Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Application of ViaSat, Inc.	)	IBFS File No. SES-LIC-20111027-01267
	)	
To Operate an Earth Station in Duluth, Georgia in the 2085-2086.5 MHz Band	)	Call Sign: E110157

OPPOSITION OF VIASAT, INC.

ViaSat, Inc. ("ViaSat") opposes the petition to deny filed by Georgia Television Company and Meredith Corporation (collectively, "Petitioners") on January 6, 2012 (the "Petition") in response to the above-referenced application.

ViaSat's application seeks authority to conduct limited telemetry, tracking, and control ("TTAC") operations using an earth station located in Duluth, Georgia. More specifically, ViaSat's earth station would be used to transmit telecommand instructions to nongeostationary orbit ("NGSO") spacecraft licensed to DigitalGlobe, Inc. and operating in the earth-exploration satellite service ("EESS").[1] As the Commission already has recognized, DigitalGlobe's EESS system facilities "the delivery of enhanced next-generation imaging services to government and commercial users," and "enhance[s] national security, environmental monitoring and forecasting functions."[2] Grant of this application will ensure that those same benefits inure to the benefit of the public. As with all U.S.-licensed EESS systems, the DigitalGlobe system relies on access to a portion of the 2025-2100 MHz band for TTAC purposes.

Petitioners fail to establish that grant of ViaSat's application would be *prima facie* inconsistent with the public interest, as is their burden under Section 25.154 of the

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1 *See DigitalGlobe, Inc.*, DA 05-2640 (rel. Sep. 30, 2005).

2 *Id.*

Commission's rules.[3] Petitioners simply allege that ViaSat's proposed earth station would cause harmful interference into their operations, without demonstrating that such interference is actually likely to occur, and without accounting for the myriad ways in which ViaSat has offered to adjust its operations to mitigate the potential for harmful interference, consistent with ViaSat's secondary status in the 2025-2100 MHz band. Significantly, addressing those possible operational adjustments is precisely why ViaSat previously had reached out to the affected broadcast licensees, including Meredith Corporation ("Meredith"), who expressly declined ViaSat's offer to try to address its concerns.[4]

As detailed below, there is no valid reason to believe that ViaSat's limited spectrum use cannot successfully co-exist on a secondary basis with the Petitioners' licensed operations. Accordingly, the Petition should be denied, and the Commission should grant ViaSat's application expeditiously.

Discussion

Section 25.154 of the Commission's rules provides that a party seeking denial of a pending earth station application must demonstrate that grant of the application would be *prima facie* inconsistent with the public interest.[5] Such demonstration must rest on specific allegations of fact that support denial of the application, which must be supported by appropriate affidavits or sworn declarations.[6] Petitioners fail to meet this burden.

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3 47 C.F.R. § 25.154(a)(4).

4 Although Georgia Television Company was notified by Comsearch of this proposed facility, Georgia Television Company did not express any interference concerns prior to filing the Petition to Deny.

5 47 C.F.R. § 25.154.

6 The Petition should be dismissed as procedurally defective because it contains factual allegations of which official notice may not be taken and that are not supported by any affidavit or declaration made under penalty of perjury. *See* 47 U.S.C. § 309(d)(1); 47 C.F.R. § 1.16; 25.154(a)(4).

The Petition reflects Petitioners' *categorical* opposition to EESS operations in the 2025-2100 MHz band, instead of a reasoned analysis of whether grant of *ViaSat's* application would serve the public interest. Tellingly, the engineering statement contained in the Petition is signed by Joe Snelson, who observed last year that "it would seem that a[n earth station] license grant in this band would be *impossible*," and complained of "opportunistic licensees" seeking to operate on a secondary basis in the band.[7] Mr. Snelson's comments appear to be part of a broad and recent initiative by the Society of Broadcast Engineers to attempt to foreclose the licensing of any additional earth stations in the 2025-2100 MHz band—even facilities in support of already operating EESS systems.[8] Such sentiment clearly runs contrary to the policy determination embodied in footnote US347 to the U.S. Table of Frequency Allocations—namely, that EESS operations are permitted in the 2025-2100 MHz band wherever possible in order to maximize spectral efficiency and facilitate the benefits derived from EESS imagery. And these types of assertions by the broadcast industry are flatly contradicted by the successful use of the 2025-2100 MHz band to support EESS systems for many years.

In light of Petitioners' clear and *a priori* bias against ViaSat's application, and Petitioners' unwillingness to engage in a constructive coordination dialogue, the Commission should view with skepticism Petitioners' allegation that ViaSat's proposed operations would actually cause harmful interference. The technical showing presented in Exhibit A hereto demonstrates that a realistic spectrum sharing environment exists. Indeed, ViaSat's proposed mitigation measures addressed the concerns of another broadcaster that initially expressed its

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7 *See* Barry Thomas and Joe Snelson, *2GHz Broadcast Auxiliary Service has yet another threat, available at* http://www.freelists.org/post/sbe104_toledo/2-GHz-threat (originally published in the SBE newsletter) (emphasis added).

8 Chris Imlay, *Band Threats: It's not paranoia if they really are after you*, THE SIGNAL, at 5 (Oct. 2011) (bimonthly publication of the Society of Broadcast Engineers).

concerns to Comsearch. ViaSat is amending its application to reflect a reduction in power and bandwidth in order to mitigate potential interference. There is no valid reason to believe that ViaSat's limited spectrum use cannot successfully co-exist on a secondary basis with Petitioners' licensed operations. For these reasons, the Commission should deny the Petition, and, consistent with the operating parameters described in this Opposition, grant ViaSat's application expeditiously.

A. ViaSat's Application Acknowledges that All Proposed Operations Would Proceed on a Secondary Basis

As an initial matter, ViaSat's application fully acknowledges that the 2025-2100 MHz band is allocated to terrestrial fixed and mobile services on a primary basis, and that EESS operations in the band must proceed on a non-harmful-interference basis.[9] In other words, ViaSat understands that its proposed earth station may not cause harmful interference into broadcast operations, and must cease transmissions in the event of harmful interference.

Based on this acknowledgment alone, the Commission can and should grant ViaSat's application, with appropriate conditions. Commission precedent makes clear that where an applicant seeks authority to operate only on a non-harmful-interference basis vis-à-vis existing licensees, the resolution of all coordination issues prior to grant is not essential.[10] That said, as discussed below, ViaSat has been and remains willing to engage with Petitioners if and when they choose to reciprocate that willingness.

B. ViaSat's TTAC Operations Would Not Cause Harmful Interference into Petitioners' Operations

Petitioners assert that ViaSat's TTAC operations would cause harmful interference into Petitioners' TV pickup facilities.[11] However, Petitioners do not provide any

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9 IBFS File No. SES-LIC-20111027-01267, Description of Application, at 1. *See also* 47 C.F.R. § 2.106 n.US347.

10 *See Maritime Telecommunications Network, Inc.*, 15 FCC Rcd 23210, at ¶ 12 (2000).

11 *See* Petition at 4-5.

substantiated data underlying their "evaluation" of ViaSat's proposed operations.[12] Moreover, Petitioners fail to conduct any analysis of the likelihood of *actual* interference from ViaSat's proposed earth station. As Commission precedent makes clear, an earth station applicant need not demonstrate that interference is *impossible*—merely that interference is "unlikely."[13]

As an initial matter, at any given time, ViaSat would operate in only a small portion of the 2085-2086.5 MHz band (128 kHz, or about 12 percent of the total).[14] Furthermore, Petitioners apparently fail to consider the short duration and the infrequency of the proposed transmissions; ViaSat's earth station would transmit TTAC instructions for only minutes each day, at around noon and midnight.[15] Moreover, Petitioners fail to take into account the reduction in power at which ViaSat has proposed to operate where an in-line interference event might occasionally exist. Simultaneously with the filing of this Opposition, ViaSat is amending its application to reduce the power by 10 dB. As explained in Exhibit A hereto, a proper understanding of ViaSat's proposed operations reveals that those operations would not be likely to cause harmful interference into broadcast operations, or meaningfully impact the programming that viewers receive.

In addition, in the unlikely event of interference, ViaSat would be able to lower power or cease operations quickly in order to eliminate that interference, consistent with ViaSat's status as a secondary licensee. Toward that end, ViaSat is willing to designate

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12 *See* Petition, Engineering Statement.

13 *See, e.g., Northrop Grumman Space & Mission Systems Corp.*, 24 FCC Rcd 2330, at ¶ 72 (2009).

14 *See* Petition, Engineering Statement at 2. ViaSat is filing an amendment to its application to clarify that the emission bandwidth is 128 kHz.

15 These transmissions would be used to instruct DigitalGlobe's remote sensing satellites to download remote sensing data using X-band spectrum. Once this instruction is sent, the earth station would cease transmitting, and would not need to continue transmitting while the image data is being downloaded.

a point of contact with 24/7 availability to address any interference concerns that may arise. ViaSat also would be willing to accommodate all reasonable requests, made in advance, to reduce power temporarily in order to mitigate further the potential for interference into TV pickup facilities operating during the noon and midnight timeframes.

C. ViaSat Remains Willing To Engage in Meaningful Dialog with Petitioners in Order To Accommodate Their Concerns

As discussed above, ViaSat's proposed operations would not likely cause harmful interference into Petitioners' TV pickup facilities. In any event, Petitioners generally are expected to act in good faith with respect to coordination requests. The Commission's coordination procedures provide that "[a]ll applicants and licensees must cooperate fully and make reasonable efforts to resolve technical problems and conflicts that may inhibit the most effective and efficient use of the radio spectrum[.]"[16] To date, Petitioners have been unwilling to engage in meaningful discussions with ViaSat. Crossing their arms and saying "no" is flatly inconsistent with their good faith obligations.

