COMMITTEE ON
ENERGY & COMMERCE
CHAIRMAN FRANK PALLONE, JR.

MEMORANDUM

March 11, 2022

To: Subcommittee on Communications and Technology Members and Staff

Fr: Committee on Energy and Commerce Staff

Re: Hearing on "5G and Beyond: Exploring the Next Wireless Frontier"

On **Wednesday, March 16, 2022, at 10:30 a.m. (EDT), in the John D. Dingell Room, 2123 of the Rayburn House Office Building, and via Cisco WebEx online video conferencing,** the Subcommittee on Communications and Technology will hold a hearing entitled, "5G and Beyond: Exploring the Next Wireless Frontier."

I. BACKGROUND

The National Telecommunications and Information Administration (NTIA) and the Federal Communications Commission (FCC) are the two agencies tasked by Congress to oversee and manage our nation's electromagnetic spectrum (spectrum) resources—a finite natural resource.[1] NTIA manages federal spectrum allocations as many federal agencies use spectrum to perform vital operations, including the Department of Defense, the Department of Transportation, the National Aeronautics and Space Administration, and the National Oceanic and Atmospheric Administration.[2] On the other end, the FCC is responsible for overseeing the commercial use of spectrum.[3]

The commercial use of spectrum provides consumers access to radio, broadcast television (TV), satellite services, and wireless broadband internet services, such as 5G wireless technology (5G) and Wi-Fi. 5G represents the fifth generation of cellular networks.[4] This technology is predicted to deliver advancements in virtual and augmented reality, artificial intelligence, machine learning, and the internet of things due to faster connectivity speeds (up to 100 times faster than

[1] Communications Act of 1934, Pub. L. No. 73-416; National Telecommunications and Information Administration Organization Act, Pub. L. No. 102– 538.

[2] National Telecommunications and Information Administration, *Spectrum Management* (www.ntia.doc.gov/category/spectrum-management) (accessed Mar. 1, 2022); National Telecommunications and Information Administration, *Federal Government Spectrum Use Reports 225 MHz-7.125 GHz* (https://ntia.gov/page/federal-government-spectrum-use-reports-225-mhz-7125-ghz) (accessed Mar. 1, 2022).

[3] 47 U.S.C. § 301.

[4] Ericsson, *Discover the power of 5G* (www.ericsson.com/en/5g) (accessed Mar. 1, 2022).

4G), ultra-low latency, and greater capacity.[5] Though 5G technology is still being deployed throughout the country,[6] experts have already begun exploring the spectrum and other technical requirements for next-generation wireless technologies, including 6G wireless technology (6G).[7]

II. KEY SPECTRUM MANAGEMENT MATTERS

A. Spectrum Pipeline

Over the last few years, the FCC, in collaboration with NTIA in certain instances, has made several spectrum bands available for 5G and next-generation wireless technology use and has started the process of making others available for such use. These bands include the 2496-2690 Megahertz (MHz) (2.5 Gigahertz (GHz)) band;[8] 3.7-4.2 GHz band (C-Band);[9] 3.55-3.7 GHz (3.5 GHz) band;[10] 3.45-3.55 GHz (3.45 GHz) band;[11] 3.1-3.45 GHz band;[12] 5.850-5.925 GHz (5.9 GHz) band;[13] 5.925-7.125 GHz (6 GHz) band;[14] and the 37.0-37.6 GHz (Lower 37 GHz) band.[15]

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[5] MIT, *5G, explained*, (Feb. 13, 2020) (mitsloan.mit.edu/ideas-made-to-matter/5g-explained); Ericsson, *Discover the power of 5G*. (www.ericsson.com/en/5g) (accessed Mar. 1, 2022).

[6] *T-Mobile, Verizon and AT&T battling it out over 5G download speeds*, ZDNet (July 15, 2021) (www.zdnet.com/article/t-mobile-verizon-and-at-t-battling-it-out-over-5g-download-speeds-video-and-gaming/).

[7] Nokia Bell Labs, *Extreme massive MIMO for macro cell capacity boost in 5G-Advanced and 6G* (Sept. 2021) (d1p0gxnqcu0lvz.cloudfront.net/documents/Nokia_Bell_Labs_Extreme_massive_MIMO_for_macro_cell_capacity_whitepaper_EN.pdf).

