January 22,

2019

Via E-Mail
Spectrum-strategy@ntia.doc.gov
National Telecommunications and Information Administration
US Department of Commerce
1401 Pennsylvania Avenue, NW
Washington, DC 20230
Attn: John Alden

**Re: Developing a Sustainable Spectrum Strategy for America's Future**

Dear Mr. Alden:
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EchoStar Satellite Operating Corporation (ESOC) and Hughes Network Systems, LLC (Hughes and collectively EchoStar), hereby submit these comments in the above-referenced proceeding (Spectrum PN). EchoStar strongly supports the development of national spectrum strategy that is technology neutral and increases the efficient use of the spectrum resource. By developing such a strategy, the competitiveness of the US space-based and terrestrial communications industries can be advanced, leading to significant public interest benefits, including increased jobs, national security, innovation, and continued US leadership in the space industry. As discussed below, this national spectrum strategy must include access to adequate spectrum on a long-term basis for the commercial satellite industry. By doing so, NTIA and the Administration can ensure the long-term growth of the commercial satellite industry, which supports residential users, businesses, and the government, no matter where the need for advanced communications develops.

**Background**

ESOC is the largest United States-based commercial Geostationary Orbit (GSO) satellite operator and fourth largest commercial geostationary orbit operator globally. ESOC owns, operates, or manages a fleet of 23 GSO satellites, providing broadcast, fixed, and mobile services. ESOC provides these services across the Americas and Europe using the S-, Ku-, and Ka-bands and has a satellite under construction that will also operate in the Q-/V- bands.

Hughes is the largest provider of satellite broadband services in the United States and globally, providing service to approximately 1.3 million subscribers across the Americas. With the launch of its Gen5 service in March 2017, Hughes provides customers across the continental United States, southeastern Alaska, Puerto Rico, and the US Virgin Islands with broadband Internet at or above Federal Communications Commission (FCC)-defined speeds of 25 Mbps down and 3 Mbps up. Today, Hughes utilizes three satellites to support this service in the United States.

In order to continue to meet consumer demand for increased capacity and speed, Hughes has received Commission authority to construct and launch EchoStar® XXIV/JUPITER™ 3, a state-of-the-art Ultra-High Density (UHD) satellite, which is currently under construction at Space Systems Loral in California and slated for launch and commercial service in 2021. This revolutionary, first-of-its-kind UHDS satellite will provide services throughout the United States using the Ka-, Q-, and V-bands with speeds upwards of 100 Mbps.

As the largest US satellite operator and service provider, as well as the largest global and US satellite broadband provider, EchoStar is particularly well-suited to comment in this proceeding and fully supports the development of a balanced, national spectrum strategy.

**Discussion**

1. In what ways could the predictability of spectrum access for all users be improved?

   Long-term certainty remains important for all users of spectrum. Of course, EchoStar recognizes the need to free up underutilized spectrum to make it available for new uses. This must be done in a balanced manner based on facts. For instance, it may take several years for a new allocation to be utilized by the communications radio services to which the allocation is made because of the time frames associated with technology development. Accordingly, such spectrum should be given a reasonable and realistic opportunity for use by the allocated radio service before it is made available for a competing use.

   A good example is the Q-/V- bands that were allocated by the ITU to the Fixed Satellite Service (FSS) in the early 2000s. Only when this spectrum was made available for satellite, could technology development begin in earnest. On average, because of the challenges of operating in space, it can take well over a decade for the development of space-based technologies. Accordingly, the fact that equipment is now only appearing on the market for the use of this spectrum is not surprising. Technology development must be considered in determining if spectrum should be made available on a shared or another basis in bands where there are existing services or new services are being deployed. In light of these time frames, failing to provide adequate international protections for FSS in the Q- and V- bands for both gateway and user terminal use at the upcoming World Radiocommunication Conference would be short-sighted, would send a negative signal about the certainty associated with spectrum access and technology development, and could result in stranded investment in space.

   In addition, it is very important that adequate protection criteria be developed on global, regional, and domestic bases to protect the uses of spectrum with flexibility. For instance, in bands shared between GSO and NGSO satellites, the use of ePFD limits is successfully being used to allow greater sharing of frequency bands between the two services. While EchoStar supports flexibility in how to meet these protection criteria, without set criteria, there is no certainty of protection from interference that could negatively impact service as well as investment. Further, these protections must be forward thinking, and with the advent of 5G, should include protections to space-based communications from potential harmful interference that may occur with the deployment of terrestrial 5G, such as aggregate interference. Failure to adopt such protections could severely impact the ability of satellite communications to provide advanced services in the United States as well as globally.

