Before the
Federal Communications Commission
Washington, DC 20554

In the Matter of	)	
	)	
Use of Spectrum Bands Above 24 GHz For Mobile Radio Services	)	GN Docket No. 14-177
	)	
Amendment of the Commission's Rules Regarding the 37.0-38.6 GHz and 38.6-40.0 GHz Bands	)	ET Docket No. 95-183 (Terminated)
	)	
Implementation of Section 309(j) of the Communications Act – Competitive Bidding, 37.0-38.6 GHz and 38.6-40.0 GHz Bands	)	PP Docket No. 93-253 (Terminated)
	)	
Petition for Rulemaking of the Fixed Wireless Communications Coalition to Create Service Rules for the 42.0-43.5 GHz Band	)	RM-11664

COMMENTS OF ECHOSTAR SATELLITE OPERATING CORPORATION, HUGHES NETWORK SYSTEMS, LLC, AND ALTA WIRELESS, INC.

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Summary

EchoStar Satellite Operating Corporation, Hughes Network Systems, LLC, and Alta Wireless, Inc. (collectively, "EchoStar") welcome the Federal Communications Commission's ("FCC") effort to enable more efficient use of the frequencies above 24 GHz and facilitate the development of new mobile radio services. Enabling greater frequency sharing and flexibility in these bands will be a challenging task and will have a far-reaching effect on the development of new technologies and services by both new FCC licensees and existing service providers.

The FCC should base any future rulemaking proposals on five core principles: (1) technology neutrality; (2) spectrum efficiency; (3) protection from harmful interference; (4) regulatory certainty; and (5) regional and global harmonization. The FCC should apply these principles in determining the use of the frequency bands above 24 GHz. In doing so, the FCC will need to strike the proper balance between enabling new 5G services and promoting continued investment and innovation in existing services.

New services should not come at the expense of existing services. These existing services, such as satellite broadband and mobile-satellite service, are thriving and enable important capabilities, including critical public safety communications during natural disasters and emergencies and cost-effective communications for U.S. consumers in rural or remote areas, where terrestrial infrastructure may be unavailable. Moreover, these existing services are expanding and exploring innovative new uses, including, for example, the use of the 17/24 GHz satellite band for enhancing the provision of video and data services to wireless broadband networks. The FCC also should take into consideration in any future rulemaking proceedings the mandates of the National Space Policy of the United States of America, which expressly

recognizes the need for continued access to spectrum for the space industry and urges agencies to protect U.S. global access to spectrum for commercial users.

With respect to specific frequency bands where EchoStar has a direct interest, the Commission should adopt the following actions, consistent with the principles set forth above:

- In the Local Multipoint Distribution Service ("LMDS") frequencies (27.5-28.35 GHz, 29.1-29.25 GHz and 31.0-31.3 GHz bands), the FCC should commence a rulemaking proceeding to examine whether current LMDS operators should be given flexibility to operate mobile terrestrial wireless radio services. Providing additional authority to existing operators is consistent with long-standing FCC policy and practice and would expedite the provision of services to the public. In areas of the country where there are presently no LMDS licensees, the FCC should examine whether 5G service deployment would be appropriate and, if so, how best to assign licenses. Of equal importance, the FCC should examine whether to change the current secondary allocation for Fixed Satellite Service ("FSS") uplinks in the LMDS band to a co-primary allocation for gateway stations and adopt rules that ensure that FSS use is not unduly curtailed in deploying gateway stations in this band.

- In the V-band frequencies (37.0 - 42.5 GHz bands), the FCC should not take any action and maintain the band for satellite broadband use. Given the demonstrated interest, including technology development, of the satellite community in utilizing this band as an expansion band for Ka-band broadband satellite systems, as well as the growing demand for satellite broadband services generally, it would be premature for the FCC to act. As the FCC is aware, satellite technology has an extensive development path, involving years of research, planning, and manufacturing. Additionally, introducing regulatory uncertainty at this stage would discourage investment and innovation in the V-band, disadvantaging the U.S. satellite industry and, more importantly, U.S. consumers.

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COMMENTS

EchoStar Satellite Operating Corporation ("ESOC"), Hughes Network Systems, LLC ("Hughes"), and Alta Wireless, Inc. ("Alta" and collectively, "EchoStar") submit these comments in response to the FCC's Notice of Inquiry (the "Spectrum Frontiers NOI").[1] Recognizing technological advancements and the increasing capability of licensees to share spectrum, the FCC invites comments on the potential for the provision of next-generation (*i.e.*, "5G") mobile radio services in the frequency bands above 24 GHz.[2] The FCC specifically identifies a number of frequency bands, including the Local Multipoint Distribution Service

[1] *See In the Matter of Use of Spectrum Bands Above 24 GHz For Mobile Radio Services, et al.*, Notice of Inquiry, FCC 14-154 (rel. Oct. 17, 2014).

[2] *Id.* ¶ 1.

("LMDS") and the V band, and invites proposals on other potential bands above 24 GHz for which sharing with a 5G service should be considered.[3]

EchoStar welcomes the FCC's effort to make more efficient use of the frequencies above 24 GHz, but has concerns that the FCC has limited its examination to enabling only new users for 5G. Instead, the FCC should expand its inquiry to ensure that the future of existing services in the frequency bands above 24 GHz are also considered, and to create a regulatory regime that allows for future expansion and flexibility for existing licensees to utilize their spectrum in a more efficient manner.

As the FCC begins proceedings on the future of the frequency bands above 24 GHz, it should base its actions on clear principles. It should carefully evaluate the pros and cons of any proposals to enable 5G services while accommodating other important public interest considerations, such as enabling the expansion and increased innovation of existing services, the importance of the services provided by existing operators to both U.S. industry and consumers, and the need for regulatory certainty to foster investment. The FCC should also take into consideration the mandates of the National Space Policy of the United States of America ("National Space Policy"), which expressly recognizes the need for continued access to spectrum for the space industry and urges agencies to protect U.S. global access to spectrum for commercial users.[4]

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[3] *Id*. ¶¶ 50-87.

[4] Executive Office of the President, National Space Policy of the United States of America (2010), *available at* http://www.whitehouse.gov/sites/default/files/national_space_policy_6-28-10.pdf.

I. Background

Founded by Charlie Ergen in 1980, today EchoStar, a U.S. company, is the largest commercial geostationary satellite operator in the United States and the fourth largest commercial geostationary operator in the world with a fleet of twenty-four owned, leased or managed satellites in the Fixed-Satellite Service ("FSS"), Broadcasting-Satellite Service ("BSS") and Mobile-Satellite Service ("MSS").[5] Additionally, EchoStar operates terrestrial LMDS networks, providing point-to-point and point-to-multi-point services,[6] and develops technology and equipment for a variety of communications services, such as Global VSATs (*i.e.*, very small aperture terminals) and set-top boxes.[7] As discussed below, many of the services EchoStar provides operate in the frequencies above 24 GHz and could be affected directly by any FCC decision to enable sharing with new 5G services.

