Testimony of

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on

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Chairman Doyle, Ranking Member Latta, members of the Committee, on behalf of CTIA and the wireless industry, thank you for the opportunity to testify today.

CTIA commends the Committee, Congress, the FCC, and the Administration for their ongoing leadership in identifying and repurposing spectrum for 5G. I especially want to thank this Committee for its commitment to crafting smart spectrum policies for 5G and our country's future. Every benefit that we are experiencing with 5G in the U.S.—expanding digital inclusion, economic growth, job creation, smart cities, and improvements in public safety, health care, and our environment—is predicated on the availability of spectrum.

And—of course—there is more to do. The FCC's auction authority is slated to expire on September 30, 2022, and Congressional action is needed to ensure the agency can auction and license spectrum that will deliver 5G to American consumers and businesses. Beyond extending this authority, it is in our national interest to identify a spectrum pipeline of bands to be auctioned for exclusive use—after the July 2022 auction of the 2.5 GHz Band there will be no more 5G spectrum in the pipeline.

We commend lawmakers from both parties for the long-standing practice of identifying specific bands for the FCC to auction, for example in the 2020 Beat CHINA for 5G Act and the MOBILE NOW Act of 2018. Even with this Congressional impetus, we find that the U.S. is falling behind our global competitors' 5G mid-band allocations, putting us at risk of ceding leadership in wireless and missing out on some of the economic and job creation benefits of 5G. A national spectrum strategy can help to meet this challenge and provide

guideposts for actions to advance 5G and U.S. global leadership in wireless. And finally, as a nation we can do much to revitalize a unified government voice on spectrum management, and CTIA commends the recent FCC-NTIA Spectrum Coordination Initiative as an important first step.

5G is Delivering for American Consumers and Businesses, in the Fight against Climate Change, and as a New Competitive Force in Home Broadband

5G wireless broadband networks are transforming the way we live and work, with speeds up to 100 times faster than 4G networks, network responsiveness five times quicker, and network capacity that can handle 100 times the number of devices. In 2020, U.S. wireless providers continued a remarkable and sustained record of wireless investment: wireless providers invested nearly $30 billion, the third straight year of increasing capital expenditures to power America's world-leading wireless networks and deliver 5G across the nation.[1]

With these network investments, the Boston Consulting Group projects that 5G will add $1.5 trillion to America's economy and create 4.5 million new jobs over the next decade.[2] 5G is updating and building the industries of the future, including healthcare, smart manufacturing, transportation, logistics, and agriculture.

5G is also contributing to protecting our planet, according to a recent Accenture study that quantifies the impact of 5G wireless services on climate change.[3] Accenture concluded that in the U.S., 5G-enabled use cases are expected to enable a 20 percent contribution toward carbon emission reduction targets, helping the country meet its climate change goals. Accenture finds that 5G use cases will have the same effect as taking nearly 72 million cars off the road for a year.

And America's wireless industry is now bringing its competitive energy to the home broadband market, with impressive success. In the fourth quarter of 2021, one wireless provider's residential broadband solution led all broadband offerings (including cable and wired competitors) with the most new subscribers, according to a recent Morgan Stanley report.[4] This is possible due to the greatly expanded capacity and capabilities of 5G, enabled by access to new spectrum. 5G for home broadband is currently available to tens of millions of American households, and competing 5G home providers will offer service to over 200 million homes by 2025.[5] And 5G for home broadband could be decisive in delivering broadband to rural America, as a recent study finds that 5G could serve 8.4 million rural households—nearly half the rural homes in the U.S.—with a future-proof broadband solution with faster speeds and lower prices.[6] Indeed, the Infrastructure Act recognized the value of fixed wireless 5G as part of NTIA's $42.5 billion broadband grant program when it identified "priority" projects as those that, among other things, are scalable to meet evolving connectivity needs and "support the deployment of 5G, successor wireless technologies, and other advanced services."[7]

Americans' Growing Demand for Wireless and the Need for More Mid-Band Spectrum

Americans are consuming more wireless service than ever before and wireless providers are investing billions in efficiency-enhancing technologies and new 5G networks—but to keep up pace with demand for new fixed and mobile 5G use cases and services, the U.S. needs to free up additional spectrum, especially licensed mid-band spectrum.