[8] Federal Communications Commission, *Report and Order, Band on Transforming the 2.5 GHz Band* (July 2019) (WT Docket No. 18-120).

[9] Federal Communications Commission, *Report and Order and Order of Proposed Modification, Expanding Flexible Use of the 3.7 GHz to 4.2 GHz Band* (Mar. 2020) (GN Docket No. 18-122).

[10] Federal Communications Commission, *Report and Order and Second Further Notice of Proposed Rulemaking, Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band* (Apr. 2015) (GN Docket No. 12-354).

[11] Federal Communications Commission, *Second Report and Order, Order on Reconsideration, and Order of Proposed Modification, Facilitating Shared Use in the 3100-3550 MHz Band* (Mar. 2021) (WT Docket No. 19-348).

[12] Infrastructure Investment and Jobs Act of 2021, Pub. L. No. 117-58.

[13] Federal Communications Commission, *First Report and Order, Further Notice of Proposed Rulemaking, and Order of Proposed Modification, Use of the 5.850-5.925 GHz Band* (Nov. 2020) (ET Docket No. 19-138).

[14] Federal Communications Commission, *Unlicensed Use of the 6 GHz Band* (Apr. 2020) (ET Docket No. 18-295).

[15] Federal Communications Commission, *Report and Order and Further Notice of Proposed Rulemaking, Use of Spectrum Bands Above 24 GHz for Mobile Radio Services* (July 2016) (GN Docket No. 14-177).

Nevertheless, it has been reported that for the United States to stay a global leader in the deployment of 5G and future wireless technologies, such as 6G, the FCC will need to make additional spectrum available, particularly mid-band spectrum, for commercial use.[16] Mid-band spectrum is important for 5G and future technologies because this spectrum range offers low-band capabilities (good signal range and indoor penetration) and higher-band benefits (increased capacity for faster speeds and lower latency).[17] It has been reported that China has made at least three times as much mid-band spectrum available to commercial mobile providers as compared to the United States.[18] NTIA and the FCC recently announced plans to develop a national spectrum strategy through their recently announced spectrum coordination initiative.[19] This strategy will not only provide transparency around spectrum use and needs, but also will include long-term spectrum planning.[20]

The national spectrum strategy is notable given that 6G is expected to require new spectrum bands and other innovative network configurations to support even higher data rates and lower latency for new applications, such as holographic communication.[21] And while the technical standards for 6G have not yet been agreed upon,[22] the spectrum requirements for this next-generation technology could include bands in the following ranges: 7-20 GHz for urban capacity; 470-694 MHz for extreme coverage; and beyond 90 GHz for highest peak data rates and sensing.[23]

B. FCC's Spectrum Auction Authority

In 1993, Congress passed the Omnibus Budget Reconciliation Act (Reconciliation Act), which included a provision giving the FCC authority to use a system of competitive bidding to grant spectrum licenses when there are two or more mutually exclusive license applications.[24] As a result, the FCC has been conducting spectrum auctions since 1994.[25] Prior to the passage of the

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[16] *China's 5G Soars Over America's*, Wall Street Journal (Feb. 16, 2022).

[17] Ericsson, *Why the U.S. needs mid-band spectrum to win at 5G* (July 31, 2020) (www.ericsson.com/en/blog/6/2020/us-needs-midband-spectrum-for-5g).

[18] *See* note 16.

[19] Federal Communications Commission, *FCC, NTIA Establish Spectrum Coordination Initiative* (Feb. 15, 2022) (press release).

[20] *Id.*

[21] Nokia Bell Labs, *The 6G era's enormous capacity demands will require new spectrum and extreme massive MIMO* (www.bell-labs.com/institute/blog/6g-eras-enormous-capacity-demands-will-require-new-spectrum-and-extreme-massive-mimo/#gref) (accessed Mar. 1, 2022); Alliance for Telecommunications Industry Solutions, *Next G Alliance Report: Roadmap to 6G* (Feb. 2022) (nextgalliance.org/wp-content/uploads/2022/02/NextGA-Roadmap.pdf).

