Testimony of

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CTIA

on

Exploring the Value of Spectrum to the U.S. Economy

before the

U.S. Senate Committee on Commerce, Science, & Transportation

Subcommittee on Communications, Technology, Innovation and the Internet

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Chairman Wicker, Ranking Member Schatz, and members of the Subcommittee, on behalf of CTIA®, thank you for the opportunity to participate in today's panel on "Exploring the Value of Spectrum to the U.S. Economy."

This is an important and timely hearing. The power of wireless is transforming how we live and work, in every community across the country and in every sector of the economy. The next generation of wireless, 5G, will add three million new jobs and half a trillion dollars to our economy. To deliver on this promise, the wireless industry needs more spectrum and streamlined siting rules to facilitate our deployment of that spectrum. 5G cannot happen without this Subcommittee's continued leadership and focus on spectrum.

Recent studies highlight the wireless industry's significant impact on the U.S. economy today. By way of example:

- **We invest in America.** U.S. wireless providers have invested more than $300 billion in their networks over the last 10 years, including more than $32 billion in 2015.[1] Indeed, a 2016 study of companies that invest substantially in the U.S. listed wireless providers as the top two "investment heroes."[2]
- **We are a job multiplier.** More than 4.6 million Americans have jobs that depend directly or indirectly on the wireless industry.[3] And employing one person in the wireless industry results in 6.5 more people finding employment, an employment multiplier that outperforms scores of other sectors, including manufacturing.[4]
- **We grow the economy.** The wireless industry as a whole generates more than $400 billion in total U.S. spending,[5] and the wireless industry's value-add is larger than the agriculture and petroleum and coal production industries.[6]

- **We are only getting started.** The mobile industry is expected to make a value-added contribution of $1 trillion to the North American economy by 2020, representing 4.5 percent of GDP by the end of the decade.[7]

Spectrum is the key input in wireless, fueling our "mobile-first" life and future economic growth. We all know how wireless changes our daily lives; launching more licensed spectrum into the marketplace is also a powerful accelerant for economic growth and job creation.

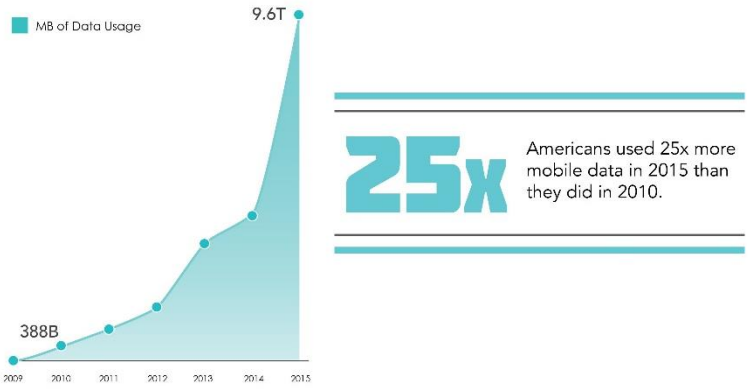
Fortunately, members of this Subcommittee and policymakers more generally have demonstrated a keen understanding of the critical role spectrum plays – and have worked together to free up more spectrum. The Federal Communications Commission (FCC) has taken several notable steps to help meet the need for more wireless broadband spectrum, including opening up more than 10 gigahertz of high-band spectrum to help realize the transition to 5G and launching the first-ever spectrum incentive auction, which will soon repurpose 84 megahertz of low-band spectrum to wireless broadband. Moreover, recognizing that we must continually focus on the spectrum pipeline, Congress required federal agencies to relinquish 30 megahertz of spectrum over the next decade to support consumers' ever-increasing need for mobile broadband services.

From the FCC to Capitol Hill, CTIA believes there is widespread and bipartisan agreement on the profound impact of wireless – and spectrum is the

key. Despite this strong foundation, more spectrum will be needed to fuel consumers' continued demand for mobile broadband and the innovation that 5G will unlock for industries across our economy.

