

555 Eleventh Street, N.W., Suite 1000
Washington, D.C. 20004-1304
Tel: +1.202.637.2200 Fax: +1.202.637.2201
www.lw.com

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June 23, 2009

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

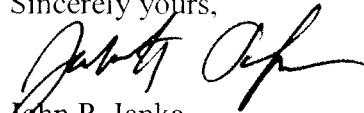
Re: Call Sign E080100: Applications of Row 44, Inc. for
Authority to Operate up to 1,000 Technically-Identical Aeronautical-Mobile
Satellite Service Transmit/Receive Earth Stations Aboard Commercial and Private
Aircraft, FCC File Nos. SES-LIC-20080508-00570; SES-AMD-20080619-00826;
SES-AMD-20080819-01074; SES-AMD-20080829-01117; SES-AMD-
20090115-00041; SES-AMD-20090416-00501 and
Special Temporary Authority, FCC File Nos. SES-STA-20080711-00928; SES-
STA-20090417-00507.

Dear Ms. Dortch:

On behalf of ViaSat, Inc., we hereby file the enclosed redacted version of a letter
in connection with the above-referenced proceedings. A confidential version of the letter is
being filed under separate cover, and under seal, pursuant to the Protective Order in DA 09-1062.

Please contact the undersigned should you have any questions.

Sincerely yours,



John P. Janka
Jarrett S. Taubman

Counsel for ViaSat, Inc.

cc: David S. Keir, Counsel for Row 44, Inc.

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Re: Call Sign E080100: Applications of Row 44, Inc. for

Authority to Operate up to 1,000 Technically-Identical Aeronautical-Mobile Satellite Service Transmit/Receive Earth Stations Aboard Commercial and Private Aircraft. FCC File Nos. SES-LIC-20080508-00570; SES-AMD-20080619-00826; SES-AMD-20080819-01074; SES-AMD-20080829-01117; SES-AMD-20090115-00041; SES-AMD-20090416-00501 and

Special Temporary Authority. FCC File Nos. SES-STA-20080711-00928; SES-STA-20090417-00507.

Ex Parte Presentation

Dear Ms. Dortch:

ViaSat, Inc. ("ViaSat") hereby responds to: (i) the test reports submitted by Row 44, Inc. ("Row 44") on April 13, 2009 ("Ground-Based Test Report") and May 11, 2009 ("In-Flight Test Report") (collectively, the "Test Reports"), along with requests for confidential treatment,¹ and (ii) the *ex parte* letter filed by Row 44 on June 17, 2009 (the "June 17 Letter"), all in connection with the above-referenced proceedings in which Row 44 seeks authority to provide aeronautical-mobile satellite service ("AMSS") in the Ku-band.

In the June 17 Letter, Row 44 claims that it has submitted "complete reports detailing both its pre-application ground testing as well as the in-flight performance of its antenna system," and "has provided more hard data, including actual flight test data, demonstrating the capabilities of its system than any prior AMSS blanket license applicant has provided." These statements are simply untrue. As explained below, the Test Reports fail to

¹ ViaSat's engineers were able to review the Test Reports only after: (i) the Commission released its Protective Order on May 13, 2009; (ii) each engineer executed an Acknowledgment of Confidentiality, as required by that Protective Order, and (iii) the time allowed for Row 44 to object to disclosure of the Test Reports to each engineer had elapsed.

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resolve the numerous, material questions of fact raised in this proceeding, many of which flow directly from deficiencies in Row 44's initial application. Accordingly, the Commission should dismiss or deny the application, and any future requests for STA in connection with the application.

ViaSat and others — including ARINC, Boeing, KVH Industries, and LiveTV — have identified significant technical deficiencies in Row 44's application. Collectively, these parties have noted that:

- Row 44 has failed, repeatedly, to provide the complete set of technical information needed to evaluate fully its application — as is Row 44's burden as an applicant seeking to operate on a non-interference basis, pursuant to waiver, with a non-FCC-compliant antenna, and in a service for which technical rules have not been adopted;
- The information that Row 44 has provided indicates that Row 44 would operate at unnecessarily high power-density levels and without the ability to maintain a level of pointing accuracy consistent with the Commission's rules — which is critical given the high power-density levels at which Row 44 is choosing to operate; and
- Independent analysis has demonstrated that, even under Row 44's unrealistic assumptions, its proposed operations would create a threat of harmful interference into adjacent operations many times greater than that which the Commission has been unwilling to tolerate in other contexts.