A. Ka-band Frequencies (28.35-28.6 GHz, 28.6-29.1 GHz, 29.1-29.25 GHz, 29.25-29.5 GHz and 29.5-30.0 GHz Bands)

1. Broadband Satellite Service (28.35-28.6 GHz, 28.6-29.1 GHz, 29.25-29.5 GHz and 29.5-30.0 GHz Bands)

Hughes is the largest satellite broadband provider in the United States, serving over one million users through two satellites, Spaceway and Jupiter 1, operating in the Ka-band.[8] The

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[5] *See infra* Parts I.A and I.C.

[6] *See infra* Part I.B.

[7] Hughes is the leading provider of VSAT technology and services internationally, supporting a wide-variety of enterprise and government customers. *See, e.g.*, Hughes Network Systems, LLC, http://www.hughes.com/technologies/application-solutions/vsat-system. EchoStar, through its subsidiary Sling Media Inc., designs and manufactures innovative set-top boxes, including the Joey and Hopper. *See, e.g.*, Sling Media Inc., http://www.slingbox.com/.

[8] The Ka-band FSS uplinks are in the 28.35-29.1 GHz and 29.25-30.0 GHz bands, and the downlinks are in the 18.3-19.3 and 19.7-20.2 GHz frequencies. *See In the Matter of Redesignation of the 17.7-19.7 GHz Frequency Band, Blanket Licensing of Satellite Earth Stations in the 17.7-20.2 GHz and 27.5-30.0 GHz Frequency Bands, and the Allocation of*

company also offers broadband satellite services in Canada and is expanding to other markets including Brazil and Mexico among others.

Additionally, Hughes plans to increase the capability of its broadband service in the Americas through the launch of Jupiter 2/EchoStar XIX in 2016.[9] The Jupiter 2 satellite "will have more than 150 Gbps throughput – 50 percent greater capacity than the Jupiter 1/EchoStar XVII satellite– with a next-generation architecture having more than 120 spot beams, providing high quality Internet coverage."[10] There are many other satellite operators that also use or soon plan to use the Ka-band for the provision of broadband satellite services.[11]

Hughes broadband service supports consumer use, as well as important government, public safety and health-related activities. For example, Hughes supports the New England Telehealth Consortium, providing data transmission services to mobile healthcare units that "provide medical care to migrant farm workers in Maine, New Hampshire and Vermont."[12]

Additional Spectrum in the 17.3 -17.8 GHz and 24.75-25.25 GHz Frequency Bands for Broadcast Satellite-Service Use, Report and Order, 15 FCC Rcd 13430 (2000).

[9] *See* Hughes Network Systems, LLC, *Hughes Selects Space Systems/Loral to Build World's Highest Capacity Broadband Satellite* (Mar. 21, 2013), *available at* http://www.hughes.com/resources/hughes-selects-space-systems-slash-loral-to-build-worlds-highest-capacity-broadband-satellite-1.

[10] Jeffrey Hill, *Hughes Drops Big News at SATELLITE 2013 with SSL Jupiter 2 Deal*, Satellite Today (Mar. 21, 2013), *available at* http://www.satellitetoday.com/telecom/2013/03/21/hughes-drops-big-news-at-satellite-2013-with-ssl-jupiter-2-deal/.

[11] *See, e.g.*, ViaSat Inc., https://www.viasat.com/broadband-satellite-networks/high-capacity-satellite-system (last visited Jan. 15, 2015); *see* Jeff Baumgartner, *DirecTV Shores Up 4K Plans*, Multichannel News (Nov. 7, 2014), *available at* http://www.multichannel.com/news/technology/directv-shores-4k-plans/385369; Caleb Henry, *DirecTV to Begin 4K Broadcasts this Year*, Via Satellite (Sep. 22, 2014), *available at* http://www.satellitetoday.com/regional/2014/09/22/directv-to-begin-4k-broadcasts-this-year/. *See also* IBFS File No. SAT-MOD-20141210-00127 (filed Dec. 10, 2014).

[12] Carolyn Duffy Marsan, *Hughes wins its first satellite-based telemedicine deal*, Network World (Jan. 11, 2013), *available at* http://www.networkworld.com/article/2162721/lan-wan/hughes-wins-its-first-satellite-based-telemedicine-deal.html.

Hughes also provides vital Internet and voice services to communities during natural disasters and emergencies, when terrestrial and wireless networks have failed or are unreliable.[13] For example, in the aftermath of Hurricane Sandy, broadband services via satellite were the only telecommunications service available in parts of the New York City area.[14] Similarly, during the aftermath of the earthquake in Haiti in 2010, Hughes satellite broadband was instrumental in assisting the State University Hospital of Haiti in providing medical assistance through telemedicine.[15]

2. Mobile-Satellite Service (Feeder Link Use in the 29.1-29.25 GHz and 29.25-29.5 GHz Bands)

EchoStar operates three MSS satellites with service links in the S band – two North American satellites, D.1 and Gamma-1,[16] and one European satellite, W2-A (now EUTELSAT 10A).[17] EchoStar is constructing a fourth satellite, EchoStar XXI, which will provide MSS in the

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[13] *See* Hughes Network Systems, LLC, *Hughes Announces New Emergency Networking Solutions for Hurricane Season* (Jun. 3, 2013), *available at* http://www.hughes.com/resources/hughes-announces-new-emergency-networking-solutions-for-hurricane-season.

[14] *Id.* ("We learned firsthand the value of satellite broadband service in the days, weeks, and months following Hurricane Sandy…. The storm destroyed over 120 homes in New York's Breezy Point area and knocked out landlines. Cell phone coverage was completely unreliable. Hughes satellite technology was the only thing that worked, and we used it—and continue to use it—to coordinate rebuilding efforts.").

[15] *See* Hughes Network Systems, LLC, *Haitian Earthquake Relief Efforts*, *available at* http://government.hughes.com/resources/haitian-earthquake-relief-efforts (last visited Jan. 15, 2015).

[16] *See* Call Signs S2651 and S2633.

[17] EchoStar's wholly-owned subsidiary, Solaris Mobile Limited, holds the license for the W2-A and is one of two pan-European MSS licensees in the S band. *See* Official Journal of the European Union, Commission Decision of 14 May 2009, 2009/449/EC.

European Union.[18] Two of these satellites, D.1 and EchoStar 21, have feeder links in the Ka-band.[19] Other MSS operators also use the Ka-band for feeder links.[20] EchoStar relies upon the Ka-band because spectrum in more developed satellite bands, such as the Ku-band, is essentially no longer available.