In 2020, mobile wireless data traffic topped 42 trillion megabytes, more than three times the amount of wireless data reported just four years earlier in 2016.[8] Over the past decade, America's wireless users have driven a 108x increase in mobile data traffic. And Americans are connecting with more and more devices, about 1.4 devices per person, for a total of 468 million wireless devices.

The demand for spectrum—in particular, mid-band spectrum—is also skyrocketing. Mid-band spectrum is the "sweet spot" of spectrum innovation and is a key factor for 5G, as it provides high speeds over a broad coverage area, making sure no one gets left out of the New Economy.

Last year, the FCC conducted two auctions for full-power mid-band spectrum, one for 280 megahertz of C-Band spectrum from 3.7-3.98 GHz, and the other for 100 megahertz from 3.45-3.55 GHz. Together, these two auctions raised over $102 billion in winning bids, and will be the backbone of wireless investment over the next few years. Contrast these auctions to the auction of 70 megahertz of CBRS spectrum that sits between the 3.45 GHz band and the C-Band: primarily due to far lower authorized power levels and a complicated sharing structure in CBRS, that spectrum sold for only $3.2 billion, less than a quarter the amount of C-Band based on a per-MHz-PoP basis. CBRS requires five times as many cell sites for coverage in suburban areas, and at least seven times as many in rural areas—significantly increasing costs, the time to deploy, and slowing 5G network buildout.[9] The CBRS sharing regime also took about 8 years from FCC proposal to auction, far longer than C-Band (3 years) and 3.45 GHz (2 years).

Wireless data projections—a 24 times increase in 5G subscriptions by 2026 and an over 500 percent increase in wireless data use over the same period[10]—demand several hundred megahertz per wireless provider to support the long-term speed and capacity needs of U.S. fixed and mobile 5G.

FCC Chairwoman Jessica Rosenworcel should be commended for moving quickly on the 3.45 GHz auction last year consistent with a bipartisan congressional directive. Similarly, her recent announcement of the 2.5 GHz auction is a welcome sign for another auction this July. There is, however, no other spectrum in the FCC's 5G pipeline.

In the meantime, other nations understand that global leadership in wireless—and the billions of dollars in economic growth and millions of jobs in the industries of tomorrow—hinges on access to prime spectrum. Leading nations around the world are making on average approximately 650 megahertz of licensed mid-band spectrum—from 3–7 GHz—available by the end of 2022.[11] But in the United States, we will have just 270 megahertz of licensed mid-band spectrum available by the end of 2022 (100 megahertz of 3.7-3.8 GHz C-Band, 100 megahertz from the 3.45 GHz band, and 70 megahertz of CBRS licenses). Even with access to Phase II C-Band spectrum from 3.8-3.98 GHz by the end of 2023, the U.S. will have a total of 450 megahertz of mid-band spectrum, meaning that these benchmark nations will have roughly 1.5 times the amount of mid-band spectrum for 5G as the United States. Those nations also continue to allocate more spectrum for future wireless use. America is playing catch-up, but with the right policies in place we can maintain our global leadership in wireless.

Key Recommendations for Future Global Wireless Competitiveness

I want to thank this Committee for its ongoing commitment to advancing U.S. wireless interests. I have four recommendations for Congress, and the U.S. wireless industry is committed to partnering with this Committee to sustain the U.S. as the global leader in wireless.

1. Re-up the FCC's Auction Authority. Reauthorizing the FCC's auction authority is critical to maintaining America's wireless leadership. Auctions have proven to be the most successful means to assign the interference-protected, exclusive-use, flexible rights spectrum licenses that are the bedrock of 5G and mobile wireless communications. Auctions create a market-driven mechanism to determine the highest and best use of spectrum, assigning spectrum rights to auction winners who invest billions of dollars into next-generation network buildouts. Spectrum auctions have resulted in, to date, over $200 billion in revenue for the U.S. taxpayers, and auction proceeds have been used to modernize systems for DoD and other agencies that have repurposed spectrum for commercial use.

Congress should expeditiously extend the FCC's auction authority. Since 1993 when Congress established the first-in-the-world spectrum auction authority, it has never allowed that authority to lapse. On five occasions, Congress has granted the FCC broad auction authority and Congress has used these opportunities to direct auctions of specific bands for commercial, licensed wireless use, with one exception (a short-term one year extension). CTIA urges Congress to do the same this year and include a requirement for auctioning specified bands coupled with an extension of the FCC's auction authority.

