Testimony of: Robert Fisher, Senior Vice President, Federal Government Relations

before the

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My name is Robert Fisher, and I am Senior Vice President, Federal Government Relations for Verizon. Thank you for inviting me to discuss 5G – the fifth generation of wireless networks – and the policies that the United States needs to adopt to win the global race to 5G.

What 5G Means

To understand 5G, it's helpful to understand what came before it. Broadly, the first generation of mobile technology, 1G, was about voice. 2G introduced short-messaging (i.e., text messaging) and the move to 3G provided the essential network speeds for accessing the internet through smartphones. Then 4G, with faster data-transfer rates, gave rise to many of the connected devices and services that we rely on today. According to CTIA, the wireless industry's impact on the state of South Dakota, due largely to the roll out of 4G, accounts for $587 million in GDP and 6,761 wireless-related jobs. Verizon has invested more than $119 million in private capital in the state of South Dakota since 2013.

Ultimately, 5G will be even faster, with an exponential growth in network capacity, greater opportunities for connectivity and improved network reliability. 5G presents the potential for up to 1000 times the network capacity of today's 4G LTE network and 20 times faster download speeds than 4G. Additionally, network latency – or lag – of less than 10 milliseconds is many times faster than the blink of an eye. The economic and social impacts of this next generation will be transformative.

With 5G, we are on the cusp of the "Fourth Industrial Revolution," which will fundamentally change how we live, work and play. The Fourth Industrial Revolution is blurring the lines between the physical and digital worlds. Everything that can be connected will be. Some call it the "Cyber Physical" era, building on such technologies as artificial intelligence, autonomous cars, robotics and biotechnology to prime a fresh wave of innovation – all of it enabled by the low latency, lightning-fast speeds, and continuous connectivity of 5G wireless technology. And Verizon is leading the way in deploying 5G.

Verizon's 5G Leadership

Verizon's 4G LTE network covers more than 98% of the U.S. population today, and we plan to quickly expand our 5G service, using a wide variety of spectrum frequencies – low band; mid-band; and Ultra Wideband (which is what we're using first for Verizon 5G Home). We have been the leader in 5G from the start. This has required a lot of important steps to get us to where we are today and where we are going. We created the 5G Technology Forum (5GTF) in 2015, with partners like Ericsson, Intel, Samsung and Qualcomm. As a result of these efforts, the first international technical standard for 5G debuted in December 2017 – ahead of expectations. Verizon also lead the way with a number of technology firsts on 5G, including the first "in the wild 5G data transmission," and we have built 5G innovation labs to help create the 5G applications that will change how we live, work and play. We were also proud to recently announce the world's first commercial 5G service, Verizon 5G Home, which launched on October 1st and is available for order in Houston, Indianapolis, Los Angeles and Sacramento. Moving forward, Verizon plans for rapid expansion of 5G Home and the launch of 5G mobility service going into 2019 and beyond.

What 5G Will Enable

What capabilities will 5G enable? Ed Chan, Verizon Senior Vice President and Chief Technology Architect, recently said at CTIA's Race to the 5G Summit, "5G will only be limited by our imagination." Looking back at the predictions of how 4G LTE would be used, no one predicted the smartphone and app economy revolution, and it may be that the most earth-shattering uses of 5G are things that no one is thinking of today – or maybe some young entrepreneur is inventing in her garage in Silicon Valley or right here in Sioux Falls?

Nevertheless, CTIA has described some of the ways that 5G will impact the U.S. economy: "Entire industries, from agriculture to transportation, will be transformed to be more

capable, efficient, and intelligent. That's the promise of 5G." In addition to providing a long-sought competitive alternative to cable broadband – as Verizon's 5G Home service does – 5G also will provide for Enhanced Mobile Broadband, such as new immersive virtual reality experiences; Mission-Critical communications, such as the connections needed for the full capabilities of self-driving cars; and connecting the "Internet of Things."

