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November 8, 2017

VIA ELECTRONIC FILING

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: ViaSat, Inc., Notice of *Ex Parte* Presentation, GN Docket No. 14-177; IB
Docket Nos. 15-256 & 97-95; RM-11664; and WT Docket No. 10-112

Dear Ms. Dortch:

On November 7, 2017, Christopher J. Murphy,¹ Associate General Counsel, Regulatory Affairs, ViaSat, Inc. (“ViaSat”), Amy Mehlman, President, Mehlman Capitol Strategies, Inc., and the undersigned participated in a meeting with the Intentional Bureau, Wireless Telecommunications Bureau, and Office of Engineering and Technology representatives listed on Exhibit 1.

In the meeting, ViaSat:

- Indicated its general support for the *Draft Order*,² including the recognition that greater potential exists for successfully sharing the 27.5-28.35 GHz, 37.5-40 GHz and 47.2-48.2 GHz band segments when earth station deployments are designed to facilitate shared spectrum use, consistent with previous technical analysis that ViaSat has provided in this proceeding.
- Explained why access to spectrum for gateway-type earth stations is critical, as further detailed below.

¹ Participating via teleconference.

² *Use of Spectrum Bands Above 24 GHz For Mobile Radio Services; et al.*, Second Report and Order, Second Further Notice of Proposed Rulemaking, Order on Reconsideration, and Memorandum Opinion and Order [*as circulated*], GN Docket No. 14-177, *et al.*; FCCCIRC1711-02 (circ. Oct. 26, 2017) (“*Draft Order*”).

- Proposed a surgical change to revised Section 25.136 in the *Draft Order*, as reflected on Exhibit 2, in order to facilitate the deployment of gateway-type earth stations that are designed to share spectrum.
- Supported the proposal to retain the longstanding terms on which satellite operators may use the 40-42 GHz and 48.2-50.2 GHz core satellite band segments.
- Explained that a recent claim that spectrum sharing in the 37.5-40 GHz band would somehow impair the growth prospects for terrestrial mobile services³ is both unsubstantiated and based on statements made over eighteen months ago that relied on incorrect premises and that since have been rebutted by detailed technical analyses.⁴

The ability to deploy gateway-type earth stations in the 37.5-40 GHz, 47.2-48.2 GHz, and 27.5-28.35 GHz band segments is critical to enable the operation of space stations with sufficient capacity to provide nationwide broadband service to homes, businesses, and government users, and to offer continuous connectivity to cars, aircraft, and trains, in urban areas and the most remote parts of the nation. Such spacecraft can connect individuals, as well as entire communities that otherwise would be left behind, with urban-comparable service and pricing.

The amount of spectrum available for such satellites determines the quantity and quality of broadband services that actually can be made available. A proxy for satellite capacity is the total bandwidth of a satellite's gateway earth stations that aggregate and connect end-user traffic to the internet. The total gateway bandwidth can be calculated by multiplying the number of

³ See, e.g., Verizon, *Ex Parte* Submission, GN Docket No. 14-177, *et al.*, at 2 (filed Nov. 3, 2017) (providing notice of meetings with legal advisors for Chairman Pai and Commissioner Clyburn and citing *Use of Spectrum Bands Above 24 GHz for Mobile Radio Services*, Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd 8014 at ¶ 91 (2016) (“*Spectrum Frontiers Order*”); see also Verizon *Ex Parte* Submissions, GN Docket No. 14-177, *et al.*, at 2 (filed Nov. 6, 2017) (in connection with meetings with advisors for Commissioners O’Rielly, Rosenworcel and Carr).

⁴ See ViaSat, Inc., *Ex Parte* Submission Responding to Inmarsat, SES and O3b, GN Docket No. 14-177, *et al.*, at 4 & n.10 (filed Oct. 18, 2017) (explaining that the submission referenced in paragraphs 90 and 91 of the *Spectrum Frontiers Order* regarding earth station compatibility is not valid because it was based on assumptions about 5G network parameters that are considerably different than the parameters that since have been identified as relevant for purposes of conducting compatibility analyses, including (i) previously assuming the operations of 5G base stations at power levels that were over 200 times higher, and (ii) previously assuming earth station receiver noise floor levels that were at least 2.5 dB more sensitive); see also ViaSat, Inc., *Ex Parte* Submission, GN Docket No. 14-177, *et al.*, at Attachment, “Fixed-Satellite Service Earth Station Receiver and 5G Coexistence (including Ground Mount Antennas)” (filed Oct. 18, 2017).

gateways by the bandwidth (spectrum) available for each gateway. This is why ViaSat has made significant R&D investments to drive down gateway size, footprint and cost, and ensure compatibility with 5G applications in millimeter wave frequencies—to enable the deployment of suitable numbers of gateways in shared bands.⁵ Doing so also enables the location of gateways as close to existing fiber networks as possible; moreover, it facilitates the efficient construction of additional fiber facilities where needed to provide connectivity to the internet.