Petitioners are mistaken in suggesting that they have been precluded from entering into such discussions because they did not have advance notice before ViaSat's application was filed. As an initial matter, Comsearch—which managed the frequency coordination process for ViaSat—did provide actual advance notice of the proposed ViaSat facilities to representatives of both Petitioners, as identified in the Comsearch database. The frequency coordination report included in ViaSat's application reflects as much.[17] While the initial Comsearch report did not address certain affected sites, Comsearch subsequently

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16 *See* 47 C.F.R. § 101.103; 47 C.F.R. § 25.251 (providing that earth station coordination shall be governed by the administrative provisions set forth in Section 101.103).

17 *See* IBFS File No. SES-LIC-20111027-01267, Frequency Coordination Report, at 5-6. Petitioners asserted to Comsearch that the PCNs were addressed to individuals who were no longer employed by the broadcast station.

corrected that omission.[18] Soon afterward, ViaSat attempted to work with the two affected licensees to address those concerns, and has resolved issues initially raised by one of these licensees.[19]

After reviewing ViaSat's application, Meredith informed ViaSat that Meredith would oppose the application regardless of what accommodations ViaSat might offer. Meredith also declined to cooperate with ViaSat's efforts to conduct testing of actual interference potential at Meredith's receive sites, or to provide detailed technical information about its equipment so that a complete interference analysis could be conducted. Such actions underscore that the Petition reflects Petitioners' *categorical* opposition to ViaSat's application, instead of a reasoned analysis of whether grant of *ViaSat's* application would serve the public interest.

Tellingly, ViaSat's application has not been placed on public notice. This fact belies Petitioners' assertion that filing a petition to deny was "their only option."[20] In truth, Petitioners could have engaged in meaningful discussions with ViaSat without jeopardizing any of their procedural rights. Instead, Petitioners proceeded immediately to the "nuclear" option.

ViaSat remains willing to engage in constructive discussions with Petitioners, when and if they choose to reciprocate that willingness. Indeed, ViaSat already has identified four potential mitigation strategies:

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18 For the sake of completeness, the additional information that Comsearch provided after its initial coordination report is included as Exhibit B. Although Georgia Television Company was notified by Comsearch of this proposed facility, Georgia Television Company did not notify Comsearch of any interference concerns prior to filing the Petition to Deny. Thus, ViaSat was not aware of Georgia Television Company's sites at issue, and was unable to reach out as ViaSat did with Meredith.

19 As a result of these discussions, and the availability of ViaSat's application in IBFS, it is clear that, at a minimum, Meredith has known of the substance of the PCN for months.

20 Petition at 4.

- ***First***, as noted above, ViaSat is filing an amendment to reduce its transmitting power by 10 dB. This would allow ViaSat to communicate with DigitalGlobe spacecraft while reducing the potential for harmful interference into Petitioners' operations.

- ***Second***, ViaSat would be willing to restrict the elevation and/or azimuth angles at which its proposed earth station would transmit, to order to minimize line-of-sight issues with Petitioners' TV pickup receive sites.

- ***Third***, ViaSat would be willing to reduce the duration of transmissions that occur during each pass of the Digital Globe spacecraft.

- ***Fourth***, ViaSat would be willing to cease all transmissions from the earth station upon receipt of notification from nearby broadcasters that they have temporary operations that would likely be adversely affected.

Notably, ViaSat has successfully offered to effect such modifications to accommodate concerns raised by other broadcasters in the Duluth area, and believes that it has successfully resolved the concerns of those broadcasters in doing so. ViaSat cannot determine which of these strategies would most effectively protect Petitioners while facilitating spectral efficiency until it has conferred with Petitioners.

*** * * ***

For the foregoing reasons, the Commission should dismiss the Petition, and grant ViaSat's application expeditiously.

Respectfully submitted,

/s/

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Counsel for ViaSat, Inc.

January 19, 2012

Exhibit A

Technical Analysis

The following analysis demonstrates the impact of the interference mitigation measures proposed by ViaSat to address the concerns raised by broadcast licensees with respect to ViaSat's proposed EESS antenna operations.

ViaSat's proposed earth station will provide TT&C support for the WorldView-1 and WorldView-2 satellites, which are licensed to DigitalGlobe, Inc. These satellites operate with approximately 90° of inclination, and pass from North to South or South to North over the Duluth area several times twice daily around noon and midnight. The range of time for the earliest pass to the latest pass during each set is approximately 3 ½ hours, with each individual pass ranging from approximately 2.5 to 12 minutes depending upon the visibility above a 5° minimum elevation threshold. The duration of the transmissions will typically not last for the entire pass.

To mitigate interference from the ViaSat facility to the television station receivers, a number of possible steps can be taken. These include:

- Constraining elevation and azimuth angles where the station may transmit;
- Reducing duration of transmissions to minimum necessary to turn on downlink (approximately 90 seconds); and
- Inhibiting transmissions for certain passes when requested if an ENG van is nearby.

The following analysis uses information taken from various sources, such as ViaSat's earth station application, the FCC radio station authorization for call sign KC25976, and the Comsearch PCN report as supplemented.

As detailed information about the technical characteristics of the receiver at the television sites was not available, a default NF value of 3 dB was used and 0 dB of line loss was assumed.

In performing the analysis, the signal transmitted from the ViaSat uplink assumed a nominal operating EIRP of 43 dBW and a bandwidth of 128 kHz. ViaSat is amending its application to reduce the EIRP from 53 dBW to 43 dBW and to change the emission bandwidth to 128 kHz to reflect the actual necessary bandwidth of the uplink.

The software program Visualyse Professional version 7.4 by Transfinite Systems was used to determine the desired received signal and noise for the television electronic news gathering (ENG) link as well as the interference level from the ViaSat uplink at each of the identified locations.

The effects of terrain height were included in the simulation using the latest available ASTER2 GDEM 30 m resolution terrain data and using ITU-R Rec. P.452-14 as the propagation model for the interference path.

The analysis showed that the worst case location of the identified sites was the Westin Plaza location at 33° 45’ 34” N, 84° 23’ 18” W. Inspection of the path profiles for other sites showed that the terrain near the ViaSat uplink site was in the path and providing 30 to 50 dB of diffraction loss.

Five cases were examined.

In Case-1, the ENG van is assumed to be collocated with the ViaSat uplink facility. This places the desired and undesired transmitters at the same location and on the same bearing to the receiving site and thus allows no advantage to the undesired signal from reduced off-axis gain at the receiving antenna. Of the five cases, this resulted in the worst C/(N+I).

In Case-2, the ENG van is sited East of Atlanta and some off-axis gain reduction in the direction of the undesired signal is present. Cases 3, 4, and 5 examine locations West, North, and South of Atlanta respectively.

In some cases the undesired signal was above the receiver noise floor when the ViaSat uplink was transmitting, but resulting overall C/(N+I) was still usable in each case.

ViaSat Uplink

Antenna Diameter:	7.3 m
Gain:	41.52 dBi
Beamwidth:	1.4°
EIRP:	43 dBW
Necessary Bandwidth:	128 kHz
Latitude:	33° 57’ 47.5” N
Longitude:	84° 05’ 45.5” W
Antenna Elevation:	289.87 m AMSL

Westin Plaza

Gain:	20 dBi
Beamwidth:	14.2°
Necessary Bandwidth:	12 MHz
Latitude:	33° 45’ 34.0” N
Longitude:	84° 23’ 18.0” W
Antenna Elevation:	629.4 m AMSL

ENG Van

Gain:	20 dBi
Beamwidth:	14.2°
EIRP:	31.5 dBW
Necessary Bandwidth:	12 MHz
Latitude:	Varies
Longitude:	Varies
Antenna Elevation:	10 m AGL

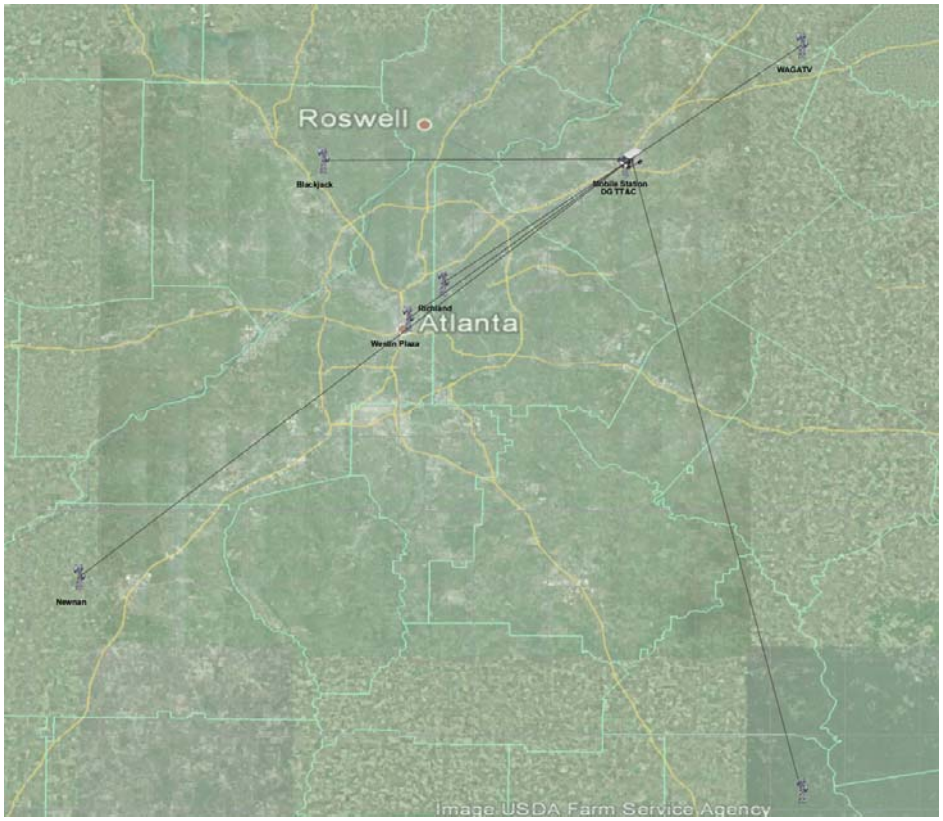
Interference Case – 1	ENG Van Collocated with ViaSat Uplink Site

