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April 6, 2006

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BY HAND DELIVERY

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

Re: Call Sign E030205, File Nos. SES-LIC-20030910-01261, SES-AMD-20031223-01860, and SES-MOD-20050829-01185

Dear Ms. Dortch:

In accordance with paragraph 58(l) of the *Order* issued in connection with the above-referenced earth station license,[1] ARINC Incorporated ("ARINC") hereby submits the attached ARINC AMSS System Compliance Report. This Report demonstrates compliance with the aggregate earth station off-axis restriction specified in paragraph 58(k) of the *Order*.

Very truly yours,

Carl Frank

Carl R. Frank

Attachment

[1] *ARINC Incorporated, Application for Blanket Authority for Operation of Up to One Thousand Technically Identical Ku-Band Transmit/Receive Airborne Mobile Stations Aboard Aircraft Operating in the United States and Adjacent Waters*, Order and Authorization, 20 FCC Rcd 7553 (Int'l Bur./OET 2005) ("*Order*").

ARINC AMSS System Compliance Report

This report is submitted pursuant to Special Provisions 130 and 131 of radio station authorization Call Sign E030205, and confirms that the aggregate earth-station off-axis e.i.r.p. spectral density is within the levels specified in ARINC's SKYLink[SM] Aeronautical Mobile-Satellite Service (AMSS) system licensing order and the design parameters in paragraph 24 of that order.[1] The data provided in this report show that SKYLink[SM] operation complies, with a significant margin, to the conditions of the licensing order.

Aggregate Off-axis E.I.R.P. Spectral Density

In order to protect Fixed Satellite Service operations from harmful interference in the 14.0-14.5 GHz band, ARINC asserted in its AMSS application that the aggregate off-axis e.i.r.p. of simultaneously transmitting SKYLink[SM] AES terminals would be kept one-dB below the VSAT emission envelope at least 99.999 percent of the time. The FCC subsequently authorized mobile satellite communications operation beginning April 6, 2005 stipulating that:

"130 – ARINC shall manage uplink operation of the SKYLink[SM] System so that the probability that aggregate earth-station off-axis e.i.r.p. spectral density will exceed a one-dB margin below the levels specified in the table below is never more than 0.001 percent. To ensure continuing compliance with this requirement, ARINC shall monitor usage patterns and traffic flow so that it can detect and adjust for any material discrepancies from the predictive assumptions identified in [ARINC's Engineering Exhibit of June 3, 2004].[2] See Order and Authorization, DA 05-1016, released April 6, 2005, for formula."

"131 – Twelve months after release of this order, ARINC shall submit evidence demonstrating compliance with the aggregate earth-station off-axis e.i.r.p. restriction specified in the preceding sub-paragraph. The showing shall reflect the most-recent available data and shall disclose any discrepancies between previous predictive assumptions and conditions actually encountered in commercial operation and explain what compensating adjustments have been made."

Analysis of substantial data collected during the first year of operation shows SKYLink[SM] to be in compliance with these terms.

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[1] See *ARINC Incorporated, Application for Blanket Authority for Operation of Up to One Thousand Technically Identical Ku-Band Transmit/Receive Airborne Mobile Stations Aboard Aircraft Operating in the United States and Adjacent Waters*, Order and Authorization, 20 FCC Rcd 7553 (April 6, 2005) ("SKYLink[SM] Order").

[2] See Exhibit 1, Reply to Supplemental Comments of The Boeing Company, ARINC Incorporated, SKYLink[SM] Application, File Nos. SES-LIC-20030910-01261 & SES-AMD-20031223-01860, Engineering Response to Boeing ("June 3, 2004 Engineering Exhibit").

1. Variables and Assumptions Affecting Aggregate Off-axis E.I.R.P. Spectral Density

On June 3, 2004, ARINC filed its Engineering Exhibit with the FCC wherein a Monte Carlo simulation was used to demonstrate that the SKYLink[SM] system would meet the interference criteria ultimately incorporated in the SKYLink[SM] Order. In the absence of operational data, a number of assumptions were used in this simulation. Tables 1 and 2 identify assumptions for which data now exists and describe what that data now consists of.

