Testimony of

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on

"The Evolution of Next-Generation Technologies: Implementing MOBILE NOW"

before the

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Chairman Thune, Ranking Member Schatz, and members of the Subcommittee, on behalf of CTIA and the U.S. wireless industry, thank you for the opportunity to testify today.

CTIA commends this Committee, Congress, the Federal Communications Commission (FCC), and the Administration for their ongoing leadership in identifying and repurposing spectrum for 5G. The full power of 5G will be transformative, and this Committee's focus on crafting smart spectrum policies is critical to our country's 5G future. The benefits that we expect to reap from 5G in the U.S.—economic growth, job creation, the promise of smart cities, and improvements in public safety, health care, and our environment, to name a few—are predicated on access to sufficient spectrum suitable for 5G.

And thanks to your leadership, the MOBILE NOW Act that Congress enacted last year stands as a critical "down payment" for our 5G future. This forward-looking, bipartisan law helped jump-start our nation's focus on mid- and high-band spectrum. Thanks to your efforts, along with key actions the FCC has taken to make spectrum available for 5G, the United States gained a first-mover advantage in 5G with the world's first commercial launches.[1] This head start is key to ensuring that the U.S. is a world-leading 5G innovation hub. We are building faster and with more certainty thanks to this Committee's leadership, and we are pleased to report that residents of South Dakota, Mississippi, Arizona, Colorado, Florida, Indiana, Massachusetts, Michigan, Nebraska, and Texas, among others, are benefiting today from your

vision. From the first 5G hospital in Chicago to the first 5G-enabled factories, smart cities, entertainment companies, and schools, we are just scratching the surface of the 5G economy.

To fully achieve our 5G future, as the MOBILE NOW Act recognized, we need to identify and repurpose more spectrum. And that need is pressing—especially in the mid-band. Now we need to finish the job fast, and I'm confident we will with this Committee's continued focus on wireless leadership.

I am pleased to have this opportunity to report on our nation's 5G progress, the impact of the MOBILE NOW Act so far, and the steps we must take and directions to pursue to maintain U.S. leadership in 5G.

America's Ever-Growing Demand for Wireless, the Arrival of 5G, and Maintaining U.S. Leadership in the Wireless Ecosystem

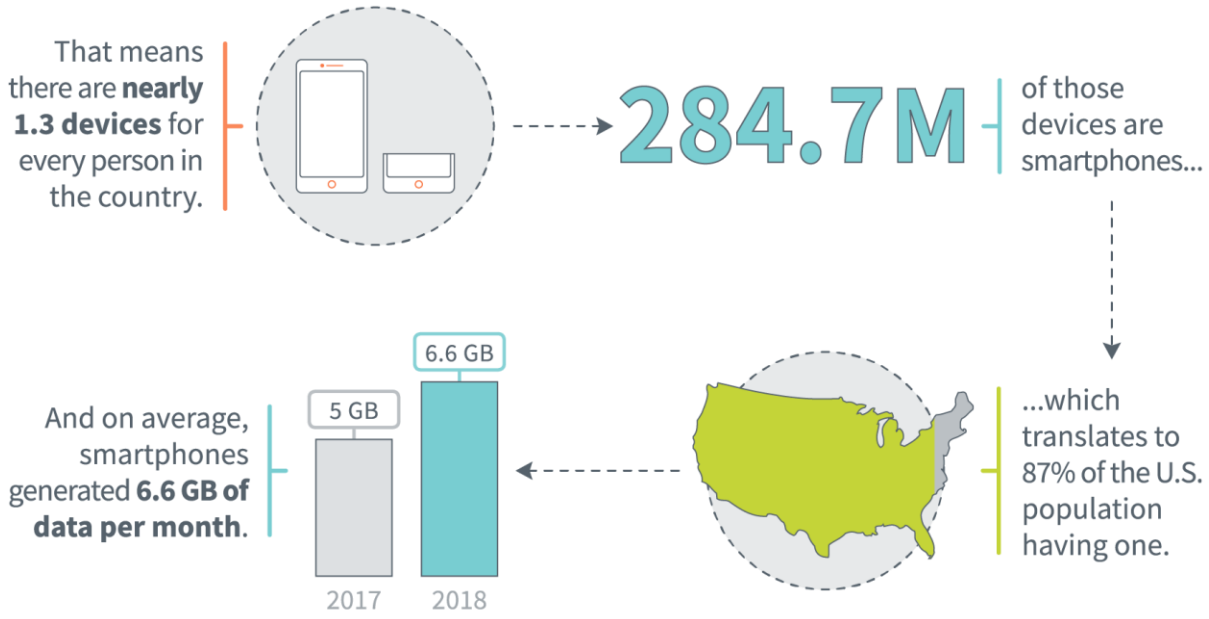
Wireless has never played a more central role in how Americans live, work, and play, and 5G will be even more transformative—making our lives better, our communities safer, and our nation more prosperous. The next few years will define our 5G future and, even as there is more work to do, we are bullish on maintaining U.S. leadership as 5G emerges and flourishes.

