# Facilitating the 21st Century Wireless Economy

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Chairman Blackburn, Ranking Member Doyle, and members of the Subcommittee, thank you for inviting me to testify about how to best facilitate the 21st century wireless economy. It is an honor to be here to discuss this important issue.

I am testifying on behalf of EchoStar Corporation, a U.S. company, and its subsidiary, Hughes Network Systems (Hughes), the largest satellite broadband operator in the United States and the world, where I am the Senior Vice President of Regulatory Affairs. In this role, I represent the companies before the U.S. government on a number of issues including, most notably for these purposes, spectrum management. I currently serve as Vice Chairman of the United Nation's International Telecommunication Union (ITU) Study Group that is examining sharing issues between satellite and International Mobile Telephony 2020 (also known as Fifth Generation or 5G) services. I am also the past Chair of the Satellite Industry Association. I currently serve as an adjunct Professor of Law at Georgetown University Law Center. In my 25 years in the telecommunications industry, I have had the honor to serve three times at the Federal Communications Commission (FCC), most recently as Deputy Chief of the Office of Engineering and Technology. Finally, I have written extensively on spectrum issues, including my book, *Spectrum Wars*, which is particularly relevant today as spectrum becomes more and more important to America's competitiveness.

I am excited to share my views on the important role the wireless industry, including satellites, plays in the success of the 21st century wireless economy. As Congress prepares to consider legislation to encourage the deployment of broadband infrastructure across America, it is important to remember the critical role of satellites in America's telecommunications infrastructure. As the largest U.S. commercial geostationary satellite operator, we operate and manage a fleet of 26 satellites that provide direct-to-home and broadband services, among others, across the United States and Latin America, with plans to expand globally. Many of our satellites, including EchoStar XIX, are constructed in the United States by U.S. companies and we often use U.S. launch providers. And EchoStar, a U.S. company, operates our entire fleet from our U.S. operations center. We also manufacture ground infrastructure to support satellite networks globally in the United States. In addition, our satellite network adds jobs to local U.S. economies through the deployment and operation of our own ground infrastructure, as we rely upon small businesses across the United States to provide our customers with installation and other services.

Besides the benefits to the U.S. economy from the construction, launch and operation of our system, our satellite network provides important services across the United States, no matter how rural or remote the location. To this end, I would like to note that rural broadband has been recognized by Chairman Walden as a priority of the Energy & Commerce Committee.

Satellites are particularly good at providing cost-effective broadband services to consumers where it would be far too expensive to deploy terrestrial infrastructure. That is why Hughes' broadband business remains focused on providing quality, cost-effective broadband services to underserved portions of the country. For example, today a consumer located in the continental United States and into southern Alaska can subscribe to our HughesNet services and receive broadband with speeds at 25 Megabits per second down to the consumer, and 3 Megabits per second up from the consumer's device (25/3 Mbps) for as little as $49.99 a month. In this manner,

we play an important complementary role in the broadband services market enabling access to high quality, cost-effective broadband service to millions of Americans who otherwise might have limited or no access at all. The availability of HughesNet and competing satellite broadband services means that a student in rural Tennessee can have access to the same information as a student in urban Nashville on a real-time basis.

In addition, satellite services are an important part of next generation communications services markets, including 5G, the Internet of Things including Machine-to-Machine communications, where access to reliable connectivity is critical. For example, today a significant majority of gas stations utilize HughesNet satellite services as a means to connect their credit card machines at gas pumps back to their headquarters for processing. Further, Hughes provides through its VSAT service remote monitoring and control for our pipeline customers, which enables environmental protection as well as the ability to monitor the pipeline's health. Having a reliable, cost-effective means to carry this data is critical to the smooth operation of our nation's energy infrastructure.

This brings me to another important role of satellite: resiliency. Because our satellites are located 22,300 miles above the Earth's equator, they are immune to natural and manmade disasters that are happening on the ground. For example, satellite communications services remain available even during tornadoes and storms such as those we recently saw affect terrestrial wireless service across the country. The importance of satellites to our Nation's emergency response community was brought home this week with the award of a contract for the deployment and operation of the FirstNet network, which the Committee was instrumental in creating, which has a satellite component to ensure network resiliency. It was similarly visible a few years ago during Superstorm Sandy, which knocked out 25 percent of the communications to ten States. Satellite broadband was there providing, for example, access to the Internet in portions of New York City that were hard hit so that residents could obtain access to much needed services to start the recovery process. In some places in New York City, for example, our network was utilized to support residents for months after the storm as the terrestrial infrastructure was rebuilt.

