

Pantelis Michalopoulos  
202 429 6494  
pmichalo@steptoe.com

Steptoe

1330 Connecticut Avenue, NW  
Washington, DC 20036-1795  
202 429 3000 main  
www.steptoe.com

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***BY ELECTRONIC FILING***

Marlene Dortch  
Secretary  
Federal Communications Commission  
45 L Street, NE  
Washington, DC 20554

**Re: Expanding Flexible Use of the 12.2-12.7 GHz Band, WT Docket No. 20-443, GN Docket No. 17-183**

Dear Ms. Dortch:

DISH Network Corporation (“DISH”) responds to an *ex parte* filing reporting a presentation against opening the 12.2-12.7 GHz band (“12 GHz band”) for 5G. That presentation, filed in outline form in the above-captioned proceedings, was made to the Commission by Space Exploration Holdings, LLC, DIRECTV, LLC, Intelsat License LLC, Kepler Communications Inc., WorldVu Satellites Limited (“OneWeb”), and SES S.A. (the “Anti-5G group”).<sup>1</sup>

This is a somewhat surprising group of companies. One of them (SpaceX) uses the 12 GHz spectrum to an uncertain extent but has no proven need for it in light of the vast other spectrum to which non-geostationary orbit (“NGSO”) satellite systems have access. In fact, the 12 GHz band represents only 3% of SpaceX’s already licensed spectrum of 15,550 MHz (see attached exhibit).<sup>2</sup> Two others (OneWeb and Kepler) want to use the spectrum, even though, again, they have no demonstrable need for it. One other, SES, does have an operational geostationary satellite using the 12 GHz band. But that satellite’s use of 12 GHz is provided exclusively *to* DISH. DISH is therefore in an authoritative position to assess the risk to that satellite from 5G services in the band.

Finally, two other companies (DIRECTV and Intelsat) do not use the 12 GHz band extensively. Indeed, if either company were interested in intensive use of the 12 GHz band, it

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<sup>1</sup> Letter from Jameson Dempsey, Space Exploration Technologies Corp., to Marlene Dortch, FCC, WT Docket No. 20-443 and GN Docket No. 17-183 (Mar. 1, 2022).

<sup>2</sup> Letter from Jeffrey Blum, DISH, to Marlene Dortch, FCC, File No. SAT-MOD-20200417-00037, at 7 (July 14, 2020). In addition, SpaceX is currently requesting authority for yet another 20,000 megahertz of spectrum in the E-band. *See* SpaceX Application, File No. SAT-LOA-20200526-00055 (May 26, 2020).

would be more concerned with the prospect of interference from SpaceX's own constellation of some 34,000 proposed satellites. As DISH has shown,<sup>3</sup> SpaceX's proposed second-generation system will sharply exceed the equivalent power flux density ("EPFD") limits intended to protect Direct Broadcast Satellite ("DBS") services, and DIRECTV (through AT&T) has correctly expressed serious concerns about the interference potential posed even by SpaceX's comparatively more modest first-generation system.<sup>4</sup>

The Anti-5G group still tries to discredit the MVDDS 5G Coalition's 2016 studies showing that higher-power terrestrial services can share the band with DBS services.<sup>5</sup> With some inconsistency, the group also tries to invest with an aura of infallibility studies submitted in that same year about the difficulties of sharing between higher-power terrestrial and NGSO services. But the Anti-5G group has it backwards for a simple reason: time, and the technical advances it brings, *helps* with sharing. For that reason, the 2016 terrestrial/DBS studies have withstood the test of time—in fact, sharing between higher-power terrestrial services is even easier now than what those studies had concluded. For that reason, too, the 2016 terrestrial/NGSO studies have been overtaken by events, including the advances of beamforming and horizon nulling, as well as, crucially, the evolution of NGSO systems into a more geostationary-like mode of operation.

### **NGSO Operations Pose the Real Proven Interference Risk to DBS**

The picture of 12 GHz sharing between NGSO services and DBS services is bleak.

***NGSO/DBS services.*** DISH has submitted uncontested evidence that SpaceX's first-generation NGSO system will exceed the EPFD limits imposed by the Commission for the protection of DBS services in the 12 GHz band.<sup>6</sup> This is shown by inputting real-world U.S.

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<sup>3</sup> See Reply of DISH Network Corporation to Opposition and Response to Comments of Space Exploration Holdings, LLC, SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105 (Mar. 8, 2022) ("DISH Gen2 Reply").

