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September 9, 2021

VIA ELECTRONIC FILING

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

Re: **Notice of Ex Parte Presentation**, Expanding Flexible Use of the 12.2-12.7 GHz Band, WT
Docket No. 20-443

Dear Ms. Dortch:

Pursuant to Section 1.1206 of the Commission's rules, 47 C.F.R. § 1.1206, DISH Network Corporation ("DISH") submits this letter summarizing the following meetings on September 8, 2021 during which DISH discussed the attached ex parte:

- A meeting with Ethan Lucarelli, Acting Legal Advisor, Wireless and Public Safety for Acting Chairwoman Jessica Rosenworcel. Present on behalf of DISH were Jeffrey Blum, Executive Vice President, External and Legislative Affairs; Hadass Kogan, Director and Senior Counsel; and Courtney Tolerico, Associate Corporate Counsel. Pantelis Michalopoulos of Steptoe & Johnson and Tom Peters of Hogan Lovells also participated on behalf of DISH.
- A meeting with William Davenport, Chief of Staff and Senior Legal Advisor for Wireless and International for Commissioner Geoffrey Starks. Present on behalf of DISH were Jeffrey Blum, Executive Vice President, External and Legislative Affairs; Hadass Kogan, Director and Senior Counsel; and Courtney Tolerico, Associate Corporate Counsel. Pantelis Michalopoulos of Steptoe & Johnson and Tom Peters of Hogan Lovells also participated on behalf of DISH.
- A meeting with Greg Watson, Policy Advisor for Commissioner Brendan Carr. Present on behalf of DISH were Jeffrey Blum, Executive Vice President, External and Legislative Affairs; Alison Minea, Vice President and Associate General Counsel, Regulatory Affairs; Hadass Kogan, Director and Senior Counsel; and Courtney Tolerico, Associate Corporate Counsel. Pantelis Michalopoulos of Steptoe & Johnson and Tom Peters of Hogan Lovells also participated on behalf of DISH.

/s/ Jeffrey H. Blum
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cc: Ethan Lucarelli
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Enclosure

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August 29, 2021

By ECFS

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

Re: Expanding Flexible Use of the 12-12.7 GHz Band, WT Docket No. 20-443

Dear Ms. Dortch:

The record assembled in response to the Commission’s Notice of Proposed Rulemaking on how to maximize efficient use of the 12.2-12.7 GHz spectrum band (“12 GHz band”)¹ confirms the broad support for opening up the band for terrestrial 5G, and the lack of expert engineering studies by those parties that oppose it. In response to the comprehensive studies undertaken and submitted to the record by the 5G proponents, AT&T and the NGSO interests confine themselves to a plainly incorrect legal argument, rehash previously debunked assertions, and attempt new but unavailing shots from the hip.

The 5G opponents offer no empirical analysis in response to the comprehensive Peters Studies about terrestrial/Direct Broadcast Satellite (“DBS”) sharing and the RKF Study about terrestrial/non-geostationary Fixed-Satellite Service (“NGSO FSS”) sharing.² Instead, they argue that two services cannot share the same spectrum if there is any potential for interference, however miniscule. This new argument, however, is directly contradicted by decades of Commission and ITU precedent. Zero interference has never been the test. To make this the new standard would run counter to the Commission’s paramount spectrum efficiency goal, as no two services would ever share the same spectrum. As the Commission explained almost 40

¹ Expanding Flexible Use of the 12.2-12.7 GHz Band, *Notice of Proposed Rulemaking*, 36 FCC Rcd. 606 (2021) (“12 GHz NPRM”).

² Comments of RS Access, LLC, WT Docket No. 20-443, GN Docket No. 17-183, App. A (May 7, 2021) (“RS Access Comments”) (attaching RKF Engineering Solutions, LLC, Assessment of Feasibility of Coexistence between NGSO FSS Earth Stations and 5G Operations in the 12.2 – 12.7 GHz Band (May 2021)) (“RKF Study”); Comments of MVDDS 5G Coalition, RM-11768, Attach. 1 (June 8, 2016) (attaching Tom Peters, MVDDS 12.2-12.7 GHz Co-Primary Service Coexistence (June 8, 2016)) (“First Peters Study”); Reply Comments of the MVDDS 5G Coalition, RM-11768, Appendix A (June 23, 2016) (attaching Tom Peters, MVDDS 12.2-12.7 GHz Co-Primary Service Coexistence II (June 23, 2016)) (“Second Peters Study”) (collectively, “Peters Studies”).

years ago, “[t]he incidence of harmful interference occurs on a probabilistic basis.”³ This is not a case of exceeding power limits for a large share of terminals of a particular type, but a case of doing so for a tiny minority.

When the shoe was on the other foot, AT&T fully supported the Commission’s decision to permit sharing of the 2.3 GHz band between its licensed Wireless Communications Service (“WCS”) and satellite radio, despite “rare” instances “where WCS would seriously degrade or obstruct or repeatedly interrupt [satellite radio] reception”⁴ As the Commission also explained there, the goal was not “an environment where interference will never occur under any circumstances.”⁵ In fact, some of the other voices expressing skepticism at the feasibility of sharing also come from parties who have in the past been ardent spectrum sharing supporters. Google and Americans for Tax Reform have long been advocates for deregulation of spectrum management, and shared, unlicensed use of the same frequencies.⁶

The Peters and RKF Studies show that sharing among higher power two-way terrestrial services, DBS service and NGSO FSS downlinks, is eminently possible. The 5G opponents dismiss the studies on almost any ground imaginable—the Peters Studies came too early,⁷ the RKF Study came too late.⁸ All of this seems a transparent attempt to hide one crucial fact—the opponents of sharing have undertaken no studies of their own. The passage of time since the Peters Studies means only that the little interference potential found there was overstated; and the Bureau has already rejected the “eleventh hour” attacks launched by NGSO proponents against the RKF study, which was in fact filed on the due date for opening comments.

³ Applications of Contemporary Communications Corporation, *Memorandum Opinion and Order*, 98 F.C.C. 2d 1229, 1239 ¶ 20 n.22 (1984) (“*Contemporary Comm’ns Corp. Order*”).

⁴ Amendment of Part 27 of the Commission’s Rules to Govern the Operation of Wireless Communications Services in the 2.3 GHz Band, *Report and Order and Second Report and Order*, 25 FCC Rcd. 11710, 11723 ¶ 28 (2010) (“*WCS Order*”).

⁵ *Id.*

⁶ See *Encouraging Innovation: Wi-Fi and LTE in Unlicensed Spectrum Bands*, Google Public Policy Blog (June 12, 2015), <https://publicpolicy.googleblog.com/2015/06/encouraging-innovation-wi-fi-and-lte-in.html> (“Innovation in unlicensed spectrum has given people more opportunity to access the Internet, when and where they need it.”); Letter from Grover Norquist, et al., ET Docket No. 19-138, Use of the 5.850-5.925 GHz Band, at 2 (Dec. 4, 2019).

⁷ See e.g., Reply Comments of AT&T Services, Inc., WT Docket No. 20-443, GN Docket No. 17-183, at 2 (July 7, 2021) (“AT&T Reply Comments”); Reply Comments of The Boeing Company, WT Docket No. 20-443, GN Docket No. 17-183, at 5-6 (July 7, 2021) (“Boeing Reply Comments”); Reply Comments of Intelsat License LLC, WT Docket No. 20-443, GN Docket No. 17-183, at 3 (July 7, 2021) (“Intelsat Reply Comments”); Reply Comments of SES S.A., WT Docket No. 20-443, GN Docket No. 17-183, at 6 (July 7, 2021) (“SES Reply Comments”).

⁸ Reply Comments of Kepler Communications Inc., WT Docket No. 20-443, GN Docket No. 17-183, at 3 (July 7, 2021) (“Kepler Reply Comments”); SES Reply Comments at 7; AT&T Reply Comments at 14; Boeing Reply Comments at 7; Intelsat Reply Comments at 1-2; Reply Comments of Space Exploration Holdings, LLC, WT Docket No. 20-443, GN Docket No. 17-183, at ii (July 7, 2021) (“SpaceX Reply Comments”).

The vast majority of the arguments made by AT&T and the NGSO proponents against the Peters Studies are rehashes of a letter filed in 2018 by AT&T, which has been rebutted thoroughly by DISH.⁹ The main problem with these criticisms is that they rely on a fundamental misunderstanding of the studies. AT&T accuses Mr. Peters of “cherry-picking” areas with a small number of DBS dishes, while in fact he assumed that these areas were positively brimming with them, with one dish every one or two square meters.

In addition, the analogies attempted by Google from the extended C-band are misguided. Google talks about 150 km “exclusion” zones in that band, but there is no longer such a thing. The exclusion zones that the Commission created some 16 years ago reflected, even then, “a high degree of worst-case conservatism,” and “far exceed[ed] what is required,” in the words of the Commission itself.¹⁰ This is why the Commission jettisoned them in 2016, in favor of an approach where there is no exclusion, just a power limit within the zone. Such concepts of exclusion are neither necessary nor relevant for sharing in the 12 GHz band in the 2020s.

As to the RKF Study, the geographic distribution of NGSO dishes with an emphasis on rural areas is not the result of magical thinking. It reflects the many emphatic statements of SpaceX that they do not plan to compete in urban areas.

What the NGSO proponents do not attack is as important as what they do: the silence validates large parts of the RKF study. Indeed, some NGSO commenters do not take issue with the interference criterion applied by RKF—an interference-to-noise (“I/N”) ratio of -8.5 dB. Those who do critique it do not explain why any alternative criterion would be better.¹¹ The 5G opponents return to the canard of questionable age—this time, it is the ITU Recommendation that is old. But the Recommendation remains fully authoritative. While SpaceX discounts the Recommendation as applicable to fixed rather than mobile terrestrial transmissions,¹² the difference matters only for how much interference is caused by the transmissions, not what the interference-to-noise threshold (against which the transmissions are to be gauged) should be. Other critiques are plain wrong: for example, RKF does not need to set forth the formula for calculating the -8.5 dB ratio because the number is provided in the relevant ITU Recommendation, ITU-R SF.1006. In any event, use of the $\Delta T/T$ criterion favored by SpaceX and Boeing would not result in a materially different conclusion: the percentage of NGSO dishes that would face the potential for interference would still be infinitesimally low—about 1.1%.

⁹ Reply Comments of DISH Network Corporation, WT Docket No. No. 20-443, GN Docket No. 17-183, at 13-16 (July 7, 2021) (“DISH Reply Comments”).

¹⁰ Wireless Operations in the 3650-3700 MHz Band, *Report and Order and Memorandum Opinion and Order*, 20 FCC Rcd. 6502 ¶¶ 60, 64 (2005) (“3650-3700 MHz Band Order”).

¹¹ See, e.g., SpaceX Reply Comments at 7-8.

¹² *Id.* at 7.

The record also does not support auctions. Even usual proponents of auctions, such as Americans for Tax Reform, recognize that they would “further delay deployment” here.¹³ AT&T asks for auctions in the hope of receiving a payment from the auction proceeds to evacuate the band. But AT&T cannot leverage the C-band proceeding to assist in this attempt at remuneration. The crucial difference between the two proceedings is that, there, the incumbents wanted out; here, DISH, the largest user of the 12 GHz band, is seeking to remain in the band and use it more heavily to improve 5G service to the public.

