considering access for unlicensed use. This spectrum is designated for Intelligent Transportation Services based on a technology known as Dedicated Short-Range Communications, or DSRC. Last year we released the results of Phase 1 lab tests that showed that spectrum sharing by unlicensed devices may be feasible, subject to the completion of field tests in Phases 2 and 3. In the meantime, the 5G Automotive Association filed a waiver petition to allow use of a different auto-related technology called C-V2X in this spectrum. Some have suggested that it is time to review the overall use of this 75 megahertz of spectrum. We are working closely with the Department of Transportation and NTIA in considering next steps.

Space services are another key element of the Commission's spectrum strategy. In recent years, we have dedicated certain new frequency bands for use by satellites. We have issued licenses to multiple organizations to launch constellations of satellites in non-geostationary low-earth orbit to provide broadband services. We recognize that satellites are an important element of the 5G equation. And at the August 1 agenda meeting, the FCC will consider a draft order that would make it easier and cheaper to license small satellites. The proposed new regulatory process would enable "smallsat" applicants to choose a streamlined alternative to existing licensing procedures that, among other things, would have a much lower application fee than for standard satellite systems. There are a lot of startups working to make smallsat technology a real player in the digital communications revolution.

Providing access to spectrum on the basis of exclusive use is always a desirable goal and the Commission continues to seek such opportunities. We often find, however, that sharing is the more appropriate approach depending on the circumstances in any slice of spectrum. For example, there wasn't another band to which we could relocate the Navy radars in the 3.5 GHz band, but sharing enabled us to tap into the spectrum resources that sit idle when the ships are far out at sea.

I can confidently tell you that the United States is leading the world in developing advanced sharing techniques. FCC staff is working closely with initiatives undertaken through the Defense Advanced Research Projects Agency Spectrum Challenge II, the Department of Defense's National Spectrum Consortium, the National Science Foundation's Platforms for Advanced Wireless Research, among many other initiatives. The techniques coming out of these endeavors hold promise for tapping into spectrum resources that were previously inaccessible.

The World Radiocommunication Conference scheduled for later this year (WRC-19) is an important forum for international spectrum allocations and technical standards. There are many issues that will be considered at WRC-19 that are vitally important to U.S. interests. The FCC works with other organizations across government, including the State Department, NTIA, and other federal agencies in developing U.S. positions for the conference. Our goal is to ensure that the United States' interests are well-represented and that consumers across our country can ultimately benefit from the innovation that wise spectrum policies enable.

Lastly, I want to recognize the outstanding staff at the FCC who day-in and day-out dedicate themselves to finding solutions to these very difficult problems. I am proud to represent the many dedicated public servants at the FCC who manage the airwaves to make all this possible.

Thank you for this opportunity to testify. I will be pleased to answer any questions that you may have.