Table 1. Factors Affecting AES E.I.R.P.

Parameter	*Original Estimates and Assumptions*	*Current*
Antenna Pattern	▪ Variations between AES antennas have independent, uniform amplitude variation over a range of +/- 0.4 dB. ▪ Greater of E-plane or H-plane values used at each point on the mask.	▪ No change. ▪ No change.
Power	▪ Nominal e.i.r.p. spectral density for CONUS coverage area assumed to be -6.53 dBW/4 kHz. ▪ Aircraft assumed to be uniformly distributed within AMC-1 satellite transponder footprint (North American beam coverage). ▪ Variations in transponder G/T assumed to have independent, uniform +/- 2 dB amplitude variation. ▪ Error in system power control assumed to have independent, uniform +/- 0.5 dB.amplitude variation. ▪ The contribution of the fixed Ground Earth Station to off-axis e.i.r.p. assumed small in compared to a single AES and does not change over time.	▪ E.I.R.P. was measured on all flights (Oct. 2005 through Feb. 2006). ▪ The actual aircraft distribution of flight paths and flight durations within the AMC-6 footprint was recorded. ▪ The measured AES e.i.r.p. includes all variations in transponder G/T. ▪ No change. Long-term measured stability of the power control system is +/- 0.4 dB. ▪ No change.
Pointing Errors	▪ Each SKYLink[SM] AES assumed to have rms pointing error of 0.1 degree (ARINC License Application Exhibit 3). This is modeled as an independent, zero-mean normal distribution with a standard deviation of 0.1 degree. ▪ Airframe flexure for aircraft types served by SKYLink[SM] assumed to less than a degree, per the airframe manufacturer. This is modeled as an independent, zero-mean normal distribution, with standard deviation of 0.5 degree.	▪ No change. ▪ No change.
Data Rate	▪ AES e.i.r.p. required to "close the link" is directly proportional to the data rate: --Normal data transmission rate: 128,000 bits per second (128 kbps) --Log-in data rate: 32 kbps	▪ The measured AES e.i.r.p. includes any non-linear response.

Table 2. Independent Variables Used to Derive Peak Demand		
Parameter	*Original Estimates and Assumptions*	*Current*
Demand per User	• Business demand per user was patterned after 30-day monthly send and receive volume for ARINC corporate Internet traffic. • A 60/40 split between business use and Internet recreational use was assumed. • Recreational use assumes a 2:7 ratio of Return Link to Forward Link traffic. • Monthly demand was compressed into 20 days to estimate daily user demand. • Peak busy-hour demand was estimated by compressing total daily traffic into 4 hours. • Distribution of message sizes assumed to be Gaussian, to account for infrequent but occasional very long messages. • Link overhead (TCP/IP acknowledgements) included in estimate.	• Actual demand was measured. • Measured demand includes the actual business/recreational mix. • Measured demand includes the actual ratio of Return to Forward Link traffic. • Actual weekday demand was measured. • Actual busy-hour demand was measured. • Measured demand includes actual mix of message sizes and types (VPN, FAX, e-mail, Internet, etc.) • Conservative protocol overhead of 40% added to demand.
Users per AES	• For business jets, this number was assumed to be one.	• Measured demand includes traffic from all users on all aircraft.
Data Rate	• Nominal data transmission rate is 128,000 bits per second (128 kbps).	• No change.
Error Rate	• Maximum acceptable bit error rate: 1 in 100,000 (1×10^{-5}).	• No change.