In fact, the Commission has rejected auctions in a much more comparable proceeding, where AT&T was holding the terrestrial licenses in question—the WCS band. The Commission opted for a more flexible terrestrial-use regime, and refused to “displace the existing pool of WCS licensees” to conduct an auction “simply because the revised technical rules afford WCS licensees enhanced spectrum rights.”¹⁴

A further notice of proposed rulemaking is not required. AT&T and Microsoft contend that the 12 GHz NPRM is essentially a Notice of Inquiry, and that a further NPRM must therefore be issued. This is not the case. The Commission has done more than enough under the Administrative Procedure Act (“APA”) to allow moving forward with new rules, including providing “a description of the subjects and issues involved,”¹⁵ and the ability to issue rules that are a “logical outgrowth” of the notice.¹⁶

The Commission should not defer a rulemaking order pending the evaluation of MVDDS substantial service showings. The two are unrelated to one another. The wisdom of opening up the band for 5G does not depend on whether a particular MVDDS licensee has offered substantial service to the public. Conversely, the evaluation of whether an MVDDS licensee offered substantial service to the public before this rulemaking even commenced is not affected by the decision to allow two-way higher power terrestrial services in the band going forward.

In any event, AT&T is trying to piggyback on the sideshow that SpaceX has tried to create—an amateurish sting operation launched by SpaceX to probe into the marketing of DISH’s MVDDS service. That operation produced evidence that DISH lived up to its promises and process—to confirm service availability based on the caller’s address, then make a follow-up call to discuss a site survey free-of-charge and installation. The rest seems to have been entrapment pure and simple—with SpaceX’s agents attempting to induce the DISH representatives to say that the service is not satisfactory. These machinations were as unavailing as they were irrelevant, since the marketing of DISH’s service has nothing to do with its buildout milestones.

¹³ Reply Comments of Americans for Tax Reform and Digital Liberty, WT Docket No. 20-443, GN Docket No. 17-183, at 2 (July 7, 2021) (“Americans for Tax Reform Reply Comments”).

¹⁴ *WCS Order*, 25 FCC Rcd. at 11790 ¶ 196 n.483.

¹⁵ 5 U.S.C. § 553(b)(3).

¹⁶ *First Am. Discount Corp. v. Commodity Futures Trading Comm'n*, 222 F.3d 1008, 1015 (D.C. Cir. 2000).

I. THE REPLY COMMENTS CONFIRM THAT THERE IS BROAD SUPPORT FOR OPENING UP THE 12 GHZ BAND FOR TERRESTRIAL 5G

The record reflects strong and diverse support for opening up the band to higher-power two-way terrestrial services, including:¹⁷

- The 5G for 12 GHz Coalition, a coalition of 33 public interest organizations, trade associates, and leading technology companies, explains that “[o]pening the 12 GHz band for terrestrial use for two-way communications is not only technically feasible, but it is also in the public interest. Modifying the band will expand the 5G economy, enhance our global leadership in 5G and national security, promote competition, bridge the nation’s digital divide, and enable opportunistic access to unused capacity.”¹⁸
- INCOMPAS and CCIA state that “[b]y unlocking the existing [MVDDS] licenses in the 12.2-12.7 GHz band for a new or expanded terrestrial Mobile allocation the Commission can accelerate mobile market competition and preserve and strengthen America’s edge in the race to 5G.”¹⁹
- T-Mobile summarized the view of the opening comments: “Commenters resoundingly agree that more spectrum is needed to support terrestrial 5G services and that the 12 GHz band may be an ideal target.”²⁰
- The incumbent MVDDS licensees observe that “the Commission stands on the threshold of a unique opportunity to make relatively simple adaptive changes in its rules that will clearly serve the public interest by unleashing a contiguous 500 MHz swath of mid-band spectrum . . . for innovative, pro-competitive terrestrial 5G development.”²¹
- And RS Access finds that “[u]pdating the rules for the 12 GHz band to allow 5G will stimulate billions of dollars in economic growth, produce immense consumer benefits, and promote national security.”²²

¹⁷ See also DISH Reply Comments at 7-8 (summarizing support from the initial comments).

¹⁸ Reply Comments of 5G for 12 GHz Coalition, WT Docket No. 20-443, GN Docket No. 17-183, at 5 (filed July 7, 2021) (“5G for 12 GHz Coalition Reply Comments”).

¹⁹ Joint Reply Comments of INCOMPAS and CCIA, WT Docket No. 20-443, GN Docket No. 17-183, at 3 (July 7, 2021) (“INCOMPAS/CCIA Reply Comments”).

²⁰ Reply Comments of T-Mobile USA, Inc., WT Docket No. 20-443, GN Docket No. 17-183, at 3 (July 7, 2021) (“T-Mobile Reply Comments”).

²¹ Joint Reply Comments of MVDDS Licensees and the Supporting Companies, WT Docket No. 20-443, GN Docket No. 17-183, at 1-2 (July 7, 2021) (“MVDDS Licensees Reply Comments”).

²² Reply Comments of RS Access, LLC, WT Docket No. 20-443, GN Docket No. 17-183, at 3 (July 7, 2021) (“RS Access Reply Comments”).

II. A NEW TERRESTRIAL 5G ALLOCATION WOULD NOT INTERFERE WITH INCUMBENT NGSO FSS OR DBS OPERATIONS

The lack of any engineering studies on the part of the 5G opponents is surprising in a proceeding whose crux is precisely the technical question of sharing. The main argument the 5G opponents make is a legal one, and one that should be dismissed as a matter of law—the idea that any miniscule amount of potential interference is enough to end any evaluation of sharing. They dismiss the DBS/5G and NGSO/5G studies on the ground these studies admit *some* potential interference no matter how small. Yet they cannot even make these attacks internally consistent—they argue that one study is supposedly too old, while the other is too new. They also allege that 5G proponents have the burden of persuasion, and *ergo*, the 5G opponents are relieved of any obligation to offer studies of their own. Finally, they take the same shots they took before against the Peters Studies, points already rebutted in DISH’s reply comments,²³ and new shots at other discrete parts of the RKF study. None find the target.

A. Minimal Potential Interference is Not an Obstacle to Sharing

The 5G opponents attempt to play a game of gotcha with the studies by alleging that the studies’ showings of minimal interference are instead admissions of interference.²⁴ For example, AT&T tries to conjure up a confession out of RS Access’s statement that, due to the decline in DBS subscribers, “the already low likelihood of interference is now even smaller.”²⁵ But a low likelihood of interference is no confession; it has consistently been the proof necessary for sharing in the eyes of the Commission. Likewise, SES, OneWeb, and Boeing invent the same imaginary standard—zero interference or get out of my band—to dismiss the RKF study.²⁶

²³ DISH Reply Comments at 10-17.

²⁴ AT&T Reply Comments at 9; Boeing Reply Comments at 9-10; Intelsat Reply Comments at 3; Reply Comments of Microsoft Corp., WT Docket No. 20-443, GN Docket No. 17-183, at 8 (July 7, 2021) (“Microsoft Reply Comments”); Reply Comments of OneWeb, WT Docket No. 20-443, GN Docket No. 17-183, at 13-14 (July 7, 2021) (“OneWeb Reply Comments”); SES Reply Comments at 6-7; SpaceX Reply Comments at 2.

²⁵ AT&T Reply Comments at 12 (quoting RS Access Comments at 47).

²⁶ SES Reply Comments at 7 (“Indeed, accepting for purposes of argument that the RKF Study is valid, its conclusion that nearly 1% of NGSO FSS receivers would experience interference in excess of the defined threshold makes clear that modifying the terrestrial rules would unacceptably harm NGSO FSS operations.”) (footnote omitted); OneWeb Reply Comments at 14 (“Despite these significant and fatal flaws that provide the most favorable scenario for terrestrial mobile, the study still demonstrates that if terrestrial mobile networks are deployed in the 12 GHz band, they will cause harmful interference into the user terminals of NGSO systems.”), Boeing Reply Comments at 9-10 (“Nevertheless, the RKF simulation identified more than 22,000 NGSO FSS customers that would receive excessive levels of interference (*i.e.*, -8.5 dB or greater I/N ratio).”) (footnote omitted); AT&T Reply Comments at 15-16 (“Despite these highly idealized (and unrealistic) assumptions, the study concludes that the mobile service will nonetheless interfere with almost 1 percent of SpaceX’s terminals. In short, despite artificially assuming vast geographic separation between SpaceX network and mobile deployments, RKF predicts significant harmful interference to incumbent satellite services.”) (footnotes omitted); SpaceX Reply Comments at 14 (“But even with all of these unrealistic and optimistic assumptions, the RKF study *still* shows massive interference to next-generation satellite users.”).

Boeing laments the 22,000 NGSO dishes (out of a total of 2,500,000) that will face the potential of interference.²⁷ The 0.888% of NGSO dishes that would face any potential for interference in the RKF study becomes “an unacceptably high likelihood of harmful interference” in Microsoft’s view.²⁸

That is not the standard. The Commission rejected this zero-interference idea as a prerequisite to sharing as early as 70 years ago: “the intensity of a radio signal received at a distant point by means of skywave transmission varies continuously over quite wide limits. The reasons for the variation have to do with the complex structure of the ionospheric medium which reflects the signal back to earth and to other factors. Predictions with respect to the behavior of these skywaves, the expected intensity etc., can generally be made only on a statistical basis involving probabilities rather than certainties.”²⁹ As the Commission explained 40 years ago, “[t]he incidence of harmful interference occurs on a probabilistic basis. It is thus more accurate to refer to the station’s potential for interference as high or low rather than whether the station at a given point in time would in fact cause or not cause interference.”³⁰

When the shoe was on the other foot, AT&T fully supported sharing between its licensed WCS and satellite radio in the 2.3 GHz band, despite the rare cases of interference. In that proceeding, the Commission explained that “[t]he service rules we adopt today will not result in an environment where interference will never occur under any circumstances. However, based on the technical record of this proceeding . . . we are confident that the instances where WCS would seriously degrade or obstruct or repeatedly interrupt [satellite radio] reception will be rare.”³¹ The Commission therefore decided on power levels that “will protect satellite radio

²⁷ Boeing Reply Comments at 9-10 (“Nevertheless, the RKF simulation identified more than 22,000 NGSO FSS customers that would receive excessive levels of interference (*i.e.*, -8.5 dB or greater I/N ratio).”).

²⁸ Microsoft Reply Comments at 8.

²⁹ Application of Donze Enterprises, Inc. (Ksgm), Saint Genevieve, Missouri, for Construction Permit, *Corrected Memorandum Opinion and Order*, 15 F.C.C. 924, 925 (1951).

³⁰ *Contemporary Comm’ns Corp. Order*, 98 F.C.C. 2d at 1239 ¶ 20 n.22 (1984); *see also* Amendment of Part 74 of the Commission’s Rules Concerning Translator Stations, *Notice of Proposed Rulemaking*, 5 FCC Rcd. 2106, 2120 ¶ 112 (1990) (“Radio signal propagation is a probabilistic phenomenon[.]”); Service Rules for Advanced Wireless Services H Block, *Report and Order*, 28 FCC Rcd. 9483, 9534 ¶ 134 (2013) (“In evaluating the interference scenario here, it is important to account for its probabilistic nature. In order for mobile-to-mobile harmful interference actually to occur, a number of worst case factors must all happen in conjunction with each other.”); Service Rules for Advanced Wireless Services in the 2000-2020 MHz and 2180-2200 MHz Bands, *Report and Order and Order of Proposed Modification*, 27 FCC Rcd. 16102, 16138 ¶ 85 (2012) (“2012 AWS Order”) (“As DISH correctly notes, the interference from the AWS-4 uplink to operations in the 1995-2000 MHz band is likely to be mobile-to-mobile interference, and is therefore probabilistic, meaning the probability of interference depends on the likelihood of the interfering and victim mobiles passing close enough to each other under the right conditions. However, determining that interference is probabilistic does not mean that it should be ignored; rather, it means that rules should be set to ensure that the probability of interference is reasonably low.”) (footnote omitted).

