

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

In the Matter of)	
)	
AC BidCo LLC)	File No. SES-MOD-_____
)	Call Sign E120106
Modification to Blanket License for)	
Operation of Ku-Band Transmit/Receive)	
Earth Stations Aboard Aircraft)	

MODIFICATION

AC BidCo LLC (“AC BidCo”) hereby requests a modification of its blanket license to operate Ku-band transmit/receive earth stations aboard aircraft (“ESAAs”) on domestic and international flights.¹ AC BidCo requests that the Commission modify the AC BidCo ESAA License by adding the Galaxy 28, SES-3, and Telesat T12V spacecraft as authorized points of communication. In addition, pursuant to Section 25.118 of the Commission’s rules, AC BidCo’s ESAA traffic that had been carried by the AMC-3 spacecraft has been transferred to the AMC-6 satellite, and AC BidCo requests that its license be updated to reflect that change.

A narrative description of the relevant changes is provided here, and AC BidCo is attaching an FCC Form 312 and Schedule B that identify the new points of communication and provide technical parameters for the ESAA operations. Supplemental technical information and copies of relevant coordination letters are attached as well. Pursuant to Section 25.117(c) of the Commission’s rules, AC BidCo is providing herein information that is changing as a result of the

¹ See Call Sign E120106, File No. SES-MFS-20160824-00738, granted Dec. 13, 2016 (the “AC BidCo ESAA License”). The ESAA license for this call sign was previously held by Gogo LLC (“Gogo”), a commonly-owned affiliate of AC BidCo. A *pro forma* assignment of the ESAA license from Gogo to AC BidCo was approved by the Commission and consummated in 2016. See File No. SES-ASG-20160714-00659, granted July 19, 2016.

modification. AC BidCo certifies that the remaining information provided in support of the AC BidCo ESAA License has not changed.²

I. SATELLITES USED BY THE AC BIDCO ESAA NETWORK

AC BidCo requests modification of its license to add satellites as points of communication for the AC BidCo ESAA network pursuant to the provisions of Section 25.227(a)(2) and (b)(2). In addition, AC BidCo requests that the Commission replace the AMC-3 satellite listed on the AC BidCo ESAA License with AMC-6, which has taken the place of AMC-3 pursuant to a fleet management maneuver. All the satellites to be added are U.S.-licensed. Updated tables listing the satellites to be used and the associated ground stations are provided in Annex 2 hereto.

Galaxy 28: Galaxy 28 is a U.S.-licensed satellite positioned at the 89° W.L. orbital location,³ and complete technical information regarding the satellite is therefore already on file with the Commission. AC BidCo seeks authority to use Galaxy 28 capacity for ESAA operations on a primary basis in the 14-14.5 GHz uplink spectrum and in the 11.7-12.2 GHz downlink spectrum, consistent with the Galaxy 28 License and the Commission's orders in the ESAA proceeding.⁴

² For the Commission's convenience, AC BidCo has attached as Annex 1 hereto a table listing the information required pursuant to Section 25.227 of the Commission's rules and providing a cross-reference to the necessary information.

³ *Intelsat License LLC*, Call Sign S2160, File Nos. SAT-LOA-19950215-00025 *et al.*, granted May 7, 1996 ("Galaxy 28 License").

⁴ *Revisions to Parts 2 and 25 of the Commission's Rules to Govern the Use of Earth Stations Aboard Aircraft Communicating with Fixed-Satellite Service Geostationary-Orbit Space Stations Operating in the 10.95-11.2 GHz, 11.45-11.7 GHz, 11.7-12.2 GHz and 14-14.5 GHz Frequency Bands*, Notice of Proposed Rulemaking and Report and Order, IB Docket Nos. 12-376 & 05-20, 27 FCC Rcd 16510 (2012); Second Report and Order and Order on Reconsideration, IB Docket No. 12-376, 29 FCC Rcd 4226 (2014) (collectively, the "ESAA Orders").

Galaxy 28 will provide coverage of Brazil. A letter confirming that operation of the AC BidCo ESAA terminals is consistent with coordination agreements with satellites operated within six degrees of Galaxy 28 is included in Annex 3.

SES-3: SES-3 is a U.S.-licensed satellite positioned at the 103° W.L. orbital location,⁵ and complete technical information regarding the satellite is therefore already on file with the Commission.⁶ AC BidCo seeks authority to use SES-3 capacity for ESAA operations on a primary basis in the 14-14.5 GHz uplink spectrum and in the 11.7-12.2 GHz downlink spectrum, consistent with the SES-3 License and the ESAA Orders.