Despite numerous opportunities, Row 44 has failed to provide detailed technical information sufficient to demonstrate that its proposed system would operate in a manner consistent with a two-degree spacing environment: indeed, Row 44 has balked at every opportunity to provide meaningful data to the Commission or the public. Such failure is inexcusable because Row 44 has held STA to conduct ground-based testing of its system for almost a year and a half, and operated its system in flight on numerous occasions (albeit without authorization in the U.S. for a number of months). Row 44's failure to provide a clear, straightforward technical showing speaks volumes; if Row 44 were capable of providing such a showing, it would have done so by now.

Similarly, Row 44 has failed to provide the data that would be needed to resolve the material questions of fact with respect to numerous technical aspects of its proposed system. These include, but are not limited to, the following material unresolved issues raised by ViaSat and others during the course of this proceeding:

1. Precisely what mechanism Row 44's system would use to ensure compliance with the 0.2 degrees peak pointing accuracy limit specified in Section 25.222(a)(6) of the Commission's rules, particularly given the non-compliance of the AeroSat antenna pattern in the elevation plane;

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2. How Row 44's system would detect mispointing in excess of 0.2 degrees given the difficulty of measuring with precision both the orientation of the antenna with respect to the aircraft and the orientation of the aircraft with respect to the earth;
3. How Row 44's antenna would ensure accurate pointing given its physical inability to track in all three axes that are relevant with respect to a moving airplane (i.e., pitch, yaw and roll);
4. How Row 44's closed-loop tracking mechanism would collect, within 100 milliseconds as required by Section 25.222(a)(7) of the Commission's rules, the numerous E_s/N_0 samples necessary to measure mispointing and enable shut-down upon mispointing by more than 0.5 degrees when data would be output by the modem only once every 100 milliseconds;
5. How Row 44's closed-loop tracking mechanism would overcome bias inherent in E_s/N_0 -based tracking, which would cause the antenna to point *towards* a victim adjacent satellite in certain instances;
6. How Row 44's system would ensure compliance with the 0.2 degrees peak pointing accuracy limit specified in Section 25.222(a)(6) of the Commission's rules when its closed-loop tracking mechanism would, in the normal course of operation, "perturb the antenna pointing vector by small known amounts" of "typically 0.2 degree[s]" — which in and of itself would exceed the limit;
7. How Row 44's system would use IRU data to facilitate effective tracking when IRUs typically installed in commercial airliners have peak accuracies of only approximately 0.6 degrees in heading and 0.15 degrees in pitch and roll;
8. How Row 44's system would control for external sources of error (e.g., installation error, airframe flex, vibration, turbulence, etc.); and
9. Precisely how Row 44 would control uplink power, particularly over those parts of the expected coverage area where power levels low enough to avoid harmful interference would not be adequate to provide service.

A more complete list of such issues is presented in Exhibit A hereto.

After acknowledging the outstanding technical issues in this proceeding and finding that additional data might speed their resolution, the Commission granted Row 44 limited testing STA and directed it to prepare the Test Reports in hopes of "facilitating assessment and resolution of concerns regarding interference that might result from *full-scale operation* as proposed in Row 44's underlying license application" (emphasis supplied). Unfortunately, Row 44 has squandered this opportunity by providing Test Reports reflecting poor experimental design and containing data of little value in either (i) resolving the disputed questions of material fact that remain outstanding on the record, or (ii) validating the questionable claims set forth in its application.

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As predicted by ViaSat, and as discussed in greater detail below, the Test Reports are fundamentally flawed in both design and implementation. Notably: (i) Row 44 has provided only a subset of data collected pursuant to STA, and has not described its methodology fully — thus failing to satisfy the Commission’s directive to Row 44; (ii) Row 44 has failed to design its test program to mirror “real world” flight conditions, rendering meaningless the data contained in the Test Reports; and (iii) Row 44’s experimental design is rife with methodological defects, rendering the resulting data unreliable.