³¹ *WCS Order*, 25 FCC Rcd. at 11723 ¶ 28.

receivers from experiencing harmful interference while advancing our goal of enabling mobile broadband service to the public in the WCS spectrum, while limiting potential harmful interference to satellite radio reception.”³² Applying the same principle in the 6 GHz proceeding, the Commission found that fixed microwave receivers would be protected from harmful interference from unlicensed indoor low power devices, despite a study in the record finding that 2.7% of microwave link paths would suffer interference.³³ This conclusion garnered strong support from, among others, Google. Here, the RKF study found an even smaller percentage of Starlink-like terminals would face any potential for interference—0.888%.³⁴

In fact, the Commission has been shifting in recent years from “snapshot” studies of interference at a frozen point in time (usually the assumed moment of worst interference) to Monte Carlo probabilistic studies.³⁵ For example, in using Monte Carlo studies to analyze interference in the 6 GHz band, the Commission “recognize[d] that an approach based on Monte Carlo simulations would give a more reliable prediction of the likelihood of interference”³⁶

³² *Id.* at 11738 ¶ 63.

³³ Unlicensed Use of the 6 GHz Band; Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz, *Report and Order and Further Notice of Proposed Rulemaking*, 35 FCC Rcd. 3852, 3904-05 ¶ 139 (2020) (“6 GHz Band Order”).

³⁴ RKF Study at 55. In other proceedings, the Commission satisfied the requirements of Section 303(y) in a single paragraph. *See e.g.*, Review of the Commission’s Rules Governing the 896-901/935/940 MHz Band, *Report and Order, Order of Proposed Modification, and Orders*, 35 FCC Rcd. 5183, 5232 ¶ 120 (2020) (“900 MHz Band Order”). As the D.C. Circuit recognized in its review of the C-band Order, “nothing in [Section 303(y)] bars the FCC from reducing harmful interference by reconfiguring the frequency band assigned to incumbent licensees.” *PSSI Glob. Servs., L.L.C. v. FCC*, 983 F.3d 1, 9 (D.C. Cir. 2020). DISH and other parties have shown that allowing mobile use in the 12 GHz band would create an incentive for innovation and investment as envisioned by Section 303(y)(2)(B). *See, e.g.*, Comments of DISH Network Corporation, WT Docket No. 20-443, GN Docket No. 17-183, at 27 (May 7, 2021) (“DISH Comments”); RS Access Comments at 5-13; Comments of Competitive Carriers Association, WT Docket No. 20-443, GN Docket No. 17-183, at 2-3 (May 7, 2021) (“CCA Comments”). TechFreedom misstates the requirements of Section 303 when it claims that because there is no IMT or 3GPP designation for the 12 GHz band, there is no international allocation. This is incorrect; rather, 303(y)(1) requires that “such use is consistent with international agreements to which the United States is a party.” The ITU has allocated the 12 GHz band to mobile usage in Region 2. 47 C.F.R. § 2.106. Allowing mobile use in the 12 GHz band would harmonize the United States with its international agreements. *See* Amendment of the Commission’s Rules with Regard to Commercial Operations in the 3550-3650 MHz Band, *Report and Order and Second Further Notice of Proposed Rulemaking*, 30 FCC Rcd. 3959, 3972 ¶ 35 (2015) (“3550-3650 MHz Order”) (noting, when reviewing changes under the 303(y) statutory requirements, that the allocations would be consistent with the ITU Region 2 Allocation Table).

³⁵ *See 6 GHz Band Order*, 35 FCC Rcd. at 3891-92 ¶ 109, 3892 ¶ 112, 3894 ¶ 116, 3899 ¶ 127. In that proceeding, AT&T argued “the record lacks adequate Monte Carlo simulations and that even if there were appropriate Monte Carlo simulations the method itself is inadequate. AT&T contends that the only appropriate analysis is a static analysis that assumes the worst-case scenarios under the worst-case assumptions, ignoring the statistical nature of access point operation.” *Id.* at 3899 ¶ 127 n.331. The Commission “clearly disagree[d].” *Id.*

³⁶ *Id.* at 3899 ¶ 127.

because, “[t]o evaluate the spectrum sharing potential, including aggregate interference impact, a technical analysis should instead take a statistical approach such as in Monte Carlo simulations so as to probabilistically account for many intertwined phenomena.”³⁷

Probabilistic studies result in a lower probability of interference than worst-case studies. For example, the Peters Studies, which are worst-case snapshots, assume that DBS dishes receive all video channels across the DBS spectrum and access all operational DBS slots, 24/7. Taking into account the actual usage of any one affected dish (only some of the time, only some of the channels, and only some of the slots) would reduce the interference potential further still. Thus, no one subscriber receives service from all the slots. In fact, no DISH subscriber receives service from the DIRECTV-only slot of 101° W.L., and few, if any, DIRECTV, subscribers receive 12 GHz service from any slot other than 101° W.L. Indeed, many DIRECTV subscribers receive much or all of their service in the Ka-band, not implicating the 12 GHz band at all.

In any event, the existence of some interference potential with a tiny minority of terminals does not mean that the potential will be realized. It means that interference can be avoided through targeted measures. As Mr. Peters explained: “Designing a radiofrequency deployment is never a one-size-fits-all proposition, and tailoring the network deployment model to avoid excess EPFD where necessary should not pose an unusually demanding challenge for network operators, especially considering the limited degree of excess EPFD observed in the models studied.”³⁸

TechFreedom jumps on the same bandwagon as AT&T and the NGSO licensees by dismissing RKF’s Monte Carlo analysis as akin to “gambling.”³⁹ If that were so, all of the nation’s safety and security agencies—including the Environmental Protection Agency, the Federal Energy Regulatory Commission, the Nuclear Regulatory Commission—would be wasting their time at the roulette table.⁴⁰ The Commission relied on Monte Carlo simulations in

³⁷ *Id.* at 3903 ¶ 135.

³⁸ Second Peters Study at 12.

³⁹ Reply Comments of TechFreedom, WT Docket No. 20-443, GN Docket No. 17-183, at 4 (July 7, 2021) (“TechFreedom Reply Comments”).

⁴⁰ *See, e.g., Schultz v. Akzo Nobel Paints, LLC*, 721 F.3d 426, 428 (7th Cir. 2013) (“Monte Carlo Analysis, a risk assessment model that accounts for variability and uncertainty in risk factors . . . The U.S. Environmental Protection Agency (EPA) has endorsed this methodology as a reliable way to evaluate risk arising from environmental exposure.”); *Lyondell Chem. Co. v. Occidental Chem. Corp.*, 608 F.3d 284, 293 (5th Cir. 2010) (“[T]he EPA itself has endorsed the use of Monte Carlo analysis in very similar applications—environmental risk assessments[.]”); *PJM Interconnection, L.L.C., Order on Rehearing and Compliance*, 153 FERC 61035 ¶ 11 (FERC 2015) (“The Commission, however, found that the Monte Carlo analysis is an appropriate tool by which price, quantity, and reliability outcomes can be simulated.”); *PJM Interconnection, L.L.C., Order Conditionally Accepting Tariff Revisions, Subject to Compliance Filing*, 149 FERC 61183, 62128 ¶ 54 (FERC 2014) (“Monte Carlo analysis is simply a tool by which price, quantity, and reliability outcomes can be simulated.”); *Northeast Nuclear Energy Co. (Millstone Nuclear Power Station, Unit 2), Decision and Order*, 38 N.R.C. 5, 8 (NRC July 9, 1993) (“The Monte Carlo calculations have incorporated enough ‘iterations’ to provide a good estimate of the pool’s reactivity.”).

determining that interference would not exist or be harmful when it allowed unlicensed use in the 6 GHz band, because they “give a more reliable prediction of the likelihood of interference.”⁴¹

In fact, some of the voices expressing skepticism at the feasibility of sharing come from parties who have in the past been ardent spectrum sharing supporters. Google, for one, has long been an advocate for deregulation of spectrum management, and shared, unlicensed use of the same frequencies.⁴² In the 6 GHz band proceeding for example, Google was among those that stated: “the 6 GHz band offers an opportunity for unlicensed operations governed by strict technical rules, but without the need for a complicated sharing mechanism or overregulation.”⁴³ In 2011, Google even commissioned a report entitled “The Case for Unlicensed Spectrum.”⁴⁴ In fact, Google supports “reform of federal, state and local regulations to remove barriers to broadband abundance.”⁴⁵ Americans for Tax Reform has likewise been firmly on the side of deregulation and shared use, asserting that “opening the 5.9 GHz spectrum for unlicensed use will contribute up to \$100 billion to GDP.”⁴⁶

B. The Allocation of Burden Does Not Excuse the Failure to Proffer Evidence

Allocation of the burden of persuasion is one thing, and DISH is willing to shoulder it, and has indeed done so in this proceeding. But this does not mean the other side—defenders of the *status quo*—need to proffer no evidence. If the allocation of the burden of persuasion meant absolution from any evidentiary obligation for the party without it, all defendants would immediately rest at the end of the prosecution’s case, and only the government would need expert testimony in a complex antitrust proceeding. As the Supreme Court has explained, the

⁴¹ *6 GHz Band Order*, 35 FCC Rcd. at 3899 ¶ 127 (2020); *id.* at 3903 ¶ 135 (“To evaluate the spectrum sharing potential, including aggregate interference impact, a technical analysis should instead take a statistical approach such as in Monte Carlo simulations so as to probabilistically account for many intertwined phenomena.”).

⁴² See *Encouraging Innovation: Wi-Fi and LTE in Unlicensed Spectrum Bands*, Google Public Policy Blog (June 12, 2015), <https://publicpolicy.googleblog.com/2015/06/encouraging-innovation-wi-fi-and-lte-in.html> (“Innovation in unlicensed spectrum has given people more opportunity to access the Internet, when and where they need it.”).

⁴³ Comments of Apple Inc., Broadcom Inc., Cisco Systems, Inc., Facebook, Inc., Google LLC, Hewlett Packard Enterprise, Intel Corp., Marvell Technology Group, Microsoft Corp., Qualcomm Incorporated, and Ruckus Networks, Use of Spectrum Bands Above 24 GHz For Mobile Radio Services, GN Docket No. 14-177, at 3 (Sept. 11, 2018); see also Miguel Helft, *Google Starts an Advocacy Campaign for More Unlicensed Spectrum*, NY Times (Aug. 18, 2008), <https://bits.blogs.nytimes.com/2008/08/18/google-starts-an-advocacy-campaign-for-more-unlicensed-spectrum>.

⁴⁴ Paul Milgrom, Jonathan Levin & Assaf Eilat, *The Case for Unlicensed Spectrum* (Oct. 12, 2011), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1948257.

⁴⁵ Transparency, Google U.S. Public Policy (last updated Dec. 2020), <https://www.google.com/publicpolicy/transparency>.

⁴⁶ Letter from Grover Norquist, et al., ET Docket No. 19-138, Use of the 5.850-5.925 GHz Band, at 2 (Dec. 4, 2019).

burden of persuasion is defined as “which party loses if the evidence is closely balanced[.]”⁴⁷ There is no close balance, and no real contest, when only one side has offered expert testimony on the key technical issues. And no defender of the *status quo* has been entitled to rest on its laurels in a spectrum proceeding. For example, in the WCS proceeding, “Sirius, XM, and the WCS Coalition each conducted individual measurements and technical analyses to support their proposed WCS power levels”⁴⁸ As the Senate Report accompanying the enactment of the Administrative Procedure Act in 1946 explained, “that the proponent of a rule or order has the burden of proof means not only that the party initiating the proceeding has the general burden of coming forward with a prima facie case *but that other parties, who are proponents of some different result, also for that purpose have a burden to maintain.*”⁴⁹

C. The Peters Studies Should Not Be Discounted on the Ground They Came Too Early, Nor the RKF Study Ignored on the Ground It Came Too Late

The 5G opponents try to discount the Peters and RKF studies based on their vintage, old and new respectively. But, AT&T cannot rebut the fact that the passage of time makes the Peters Studies even more conservative because of the dramatic technical advances achieved over the past five years.⁵⁰ These advances include massive MIMO, adaptive beam steering and beam forming, aggregation of three or more carriers, device technology advancements, optimized power consumption, self-organization and optimization to avoid interference, and advancements in architecture (such as network virtualization, densification, and Open RAN). As RKF explains, “it is not unreasonable to assume that a terrestrial deployment will use existing interference-mitigation technologies to coexist . . . these antennas are not unrealistic and incorporate interference-mitigation features found in today’s wireless deployments. If anything, the [RKF] study omitted the use of certain helpful coexistence tools like horizon nulling, which would have further reduced the probability of an exceedance event.”⁵¹ To those, RS Access’s comments have added a further factor facilitating sharing—the decline of the DBS subscriber base since 2016.