Wanted Link Info

EIRP:	31.5 dBW
Path Loss:	131.332 dB
Receive Antenna Gain:	20 dB
C (Signal Strength):	-79.832 dBW
N (Noise):	-133.037 dBW
C/N:	53.205 dB

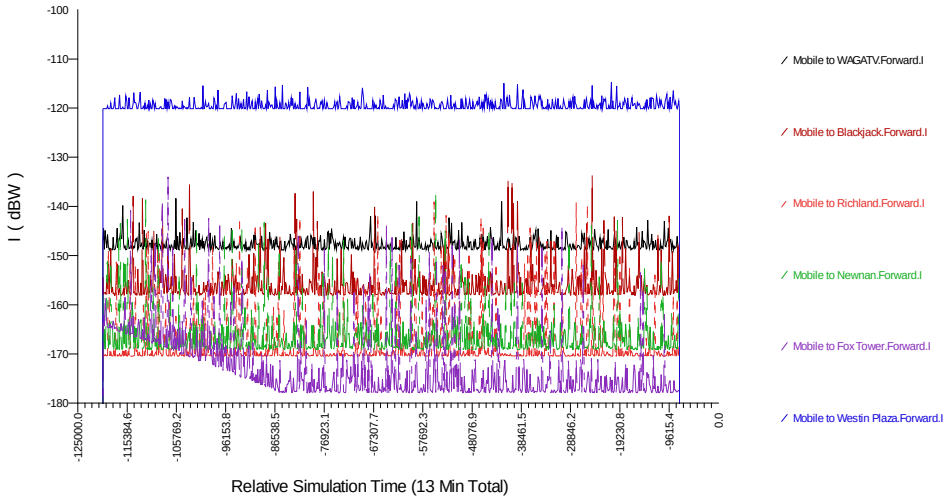
Unwanted Link Info

TX Output:	1.5 dBW
Gain Toward Victim:	-10 dBi
Path Loss:	129.527 dB
Relative Receive Gain:	19.968 dBi
I (Interference Strength):	-119.521 dBW
I/N:	13.516 dB
C/I:	39.688 dB
C/(N+I):	39.599 dB



Map for Interference Case-1 – ENG Van Collocated with ViaSat Uplink Site

Received Interference Power vs Time Graph



Case-1 – Received Interference Power During One Pass

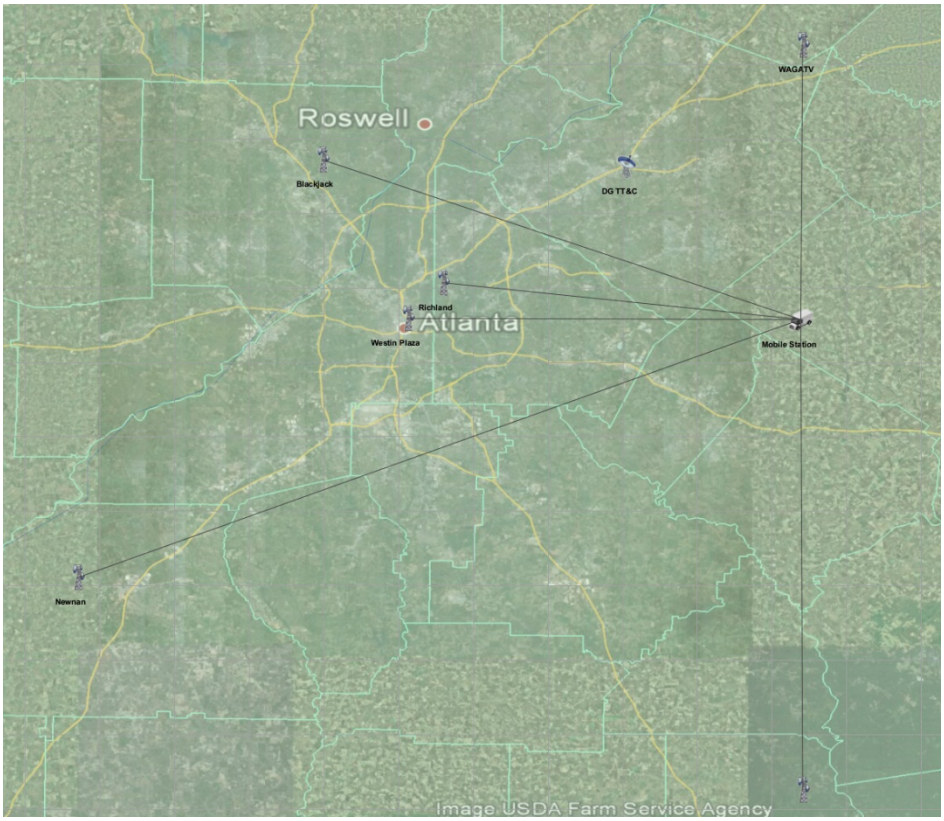
Interference Case – 2	ENG Van Located East of Atlanta

Wanted Link Info

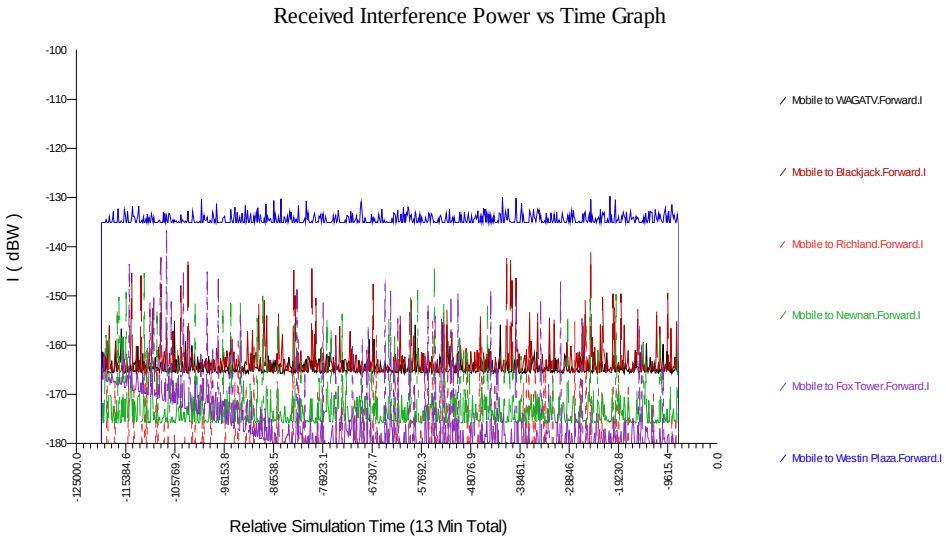
EIRP:	31.5 dBW
Path Loss:	134.897 dB
Receive Antenna Gain:	20 dB
C (Signal Strength):	-83.397 dBW
N (Noise):	-133.037 dBW
C/N:	49.640 dB

Unwanted Link Info

TX Output:	1.5 dBW
Gain Toward Victim:	-10 dBi
Path Loss:	130.099 dB
Relative Receive Gain:	5.019 dBi
I (Interference Strength):	-135.042 dBW
I/N:	-2.005 dB
C/I:	51.645 dB
C/(N+I):	47.518 dB



Map for Interference Case-2 – ENG Van East of Atlanta



Case-2 – Received Interference Power During One Pass

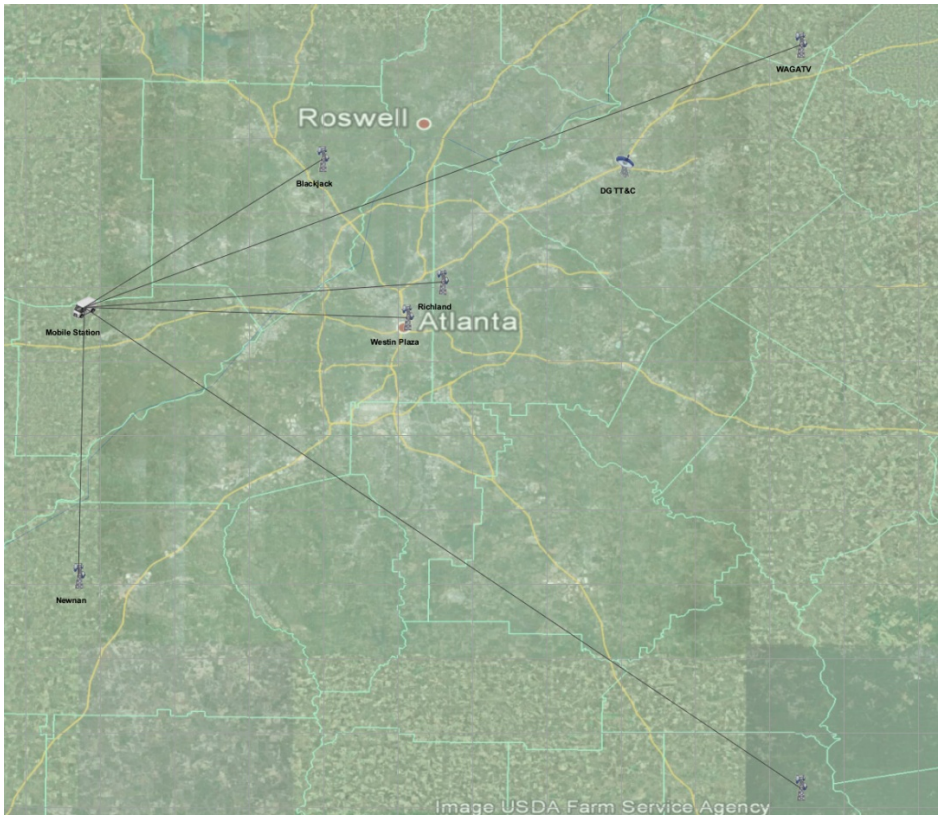
Interference Case – 3	ENG Van Located West of Atlanta