In addition, satellite capability continues to evolve to meet consumer needs. Let me demonstrate this by looking back just a decade ago at broadband speeds for wireless technologies. In 2007, the highest speed offered by a Hughes service plan was 1 Mbps. In 2008, consumers on Hughes' first broadband satellite, SPACEWAY 3, had access to service at speeds up to 2 Mbps. While that seems slow by today's standards, at the time it was well in excess of the 200 kbps standard used by the FCC to define broadband services.[1]

In 2012, Hughes launched its EchoStar XVII satellite which used advanced technology to deliver broadband speeds of up to 15/3 Mbps to consumers in the United States. Here again, Hughes provided a level of service that greatly surpassed the FCC's definition of broadband at the time (4/1 Mbps). [2] In 2013, the Obama Administration reported that North America's average

[1] https://apps.fcc.gov/edocs_public/attachmatch/FCC-08-88A1.pdf

[2] *See Sixth Broadband Deployment Report*, 25 FCC Rcd. 9556, ¶ 5 (2010) (establishing 4/1 Mbps broadband standard).

broadband speed was the highest in the world at 2.6 Mbps.[3] Accordingly, Hughes was once again able to meet or exceed the FCC-defined broadband speed.

EchoStar XIX, which went into service just last month, is, along with the rest of the Hughes satellite network, now bringing consumers broadband speeds of 25/3 Mbps and more, which once again meets or exceeds the FCC's current definition of broadband.[4] So, in just this past decade, Hughes has seen a 2400 percent growth in maximum download speed of its satellite broadband service offering. This is in contrast to all broadband services (including fiber), which, for example, only saw a doubling of maximum speeds from 2009 to 2013.[5] In fact, the FCC in its 2016 Measuring Broadband Report found that Hughes was one of the few service providers who met or exceeded the speeds that it promised to consumers.[6]

While demand for speed has increased, so has demand for capacity and hence, spectrum. Both satellite and terrestrial wireless systems can increase capacity by accessing additional spectrum, building-out additional infrastructure, and using innovative technologies that increase spectrum efficiency. A terrestrial wireless operator can deploy the infrastructure needed to increase capacity more incrementally, by locating additional towers and other sites to support new equipment. By contrast, for satellite operators, adding new infrastructure involves design, construction, and launch of a new satellite, a process that takes several years and an investment of hundreds of millions of dollars. Because of the time and expense of this effort, the satellite industry has been particularly adept at developing innovative technology to increase the capacity of their satellite networks. Hughes has leveraged technological advances with the use of spectrum above the cellular bands to increase the capacity of its network exponentially. For example, in 2008, SPACEWAY 3, our first broadband satellite, had a capacity of 10 gigabit (Gbps). Today EchoStar XIX alone has a capacity of 220 Gbps. However, like wireless providers, Hughes is at the point where the only real way to achieve meaningful increases in capacity is to access more spectrum.

With all wireless services requiring access to increased spectrum to meet the needs of the 21st century digital wireless economy, it is important that Congress and the FCC follow the long-established principle of technological neutrality. By adopting technology-neutral laws and regulations, Congress and the FCC will ensure different platforms can compete to meet the full range of consumer demands. Failure to enable such competition could result in certain segments of the U.S. population being denied affordable access to important services. Let me explain.

If we look back just over a decade or so, spectrum was still largely allocated to different uses on an exclusive basis. While the FCC required spectrum sharing in certain bands, this was accomplished through coordination in limited geographic areas, whereby these services had technical characteristics that enabled sharing to occur with limited operational constraints. At this time there was a recognition by the FCC and spectrum managers that it is very difficult to enable

[3] https://obamawhitehouse.archives.gov/sites/default/files/broadband_report_final.pdf

[4] *See 2015 Broadband Progress Report and Notice of Inquiry on Immediate Action to Accelerate Deployment*, 30 FCC Rcd. 1375, ¶ 3 (2015) (establishing 25/3 Mbps broadband standard).