AT&T’s response is to dismiss these developments as “vague generalities,” and to charge DISH with offering no evidence of such technology being used in practice.⁵² But the evidence is abundant: massive MIMO antennas, for example, have been deployed by all three of the largest carriers. And, with respect to Open RAN, as Chairwoman Rosenworcel has said: “History tells us that when you give innovators in the United States a sandbox to test new ideas, good things

⁴⁷ *Schaffer v. Weast*, 546 U.S. 49, 56 (2005).

⁴⁸ *WCS Order*, 25 FCC Rcd. at 11730 ¶ 44.

⁴⁹ S. Doc. No. 248, 79th Cong., 2d sess. 208 (1946), <https://www.justice.gov/sites/default/files/jmd/legacy/2014/03/20/senatorept-752-1945.pdf> (emphasis added).

⁵⁰ See DISH Reply Comments at 18.

⁵¹ Letter from David Marshack, RKF, to Marlene Dortch, FCC, WT Docket No. 20-443, at 9-10 (Aug. 9, 2021).

⁵² AT&T Reply Comments at 11.

follow. Here's hoping that creating two new sandboxes to explore wireless innovation will unlock exciting new breakthroughs in open RAN technology.”⁵³

The point here is simple: directionally, relevant developments since 2016 make even the minimal interference found then overstated; conversely, nothing that has happened since pulls in the other direction of more interference. AT&T does not argue anything does. Therefore, the lapse of five years provides more reason to credit these studies, not doubt them.

As to the RKF study, the phrase “eleventh hour” recurs in the 5G opponents’ accounts of its submission.⁵⁴ This is a strange turn of phrase to describe a study filed on the due date for opening comments in this proceeding. As the Wireless Bureau stated, “we give no credit to the 12 GHz [NGSO] Alliance’s suggestion that the studies that RS Access and DISH submitted with their timely-filed comments were somehow ‘belated submissions . . . to limit other interested parties’ ability to review and reply.”⁵⁵ The Commission has, of course, also declared its openness to *ex parte* submissions beyond the initial opening and reply comments.⁵⁶

⁵³ Remarks of Acting Chairwoman Jessica Rosenworcel, FCC Open RAN Solutions Showcase (July 14, 2021), <https://docs.fcc.gov/public/attachments/DOC-374072A1.pdf>; see also Promoting the Deployment of 5G Open Radio Access Networks, *Notice of Inquiry*, 36 FCC Rcd. 5947, 5949 ¶ 4 (Mar. 18, 2021) (“Open and virtualized radio access networks have the potential to address national security and other concerns that the Commission and other federal stakeholders have raised in recent years about network integrity and supply chain reliability.”).

⁵⁴ Kepler Reply Comments at 3 (“MVDDS proponents have finally submitted a technical analysis at the eleventh hour . . .”); SES Reply Comments at 7 (referring to “[t]he eleventh-hour submission of a study by RS Access . . .”); AT&T Reply Comments at 14 (“In its Comments, RS Access finally disclosed its much-anticipated technical study . . .”); Boeing Reply Comments at 7 (“In *ex parte* filings, RS Access claimed to have a technical study indicating that spectrum sharing is possible, but the company declined to disclose it prior to the comment deadline.”); Intelsat Reply Comments at 1-2 (“The coexistence study submitted—at long last— by RS Access . . .”); SpaceX Reply Comments at ii (“RS Access . . . hid [its study] until the last possible minute . . .”).

⁵⁵ Expanding Flexible Use of the 12.2-12.7 GHz Band, WT Docket No. 20-443, Order, DA 21-649 ¶ 3 n.12 (June 3, 2021).

⁵⁶ *12 GHz NPRM*, 36 FCC Rcd. 630 ¶ 61 (stating that this proceeding will be treated as a “permit-but-disclose” proceeding in accordance with the Commission’s *ex parte* rules); Expanding Flexible Use of the 12.2-12.7 GHz Band, WT Docket No. 20-443, Order, DA 21-519 ¶ 4 (May 4, 2021) (“To the extent that members of the 12 GHz Alliance have input on whether filings in the comment stage demonstrate the feasibility of sharing in this band, they may submit such input at the reply stage and in subsequent *ex parte* presentations.”).

D. AT&T Reiterates Old Talking Points About the Peters Studies While Contributing Nothing New to the Record

1. AT&T's Attacks on the Peters Studies Have Been Thoroughly Rebutted

AT&T's remaining arguments are all rehashes of its 2018 letter. Other 5G opponents, like Intelsat, also base the entirety of their opposition to sharing on these same arguments.⁵⁷ AT&T, of course, could not have read DISH's reply comments at the time it was preparing its own. But far from leaving AT&T's arguments⁵⁸ about the Peters Studies unanswered, DISH has thoroughly rebutted them.⁵⁹ The main problem with all of AT&T's arguments is a misunderstanding of Mr. Peters's method. Mr. Peters assumed a concentration of DBS dishes many times denser than what can be found anywhere in the nation, and still found minimal interference into these dishes. Thus, AT&T complains that Mr. Peters "cherry-picked" the Washington D.C. area near the Capital One Arena because not many downtown Washingtonians have DBS dishes. But this is irrelevant: no matter how many dishes are found there, *Mr. Peters assumed there was one in every square meter of that area.*

The same key premise of the Peters Studies also disposes of AT&T's complaint that Mr. Peters inappropriately looked at a "snapshot" because consumers may have to move a dish location if a new building is constructed in their previous line of sight; Mr. Peters assumed the ubiquitous presence of DBS dishes, meaning that he accounted for possible changes in the dish locations.

Other points made by AT&T in 2018 are similarly unavailing. The 2018 AT&T letter erroneously suggested that the 2016 Peters studies had considered only one DBS orbital location: as mentioned, they had in fact considered *all* seven operational DBS slots then, as now, serving the U.S. That included all of DIRECTV's orbital locations, whether DIRECTV uses them or not. In fact, DIRECTV appears to make minimal or no use of two of its three DBS orbital locations, 110° and 119° W.L., which makes the 2016 studies even more conservative. In effect, the studies confirm that DBS users are adequately protected even for the purpose of receiving transmissions that DIRECTV does not appear to make.

AT&T also purports to criticize the limitations of LIDAR, but it cannot help simultaneously acknowledging that "high-resolution clutter data is an important piece of accurate EPFD analyses."⁶⁰ AT&T's supposed objection to LIDAR data is unpersuasive. It consists of the same argument that buildings are built and demolished as time goes by, and of the complaint that LIDAR data do not tell us if a building is made of wood, concrete, glass, etc.—a complaint that betrays how much LIDAR data *do* tell us. Nor does AT&T propose a better, or any,

⁵⁷ Intelsat Reply Comments at 4-5; Boeing Reply Comments at 5-6.

⁵⁸ AT&T Reply Comments at 8-10.

⁵⁹ DISH Reply Comments at 13-17.

⁶⁰ Letter from Michael P. Goggin, AT&T, to Marlene Dortch, RM-11768, Technical Appendix at 2 (June 14, 2018) ("AT&T 2018 Letter").

alternative—in fact, there is no better alternative for considering clutter in a sharing environment than the actual LIDAR data.

And AT&T’s statement that “the technical studies’ mobile use analysis also fails to assess the impact of actual mobile operation”⁶¹ is misleading. As Mr. Peters has explained, the study “considered five mobile locations per base station and assumed that each was at the edge of coverage where the mobile devices would transmit at their maximum power.”⁶² While AT&T complains of “stationary” devices, this assumption effectively simulates the worst case in which all mobile units are at the cell edge, transmitting at their maximum power. Any movement of the mobile units to other locations will either improve the coverage conditions so that power control will reduce the power, or reduce the coverage so that the link is broken and mobile transmissions no longer occur. In any event, base station transmissions are a much more significant factor in the interference analysis than lower-power mobile transmissions.

AT&T also faults the 2016 studies for using what it deems artificially low effective isotropically radiated power (“EIRP”) levels compared to 5G applications at lower bands.⁶³ In light of their conservatism, the 2016 studies strongly suggest that, even at higher power than assumed by Mr. Peters, terrestrial transmissions would have an immaterial effect on a tiny percentage of DBS antennas. But DISH’s proposal, which preserves the equivalent power flux density (“EPFD”) limits for the band, totally disposes of AT&T’s objection. If EPFD limits are exceeded at a higher EIRP level, then terrestrial transmissions at that level would not be allowed in the band.

The same response disposes of AT&T’s criticism directed at the four-to-five meter height the studies have assumed for base stations.⁶⁴ If a greater height were to result in an EPFD level exceeding the limit, transmissions from that height would be disallowed. And AT&T does not take into account the fact that even the minimal portion of the hypothetically ubiquitous dishes that would be exposed to the potential for interference can be totally protected by simple coordination, including base station siting procedures. These procedures, already required by the rules, would continue to apply, with some streamlining.

AT&T is in a position to replicate the two 2016 studies using the characteristics of its own DBS dishes to calculate the EPFD levels generated by terrestrial transmissions at these dishes. All parameters of the 2016 studies are known to AT&T and the public. AT&T has not done so, which suggests the results are not likely to be materially different.

Analogies attempted by Google based on the extended C-band, as well as the C-band proper, are based on a distorted understanding of Citizens Broadband Radio Service (“CBRS”) rules, and do not support the concept of draconian exclusion zones in the 12 GHz band. Google

⁶¹ *Id.* at 5.

⁶² First Peters Study at 23.

⁶³ AT&T 2018 Letter, Technical Appendix at 2-3.

⁶⁴ *See id.* at 3; *see also* First Peters Study at 19 (four meter height); Second Peters Study at 8 (five meter height).

maintains that the protection of satellite services “requires large geographic exclusion or coordination zones,” based on what it calls mandatory “exclusion or protection zones of 150 km” in the CBRS band.⁶⁵ They are nothing of the kind. While the Commission had initially mandated them as exclusion zones some 16 years ago, it did so with significant misgivings even then and subsequently abolished them, recreating them as zones in which an aggregate limit should be met.