Wanted Link Info

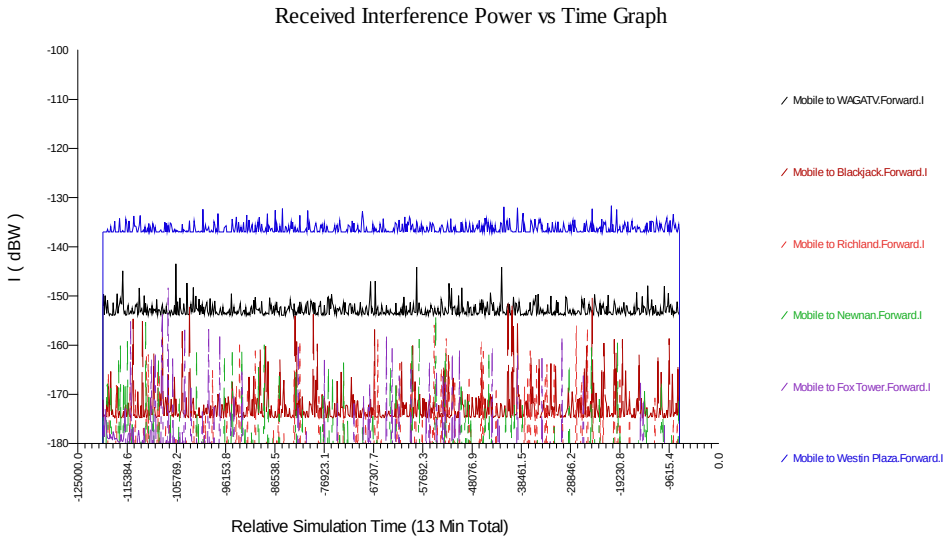
EIRP:	31.5 dBW
Path Loss:	132.311 dB
Receive Antenna Gain:	20 dB
C (Signal Strength):	-80.827 dBW
N (Noise):	-133.037 dBW
C/N:	52.210 dB

Unwanted Link Info

TX Output:	1.5 dBW
Gain Toward Victim:	-10 dBi
Path Loss:	129.527 dB
Relative Receive Gain:	3.072 dBi
I (Interference Strength):	-136.417 dBW
I/N:	-3.380 dB
C/I:	55.589 dB
C/(N+I):	50.568 dB



Map for Interference Case-3 – ENG Van West of Atlanta



Case-3 – Received Interference Power During One Pass

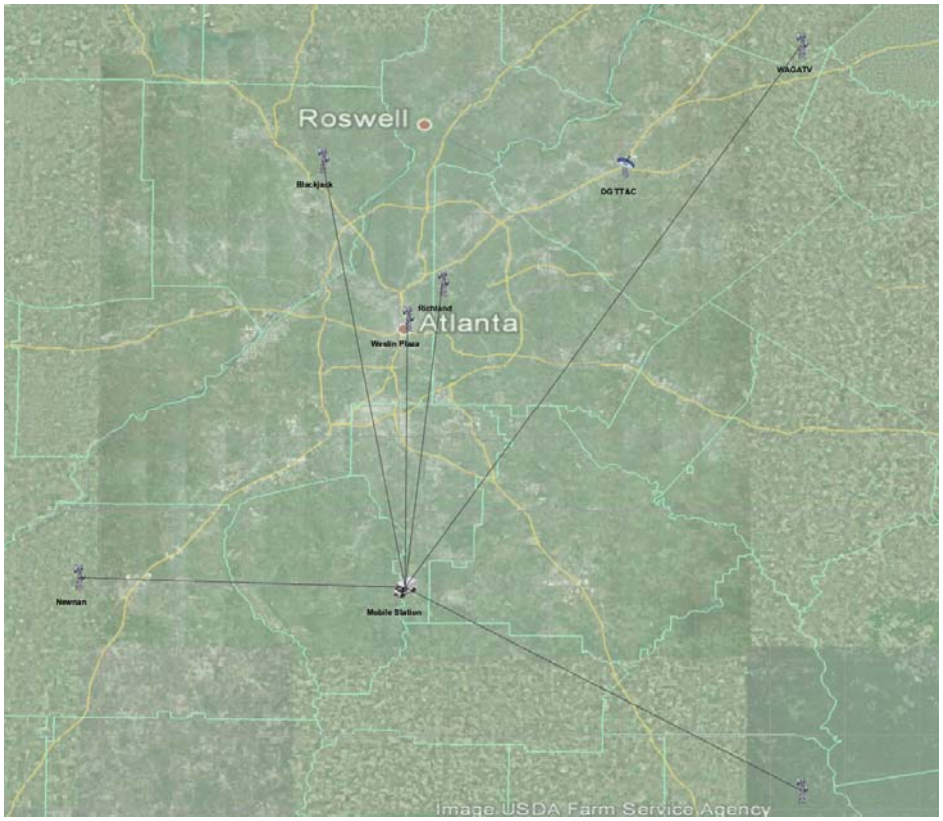
Interference Case – 4	ENG Van Located South of Atlanta

Wanted Link Info

EIRP:	31.5 dBW
Path Loss:	132.164 dB
Receive Antenna Gain:	20 dB
C (Signal Strength):	-80.664 dBW
N (Noise):	-133.037 dBW
C/N:	52.373 dB

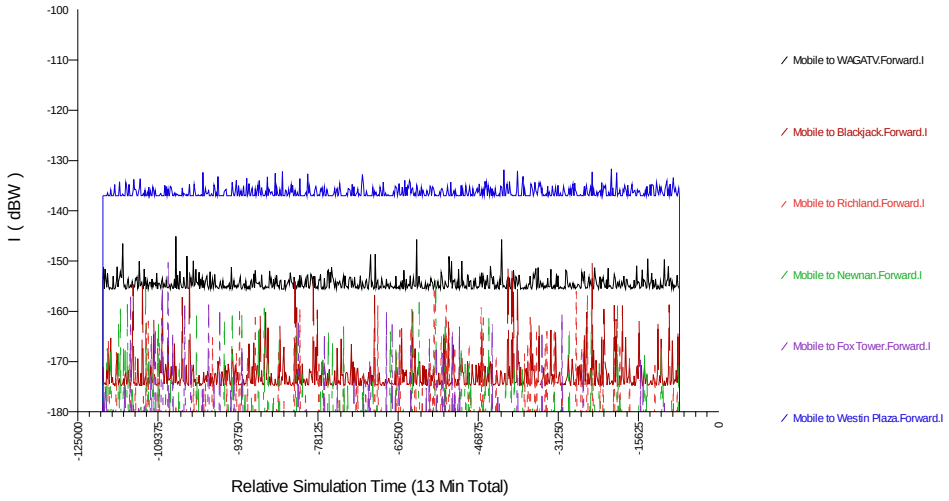
Unwanted Link Info

TX Output:	1.5 dBW
Gain Toward Victim:	-10 dBi
Path Loss:	129.527 dB
Relative Receive Gain:	3.072 dBi
I (Interference Strength):	-136.417 dBW
I/N:	-3.380 dB
C/I:	55.753 dB
C/(N+I):	50.732 dB



Map for Interference Case-4 – ENG Van South of Atlanta

Received Interference Power vs Time Graph



Case-4 – Received Interference Power During One Pass

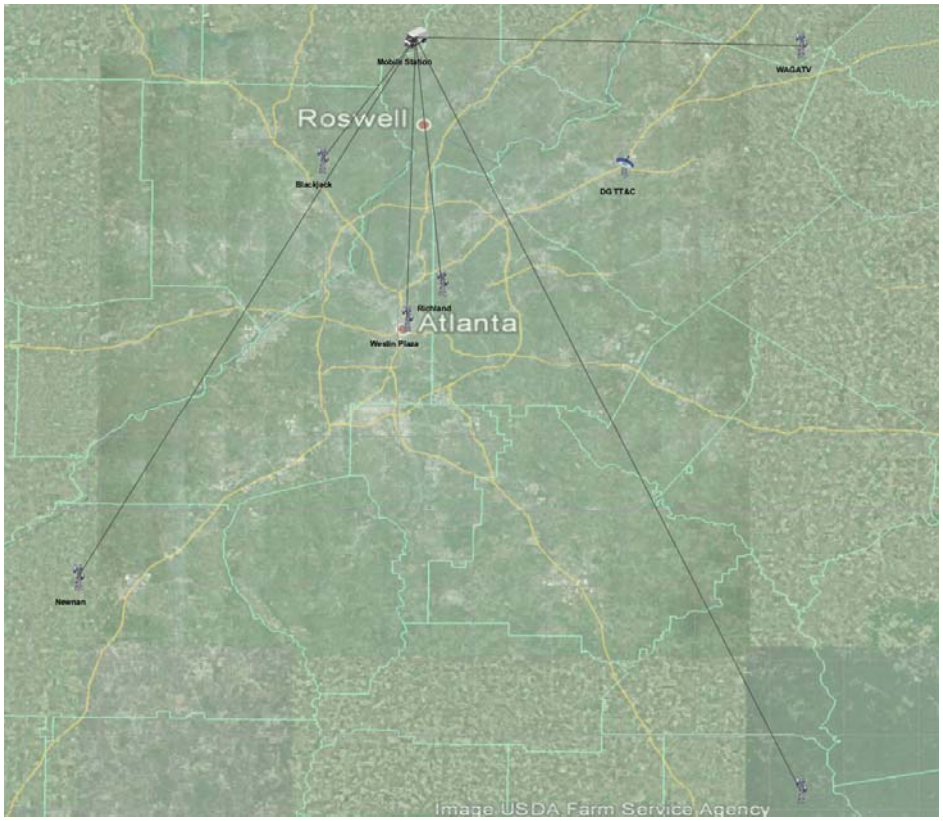
Interference Case – 5	ENG Van Located North of Atlanta