2. Most Recent Data

As requested by the FCC, the most recent available data was used to prepare this report. The oldest statistics relate to geographical coverage starting October 17, 2005 when SKYLink[SM] service was transferred from SES-Americom satellite AMC-1 (transponder 16) to AMC-6 (transponder 12). The move to AMC-6 improved CONUS coverage and resulted in an overall reduction in return-link power because of improved G/T contours. Figure 1 depicts the AMC-6 coverage area using actual flights during the period October 17, 2005 to February 28, 2006. The circular area over New Mexico delimits the "no transmit zone" boundary at 50,000 feet required to protect TDRSS facilities near White Sands.[3] This exclusion zone is both range and altitude dependent, which means that aircraft below certain altitudes may communicate during final descent or takeoff at airports within the boundary shown. The actual distribution of measured e.i.r.p. for all flights was determined from data collected in January and February 2006 in order to reflect the latest hardware and software improvements to the AES transceiver.

[3] Coordination Agreement Between NASA and ARINC for Operation of the ARINC SKYLink AMSS in the 14.0-14.5 GHz Band, signed by NASA on September 3, 2004.

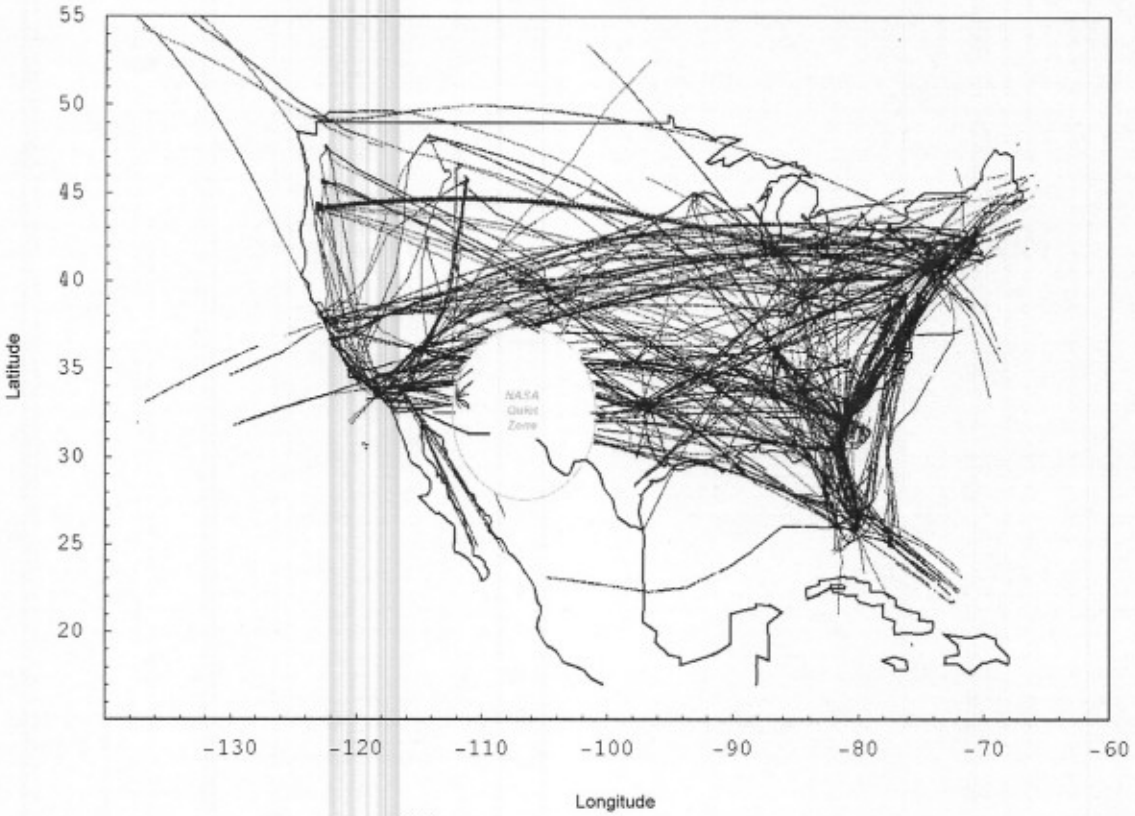

Figure 1. SKYLink[SM] CONUS Coverage Area and Flight Paths

Traffic data collected from February 15, 2006 through March 15, 2006 were used to validate peak demand assumptions in the simulation. These data included all facsimile, VPN traffic and Internet traffic over SKYLink[SM]. The ARINC traffic monitoring system routinely records byte counters in the AES router once a minute for all active aircraft. This count is conservative since it includes all data appearing on the router LAN, whether or not it passes through the satellite link. A forty-percent burden was