MSS is used for a variety of consumer, as well as business, needs, including a wide range of services from M2M to intelligent transport networks. As the FCC has noted, "MSS is particularly well suited for meeting the needs of the transportation, petroleum, and other vital industries."[21] For many of these services, the terrestrial infrastructure is insufficient and it is critical to have a satellite-based delivery system. Perhaps of even greater importance, MSS is used by first responders, who have a critical need for voice and data communications that are mobile in nature and can be used wherever emergencies occur, including in rural or remote areas unserved by terrestrial infrastructure.

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[18] *See, e.g.*, Peter B. de Selding, *EchoStar's Satellite-broadband Revenue Rises Despite Slower Subscriber Growth*, Space News (Aug. 7, 2014), *available at* http://www.spacenews.com/article/financial-report/41518echostar%E2%80%99s-satellite-broadband-revenue-rises-despite-slower-subscriber.

[19] *See, e.g.*, Stamp Grant, File No. SAT-MOD-20070919-00129 (granted Apr. 2, 2008) (authorizing, *inter alia*, operations on the D.1 satellite (then ICO-G1) in the 29.25-30.0 GHz frequencies).

[20] *See, e.g., Motorola Satellite Communications, Inc. for Authority to Construct, Launch, and Operate a Low Earth Orbit Satellite System in the 1616-1626.5 MHz Band*, Order and Authorization, 10 FCC Rcd 2268 (IB 1995).

[21] *Fixed and Mobile Services in the Mobile Satellite Service Bands at 1525-1559 MHz and 1626.5-1660.5 MHz, 1610-1626.5 MHz and 2483.5-2500 MHz, and 2000-2020 MHz and 2180-2200 MHz*, Report and Order, 26 FCC Rcd 5710 ¶ 4 (2011).

B. Local Multipoint Distribution Service (27.5-28.35 GHz, 29.1-29.25 GHz and 31.0-31.3 GHz Bands)

The FCC auctioned the terrestrially-based LMDS spectrum in 1998, and today there are a number of LMDS systems deployed in the United States.[22] Alta holds four LMDS licenses covering the San Diego, Phoenix, Cheyenne and Kansas City Basic Trading Areas or BTAs.[23] Alta leases portions of its spectrum to Nextlink Wireless, LLC, a subsidiary of XO Communications that provides backhaul and others services,[24] and uses the remaining network capacity for internal purposes.

Portions of the LMDS frequencies are allocated to satellite feeder links on a secondary basis (27.5-28.35 GHz) or co-primary basis (29.1-29.25 GHz band).[25] A number of satellite companies, including Hughes, are either licensed or have proposed to operate their FSS gateways in these bands.[26] Such use is necessary in order to have sufficient capacity to meet growing consumer demands for broadband satellite services.

C. Reverse Band Broadcasting-Satellite Service (24.75-25.25 GHz Band)

EchoStar operates the satellite network of DISH Network Corporation and its subsidiaries and affiliates (collectively, "DISH"), which provide direct-to-home services to more than 14

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[22] *See, e.g.*, "LMDS Auction Closes Winning Bidders in the Auction of 986 Local Multipoint Distribution Service (LMDS) Licenses," Public Notice, DA 98-572 (Mar. 26, 1998). LMDS has many of the same advantages as fiber, including high-bandwidth capability, but does not have the same high costs for deployment.

[23] *See* Call Signs WPOH667, WPOH669, WPOH670, and WPOH668.

[24] *See, e.g.*, Application, ULS File No. 0006477873 (accepted Sep. 26, 2014).

[25] *See, e.g.*, *In the Matter of Rulemaking to Amend Parts 1, 2, 21, and 25 of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Band, to Reallocate the 29.5-30.0 GHz Frequency Band, to Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services*, Third Report and Order, 12 FCC Rcd 22310 ¶ 40 (1997).

[26] *See, e.g.*, Stamp Grant, Application of ViaSat, Inc., IBFS File No. SAT-LOI-20140204-00013 (granted Jun. 18, 2014) (authorizing uplink operations in the 28.1-28.35 MHz band).

million U.S. consumers, primarily through a fleet of Direct Broadcast Satellite ("DBS") satellites, which operate in the 12/17 GHz bands.[27] Recognizing that demand for such services was growing rapidly, the FCC in 2000 allocated spectrum in the 17/24 GHz band for Broadcasting-Satellite Service ("BSS") to serve as an expansion band for DBS service.[28] Because the BSS downlink in the 17 GHz is conducted in the same frequency band as the service uplink for DBS service, the 17/24 GHz BSS band is commonly referred to as the "Reverse Band."[29]

Current developments demonstrate how the promise of the Reverse Band is taking shape. For example, DISH has a pending FCC application requesting authority to use capacity on a Reverse Band payload, Ciel-6i, to explore the provision of video and data services for wireless broadband networks.[30] Once proven, DISH will be able to utilize this capacity to deploy

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[27] *See* EchoStar Satellite Operating Corporation, http://www.echostarsatelliteservices.com/SatelliteFleet/Fleet.aspx (last visited Jan. 15, 2015).

[28] The 17 GHz band is used for downlink transmissions and the 24 GHz band, 24.75-25.25 GHz, is used for uplink transmissions. *See Redesignation of the 17.7-19.7 GHz Frequency Band, Blanket Licensing of Satellite Earth Stations in the 17.7-20.2 GHz and 27.5-30.0 GHz Frequency Bands, and the Allocation of Additional Spectrum in the 17.2-17.8 GHz and 24.75-25.25 GHz Frequency Bands for Broadcast Satellite-Service Use*, Report and Order, 15 FCC Rcd 13430 ¶ 97 (2000).

[29] *See, e.g., The Establishment of Policies and Service Rules for the Broadcasting-Satellite Service at the 17.3-17.7 GHz Frequency Band and at the 17.7-17.8 GHz Frequency Band Internationally, and at the 24.75-25.25 GHz Frequency Band for Fixed Satellite Services Providing Feeder Links to the Broadcasting-Satellite Service and for the Satellite Services Operating Bi-directionally in the 17.3-17.8 GHz Frequency Band*, Notice of Proposed Rulemaking, 21 FCC Rcd 7426 ¶ 56 (2006).