The Commission specifically created zones of 150 km around grandfathered earth stations in the 3650-3700 MHz band in 2005.⁶⁶ Even then, the Commission went out of its way to explain that the approach was overly conservative and afforded grandfathered GSO earth stations in the band more than the necessary protection. The Commission “recogniz[ed] that the simplified circular protection zone that we are imposing here employs a high degree of worst-case conservatism that, in many instances, could result in prohibiting the use of transmitters in less-than-worst-case circumstances where, in reality, there would be no likelihood of interference to FSS earth stations.”⁶⁷ And, “[t]o underscore the conservative nature of this approach, we note that we are adopting a protection zone that far exceeds what is required[.]”⁶⁸ Indeed, the Commission believed, “in many cases separation distances of less than 150 km can readily be achieved and still protect the FSS earth station.”⁶⁹

It was thus no surprise that the Commission relaxed this approach drastically, starting in 2015, when it found the 150 km “default separation distance” “to be excessively large, overly simplistic, and inefficient”⁷⁰ Instead, the Commission adopted a long term aggregate protection limit based on an interference-to-noise value of -12 dB, which translates into an increased noise floor of no more than -129 dBm/MHz.⁷¹ The Commission then changed the function of the 150 km zone. Under the new rules, it became simply the zone in which the emissions from all co-frequency Citizens Broadband Service Devices (CBSDs) operating in the 3600-3700 MHz band may not exceed the value of -129 dBm/MHz.⁷²

In practice, moreover, compliance with this limit is facilitated by a simple fact. As the Commission itself has recognized, the potential for interference is typically dominated by a

⁶⁵ Google Reply Comments at 3-5.

⁶⁶ See *Wireless Operations in the 3650-3700 MHz Band, Report and Order and Memorandum Opinion and Order*, 20 FCC Rcd. 6502, 6525 ¶ 60 (2005); 47 C.F.R. § 90.1331.

⁶⁷ *3650-3700 MHz Band Order*, 20 FCC Rcd. at 6525 ¶ 60.

⁶⁸ *Id.* at 6527 ¶ 64.

⁶⁹ *Id.* at 6526 ¶ 63.

⁷⁰ *3550-3650 MHz Order*, 30 FCC Rcd. at 4046 ¶ 288. This order concerned the entire 3550-3700 MHz band.

⁷¹ *Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band, Order on Reconsideration and Second Report and Order*, 31 FCC Rcd. 5011, 5089 ¶ 266 (2016) (“*3550-3650 MHz Band Second Order*”).

⁷² See 47 C.F.R. § 96.17(a)(2).

single interferer, with other base stations adding very little to the aggregate emissions.⁷³ This means that the potential for interference can be averted within the 150 km station with little to no effect on the majority of stations within the zone.

Google provides no information on the actual effect that the rule has on co-channel CBRS deployments, which is the critical consideration when assessing coexistence. Thus, the CBRS service rules provide no reason to conclude that coexistence in the 12 GHz band would require large exclusion or coordination zones on the order of 150 km.

2. A Database Is a Practical Measure to Facilitate Coordination in the Few Cases Where It Will Be Needed

AT&T also criticizes⁷⁴ Mr. Peters' proposal of "a secure database managed by a neutral third-party host who would identify spectrum availability."⁷⁵ To begin with, the scope of this proposal is limited to giving two-way higher-power terrestrial service providers even greater flexibility than assumed in the study. As Mr. Peters explained: "Although the 2016 studies showed that this highly conservative approach was possible, there are more sophisticated and efficient ways to achieve even more meaningful coexistence. One such way is to enlist a secure database managed by a neutral third-party host who would identify spectrum availability whenever required."⁷⁶ To that end, Mr. Peters' proposal would simply improve the antiquated coordination procedure existing today between DBS and MVDDS, which requires a time-consuming exchange of paper letters and technical information. Under the rules, this can take up to 135 days—the MVDDS licensee must first provide a list of technical parameters to the DBS licensee at least 90 days before starting operations.⁷⁷ Then, no later than 45 days after receiving the MVDDS information, the DBS licensee is to provide the MVDDS licensee with a list of new DBS customer locations that have been installed in the 30-day period following the MVDDS notification and that the DBS licensee believes may receive harmful interference.⁷⁸ Finally, the MVDDS licensee in turn must take into account any new DBS customers or other relevant information provided by the DBS licensee in response to the notification.⁷⁹ Mr. Peters proposes

⁷³ See, e.g., Expanding Flexible Use in the 3.7-4.2 GHz Band, *Report and Order and Order of Proposed Modification*, 35 FCC Rcd 2343, 2475-76 ¶ 363 (2020) ("To account for aggregate interference effects, which we expect will be dominated by a single interferer . . .").

⁷⁴ AT&T Reply Comments at 11-12.

⁷⁵ DISH Comments, Ex. 1, Declaration of Tom Peters ¶ 8 ("Peters Declaration").

⁷⁶ *Id.*

⁷⁷ See 47 C.F.R. § 101.1440(d)(1) (requiring the MVDDS licensee to provide the following information at least 90 days before commencing operations: (i) Geographic location (including NAD 83 coordinates) of its proposed station location; (ii) Maximum EIRP of each transmitting antenna system; (iii) height above ground level for each transmitting antenna; (iv) antenna type along with main beam azimuth and altitude orientation information, and description of the antenna radiation pattern; (v) description of the proposed service area; and (vi) survey results along with a technical description of how it determined compliance with the appropriate EPFD level at all DBS subscriber locations).

⁷⁸ 47 C.F.R. § 101.1440(d)(2).

⁷⁹ 47 C.F.R. § 101.1440(d)(3).

to modernize the coordination procedures by using a cloud-based database to achieve the same result in a fraction of the time.⁸⁰

AT&T expresses worry that the database would contain sensitive customer information—a concern that is understandable at first blush. But AT&T ignores that, under the *current* rules, MVDDS licensees must conduct a site survey to determine the precise locations of all DBS customers of record. This is the same “sensitive” information about whose disclosure AT&T is concerned, except it is gathered more expensively, and it is less protected than under Mr. Peters’ proposal, as MVDDS licensees are not required to keep their own site surveys confidential.⁸¹ In addition, after receiving notice of a new MVDDS tower, DBS providers must provide the MVDDS licensee with all new customer locations added within 30 days from the notice. Again, this is the same sensitive information, except its collection subjects the DBS providers, including DISH and DIRECTV themselves, to a greater burden.

Nor does a database implicate or imply “vast geographic protection zones”⁸²; the minimal interference found by Mr. Peters obviates any such zones, and the database would merely give terrestrial licensees greater flexibility where DBS dishes simply do not exist. Finally, the existence of a coordination database would not be “tantamount to a freeze” on DBS growth.⁸³ First of all, AT&T forgets that new subscribers close to MVDDS towers have no protection today. Specifically, under the existing rules, MVDDS operators are only required to protect DBS dishes that were installed up to 60 days before commencement of the MVDDS tower’s operation.⁸⁴ As to new customers, the existing rules make DBS carriers, and MVDDS licensees, responsible for protecting them.⁸⁵ And mobile DBS customers (i.e., using a recreational vehicle) are not protected at all. In any event, the Peters Studies show the extremely low likelihood of interference into almost all possible dish locations, thus already accounting for future dishes. And finally, the addition of a new DBS location to the database means that the terrestrial service licensee would no longer have greater flexibility than the EPFD limits applicable when in the vicinity of dishes. DISH is keenly interested in signing up new subscribers, and despite AT&T’s lack of confidence in DISH’s self-interest, the Peters Studies demonstrate that both DIRECTV and DISH can continue to do so.

E. The Attacks on RKF’s Study Are Equally Unavailing

As to the RKF study, what the NGSO proponents do not attack is as important as what they do: the silence validates large parts of the RKF study. A number of NGSO proponents do not dispute that, based on the RKF study’s assumptions, a very low percentage of NGSO dishes

⁸⁰ Peters Declaration ¶ 8.

⁸¹ See 47 C.F.R. § 101.1440(d)(1)(vi) (requiring MVDDS operators to share site surveys with DBS operators).

⁸² AT&T Reply Comments at 12.

⁸³ *Id.*

⁸⁴ MVDDS licenses must give at least 90 days notice before commencement of operations and must protect DBS locations added within 30 days of that notice. See 47 C.F.R. § 101.1440(d).

⁸⁵ See 47 CFR § 101.1440(e).

would be faced with even the potential for interference. They only dispute some of those assumptions, especially the geographic distribution of NGSO dishes and terrestrial networks, arguing that it amounts to geographic exclusion zones—rural areas for NGSO FSS, urban areas for terrestrial service.⁸⁶ And as another example of limited engagement, many NGSO commenters do not confront head-on the question of the interference criterion applied by RKF—an interference-to-noise (“I/N”) ratio of -8.5 dB.⁸⁷ The few who do critique it do not explain why any alternative criterion would be better, or even propose an alternative.

Rural/urban areas. The RKF Study’s geographic distribution of the two networks is governed by reality, not by magical thinking. It is SpaceX that has emphasized that it will not target urban areas. As Mr. Musk has stated: “I want to be clear . . . it’s not like Starlink is some huge threat to telcos. I want to be super clear it is not.”⁸⁸ Mr. Musk doubled down on this assurance just recently. At the 2021 Mobile World Congress, he stated: “it’s really meant for sparsely populated regions because our spot size is quite big, so we’re well suited for low to medium density areas but not high density areas. In high density areas we will be able to serve a limited number of customers.”⁸⁹ Mr. Musk is also reported to have said: “The challenge for

⁸⁶ Boeing Reply Comments at 9 (“The study also fails to randomly distribute the 5G devices and NGSO FSS receivers throughout the country, segregating the devices based on population and rural designations”); Reply Comments of Google LLC, WT Docket No. 20-443, GN Docket No. 17-183, at 14 (July 7, 2021) (“Google Reply Comments”) (“And, as noted by RKF, the study is generally biased toward placing satellite terminals in rural areas while placing 5G systems in more populated areas, which results in statistically fewer 5G mobile devices in proximity to NGSO FSS terminals”); Microsoft Reply Comments at 8-9 (“First, the geographic distribution of simulated devices in the RS Access study almost certainly masks significant interference problems. The study simulated only 140,000 terrestrial mobile base stations and 2.5 million NGSO user terminals (rather than the 5 million user terminals Starlink has applied for at the Commission) across all 8 million square kilometers of the continental United States. It concentrates the former in more densely populated areas and distributed the latter primarily across rural areas.”) (footnote omitted); OneWeb Reply Comments at 15 (“In addition, the NGSO FSS user terminal distribution model that is used in the study assumed that the majority of the terminals will be deployed in the unserved Rural Digital Opportunity Fund (‘RDOF’) blocks and in rural areas outside of the RDOF blocks.”), SpaceX Reply Comments at 5-6 (“Although the study’s authors twist themselves into knots attempting to claim that the study ‘conservatively’ includes a substantial number of NGSO FSS user terminals in urban and suburban areas overlapping with terrestrial deployments, by the study’s own terms it is clear that this is not the case.”).

⁸⁷ For example, OneWeb, Boeing, Google, and Kepler may all dispute the assumptions of the RKF Study, and therefore its conclusion that the -8.5 dB limit is met for all but a few NGSO terminals; but they do not appear to dispute the appropriateness of the -8.5 dB objective itself. *See* Boeing Reply Comments at 8 (“The RKF study also fails to explain how it calculated an aggregate interference-to-noise (‘I/N’) ratio of -8.5 dB . . .”); Google Reply Comments at 14 (“The FSS interference criterion is taken to be -120.9 dBm/MHz based on their assumed values of system temperature (200 K) and I/N objective (-8.5 dB.”); OneWeb Reply Comments at 26-27 (questioning not the -8.5 dB criterion, but only how the probability of exceeding it is calculated).

⁸⁸ Via Satellite Magazine, Elon Musk, Founder & Chief Engineer, SpaceX - SATELLITE 2020 Opening Day Keynote, YouTube, at 16:15 (Mar. 9, 2020), <https://www.youtube.com/watch?v=HPV8Xp3pEpI>.