Wanted Link Info

EIRP:	31.5 dBW
Path Loss:	132.615 dB
Receive Antenna Gain:	20 dB
C (Signal Strength):	-81.129 dBW
N (Noise):	-133.037 dBW
C/N:	51.908 dB

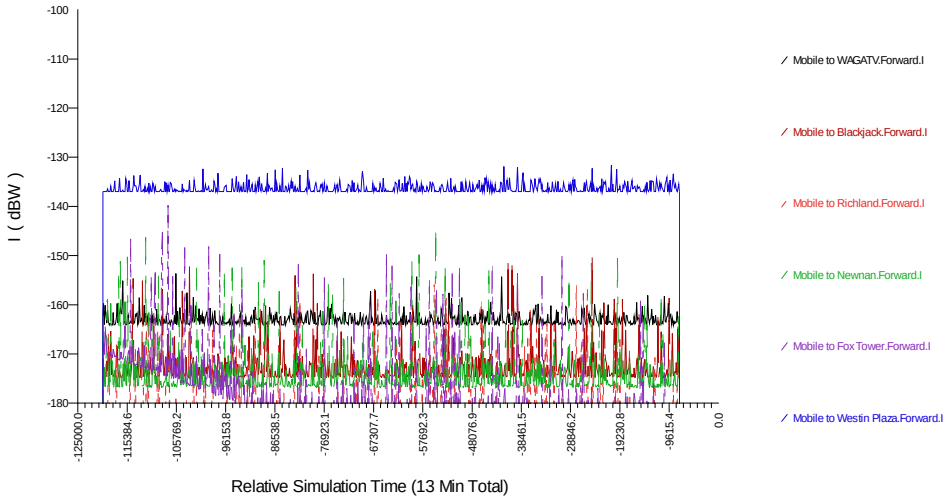
Unwanted Link Info

TX Output:	1.5 dBW
Gain Toward Victim:	-10 dBi
Path Loss:	129.527 dB
Relative Receive Gain:	3.072 dBi
I (Interference Strength):	-136.417 dBW
I/N:	-3.380 dB
C/I:	55.287 dB
C/(N+I):	50.266 dB



Map for Interference Case-5 – ENG Van North of Atlanta

Received Interference Power vs Time Graph



Case-5 – Received Interference Power During One Pass

ENGINEERING INFORMATION CERTIFICATION

I hereby certify that I am the technically qualified person responsible for reviewing the engineering information contained in the foregoing submission, that I am familiar with Part 25 of the Commission's rules, that I have either prepared or reviewed the engineering information submitted in this filing, and that it is complete and accurate to the best of my knowledge and belief.

Daryl T. Hunter, P.E.
ViaSat, Inc.
6155 El Camino Real
Carlsbad, CA 92009-1699

Dated: January 19, 2012

Exhibit B

Comsearch Additional Information

Receiver Location	Distance To Receiver	Azimuth to Receiver	Predicted Margin LOS	Estimated Pathloss
Richland Twr	28.5 km.	232.8 deg.	50.6 dB	41.4 dB
Blackjack Twr	37.6 km.	271.6 deg.	48.2 dB	41.8 dB
Westin Plz	35.3 km.	230.3 deg.	44.8 dB	23.5 dB
Newnan Twr	91.6 km.	228.3 deg.	40.5 dB	52.2 dB
Fox Twr	95.5 km.	166.6 deg.	40.1 dB	48.3 dB

Case Details
Earth Station Name DULUTH, GA
Owner ViaSat, Inc
Latitude (DMS) (NAD83) 33 57 47.2 N
Longitude (DMS) (NAD83) 84 5 43.0 W
Ground Elevation (ft/m) 939.00 / 286.21 Amsl
Antenna Centerline (ft/m) 12.00 / 3.66 Agl
Antenna Model 7.3 Meter
Objectives: Transmit -154.0 (dBW /4 kHz) Tx Power -2.8 (dBW/4 kHz)

Terrestrial Path			Gnd	Edisct	Ges	FsLoss	Dist	Pr	Tpwr	Plan
Latitude	Longitude	Call Sign	Acl	Tdisct	Gts	Tant	Az	Margin		LL
Owner						Loading				
Freq/Pol										

3 RICHLAND TWRGATEMPY LOC GA 266.70 139.4 7.0 127.6 28.5-103.4 0.0BT
33 48 27 84 20 27 RXONLY 304.80 195.2 20.0 2UDR2N 232.8 50.6 0.0
MECOGA: MEREDITH CORPORATION - WGCL-TV DIGITAL DIG RCN:
2025.5000B 2037.5000B 2049.5000B 2061.5000B 2073.5000B 2085.5000B
2097.5000B
Status: L Equipment: AB9823 Emission: 12M0D7W

4 BLACKJACK GATEMPY LOC GA 386.20 175.3 7.0 130.0 37.6-105.8 0.0BT
33 58 19 84 30 8 RXONLY 76.20 295.5 20.0 22OMNM 271.6 48.2 0.0
MECOGA: MEREDITH CORPORATION - WGCL-TV DIGITAL DIG RCN:
2025.5000B 2037.5000B 2049.5000B 2061.5000B 2073.5000B 2085.5000B
2097.5000B
Status: L Equipment: AB9823 Emission: 12M0D7W

6 WESTIN PLZ GATEMPY LOC GA 324.60 136.8 7.0 129.4 35.3-109.2 0.0BT
33 45 34 84 23 18 RXONLY 304.80 253.0 16.0 O20000 230.3 44.8 0.0
MECOGA: MEREDITH CORPORATION - WGCL-TV DIGITAL DIG RCN:
2025.5000B 2037.5000B 2049.5000B 2061.5000B 2073.5000B 2085.5000B
2097.5000B
Status: L Equipment: AB9823 Emission: 12M0D7W

11 NEWNAN TOWERGATEMPY LOC GA 256.90 134.8 7.0 137.7 91.6-113.5 0.0BT
33 24 41 84 49 48 RXONLY 304.80 1.0 20.0 2UDR2N 228.3 40.5 0.0
MECOGA: MEREDITH CORPORATION - WGCL-TV DIGITAL DIG RCN:
2025.5000B 2037.5000B 2049.5000B 2061.5000B 2073.5000B 2085.5000B
2097.5000B
Status: L Equipment: AB9823 Emission: 12M0D7W
OH LOSS 20% / 0.0025%: 52.20 / 10.10

12 FOX TOWER GATEMPY LOC GA 271.20 73.4 7.0 138.1 95.5-113.9 0.0BT
33 7 32 83 51 32 RXONLY 271.30 21.7 20.0 2UDR2N 166.6 40.1 0.0
MECOGA: MEREDITH CORPORATION - WGCL-TV DIGITAL DIG RCN:
2025.5000B 2037.5000B 2049.5000B 2061.5000B 2073.5000B 2085.5000B
2097.5000B
Status: L Equipment: AB9823 Emission: 12M0D7W

Pathloss Calculation

Path data for case # 1	DULUTH		RICHLANDTWR	
Latitude	33 57 47.2		33 48 27.0	
Longitude	84 5 43.0		84 20 27.0	
Antenna Center Agl	12.01 ft.	3.66 m.	1000.05 ft.	304.80 m.
Site Elevation Amsl	939.05 ft.	286.21 m.	875.04 ft.	266.70 m.
Antenna Center Amsl	951.06 ft.	289.87 m.	1875.09 ft.	571.50 m.
Effective Antenna Ht ...	12.01 ft.	3.66 m.	1000.05 ft.	304.80 m.
Horizon Distance	0.06 mi.	0.09 km.	17.38 mi.	27.96 km.
Horizon Elevation Amsl .	979.08 ft.	298.41 m.	993.81 ft.	302.90 m.
Ray Crossover Angle	86.99 mr.			
Terrain Delta Ht	72.97 ft.	22.24 m.		
Effective Distance	22.30 mi.	35.88 km.		
Pathlength	17.73 mi.	28.53 km.		
Azimuth	232.84 deg.		52.70 deg.	
Frequency	2050 MHz			
K Factor	1.33 (K)			

Radio Climate Phrase ... Continental Temperate Climate
Type of Path ..... Rounded Single Object
Free Space Path Loss ... 127.7 dB Atmospheric Loss ... 0.173 dB
Diff. Loss .... 46.4 dB (174.1 dB) Tropo. Loss ... 91.2 dB (218.9 dB)
Terrain data type ..... 1.0 ARC Second

Losses	L-Fspl	Sigma	Controlling Propagation Mode
169.1 dB	41.4 dB	3.6 dB	20. % Diffraction
165.5 dB	37.8 dB	3.7 dB	1. % Diffraction
164.5 dB	36.8 dB	3.8 dB	0.1 % Diffraction
163.8 dB	36.1 dB	3.8 dB	0.01 % Diffraction
163.1 dB	35.3 dB	3.9 dB	0.0025% Diffraction

The OH loss calculations considered a terrain profile of 205 points.
The list below shows the highest point in each fiftieth of the path length.