[30] *See* Application of DISH Operating L.L.C., IBFS File No. SES-LFS-20140924-00752 (filed Sep. 24, 2014). Hughes Network Systems Canada ULC has a contract with Ciel Satellite Limited Partnership, a subsidiary of SES Americom, Inc., to use the 17/24 GHz capacity on Ciel-6i, a Canadian-licensed satellite, and HNS Canada has, in turn, leased this capacity to DISH.

advanced multichannel video services to consumers on their hand-held mobile devices.[31] Additionally, DIRECTV recently launched the DIRECTV-14 satellite and has applied for authority to launch the DIRECTV-15 satellite, both of which will operate in the Reverse Band (as well as the Ka-band) to expand high definition television programming and video-on-demand services.[32]

D. V-Band (37.0-42.5 GHz Band)

The V-band has been recognized by the FCC as an expansion band for FSS.[33] Accordingly, many satellite operators, including EchoStar, have made satellite filings at the International Telecommunications Union (ITU) in anticipation of putting this spectrum band to use. To this end, satellite manufacturers have been actively working on technology to support FSS use of this band. However, regulatory uncertainty exists in this band because the FCC has not concluded its rulemaking on the use of these frequencies.[34]

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[31] *Id*. at 2. Demand for mobile video services is growing at an incredible rate. *See* Roland Banks, "Are Mobile TV and Video Still Killer Apps?" Mobile Industry Review (Sep. 22, 2014), *available at* http://www.mobileindustryreview.com/2014/09/mobile-video-still-killer-app.html ("According to Cisco's 5-year forecast, mobile data traffic grew 81% in 2013 of which 53% was video, and is predicted to rise to over two-thirds of all mobile data traffic by 2018.").

[32] *See* Space Systems/Loral, LLC, http://sslmda.com/html/satexp/directv14.html (last visited Jan. 15, 2015); Jeff Baumgartner, "DirecTV Shores Up 4K Plans," Multichannel News (Nov. 7, 2014), *available at* http://www.multichannel.com/ news/technology/directv-shores-4k-plans/385369; Caleb Henry, *DirecTV to Begin 4K Broadcasts this Year*, Via Satellite (Sep. 22, 2014), *available at* http://www.satellitetoday.com/regional/2014/09/22/directv-to-begin-4k-broadcasts-this-year/.

[33] *In the Matter of Allocation and Designation of Spectrum for Fixed-Satellite Services in the 37.5-38.5 GHz, 40.5-41.5 GHz, and 48.2-50.2 GHz Frequency Bands; Allocation of Spectrum to Upgrade Fixed and Mobile Allocations in the 40.5-42.5 GHz Frequency Band; Allocation of Spectrum in the 46.9-47.0 GHz Frequency Band for Wireless Services; and Allocation of Spectrum in the 37.0-38.0 GHz and 40.0-40.5 GHz for Government Operations*, Report and Order, 13 FCC Rcd 24649 ¶ 1 (1998).

[34] *See In the Matter of Allocation and Designation of Spectrum for Fixed-Satellite Services in the 37.5-38.5 GHz, 40.5-41.5 GHz and 48.2-50.2 GHz Frequency Bands, Allocation of Spectrum to*

II. Discussion

A. The FCC Should Adopt Core Principles to Govern the Spectrum Frontiers Proceedings

EchoStar supports the FCC's efforts to enable more efficient use of the frequencies above 24 GHz and facilitate the development of new 5G services. Satellite and LMDS operators, including EchoStar, have always supported sharing in their frequency bands in a manner that protects existing operators from harmful interference and enables the development of innovative services to meet customer demands.[35] This proceeding provides the FCC with an opportunity to further increase the shared use of frequency bands in a manner that both encourages development of new 5G services and ensures existing licensees the opportunity to expand their services and receive protection from potential harmful interference. To best accomplish this goal, EchoStar urges the FCC to adopt a set of overarching principles to govern its actions in the Spectrum Frontiers proceedings – namely, technology neutrality, spectrum efficiency, protection from harmful interference, regulatory certainty and regional and global harmonization.

Application of these principles should be on a band-by-band basis, and each band under consideration should be evaluated in a separate rulemaking proceeding. By utilizing such an approach, the FCC can best accommodate competing policy goals and balance competing interests on a more granular basis. Likewise, the FCC can best ensure that all voices for each specific frequency band, which are likely to be different across the various bands, are heard fully

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Upgrade Fixed and Mobile Allocations in the 40.5-42.5 GHz Frequency Band, Allocation of Spectrum in the 46.9-47.0 GHz Frequency Band for Wireless Services, and Allocation of Spectrum in the 37.0-38.0 GHz and 40.0-40.5 GHz for Government Operations, Third Notice of Proposed Rulemaking, 25 FCC Rcd 15663 (2010).

[35] *See, e.g.*, Comments of EchoStar Satellite Operating Company and Hughes Network Systems, LLC, Docket No. 12-354 (Jul. 14, 2014).

and fairly and that the facts and positions specific to each particular band are not inadvertently lost in a sea of filings.

In addition, EchoStar urges the FCC to take into consideration the mandates of the National Space Policy. A critical goal of this policy is to enable the United States to remain competitive in the global space industry.[36] The National Space Policy expressly recognizes that there is a need for continued access to spectrum for the space industry and mandates that agencies should "[s]eek to protect U.S. global access to, and operation in, the radiofrequency spectrum and related orbital assignments required to support the use of space by . . . U.S. commercial users."[37] Accordingly, in addition to the principles outlined below, the FCC should take into account the very clear mandates of the National Space Policy in making any decisions in this proceeding.

1. Technology Neutrality

The FCC's overarching principle should be one of technology neutrality, a long-standing FCC policy.[38] As the FCC has recognized, it should not attempt to pick winners and losers.[39]

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[36] National Space Policy at 3 ("A robust and competitive commercial space sector is vital to continued progress in space. The United States is committed to encouraging and facilitating the growth of a U.S. commercial space sector that supports U.S. needs, is globally competitive, and advances U.S. leadership in the generation of new markets and innovation-driven entrepreneurship.").

[37] National Space Policy at 9.

[38] *See, e.g., In the Matter of Amendment of Part 27 of the Commission's Rules to Govern the Operation of Wireless Communications Services in the 2.3 GHz Band, Establishment of Rules and Policies for the Digital Audio Radio Satellite Service in the 2310-2360 MHz Frequency Band*, Report and Order and Second Report and Order, 25 FCC Rcd 11710 ¶ 28 (2010) ("Furthermore, consistent with the Commission's long-standing policies of maintaining technical and service neutrality in its rules and allowing flexible spectrum use by licensees, we adopt rules that remain technology neutral instead of adopting rules that mandate the use of a particular technology or service."); *In the Matter of Biennial Regulatory Review - Amendment of Parts 1, 22, 24, 27 and 90 to Streamline and Harmonize Various Rules Affecting Wireless Radio Services*, Report and Order, 20 FCC Rcd 13900 ¶ 20 (2005) ("We also believe that licensees are in the best

Such decisions should be left to consumers and the marketplace. Accordingly, in enabling greater use of the frequency bands above 24 GHz, the FCC should balance carefully its initiative to facilitate terrestrial, mobile 5G services with the need for a wide diversity of technologies, some of which, like satellites, meet different consumer needs, including cost-effective service to rural or remote areas where terrestrial infrastructure may be unavailable and also are capable of being part of the 5G infrastructure.