The U.S. led the world in 4G—not just as the first mover in network deployments, but in market-transforming innovation as well. And we are well-positioned for 5G: last year, U.S. wireless providers were the first to deploy commercial 5G networks, and today we are poised to turn the United States into the center of 5G-powered innovation. But other countries are

working to seize the mantle of 5G leadership, and U.S. private sector investment, innovation, and initiative cannot do it alone. Thankfully, Congress, the FCC, and the Administration understand that a sound spectrum policy is critical for our 5G future.

Unprecedented Growth in Wireless. The U.S. continues to experience unprecedented growth in demand for wireless services. In 2018, we saw an 82 percent increase in mobile data use from the prior year.[2] To put this in perspective, 2018's mobile data is more data than Americans used *in the first six and a half years of this decade combined*. And the number of voice minutes and text messages in 2018 were up, too.[3]

There are now more mobile devices than there are people living in the U.S., with a total of 421.7 million connected devices.[4] Data usage on smartphones continues to skyrocket—up to 6.6 GB of data per month on average, an increase of more than 30 percent in 2018. And the number of data-only devices, like connected cars, smartwatches, and health monitors, grew more than 10 percent in 2018.[5]



This growth is made possible because of the wireless industry's continued, massive investment in the United States. In 2018, the wireless industry invested $27.4 billion in capital expenditures[6]—primarily for expanding the capacity and coverage of wireless networks and upgrading network technology to support 5G. The results are tangible: in terms of infrastructure deployment, the number of cell sites increased by more than 25,000 in 2018,[7] the biggest year-over-year increase since 2010-2011; and in terms of service, consumers today are experiencing even faster download speeds, 90 percent faster than just five years ago.[8]

U.S. Leadership and the Power of Innovation. Most importantly, these numbers tell a story of American innovation and, looking ahead, the U.S. is uniquely positioned to take advantage of 5G's promise. If we get it right, we can and will—again—lead the world in the next

generation of wireless, which means real and significant benefits for the U.S. economy and consumers.

But we are not alone in this drive to lead on 5G, as other nations are eager to lead as well. The good news is that the U.S. has a proven playbook in 4G leadership that translates to the 5G era: competition, innovation, and investment. While other nations scramble to do what we have done, these core principles form a U.S. playbook that is fundamentally different from other countries—and that's a good thing. State-owned carriers won't be able to replicate the dynamic that allowed us to lead the world in 4G and propels us forward in the 5G revolution.

U.S. 5G competition, innovation, and investment are ready to go: U.S. wireless providers are starting to invest a projected $275 billion to deploy 5G, creating three million jobs, and adding $500 billion to the U.S. GDP.[9] U.S. wireless providers are deploying a deep and wide 5G platform, with half of U.S. connections expected to be 5G by 2025, compared with only 28 percent of connections in China. Of course, more work needs to be done, and that begins with spectrum, in particular, mid-band spectrum. Other nations are on track to have four times the mid-band spectrum available by the end of 2020. Japan, China, and South Korea have each assigned hundreds of megahertz of mid-band spectrum to their national carriers. This Committee's work on the MOBILE NOW Act was a jump start to our 5G future, and full implementation of various key provisions in the Act will help us finish the job fast.

How the U.S. Will Lead on 5G: Spectrum Availability and Smart Infrastructure Policies

We need an all-of-the-above approach to spectrum strategy that includes a healthy mix of low-, mid-, and high-band spectrum. The Spectrum Act of 2012 set the framework for the 600 MHz broadcast incentive auction, and wireless providers right now are building out low-band 5G-capable networks on track to reach more than 200 million Americans with 5G this year. That is one of the clearest examples that a future-oriented spectrum policy creates remarkable opportunities for U.S. consumers.