added to the traffic count as a conservative estimate of the TCP/IP protocol overhead. Figure 2 illustrates the variation in weekday traffic during the busiest hours of the day and corresponds very closely with our earlier assumptions. Even the observed 3:8 ratio of Return-link to Forward-link traffic in Figure 2 compares favorably with the original estimates. The rather broad peak from 3PM to 6PM EST is attributed to active aircraft being in multiple time zones.

Data at one-second resolution is routinely collected by the Network Operating Center (NOC) on all active aircraft. This data was examined from January 1, 2006 through February 28, 2006 (the latest period available) for all possible occurrences of simultaneously transmitting AES. The greatest number of AES appearing within any two-second window was four and this occurred 34 times, or 0.00007% of the time. A two-second sliding window was used to allow for any transmissions that spill into the next second. The actual probability of simultaneous transmissions may be considerably less than this because the NOC polls all active units at randomized intervals when they are not transmitting. The 0.00007% figure is also conservative

because many transmissions are completed within a fraction of a second and do not overlap any another transmission.

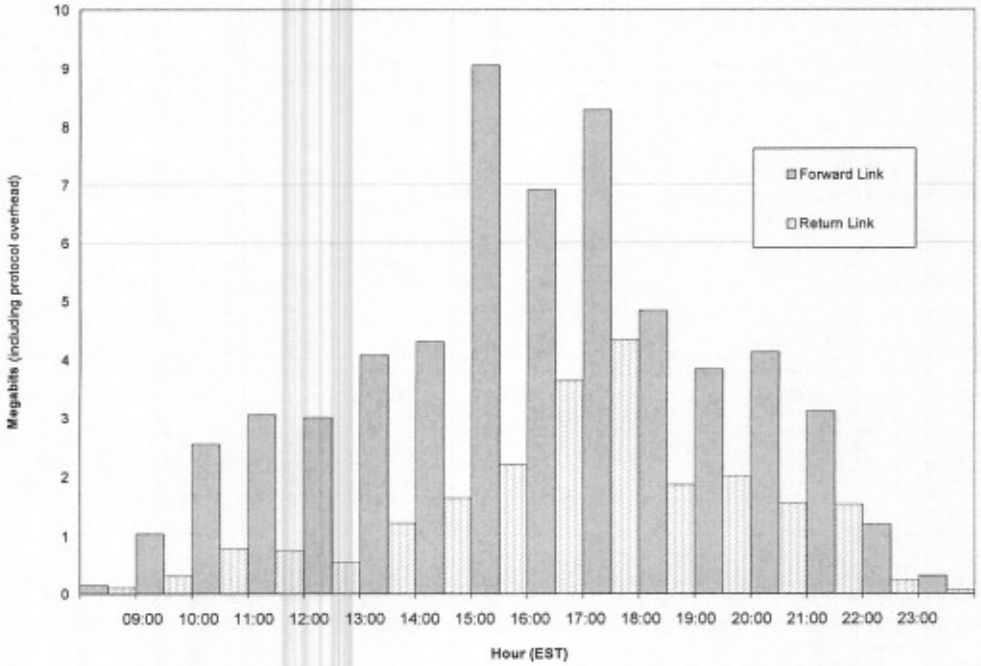

Figure 2. Hourly Variation in SKYLink[SM] Send and Receive Traffic

On March 7, 2006, for example, when the greatest hourly demand was observed, four aircraft were logged on to the network. Only two of those aircraft, however, could have possibly transmitted simultaneously and this could only have happened during a single 20 minute interval. The greatest traffic offered by either user during any of those 20 minutes required less than 8 seconds to transmit and, on average, amounted to less than 2 seconds of use per minute.