2. Replenish the Spectrum Pipeline. A predictable pipeline of spectrum will do much to advance U.S. 5G interests and will help us keep delivering new innovations to the American people and match the actions foreign governments are taking. We agree with FCC Chairwoman Rosenworcel: "[E]nsuring there is a pipeline of licensed and unlicensed spectrum is important for the development of 5G wireless service, next-generation services and devices, and our national economic growth and global competitiveness."[12] It can take significant time to identify and make spectrum available for auction, so it is in our national interest to develop a spectrum pipeline that addresses today's needs and plans for the future.

The lower 3 GHz band (3.1-3.45 GHz) is a top priority. This 350 megahertz swath neighbors existing full-power commercial spectrum, making it an ideal fit to provide large channels and flexibility to be aggregated with other bands. The Infrastructure Act provided the Department of Defense with resources to study repurposing lower 3 GHz spectrum for commercial services and extended authority for an auction. Bringing the 3.1-3.45 GHz band to market in the near term is crucial to our global 5G leadership.

Congress can take steps now to streamline access to this key band, and we support the Spectrum Innovation Act, which would enhance the process to bring that critical mid-band spectrum to auction. Congress should also take steps to identify and set clear deadlines for future access to other mid-band spectrum, as well as low- and high-band spectrum at the same time it extends auction authority. In doing so, priority should be given to those bands that are internationally harmonized for global use and those bands that can best be cleared of existing users to allow full-power 5G-friendly rules.

The 7/8 GHz band (7.125–8.4 GHz) is a prime mid-band resource that NTIA has already found to be underutilized. We also recommend mid-band spectrum in the mid- to upper-frequencies in the 4 GHz band that are used today in China and other countries.

Good spectrum policy requires a mix of spectrum bands leveraging differing capacity and coverage characteristics. With respect to low-band spectrum, in 2015 Congress directed the FCC to auction at least 30 megahertz below 3 GHz by 2024. Congress now has the opportunity to clearly define the spectrum to be auctioned and pair it for expanded capabilities. Congress should actively consider the 1.3-1.35 GHz band, the 1.124-1.164 GHz band, and 1.78-1.83 GHz band. Congress should also set a clear timetable to address commercial access to high-band spectrum, the 26 GHz, 42 GHz, and 50 GHz bands.

CTIA commends Congress' ongoing interest in repurposing and auctioning spectrum. Congressional directives to auction spectrum ensure timely access to new spectrum and have significant positive economic and societal benefits.

3. Renewing a National Spectrum Strategy. CTIA supports calls by Department of Commerce Secretary Gina Raimondo and FCC Chairwoman Rosenworcel for a national spectrum strategy. A national strategy should balance spectrum priorities in a way that enables federal agencies to meet their missions—including national defense—while ensuring sufficient spectrum is available for another national priority—empowering all Americans in the digital era and promoting a robust and innovative economy. Today, the federal government is the majority spectrum holder between 3.0-8.4 GHz, and the Department of Defense occupies 2/3 of that entire swath (totaling 3,600 of 5,400 megahertz). We should

continue to find ways to repurpose spectrum and repackage federal systems, providing them with new, more efficient state-of-the-art technology funded by auction proceeds.

On the commercial side, our wireless ecosystem thrives with licensed networks and unlicensed operations, but we also need a more balanced approach between licensed and unlicensed allocations. Today the U.S. has far more unlicensed mid-band spectrum than licensed mid-band spectrum— the U.S. has made 1,905 megahertz of mid-band spectrum available for unlicensed, eclipsing mid-band licensed allocations by more than four to one. We stand ready to assist in developing a balanced national spectrum strategy.

4. Revitalizing a Unified Government Voice on Spectrum Issues. I am pleased that two nationwide wireless providers launched C-Band 5G in January 2022, with no impact on aircraft safety, but the process to get there over the last 6 months was challenging and frustrating for all involved. While the U.S. Government's spectrum management generally works well, it broke down in the C-Band / altimeter co-existence debate. As a nation, we can and must do better.

The FCC and NTIA share responsibility for managing spectrum use in the United States, informed by a wide range of stakeholder input from affected industries, consumer groups, and other government agency interests. On the federal spectrum side, NTIA administers spectrum use for federal users—such as DOD, FAA, and NASA—and it serves as federal agencies' coordinating arm and the Executive Branch liaison to the FCC on commercial spectrum uses, including the avoidance of interference. We support NTIA and the critical role of the agency's deeply talented and committed spectrum experts, and we

welcome its leadership to speak on the Executive Branch's behalf and with a single unified voice.

