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September 9, 2016

VIA ELECTRONIC FILING IN IBFS

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

Re: ViaSat, Inc., IBFS File No. SAT-MOD-20160527-00053, Call Sign S2902

Dear Ms. Dortch:

ViaSat, Inc. ("ViaSat") responds to the Commission's request dated August 15, 2016 for additional information regarding the above-referenced application seeking to modify its grant of U.S. market access for the ViaSat-2 satellite at the 69.9º W.L. orbital location to add the 27.5-28.1 GHz and 17.7-18.3 GHz frequencies. The attached Attachment A provides the technical information and analyses requested.

If you have any questions regarding this submission, please contact the undersigned.

Respectfully submitted,

/s/

John P. Janka
Elizabeth R. Park

Attachment

cc: Jose Albuquerque
Stephen Duall
Alyssa Roberts

ATTACHMENT A

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Engineering Analysis and Supporting Technical Information

REQUEST ONE: *For the frequency band 17.7-17.8 GHz (space-to-Earth) please provide the predicted transmitting antenna off-axis gain information specified in Section 25.264(a) of the Commission's rules, 47 CFR § 25.264(a). In addition, please perform the power flux-density (pfd) calculations based upon this off-axis antenna gain information as specified in Section 25.264(b) and identify each prior-filed U.S. Direct Broadcast Satellite (DBS) space station at whose location the coordination threshold pfd level of -117 dBW/m^2/100 kHz is exceeded. Although ViaSat considers the 61.5º W.L. ITU Region 2 Broadcasting-Satellite Service (BSS) Plan location in its application, its pfd calculations must take into account all prior-filed U.S. DBS space stations as defined in Section 25.264(b)(1).*

Figures 1 and 2 below provide the requested transmitting off-axis gain information for the A type and B type spot beams. The beams are circular and symmetric about the Z axis.

In addition to the 61.7° W.L. orbital position considered in ViaSat's technical annex, two other DBS networks that use the 17.7-17.8 GHz band segment and that have U.S. market access are operated within the vicinity of the nominal 70° W.L. orbital location: NIMIQ 5 at 71.7° W.L., and Quetsat at 77.0° W.L. The geocentric angle between ViaSat-2 at 69.9° W.L. and each of the former locations is 8.1°, 1.9°, and 7.2° respectively. In the X axis, the off-axis angle toward each of the potential victim satellites is in the range of 85.95° to 89.05°.

Examining Figures 1 and 2 shows that for an off-axis angle between 85° and 90° the gain is reduced by approximately 100 dB for the A type beam and by approximately 80 dB for the B type beam.

The distance between ViaSat-2 and each of the potential victim satellites ranges between 1397.9 km for the closest satellite and 5954.8 km for the farthest satellite. The associated spreading loss values for the two distances are 133.9 dB(m^2) and 146.5 dB(m^2).

Assuming the higher EIRP density of 39.5 dBW/MHz for the A type beam, the minimum spreading loss of 133.9 dB(m^2), and a conservative 80 dB of off-axis gain reduction, the worst case pfd at any of the potential victim satellite locations is -184.4 dB(W/(m^2 * 100 kHz)). As shown in the calculation in Table 1 below, this is approximately 67.4 dB lower than the coordination threshold pfd level of -117 dB(W/(m^2 * 100 kHz)).