[22] *6G Is Years Away, but the Power Struggles Have Already Begun*, Institute of Electrical and Electronics Engineers (Nov. 29, 2021) (spectrum.ieee.org/6g-geopolitics).

[23] *See* note 7.

[24] Federal Communications Commission, *About Auctions* (www.fcc.gov/auctions/about-auctions) (accessed Feb. 22, 2022).

[25] *Id.*

Reconciliation Act, the FCC selected spectrum license applicants through the use of comparative hearings and lotteries.[26] However, since receiving competitive bidding authority, the FCC has found auctioning spectrum to be a more efficient means of granting spectrum licenses.[27] Spectrum auctions have also benefited the American public, including by raising $200 billion in federal revenue.[28]

Notably, this grant of authority has, from the start, been subject to an expiration date.[29] However, Congress has extended the FCC's spectrum auction authority several times over the last three decades. Currently, the FCC's authority is set to expire on September 30, 2022.[30] If Congress fails to act, the FCC will no longer have the authority to hold spectrum auctions, grant spectrum licenses related to those auctions, or do other auction work that relies on this authority, except for certain spectrum identified under the Spectrum Pipeline Act of 2015 and under the Infrastructure Investment and Jobs Act, also known as the Bipartisan Infrastructure Law.[31]

C. Spectrum Coordination

In recent years, the lack of coordination between NTIA and the FCC has increasingly been a challenge for U.S. spectrum management.[32] Even though NTIA and the FCC have entered into a Memorandum of Understanding (MOU) to ensure that the two agencies are coordinating in a manner that allows federal and commercial users to utilize our country's finite spectrum reserves in the most efficient means possible,[33] there has been a lack of coordination in recent years between NTIA and the various federal agencies it represents before the FCC, as well as a lack of coordination between NTIA and the FCC.[34] This lack of coordination has led to disputes that have pitted the FCC against various executive branch agencies directly, in contravention of the usual

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[26] *Id.*

[27] *Id.*

[28] Federal Communications Commission, *Auctions Summary* (www.fcc.gov/auctions-summary) (accessed Mar. 1, 2022).

[29] Omnibus Budget Reconciliation Act of 1993, Pub. L. No. 103-66.

[30] 47 U.S.C. § 309(j).

[31] *Id*.

[32] Government Accountability Office, *Spectrum Management: Agencies Should Strengthen Collaborative Mechanisms and Processes to Address Potential Interference* (June 2021) (GAO-21-474); Government Accountability Office*, Spectrum Management: NTIA Should Improve Spectrum Reallocation Planning and Assess Its Workforce* (Jan. 2022) (GAO-22-104537).

[33] Federal Communications Commission, *FCC and NTIA Sign New Memorandum of Understanding on Spectrum Coordination* (Jan. 31, 2003) (press release).

[34] Government Accountability Office, *Spectrum Management: Agencies Should Strengthen Collaborative Mechanisms and Processes to Address Potential Interference* (June 2021) (GAO-21-474); Government Accountability Office, *Spectrum Management: NTIA Should Improve Spectrum Reallocation Planning and Assess Its Workforce* (Jan. 2022) (GAO-22-104537).

spectrum management processes that occur between NTIA and the FCC.[35] However, NTIA and the FCC's new spectrum coordination initiative includes a commitment to update the MOU between the two agencies.[36]

III. WITNESSES

The following witnesses have been invited to testify:

Scott Bergmann
Senior Vice President, Regulatory Affairs
CTIA

Mary L. Brown
Senior Director, Government Affairs
Cisco Systems, Inc.

Greg Guice
Director of Government Affairs
Public Knowledge

Jayne Stancavage
Global Executive Director, Product and Digital Infrastructure Policy
Intel Corporation

Von Todd
Chief Executive of Corporate Strategy and Analytics, HTC Inc.
Director, Competitive Carriers Association Board of Directors

[35] Government Accountability Office, *Spectrum Management: Agencies Should Strengthen Collaborative Mechanisms and Processes to Address Potential Interference* (June 2021) (GAO-21-474); *See* note 33.

[36] *See* note 19.