



Jeffrey H. Blum
Executive Vice President,
External & Legislative
Affairs
Jeffrey.Blum@dish.com
(202) 463-3703

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VIA ELECTRONIC FILING

Marlene H. 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; IBFS File No. SAT-MOD-20200417-00037; Petition of Starlink Services, LLC for Designation as an Eligible Telecommunications Carrier, WC Docket No. 09-197

Dear Ms. Dortch:

Four filings later, Space Exploration Holdings (“SpaceX”) has refused to answer a simple question: does it commit as a license condition that it will not use more than one satellite beam using the same frequency in the same area? In its latest filing,¹ not only does SpaceX fail to answer, it now professes to be mystified with DISH’s insistence in asking. SpaceX attempts to argue that it answered the question in the third of these filings when it stated, “in no uncertain terms,” that SpaceX’s “use of Nco=1 for Ku-band operations is not just an analytical input for analysis.”² But, in fact, these terms are highly “uncertain.” More than “just an analytical input” does not provide any clarity on the subject, as it falls far short of a commitment from SpaceX that it will not use more than one satellite beam using the same frequency in the same area.

In his February 15, 2021 study, DISH’s expert, Marc Dupuis, found that SpaceX’s Starlink system, as proposed to be modified,³ would violate the applicable Equivalent Power Flux Density (“EPFD”) limits adopted by both the International Telecommunication Union (“ITU”) and the Commission for the protection of millions of DBS customers receiving service in the 12.2-12.7 GHz (“12 GHz”) band throughout the United States if it operates at an Nco of 2 or more.⁴ Critically, SpaceX has *not* refuted the February 15th conclusions of Mr. Dupuis that operating at an Nco of 2 or more would violate the EPFD limits.

¹ Letter from David Goldman, SpaceX, to Marlene Dortch, FCC, IBFS File No. SAT-MOD-20200417-00037 (Mar. 18, 2021) (“SpaceX March 18 Letter”).

² SpaceX March 18 Letter at 1, quoting Letter from David Goldman, SpaceX, to Marlene Dortch, FCC, IBFS File No. SAT-MOD20200417-00037, at 2 (Mar. 16, 2021) (“SpaceX March 16 Letter”).

³ Application of Space Exploration Holdings, LLC for Modification of Authorization for the SpaceX NGSO Satellite System, IBFS File No. SAT-MOD-20200417-00037 (filed Apr. 17, 2020).

⁴ See Letter from Jeffrey Blum, DISH, to Marlene Dortch, FCC, IBFS File No. SAT-MOD20200417-00037; WT Docket No. 20-443 (Feb. 15, 2021) (attaching *EPFD Assessment of SpaceX into DISH Ku-band GSO Networks*) (“Feb. 15 Study”); see also ITU RR R.R. 22.5I, 22.5C; 47 C.F.R. § 2.106 n. 5.487A; 47 CFR § 25.289.

In a further study using *actual* DISH DBS locations, Mr. Dupuis found that, even if SpaceX uses only one satellite in the same frequency at a time to serve an area (*i.e.* an Nco value of 1), Starlink would still exceed the EPFD limits at DBS customer dishes in many areas across the country.⁵ DISH presented these results for the Phoenix area, showing that transmission from even one beam of the Starlink system will exceed EPFD limits by as much as 5 dB.⁶ SpaceX is silent on these results as well.

Rather than respond with a reasoned analysis of its own, SpaceX’s latest letter describes the analysis provided by Mr. Dupuis as “flawed,” without saying how.⁷ And SpaceX takes umbrage at DISH’s “repeated[ed] claims that SpaceX has not stated for the record how it will transmit to a given point on the Earth”⁸ But the phrasing again betrays the vagueness surely intended by SpaceX. How *will* SpaceX transmit to a given point on the Earth? Will it transmit using more than one co-frequency beam if necessary to meet demand in an area? Instead of committing unequivocally that SpaceX will not use more than one satellite beam using the same frequency in the same area, SpaceX evades the question. Below are some examples:

| What SpaceX Says | What SpaceX Does Not Say |
|--|---|
| “SpaceX simply will not operate as DISH and its paid consultant hypothesize. Instead, it will comply with the terms of its license.” ⁹ | SpaceX does not commit it will use only one co-frequency beam in an area at a time. |
| “DISH totally rejects the possibility that SpaceX plans to operate consistent with that parameter [Nco of 1 or 1 beam at a time].” ¹⁰ | Is the possibility a reality? <i>Does</i> SpaceX have a plan to operate consistent with that parameter? How will it do so? |
| Mr. Dupuis’ study “would have used different parameters” than SpaceX had submitted to the Commission and that “[t]hird parties do not get to tell applicants how they must operate their satellite systems.” ¹¹ | SpaceX does not acknowledge that the “third party” is DISH, whose DBS operations must be protected from interference under the FCC’s rules, and that SpaceX cannot operate its system if it exceeds the EPFD levels. |
| Use of an Nco of 1 is “not just an analytical input for analysis, but actually reflects the way SpaceX operates its system.” ¹² | The way in which Starlink <i>currently</i> operates (with a total of around 10,000 beta users) says nothing about how it will meet increased demand in the future if it has more satellites, more users, and promises for increased speeds. SpaceX does |

⁵ Letter from Jeffrey Blum, DISH, to Marlene Dortch, FCC, IBFS File No. SAT-MOD20200417-00037 (Mar. 17, 2021) (“DISH March 17 Letter”).