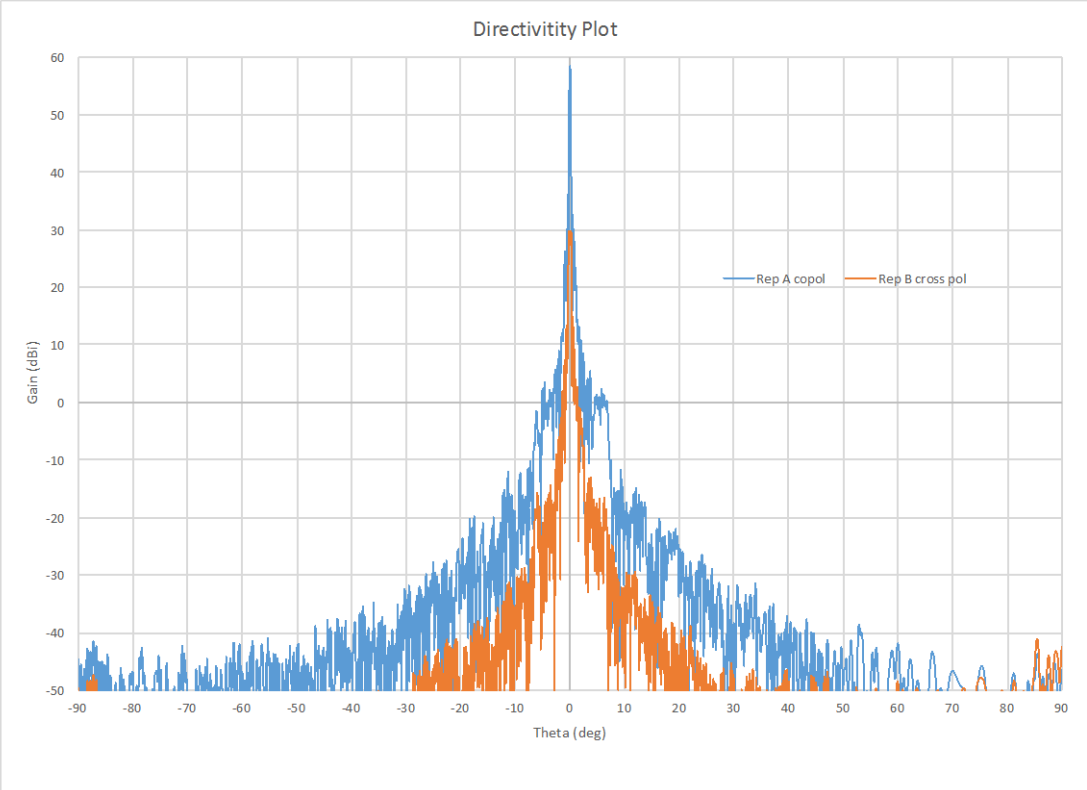

Figure 1 A Type Gain Plot

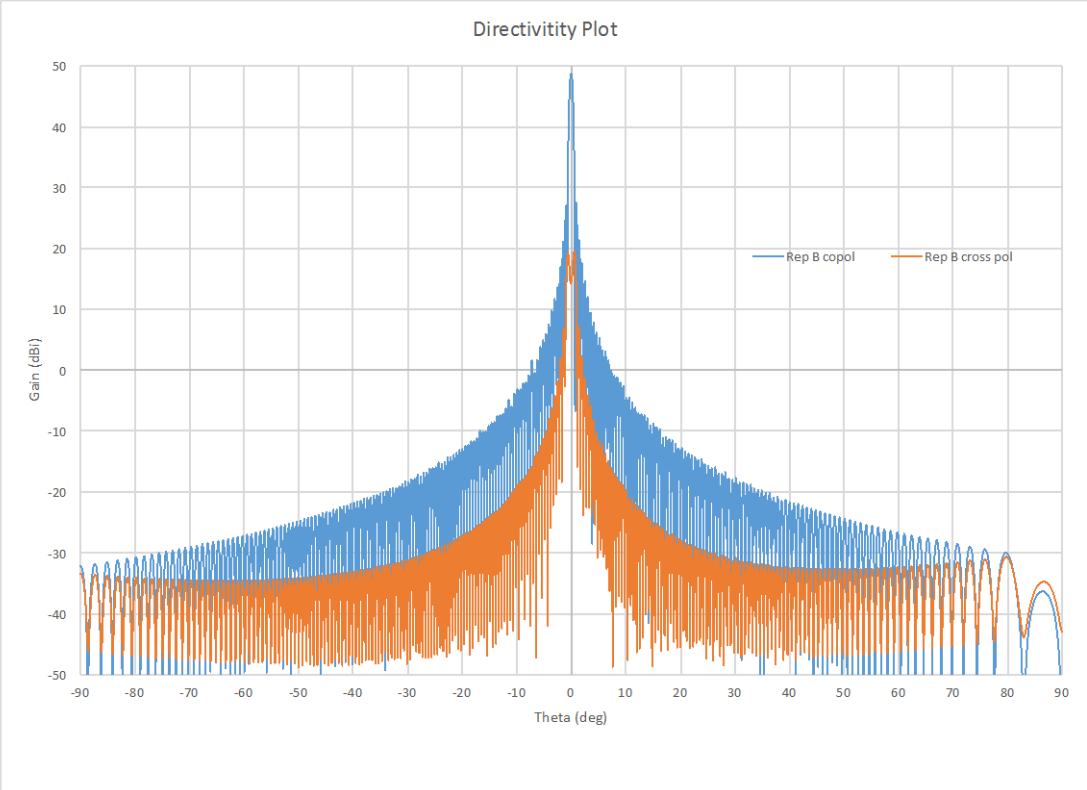

Figure 2 B Type Gain Plot

Victim satellites	SOMESAT	NIMIQ 5	QUETSAT		
Orbital location	61.7	71.7	77.0	deg	
Orbital spacing from VS-2	8.1	-1.9	-7.2	deg	
Separation distance	5954.8	-1397.9	-5294.1	km	
Spreading loss for distance	146.5	133.9	145.5	dB(m^2)	
EIRP density - A type beam	39.5			dBW/MHz	
EIRP density - B type beam	32.3			dB-m^2	
Off-axis angle to victim	86.0	89.0	86.4	deg	
Antenna discrimination	80.0	80.0	80.0	dB	
pfd at victim orbital loc	-197.0	-184.4	-196.0	dBW/(m^2*100 kHz)	
25.264 Requirement	-117.0			dBW/(m^2*100 kHz)	
Margin above requirement	80.0	67.4	79.0	dB	