2. Spectrum Efficiency

To facilitate efficient use of spectrum and encourage service innovation, the FCC should adopt regulations that enable flexibility for all licensees and not only new entrants to the bands. The FCC has long held that greater operating flexibility enhances the ability of licensees to respond to market demands and facilitates the efficient provision of service to the benefit of consumers.[40] Giving all licensees technical and operational flexibility will maximize the

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position to decide what combination of equipment will result in the most efficient provision of service.... [W]e believe it is in the public interest to afford licensees the flexibility to make these types of decisions regarding system design.”).

[39] *See, e.g., In the Matter of Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable & Timely Fashion, & Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996*, Report, 14 FCC Rcd 2398 ¶ 5 (1999) (“Our role is not to pick winners and losers, or to select the best technology to meet consumer demand.”); *In Re Creation of Low Power Radio Service*, Report and Order, 15 FCC Rcd 2205 (2000) (Statement of Chairman William Kennard) (“[I]t is not the business of the FCC to pick winners and losers. We should empower consumers to decide what he or she prefers, rather than ruling out some options on our own and depriving the listener of making that choice for him- or herself.”).

[40] *See, e.g.,* Spectrum Task Force Report, ET Docket No. 02-135 at 16 (2002)(“[F]lexibility in spectrum regulation is critical to improving access to spectrum.”); *In the Matter of Amendment of Parts 1, 21, 73, 74 and 101 of the Commission’s Rules to Facilitate the Provision of Fixed and Mobile Broadband Access, Educational and Other Advanced Services in the 2150-2162 and 2500-2690 MHz Bands*, 19 FCC Rcd 14165 (2004); *In the Matter of Amendment of Parts 1 and 22 of the Commission's Rules with Regard to the Cellular Service, Including Changes in Licensing of Unserved Area Amendment of the Commission’s Rules with Regard to Relocation of Part 24 to Part 27 Interim Restrictions and Procedures for Cellular Service Applications*

potential benefits to consumers. Indeed, in situations where the FCC has given existing operators additional flexibility, such as in many of the wireless services, including advanced wireless services, the FCC has enabled the introduction of new and exciting services to consumers.[41]

The basic premise underlying the Spectrum Frontiers NOI is that spectrum sharing will enable more efficient use of spectrum. Critical to this assumption of greater sharing, which the FCC similarly recognized in sharing proposals in the National Broadband Plan, is that advancements in technology would "allow access to many different frequencies . . . without harming other users' operations or interest."[42] The FCC should ensure that spectrum efficiencies result in both existing and new users flourishing and not simply new spectrum licensees benefiting at the expense of existing licensees, which would not result in efficient sharing or serve the public interest. Proposals of the latter type would be unfair to existing licensees and also could result in unintended consequences, such as loss of access to critical public-safety services provided by existing licensees.

3. Protection from Harmful Interference

Failure to establish adequate protection for existing operators could jeopardize billions of dollars in investments and, perhaps more importantly, harm U.S. consumers by diminishing the

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Amendment of Parts 0, 1, and 22 of the Commission's Rules with Regard to Frequency Coordination for the Cellular Service Amendment of the Commission's Rules Governing Radiated Power Limits for the Cellular Service, Notice of Proposed Rulemaking, FCC 14-181 ¶ 1 (2014).

[41] *See, e.g.*, Roger C. Sherman, *Evolution in the Cellular Service*, Official FCC Blog (Oct. 2, 2014), www.fcc.gov/blog/evolution-cellular-service (describing the benefits and need for increased licensee flexibility as a result of the evolution in cellular service).

[42] *See* Federal Communications Commission, *Connecting America: The National Broadband Plan* at 95, www.broadband.gov/plan/ (emphasis added).

regulatory certainty that existing service providers currently have. Any action the FCC proposes in the Spectrum Frontiers proceedings should not only protect existing facilities from harmful interference but also allow them to expand current operations to meet consumer demands. The FCC should consider rules that ensure that 5G licensees sharing with existing operators provide adequate notice to customers that their 5G operations may be impacted if they cause harmful interference to existing services or if additional spectrum is needed by existing operators.

In many cases, to ensure that existing operators can expand their current services, the FCC should consider establishing 5G services as a secondary service. Similarly, proposed technical rules for 5G services in the frequencies above 24 GHz should be designed to minimize the potential for harmful interference to existing services. Failure to establish adequate protection for existing operators could jeopardize billions of dollars in investments and, perhaps more importantly, harm U.S. consumers.

4. Regulatory Certainty

Because satellite technology has a long development path, regulatory certainty promotes investment in satellite broadband. The technology is extraordinarily complex, and satellites require considerable time and upfront costs to plan, build and launch. The planning process alone can require more than five years, and a satellite asset can last 15 years or more.

For these reasons, the U.S. government, including the FCC, has recognized consistently the need for long-term certainty in the satellite industry.[43] Accordingly, in any frequency band

[43] For example, the 2010 National Space Policy specifically requires the U.S. government to:

- seek to protect U.S. global access to, and operation in, the radiofrequency spectrum and related orbital assignments required to support the use of space by . . . U.S. commercial users; and
- seek to ensure the necessary national and international regulatory frameworks will remain in place over the lifetime of the system.

above 24 GHz where satellite operations exist or are planned, the FCC should carefully consider proposals to enable 5G services in those bands against the need for a stable regulatory environment necessary to foster investment and development of complex satellite service infrastructure. Failure to do so would result in a loss of a valuable communications technology and services for U.S. consumers.

5. Regional and Global Harmonization

Any action the FCC proposes should reflect the need for regional and global harmonization of services. Harmonization allows operators to take advantage of economies of scale and other efficiencies, which reduce service costs and benefit users of the service.[44] This is especially important for satellite services, which by their very nature operate across national boundaries. Failure to allow satellite systems to provide regional or global services would lead to obvious inefficiencies in spectrum use and could be financially devastating to operators. Further, to the extent that satellites are operating globally based on certain assumptions of technical parameters, the introduction of co-primary terrestrial services in the band could affect coordination agreements in a way that negatively impacts satellite operators.

See National Space Policy at 6-7; *see also Allocation and Designation of Spectrum for Fixed-Satellite Services in the 37.5-38.5 GHz, 40.5-41.5 GHz and 48.2-50.2 GHz Frequency Bands*, Second Report and Order, 18 FCC Rcd 25428 ¶ 54 (2003) ("We recognize that both Government and commercial systems must remain sufficiently sure of their access to orbital and spectrum resources if they are to proceed with research, development and production of their planned space-station systems.").

[44] *See* Spectrum Frontiers NOI ¶ 48; *see also* Spectrum Policy Task Force Report at 42 ("[R]egional and world wide [sic] harmonization of band use can have significant advantages both in terms of truly ubiquitous services and economies of scale.").