As detailed below, the _____ hours of in-flight test data that Row 44 has submitted do nothing to quantify the interference risk that would be presented by “full scale operations” of Row 44’s systems — hundreds of non-compliant Row 44 terminals simultaneously transmitting high-power-density signals from moving aircraft. At a minimum, and as Row 44 itself has acknowledged, Row 44 should have submitted data from many more aircraft in order to “permit analysis based on circumstances where multiple aircraft are operating in the same geographic area and providing service to a high volume of passenger users.” and to account for the “operation of equipped aircraft on different routes, in different regions, and on different days . . . in a greater variety of flight conditions with respect to uncontrolled variables such as weather, wind speed, and turbulence.”²

Further, the fact that Row 44 had to

_____, calls into question the repeated assurances Row 44 has made in the past that its system would need to shut off only infrequently, during banking maneuvers that Row 44 asserts likely would occur only at the beginning and end of commercial airliner flights.

Consequently, more than one year after Row 44 submitted its initial application, Row 44 still has failed to provide the data necessary to validate the technical claims in its application. At the same time, the technical issues raised by ViaSat in its initial Petition to Deny persist, unresolved on the record. Accordingly, the Commission should dismiss or deny the application, as well as any future requests for STA in connection with the application. At a minimum, the Commission should require Row 44 to address the issues summarized below before granting Row 44 any further authority.

A. Background

While Row 44 complains that more than a year has passed since the filing of its application, the blame for this state of affairs falls squarely on Row 44’s shoulders. This is apparent in reviewing the history of this proceeding:

Deficiencies in Row 44’s Initial Application. Row 44’s application, initially filed on May 8, 2008, seeks authority to provide AMSS in the Ku-band using the Horizons-1, AMC-2, and AMC-9 geostationary satellites. As an applicant to use Ku band FSS spectrum for

² See Letter from David S. Keir, Counsel for Row 44, Inc., to Marlene H. Dortch, Secretary, Federal Communications Commission (Feb. 11, 2009).

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AMSS, Row 44 seeks a waiver of the U.S. Table of Frequency Allocations to provide service on both a non-conforming and a secondary basis, and thus on a strict-non-interference basis. Commission precedent establishes that Row 44 bears the burden of submitting a detailed engineering analysis demonstrating that using its non-Section 25.209-compliant antenna for these purposes would not cause interference into any compliant services in a two-degree spacing environment. However, as ViaSat and others have demonstrated, Row 44 has failed to meet this burden.

ViaSat Petition to Deny and other Opposition to the Application. ViaSat's June 27, 2008 Petition to Deny noted numerous technical deficiencies in Row 44's application, including Row 44's failure to establish that its proposed AMSS system would: (i) satisfy the pointing accuracy requirements set forth in Section 25.222(a)(6) and (7) of the Commission's rules; (ii) satisfy the power density limits set forth in Section 25.134(g)(1) of the Commission's rules; or (iii) otherwise operate in a manner consistent with a two-degree spacing environment. ViaSat also noted Row 44's failure to include in its application: (i) representative link budgets covering both the forward and return links with respect to all three satellites that Row 44 proposes to use, or (ii) any demonstration that its proposed system could operate with the significant pitch, yaw, and roll of flight and without interfering with FCC-compliant operations on adjacent spacecraft. Consistent with Commission precedent regarding incomplete applications, ViaSat respectfully requested that the Commission dismiss or deny the application.³ Subsequently, ARINC, Boeing, KVH Industries, and LiveTV filed letters echoing these sentiments.

Commission "Deficiency Letters" and Subsequent Amendments. After ViaSat filed its Petition, the Commission issued two deficiency letters — one on August 7, 2008 and the other on August 25, 2008 — noting the incomplete nature of Row 44's initial application, and requiring Row 44 to file corrective amendments or face dismissal.⁴ Among other things, those letters asked Row 44 to provide the Commission with further information regarding the pointing performance of its proposed system and the maximum EIRP density toward the geostationary arc should Row 44's antenna be misoriented to the maximum extent specified (0.5 degrees). On August 19, 2008 and August 29, 2008, Row 44 filed amendments purporting to respond to these deficiency letters.