Dist. (km.)	Elev. (m.)	Obstr. (m.)	K=Inf. Clrnce. (m.)	K= 1.33 Clrnce. (m.)	Dist. (km.)	Elev. (m.)	Obstr. (m.)	K=Inf. Clrnce. (m.)	K= 1.33 Clrnce. (m.)
0.00	286.2	3.7	0.0	0.0	14.55	323.7	0.0	109.8	97.8
0.09	286.2	11.8	-7.2	-7.4	15.26	322.2	0.0	118.3	106.4
0.43	294.6	0.0	-0.5	-1.2	15.41	321.3	0.0	120.7	108.7
0.57	290.7	12.2	-7.4	-8.3	15.98	314.4	0.0	133.2	121.4
1.19	290.5	12.2	-1.1	-3.0	16.55	301.1	0.0	152.1	140.4
1.71	275.0	0.0	31.8	29.1	17.40	292.8	0.0	168.9	157.4
2.57	292.4	0.0	22.8	18.9	18.12	300.7	0.0	168.0	156.9
3.28	292.4	0.0	29.9	25.0	18.26	300.1	0.0	170.0	159.0
3.71	281.9	0.0	44.6	39.2	19.26	298.2	0.0	181.8	171.2
4.42	275.8	0.0	57.7	51.4	19.69	305.2	0.0	179.0	168.7
4.71	269.3	0.0	67.0	60.4	19.97	299.6	0.0	187.4	177.3
5.56	280.6	0.0	64.2	56.7	20.97	297.6	0.0	199.3	189.9
5.99	291.7	0.0	57.3	49.3	21.40	294.0	0.0	207.1	198.1
6.56	288.0	0.0	66.6	58.1	22.11	282.7	0.0	225.4	217.1
6.85	282.4	0.0	75.1	66.3	22.68	300.7	0.0	213.1	205.2
7.85	289.8	0.0	77.5	67.9	23.11	303.2	0.0	214.8	207.4
8.42	299.6	0.0	73.4	63.4	23.39	300.0	0.0	220.8	213.7
8.70	298.3	0.0	77.5	67.3	24.39	276.1	0.0	254.6	248.6
9.27	308.5	0.0	72.9	62.4	24.82	288.6	0.0	246.3	240.9
9.84	308.9	0.0	78.1	67.3	25.53	292.6	0.0	249.3	244.8
10.70	307.5	0.0	88.0	76.7	25.68	296.8	0.0	246.5	242.2
11.13	300.6	0.0	99.1	87.7	26.68	300.5	0.0	252.7	249.8
11.84	314.9	0.0	91.8	80.2	27.10	301.9	0.0	255.5	253.2
12.13	318.4	0.0	91.2	79.4	27.67	301.0	0.0	262.1	260.7
12.98	312.0	0.0	106.0	94.1	27.96	291.6	0.0	274.3	273.3
13.12	318.0	0.0	101.4	89.5	28.53	266.7	304.8	0.0	0.0
13.69	317.2	0.0	107.9	95.9					

Pathloss Calculation

Path data for case # 1	DULUTH		WESTIN PLZ	
Latitude	33 57 47.2		33 45 34.0	
Longitude	84 5 43.0		84 23 18.0	
Antenna Center Agl	12.01 ft.	3.66 m.	1000.05 ft.	304.80 m.
Site Elevation Amsl	939.05 ft.	286.21 m.	1065.01 ft.	324.60 m.
Antenna Center Amsl	951.06 ft.	289.87 m.	2065.06 ft.	629.40 m.
Effective Antenna Ht ...	12.01 ft.	3.66 m.	1100.74 ft.	335.49 m.
Horizon Distance	0.06 mi.	0.09 km.	21.58 mi.	34.72 km.
Horizon Elevation Amsl .	979.08 ft.	298.41 m.	1007.92 ft.	307.20 m.
Ray Crossover Angle	87.72 mr.			
Terrain Delta Ht	65.71 ft.	20.03 m.		
Effective Distance	26.68 mi.	42.92 km.		
Pathlength	21.94 mi.	35.29 km.		
Azimuth	230.29 deg.		50.12 deg.	
Frequency	2050 MHz			
K Factor	1.33 (K)			

Radio Climate Phrase ... Continental Temperate Climate
Type of Path ..... Rounded Single Object
Free Space Path Loss ... 129.6 dB Atmospheric Loss ... 0.214 dB
Diff. Loss .... 46.7 dB (176.3 dB) Tropo. Loss ... 90.6 dB (220.2 dB)
Terrain data type ..... 1.0 ARC Second

Losses	L-Fspl	Sigma	Controlling Propagation Mode
171.4 dB	41.8 dB	3.6 dB	20. % Diffraction
166.9 dB	37.4 dB	3.7 dB	1. % Diffraction
165.7 dB	36.1 dB	3.9 dB	0.1 % Diffraction
164.8 dB	35.2 dB	4.0 dB	0.01 % Diffraction
163.8 dB	34.2 dB	4.1 dB	0.0025% Diffraction

The OH loss calculations considered a terrain profile of 252 points.
The list below shows the highest point in each fiftieth of the path length.

Dist. (km.)	Elev. (m.)	Obstr. (m.)	K=Inf. Clrnce. (m.)	K= 1.33 Clrnce. (m.)	Dist. (km.)	Elev. (m.)	Obstr. (m.)	K=Inf. Clrnce. (m.)	K= 1.33 Clrnce. (m.)
0.00	286.2	3.7	0.0	0.0	17.72	306.6	0.0	153.7	135.4
0.09	286.2	11.8	-7.3	-7.5	18.58	300.1	0.0	168.5	150.2
0.43	295.3	0.0	-1.3	-2.2	19.58	322.6	0.0	155.6	137.4
1.29	290.5	0.0	11.7	9.2	19.86	310.0	0.0	170.9	152.9
1.57	288.1	0.0	16.9	13.8	20.72	309.6	0.0	179.6	161.8
2.57	286.8	0.0	27.8	22.8	21.29	300.4	0.0	194.3	176.7
3.29	289.0	0.0	32.5	26.3	22.58	303.8	0.0	203.3	186.3
3.57	286.9	0.0	37.3	30.7	23.01	311.0	0.0	200.2	183.5
4.57	284.7	0.0	49.2	40.9	23.86	297.4	0.0	222.0	205.9
5.57	289.7	0.0	53.8	44.0	24.15	304.1	0.0	218.1	202.2
6.00	288.2	0.0	59.4	49.0	25.01	310.7	0.0	219.7	204.6
6.43	286.5	0.0	65.2	54.3	25.72	304.5	0.0	232.8	218.3
7.72	287.0	0.0	77.1	64.6	26.29	299.1	0.0	243.7	229.7
8.43	303.7	0.0	67.3	53.9	27.15	288.6	0.0	262.4	249.4
9.15	308.6	0.0	69.2	55.1	28.15	298.5	0.0	262.2	250.3
9.29	301.5	0.0	77.7	63.5	28.29	287.0	0.0	275.0	263.4
10.15	294.8	0.0	92.7	77.6	29.01	286.5	0.0	282.4	271.7
11.29	317.3	0.0	81.2	65.2	30.01	279.4	0.0	299.1	289.8
11.57	317.4	0.0	83.8	67.6	31.01	299.1	0.0	289.1	281.2
12.15	317.6	0.0	89.1	72.5	31.58	297.9	0.0	295.8	288.8
13.29	312.0	0.0	105.7	88.5	32.15	289.4	0.0	309.8	303.8
14.00	318.0	0.0	106.6	89.0	33.15	301.6	0.0	307.2	303.0
14.72	322.5	0.0	109.0	91.1	33.44	304.8	0.0	306.7	303.1
14.86	320.5	0.0	112.3	94.4	34.58	294.4	0.0	328.1	326.7
15.58	303.8	0.0	135.9	117.8	35.15	323.1	0.0	304.9	304.6
16.72	308.9	0.0	141.8	123.5	35.29	324.6	304.8	0.0	0.0
17.58	315.3	0.0	143.6	125.3					

Pathloss Calculation

Path data for case # 4	DULUTH		BLACKJACK	
Latitude	33 57 47.2		33 58 19.2	
Longitude	84 5 43.0		84 30 8.3	
Antenna Center Agl	12.01 ft.	3.66 m.	250.01 ft.	76.20 m.
Site Elevation Amsl	939.05 ft.	286.21 m.	1267.12 ft.	386.20 m.
Antenna Center Amsl	951.06 ft.	289.87 m.	1517.13 ft.	462.40 m.
Effective Antenna Ht ...	12.01 ft.	3.66 m.	518.99 ft.	158.18 m.
Horizon Distance	1.77 mi.	2.85 km.	20.91 mi.	33.64 km.
Horizon Elevation Amsl .	1016.78 ft.	309.90 m.	1042.37 ft.	317.70 m.
Ray Crossover Angle	5.01 mr.			
Terrain Delta Ht	81.34 ft.	24.79 m.		
Effective Distance	36.43 mi.	58.61 km.		
Pathlength	23.39 mi.	37.63 km.		
Azimuth	271.62 deg.		91.39 deg.	
Frequency	2000 MHz			
K Factor	1.33 (K)			

Radio Climate Phrase ... Continental Temperate Climate
Type of Path ..... Two Single Knife Edges
Free Space Path Loss ... 129.9 dB Atmospheric Loss ... 0.227 dB
Diff. Loss .... 28.1 dB (158.0 dB) Tropo. Loss ... 54.7 dB (184.7 dB)
Terrain data type ..... 1.0 ARC Second

Losses	L-Fspl	Sigma	Controlling Propagation Mode
153.4 dB	23.5 dB	3.6 dB	20. % Diffraction
148.6 dB	18.7 dB	3.8 dB	1. % Diffraction
147.2 dB	17.3 dB	3.9 dB	0.1 % Diffraction
146.3 dB	16.4 dB	4.0 dB	0.01 % Diffraction
145.3 dB	15.3 dB	4.1 dB	0.0025% Diffraction

The OH loss calculations considered a terrain profile of 265 points.
The list below shows the highest point in each fiftieth of the path length.