B. There is a Need to Accommodate Increasing Spectrum Use by Satellite Systems

Because satellite networks provide distance-insensitive service over very broad coverage areas, they are ideal for providing communications services in rural and remote areas where terrestrial networks are limited or unavailable. Satellite technology ensures that consumers, no matter where they are located, have access to advanced communications capabilities, including broadband service at speeds comparable to terrestrial technologies and at rates that are cost effective.[45]

As President Obama has recognized, "[b]roadband can remove geographic barriers between patients and their doctors. It can connect our kids to the digital skills and 21st century education required for the jobs of the future."[46] The Commission itself has noted that "[b]roadband has gone from being a luxury to a necessity for full participation in our economy and society – for all Americans."[47] Similarly, the International Telecommunications Union (ITU), in its most recent broadband report, recognized the importance of satellite broadband in providing Internet services to the entire world:

> [T]he latest generation of satellites (including High-Throughput Satellites . . .) are 'game changers'. . . [because] they have removed performance and cost barriers to the delivery of consumer-grade Internet access.[48]

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[45] Comments of Hughes Network Systems, LLC, GN Docket No. 14-126, at 4 (filed Sep. 4, 2014).

[46] Remarks by the President on Monthly Employment Numbers, The White House Office of the Press Secretary (July 2, 2010), *available at* www.whitehouse.gov/the-press-office/remarks-president-monthly-employment-numbers.

[47] FCC Encyclopedia, Connect America Fund, http://www.fcc.gov/encyclopedia/connecting-america.

[48] International Telecommunications Union, *The State of Broadband 2014: Broadband for All, A Report by the Broadband Commission*, Sep. 2014, *available at* http://www.broadbandcommission.org/Documents/reports/bb-annualreport2014.pdf.

The future of satellite broadband is bright. The past decade has witnessed a tremendous change in the communications satellite industry with regard to operations in the frequency bands above 24 GHz. For example, although Ka-band satellites were envisioned for high-speed data communications nearly twenty years ago, it has been only in the last few years that the technology has developed sufficiently to enable widespread use of such services at speeds comparable to that of terrestrial services. In 2013, subscription to broadband service grew 20%, and such services generated revenues of nearly $2 billion/year.[49] Today, there are Ka-band broadband satellites providing services to more than 1.5 million U.S. consumers at speeds as high as 15 Mbps, and demand for these advanced broadband satellite systems is increasing.[50] In the next year or two, the United States will see the launch of at least two additional high-throughput satellites, which will introduce even greater broadband speeds and capabilities to millions more Americans.[51]

Satellite broadband services also play an important role in providing critical safety-of-life services in times of emergencies or disasters.[52] The same is true of MSS operations. Indeed, the FCC recently acknowledged:

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[49] *See* Satellite Industry Association, 2014 State of the Satellite Industry Report at 12 (Sep. 2014), *available at* http://siaorg.siteprotect.net/wp-content/uploads/2014/09/SSIR-September-2014-Update.pdf.

[50] *See* EchoStar Corp., Quarterly Report (Form 10-Q) at 40 (Nov. 6, 2014) (approximately 960,000 subscribers as of September 30, 2014); ViaSat, Inc., Annual Report (Form 10-Q), at 3 (Nov. 12, 2014) (approximately 657,000 subscribers as of Oct. 3, 2014).

[51] *See* Hughes Network Systems, LLC, *Hughes Selects Space Systems/Loral to Build World's Highest Capacity Broadband Satellite* (Mar. 21, 2013), *available at* http://www.hughes.com/resources/hughes-selects-space-systems-slash-loral-to-build-worlds-highest-capacity-broadband-satellite-1; Boeing Defense, Space & Security Communications, Defense, Space & Security: ViaSat-2, http://www.boeing.com/boeing/defense-space/space/bss/factsheets/702/viasat/viasat-2.page (last visited Jan. 15, 2015).

[52] *See supra* Part I.A.1.

> MSS has the ability to provide communications to mobile user terminals anywhere in the United States, including in remote areas where people are without basic telecommunications services . . . . MSS operators have the ability to operate when existing terrestrial infrastructure is non-existent or has been degraded or destroyed and therefore can meet public safety and emergency communication needs in times of national crises and natural disasters.[53]

To provide such services, MSS systems require the use of feeder link spectrum. However, traditional feeder link bands, such as the Ku-band, are congested, and MSS operators must look for feeder link spectrum elsewhere, including in the Ka-band. Because satellite equipment and technology in the Ka-band has been developed and is widely in use for feeder links, it is critical that the FCC ensure that the Ka-band continues to remain available for the growing needs of the satellite community and their users.[54]

C. Increased Demand for Innovative Satellite Services Requires Access to Capacity and Flexibility

The State of Broadband 2014: Broadband for All, a report by the ITU Broadband Commission, notes that "manufacturers are carrying out R&D in new generations of high-throughput satellites (HTS) capable of providing 50-100 Mbps by 2020."[55] Provided below is a table from the ITU report with the projected potential of Ka-band satellite broadband:[56]

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[53] *Fixed and Mobile Services in the Mobile Satellite Service Bands at 1525-1559 MHz and 1626.5-1660.5 MHz, 1610-1626.5 MHz and 2483.5-2500 MHz, and 2000-2020 MHz and 2180-2200 MHz*, Report and Order, 26 FCC Rcd 5710 ¶ 4 (2011).

[54] This overview just scratches the surface. There are many other commercial satellite operations in use or being developed in the frequencies above 24 GHz.

[55] ITU Report page 52.

[56] The Broadband Commission for Digital Development was launched by the International Telecommunication Union (ITU) and the United Nations Educational, Scientific and Cultural Organization (UNESCO).

Box Table 1: Advances in Satellite Broadband Technologies

Timeline	2005	2010	2015	2020
Generation	Ku-band satellites	First generation multi beam Ka-band satellites	Second generation multi beam Ka-band satellites	Third generation multi beam Ka-band satellites
Service capability	Internet broadband	High speed internet broadband	Superfast internet broadband	Very high speed internet broadband
Maximum service rate	2-3 Mbps	10-2 [sic] Mbps	30-50 Mbps	100 Mbps
Capacity per satellite	5	50-100	150-200	>500
Users per satellite	100,000	Several 100,000s	up to 1 million	>1 million

Source: ISI European Technology Platform.

This report shows that Ka-band satellites will continue to provide critical broadband services in the future. However, this is just the tip of the iceberg. The uptakes by consumers for broadband satellite services demonstrate that there is a need for more satellite capacity. Accordingly, it is critical that, as part of any proceeding that considers making any part of the Ka-band available for 5G services, the FCC should ensure there is the ability for broadband satellite systems to expand, including with respect to the addition of new gateway earth stations and user terminals, as appropriate.