⁸⁹ CNET Highlights, *WATCH: Elon Musk discuss Starlink Internet at MWC 2021 - Livestream*, YouTube, at 4:34-39 (June 29, 2021), <https://youtu.be/RcnVTgrgThE>.

anything that is space-based is that the size of the cell is gigantic . . . it's not good for high-density situations . . . We'll have some small number of customers in LA. But we can't do a lot of customers in LA because the bandwidth per cell is simply not high enough.”⁹⁰ Mr. Musk's tweets hammer this same point home: “Starlink will be great for any sparsely populated areas with expensive or little to no connectivity!”⁹¹ “SpaceX is developing rockets needed to make life multiplanetary — full & rapid reusability at large scale. Even if SpaceX fails in that goal, the rockets will still be most advanced on Earth. *Starlink's purpose is to provide Internet to the least served & to pay for Mars.*”⁹² “Starlink is really meant for those who are least served. [The] Bay [Area] usually has great Internet.”⁹³

SpaceX's reply comments ignore these statements, countering that a “large,” but unspecified, proportion of Starlink orders comes from urban locations, and that SpaceX “is authorized to provide, and is providing, a competitive broadband service throughout the United States.”⁹⁴ But it is impossible to reconcile this statement with Mr. Musk's assurances that SpaceX will not compete with “telcos” in “high density areas.” Moreover, what SpaceX carefully avoids to address is how many urban customers it serves now, and what its actual proportion of urban to rural customers is.

OneWeb counters that it has a different business plan.⁹⁵ OneWeb states that it did not participate in the Rural Digital Opportunity Fund (“RDOF”) auction,⁹⁶ and that, therefore, the concentration of NGSO dishes in RDOF areas is inapplicable to it. But what OneWeb does not say is that the reason for its absence from the RDOF auction is its plan to concentrate on urban areas instead—there is no such plan. Instead, OneWeb states it will “initially focus its services on enterprise customers, federal, state, and local government users, and Mobile Network Operators.”⁹⁷ While OneWeb claims these customers “need connectivity in metropolitan as well

⁹⁰ Jon Brodtkin, *Elon Musk: Starlink latency will be good enough for competitive gaming*, Ars Technica (Mar. 10, 2020), <https://arstechnica.com/information-technology/2020/03/musk-says-starlink-isnt-for-big-cities-wont-be-huge-threat-to-telcos>.

⁹¹ Elon Musk (@ElonMusk), Twitter (Feb. 5, 2020, 6:02 PM ET), <https://twitter.com/elonmusk/status/1225192950956744704>.

⁹² Elon Musk (@ElonMusk), Twitter (Mar. 22, 2021, 8:35 PM ET), <https://twitter.com/elonmusk/status/1374157805406523397> (emphasis added)

⁹³ Elon Musk (@ElonMusk), Twitter (Feb. 24, 2021, 8:28 PM ET), <https://twitter.com/elonmusk/status/1364749052626231296>.

⁹⁴ SpaceX Reply Comments at 6.

⁹⁵ OneWeb Reply Comments at 15-16 (“OneWeb will initially focus its services on enterprise customers, federal, state, and local government users, and Mobile Network Operators. These customers will include businesses with multiple locations in various geographic areas and government users that need connectivity in metropolitan as well and rural and remote areas, all of whom will expect to be served with the same quality of service wherever their NGSO FSS user terminals are deployed in the United States.”).

⁹⁶ *Id.* at 15 (“This is not a representative deployment model for OneWeb, which did not participate in the FCC's RDOF auction (Auction 904).”)

⁹⁷ *Id.* at 15-16.

as and rural and remote areas,”⁹⁸ it does not explain why these customers turn to NGSO systems for service in areas for which it is not well-suited. It is hard to understand, for example, why Mobile Network Operators would turn to NGSO services to supplement their offering in cities. Additionally, this is different than the description OneWeb gives in its website. There, OneWeb includes “rural schools and communities” as one of its key target markets.⁹⁹ Indeed, while OneWeb describes its proposed plan, it does not discuss any interest or demand corresponding to that plan on the part of customers with needs in urban areas. And finally, what OneWeb leaves unsaid is what it cannot say: that it expects to serve large concentrations of NGSO dishes in the nation’s cities.

The RKF Study was guided by what one NGSO licensee has revealed about its plans, not by an effort to gerrymander.¹⁰⁰ In fact, while it reasonably assumed heavier distribution of NGSO dishes in rural areas, the RKF Study was conservative in not excluding them from urban areas, too. Thus, for example, as RKF has explained: “RKF’s methodology currently assumes such a dense deployment of satellite terminals in metropolitan centers where RDOF funds were assigned, such as Chicago, San Francisco, and Baltimore, that deployments there may already exceed the capacity of SpaceX’s satellite system to support them while still offering a competitive level of service.”¹⁰¹ And the RKF Study is in fact conservative, since it has not discounted SpaceX’s “urban” service, even in urban areas where suitability to receive support under the Rural Digital Opportunity Fund has been questioned by the Commission.¹⁰²

Nor did the RKF study place 5G base stations exclusively in urban areas. In fact, “the study’s siting algorithm simulated 5G base stations covering more than 500 communities with fewer than 10,000 POPs, nearly 1,000 communities with fewer than 20,000 POPs, and more than 1,200 communities with fewer than 30,000 POPs.”¹⁰³ In sum, RKF did not force geographic separation on the model; it merely implemented the expected geographic targets of the two services.

⁹⁸ *Id.* at 16.

⁹⁹ Network, OneWeb, <https://oneweb.world/network> (“The technology behind our first LEO-only dual parabolic antennas integrates complex satellite communications technology into a simple UT design to meet specific needs for many different sectors including: small, medium and large enterprises; rural schools and communities; and major vertical sectors such as Maritime, Aviation, and Governments with mission critical applications.”) (last visited Aug. 29, 2021).

¹⁰⁰ SpaceX also disputes the 2.5 million NGSO terminals distributed by the RKF Study in the U.S as too low a number. SpaceX Reply Comments at 6. But analysts disagree. Cowen estimates that, once all satellites are launched, Starlink will be able to serve a total addressable market of at most 1.5 million users. Mike Dano, *Starlink’s Network Faces Significant Limitations, Analysts Find*, LightReading (Sept. 23, 2020), <https://www.lightreading.com/4g3gwifi/starlinks-network-faces-significant-limitations-analysts-find/d/d-id/764159>.

¹⁰¹ RKF Study at 9.

¹⁰² *See id.* at 3-4.

¹⁰³ Letter from David Marshack, RKF Engineering Solutions, LLC, to Marlene Dortch, FCC, WT Docket No. 20-443, at 2-3 (Aug. 9, 2021) (“RKF Ex Parte”).

Elevation angles. As for some commenters' charge that RKF did not take into account NGSO terminals receiving service at elevation angles below 25 degrees, that charge is hard to reconcile with the review of Starlink service concluding that the service is not of good quality even at low angles above 25 degrees.¹⁰⁴ RKF "seriously question[s] whether SpaceX would, in fact, use lower elevation angles for Starlink. Lower elevation angles imply more obstructions from buildings, trees, and other clutter, longer latency, and lower capacity."¹⁰⁵ To be sure, this charge is odd coming from SpaceX, which has itself set 25 degrees as the minimum elevation angle. SpaceX also claims that the distribution of elevation angles assumed by RKF—*i.e.*, RKF's assumption that most Starlink terminals will have look angles of between 55 and 85 degrees—is different than the actual distribution of elevation angles for its system.¹⁰⁶ But SpaceX's purported actual distribution unwittingly corroborates, rather than rebuts, RKF's point. First, the "actual" distribution shows that most elevation angles are higher than 55 degrees, and indeed 90 degree elevation angles occur at least as frequently as 85 degree angles. Second, if the "actual" distribution depicts the present or past, it reflects only a fraction of SpaceX's total 4,408 licensed satellites. Additional in-orbit satellites will naturally enable SpaceX to increase elevation angles even further. As RKF has put it, "SpaceX's distribution appears to reflect Starlink's present-day, less-than-fully-deployed system that is still in beta service."¹⁰⁷

And lower angles do not only mean worse service. They also mean less available capacity. At lower angles, the surface of the spot beam increases, which means that the same bandwidth is spread among more users. RKF estimates that "going from an average look angle of 45° to 25° could diminish capacity by 80%."¹⁰⁸ SpaceX does not explain how this loss of bandwidth could be reconciled with its commitment to an Nco of 1 and corresponding condition imposed on its authorization, under which SpaceX may not compensate for the capacity loss by marshalling additional beams to focus on the same area.¹⁰⁹

Interference threshold. Only two commenters suggest an alternative, which is both inappropriate and would not materially change the RKF Study's conclusions anyway. SpaceX and Boeing mention the 6 percent $\Delta T/T$ criterion, which translates into -12.3 dB, and which the Commission has applied to trigger measures for the avoidance of interference from one NGSO system into another.¹¹⁰ This is for good reason: the *NGSO Order* itself acknowledges the imperfection of the 6 percent $\Delta T/T$ standard and applies it only to the narrow case of intra-NGSO sharing: "[w]hile the Commission once found this long-term interference criterion to be unsuited for NGSO FSS sharing, based on the current record we conclude that this approach is

¹⁰⁴ See DISH Reply Comments at 20.

¹⁰⁵ RKF Ex Parte at 6.

¹⁰⁶ SpaceX Reply Comments at 8-9.

¹⁰⁷ RKF Ex Parte at 7.

¹⁰⁸ *Id.* at 7.

¹⁰⁹ See *id.*; Space Exploration Holdings, LLC Request for Modification of the Authorization for the SpaceX NGSO Satellite System, Order and Authorization and Order on Reconsideration, FCC- 21-48 ¶ 97(e) (Apr. 27, 2021).

¹¹⁰ Boeing Reply Comments at 8; SpaceX Reply Comments at 7-8.

the best method for characterizing the situations in which there is potential for interference between NGSO FSS systems.”¹¹¹ The criterion’s long-term horizon makes it particularly inappropriate for this case, as the Commission has always seen it as a placeholder, with the industry first needing to “gain[] experience in its implementation” before the Commission would “revisit our specific threshold for spectrum-splitting in light of the matured technical designs[.]”¹¹²

Unsurprisingly, while SpaceX accuses RKF of failing to offer justification for the interference-to-noise criterion, it does not itself justify why the $\Delta T/T$ standard is supposedly superior, confining itself to the age of the ITU recommendation and the fact that it was developed for interference from fixed, not mobile, services into NGSO constellations. This is hardly disqualifying: the most powerful terrestrial transmissions come from fixed base stations. As for mobile user equipment, the main difference from fixed equipment is irrelevant: mobile equipment generates transmissions from a large number of fixed locations and therefore generates a worse worst-case scenario. But this difference is relevant to the transmissions that need to be compared to the -8.5 dB standard to determine the potential for interference, not to the level of the standard itself.

And the few critiques of the threshold used by RKF are plain wrong: for example, RKF does not need to set forth the formula for calculating the -8.5 dB ratio, as suggested by Boeing,¹¹³ because the number is provided in the relevant ITU Recommendation, ITU-R SF.1006. In other words, RKF did not need to “calculate[] an aggregate interference-to-noise . . . ratio of -8.5 dB using the formula provided in Recommendation SF.1006,” as Boeing puts it.¹¹⁴ It is the Recommendation that determines the -8.5 dB threshold. And RKF did provide the formula for calculating the aggregate I/N ratio produced by the terrestrial transmissions for the purpose of comparing it against the -8.5 dB threshold.¹¹⁵

In any event, the difference between the two criteria is minimal. Even using the more restrictive 6% $\Delta T/T$ criterion, the RKF Study concludes that only about 1.1% of NGSO terminals would be faced with the potential for interference from higher-power two-way terrestrial transmissions.¹¹⁶ The same applies to the -129 dBm/MHz interference criterion “used for C-band earth station protection in the CBRs rules[.]”¹¹⁷ and favored by Google. As the Commission has explained, this criterion is based on an interference-to-noise limit of -12 dB.¹¹⁸

¹¹¹ Update to Parts 2 and 25 Concerning Non-Geostationary, Fixed-Satellite Service Systems and Related Matters, *Report and Order and Further Notice of Proposed Rulemaking*, 32 FCC Rcd. 7809, 7825 ¶ 49 (2017).