³ See, e.g., Letter from Kathryn Medley, Chief, Satellite Engineering Branch, Satellite Division, International Bureau, to George F. Wazeter, Telesat Network Services, DA 09-1238 (Jun. 3, 2009) (noting that 47 C.F.R. § 25.112, requires the Commission to return, as unacceptable for filing, any earth station application that is not substantially complete, contains internal inconsistencies, or does not substantially comply with the Commission's rules).

⁴ See Letter from Scott A. Kotler, Chief, Systems Analysis Branch, Satellite Division, International Bureau to David S. Keir (Aug. 7, 2008); Letter from Scott A. Kotler, Chief, Systems Analysis Branch, Satellite Division, International Bureau to David S. Keir (Aug. 25, 2008).

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ViaSat Supplement to Petition to Deny. On October 10, 2008, ViaSat filed a Supplement to its Petition to Deny, which demonstrated that Row 44's amendments were not fully responsive to the Commission's inquiries, and otherwise failed to address all of the technical deficiencies in the application. In particular, ViaSat noted that Row 44 still had not demonstrated the ability to operate in a manner consistent with a two-degree spacing environment, insofar as: (i) Row 44's system design would exceed the Commission's EIRP density mask; (ii) Row 44 had not established its ability to comply with the Commission's pointing accuracy requirements; (iii) Row 44 had not accounted properly for the impact of aircraft banking and other maneuvers on interference toward the GSO arc; and (iv) Row 44 had not provided representative link budgets.

ViaSat Interference Analysis. Subsequently, Commission staff requested that ViaSat provide additional information quantifying the interference that Row 44's proposed system could cause into adjacent satellites. On December 8, 2008, ViaSat submitted an Interference Analysis demonstrating that Row 44's proposed system would pose a threat of harmful interference into operations on adjacent spacecraft, arising from the combination of: (i) Row 44's use of an antenna that does not meet the Section 25.209 antenna mask that is a cornerstone of the Commission's two-degree spacing policy, and (ii) Row 44's use of a high-power density wave form. More specifically, ViaSat showed that Row 44's secondary/non-conforming services would cause at least a 10.2% $\Delta T/T$ increase into VSAT networks on adjacent satellites — even if Row 44's antennas were mispointed only by 0.2 degrees (the peak mispointing limit set forth in Section 25.222(a)(6) of the Commission's rules) and otherwise operated precisely as Row 44 intends. ViaSat also showed that this interference threat would be far worse when evaluated under more realistic assumptions. ***That interference analysis remains un rebutted to this day.***

Unresolved Technical Issues and Calls for Additional Data. After two pleading cycles, Row 44 had still failed to resolve numerous material questions of fact with respect to its application (see Exhibit A hereto). Instead of submitting technical information sufficient to resolve these issues, or presenting any detailed analysis countering ViaSat's Interference Analysis, Row 44 continued to press the Commission to grant its application and associated request for STA. In response, ViaSat and other parties noted that Row 44 had not submitted for the record: (i) any data collected during ground testing pursuant to previous STA, or (ii) any data collected during Row 44's previous, well-publicized and unauthorized in-flight operations of its proposed system.⁵ In addition, ViaSat and other parties — including EchoStar and KVH Industries — indicated their desire to work with Row 44 and the Commission to design

⁵ See, e.g., Letter from John P. Janka, Counsel for ViaSat, Inc., to Marlene H. Dortch, Secretary, Federal Communications Commission (Jan. 29, 2009).

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mutually-acceptable experiments to test the capabilities of Row 44's system, expressing a willingness to make facilities and other resources available for such tests.⁶

Submission of Row 44's Deficient "Test Plan." While ViaSat provided input to Row 44 on February 3, 2009, based on its own extensive experience in designing and implementing mobile satellite antennas,⁷ this input was promptly ignored. Instead, on February 6, 2009 Row 44 submitted a "Test Plan" to the Commission as a *fait accompli*.⁸ Row 44 afforded ViaSat no opportunity to review or comment on the "Test Plan," which was unfortunate because Row 44's proposed approach suffered from numerous deficiencies, many of them apparent with only a cursory review. Most significantly, and as ViaSat explained once it saw Row 44's proposal, Row 44 failed to specify any testing methodology whatsoever — and thus did not have much of a plan at all. Further, Row 44 failed to provide any indication of how aircraft would be instrumented to measure pointing performance — a conspicuous omission given the documented difficulty (if not impossibility) of measuring with precision both the orientation of the antenna with respect to the aircraft and the orientation of the moving aircraft with respect to the earth.⁹