I want to commend FCC Chairwoman Rosenworcel and NTIA Administrator Alan Davidson for the announcement of their agencies' new Spectrum Coordination Initiative to strengthen the processes for decision-making and information sharing and to enhance cooperative efforts to resolve spectrum policy issues.[13] The Initiative identifies many positive reforms, and I want to highlight two that are especially important to C-Band 5G / altimeter coexistence. First, the agencies "recommit to scientific integrity and evidence-based policy," including in the area of interference protection—it is critical that this commitment extend to all federal agency involvement in spectrum. And second, they commit to "revamp technical collaboration," including technical exchange and engagement. Both steps will go a long way toward avoiding future challenges in spectrum. This Committee should empower the FCC and NTIA to speak with one voice on spectrum matters and leverage their expertise to address spectrum interference concerns.

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Thank you again for this opportunity to testify, and I look forward to your questions.

[1] *CTIA Wireless Industry Indices report (July 2021).*

[2] Enrique Duarte Melo et al., *5G Promises Massive Job and GDP Growth in the US*, Boston Consulting Group (Feb. 2021), https://www.ctia.org/news/report-5g-promises-massive-job-and-gdp-growth-in-the-u-s. Conversely,

delayed access to 5G spectrum has real impacts: every six-month delay in 5G deployment costs our nation's economy $25 billion in economic benefits over the next decade, risks America's competitiveness, and jeopardizes our ability to ensure global 5G leadership. *Id.*

[3] Monica Kuroki et al., *5G Connectivity: A Key Enabling Technology to Meet America's Climate Change Goals*, Accenture (Jan. 2022), https://newsroom.accenture.com/news/5g-enabled-technologies-could-solve-for-one-fifth-of-us-climate-change-target-by-2025-new-study-finds.htm.

[4] Morgan Stanley Research, Chart of the Week: 5G Starts to Gain Traction (Jan. 31, 2022).

[5] CTIA, 5G for Home Broadband (Nov. 2021), https://api.ctia.org/wp-content/uploads/2021/11/State-5G-for-Home-What-is-5G-Home-Broadband-Fall-21.pdf.

[6] 5G Fixed Wireless Broadband: Helping close the digital divide in rural America, Accenture (Nov. 2021), https://api.ctia.org/wp-content/uploads/2021/11/CTIA-Rural-HHs-mini-POV-V2-20211115.pdf.

[7] Infrastructure Investment and Jobs Act, 117 Pub. L. 58, 135 Stat. 429 (2021), Section 60102(a)(2)(I) (defining "priority broadband project") and Section 60102(h)(1)(A) (directing States to prioritize funding for such priority broadband projects).

[8] Dr. Robert F. Roche & Sean McNicholas, *CTIA's Wireless Indices Report: A Comprehensive Report from CTIA Based on CTIA's Wireless Industry Survey Results, Year-End 2020 Results* (July 2021).

[9] Letter from Kara R. Graves, CTIA to Marlene H. Dortch, FCC, WT Docket No. 19-348, Attachment: *5G Mid-Band Spectrum Deployment* at 3 (Feb. 16, 2021).

[10] Ericsson, *Ericsson Mobility Report* (Nov. 2020), https://www.ericsson.com/4adc87/assets/local/reports-papers/mobility-report/documents/2020/november-2020-ericsson-mobility-report.pdf.

[11] Janette Stewart, Chris Nickerson, Tamlyn Lewis, *5G Mid-Band Spectrum Global Update*, ANALYSYS MASON, at 1 (Mar. 2020), https://api.ctia.org/wp-content/uploads/2020/03/5G-mid-band-spectrum-global-update-march-2020.pdf (Analysys Mason Report).

[12] Questions for the Record, The Honorable Jessica Rosenworcel, FCC, Response to Questions for the Record (2021), https://www.commerce.senate.gov/services/files/E4FB6E39-28F0-4328-902A-04F5F511825C.

[13] *See FCC, NTIA Establish Spectrum Coordination Initiative* (Feb. 15, 2022), https://www.fcc.gov/document/fcc-ntia-establish-spectrum-coordination-initiative.