¹¹² *Id.*

¹¹³ Boeing Reply Comments at 8.

¹¹⁴ *Id.*

¹¹⁵ That formula is $N = 10 \cdot \log_{10}(kTB)$. RKF Study at 14.

¹¹⁶ RKF Study at 50.

¹¹⁷ Google Reply Comments at 12.

¹¹⁸ *3550-3650 MHz Band Second Order*, 31 FCC Rcd. at 5089 ¶ 266.

Again, under this criterion, only about 1.1% of NGSO terminals would experience even the potential for interference.

Google also incorrectly seeks to rely on the Commission’s recent analysis of sharing in the C-band, arguing that “co-channel sharing between mobile and FSS in the 12 GHz band is less feasible than in the C-band, where the Commission found it unworkable.”¹¹⁹ But the comparison of FSS operations in the 12 GHz band and the C-band is flawed for two key reasons.

First, unlike NGSO terminals, C-band earth stations are not frequency-agile, which means they cannot simply change to a different frequency if interference occurs. Although C-band earth stations are not dynamic, C-band operators nevertheless require some flexibility to manually change frequencies or manually change the pointing angle to a new GSO satellite if there is a transponder or satellite failure. This combination of circumstances led the Commission to determine that coexistence with terrestrial deployments is unworkable. Unlike the C-band, in the 12 GHz band NGSO terminals are frequency-agile, have at least 1500 MHz of alternate spectrum, are mostly serving unserved and underserved communities which are predominately located in rural areas, and are personal-use devices.

Second, the geographic distribution of C-band GSO antennas is markedly different than would be the case in the 12 GHz band. A large number of the 18,000 C-band antennas are located in urban areas. Most of these antennas are used to distribute programming to a large number of households and therefore require robust protection. By contrast, the distribution of NGSO antennas is more heterogeneous than would be the case for GSO antennas in the C-band. In particular, NGSO antennas in the 12 GHz band are more heavily weighted towards less densely populated areas of the United States than GSO antennas in the C-band.

III. AN AUCTION IS NOT SUPPORTED BY PRECEDENT AND WOULD DISSERVE THE PUBLIC INTEREST

The record here does not support an auction. Even usual proponents of auctions, such as Americans for Tax Reform, recognize that an auction would cause unwanted delay: “[o]pening the spectrum for auction under a new allocation would further delay deployment for any of the suggested technologies such as, fixed broadband, mobile and IoT.”¹²⁰ AT&T asks for an auction in the hope of receiving a payment from the auction proceeds to evacuate the band. But AT&T cannot leverage the C-band proceeding to assist in this attempt at remuneration. The crucial difference between the two proceedings is that, there, the incumbents wanted out; here, DISH, the largest user of the 12 GHz band, is seeking to double down. True, it appears that AT&T wants out, too, like the C-band incumbents. But, even if the Commission were to apply the logic of the C-band proceeding to AT&T’s hoped-for exit, AT&T’s entitlement to compensation would be limited. AT&T’s current use of the 12 GHz band is minimal. Largely, DIRECTV serves its customers 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.

¹¹⁹ Google Reply Comments at 10.

¹²⁰ Americans for Tax Reform Reply Comments at 2.

A re-auction is also precluded by Commission precedent. In fact, the Commission has rejected auctions in a much more comparable proceeding, where AT&T was holding the terrestrial licenses in question—the WCS licenses. There, Sirius XM argued that the Commission was required to hold a new auction because the revised technical rules would give WCS licensees enhanced spectrum rights. The Commission soundly rejected this premise. The Commission’s words are worth quoting at some length: “On balance, we believe that the public interest is better served here by applying the new performance requirements to the incumbent WCS licensees, within a more flexible technical regime, rather than attempting to displace the existing pool of WCS licensees or otherwise to restructure license assignments in order to license new spectrum rights by auction Accordingly, we disagree with Sirius XM's contention that we are required to auction new spectrum licenses simply because the revised technical rules afford WCS licensees enhanced spectrum rights.”¹²¹ The WCS proceeding is an instructive guide for the Commission here, as the only differences militate more strongly against an auction in this proceeding: AT&T’s licenses were not acquired at auction, while the MVDDS licenses were; and AT&T ended up selling its rights to the spectrum, while DISH and the MVDDS licenses want to build it out for robust terrestrial services.

As for T-Mobile, it would also like the 12 GHz band to be seized by one of the three large carriers, in contravention of the encouragement President Biden recently issued to the Commission to limit the eligibility of large incumbent carriers for new licenses in order “to help avoid excessive concentration of spectrum license holdings in the United States[.]”¹²²

In any event, there is no initial license *to* auction without improperly doing away with the existing, and duly auctioned, licenses for that spectrum. Permitting MVDDS licensees to provide two-way, flexible use broadband service would not be “tantamount to an entirely new allocation.”¹²³ Far from the sea change AT&T and T-Mobile allege,¹²⁴ two-way, mobile use by MVDDS licenses is neither unreasonable nor unanticipated. The Commission has acknowledged the possibility of robust terrestrial service by MVDDS licensees since the inception of the MVDDS service rules.¹²⁵ The 12 GHz band is also allocated to terrestrial mobile service internationally, with mobile service has co-primary status for most of the spectrum in most of the world, including all of Region 2, meaning a mobile authorization for terrestrial licensees was at the least foreseeable, if not expected. And neither T-Mobile nor AT&T accounts for the delay of an auction process.

¹²¹ *WCS Order*, 25 FCC Rcd. at 11790-91 ¶ 196 n.483.

¹²² Promoting Competition in the American Economy, Exec. Order No. 14036, 86 Fed. Reg. 36987, 36994 § 5(l)(ii) (July 9, 2021).

¹²³ AT&T Reply Comments at 32.

¹²⁴ *See id.* at 33; T-Mobile Reply Comments at 9.

¹²⁵ DISH Reply Comments at 6; *see* 47 C.F.R. § 101.1407 (“Two-way services may be provided by using other spectrum or media for the return or upstream path.”).

IV. A FURTHER NPRM IS NOT REQUIRED

AT&T contends that the 12 GHz NPRM is essentially a Notice of Inquiry, and that a further NPRM must therefore be issued.¹²⁶ This administrative paralysis is not required by the APA, however, because the Commission has done more than enough to allow moving forward with new rules. Under the APA, an agency's notice must include "either the terms or substance of the proposed rule *or* a description of the subjects and issues involved."¹²⁷ Under D.C. Circuit precedent, the final rules adopted by the agency must be a "logical outgrowth" of the notice.¹²⁸ A notice "satisfies the logical outgrowth test if it expressly ask[s] for comments on a particular issue or otherwise ma[kes] clear that the agency [is] contemplating a particular change."¹²⁹

The 12 GHz NPRM handily satisfies these criteria. The proceeding stems from the MVDDS 5G Coalition's petition to permit such use by MVDDS licenses, and the record focuses extensively on discussing the merits and viability of that proposal. The second paragraph of the NPRM specifically seeks comment on "whether the Commission could add a new or expanded terrestrial Mobile allocation in the 12 GHz band without causing harmful interference to incumbent licensees . . . while protecting incumbent operations from harmful interference . . ." ¹³⁰ Far from "*untested via exposure to diverse public comment*,"¹³¹ the record contains input from a broad range of stakeholders and extensive discussion on this proposal, as well as interference and co-existence studies that set forth technical criteria on whether sharing is feasible and the effect that such operations will have on existing licensees.¹³² AT&T and Microsoft know well what they are opposing when AT&T writes that "the Commission has unequivocally—and repeatedly—stated that this proceeding is 'focused on protecting incumbent licensees from harmful interference[,]'"¹³³ and when Microsoft writes that "none of the regulatory approaches outlined in the NPRM would adequately address the twin challenges of protecting existing NGSO FSS operators from harmful interference while facilitating a meaningful 12 GHz terrestrial service."¹³⁴ Simply stated, they are on notice, and shall not be heard complaining about a supposed lack of it.

¹²⁶ AT&T Reply Comments at 34.

¹²⁷ 5 U.S.C. § 553(b)(3) (emphasis added). The proffering of "terms or substance of a proposed rule" is sufficient to provide sufficient notice under the APA, but not required; the Commission may also satisfy this obligation by presenting "a description of the subjects and issues involved." *Id.*

¹²⁸ *First Am. Discount Corp. v. Commodity Futures Trading Comm'n*, 222 F.3d 1008, 1015 (D.C. Cir. 2000).

¹²⁹ *U.S. Telecom Ass'n v. FCC*, 825 F.3d 674, 700 (D.C. Cir. 2016) (internal quotation omitted).

¹³⁰ *12 GHz NPRM*, 36 FCC Rcd. at 607 ¶ 2.

¹³¹ Microsoft Reply Comments at 6 (internal quotation omitted).

¹³² *See* DISH Reply Comments at 1-4.

¹³³ Comments of AT&T Services, Inc., WT Docket No. 20-443, GN Docket No. 17-183, at 2 (May 7, 2021).

¹³⁴ Comments of Microsoft Corporation, WT Docket No. 20-443, GN Docket No. 17-183, at 3 (May 7, 2021).

V. THE COMMISSION SHOULD NOT DELAY THIS PROCEEDING BASED ON INDIVIDUAL LICENSING ISSUES

The Commission should not defer a rulemaking order pending the evaluation of MVDDS substantial service showings. The two are unrelated to one another. The wisdom of opening up the band for 5G does not depend on whether a particular MVDDS licensee has offered substantial service to the public. Conversely, the evaluation of whether an MVDDS licensee offered substantial service to the public before this rulemaking even commenced is not affected by the decision to allow two-way higher power terrestrial services in the band going forward. And surely, even AT&T cannot argue that no MVDDS licensee has met the substantial service milestone. Certainly, DISH has done so.

An account of the WCS history is instructive. AT&T had a stake in the WCS band nearly since it was created by the Commission in 1997.¹³⁵ The first problem for the WCS band's buildout was that it took ten years (from 1997 to 2007) for the Commission to start removing obstacles that, in AT&T's own words, had "hindered WCS equipment development, network design, and facility deployment."¹³⁶ AT&T also argued an extension was necessary because of "circumstances [that] are beyond the WSC licensees' control."¹³⁷ The Commission then granted a three-year extension, until July 2010, in part because "relatively restrictive [out of band emission] limits may have impeded the development of WCS equipment . . ."¹³⁸

It was only in 2010, with the three-year deadline approaching, that the Commission adopted new service rules for WCS, to enable licensees to provide mobile broadband services in the band (including "to individuals residing in rural and underserved areas of the United States") by among other things, relaxing out of band emission attenuation required for WCS customer

¹³⁵ See Public Notice, WCS Auction Closes: Winning Bidders in the Auction of 128 Communications Service Licenses, 12 FCC Rcd. 21653 (1997). Comcast assigned some of its WCS spectrum to AT&T in 2000. See Application of Comcast Corporation and AT&T Inc., Public Interest Showing, ULS File No. 0005301644 (filed Aug. 1, 2012). AT&T acquired all of the WCS spectrum licenses in 2012. Applications of AT&T Mobility Spectrum LLC et al., for Consent to Assign and Transfer Licenses, *Memorandum Opinion and Order*, 27 FCC Rcd. 16459 (2012).

¹³⁶ See Consolidated Request of the WCS Coalition for Limited Waiver of Construction Deadline for 132 WCS Licenses, *Order*, 21 FCC Rcd. 14134, 14137 ¶ 5 (2006).

¹³⁷ *Id.* at 14137 ¶ 6.