Commission Grant of Limited STA to Allow Further Testing, Conditioned on Reporting of Testing Results. On March 13, 2009, the Commission granted Row 44's request for STA to conduct "limited mobility testing" of its proposed AMSS system under actual flight conditions.¹⁰ In granting STA, the Commission noted the existence of unresolved issues in the proceeding,¹¹ and indicated that data collected pursuant to STA would be used to "facilitat[e] assessment and resolution of concerns regarding interference that might result from *full-scale operation* as proposed in Row 44's underlying license application."¹² To facilitate this end, the Commission required Row 44 to prepare and submit separate reports on its ground-based and in-flight testing of its proposed AMSS system¹³

⁶ See Letter to John Giusti, Acting Chief, International Bureau, Federal Communications Commission from Representatives of EchoStar Corporation, KVH Industries, Inc. and ViaSat, Inc. (Feb. 3, 2009).

⁷ See Attachment B to Letter from David S. Keir, Counsel for Row 44, Inc., to Marlene H. Dortch, Secretary, Federal Communications Commission (Feb. 6, 2009).

⁸ See Letter from David S. Keir, Counsel for Row 44, Inc., to Marlene H. Dortch, Secretary, Federal Communications Commission (Feb. 6, 2009) ("Test Plan Letter").

⁹ See Letter from John P. Janka, Counsel for ViaSat, Inc., to John Giusti, Acting Chief, International Bureau, Federal Communications Commission (Feb. 9, 2009).

¹⁰ See Explanatory Statement, FCC File Nos. SES-STA-20080711-00928 (Jul. 11, 2008).

¹¹ See *Row 44, Inc.*, Order and Authorization, DA 09-585 at ¶ 5 n.5 (Mar. 13, 2009).

¹² See *id.* at ¶ 6 (emphasis supplied).

¹³ *Id.* at ¶ 7.

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B. Row 44 Has Not Satisfied the Conditions Set Forth in the Row 44 STA Order

As noted above, the Commission conditioned its grant of STA to Row 44 on Row 44's submission of separate reports on ground-based and in-flight testing of Row 44's proposed AMSS system pursuant to STA. First, the Commission required Row 44 to submit a "detailed report on ground-based testing" conducted pursuant to prior STA, to include "test data pertaining to antenna mispointing and a description of test procedures." Second, the Commission required Row 44 to submit a "detailed written report on the results of [in-flight] technical testing" conducted pursuant to STA and in accordance with Row 44's "Test Plan."¹⁴ In short, these reports were to provide complete test data as well as a full specification of the methodology employed in such testing. Row 44 has failed on both counts.

Row 44's Failure to Submit Complete Testing Data. As an initial matter, it is immediately apparent that the in-flight test data reported by Row 44 are incomplete. Row 44 has presented data with respect to

This belies the intent of the STA,

which was to permit Row 44 to gather test data sufficient to facilitate the evaluation of Row 44's performance claims across a large variety of flights, aircraft, and flight conditions.

Row 44's failure to submit data with respect to these flights — or even a much larger sample of these flights — is inexplicable.

Moreover, although Row 44 has held STA for ground-based testing for over a year and a half — since January 2007 — Row 44's Ground-Based Test Report contains only
Specifically, Row 44 has failed to provide measured test data relevant to a key issue in this proceeding: the extent to which Row 44 is able to cease transmissions when the of its AeroSat antenna "tilts" toward an adjacent satellite during a banking maneuver.¹⁵ As ViaSat has explained, this "tilting" could be caused by any combination of geographic skew, aircraft pitch, yaw or roll and a variety of other factors.¹⁶

, Row 44's Ground-Based Test Report fails to provide any data that substantiate Row 44's claims of antenna pointing accuracy in the . Rather, Row 44 assumes away the problem, by mistakenly claiming¹⁷ In the same manner, Row 44 fails to provide data substantiating its claims that it would be able to cease transmissions

¹⁴ Notably, in that "Test Plan" Row 44 agreed to collect and make available to adjacent satellite operators, *inter alia*, data with respect to "[o]ccurrences of antenna mispoint and associated mute of transmission" for operations on commercial aircraft. Test Plan Letter, Att. A at 3.

