

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

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AUG 29 2006

Federal Communications Commission
Office of Secretary

In the matter of)

Application of RaySat, Inc. for Authority to)
Operate 4,000 In-Motion Mobile Satellite)
Antennas in the 14.0-14.5 GHz and 11.7-)
12.2 GHz Frequency Bands)

) File No. SES-LIC-20060629-01083

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AUG 30 2006

Satellite Division
International Bureau

RESPONSE OF VIASAT, INC.

ViaSat, Inc. ("ViaSat") submits the following response to the reply comments of RaySat, Inc. ("RaySat")¹ in connection with the above-captioned application for authority to operate vehicle-mounted antennas in the Ku band.² In its Comments, ViaSat identifies a number of technical deficiencies in RaySat's proposed system, which, if operated as described in the Application, could result in harmful interference to adjacent satellite networks.³ RaySat's Reply does not adequately address the issues raised by ViaSat, and casts further doubt on whether RaySat's proposed system can operate without causing interference to adjacent satellites.

Moreover, RaySat's suggestion that ViaSat's Comments are based on a desire to "force" RaySat to use ViaSat's satellite modem products is both baseless and inaccurate.⁴ ViaSat supports the development of a wide range of satellite antenna and modem technologies,

¹ Reply Comments of RaySat, Inc., *Application of RaySat, Inc. for Authority to Operate 4,000 In-Motion Mobile Satellite Antennas in the 14.0-14.5 GHz and 11.7-12.2 GHz Frequency Bands*, File No. SES-LIC-20060629-01083 (Aug. 17, 2006) ("Reply").

² *Application of RaySat, Inc. for Authority to Operate 4,000 In-Motion Mobile Satellite Antennas in the 14.0-14.5 GHz and 11.7-12.2 GHz Frequency Bands*, File No. SES-LIC-20060629-01083, Public Notice, Report No. SES-00834 (rel. July 5, 2006) (the "Application").

³ Comments of ViaSat, Inc. to Application, File No. SES-LIC-20060629-01083 (Aug. 4, 2006) ("ViaSat Comments").

⁴ Reply at 1.

as demonstrated by its comments in other proceedings.⁵ ViaSat references spread spectrum technology in its Comments to the Application only to distinguish RaySat's proposal from technical scenarios in which the imposition of antenna pointing accuracy requirements is unnecessary to protect adjacent satellites from interference.⁶ RaySat incorrectly credits ViaSat as being "known in the industry as one of the original developers of spread spectrum modems."⁷ In fact, the concept and implementation of spread spectrum technology predates World War II.⁸ While it is true that ViaSat has developed modem technology for mobile antennas that use spread spectrum modulation techniques, it is also true that the vast majority of ViaSat's commercial VSAT business and revenues is composed of products that use single channel per carrier ("SCPC") modems, which are much like those modems that RaySat proposes to use. ViaSat expressly does not oppose RaySat's use of SCPC technology. ViaSat's concerns regarding RaySat's Application relate to the potential interference that RaySat's particular system, as described in the Application, could pose to other Ku band users.

⁵ Comments of ViaSat, Inc., *Service Rules and Procedures to Govern the Use of Aeronautical Mobile Satellite Service Earth Stations in Frequency Bands Allocated to the Fixed Satellite Service*, IB Docket No. 05-20 at 7 (filed July 5, 2005) ("ViaSat AMSS Comments") (advocating off-axis EIRP density limits in the AMSS context that are technology neutral); Comments of ViaSat, Inc., *Amendment of Parts 2 and 25 of the Commission's Rules to Allocate Spectrum in the Ku and Extended Ku Bands to the Vehicle Mounted Earth Station Satellite Service ("VES") on a Shared Primary Basis and to Adopt Licensing and Service Rules for VMES Operations in the Ku and Extended Ku Bands*, RM 11336 at 6 (filed Aug. 21, 2006) ("ViaSat VES Comments") (proposing antenna pointing accuracy requirements that accommodate a wide range of land mobile earth station systems and reflect technical differences in such technologies).

⁶ ViaSat Comments at 4-5.

⁷ Reply at 1.

⁸ Actress Hedy Lamarr is credited by some sources as one of the inventors of spread spectrum communications. See, e.g., http://en.wikipedia.org/wiki/Hedy_Lamarr and <http://www.sss-mag.com/shistory.html> (visited August 22, 2006).

I. RAYSAT FAILS TO DEMONSTRATE HOW IT WILL PROTECT ADJACENT SATELLITE NETWORKS FROM INTERFERENCE FROM ITS NON-CONFORMING ANTENNAS

RaySat's use of non-conforming antenna technology presents a problem because RaySat has not adequately addressed how it will constrain the potential for interference created by the use of non-conforming antennas. Because RaySat's proposed antenna does not comply with the off-axis EIRP density limits set forth in Section 25.209 of the Commission's rules, RaySat must demonstrate that its system as a whole is designed to operate in a manner that does not cause harmful interference.

In its Reply, RaySat fails to address this deficiency. RaySat simply indicates that its proposed antenna *could* be used with a number of VSAT systems using both spread and non-spread spectrum solutions that would have the capability to monitor the bandwidth, frequency and power levels of RaySat's remote antennas.⁹ It is insufficient merely to indicate that the system is capable of preventing interference when used with the appropriate modem, without committing to use such a modem.