Dist. (km.)	Elev. (m.)	Obstr. (m.)	K=Inf. Clrnce. (m.)	K= 1.33 Clrnce. (m.)	Dist. (km.)	Elev. (m.)	Obstr. (m.)	K=Inf. Clrnce. (m.)	K= 1.33 Clrnce. (m.)
0.00	286.2	3.7	0.0	0.0	19.10	326.5	0.0	50.9	30.1
0.14	281.8	0.0	8.7	8.4	20.24	336.0	0.0	46.7	25.9
1.28	292.5	0.0	3.3	0.5	20.38	330.2	0.0	53.1	32.4
1.85	299.4	0.0	-1.0	-4.9	21.81	309.5	0.0	80.4	60.0
2.85	309.9	0.0	-7.0	-12.8	22.52	321.2	0.0	71.9	51.9
3.42	306.7	0.0	-1.1	-8.0	22.81	337.8	0.0	56.6	36.7
3.99	317.7	0.0	-9.5	-17.4	23.66	321.0	0.0	77.4	57.9
4.70	303.0	0.0	8.4	-0.7	24.80	321.0	0.0	82.6	63.8
5.70	306.9	0.0	9.1	-1.6	24.94	314.6	0.0	89.6	71.0
6.56	300.9	0.0	19.0	7.0	26.09	310.1	0.0	99.4	81.6
6.98	306.3	0.0	15.6	3.0	27.08	291.0	0.0	123.0	106.2
8.12	315.9	0.0	11.2	-2.9	27.80	308.1	0.0	109.2	93.1
8.98	326.8	0.0	4.2	-10.9	28.22	319.5	0.0	99.8	84.1
9.27	328.8	0.0	3.5	-11.9	28.65	314.9	0.0	106.3	91.2
10.41	332.2	0.0	5.4	-11.3	29.51	320.7	0.0	104.4	90.3
10.55	325.3	0.0	12.9	-3.9	30.22	304.9	0.0	123.5	110.3
11.40	324.7	0.0	17.5	-0.2	31.36	305.1	0.0	128.5	116.9
12.40	312.1	0.0	34.6	16.2	31.79	308.6	0.0	127.0	116.1
13.11	316.9	0.0	33.1	14.1	32.64	309.5	0.0	130.0	120.4
13.97	297.0	0.0	56.9	37.4	33.78	286.8	0.0	158.0	150.3
14.40	293.0	0.0	62.9	43.1	34.50	302.6	0.0	145.4	139.0
15.11	286.8	0.0	72.3	52.3	35.35	311.8	0.0	140.1	135.4
16.11	287.4	0.0	76.3	55.9	36.06	321.8	0.0	133.4	130.1
17.25	281.1	0.0	87.8	67.1	36.21	330.3	0.0	125.6	122.5
17.82	319.2	0.0	52.4	31.5	37.49	382.8	0.0	78.9	78.6
18.53	329.7	0.0	45.1	24.3	37.63	386.2	76.2	0.0	0.0

Pathloss Calculation

Path data for case # 11	DULUTH	NEWNAN TOWER
Latitude	33 57 47.2	33 24 41.0
Longitude	84 5 43.0	84 49 47.8
Antenna Center Agl	12.01 ft. 3.66 m.	1000.05 ft. 304.80 m.
Site Elevation Amsl	939.05 ft. 286.21 m.	842.89 ft. 256.90 m.
Antenna Center Amsl	951.06 ft. 289.87 m.	1842.94 ft. 561.70 m.
Effective Antenna Ht ...	12.01 ft. 3.66 m.	1000.05 ft. 304.80 m.
Horizon Distance	0.31 mi. 0.50 km.	45.28 mi. 72.86 km.
Horizon Elevation Amsl .	971.50 ft. 296.10 m.	1063.37 ft. 324.10 m.
Ray Crossover Angle	15.70 mr.	
Terrain Delta Ht	73.38 ft. 22.37 m.	
Effective Distance	71.44 mi. 114.95 km.	
Pathlength	56.91 mi. 91.57 km.	
Azimuth	228.27 deg.	47.86 deg.
Frequency	2000 MHz	
K Factor	1.33 (K)	

Radio Climate Phrase ... Continental Temperate Climate
Type of Path ..... Irregular Terrain
Free Space Path Loss ... 137.7 dB Atmospheric Loss ... 0.551 dB
Diff. Loss .... 81.4 dB (219.0 dB) Tropo. Loss ... 66.2 dB (203.8 dB)
Terrain data type ..... 1.0 ARC Second

Losses	L-Fspl	Sigma	Controlling Propagation Mode
189.8 dB	52.2 dB	4.2 dB	20. % Tropospheric Scatter
172.6 dB	35.0 dB	7.3 dB	1. % Tropospheric Scatter
162.2 dB	24.5 dB	9.5 dB	0.1 % Tropospheric Scatter
153.8 dB	16.1 dB	11.2 dB	0.01 % Tropospheric Scatter
147.7 dB	10.1 dB	12.5 dB	0.0025% Tropospheric Scatter

The OH loss calculations considered a terrain profile of 368 points.
The list below shows the highest point in each fiftieth of the path length.

Dist. (km.)	Elev. (m.)	Obstr. (m.)	K=Inf. Clrnce. (m.)	K= 1.33 Clrnce. (m.)	Dist. (km.)	Elev. (m.)	Obstr. (m.)	K=Inf. Clrnce. (m.)	K= 1.33 Clrnce. (m.)
0.00	286.2	3.7	0.0	0.0	46.91	293.6	0.0	135.5	12.0
0.50	296.1	0.0	-4.7	-7.4	49.15	285.4	0.0	150.4	27.4
3.49	288.9	0.0	11.3	-6.8	50.40	283.6	0.0	155.9	33.5
5.49	279.6	0.0	26.6	-1.3	51.65	267.5	0.0	175.7	54.1
6.49	286.6	0.0	22.5	-10.0	54.64	282.4	0.0	169.7	50.7
8.98	304.2	0.0	12.3	-31.4	56.14	283.5	0.0	173.0	55.7
10.48	315.0	0.0	6.0	-44.1	57.89	296.7	0.0	165.0	50.0
12.23	306.8	0.0	19.4	-37.8	58.64	299.3	0.0	164.6	50.7
13.72	309.8	0.0	20.8	-42.2	62.13	305.1	0.0	169.2	61.3
15.72	317.7	0.0	18.8	-51.5	63.87	306.2	0.0	173.3	69.0
17.72	324.8	0.0	17.7	-59.5	64.62	314.0	0.0	167.7	65.0
18.71	324.1	0.0	21.3	-59.1	67.62	306.2	0.0	184.4	88.9
20.21	314.4	0.0	35.5	-49.6	68.62	304.4	0.0	189.2	96.3
22.95	310.4	0.0	47.6	-45.3	71.11	311.3	0.0	189.7	103.9
24.20	304.1	0.0	57.6	-38.5	72.86	311.7	0.0	194.4	114.0
26.20	281.6	0.0	86.0	-15.0	73.36	300.0	0.0	207.6	128.8
27.95	292.5	0.0	80.3	-24.5	75.35	299.7	0.0	213.9	141.8
30.44	293.4	0.0	86.8	-22.9	77.10	283.1	0.0	235.6	169.8
32.19	318.1	0.0	67.3	-45.4	79.09	269.8	0.0	254.9	196.7
33.93	311.1	0.0	79.5	-35.8	81.59	279.0	0.0	253.1	205.1
35.68	308.9	0.0	86.9	-30.7	82.59	262.5	0.0	272.5	228.8
37.93	305.8	0.0	96.7	-23.3	85.58	271.5	0.0	272.4	242.2
39.67	311.8	0.0	95.8	-25.6	86.33	286.7	0.0	259.4	232.8
41.42	318.1	0.0	94.7	-27.8	88.08	280.0	0.0	271.3	253.2
42.42	314.1	0.0	101.7	-21.3	90.57	278.1	0.0	280.6	275.3
44.66	293.4	0.0	129.1	5.5	91.57	256.9	304.8	0.0	0.0

Pathloss Calculation

Path data for case # 12	DULUTH		FOX TOWER	
Latitude	33 57 47.2		33 7 32.0	
Longitude	84 5 43.0		83 51 32.0	
Antenna Center Agl	12.01 ft.	3.66 m.	890.14 ft.	271.30 m.
Site Elevation Amsl	939.05 ft.	286.21 m.	889.81 ft.	271.20 m.
Antenna Center Amsl	951.06 ft.	289.87 m.	1779.94 ft.	542.50 m.
Effective Antenna Ht ...	12.01 ft.	3.66 m.	1097.49 ft.	334.50 m.
Horizon Distance	0.31 mi.	0.50 km.	50.78 mi.	81.71 km.
Horizon Elevation Amsl .	966.25 ft.	294.50 m.	1000.71 ft.	305.00 m.
Ray Crossover Angle	12.77 mr.			
Terrain Delta Ht	79.59 ft.	24.26 m.		
Effective Distance	72.09 mi.	116.00 km.		
Pathlength	59.32 mi.	95.45 km.		
Azimuth	166.64 deg.		346.77 deg.	
Frequency	2000 MHz			
K Factor	1.33 (K)			

Radio Climate Phrase ... Continental Temperate Climate
Type of Path ..... Irregular Terrain
Free Space Path Loss ... 138.0 dB Atmospheric Loss ... 0.575 dB
Diff. Loss .... 69.4 dB (207.4 dB) Tropo. Loss ... 63.2 dB (201.2 dB)
Terrain data type ..... 1.0 ARC Second

Losses	L-Fspl	Sigma	Controlling Propagation Mode
186.3 dB	48.3 dB	4.2 dB	20. % Tropospheric Scatter
169.0 dB	31.0 dB	7.4 dB	1. % Tropospheric Scatter
158.4 dB	20.4 dB	9.5 dB	0.1 % Tropospheric Scatter
149.8 dB	11.8 dB	11.4 dB	0.01 % Tropospheric Scatter
143.6 dB	5.6 dB	12.7 dB	0.0025% Tropospheric Scatter

The OH loss calculations considered a terrain profile of 383 points.
The list below shows the highest point in each fiftieth of the path length.