Indeed, the future demand for satellite broadband is likely to be so great that even if the FCC allows continued expansion in the Ka-band, that spectrum alone is unlikely to be able to support the growing demand for broadband satellite services. In fact, in anticipation of the need

for additional capacity to provide broadband services, many satellite operators have made ITU filings for V-band satellite spectrum and vendors have been actively developing the equipment necessary to provide V-band broadband satellite services.[57] Accordingly, as the FCC examines the V-band, it is critical that the Commission recognize that any proposed changes to this band could severely curtail future satellite broadband use and, accordingly, retard the growth of satellite broadband services.

D. New 5G Services Should Not Be Permitted to Restrain the Growth of Existing Services

If the FCC elects to consider enabling the use of any of the frequency bands above 24 GHz for sharing with new 5G services, the FCC should ensure that existing services, such as satellite and LMDS, are not only protected but also allowed to expand. If the FCC fails to enable the growth and flexibility of satellite and LMDS use of the frequencies above the 24 GHz band, the U.S. economy would be negatively impacted.

As discussed above, satellites provide critical service to unserved or underserved areas. Indeed, the United States is the leading country for satellite broadband services. This is, in part,

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[57] *See* European Space Agency, Our Activities, Telecommunications & Integrated Applications, Alphasat, http://www.esa.int/Our_Activities/Telecommunication _Integrated_Applications/Alphasat/Aldo_Paraboni_Q_V_Band_Payload (noting the need to use V-band spectrum because of scarcity in other bands); *see also, e.g.*, Letter from Stephen D. Baruch, Attorney for Northrop Grumman Space & Mission System Corporation, to Marlene H. Dortch, Secretary, Federal Communications Commission, SAT-LOA-19970904-00080, (filed Mar. 26, 2009) (discussing that the satellite industry will "cross the threshold" for the V-band spectrum and that V-band "systems and technology are now practicable"); *see also, Allocation and Designation of Spectrum for Fixed-Satellite Services in the 37.5-38.5 GHz, 40.5-41.5 GHz and 48.2-50.2 GHz Frequency Bands*, IB Docket No. 97-95, Comments of the Satellite Industry Association at 3-4 (filed Jan. 6, 2011) ("Commercial satellite use of V-band spectrum is now just over the horizon . . . [t]he satellite industry is perhaps just one spacecraft generation (*i.e.*, fewer than five years) away from seeing V-band spectrum tapped to relieve the demand for feeder link spectrum. . . . V-band FSS spectrum . . . will soon enhance satellite broadband capabilities and capacity.").

because of the vast geographic areas that communications networks must cover and also because the United States has been the leader in the development of these services.

History has shown that in most cases it is simply not economical for terrestrial broadband networks to cover vast geographic areas. EchoStar's own experience has shown that as satellite broadband has entered the marketplace many rural customers, as well as customers in areas with limited broadband choices, have been quick to adopt satellite broadband services, even over terrestrial options.

Further, the provision of satellite broadband in the United States supports U.S. manufacturing jobs. For example, Hughes manufactures its broadband terminals here in the United States, and the United States is the headquarters of the satellite manufacturers that have constructed the state-of-the-art Ka-band satellites.[58] Indeed, more generally, U.S. firms earn the vast majority of global revenues associated with manufacturing satellites.[59] This is unlike terrestrial wireless network technology, which is primarily manufactured outside of the United States, providing no increase in jobs to the U.S. economy.

Similarly, not increasing flexibility for LMDS licensees and allowing such services to grow would be a policy failure. LMDS today provides valuable backhaul and other services. However, with the potential of greater flexibility, such as a mobile 5G offering, this service can

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[58] For example, the Boeing Company is a U.S. corporation that is building ViaSat-2, a next-generation Ka-band broadband satellite. *See supra* note 51. Lockheed Martin is a U.S. corporation that built the hybrid Ku/Ka-band satellites, AMC-15 and AMC-16. *See* EchoStar Satellite Operating Corporation, http://www.echostarsatelliteservices.com/SatelliteFleet/Fleet.aspx (last visited Jan. 15, 2015). Space Systems/Loral, LLC is a Canadian-owned company, based in California, that manufactured both ViaSat-1 and Jupiter 1. *See* Space Systems/Loral, LLC, http://sslmda.com/ (last visited Jan. 15, 2015).

[59] *See* Satellite Industry Association, *2014 State of the Satellite Industry Report* at 18 (Sep. 2014), *available at* http://siaorg.siteprotect.net/wp-content/uploads/2014/09/SSIR-September-2014-Update.pdf (U.S. firms earned 70% of global satellite manufacturing revenues in 2013).

be expected to grow and meet additional needs of U.S. consumers. Providing such additional authority to existing licensed operators is consistent with FCC practices and would expedite the provision of new services to the public.[60] LMDS operators today are well-situated to leverage future technologies, such as 5G, but the FCC must have the foresight to give them the operational flexibility necessary to proceed.

E. The FCC Should Consider the Following Specific Proposals for the LMDS and V-Band Frequencies

1. In the LMDS Frequencies (27.5-28.35 GHz, 29.1-29.25 GHz and 31.0-31.3 GHz Bands), the FCC Should Examine Whether LMDS Operators Should Be Given More Flexibility Under Their Current Licenses

While initially LMDS has been slow to develop, today LMDS licensees, like Alta Wireless, have met their build-out milestones and are utilizing their spectrum efficiently to provide services, including backhaul, to meet the business needs of customers. Moreover, as the FCC has previously recognized, additional authority to provide 5G services, could greatly enhance the services that LMDS operators are able to provide their customers.[61] By enabling existing licensees to offer a wider variety of terrestrial services, the FCC would increase the efficient use of these frequencies and facilitate the introduction of more dynamic and diverse service offerings to current and prospective customers of LMDS operators.

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[60] *See, e.g., In the Matter of Amendment of Parts 1 and 22 of the Commission's Rules with Regard to the Cellular Service, Including Changes in Licensing of Unserved Area, et al.*, Report and Order and Further Notice of Proposed Rulemaking, FCC 14-181 ¶¶ 8-11, 34-46 (Nov. 7, 2014) (declining to auction overlay Cellular licenses and instead awarding expansion spectrum rights to existing licensees); Spectrum Policy Task Force Report at 49, 51.

[61] Spectrum Frontiers NOI ¶ 53 ("While the Commission has not, to date, authorized any specific service (including LMDS) to provide mobile service in those bands, it did express an expectation that it would expand the LMDS authorization for Fixed service to include Mobile service if proposed and supported by the resulting record.").

Accordingly, EchoStar recommends that the FCC initiate a proceeding in order to grant LMDS licensees the flexibility to deploy 5G services in their licensed service areas, subject to interference standards and technical rules to protect other existing users from such expanded use.[62] In geographic areas where no LMDS operator is licensed, the FCC should examine whether 5G service deployment would be appropriate and, if so, how best to assign licenses.