In the MOBILE NOW Act, this Committee recognized the critical role of spectrum to our wireless future and provided meaningful leadership and legislative direction to the FCC. Section 603 of the MOBILE NOW Act directed the FCC and the National Telecommunications and Information Administration (NTIA) to identify at least 255 megahertz of federal and non-federal spectrum for licensed and unlicensed wireless broadband use by December 31, 2022, with at least 100 megahertz for licensed commercial use below 6 GHz.[10] The provision is an important start, but we need to move quickly to execute, particularly on mid-band spectrum.

Following this Committee's lead and Chairman Pai's 5G FAST Plan, the FCC has done important work making spectrum available, and later this year the FCC will auction three more high-frequency bands. Now, we need to focus on delivering critical mid-band spectrum to market. To that end, we commend the FCC for scheduling an auction of the Priority Access

Licenses in the 3.5 GHz band for June 2020. But more work needs to be done to build on that 70-megahertz mid-band down payment.

Mid-Band Spectrum. As the Committee recognized through the MOBILE NOW Act, mid-band spectrum will be a workhorse for 5G and the "sweet spot" of spectrum innovation. That's because it leverages both capacity and coverage opportunities—meaning it can handle the increased traffic that 5G will bring, and it can travel distances, which is helpful in more rural and suburban settings. Mid-band spectrum has great potential to facilitate the rapid deployment of 5G services because it will accommodate the wide bandwidths necessary to facilitate the faster connections and low latency that 5G technology promises. For these reasons, freeing up mid-band can be a spectrum stimulus for our country. Recent estimates have shown that making 400 megahertz of licensed mid-band spectrum available in the U.S. will drive $274 billion in GDP growth and 1.33 million new jobs.[11]

The 3.7 GHz Band. This Committee recognized some of the most critical mid-band opportunities and took steps to advance investigation of those bands. We appreciate the MOBILE NOW Act's interest in repurposing mid-band spectrum between 3.7 GHz and 4.2 GHz, the "C-Band," for commercial wireless services.[12] We thank Chairmen Wicker and Thune, as well as Ranking Members Schatz and Cantwell and Senator Markey, for your focus on this band. Additionally, we applaud Senators Gardner and Hassan for their early work making the C-Band

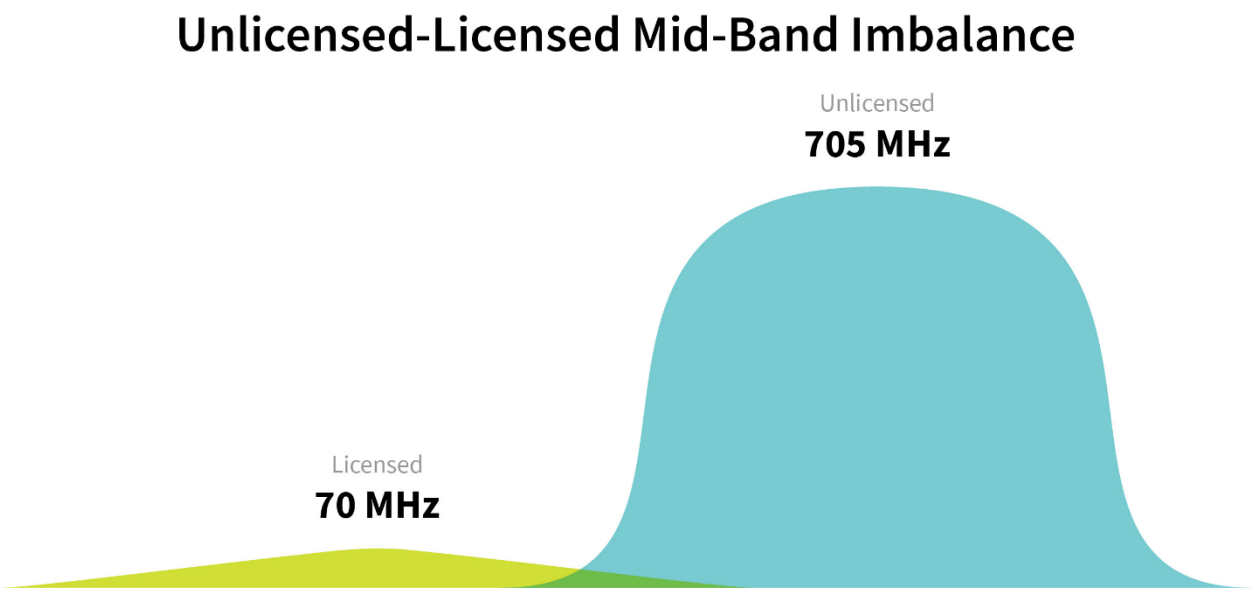
available for commercial use in the AIRWAVES Act. It is encouraging to see the bi-partisan recognition of the need to make more mid-band available for innovative 5G services.