Significantly, to achieve the required capacity of next-generation satellites, the satellite industry needs to deploy gateways across many different types of PEAs—those that contain one or two counties, and those that contain many more counties. While the numerical limits proposed in the *Draft Order* would allow up to 15 protected earth stations in many PEAs, those limits would allow *the entire satellite industry* to deploy only three such earth stations in large “one-county” PEAs, such as Phoenix, Arizona; El Paso, Texas; San Diego, California; and Madison, Wisconsin. Similarly, those limits would allow the entire satellite industry to deploy only six such earth stations in large “two county” PEAs, such as Buffalo, New York; Cape Coral, Florida; Colombia, South Carolina; Wichita, Kansas; Albuquerque, New Mexico; and Colorado Springs, Colorado.

The change to Section 25.136 proposed in Exhibit 2 is intended to allow the deployment of additional “zero impact” earth stations on a protected basis, regardless of the numerical earth station limits otherwise applicable in a given county or PEA. Such zero impact earth stations would be defined as those having a “potential interference zone”⁶ that is *contained entirely within an area within the control of the earth licensee*, and that otherwise does not cover any population or any major event venue, urban mass transit route, passenger railroad, cruise ship port, or road type specified in that rule. Notably, that zone would be established by using the same clearly-defined technical parameters established last summer that define the relevant boundary for all interested parties: the geographic area within which an earth station generates a power flux density (PFD), at 10 meters above ground level, of no more than -77.6 dBm/m²/MHz.⁷

The existence of suitable earth station licensee control over the zero impact zone would be established in the usual earth station application process contemplated by Section 25.136. Thus, such zero impact earth stations would not impair 5G deployment, and the circumstances

⁵ See Transcript of FY18 Q1 Results Earnings Call, ViaSat, Inc. (Aug. 8, 2017), available at <https://seekingalpha.com/article/4096690-viasat-vs-2018-results-earnings-calltranscript>. See also ViaSat, Inc., Notice of *Ex Parte* Presentation, GN Docket No. 14-177, *et al.*, Attachment B at 2 (filed Sept. 25, 2017) (discussing Shannon capacity limits and satellite infrastructure and spectrum requirements).

⁶ *Draft Order*, n.278 (“The Commission defined the permissible interference zone as the contour within which all the FSS licensees at a given location would, in the aggregate, generate a power flux density (PFD), at 10 meters above ground level, of no more than -77.6 dBm/m²/MHz.”)

⁷ See *id.*; see also *id.* at Appendix A, 25.136(d)(4)(ii).

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under which such earth stations could be licensed would be a function of the earth station licensee employing appropriate engineering, coupled with the construction of a wall or fence or holding real estate rights that encompass “potential interference zones,” depending on the requirements of the individual earth station at issue. This approach thus is scalable for various types of earth stations.

The other changes to the *Draft Order* reflected on Exhibit 2 are intended to allow the proposed conclusions to be reached in the specified paragraphs without making overbroad and unnecessary factual assertions.

Copies of this letter are being provided to the individuals listed in Exhibit 1. Please contact us if you have any questions regarding this submission.

Respectfully submitted,

/s/

John P. Janka
Elizabeth R. Park

cc: Rachael Bender
Louis Peraertz
Erin McGrath
Kevin Holmes
Umair Javed

Exhibit 1

Office of Engineering and Technology

Julius Knapp

Jamison Prime (via teleconference)

Michael Ha

Bahman Badipour

Nicholas Oros

International Bureau

Thomas Sullivan

Jennifer Gilsenan

Robert Nelson

Jose Albuquerque

Chip Fleming

Diane Garfield

Wireless Telecommunications Bureau

Charles Oliver

John Schauble

Exhibit 2

Proposed Revisions to Draft Second Report and Order in Spectrum Frontiers

A. Proposed Revision to Section 25.136(d)(4)(i):

(4) The applicant demonstrates compliance with all of the following criteria in its application:

(i) There are no more than two other authorized earth stations operating in the 47.2-48.2 GHz band within the county where the proposed earth station is located that meet the criteria contained in paragraphs (d)(1), (d)(2), (d)(3) or (d)(4) of this section, and there are no more than 14 other authorized earth stations operating in the 47.2-48.2 GHz band within the Partial Economic Area where the proposed earth station is located that meet the criteria contained in paragraphs (d)(1), (d)(2), (d)(3) or (d)(4) of this section. For purposes of this requirement, (x) multiple earth stations that are collocated with or at a location contiguous to each other shall be considered as one earth station and (y) no earth station that generates a power flux density (PFD), at 10 meters above ground level, of greater than or equal to -77.6 dBm/m²/MHz, entirely within an area that is under the control of the licensee of such earth station, shall be subject to these numerical limits within a given county or a given Partial Economic Area;

Rationale:

In cases where the “permissible interference zone” described in footnote 278 of the draft order would exist entirely within an area that is under the control of the earth station licensee (whether because of construction of a wall or fence, the holding of property rights, or otherwise) there would be no need to impair the continued operation of that earth station. Allowing this type of a deployment would be particularly helpful in cases, such as PEAs with fewer than five counties, where the numerical limits otherwise would not allow the deployment of 15 protected earth stations in that PEA. Notably, this change would not affect UMFUS deployment in any areas outside the control of the earth station licensee.