Growing Demand for Data and the Next Driver of Demand, 5G

The demand for mobile has skyrocketed in recent years, driving home the need to free up more spectrum for mobile broadband. The amount of data flowing over U.S. wireless networks more than doubled in 2015[8] to a level 25 times greater than in 2010.[9]



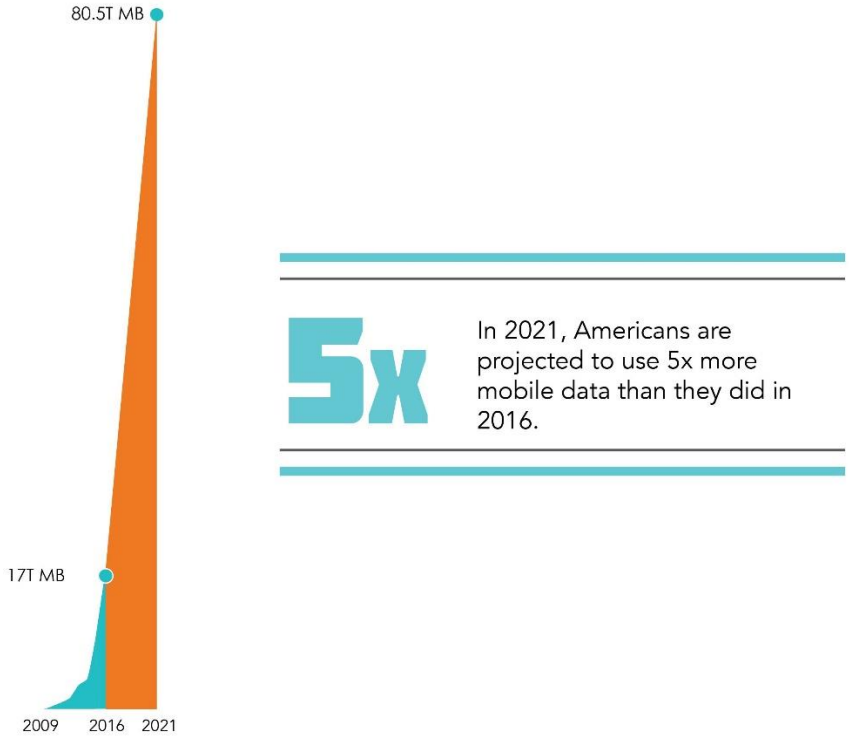
This is due to the advent of smartphones and tablets, massive growth in mobile video (64 percent of all U.S. mobile data traffic[10]), and the nationwide deployment of 4G LTE networks.

In just seven years, wireless providers have blanketed the country with $200 billion in network spending to deliver 4G LTE mobile broadband nationwide.[11]

Today, 99.7 percent of Americans have access to 4G LTE service, and 95.9 percent can choose from three or more 4G LTE providers.[12]

Mobile broadband has unlocked opportunities for all Americans. Whether you are low-income, a person with disabilities, or live in a rural community, wireless has helped bring the United States closer to closing the digital divide.[13] In fact, nearly half of all American homes are "wireless-only."[14]

And there is no end in sight when it comes to growth in mobile demand. Cisco projects that mobile data traffic in the U.S. will grow by a factor of five from 2016 to 2021, or roughly 125 times mobile data levels in a decade's time.[15]



Communities across the country, and industries including agriculture, automobiles, healthcare, appliance manufacturing, and energy, have already begun harnessing the power of wireless connectivity. For example, farmers have been using wireless technology to prevent the over- and under-watering of crops and to preserve resources during droughts, demonstrating the benefits of the Internet of Things (IoT) and next-generation technologies in rural areas.[16] And medical researchers have been using wearables and movement sensors to monitor and improve the progression of diseases such as Parkinson's.[17]

We are about to have a revolutionary breakthrough in the next generation of wireless – known as 5G. 5G networks will be 10 times faster and five times more responsive than today's networks. They will be able to support 100 times more wireless devices from beacons to wearables.

The deployment of 5G networks and increased competitiveness will create jobs for communities of all sizes. From 333 new jobs in Tupelo, Mississippi to more than 1,500 in Sioux Falls to nearly 3,500 in Honolulu, and almost 8,000 in Jacksonville, cities and towns across the country will benefit from the rapid deployment of next-generation 5G services.

America's wireless industry is ready to make significant new investments to bring these benefits to communities all over the country. One recent study estimates that wireless operators will invest $275 billion dollars over the next

decade to deploy 5G. That investment is projected to create a new 5G job for every 100 Americans: three million total jobs.