We are pleased that Chairman Pai recently announced a clear direction for repurposing the C-Band, and we share the goals he set forth: making available a significant amount of spectrum for 5G; doing it quickly; generating revenue for the U.S. government; and protecting the services currently delivered over the C-Band. We support a public auction of at least 280 megahertz and urge the Commission to move to an order, set an auction date for next year, and clear the band for new 5G services as soon as possible.

The 6 GHz Band. In addition, unlicensed spectrum is a necessary input in an all-of-the-above spectrum strategy, and Section 603 of the MOBILE NOW Act also directed the FCC and NTIA to identify 100 megahertz below 8 GHz for unlicensed use. The FCC has just announced its intent to make available 45 megahertz of 5.9 GHz for unlicensed use, consistent with MOBILE NOW.

The 6 GHz band represents another opportunity, like the 3.5 GHz band, where we can enable new licensed and unlicensed services. The FCC has a proceeding underway examining 1,200 megahertz in this band, and we support the introduction of unlicensed operations in the lower portion provided the FCC adopts an interference protection framework that protects critical incumbent fixed-link services that will remain in the band, including those licensed to

power companies, public safety entities, broadcasters, and rural broadband providers. Unlicensed devices (including indoor and very low power outdoor/indoor devices) can co-exist so long as they are subject to a trusted mechanism that knows their location and ensures their operations will not cause harmful interference into the nearly 100,000 fixed links providing vital communications for public safety, critical infrastructure, and wireless backhaul.[13]



The 6 GHz band—which is an expansive 1,200 megahertz of mid-band spectrum—can also provide opportunities for cleared licensed use. CTIA has called for the FCC to take a balanced approach to the 6 GHz band by exploring the upper portion of the band for licensed, flexible-use, including for 5G.[14] While the mobile wireless industry has access to zero licensed mid-band spectrum above 3 GHz today and is only slated to gain access to 70 megahertz of licensed spectrum in the 3.5 GHz band next year, the unlicensed community today has access

to 705 megahertz in the same frequency range. Given this stark divide, policymakers should look to provide balance in its allocation of this critical mid-band spectrum opportunity.

Through an auction of upper 6 GHz spectrum, the license winners, the FCC, and NTIA would work to find a home for incumbents that provides comparable reliability, throughput, and operating costs to their current locations. Some microwave links could move to the 7 GHz band that today is lightly used by federal government users for similar services. CTIA has proposed that the FCC work with NTIA to add a non-federal allocation to the 7.125-8.4 GHz band, which NTIA has already identified for potential sharing with commercial services, so these frequencies can be available as one option for relocating fixed links from the repurposed portion of the 6 GHz band. The 7 GHz band is already home to fixed microwave services, so this combination would promote more efficient and effective use of spectrum. This proposal can be a win-win, as exploration of licensing in the upper 6 GHz band need not delay FCC action on unlicensed operations in the lower portion of the band.

The Lower 3 GHz Band. The Committee deserves great credit for identifying the opportunity in the 3100-3550 MHz band early and jumpstarting a process to ensure that commercial and federal systems have the resources needed to thrive. The Department of Defense (DOD) currently operates high-powered radar systems in the band, and there are some non-federal secondary users, including entities offering radiolocation services. That's why we

are eagerly awaiting the NTIA report required in the MOBILE NOW Act on the feasibility of opening spectrum in this band for commercial wireless use.[15]

We hope the Committee helps shepherd this review and ensures expeditious action to leverage opportunities for more efficient use of this band. The FCC will vote this month on a proposal to consider relocating the non-federal services from the upper 250 megahertz, 3300-3550 MHz, to the lower portion of the band to help ready the band for additional 5G use.[16] We support NTIA's and the FCC's focus on this band, as this spectrum could play a crucial role in our nation's 5G goals as we seek to identify additional, much-needed mid-band spectrum, and we look forward to working collaboratively with this Committee, DOD, and NTIA to open this band to robust commercial mobile wireless use.