¹⁵ See, e.g., Supplement to Petition to Deny of ViaSat, Inc. at 8-11 (Oct. 10, 2008); Reply to Opposition to Supplement of ViaSat, Inc. at 14-17 (Nov. 4, 2008).

¹⁶ *Id.*

¹⁷ See Ground-Based Test Report at 1.

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in a timely manner when this tilting, or skew, in the elevation plane exceeds the 25 degree shut off point that Row 44 has proposed.

Furthermore, Row 44's In-Flight Test Report describes the transmission muting events as occurring when "¹⁸ There is no indication at all of transmissions being muted when an error in elevation pointing occurred, or what the elevation error was when

Row 44's Failure to Fully Detail its Testing Methodology. A close reading of the Test Reports reveals numerous holes in Row 44's description of its testing methodology, and more generally that Row 44 has failed to provide sufficient detail to evaluate the manner in which that methodology may have biased the resulting test data. This is troubling as a general matter of experimental design, but also because Row 44 itself admits

¹⁹ Such admissions merely heighten the need to carefully scrutinize the experimental methodology used. While Row 44's description of methodology is generally underspecified, a few concrete examples are illustrative:

- Row 44 Provides No Information about How It Measured or Confirmed Actual Pointing Error on the Ground or While In Flight.

¹⁸ In-Flight Test Report at 32, 33.

¹⁹ See Ground-Based Test Report at 25.

- Row 44 Fails to Fully Specify Exactly What It is Measuring. Row 44’s Test Reports fail to define fully various terms it employed.

Thus, leaving aside the numerous issues with respect to the test data that Row 44 *did* report (which are detailed below), it is clear that Row 44 has not satisfied the conditions imposed by the Commission in granting STA: Row 44 has provided an *incomplete* report of data collected pursuant to STA, and an *incomplete* specification of the methodology used to gather such data. Accordingly, the Commission should immediately terminate Row 44’s STA, and require Row 44 to submit complete data with respect to *all* operations pursuant to such STA, as well as a comprehensive discussion of the methodology used to gather such data. The Commission should take no further action with respect to Row 44’s AMSS application or associated STA requests until this information has been submitted and evaluated by the Commission and interested parties.

C. The Test Data that Row 44 Does Report Do Not Reflect Expected “Real World” Conditions

Proper experimental design demands that experimental conditions mirror, to the extent possible, those conditions expected under “real world” operation. Simply put, Row 44 has failed to design its testing program in a manner that is representative of its “full-scale,” intended operations. As such, the utility of Row 44’s data is questionable. While not exhaustive, the following examples are indicative of the disconnects between the “real world” and Row 44’s experimental design:

- Row 44 Failed to Observe Operations of its System with of Mispointing.

²¹ See Ground-Based Test Report at 22-23.

- Row 44 Failed to Test the Effects of the Simultaneous Operation of its Proposed System on Multiple Commercial Aircraft.

- Row 44's Ground-Based Testing Failed to Account for Airframe Dynamics in the Flight Environment.

²² See, e.g., Opposition of Row 44, Inc. to Supplement to Petition to Deny of ViaSat, Inc. at 6-8 (Oct. 23, 2008).

²³ See Letter from David S. Keir, Counsel for Row 44, Inc., to Marlene H. Dortch, Secretary, Federal Communications Commission (Feb. 11, 2009).

- Row 44 Failed to Provide Data Regarding its Closed-Loop Tracking Mechanism.

- Row 44 Failed to Take into Account Beam Deflection Angles and Polarization Skew

- Row 44 Failed to Allow its System to Operate

²⁴ See, e.g., Application, System Description at 9-10.

²⁵ See Ground-Based Test Report a 35.

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These are but a few of the methodological defects that compromise the integrity of the data in Row 44's report.

E. More than One Year after the Filing of Its Initial Application, Row 44 Still Has Failed to Resolve Critical Technical Deficiencies in its Application

Row 44 has now had over a year to address the deficiencies in its application that have been noted by ViaSat and others, and acknowledged by the Commission. Inexplicably, Row 44 has failed to do so, despite a grant of STA intended to serve precisely this purpose. While Row 44 appears to place little value on the Commission's technical standards or other rules, the Commission should hold Row 44 to the same technical rules it has applied over the years, and the standards to which it has held other AMSS applicants.