2. To what extent would the introduction of automation facilitate assessments of spectrum use and expedite the coordination of shared access, especially among Federal and non-Federal spectrum stakeholders?

   RF protection for all communications services is critical. To this end, using automation to facilitate assessments of spectrum and the coordination of shared access is particularly important in bands where aggregate interference is a potential issue. For example, in the 27.5–28.35 GHz band (the 28 GHz band) the FCC has authorized the use of the band for both UMFUS and satellite gateways, with FSS space station receivers also operating in the band. While potential of interference from an individual UMFUS station into a satellite space station receiver is minimal, the aggregate interference impact must be assessed as UMFUS deployments are made. The potential for aggregate interference can be minimized by terrestrial operators' adherence to reasonable total radiated power and base station antenna down tilt standards. With the advent of terrestrial 5G, it is important that such protections must be adopted to ensure that all communications are protected from harmful interference.

3. What is the practical extent of applying standards, incentives and enforcement mechanisms to promote efficient and effective spectrum use?

   Increasing the efficiency of spectrum is critical and all approaches, if balanced against burdens or disincentives, are worth being considered. First and foremost, enforcement is an important part of the equation, especially in shared bands. As discussed in response to question 2, if harmful aggregate interference in the 28 GHz band is experienced by FSS operators from terrestrial 5G services, the rules must protect against such harmful interference and must be enforced. Protections in other bands must also be enforced. However, it is important to note that rules governing spectrum use can be adopted in a way to incentivise the most efficient spectrum use. It would be worth pursuing regulatory regimes that provide certain incentives in one area if an operator chooses to comply with certain other regulatory obligations that enable more efficient use of the spectrum resource.

   While complying with standards may help a single service to most efficiently use the spectrum resource, they are not aimed at protecting shared services from harmful interference. Accordingly, while standards may address power limits and other operational limits, on their own, they are insufficient to promote efficient and effective spectrum use for more than a single service.

4. How might investment in RDT&E improve spectrum-utilization methods and spectrum-sharing tools and techniques?

   No comment.

5. What are the risks, if any, to the global competitiveness of US industries, associated with spectrum management and policy actions?

   Spectrum management and policy actions play an important role in the success of all spectrum-based communications services. Long-term certainty remains of critical importance to the all communications industries, but is perhaps of even greater importance for space-based communications because of the long-lead times, the difficulty of operating in the space-environment, and the longer life of the assets in space. In addition, the failure to enable the use of internationally harmonized spectrum could significantly limit the ability of satellites to provide cost-effective communications globally.

   Further, it is important to remember, that as opposed to terrestrial communications, a fair amount of satellite and satellite equipment manufacturing occurs in the United States. This is complemented by a very robust launch industry with the addition of a new US launch providers in the past few years, including SpaceX. If spectrum policies fail to provide sufficient access to spectrum to support the commercial satellite industry, it is possible that these industries will fail. This would negatively impact the United States, which is a leader in the space industry, perhaps switching the balance of power to other space powers such as Russia, China, or India. Such a result would undermine the goals of the recent Presidential Space Directives.

6. How could a spectrum management paradigm be structured such that it satisfies the needs of commercial interests while preserving the spectrum access necessary to satisfy the mission requirements and operations of Federal entities?

   The government relies quite heavily on commercial satellite systems for their critical missions, including defense and national security. Accordingly, when the US government and federal entities wish to ensure that they have the spectrum access to satisfy their mission requirements, they must look to see that the systems, such as commercial satellite systems, have access to sufficient spectrum today and in the future to meet their requirements. This requires the US government to partner with commercial service providers who provide access to critical communications systems in ensuring that adequate spectrum is available to meet the requirements for these systems and important government missions. Accordingly, it is critical that during US proceedings and in the US preparatory process for international meetings, that the NTIA and federal entities support their commercial partners in ensuring adequate spectrum is available to support important government missions. Failure to have this input in making domestic and international spectrum decisions could result in communications systems and technologies that the US government relies on not having sufficient access to spectrum to support their missions.