5G will unlock the Internet of Things. Machine-to-machine devices make up about 23 percent of all wireless connections today but are expected to grow more than five times to reach 58 percent of all wireless device connections by the end of the decade.[18]

5G will also enable a new generation of Smart communities. 5G and Smart Cities will have dramatic impact and savings for municipalities and consumers. With 5G, integrated technologies that assist in the management of vehicle traffic and electrical grids will produce $160 billion in benefits and savings through reductions in energy usage, traffic congestion, and fuel costs.[19]

5G will unleash innovation and growth for industries across our economy.[20] Sectors that are expected to leverage 5G's speed, connectivity, and responsiveness, include:

- **Energy.** Wireless-enabled smart grids could create $1.8 trillion for the U.S. economy, saving consumers hundreds of dollars per year.
- **Health.** Wireless devices could create $305 billion in annual health system savings from decreased costs and mortality due to chronic illnesses.
- **Public Safety.** Improvements made by wireless connectivity can save lives and reduce crime. A one-minute improvement in emergency response time translates to a reduction of eight percent in mortality.

- **Transportation.** Wireless-powered self-driving cars could reduce emissions by 40-90 percent, travel times by nearly 40 percent, and delays by 20 percent. That translates to $447 billion per year in savings and, more importantly, 21,700 lives saved.

Each of these industry sectors is leveraging the wireless platform today and stands to benefit from the increased speeds, connectivity, and responsiveness that 5G is poised to deliver.

The Economic Benefits of Spectrum

To unleash 5G and these substantial economic benefits, the wireless industry depends on policymakers to make additional spectrum available for mobile wireless services. Indeed, there are few other actions the government can take to jumpstart such dramatic private-led job creation and economic growth.

CTIA favors a policy that supports both licensed and unlicensed spectrum, recognizing that licensed spectrum is the foundation for our world-leading 4G LTE networks. Licensed spectrum provides exclusive access and clear interference protection rights, delivering the certainty necessary for carriers to invest billions of dollars in network deployment. This exclusivity is also critical to delivering the high-quality, secure, and reliable service that consumers have come to demand.

Licensed spectrum is a proven difference maker for the economy. One recent study found that the introduction of 20 megahertz of AWS-1 spectrum increased U.S. GDP by $48.6 billion from 2011 to 2014.[21] And the economic value

of all licensed spectrum made available to date is estimated to be approximately $500 billion, with social benefits at least 20 to 30 times that amount.[22] A 2017 Accenture report projected the future economic impact of 5G to be even more astounding: boosting the U.S. GDP by $500 billion.[23]

With the right policies in place, wireless will have a profound impact on U.S. economic growth. As one recent report concluded, "[m]obile broadband is, and will continue to be, an essential catalyst for the U.S. economy, spurring economic growth and innovation in existing industries while motivating entirely new industries."[24]

The other economic benefit of licensed spectrum is to our nation's debt. The U.S. wireless industry has now spent more than $100 billion at FCC spectrum auctions for licensed spectrum – with most of that money going straight to the U.S. Treasury, reducing the debt and funding other Congressional priorities.

Global Leadership in Wireless

The United States has been the global leader in 4G LTE deployment and we have the ability to lead in 5G as well. The wireless industry is conducting a number of 5G trials across the country, building on years of research and development investment. And as I noted previously, the FCC opened up 10 gigahertz of high-band spectrum last year that serves as an important down payment on the

spectrum needed to support 5G. We are well-positioned to lead, but this time around, global competition is fierce.

Many nations are vying to seize the 5G leadership mantle. South Korea, for example, has committed $1.5 billion to its "5G Creative Mobile Strategy,"[25] and expects to launch a 5G trial network for the Winter Olympic Games in 2018.[26] Japan plans to follow suit with its own 5G trial network for the 2020 Summer Olympics.[27] The European Commission has committed 700 million Euros ($759 million) of public funds to support 5G activities as part of its Horizon 2020 Programme.[28] And this past September, the European Union released "5G for Europe: An Action Plan" that calls for making provisional spectrum bands available for 5G ahead of the 2019 World Radio Communication Conference.[29] The EU and Brazil have an agreement to develop 5G, along with similar key cooperation initiatives with South Korea, Japan, and China.[30] And the Chinese government has an ongoing 5G technology trial in the 3400-3600 MHz band[31] and it has set ambitious goals for domestic 5G as part of its Made in China 2025 project.[32]

The U.S. wireless industry will continue to invest, deploy, and innovate, but our continued global leadership depends on a committed and comprehensive spectrum and infrastructure policy.

Policies to Advance the Economic Impact of Spectrum

CTIA encourages policymakers to take several actions to preserve continued U.S. leadership in wireless, ensure the availability of 4G LTE and 5G services for American consumers, and foster continued U.S. economic growth. Moreover, as policymakers consider proposals to devote hundreds of billions of, or even a trillion, government dollars to infrastructure investment, we note that the wireless industry stands ready to invest billions of its *own* dollars, if policymakers update national and local siting and zoning rules to reflect the wireless networks of today and tomorrow. These steps will expedite the wireless industry's investment of over $275 billion, and will not cost taxpayers a dime.