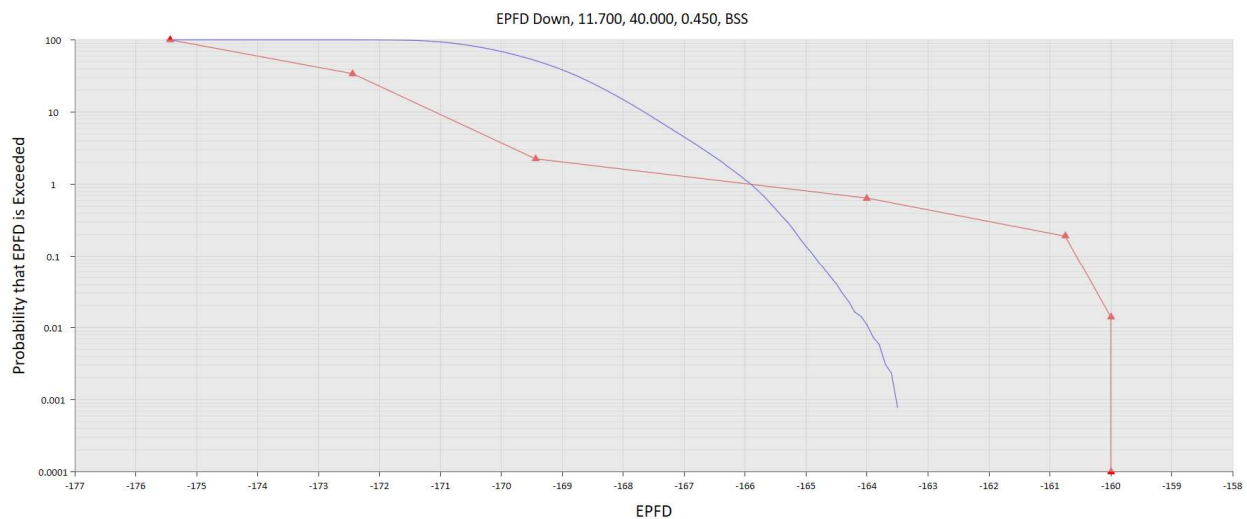
<sup>4</sup> Reply of AT&T Services, Inc., File No. SAT-MOD-20200417-00037 at 2-3 (Aug. 7, 2020) ("AT&T Third Modification Reply").

<sup>5</sup> The MVDDS 5G Coalition submitted two studies: Comments of MVDDS 5G Coalition, RM-11768, Attachment 1 (June 8, 2016) (attaching MVDDS 12.2-12.7 GHz Co-Primary Service Coexistence (June 8, 2016)); Reply Comments of the MVDDS 5G Coalition, RM-11768, Appendix A (June 23, 2016) (attaching MVDDS 12.2-12.7 GHz Co-Primary Service Coexistence II (June 23, 2016)) (collectively, "2016 Coalition Studies").

<sup>6</sup> See Letter from Jeffrey Blum, DISH, to Marlene Dortch, FCC, File No. SAT-MOD20200417-00037; WT Docket No. 20-443 (Feb. 15, 2021) (attaching EPFD Assessment of SpaceX into DISH Ku-Band GSO Networks); Letter from Jeffrey Blum, DISH, to Marlene Dortch, FCC, File No. SAT-MOD20200417-00037; WT Docket No. 20-443 (Mar. 25, 2021) (attaching EPFD Assessment of SpaceX into DISH Ku-band GSO Networks Located in the United States); Letter from Jeffrey Blum, DISH, to Marlene Dortch, FCC, File No. SAT-MOD20200417-00037 (Apr.

DBS dish locations in the ITU-approved software (instead of the hypothetical “worst-case geometries,” for example off the coast of Greenland, posited by that software). And the EPFD limits are exceeded by even greater amounts when one considers the effect of all NGSO satellites above the horizon for a particular DBS dish.