Further, in FCC rulemakings, it is critical that NTIA and federal entities file comments and share their views on the importance of commercial systems to their missions. In addition, in the preparatory process for international meetings, including the World Radiocommunication Conference, NTIA, and the federal entities should affirmatively support sufficient spectrum and protections being provided to commercial services that support their missions. In this manner, the US government can work to ensure that all users, both private sector and governmental, have adequate spectrum access.

7. What are the likely future needs of spectrum users, both terrestrial and space-based application within the next 15 years? In particular, are present allocations of spectrum sufficient to provide next generation services like 5th generation satellite services and merging space-based applications? For commenters who asset that existing allocations are insufficient, NTIA is interested in understanding better the amount of spectrum presently available to provide particular services (or similar services) and estimates of the amount of additional spectrum in each frequency bands that the commenter believes is needed.

   Based on the successful deployment of satellite broadband and other advanced satellite services, and the increased demand we are seeing in the United States and globally for such services, especially with the deployment of 5G and other advanced services like IoT and M2M, increased demand for access to commercial satellite services will continue to grow. New high throughput GSO networks and mega-constellations of NGSO networks are bringing and will continue to bring higher capacity, higher speed communications services to users wherever they are located. In addition, satellites play an especially important role to national security and defense communications. All of these uses result in an increase for access to greater capacity and speed on satellite systems, resulting in the need for greater continues to grow, greater access to spectrum.

   Today many of these systems, including Hughes broadband satellite system relies on existing spectrum allocations in the Ka bands for use by gateways and user terminals (18.3-19.3 GHz, 19.7-20.2 GHz, 27.5-28.6 GHz and 29.25-30 GHz). Hughes has under construction a UHD satellite that will provide broadband service to the United States at speeds of approximately 100 Mbps. To meet the demands of customers for high-speed, high-capacity services, Hughes is building this satellite in the Ka-band as well as in the millimeter wave bands above 30 GHz (40-42 GHz, 48.2-50.2 GHz, and 50.4-51.4 GHz). For future systems, Hughes anticipates it will need additional spectrum including access in the 37.5-40 GHz and in the E-band (70/80 GHz band). Further, Hughes anticipates that it will need access to the 51.-4-52.4 GHz band for its gateway use, which is under consideration at the 2019 WRC, as well as additional new allocations in the future (e.g., 37.5-39.5 GHz for FSS gateways). While some of this spectrum will be used for gateways that can be shared (e.g., 47.2-48.2 GHz and 50.4-51.4 GHz), with reasonable protection criteria imposed with terrestrial mobile services, some of the bands will be required for user terminals (i.e., 40-42 GHz and 48.2-50.2 GHz). Because of the inability of two widely deployed services being able to share, this spectrum must be made available on an exclusive primary basis to satellites. Accordingly, it is critical as the United States looks at future needs for space-based applications, they consider these planned uses.

   Other systems of critical importance include our S-band mobile satellite service systems (operating in the bands 1980-2010 MHz and 2170-2200 MHz). EchoStar today has its EchoStar XXI satellite operating in these bands over Region 1 and is operating DISH Network's two S-band MSS satellites over Region 2. These systems provide important MSS services today and will have an important role in providing IOT and other services going forward. In some countries, including the United States, Canada, and throughout the European Union, these bands are also available for terrestrial use by the same licensee as the satellite operator. Through such a regulatory regime, and through bilateral coordination, regulators can ensure that the spectrum is used in the space and on the ground in the most efficient manner.

   In addition, satellites also support a significant amount of competitive programming through their satellite systems in the bands 11.7-12.2 GHz, 12.2-12.7 GHz, 14-14.5 GHz, 17.3-17.8 GHz and 18.55-18.8 GHz. EchoStar operates a number of satellites in these bands on behalf of the DISH Network, who has millions of customers across the United States for Direct-To-Home service today. In order to support these and the hundreds of millions of subscribers globally, these allocations must continue to be available for such services for the foreseeable future.

**Conclusion**

The United States is well-positioned to be a leader in 5G and continue its overall leadership in communications. EchoStar/Hughes supports the efforts of the Administration and NTIA to develop a spectrum management and policy regime that advances all technologies, including commercial satellites. We are at a very important juncture in the development of next-generation communications technologies and making sure that adequate spectrum is available to support these systems now and in the future. By adopting a technology-neutral regime that recognizes the important role of multiple technologies, the Administration can develop a spectrum management regime that best serves the interests of US consumers, businesses, and important government missions.

Respectfully submitted,

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