We also applaud Chairman Wicker and Ranking Member Schatz for introducing the Supplementing the Pipeline for Efficient Control of The Resources for Users Making New Opportunities for Wireless (SPECTRUM NOW) Act, which requires the auction of 100 megahertz between 3450 MHz and 3550 MHz for wireless use. We are pleased that NTIA launched an investigation into this 100-megahertz segment of the band,[17] and we appreciate FCC Commissioner O'Rielly's comments that the "top 100 megahertz should be reallocated immediately, and…the requisite study [of the 3100-3550 MHz band] needs to get done quickly, not years from now, so that we know what is there and what protections will be needed."[18]

Many nations are set to deploy 5G in these frequencies, and it is critical that we consider this band's ability to support commercial mobile services as soon as possible.

Additional High-Band Spectrum and International Harmonization. We also appreciate the MOBILE NOW Act's directive on, and the FCC's continued consideration of, the 42 GHz band for terrestrial wireless operations. Terrestrial mobile use of the 42 GHz band would benefit from significant economies of scale, as it is within the same "tuning range" of equipment specified by 3GPP for high-band spectrum that is being auctioned later this month. Manufacturers can design and build equipment capable of operating across the 37-43.5 GHz range, which was identified for 5G at the World Radiocommunication Conference (WRC-19) last month, and already includes the 37 GHz and 39 GHz bands that will be included in FCC Auction 103. We urge this Committee to continue its focus on the 42 GHz band, as it has the potential for global harmonization, which can create economies of scale and drive down the cost of wireless equipment.

To that end, with the close of WRC-19 last month, one overriding message is clear: the demand for wireless services continues to grow rapidly and the need to deliver additional spectrum to meet this demand is more urgent than ever. We thank the U.S. delegation for its commitment to advancing our nation's 5G goals in the international arena.

Support for Transitioning Federal Spectrum While Maintaining the Federal Mission.

Sound spectrum policy encourages federal use of more modern and spectrally efficient communications systems, and auction proceeds can serve to transition federal systems to modern technologies and free up spectrum for commercial use. Since it was first adopted in 2005, the Spectrum Relocation Fund (SRF) has proven to be an innovative legislative tool that can be used to cover the costs of relocating or updating federal agency systems or R&D efforts to free up additional spectrum. At its heart, the SRF provides the certainty that any federal spectrum band transition or new system deployment necessary to free up spectrum will be fully covered.[19]

We support enhanced flexibility and funding in the SRF so that federal incumbents can consider improvements to their current systems and enhance the efficiency of their spectrum use. In turn, more efficient federal use can unlock additional spectrum for exclusive or shared commercial use. Going forward, all spectrum users will need to increase efforts to be good stewards of this limited natural resource—and the wireless industry is proud to be a leader in such efforts. Earlier this year, a CTIA study found that U.S. wireless providers have increased their spectrum efficiency 42 times since 2010.[20] We hope to continue to work with this Committee on ways to further enhance the SRF to reallocate or share additional federally held spectrum when and where it could be used more efficiently.

To that end, we appreciate again Chairman Wicker's and Ranking Member Schatz's effort through the SPECTRUM NOW Act, as well as Senators Moran and Udall's leadership to help agencies more efficiently and effectively manage their spectrum resources. We also applaud Senator Lee for introducing the Government Spectrum Valuation Act, which would better equip this Committee and the Administration to ensure spectrum is being put to its best and highest use by determining its market value. We also recognize Senator Markey's past work to incentivize agencies to move off spectrum that could otherwise be reallocated to consumer uses. We hope these important legislative efforts move forward this Congress.