Incentive Auction. The successful 600 MHz incentive auction will deliver 70 megahertz of new mobile broadband spectrum, and an additional 14 megahertz of spectrum for unlicensed uses like Wi-Fi and LTE-U/Licensed Assisted Access services. It has already raised $19.6 billion, making it the second largest FCC auction ever – by spectrum allocated or by revenue. CTIA is keenly interested in ensuring timely access to this spectrum, which is critical to our leadership in 5G services. We support a seamless repacking process for remaining broadcasters, and we are committed to working collaboratively to achieve the 39-month transition. Three years and three months is significantly longer than the wireless industry has had to wait to begin deploying new services to consumers in recent

auctions, and any delay would put at risk 5G development, rural buildout, and be inequitable to those companies investing nearly $20 billion in new spectrum.

High-Band Spectrum. The FCC's decision last year to repurpose high-band spectrum for mobile services was an important step for U.S. leadership in 5G. The FCC should enhance those rules with targeted reforms, and promptly move forward with the 18 gigahertz of high-band spectrum previously identified by the FCC and this Committee through the MOBILE NOW Act. In making additional high-band spectrum available, the FCC should emphasize large contiguous blocks of exclusive, licensed spectrum.

Spectrum Pipeline. We appreciate this Committee's continued attention to the spectrum pipeline and the need to identify additional spectrum bands that can meet the ever-increasing demands for mobile broadband services. The process of bringing spectrum to market is time consuming – it takes on average 13 years to reallocate spectrum for wireless use. The AWS-3 band, for example, was a 13-year journey to free up 65 megahertz of spectrum that culminated in a 2015 auction resulting in more than $40 billion in revenues to the U.S. Treasury. This underscores the urgency of beginning this process today, as the ability of the United States to remain a global leader in wireless depends on the ability of policymakers to identify sufficient licensed spectrum.

We need a clear plan for additional licensed spectrum across a wide and diverse range of frequencies to meet tomorrow's needs. As part of this process, government should continue to review spectrum currently allocated for federal use and consider ways to incentivize federal agencies to use their spectrum resources more efficiently and effectively. The direct impact of new spectrum cannot be underestimated. For every 10 megahertz of licensed spectrum made available, the U.S. GDP increases by more than $3.1 billion and U.S. employment increases by at least 105,000 jobs.

Modernizing Infrastructure Siting Policies. Lastly, we must move forward with modernizing infrastructure siting policies so that spectrum can be fully utilized and wireless networks can be rapidly and efficiently deployed. Wireless carriers invest billions of dollars building cell sites to provide faster broadband wireless networks that will enable new products and services. Unfortunately, current federal, state, local, and tribal siting laws and policies were designed to review large cell towers one by one, but not to process small cells that are far less intrusive, more numerous, and leverage existing structures. As a nation, we need to update those laws and policies to remove barriers to efficient deployment of small cells and 5G services. These outdated policies are slowing wireless providers' significant investment and must be addressed.

To speed deployment of broadband services, Congress and the FCC should address burdensome local permitting processes; modernize right-of-way access and pole attachment policies; and streamline and clarify the historic preservation and environmental review processes. We would suggest reasonable shot clocks for new site and collocation permit applications and broader application of existing deemed granted remedies. Additionally, permit fees and other charges for wireless siting should be reduced to reflect small cells' minimal impact and be limited to the actual, incremental costs to localities for processing these applications.

Federal agencies should also adopt streamlined policies to enable small cell deployment on federal lands, properties, and buildings. In particular, streamlined processes for siting on federal lands in rural and remote areas would greatly improve the ability of the wireless industry to serve these hard to reach customers.

By promoting sound infrastructure policies at the federal, state, local, and tribal levels, we will enable wireless providers to invest resources more quickly – expediting connectivity, adding jobs, and advancing 5G leadership.

* * *

CTIA appreciates the opportunity to work with the Subcommittee, Congress, and other interested parties to ensure that we have spectrum policies that allow the wireless industry to meet growing consumer demands and support U.S. economic growth to its fullest extent. We look forward to engaging with you to accomplish these objectives.

Thank you for the opportunity to testify today. If CTIA can provide any additional information you would find helpful, please let us know.

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