B. Proposed Revision to Draft Paragraph 121:

On the other hand, we conclude that for smaller markets, relaxing the 0.1 percent population metric is consistent with the Commission’s goal of creating meaningful, targeted opportunities to deploy additional FSS earth stations without harming terrestrial operations.³⁰⁸ Maintaining the 0.1 percent limit in smaller markets could make it more difficult for FSS operators to site earth stations in those markets, ~~which could drive earth station siting towards more heavily populated places and centers of commercial activity.~~³⁰⁹ In contrast, relaxing the 0.1 percent limit in smaller markets would provide ~~is more consistent with our goal of providing~~ targeted opportunities for siting earth stations in such more remote, less densely populated areas.³¹⁰

Rationale:

In last year's Spectrum Frontiers Order, the Commission acknowledged the need for satellite operators to deploy gateway earth stations in a wide range of locations, including in and near urban areas where end users and fiber facilities are located. The Commission expressly rejected proposals to relegate earth station deployment to rural and remote areas. Thus, the sharing framework adopted affords the ability to locate earth stations near population centers. See Spectrum Frontiers Order at ¶ 60. Consistent with those determinations, language suggesting that the Commission is promoting or prioritizing rural deployment of earth stations should be removed.

C. Proposed Revision to Draft Paragraphs 212-213:

212. Discussion. We ~~decline to allow find that allowing~~ satellite earth stations in the 37.5-40 GHz band ~~on an opportunistic basis at this time. has the potential to result in a negative customer experience for satellite broadband consumers. It is true that no earth stations in the 37.5-40 GHz band will generate any direct interference because earth stations operate in a receive-only mode in that band, where satellite operations are authorized only in a space-to-Earth mode. In general, however, consumer earth stations tend to need stronger satellite signals than larger, more sophisticated gateway earth stations. We have denied Boeing's request for increased power levels at this time, but Boeing could renew its request. If we allowed satellite user equipment to use 37.5-40 GHz on an opportunistic basis, but the buildout of terrestrial systems eventually required FSS operators to relinquish their use of channels below 40 GHz, customers could experience a reduction in service quality. We do not agree with Boeing's argument that consumers could simply narrow their usage to bands above 40 GHz, where satellite is primary.⁵⁸² If it is true, as Boeing argues, that additional bandwidth below 40 GHz is necessary to provide adequate high-speed Internet service to consumers,⁵⁸³ then surely those same consumers would experience a decline in the quality of their services if they were required to relinquish those channels. Alternatively, if those consumers would not experience a decline in the quality of their service upon relinquishing channels below 40 GHz, the implication is that those channels are not necessary for the delivery of high-quality satellite service.~~

213. We agree with Boeing that satellites could complement terrestrial services by providing assured coverage to rural areas, and we acknowledge that mmW mobile services will likely appear first in high-traffic areas. Recent developments, however, suggest that the same technologies that will support non-line-of-sight service to mobile users over short distances will also be able to support non-line-of-sight service to fixed users over longer distances. For example, Starry says that it can provide fixed mmW service to consumers at distances up to 1 kilometer.⁵⁸⁴ However, we find that FSS proponents have not met their burden of demonstrating that allowing satellite end user devices in 37.5-40 GHz is necessary and appropriate at this time. FSS will retain the 40-42 GHz band where satellite end user devices can be located without restriction. In addition, FSS can use the 37.5-40 GHz band for a limited number of individually licensed earth stations. We believe this framework promotes efficient spectrum use while providing both UMFUS and FSS with the opportunity to provide service.

Rationale:

Many of the reasons identified for denying broad authority for satellite user equipment to use 37.5-40 GHz on an opportunistic basis are not accurate in all cases. As ViaSat has indicated throughout this proceeding, its small gateways and its user terminals will be capable of operating with satellite downlinks that are within the current downlink pfd limit. Moreover, the use of spectrum on a secondary basis for additional capacity when and where such spectrum is available could be used in a variety of ways that would not result in a reduction in quality should a given terminal be required to switch to another frequency band.

D. Proposed Revision to Draft Footnote 277:

²⁷⁷ *R&O*, 31 FCC Rcd at 8037, para.58. The Commission encouraged UMFUS licensees to be flexible in providing certainty to the operation of secondary FSS earth stations in areas where they do not intend to deploy terrestrial services, but emphasized that FSS earth stations deployed on a secondary basis will otherwise have no expectation of interfering rights and will have to cease operation if requested by UMFUS licensees at any time on the basis of harmful interference to their services. *Id.*

Rationale:

Clarify that this language references the Spectrum Frontiers Order provision that FSS earth stations may continue to be authorized without protection on a secondary basis, and does not apply to earth stations authorized on a protected basis under Section 25.136.