⁶ *Id.* at 4.

⁷ SpaceX March 18 Letter at 1.

⁸ *Id.*

⁹ Letter from David Goldman, SpaceX, to Marlene Dortch, FCC, IBFS File No. SAT-MOD20200417-00037, at 2 (Mar. 9, 2021).

¹⁰ *Id.*

¹¹ *Id.*

¹² SpaceX March 16 Letter at 2.

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| | not commit to use only one beam in any area at a time. |
| “DISH repeatedly claims that SpaceX has not stated for the record how it will transmit to a given point on the Earth just days after SpaceX stated on the record that the data SpaceX provided to DISH ‘actually reflects the way SpaceX operates its system.’” ¹³ | SpaceX continues to stop short of a commitment even after DISH had pointed out why that precise language does not amount to one. |

These hedged pronouncements are not accidents of draftsmanship. Indeed, Mr. Dupuis’ view that the use of only one beam at a time ($N_{co}=1$) is unrealistic was not based on speculation but on logical analysis (to date unrebutted by SpaceX). Here is Mr. Dupuis reasoning:

Let’s assume that each SpaceX Starlink satellite has multiple beams, each carrying one channel with a 240 MHz carrier bandwidth. Depending on the link budget, this could support about 200 to 300 Mbps of user traffic per beam.

[O]ne beam would thus likely support no more than 10 users actively requesting service in one area at a busy hour, providing 30 Mbps peak data rate to each (10 users times 30 Mbps equals 300 Mbps). But in reality, there are probably 50 to 100 users that are sharing that same 300 Mbps data pipe . . . If the area being served . . . is a large remote village, or a busy port without terrestrial infrastructure, or public transportation, the number of users seeking simultaneous access, especially during early evening busy hours, could easily be counted in the thousands. SpaceX would have the technical ability, and would likely not refuse, to serve these users, without sacrificing quality of service, by simply overlapping another beam from another satellite. In fact, the demand may require the addition of many such beams, and there will be a high likelihood that several of these additional beams would be co-frequency to the original serving beam, thus N_{co} would no longer be constrained to one, but could be much higher.¹⁴

And of course, SpaceX has been touting speeds, not of 30 Mbps, but up to *10 Gbps*.¹⁵ At 10 Gbps, the bandwidth of one beam may not be enough to serve even one user. The idea that SpaceX will only ever use one beam at a time is simply not credible or realistic. DISH has already pointed to the discrepancy between the bandwidth of one beam and the internet speeds that SpaceX is trumpeting.¹⁶

Throughout its four filings, SpaceX has remained free to challenge these analyses, and to object to Mr. Dupuis’ figures for the bandwidth of each of its beams. It has not done so.

¹³ SpaceX March 18 Letter at 1.

¹⁴ Feb. 15 Study at 21-22.

¹⁵ Letter from David Goldman, SpaceX, to Marlene Dortch, FCC, IBFS File No. SAT-MOD-20200417-00037, Attachment at 2 (Jan 22, 2021).

¹⁶ See Letter from Jeffrey Blum, DISH, to Marlene Dortch, FCC, IBFS File No. SAT-MOD20200417-00037; WT Docket No. 20-443, at 2-3 (Mar. 4, 2021).

SpaceX fares no better in its preemptive attack on Mr. Dupuis’ use of real-world parameters to show that SpaceX would violate the EPFD limits even with an Nco of 1. As Mr. Dupuis will explain in his forthcoming report, this real-world information is superior to the simulation parameters embedded in the software used by the Radiocommunication Bureau. Mr. Dupuis’ February 15th report accepted this software’s assumptions and focused on the use of more than one satellite accepting these assumptions. Mr. Dupuis’ forthcoming study takes the further step of replacing the assumptions with actual real-world information. Mr. Dupuis never conceded or “confirmed” (as SpaceX falsely contends)¹⁷ the hypothetical assumption embedded in the ITU software is superior to actual evidence, and SpaceX does not explain why its assumption is better than reality, other than to describe the assumption as “internationally established.”¹⁸

Finally, SpaceX professes “shoc[k]” at DISH’s supposed admissions against interest—that DISH is especially concerned by SpaceX’s system because “no one other than SpaceX has commenced providing service in the U.S.”¹⁹ This is an unconvincing attempt to obscure the critical interference issues presented by DISH’s analysis: DISH’s concern is due to the fact that an operational NGSO system poses a more pressing concern about interference into DISH’s service than services that have not yet launched or may never do so.²⁰ Twisting DISH’s words to read them as implying that DISH is afraid of a competitor is nonsensical. DISH welcomes competition and SpaceX has 25,550 MHz of authorized or requested spectrum with which to compete. The 12 GHz band is a miniscule portion of this allotment.

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Given these serious interference issues, any grant of SpaceX’s Third Modification should exclude the 12 GHz frequencies.

/s/ Jeffrey H. Blum
Jeffrey H. Blum

¹⁷ SpaceX March 18 Letter at 1.

¹⁸ *Id.*

¹⁹ *Id.* at 2, quoting DISH March 17 Letter at 5 (Mar. 17, 2021)

²⁰ See Christopher Mims, *Elon Musk and Amazon Are Battling to Put Satellite Internet in Your Backyard*, Wall Street Journal (Mar. 20, 2021), <https://www.wsj.com/articles/elon-musk-and-amazon-are-battling-to-put-satellite-internet-in-your-backyard-11616212827>.