¹³⁸ *Id.* at 14139 ¶ 10, 14141 ¶ 13. Satellite radio interests had opposed the extension on grounds that the difficulties faced by the WCS licensees were known at the time they obtained the licenses, that regulatory risk is inherent in the rulemaking process, and that WCS licensees were aware of the requirements when they bid on the licenses. *Id.* at 14138-39 ¶ 8. In granting the extension, the Commission found that "WCS licensees have demonstrated that they face factors beyond their control that have limited their options in providing service, but that new technology solutions may be available in the near future" and that "limited deployment attempts using available equipment have been marred by technical problems or proved to be economically infeasible." *Id.* at 14139 ¶ 9-10.

premises equipment (CPE),¹³⁹ and moving the buildout deadline to September 2016.¹⁴⁰ The deadline was further extended—twice—to September 2019,¹⁴¹ and then finally until September 2021.¹⁴² By 2017, the Commission noted that the WCS band had “remained underutilized for nearly 20 years[.]”¹⁴³ AT&T promised that, this time, it would build a “smart grid” using the band.¹⁴⁴ But it was too late: in September 2020, AT&T finally gave up and requested that it be allowed to assign its WCS licenses to Sirius XM, partly on account of obstacles to broadband deployment, which were removed too late by the Commission.¹⁴⁵

Moreover, AT&T is trying to piggyback on the sideshow that SpaceX has tried to create—an unsuccessful sting operation launched by SpaceX to probe into the marketing of DISH’s MVDDS service. SpaceX’s agents tried to press the DISH representatives to state the service is not attractive. For example, they eventually asked the DISH representative to “acknowledge” that the MVDDS antennas would make the house look like “Mickey Mouse.” Yet, despite the questionable tactics, the operation produced evidence that DISH lived up to its promises and process: service availability is confirmed based on the prospective customer’s address. DISH’s customer service agents then contact customers who are interested in MVDDS service to discuss a potential installation of equipment with the customer. DISH will offer to conduct a site survey to verify line of sight at the customer’s address. While SpaceX accuses DISH of requiring a site survey, what goes unmentioned is that the survey is free, and that none of SpaceX’s operatives appear to have taken advantage of it. And, as SpaceX acknowledged, its undercover agents did in fact “receive[] follow up calls from DISH representatives[.]”¹⁴⁶

¹³⁹ Amendment of Part 27 of the Commission's Rules to Govern the Operation of Wireless Communications Services in the 2.3 GHz Band, *Report and Order and Second Report and Order*, 25 FCC Rcd 11710, 11724 ¶ 31, 11726 ¶ 36 (2010).

¹⁴⁰ *Id.* at 11791 ¶ 197.

¹⁴¹ Amendment of Part 27 of the Commission’s Rules to Govern the Operation of Wireless Communications Services in the 2.3 GHz Band, *Order on Reconsideration*, 27 FCC Rcd. 13651, 13700 ¶ 121 (2012).

¹⁴² See AT&T Mobility Spectrum LLC et al. Petition for Limited Waiver of Interim Performance Requirements for 2.3 GHz WCS C and D Block Licenses, *Order*, 32 FCC Rcd. 708, 716 ¶ 20 (2017).

¹⁴³ *Id.* at 713 ¶ 11.

¹⁴⁴ *Id.* at 711 ¶ 8.

¹⁴⁵ See Request for Waiver of AT&T Mobility Spectrum LLC, Call Sign No. KNLB270, ULS File No. 0009220788 (received Sept. 14, 2020) (“AT&T Waiver Request”). The Bureau consented to the assignment in January 2021. See Assignment of Authorization of Sirius XM Radio, Inc., ULS File No. 0009368523 (received Jan. 15, 2021).

¹⁴⁶ Comments of Space Exploration Holdings, LLC, WT Docket No. 20-443, GN Docket No. 17-183, at 11 (May 7, 2021).

VI. SECTION 316 DOES NOT BAR THE COMMISSION FROM ADDING A MOBILE ALLOCATION TO THE 12 GHZ BAND

A mobile allocation would not modify the NGSO operators' licenses under Section 316 of the Communications Act.¹⁴⁷ TechFreedom cites to the D.C. Circuit's general description of Section 316 in *PSSI Global* but omits how the court actually applied the statute.¹⁴⁸ As the D.C. Circuit explained, "[b]ecause the potential for new interference reflects at most a minor disruption to PSSI's business, the FCC did not impermissibly modify its licenses."¹⁴⁹ TechFreedom claims that allowing a mobile allocation in the 12 GHz band would result in "debilitating" interference.¹⁵⁰ But that is wrong, as the RKF study demonstrates.¹⁵¹ Instead, any interference would be minor at most and easily addressable with coordination. Additionally, the licenses for NGSO operators are already *conditioned* on the outcome of 12 GHz proceeding.¹⁵² And the Commission already dealt with almost the exact same objection when it updated the service rules for the WCS band—Sirius XM objected that the new rules would cause interference, therefore constituting an improper modification of its license under Section 316.¹⁵³ The Commission first emphasized that its rule changes were tailored to avoid harmful interference. The Commission next explained that, in any case, "Section 316 of the Act provides for an adjudication process before the Commission may modify a particular license. That provision, however, does not deprive the Commission of its authority to establish rules of general applicability to an industry through its notice-and-comment rulemaking authority."¹⁵⁴

VII. SECTION 303 ALLOWS THE COMMISSION TO CONFORM THE ALLOCATION OF THE BAND TO THE INTERNATIONAL TABLE OF ALLOCATIONS

TechFreedom reads Section 303(y) as imposing a higher bar on a new allocation than the language or precedent support.¹⁵⁵ TechFreedom is incorrect in three ways. First, as discussed, its dismissal of the probabilistic nature of the RKF study as gambling shows ignorance of the state of electrical engineering science, as well as the Commission's adherence to it. Indeed, TechFreedom does not specify what kind of analysis would, in its view, pass muster. In the

¹⁴⁷ *Cellco P'ship v. FCC*, 700 F.3d 534, 543 (D.C. Cir. 2012) ("Verizon is right that the Commission's section 316 power to 'modif[y]' existing licenses does not enable it to fundamentally change those licenses.").

¹⁴⁸ TechFreedom Reply Comments at 8.

¹⁴⁹ *PSSI Glob. Servs., L.L.C. v. FCC*, 983 F.3d 1, 10 (D.C. Cir. 2020)

¹⁵⁰ TechFreedom Reply Comments at 8.

¹⁵¹ See generally RKF Study.

¹⁵² DISH Comments at 58-59.

¹⁵³ *WCS Order*, 25 FCC Rcd. at 11773 ¶ 155.

¹⁵⁴ *Id.* at 11773 ¶ 156.

¹⁵⁵ TechFreedom cites to 303(y)(B) and 303(y)(C). TechFreedom Reply Comments at 2. This is erroneous; the citations should be 303(y)(2)(B) and 303(y)(2)(C).

AWS-4 proceeding, the Commission found that a minimum level of interference does not constitute harmful interference under Section 303(y)(2)(C).¹⁵⁶ And in other proceedings, the Commission has resolved the Section 303(y) analysis in a single paragraph.¹⁵⁷ As the D.C. Circuit recognized in its review of the C-band Order, “nothing in [Section 303(y)] bars the FCC from reducing harmful interference by reconfiguring the frequency band assigned to incumbent licensees.”¹⁵⁸

Second, DISH and other parties have shown that allowing mobile use in the 12 GHz band would create an incentive for innovation and investment as envisioned by Section 303(y)(2)(B).¹⁵⁹

Third, TechFreedom turns the Section 303(y)(1) requirement of consistency with international agreements on its head: it is the *lack* of a Mobile Service allocation that is not consistent with international agreements to which the United States is a party—the Constitution and Convention of the International Telecommunications Union—under which the International Table of Allocations has been promulgated; and it is the addition of the allocation that would harmonize U.S. and international rules.¹⁶⁰ Contrary to TechFreedom’s claims, the 3GPP status of the band is irrelevant as the United States is not, and cannot, be a party to any 3GPP agreement within the meaning of Section 303(y)(1).

VIII. SPACEX’S 12 GHZ FLEXIBILITY WILL REMAIN CONSTRAINED BY THE NEED TO PROTECT DBS, NOT 5G TERRESTRIAL OPERATIONS

SpaceX alleges that DISH “on one hand alleg[es] in a separate proceeding that the constraints on NGSOs in the 12 GHz Band are so tight that SpaceX could not even provide a

¹⁵⁶ *2012 AWS Order*, 27 FCC Rcd. at 16188 ¶ 226 (“Further, the flexibility we are permitting will itself provide licensees with the ability to adjust their operations to minimize any interference that might occur. Our technical rules for the AWS-4 band will permit licensees to provide a wide variety of services in these bands with a minimum of interference, and will permit both in-band (if any) and adjacent-band licensees to operate with sufficient certainty and clarity regarding their rights and responsibilities. Because we are adopting technical restrictions to protect other spectrum users, this proposal will not result in harmful interference.”) (footnotes omitted).

¹⁵⁷ *See, e.g., 900 MHz Band Order*, 35 FCC Rcd. at 5232 ¶ 120 (“We find that these changes to the Table of Allocations are consistent with the Commission’s authority under section 303(y) of the Communications Act. First, as required by section 303(y)(1), flexible use of the 900 MHz band is consistent with applicable international agreements. Such use would remain subject to bilateral discussions commonly undertaken whenever spectrum is put to use in border areas. Second, as required by section 303(y)(2), after notice and comment, we find that flexible use: (1) is in the public interest, (2) will stimulate investment in broadband, and (3) would not result in harmful interference. Replacing the Land Mobile Service allocation with a Mobile Except Aeronautical Mobile Service allocation in the broadband segment will promote innovation and investment in new wireless technologies, while preserving incumbent narrowband uses.”).

¹⁵⁸ *PSSI Glob. Servs., L.L.C.*, 983 F.3d at 9.

¹⁵⁹ *See, e.g., DISH Comments* at 27; *RS Access Comments* at 5-13; *CCA Comments* at 2-3.

¹⁶⁰ 47 U.S.C. 303(y)(1).

quality service, but on the other hand, alleg[es] that maintaining those same rules amounts to unconstrained access to the band.”¹⁶¹ In fact, there is no inconsistency.

As DISH has demonstrated, there is “detailed engineering evidence showing both that the proposed modification would adversely affect reception at DBS consumer dishes and that the system as modified would exceed the applicable power limits under International Telecommunication Union and Commission rules.”¹⁶² In other words, SpaceX would not be able to use the 12 GHz band to meet its Rural Digital Opportunity Fund obligations if such service interferes with DBS operations.¹⁶³ But SpaceX’s duty to protect DBS has nothing to do with any impairment of SpaceX’s service due to the introduction of higher-power two-way terrestrial services in the band.

IX. CONCLUSION

Only the proponents of opening up the 12 GHz band to higher-power two-way terrestrial services have submitted in the record studies showing that sharing the band is feasible. The record is devoid of studies disputing that conclusion.

Respectfully submitted,

/s/ Pantelis Michalopoulos
Pantelis Michalopoulos
Counsel to DISH Network Corporation

CC: Acting Chairwoman Jesscia Rosenworcel
Commissioner Brendan Carr
Commissioner Geoffrey Starks
Commissioner Nathan Simington

¹⁶¹ SpaceX Reply Comments at 21 (footnote omitted).

¹⁶² See Partial Opposition of DISH Network Corporation, WC Docket No. 09-197, at 5 (Feb. 22, 2021) (“ETC Opposition”); see also Letter from Jeffrey Blum, DISH, to Marlene Dortch, FCC, IBFS File No. SAT-MOD20200417-00037; WT Docket No. 20-443 (Feb. 15, 2021).

¹⁶³ ETC Opposition at 5.