Table 1 RDBS PFD Calculation Results

REQUEST TWO: *Please provide an interference analysis as described in Section 25.140(b)(4)(iii) of the Commission's rules, 47 CFR § 25.140(b)(4)(iii), demonstrating that ViaSat's proposed operations in the 17.7-17.8 GHz (space-to-Earth) band will not cause more interference to any current or future 17/24 GHz BSS satellite networks than if the applicant were located at the precise Appendix F orbital location from which it seeks to offset. ViaSat's orbital location, 69.9º W.L., is offset 1.1 degrees from the 71º W.L. Appendix F orbital location. Accordingly, ViaSat's operations from this location must be at pfd levels that are reduced from those specified in Section 25.208(c) in accordance with the following calculation methodology:*

For a given location on the surface of the Earth at which the required pfd reduction value needs to be determined, calculate the topocentric angular separation 'ϕ' of the 71º W.L. and 67º W.L. geostationary orbital locations, and the corresponding off-axis gain GCO1(ϕ) of the antenna specified in Section 25.224(a)(1) of the Commission's rules at that angular separation. For the same location on the surface of the Earth, also calculate the topocentric angular separation of the 67º W.L. and 69.9 º W.L. geostationary orbital locations, and the gain of the antenna GCO2(ϕ) specified in Section 25.224(a)(1) of the Commission's rules at that angular separation. Then, perform the subtraction GSO2(ϕ) – GCO1(ϕ). The result is the required reduction in pfd from the value specified in Section 25.208(c).

Please demonstrate that under all atmospheric conditions, and for all angles of arrival, the pfd levels at the Earth's surface from ViaSat's transmissions in the 17.7-17.8 GHz (space-to-Earth) band will not exceed these calculated levels anywhere within the United States and its Territories.

The following interference analysis demonstrates that ViaSat's proposed operations in the 17.7-17.8 GHz (space-to-Earth) band will not cause more interference to any current or future 17/24 GHz BSS satellite networks than if the applicant were located at the precise Appendix F orbital location from which it seeks to offset. ViaSat's orbital location of 69.9° W.L. is 1.1° offset from the 71.0° W.L. and accordingly that much closer to the 67.0° W.L. orbital location.

Table 2 below identifies the topocentric separation angle between the 71° W.L. and 67° W.L. orbital locations and the topocentric separation angle between the 67° W.L. and 69.9° W.L. orbital locations. Table 2 also includes the corresponding off-axis co-polar pattern gain values calculated for the reference antenna for each of the two topocentric angles. The difference in the two gain values is the amount by which ViaSat's pfd at that location of interest must be reduced from the value specified in Section 25.208(c).

ViaSat determined the above values for the NW, SW, NE, and SE corners of the U.S., as well as Puerto Rico. In Table 2, the resulting values are shown, demonstrating that the pfd levels from ViaSat-2 at the 69.9° W.L. meets the required pfd limit (as reduced to account for the relevant

topocentric angles) at all locations within the United States and territories for both type spot beams. Therefore, operations of ViaSat-2 in the 17.7-17.8 GHz band segment at the 69.9° W.L. orbital location will not cause more interference to any current or future 17/24 GHz BSS satellite networks than if the satellite were located at the 71° W.L. orbital location.

			Topo sep	Topo sep		
	Lat	Long	67 - 71	67 - 69.9		
NW	48.8	124.7	4.2	3.0	deg	
SW	32.5	117.1	4.3	3.1	deg	
NE	46.8	69.9	4.4	3.2	deg	
SE	24.8	81.0	4.6	3.3	deg	
PR	17.9	65.5	4.7	3.4	deg	
	GCO1	GCO2				
NW	13.48	20.30	dBi			
SW	13.14	19.25	dBi			
NE	12.84	18.24	dBi			
SE	12.43	16.78	dBi			
PR	12.28	16.23	dBi			
		A type	B type	Limit		
	Spread Loss	pfd	pfd	pfd		
NW	163.1	-123.6	-130.8	-121	dBW/(m^2*MHz)	
SW	162.8	-123.3	-130.5	-121	dBW/(m^2*MHz)	
NE	162.6	-123.1	-130.3	-118	dBW/(m^2*MHz)	
SE	162.3	-122.8	-130.0	-115	dBW/(m^2*MHz)	
PR	162.2	-122.7	-129.9	-115	dBW/(m^2*MHz)	
		Margin	Margin			
NW		2.6	9.8	dB		
SW		2.3	9.5	dB		
NE		5.1	12.3	dB		
SE		7.8	15.0	dB		
PR		7.7	14.9	dB		

Table 2 DBS PFD Calculation Results

DECLARATION

I, Daryl T. Hunter, hereby make the following declarations under penalty of perjury. I understand that this Declaration will be submitted to the Federal Communications Commission.

1. I am Senior Director, Regulatory Affairs of ViaSat, Inc.
2. I have reviewed the foregoing Attachment A, Response to Request for Additional Information, Engineering Analysis and Supporting Technical Information, and it is true and correct to the best of my knowledge, information and belief.

Daryl T. Hunter, P.E.

Executed September 9, 2016