Finally, it is important to note that Congress has recognized the value of exclusive-use licensing by directing NTIA to give priority to allocations that involve exclusive, non-federal use,[21] and that spectrum sharing should only be considered when spectrum cannot be made available on an exclusive-use basis. We were troubled by a provision in the Senate-passed version of the National Defense Authorization Act (NDAA), Section 214, which allows DOD, not the FCC or NTIA, to establish a sharing program on spectrum used by DOD *and* incumbent commercial systems. Commercial spectrum has never been—and should not be—governed by DOD. Any consideration of spectrum sharing policy decisions, technologies, or reports involving federal and non-federal spectrum should be led by the FCC and/or NTIA.

Infrastructure Siting and Wireless Broadband Deployment. Thanks to efforts by this Committee and the FCC, expanding wireless broadband is a national priority. The MOBILE NOW Act took important steps to help wireless providers site infrastructure on federal lands and properties. CTIA supports reasonable and enforceable timelines for handling siting applications and applauds Section 606's inclusion of a 270-day shot clock to grant or deny an application to site wireless facilities on federal lands. We also commend the MOBILE NOW Act's efforts to streamline and standardize the process by which broadband providers can obtain access to federal properties for siting wireless facilities. We encourage the Committee to ensure federal agencies are taking the steps necessary to ease the burdens of deploying on federally managed lands and properties.

Finally, we applaud Senators Gardner and Sinema for introducing the TOWER Act to increase broadband deployment and close the workforce shortage in the communications industry. The wireless industry is projected to invest heavily in deploying 5G and this legislation will help ensure we have the skilled workforce necessary.

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Thank you for the opportunity to testify today. CTIA appreciates this Committee's actions through the MOBILE NOW Act to promote U.S. leadership in 5G. We look forward to

continuing to work with all of you through the implementation of this important law and on additional efforts to advance our ability to maintain global leadership in 5G.

[1] CTIA, *A National Spectrum Strategy to Lead in 5G*, at 2 (Apr. 2, 2019), https://api.ctia.org/wpcontent/uploads/2019/04/A-National-Spectrum-Strategy-to-Lead-in-5G.pdf.

[2] CTIA, *2019 Annual Survey Highlights*, at 1 (June 20, 2019), https://www.ctia.org/news/2019-annual-survey-highlights.

[3] *Id*. at 3.

[4] *Id*. at 4.

[5] *Id*.

[6] *Id*. at 5.

[7] *Id*.

[8] *Id*.

[9] *Id*. at 6.

[10] Consolidated Appropriations Act, 2018, Pub. L. No. 115-141, Division P (RAY BAUM'S Act of 2018), Title VI (MOBILE NOW Act), § 603, 132 Stat. 348.

[11] David W. Sosa, Ph.D. and Greg Rafert, Ph.D., *The Economic Impacts of Reallocating Mid-Band Spectrum to 5G in the United States*, ANALYSIS GROUP (Feb. 2019), https://www.ctia.org/news/the-economic-impacts-of-mid-band-spectrum-in-the-united-states.

[12] MOBILE NOW Act § 605(b).

[13] *See Ex Parte* Letter from CTIA to FCC, ET Docket No. 18-295 (filed Oct. 22, 2019).

[14] *See* Comments of CTIA, ET Docket No. 18-295 (filed Feb. 15, 2009).

[15] MOBILE NOW Act § 605(a).

[16] *Facilitating Shared Use in the 3.1-3.55 GHz Band*, Draft Notice of Proposed Rulemaking, WT Docket No. 19-348, FCC-CIRC1912-03 (draft rel. Nov. 21, 2019).

[17] U.S. Department of Commerce, Annual Report on the Status of Spectrum Repurposing (Aug. 2019).

[18] Michael O'Rielly, Commissioner, Federal Communications Commission, Remarks Before the Mobile World Congress Americas 2019 Everything Policy Track (Oct. 23, 2019).

[19] CTIA, *The Benefits of Spectrum Auctions for Wireless Consumers, Providers, and Federal Agencies*, at 1 (Apr. 2019), https://api.ctia.org/wp-content/uploads/2019/03/The-Benefits-of-Spectrum-Auctions-for-Wireless-Consumers-Providers-and-Federal-Agencies.pdf.

[20] CTIA, *Smarter and More Efficient: How America's Wireless Industry Maximizes Its Spectrum*, (July 2019), https://www.ctia.org/news/wireless-providers-increased-spectrum-efficiency-by-42-times-since-2010-new-paper-shows.
[21] 47 U.S.C. § 923(j).