Row 44 appears to believe that the only relevant arbiters of compliance with Commission rules and policies are a few commercial satellite operators that have an interest in selling their capacity to Row 44. Needless to say, the Commission has an independent obligation to carefully review Row 44's applications, and cannot and should not defer to the satellite operators' economically motivated "conclusions." Moreover, it bears emphasis that none of those operators has contested ViaSat's interference analysis.

To the extent that Row 44 urges reliance on its providers of satellite capacity to coordinate their satellites so that Row 44 traffic is located on transponders where it would not pose a threat to VSAT traffic on adjacent spacecraft, it is imperative that the Commission confirm that those operators have effectuated such coordination, and that they have done so for more than the single transponder that Row 44 has used for testing purposes. Based on Row 44's stated desire to install its terminals on hundreds of commercial airliners, many transponders (about 23) would be needed to support Row 44's business plans for Southwest Airlines and Alaska Airlines, and even more would be needed to support other commercial carriers.³⁰ Thus, twice that number of transponders on adjacent spacecraft potentially would be affected by Row 44 interference, and could not be used for VSAT traffic. Therefore, it is critical that Row 44 be constrained to using transponders that have been suitably coordinated. Moreover, because these spacecraft operators are not the only ones who could be affected by Row 44's operations, it is critical that they (and Row 44) bear the burden of modifying their operations in the future should another satellite operator be adversely affected by Row 44's non-compliant operations. The

³⁰ Assuming the use of a 36 MHz-equivalent transponder, and the assignment of 1.6 MHz to each 256 kbit/s return link, Row 44 would need one transponder for every 22 return channels (forward channels are disregarded for present purposes because they would not pose the same level of interference risk). Because Row 44 has explained that its service would not be degraded by multiple aircraft sharing a single 256 kbit/s channel, it is apparent that Row 44 is not assigning more than one aircraft to a given return channel. Assuming the deployment of the Row 44 service on the entire fleet of about 650 Southwest and Alaska Airlines aircraft, with about 500 aircraft flying at any given time, Row 44 would require about 23 transponders for all of its return channels (500 aircraft / 22 aircraft per transponder).

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Commission has adopted a similar requirement in other cases where it sought to ensure that non-compliant operations that are coordinated do not constrain subsequently-deployed services that are FCC-compliant.³¹

ViaSat and other proponents of mobile services have invested considerable sums to design networks that satisfy the Commission's rules, ensure non-interfering operations, and still enable the provision of new and innovative broadband services, all without posing a threat to the millions of VSAT terminals that currently are in operation. Industry participants have taken these steps even though it would have been considerably less expensive to move forward without complying with such technical constraints, and without performing rigorous pre-operational testing to generate data sufficient to demonstrate two-degree compatibility. In contrast, Row 44 has not followed this path. The Commission should not reward Row 44 for its intransigence.

Accordingly, the Commission should dismiss or deny the application, as well as any future requests for STA in connection with the application. At a minimum, the Commission should require Row 44 to address the issues summarized above and in Exhibit A before granting Row 44 any further authority.

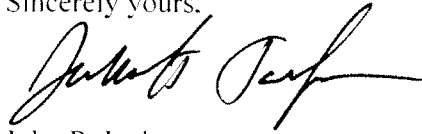
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Please contact the undersigned should you have any questions.

³¹ See 47 C.F.R. § 25.138(c).

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Sincerely yours,



John P. Janka
Jarrett S. Taubman

Counsel for ViaSat, Inc.

cc: John Giusti (redacted version) William Bell (redacted version)
Rod Porter (redacted version) Kathryn Medley (redacted version)
Bob Nelson (redacted version) Sophie Arrington (redacted version)
Fern Jarmulnek (redacted version) Trang Nguyen (redacted version)
Steve Spaeth (redacted version) Frank Peace (redacted version)
Karl Kensinger (redacted version) Jeanette Spriggs (redacted version)
Steve Duall (redacted version) Cassandra Thomas (redacted version)

David S. Keir, Counsel for Row 44, Inc. (redacted and unredacted versions)