The Court of Appeals for the District of Columbia Circuit is considering the question of whether the Commission should consider these showings in the context of SpaceX’s third-modification, or whether it should defer to an ITU process that the ITU itself recognizes may not work.<sup>7</sup> But, SpaceX’s proposed Gen2 system, of almost 30,000 satellites, does not even implicate that question. DISH has shown that *SpaceX will exceed the EPFD limits even by using the ITU-approved software without making any adjustments to it.*<sup>8</sup> Figures 16(b) and (c) from the report accompanying DISH’s reply in the Gen2 application proceeding illustrate this vividly. For the 45 cm and 60 cm DBS dishes, the EPFD level of the SpaceX proposed constellation (the blue line) exceeds the EPFD limit (the red line) by significant amounts and over a significant time variability range.<sup>9</sup>



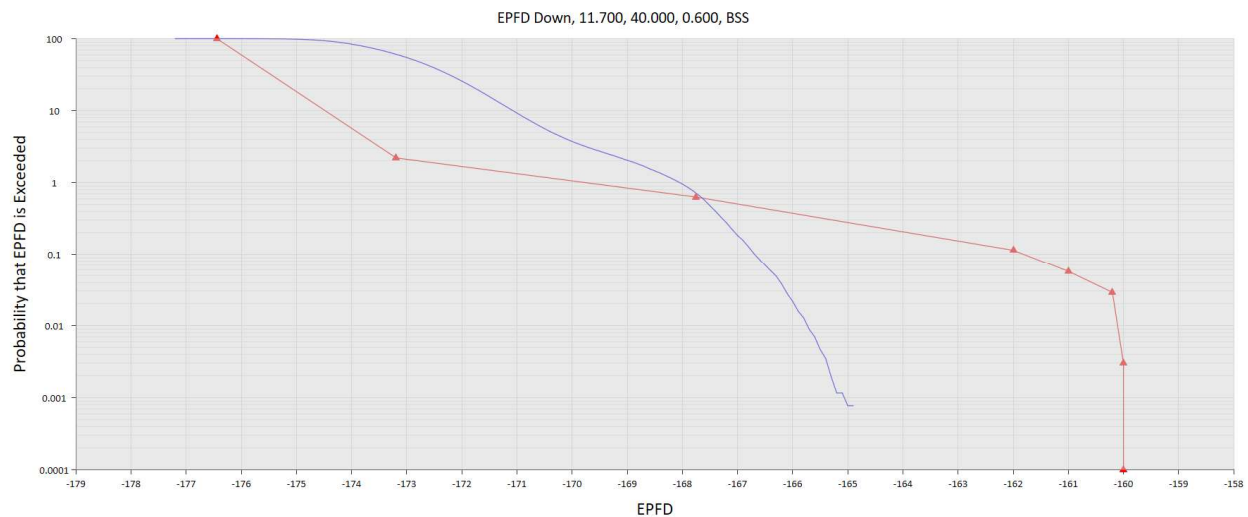
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23, 2021) (attaching EPFD Assessment of SpaceX With Multiple Frequency Reuse Into DISH Ku-Band GSO Receivers Located in the United States).

<sup>7</sup> See *Viasat, Inc. v. FCC*, Case No. 21-1123 (D.C. Cir.).

<sup>8</sup> Marc Dupuis, Second Technical Study on SpaceX Second-Generation System, at 25-27 (March 8, 2022) (attached as Exhibit 1 to DISH Gen2 Reply) (“Dupuis Gen2 Reply Report”).

<sup>9</sup> *Id.* at 21, Figures 16(b), 16(c).



The results are even worse with adjustments such as an Nco greater than 1 and real-world DBS dish locations.<sup>10</sup>

All four of DISH’s expert reports must be fully considered in the context of this proceeding, as the Commission needs to determine what rule changes advance the public interest. And, since SpaceX’s 12 GHz authorization is entirely subject to this proceeding’s outcome, the Commission needs to account for the significant interference SpaceX will cause to existing DBS operations as it considers updating the 12 GHz rules to permit two-way higher power terrestrial use. In fact, the Commission repeatedly has told SpaceX that its 12 GHz authorization is “subject to any modification necessary to bring it into conformance with future actions in Commission rulemakings, including but not limited to the 12 GHz proceeding, which is expressly referenced in the ordering clauses below.”<sup>11</sup> The Commission went so far as to warn SpaceX that its use of 12 GHz is at SpaceX’s “own risk”<sup>12</sup> and that “*any investments* made toward operations” in 12 GHz “*assume the risk* that operations may be subject to additional conditions or requirements as a result of any future Commission actions.”<sup>13</sup>

It is not only DISH that is concerned about SpaceX’s interference into DBS. Before the DIRECTV spinoff, AT&T, too, understood the potential threat into satellite television in the

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<sup>10</sup> *Id.* at 25-28, 28-31.