Policies to Win the Global Race to 5G

The U.S. winning the race to 5G is not a guarantee. Research by CTIA earlier this year found China has a narrow lead over the U.S. and South Korea in the race to 5G. It is imperative that we take the lead as we did with 4G. Why is it so important? Commissioner Carr said it best earlier this year: "The stakes are high. Winning the race to 5G could mean three million new jobs, half a trillion dollars in GDP, and $275 billion of private sector investment, all without a penny of new taxes. We want that. But our friends and competitors in Europe and Asia what that too." To underscore the Commissioner's point, all of this is being done with private capital. Fortunately, we know what needs to be done. Commissioner Carr hit on the winning playbook: focus on spectrum and infrastructure. Congress and the FCC have made great strides on both parts of this playbook.

Under Commissioner Carr's leadership, the FCC recently issued a ruling that adopted common-sense guidelines that reduce the time and cost of deploying next generation wireless infrastructure while accounting for legitimate local interests. This ruling built on the momentum established over the past few years in numerous states and communities to reform infrastructure siting policies. In terms of spectrum policy, the FCC has moved fast to open up more spectrum in frequency bands that have not traditionally been used for cellular communications but are critical for 5G.

But FCC and state action is not enough. We need help from Congress, too, and that effort has been led by Chairman Thune, who, together with Senator Brian Schatz, introduced

the “Streamline Small Cell Deployment Act” to help promote the deployment of small cell equipment. This bipartisan legislation is an important and thoughtful kickoff to a conversation about how best to modernize small cell deployment policy. The Streamline Act would add significant provisions to the national policy framework that the FCC’s recent decision just could not cover. As just one example, the Streamline Act would provide that small cell applications are “deemed granted” at the end of the allowed timetable for state and municipal authorities to act on an application. The FCC found that the remedy for inaction on an application is in the judicial system, and decided not to apply a “deemed granted” remedy, though it provided substantial guidance that should expedite judicial review. However, even expedited judicial review involves delay and uncertainly, so a “deemed granted” remedy is a critical component to promote investment.

In addition, while the FCC correctly noted that state and local governments are entitled to recover all reasonable costs related to the building of small cell antennas, this provision of the FCC’s new rules is opposed by some jurisdictions and likely will be challenged in court. Codifying the cost-based fee standard – as the Streamline Act would do – provides additional certainty and legitimacy behind this important principle, which simply ensures that states and localities have the ability to recover their costs, but not to tax infrastructure investment for additional revenues and for spending on unrelated purposes.

Chairman Thune also has led the way on ensuring access to critical “mid-band” spectrum, which is a crucial component of 5G deployment. Mid-band spectrum provides a good mix of coverage and capacity and is essential for a broad, nationwide roll-out of 5G technologies. And there are other bipartisan efforts underway to ensure adequate spectrum resources. Of particular note is the Airwaves Act, which would help to create a spectrum pipeline, encourage rural wireless deployment, and reallocate underused spectrum. The Airwaves Act will help to encourage rural wireless investment by setting aside 10% of proceeds from the spectrum auctions required by the Act to deploy wireless in underserved, often rural

areas. The Act also requires the FCC to study the impact of unlicensed spectrum on rural healthcare, education, agriculture, and broadband access. In addition, FCC Commissioner O'Rielly recently outlined a plan for moving forward on 3.5 GHz spectrum to be considered at the FCC's October meeting. We encourage the FCC to ensure the 3.5 GHz band plays a critical role in delivering 5G services to American consumers.

Verizon has always worked with policymakers at all levels to ensure that the building of our country's biggest and best network is accomplished with the cooperation and support of our government partners. While there are some municipalities that have expressed concerns about having a standardized framework governing antenna siting, I can assure you that Verizon believes that dialogue and compromises between providers and localities are more important than ever. Under the FCC's new rules and the provisions of the Streamline Act, there is still a great deal of leeway and oversight for localities to manage their rights of way. It will be most productive if providers work together with localities on comprehensive plans for small cell deployment. Verizon remains committed to that goal.

Conclusion

To sum up: the U.S. needs to win the race to 5G, and while Verizon is investing and innovating to help get us there, it is critical for the federal, state, and local governments to all be rowing in the same direction to get to the right policy framework. With the leadership of Chairman Thune and Commissioner Carr, and many other policymakers, we are making great progress, and I have high hopes that the U.S. will lead the world on 5G network deployment.