Exhibit A:
Unresolved Material Questions of Fact

Material Questions Related to Row 44's Pointing Accuracy Generally

1. Precisely what mechanism Row 44's system would use to ensure compliance with the 0.2 degrees *peak* pointing accuracy limit specified in Section 25.222(a)(6) of the Commission's rules.
2. How Row 44's system would detect mispointing in excess of 0.2 degrees given the difficulty of measuring with precision both the orientation of the antenna with respect to the aircraft and the orientation of the aircraft with respect to the earth.
3. Whether Row 44's system would be capable of meeting the Commission's pointing accuracy requirements on aircraft that are not "typical" (a term that Row 44 fails to define, and that is fundamentally inconsistent with the purpose of those requirements).
4. How Row 44's antenna would ensure accurate pointing given its physical inability to track in all three axes.

Material Questions Related to Row 44's Closed-Loop Tracking Mechanism

5. How Row 44's closed-loop tracking mechanism would collect, within 100 milliseconds as required by Section 25.222(a)(7) of the Commission's rules, the numerous E_s/N_0 samples necessary to enable shut-down upon mispointing by more than 0.5 degrees when data would be output by the modem only once every 100 milliseconds.
6. How Row 44's closed-loop tracking mechanism would overcome bias inherent in E_s/N_0 -based tracking, which would cause the antenna to point *towards* an adjacent satellite in certain instances.
7. How Row 44's system would ensure compliance with the 0.2 degrees *peak* pointing accuracy limit specified in Section 25.222(a)(6) of the Commission's rules when its closed-loop tracking mechanism would, in the normal course of operation, "perturb the antenna pointing vector by small known amounts" of "typically 0.2 degree[s]" — which in and of itself would exceed the limit.

Material Questions Related to Row 44's IRU-Based Tracking Mechanism

8. How Row 44's system would use IRU data to facilitate effective tracking when IRUs typically installed in commercial airliners have peak accuracies of only approximately 0.6 degrees in heading and 0.15 degrees in pitch and roll.
9. How Row 44's system would control for external sources of error, such as: (i) imprecision in the installation of the IRU on the airplane (e.g., imperfect alignment); (ii) imprecision in the installation of Row 44's antenna on the airplane; (iii) bending of the airframe due to loading of fuel, passengers, and freight; (iv) bending of the airframe due to in-flight dynamics, including turbulence; or (v) static and dynamic errors associated with the AeroSat antenna, which would total to significantly more than 0.2 degrees peak requirement with which Row 44 claims it would comply — particularly given the limitations in closed-loop tracking discussed above.

REDACTED FOR PUBLIC INSPECTION

Exhibit A: Unresolved Material Questions of Fact

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Material Questions Related to Aircraft Banking, Misorientation and Skew

10. How Row 44's system would control for aircraft banking, even small degrees of which would point Row 44's elevation pattern into the GSO arc.
11. Whether and how Row 44's proposed system would account for the aircraft's flight dynamics in measuring misorientation or "skew."
12. How Row 44's system would ensure that transmissions cease and do not resume when the applicable "skew" limit is exceeded.
13. Why Row 44 selected a +/- 25 degree "skew limit," and whether this limit is sufficient to protect adjacent operations.
14. The exact circumstances in which Row 44 would inhibit transmissions, accounting for both geographic skew and banking angle (and other relevant factors).
15. How Row 44 would determine if its antenna were mispointed by more than 25 degrees;
16. Precisely how Row 44's system would inhibit transmissions if this threshold were exceeded.

Material Questions with Respect to Row 44's Power Levels

17. Precisely how Row 44 would control uplink power, particularly over those parts of the expected coverage area where power levels low enough to avoid harmful interference would not be adequate to provide service.
18. Whether Row 44 would be able to close its service links at the power limits it proposes.
19. Whether Row 44 actually is able to limit its amplifier power as it represents.

Other Material Questions

20. Precisely how Row 44's system would manage skew, power levels, and other link parameters during hand-offs between satellites.
21. The exact geographic service areas in which Row 44 would not be able to offer service to the public, while banking or otherwise.
22. How Row 44 would communicate its geographic service limitations to the public in order to manage consumer expectations.

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.



A handwritten signature in black ink, appearing to read "Daryl T. Hunter", written over a horizontal line.

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

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