3. Analysis of Most Recent Data

Measured values of AES power for actual geographical locations and dwell times were found to be substantially lower than the estimates used in the original simulation and exhibited a broader range of values. While a lower average e.i.r.p. reduces the probability of exceeding the aggregate off-axis limits, any increase in the percentage of AES toward the upper end of the distribution has an adverse effect. Such an increase could arise, for example, if satellite uplink G/T contours and downlink e.i.r.p. contours are not congruent. In Paragraph 43 of the SKYLink[SM] Order, the FCC asked that we "disclose the extent, if any, to which the downlink footprint extends beyond the minimum G/T control and explicitly account for the consequent impact on aggregate e.i.r.p." The impact of any such mismatch was determined by rerunning the Monte Carlo simulation using the actual e.i.r.p. distribution and measured peak demand. After 100 million trials, a sufficient number of low-probability events were observed to determine that the SKYLink[SM]

system is operating below a 0.0001% chance of exceeding the aggregate off-axis e.i.r.p. This result is consistent with the observation in the previous section that two or fewer actual simultaneous transmissions occurred during the most recent period for which data was available.

In Paragraph 46 of the SKYLink[SM] Order, the FCC asked that we address error factors in the system used to calibrate and monitor AES e.i.r.p. This system consists of: 1) a test signal generator and reference transmitter co-located with the hub earth station, which generates a reference waveform for the hub uplink transmission, 2) a precision uplink power control unit, which maintains a constant signal level at the satellite, 3) a 4.5-meter antenna conforming to the requirements of Section 25.209, and 4) a receive signal processor to determine if an adjustment is required on the uplink power control or the AES. Based on measurements after the move to AMC-6, this system has a demonstrated long term stability of +/- 0.4 dB. This is slightly better than the original estimate used in the Monte Carlo simulation.

4. Conclusion

The Monte Carlo simulation used previously to account for the many factors affecting aggregate off-axis e.i.r.p. was run using actual traffic demand plus observed power levels over the entire satellite footprint.[4] Even with the addition of 40 percent protocol overhead during peak demand periods, the chance that aggregate earth-station off-axis e.i.r.p. spectral density will exceed a one-dB margin below the levels specified in the SKYLink[SM] license are at least two orders of magnitude less than the allowed 0.001 percent. ARINC will continue to monitor SKYLink[SM] performance and make any adjustments necessary to maintain compliance with its license.

[4] For a description of this Monte Carlo model, see ARINC's June 3, 2004 Engineering Exhibit.

ViaSat

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March 16, 2006

Mr. William M. Kolb
Project Manager, SKYLink Program
ARINC, Inc.
2551 Riva Road
Annapolis, Maryland 21401
410-266-4017

SKYLink Interference Report

Dear Mr. Kolb:

I have had our Network Operations Center (NOC) search through our customer service ticket data base from the period April 6, 2005 to present for any record of interference reports from the SKYLink network operating under earth station license E030205.

There were no reports of interference from the SKYLink network made by other users on AMC-6, nor were there any from users of or operators of the adjacent satellites.

Regards,

Daryl T. Hunter, P.E.
Senior Systems Engineer

SES AMERICOM
An SES GLOBAL Company

Frederick D. Cain
Director, Transponder Capacity
Enterprise Solutions

March 20, 2006

Mr. William M. Kolb
Project Manager, SKYLink Program
ARINC
2551 Riva Road
Annapolis, MD 21401-7465

Re: SKYLink Interference Report

Dear Bill;

SES Americom has searched its records for any interference issues pertaining to ARINC. The search covered the period of time from April 6, 2005 through today. The search was conducted on AMC1 transponder 16 and AMC6 transponder 12. To the best of our knowledge there were no known instances of interference caused by the ARINC operation of traffic on the above transponders.

SES Americom is pleased to have ARINC as a client with a clean operational record. If there are any questions on this matter please feel free to contact me directly.

Sincerely;

Frederick D Cain