<sup>11</sup> Space Exploration Holdings, LLC Request for Modification of the Authorization for the SpaceX NGSO Satellite System, *Order, Authorization, and Order on Reconsideration*, 36 FCC Rcd. 7995, 8025 ¶ 50 (2021).

<sup>12</sup> *Id.*

<sup>13</sup> Space Exploration Holdings, LLC, Application for Approval for Orbital Deployment and Operating Authority for the SpaceX NGSO Satellite System, *Memorandum Opinion, Order and Authorization*, 33 FCC Rcd. 3391, 3405 ¶ 40(r) (2018) (emphasis added).

12 GHz band from NGSO operations.<sup>14</sup> In connection with SpaceX’s first-generation system, AT&T asked the Commission for DBS protections and opposed SpaceX’s request for a continuing waiver of the requirement that it receive a favorable or qualified favorable finding of EPFD compliance by the ITU “[p]rior to the initiation of service . . . .”<sup>15</sup> Yet DIRECTV has now lapsed into silence about the even more serious interference concerns raised by SpaceX’s second-generation proposal.

***Higher-Power Terrestrial/DBS Services.*** DISH has both satisfied itself, and has shown to the Commission, that co-existence between 5G and DBS is possible. DISH has every reason to be cautious about the introduction of higher-power services in the 12 GHz band, as its own DBS service relies almost exclusively on the use of the band. DISH does not want to cannibalize its own service or allow others to harmfully interfere with it.

The 2016 Coalition Studies, prepared by Tom Peters, former Chief Engineer of the Commission’s Wireless Telecommunications Bureau, showed that sharing between higher-power two-way services and DBS is feasible even in densely populated areas with DBS users receiving service from each DBS slot and all the 12 GHz band spectrum.<sup>16</sup> The only attempts to rebut the studies consist of arguments put forth in a 2018 letter by AT&T and rehashes of the same arguments.<sup>17</sup> The main problem with these criticisms is that they rely on a fundamental misunderstanding of the studies. AT&T has accused Mr. Peters of “cherry-picking” areas with a small number of DBS dishes, while in fact he assumed that these areas were densely packed with DBS dishes, with one dish every one or two square meters. All of these objections have already been thoroughly rebutted in this proceeding.<sup>18</sup>

### **DIRECTV Does Not Appear to Significantly Rely on the 12 GHz Band**

Ironically, the 5G objections do not come from the satellite television company that actually remains a heavy user of the 12 GHz band (DISH), but from the other satellite television company, which no longer puts it to extensive use (DIRECTV). DIRECTV serves its customers mainly by using other bands—the Ka-band and Reverse Band Working (“RBW”) Broadcasting-Satellite Service (“BSS”) payloads on its satellites at 99°, 101°, and 103° W.L.

In fact, a review of DIRECTV’s satellites and orbital slots suggests that DIRECTV has at least as much bandwidth outside the 12 GHz band as DISH has in the 12 GHz band. In other

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<sup>14</sup> See AT&T Third Modification Reply at 2-3.

<sup>15</sup> 47 C.F.R. § 25.146(c).

<sup>16</sup> Reply Comments of DISH Network Corporation, WT Docket No. 20-443, at 10-17 (July 7, 2021) (“DISH 12 GHz Reply”).

<sup>17</sup> See Letter from Michael Goggin, AT&T, to Marlene Dortch, RM-11768, Technical Appendix at 2 (June 14, 2018).

<sup>18</sup> See Letter from Pantelis Michalopoulos, Counsel for DISH, to Marlene Dortch, FCC, WT Docket No. 20-443, at 2-3 (Jan. 13, 2022); DISH 12 GHz Reply at 10-17.

words, without using 1 MHz of the 12 GHz spectrum, DIRECTV could provide more direct-to-home service than DISH does using the 12 GHz band. Specifically, DIRECTV is authorized to use the full Ka-band and the full RBW-band at each of the 99° W.L., 101° W.L., and 103° W.L. slots. The RBW band comprises 500 MHz of downlinks. The Ka-band includes 800 MHz of clear spectrum for GSO downlinks, plus 200 MHz of additional Ka-band downlink spectrum, which DIRECTV is also authorized to use. Considering only the 800 MHz of downlink Ka-band spectrum and the 500 MHz of RBW spectrum, DIRECTV has a total of 3.9 GHz of non-DBS downlink spectrum available from these slots. Adding the remaining Ka-band spectrum increases that amount to 4.5 GHz. By comparison, DISH uses the 12 GHz band at six slots, for a total of almost 3 GHz of 12 GHz band spectrum.<sup>19</sup>