A number of satellite earth stations operate in the LMDS bands on a co-primary or secondary basis.[63] Indeed, the LMDS band is a prime example of how satellite and terrestrial frequency bands can be shared effectively.[64] Any FCC proposals should not seek to undo or otherwise jeopardize these sharing arrangements. Existing satellite operators, as well as those developing systems, must have regulatory certainty about their continued access to this spectrum for existing, as well as new, gateway earth stations.[65] The FCC should consider in a rulemaking proceeding how to make the most efficient use of this shared band in a way that supports all existing services.

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[62] *See supra* note 40.

[63] *See* Spectrum Frontiers NOI ¶¶ 54-55 ("[T]here appears to be considerable satellite use of [the 27.5-28.35 GHz] band.").

[64] In the Ka-band, geostationary orbit and non-geostationary orbit satellites and terrestrial services, both commercial and government, all share a discrete amount of spectrum in the United States to offer consumers and government users broadband and other important services.

[65] *See, e.g., In the Matter of Allocation and Designation of Spectrum for Fixed-Satellite Services in the 37.5-38.5 GHz, 40.5-41.5 GHz and 48.2-50.2 GHz Frequency Bands, Allocation of Spectrum to Upgrade Fixed and Mobile Allocations in the 40.5-42.5 GHz Frequency Band, Allocation of Spectrum in the 46.9-47.0 GHz Frequency Band for Wireless Services; and Allocation of Spectrum in the 37.0-38.0 GHz and 40.0-40.5 GHz for Government Operations*, Second Report and Order, 18 FCC Rcd 25428 ¶ 54 (2003) ("We recognize that both Government and commercial systems must remain sufficiently sure of their access to orbital and spectrum resources if they are to proceed with research, development and production of their planned space-station systems.").

Specifically, the FCC should examine whether to change the current secondary allocations for satellite uplinks for gateway stations in the LMDS band to a co-primary allocation and take some additional measure to ensure that such stations can continue to operate and expand when 5G services also are authorized in these bands. Because of the small number of gateway stations that are required to operate with a FSS system, another simple way to enable continued shared use is to have a first-in-time, first-in-right approach, which the FCC has adopted in numerous spectrum proceedings.[66] Thus, once a gateway station is installed and in operation, new LMDS systems, providing 5G services, will have to take this into account so as to not suffer interference from such FSS operations.[67] Such sharing could be managed through the use of databases and smart technologies and lead to substantially increased use of the LMDS band on a shared basis, consistent with the FCC's vision for more efficient spectrum use. Other options should also be explored, including those that rely on cognitive radios and database management that would provide all users with the ability to expand their services.[68]

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[66] *See, e.g., The Establishment of Policies and Service Rules for the Broadcasting-Satellite Service at the 17.3-17.7 GHz Frequency Band*, Second Report and Order, 26 FCC Rcd 8927 ¶13 (2011) ("When satellite services share a frequency band on such an equal basis, new space station entrants are required to avoid causing harmful interference to incumbent operators, and radio stations/facilities are protected based on the order in which the license applications are either received or authorized."); *Amendment of Part 27 of the Commission's Rules to Govern the Operation of Wireless Communications Services in the 2.3 GHz Band, Establishment of Rules and Policies for the Digital Audio Radio Satellite Service in the 2310-2360 MHz Frequency Band* Report and Order and Second Report and Order, 25 FCC Rcd 11710 ¶186 (2010) ("[A]s is typically the case when co-primary services coordinate, we find a first-in, first-protected coordination approach is appropriate to address future AMT deployments."). This type of approach is also adopted in other countries, including, for example, Canada.

[67] FSS should not be burdened with protecting LMDS once they are licensed for this gateway location.

[68] In addition, the FCC should explore the use of a soft band segmentation, such as that used in the 37.5-42.5 GHz band. *See Allocation and Designation of Spectrum for Fixed-Satellite Services in the 37.5-38.5 GHz, 40.5-41.5 GHz and 48.2-50.2 GHz Frequency Bands*, Second Report and Order, 18 FCC Rcd 25428 ¶ 54 (2003).

2. In the V-Band Frequencies (37.0-42.5 GHz), the FCC Should Not Take Any Action, Given the Demonstrated Interest of the Satellite Community in This Band and the Need for Regulatory Certainty to Facilitate Development

EchoStar believes it is premature to enable 5G services in the V-band and doing so would unnecessarily jeopardize ongoing satellite investment and development in this band. Unlike in the Ka-band, the V-band is a downlink band. Accordingly, these earth stations are vulnerable to receiving harmful interference from nearby 5G operations. Further, the V-band generally is considered the natural expansion band for Ka-band satellite systems.[69] Although there have been no successful commercial ventures, satellite operators have been and continue to be interested in developing this band.[70] For example, operators have made numerous ITU filings and considerable efforts to implement those plans.[71] As development in this band grows and the equipment to enable the use of this spectrum becomes more readily available, EchoStar expects that satellite use of this band will proliferate.

As the FCC is aware, planning and construction of space stations takes many years.[72] Initiating a rulemaking to introduce 5G services in these bands would be disruptive, upset the expectations of the satellite community regarding the V-band, and introduce regulatory

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[69] Ashish Tyagi *et al*., *Future of V Band in Satellite Communication*, 1 International Journal of Science, Engineering and Technology 1, 2 (Nov. 26, 2013), *available at* www.ijset.in/wp-content/uploads/2014/02/IJSET_101100152013.pdf ("[T]he congestion in lower frequency bands like Ku-band will push new systems into moving progressively to Ka band and, in a longer term, to Q/V band.").

[70] Northrop Grumman Corporation, *Northrop Grumman Begins Integrating High-Speed Downlink Antennas for Fourth Advanced EHF Communications Payload*, PR Newswire (Mar. 11, 2014), www.prnewswire.com/news-releases/northrop-grumman-begins-integrating-high-speed-downlink-antennas-for-fourth-advanced-ehf-communications-payload-249452801.html (demonstrating that the Advanced Extremely High Frequency satellites used by the United States Air Force Command operates at 40 GHz).

[71] *See, e.g., supra* Part I.D.

[72] *See supra* Part II.A.4.

uncertainty, which could have a devastating impact on the investment and development in this band. Accordingly, the FCC should not focus its efforts on enabling 5G sharing in the V-band and, instead, should target opportunities in the many other frequency bands above 24 GHz.[73]

[73] *See* Spectrum Frontiers NOI ¶¶ 46-83.

III. Conclusion

Through this proceeding, the FCC hopes to enable more efficient use of spectrum in frequencies above 24 GHz and facilitate the development of 5G services. EchoStar supports these important public policy goals. However, if the FCC ignores or fails to consider properly the current uses of those bands and curtails the potential growth and flexibility of existing licensees, the results would negatively impact U.S. consumers and would not serve the public interest. Accordingly, EchoStar urges the FCC to move forward in its Spectrum Frontiers proceedings with a balanced approach that enables 5G services but also, most importantly, ensures continued use and expansion of existing services.

Respectfully submitted,

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