Likewise, RaySat's notion that it *could* use a modem that can employ a central control point is distinguishable from a certification in the Application that the system will operate using a central control point. RaySat reiterates in the Reply that its system users would be served through central hubs, but that "there is no *single* central control point governing the entire network of RaySat users."¹⁰ Thus, RaySat still does not indicate how it, as the licensee, intends to manage the diverse hub operations. Instead, RaySat states that it would rely on hub

⁹ Reply at 3.

¹⁰ *Id.* at 3, 4.

and satellite operators to verify compliance of remote operations.¹¹

II. TRACKING REQUIREMENTS ON RAYSAT'S PROPOSED NETWORK ARE NECESSARY TO ISOLATE AND HELP RESOLVE ANY INCIDENTS OF INTERFERENCE

In its Comments, ViaSat asks the Commission to require RaySat to demonstrate that its system has the ability to track terminal locations for potential review in the event interference issues arise.¹² RaySat responds to ViaSat's inquiry regarding RaySat's ability to track terminal locations and operating parameters by stating that it "views tracking capabilities as unnecessary and, in the case of most users, impractical."¹³ RaySat's sweeping assertion that operation of ESVs, VSATs and satellite news gather ("SNG") terminals in recent history have been virtually interference-free is untrue. Based on ViaSat's extensive experience operating Ku band VSAT networks, ViaSat knows first hand that mobile and transportable antennas in the Ku band can cause, and have caused, real and harmful interference.¹⁴ Without the ability to track the locations and operating parameters of mobile terminals, Ku band users may have difficulty or may even be unable to resolve interference from such terminals. For this reason, ViaSat has consistently endorsed a requirement for tracking terminal locations for all carriers to enforce interference protections.¹⁵ Consistent with its views that there should not be a publicly

¹¹ *Id.* at 4, 5.

¹² ViaSat Comments at 4.

¹³ Reply at 7.

¹⁴ The Satellite Users Interference Reduction Group lists a number of interference events, including interference generated by satellite news gathering ("SNG") and VSAT terminals. See <http://www.suirg.org/>. Additionally, ViaSat has observed instances of interference from ESV terminals and SNGs.

¹⁵ ViaSat VES Comments at 8-9; ViaSat AMSS Comments at 22; ViaSat, Inc. Reply Comments, *Service Rules and Procedures to Govern the Use of Aeronautical Mobile Satellite Service Earth Stations in Frequency Bands Allocated to the Fixed Satellite Service*, IB Docket No. 05-20 at 19-21 (filed Aug. 3, 2005).

accessible database containing tracked data,¹⁶ ViaSat does *not* suggest that RaySat be required to make public any actual tracking data.

III. RAYSAT'S LINK BUDGET CALCULATION IS INCONSISTENT WITH ITS APPLICATION

RaySat's link budget calculation is inconsistent with its Application, which states its system will operate using Rate 1/3 FEC and BPSK modulation.¹⁷ The link budgets that RaySat includes in its Reply are based on a modem with a higher rate of 5/16 FEC and assume that a typical modem used in its system will achieve a threshold Eb/No of 2.0dB.¹⁸ Based on RaySat's assumptions, RaySat's link budget calculation reflects a lower input power density and a bandwidth that is 6.6% higher than is reflected in the Application. Thus, RaySat's link budget calculation does not reflect the emission designator for the 128 kbits/s operation described in its Application. Moreover, RaySat does not provide a link budget calculation for the 512 kbits/s emission designator in the Application.

In addition, RaySat asserts in the Reply that there is no economic benefit for a remote user to decrease the return link's bandwidth or increase its power because the overall power utilization for the forward link is greater than the bandwidth utilization on the forward link.¹⁹ While RaySat may be able to balance power and bandwidth based upon the coding rates and modulation selected for the forward link, and thereby operate within the off-axis power

¹⁶ *Id.*

¹⁷ ViaSat notes that the link budgets calculations ViaSat submitted were reasonable and consistent with the data in RaySat's Application. Because RaySat did not provide link budgets with the pertinent values, ViaSat chose a reasonable Eb/No for rate 1/3 TPC FEC from the set of available commercial satellite modems for which ViaSat had data.

¹⁸ Reply at 9. RaySat's assumed threshold rate represents a Rate 5/16 FEC modem that is approximately 0.4dB lower than the performance specifications of widely-available commercial Rate 5/16 FEC modems.

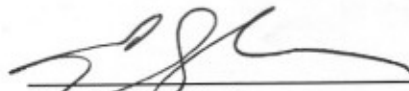
¹⁹ Reply at 5.

density limits, RaySat does not provide a link budget for the forward link and/or a demonstration that its proposed system is capable of operating in this manner.

IV. CONCLUSION

For the reasons described herein and in ViaSat's Comments, the Commission should require RaySat to cure the technical deficiencies in Applications and to resolve the potential interference concerns before the Commission grants RaySat's requested authority.

Respectfully submitted,



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Filed: August 29, 2006

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 pleading, and that it is complete and accurate to the best of my knowledge and belief.



Daryl T. Hunter

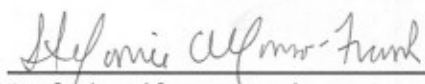
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Dated: August 29, 2006

CERTIFICATE OF SERVICE

I, Stefanie Alfonso-Frank, hereby certify that on this 29th day of August, 2006, served a true copy of the foregoing Comments of ViaSat, Inc. by first class mail, postage pre-paid upon the following:

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