As a result, many DIRECTV subscribers receive most or all of their service in the Ka-band, not implicating the 12 GHz band at all. And few, if any, DIRECTV subscribers seemingly receive 12 GHz service from any slot other than 101° W.L. Outside of 101° W.L., DIRECTV nominally operates the T5 satellite at 110° W.L. and the T7S and T8 satellites at 119° W.L. But none of these satellites seems extensively used. DIRECTV was apparently offering service to Puerto Rico (but not the continental U.S.) from the T5 satellite at 110° W.L. But it now appears that no programming is provided from that slot.<sup>20</sup> DIRECTV seems to have shifted its Puerto Rico programming to a spot beam from its CONUS fleet operating from 99-103 degrees.<sup>21</sup> As for the 119° W.L. slot, DIRECTV currently appears to operate only a few local spot beams from it.<sup>22</sup> DIRECTV is also reportedly phasing out that slot altogether and transitioning the programming formerly distributed from it to the fleet operating at 99-103 degrees.<sup>23</sup> Indeed, DIRECTV has already requested the deorbiting of T7S. The T5 and T8 satellites are themselves over 19 and 15 years old respectively. And DIRECTV has no plans to replace them: in 2018, AT&T's CEO

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<sup>19</sup> DISH has access to the 12 GHz band at the 61.5° W.L., 72.7° W.L., 77° W.L., 110° W.L., 119° W.L., and 129° W.L. orbital locations. The only slots where DISH does not use the entire 500 MHz of the 12 GHz band are 110° W.L., where DISH operates 29 out of 32 channels, with three assigned to DIRECTV, and 119° W.L., where DISH operates 21 channels, with 11 assigned to DIRECTV.

<sup>20</sup> See Stuart Sweet, *No Signal on DIRECTV's 110 Satellite? Here's the Solution*, Solid Signal Blog (June 7, 2020), <https://blog.solidsignal.com/tutorials/no-signal-on-directvs-110-satellite-heres-the-solution>.

<sup>21</sup> See *AT&T Directv Puerto Rico*, Satellite Guys Forum (Nov. 21, 2018), <https://www.satelliteguys.us/xen/threads/at-t-directv-puerto-rico.379506>; Stuart Sweet, *Is AT&T Getting Rid of the 95 Satellite Location?*, Solid Signal Blog (Nov. 10, 2019), <https://blog.solidsignal.com/tutorials/is-att-getting-rid-of-the-95-satellite-location>.

<sup>22</sup> See *DIRECTV USA on T8 at 119.0°W*, LyngSat (last updated Apr. 1, 2022) <https://www.lyngsat.com/packages/DirectV-USA-119W.html>.

<sup>23</sup> See Stuart Sweet, *Is AT&T Getting Rid of the 95 Satellite Location?*, Solid Signal Blog (Nov. 10, 2019), <https://blog.solidsignal.com/tutorials/is-att-getting-rid-of-the-95-satellite-location>.

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stated that the company had “launched our last satellite.”<sup>24</sup> This has been true for quite a while as DIRECTV has not launched a DBS-only satellite in the past 15 years.

### **The Commission Can Both Advance 5G and Satellite Services in the 12 GHz Band**

If MVDDS services are unshackled from the outdated restrictions to which they remain subject, such as the prohibition on two-way services and overly restrictive power limits, they can be used in 5G offerings, helping advance and cement the 5G revolution and United States 5G leadership. So, the option for the Commission is: all of the above—all of the services (MVDDS, DBS, and NGSO) to which the band is already allocated, and the benefits of 5G? Or, some of the above, and no 5G in the band? For the public interest, the first choice is the only one.

Respectfully submitted,

/s/ Pantelis Michalopoulos  
Pantelis Michalopoulos  
Christopher Bjornson  
*Counsel to DISH Network Corporation*

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<sup>24</sup> See Caleb Henry, *DIRECTV Owner AT&T Says It’s Done Buying Satellites*, Space News (Dec. 4, 2018), <https://spacenews.com/directv-owner-att-says-its-done-buying-satellites>.