[5] https://obamawhitehouse.archives.gov/sites/default/files/broadband_report_final.pdf

[6] https://www.fcc.gov/reports-research/reports/measuring-broadband-america/measuring-fixed-broadband-report-2016

sharing between two widely deployed services, such as cellular mobile user devices and satellite VSATs used in the home and in businesses.

However, demand for greater speeds and more and more spectrum required Congress and the FCC to adopt new methods of increasing spectrum efficiency, including expanding sharing and clearing spectrum for new uses. For example, Congress enabled the use of incentive auctions to clear some of the 600 MHz band previously allocated to television for new uses. This auction, which closed last week, was very successful at providing access to new spectrum for mobile wireless services. In addition, Congress has successfully required some government operations to be relocated to other frequency bands to make spectrum available for new commercial services, a subject also of Mobile NOW. And of course, the FCC has enabled greater sharing of spectrum through innovative new approaches, as evidenced by the 3.5 GHz band rulemaking.

With the upcoming development of 5G technologies and the anticipated consumer demand for broadband services, additional actions will be required to make spectrum available for this use. Satellite is expected to serve a complementary role to the terrestrial network for 5G, especially in rural and remote areas where consumers might be left behind without access to satellite services. Other wireless technologies, such as solar planes and Wi-Fi, also anticipate playing a role. Accordingly, in order to ensure the success of 5G, it is critical that additional spectrum be made available across platforms.

To ensure that consumers can have access to the technologies that best meet their needs, the FCC and Congress must follow the principle of enabling competition among platforms by ensuring that no single platform is favored. First, to the extent additional spectrum is cleared and made available for 5G, it should not be made available simply for one technology – whether satellite or terrestrial wireless. While the split between platforms does not have to be 50-50, it should take into account the consumer demand for access to different platforms, and the role that these platforms will play generally and in different geographic areas of the country.

Second, with regard to increasing spectrum sharing, such as we are seeing in the millimeter wave bands above 24 GHz, the same principle must be followed. First, with regard to bands where there is an incumbent, it is critical that any sharing criteria adopted be reasonable and enable both services (including the satellite broadband incumbent) to grow. The same principle needs to be followed in the higher fallow bands. For instance, one of the millimeter wave bands under consideration for 5G is the in bands in the 40 to 75 GHz range, also known as the V band. For years, this band has been allocated to satellite in the international Table of Allocations which the FCC follows, and so has been viewed by the satellite industry as the next frontier for expansion. Satellite operators are currently designing their next-generation satellites to operate in that band. In contrast, the mobile industry is looking at V Band and other millimeter wave bands to density their networks in urban markets that may require more capacity. It would make no sense to cut off or severely curtail access to this band for satellite broadband by adopting sharing criteria that overwhelmingly favor terrestrial wireless technologies. Instead, the FCC should look at adopting a sharing regime that recognizes that terrestrial deployment will be focused in the most urban portions of the country, while there is less likely to be a significant demand for dense terrestrial wireless networks in areas with lower populations, making those areas appropriate for greater

satellite deployment. Such sharing does not mean that one portion of the country will not receive wireless services; it just ensures that both platforms can grow and deploy to meet consumer needs across our expansive country. Finally, it is also important that until advanced sharing technology (such as cognitive radios) are proven, it will be necessary to limit sharing between widely deployed services such as mobile wireless devices and satellite broadband user terminals. Accordingly, retaining some exclusive spectrum may be necessary. Congress and the FCC must follow a holistic approach to spectrum management to plan for the future, ensuring that there is competition among platforms and that growing consumer demands for all applications and uses can be met.

We are in a very exciting time. The 21st century digital economy is booming and with continued U.S. leadership in the satellite and other wireless industries, the future is very bright. But it is critical that Congress and the FCC ensure that all technologies are given the resources they need to meet the needs of consumers, no matter where they are located. Broadband means economic opportunity. By allocating spectrum in a technology-neutral manner to enable competition among platforms, we can ensure that consumers, not the government, are able to pick the best technology for their use and that the digital economy will continue to blossom.

EchoStar and Hughes are committed to working with Congress, the FCC, and the Administration to advance policies that facilitate the 21st century wireless economy, especially in rural and remote portions of the United States. Meeting broadband infrastructure challenges, especially in rural America, is critical to job creation and economic development. Thank you for the opportunity to share my thoughts at this important hearing. I welcome any questions.