Dist. (km.)	Elev. (m.)	Obstr. (m.)	K=Inf. Clrnce. (m.)	K= 1.33 Clrnce. (m.)	Dist. (km.)	Elev. (m.)	Obstr. (m.)	K=Inf. Clrnce. (m.)	K= 1.33 Clrnce. (m.)
0.00	286.2	3.7	0.0	0.0	47.73	226.3	0.0	189.9	55.6
0.50	294.5	0.0	-3.3	-6.1	51.22	217.4	0.0	208.0	74.4
2.25	306.0	0.0	-10.2	-22.5	51.97	214.0	0.0	213.4	80.2
4.75	294.4	0.0	8.0	-17.4	54.22	190.0	0.0	243.4	111.5
6.00	284.8	0.0	20.9	-10.7	56.97	208.4	0.0	232.3	103.0
8.75	289.9	0.0	23.1	-21.6	57.72	201.0	0.0	241.6	113.2
10.00	297.4	0.0	18.9	-31.4	59.97	199.2	0.0	249.4	123.9
13.24	299.1	0.0	25.8	-38.4	61.72	207.0	0.0	246.2	123.4
13.74	305.0	0.0	21.2	-45.0	63.97	205.5	0.0	253.7	134.9
16.49	281.3	0.0	52.2	-24.6	65.72	190.0	0.0	273.8	158.6
17.24	291.7	0.0	43.8	-35.7	68.47	190.0	0.0	281.1	172.1
19.99	275.1	0.0	67.7	-21.3	70.47	200.0	0.0	276.4	172.5
21.24	264.1	0.0	82.0	-11.0	71.71	208.0	0.0	271.7	171.3
24.49	280.1	0.0	74.6	-27.9	72.71	202.0	0.0	280.3	182.8
24.99	268.7	0.0	87.3	-16.5	76.21	204.5	0.0	287.1	200.6
26.74	261.4	0.0	99.2	-9.1	76.71	212.0	0.0	280.9	196.1
30.49	243.2	0.0	127.4	10.6	78.46	202.0	0.0	295.5	216.9
32.23	268.2	0.0	107.0	-13.2	81.96	195.3	0.0	311.5	246.3
32.48	271.3	0.0	104.5	-16.1	82.21	177.5	0.0	329.9	265.7
35.23	271.9	0.0	111.2	-13.9	85.71	171.2	0.0	345.5	296.3
36.48	255.0	0.0	131.4	4.6	85.96	169.1	0.0	348.3	300.1
39.98	249.4	0.0	146.3	15.5	88.71	168.9	0.0	355.7	320.5
40.23	250.8	0.0	145.5	14.5	90.46	178.6	0.0	350.7	324.0
43.23	233.9	0.0	170.4	37.2	92.45	152.6	0.0	382.0	365.6
44.48	229.6	0.0	178.0	44.3	94.95	159.7	0.0	381.5	378.7
46.98	231.4	0.0	182.8	48.5	95.45	271.2	271.3	0.0	0.0

Receiver Location	Distance To Receiver	Azimuth to Receiver	Predicted Margin LOS	Estimated Pathloss
Gainesville	28.3 km.	50.4 deg.	55.7 dB	9.8 dB

Case Details - KC25976
Earth Station Name DULUTH, GA
Owner ViaSat, Inc
Latitude (DMS) (NAD83) 33 57 47.2 N
Longitude (DMS) (NAD83) 84 5 43.0 W
Ground Elevation (ft/m) 939.00 / 286.21 Amsl
Antenna Centerline (ft/m) 12.00 / 3.66 Agl
Antenna Model 7.3 Meter
Objectives: Transmit -154.0 (dBW /4 kHz) Tx Power -2.8 (dBW/4 kHz)

Terrestrial Path Latitude Longitude Call Sign Owner Freq/Pol	Gnd Acl	Edisct Tdisct	Ges Gts	FsLoss Tant Loading	Dist Az	Pr Margin	Tpwr LL	Plan
1 GAINESVILLE GATEMPY LOC 34 7 32 83 51 31 RXONLY	GA 262.10 537.70	43.0 0.1	7.0 25.0	127.5 2QUADN	28.3-98.3 50.4	55.7	0.0	0.0BT
WAGATV: New World Communications of Atlanta, Inc DIGITAL DIG RCN: 2025.5000B 2037.5000B 2049.5000B 2061.5000B 2073.5000B 2085.5000B 2097.5000B								
Status: L		Equipment: AB9823 Emission: 12M0D7W						
OH LOSS 20% / 0.0025%: 0.00 / 0.00								

Pathloss Calculation

Path data for case # 1	DULUTH		GAINESVILLE	
Latitude	33 57 47.2		34 7 32.0	
Longitude	84 5 43.0		83 51 31.0	
Antenna Center Agl	12.01 ft.	3.66 m.	1764.19 ft.	537.70 m.
Site Elevation Amsl	939.05 ft.	286.21 m.	859.95 ft.	262.10 m.
Antenna Center Amsl	951.06 ft.	289.87 m.	2624.14 ft.	799.80 m.
Effective Antenna Ht ...	30.00 ft.	9.14 m.	1764.19 ft.	537.70 m.
Horizon Distance	0.21 mi.	0.34 km.	17.39 mi.	27.98 km.
Horizon Elevation Amsl .	987.58 ft.	301.00 m.	987.58 ft.	301.00 m.
Ray Crossover Angle	16.58 mr.			
Terrain Delta Ht	127.64 ft.	38.90 m.		
Effective Distance	17.40 mi.	28.00 km.		
Pathlength	17.60 mi.	28.32 km.		
Azimuth	50.43 deg.		230.56 deg.	
Frequency	2050 MHz			
K Factor	1.33 (K)			

Radio Climate Phrase ... Continental Temperate Climate
Type of Path ..... Single Knife Edge
Free Space Path Loss ... 127.7 dB Atmospheric Loss ... 0.171 dB
Diff. Loss .... 14.8 dB (142.5 dB) Tropo. Loss ... 68.9 dB (196.6 dB)
Terrain data type ..... 1.0 ARC Second

Losses	L-Fspl	Sigma	Controlling Propagation Mode
137.5 dB	9.8 dB	3.6 dB	20. % Diffraction
133.9 dB	6.2 dB	3.7 dB	1. % Diffraction
132.9 dB	5.2 dB	3.8 dB	0.1 % Diffraction
132.2 dB	4.6 dB	3.8 dB	0.01 % Diffraction
131.5 dB	3.8 dB	3.9 dB	0.0025% Diffraction

The OH loss calculations considered a terrain profile of 205 points.
The list below shows the highest point in each fiftieth of the path length.

Dist. (km.)	Elev. (m.)	Obstr. (m.)	K=Inf. Clrnce. (m.)	K= 1.33 Clrnce. (m.)	Dist. (km.)	Elev. (m.)	Obstr. (m.)	K=Inf. Clrnce. (m.)	K= 1.33 Clrnce. (m.)
0.00	286.2	3.7	0.0	0.0	14.23	347.8	0.0	198.3	186.5
0.14	282.7	0.0	9.7	9.5	15.09	336.4	0.0	225.1	213.3
0.34	280.0	21.0	-5.0	-5.6	15.37	322.6	0.0	244.0	232.3
1.00	289.6	0.0	18.2	16.6	16.37	330.0	0.0	254.6	243.0
1.57	297.5	0.0	20.6	18.1	16.80	336.0	0.0	256.2	244.8
1.99	305.0	0.0	20.7	17.7	17.51	347.3	0.0	257.8	246.6
2.28	299.0	0.0	31.9	28.4	18.08	347.2	0.0	268.1	257.2
2.99	313.6	0.0	30.1	25.6	18.36	352.2	0.0	268.2	257.4
3.56	317.3	0.0	36.6	31.4	19.21	358.6	0.0	277.2	266.9
4.27	319.0	0.0	47.7	41.7	19.64	360.0	0.0	283.5	273.4
4.98	318.1	0.0	61.5	54.6	20.21	360.0	0.0	293.7	284.1
5.55	312.1	0.0	77.7	70.3	20.64	366.0	0.0	295.4	286.1
5.98	328.0	0.0	69.5	61.6	21.49	359.3	0.0	317.5	308.8
6.55	322.9	0.0	84.8	76.4	21.78	365.3	0.0	316.6	308.2
6.83	316.0	0.0	96.9	88.2	22.20	347.8	0.0	341.8	333.8
7.83	312.6	0.0	118.2	108.7	23.20	326.8	0.0	380.8	373.7
8.40	318.0	0.0	123.1	113.2	23.34	336.5	0.0	373.6	366.8
8.68	322.5	0.0	123.7	113.6	24.05	335.9	0.0	387.0	381.0
9.11	318.7	0.0	135.2	124.8	24.48	324.0	0.0	406.6	401.1
9.96	307.1	0.0	162.1	151.4	25.05	288.6	0.0	452.3	447.4
10.53	315.8	0.0	163.7	152.6	25.90	290.5	0.0	465.7	462.0
10.96	325.9	0.0	161.3	150.1	26.19	287.9	0.0	473.5	470.2
11.53	339.5	0.0	157.9	146.5	26.90	275.3	0.0	498.9	496.6
12.38	337.5	0.0	175.3	163.7	27.47	276.6	0.0	507.8	506.4
12.67	348.0	0.0	169.9	158.2	28.18	258.4	0.0	538.8	538.6
13.52	346.6	0.0	186.7	174.9	28.32	262.1	537.7	0.0	0.0
13.95	348.0	0.0	193.0	181.2					

CERTIFICATE OF SERVICE

I, Karen Sprung, hereby certify that on this 19th day of January 2012, I served a copy of the foregoing "Opposition of ViaSat, Inc." by first class mail upon the following:

Michael Basile
Dow Lohnes PLLC
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Robert J. Folliard, III
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/s/

Karen R. Sprung
Communications Analyst