SES-3 will provide coverage of North America. A letter confirming that operation of the AC BidCo ESAA terminals is consistent with coordination agreements with satellites operated within six degrees of SES-3 is included in Annex 3.

Telesat T12V: Telesat T12V is a U.S.-licensed satellite positioned at the 15° W.L. orbital location,⁷ and complete technical information regarding the satellite is therefore already on file with the Commission. AC BidCo seeks authority to use Telesat T12V capacity for ESAA operations on a primary basis in the 14-14.5 GHz uplink spectrum and in the 11.7-12.2 GHz downlink spectrum, consistent with the Telesat T12V License and the ESAA Orders.

Telesat T12V will provide coverage of Brazil. A letter confirming that operation of the AC BidCo ESAA terminals is consistent with coordination agreements with satellites operated within six degrees of Telesat T12V is included in Annex 3.

⁵ *SES Americom, Inc.*, Call Sign S2892, File Nos. SAT-RPL-20121228-00227 & SAT-AMD-20131113-00132, grant-stamped Apr. 2, 2015 (“SES-3 License”).

⁶ AC BidCo has already commenced ESAA operations with SES-3 pursuant to a grant of Special Temporary Authority. *See AC BidCo LLC*, File No. SES-STA-20161027-00864, granted Nov. 10, 2016.

⁷ *Skynet Satellite Corp.*, Call Sign S2933, File No. SAT-LOA-20141010-00107, grant-stamped Oct. 29, 2015 (“Telstar T12V License”).

Traffic Transfer from AMC-3 to AMC-6: The AC BidCo ESAA License includes authority to communicate with the AMC-3 satellite at 67° W.L. In October 2016, SES Americom, Inc. (“SES”) submitted a notification pursuant to the Commission’s fleet management procedures of its intent to relocate its AMC-6 satellite from 72° W.L. to 67° W.L. to take the place of AMC-3, and SES later advised the Commission that the relocation had been completed.⁸ As a result of this satellite change, AC BidCo ESAA traffic that had been carried by AMC-3 at 67° W.L. was transferred to the AMC-6 satellite at that location effective December 10, 2016.

Section 25.118(a)(3) allows earth station licensees to implement changes in points of communication without prior consent of the Commission if the change results from a space station relocation made pursuant to the fleet management procedures.⁹ The rule requires the earth station licensee to provide a notification within 30 days after the modification takes place. Accordingly, AC BidCo hereby notifies the Commission of this change in points of communication and requests that the Commission modify the AC BidCo ESAA License to specify the use of AMC-6 at 67° W.L. in lieu of AMC-3 at that location.

Like AMC-3, AMC-6 is a U.S. licensed satellite, and complete technical information regarding the satellite is therefore already on file with the Commission.¹⁰ AC BidCo requests update of its license to reflect its use of AMC-6 capacity for ESAA operations on a

⁸ *SES Americom, Inc.*, Call Sign S2347, File No. SAT-MOD-20161014-00098; letter from Karis A. Hastings, Counsel for SES Americom, Inc. to Marlene H. Dortch, Secretary, Federal Communications Commission, File No. SAT-MOD-20161014-00098, dated Dec. 12, 2016.

⁹ *See* 47 C.F.R. Section 25.118(a)(3)(i).

¹⁰ *SES Americom, Inc.*, Call Sign S2347, File No. SAT-MOD-20150820-00059, grant-stamped Nov. 5, 2015 (“AMC-3 License”).

primary basis in the 14-14.5 GHz uplink spectrum and the 11.7-12.2 GHz downlink spectrum, consistent with the Commission's ESAA Decisions and with the terms of the AMC-3 license.

AMC-6 provides coverage of North America. A letter confirming that operation of the AC BidCo ESAA terminals is consistent with coordination agreements with satellites operated within six degrees of AMC-6 at 67° W.L. is included in Annex 3.

II. COORDINATION AND SPECTRUM SHARING MATTERS

Attached as Annex 3 pursuant to Section 25.227(b)(2) of the Commission's rules are copies of letters confirming that AC BidCo's proposed ESAA operations are consistent with the coordination agreements between the satellites discussed above and operators of adjacent spacecraft. Furthermore, AC BidCo's operations with the additional satellites will conform to the terms of the agreements between AC BidCo and the National Aeronautics and Space Administration and the National Science Foundation, as required by the AC BidCo ESAA License.¹¹

¹¹ AC BidCo ESAA License, Special and General Provisions, Condition 90304.

III. CONCLUSION

AC BidCo respectfully requests that the Commission modify the AC BidCo ESAA License to reflect the changes described herein.

Respectfully submitted,

AC BIDCO LLC

By: /s/ Marguerite Elias

Of Counsel

Karis A. Hastings
SatCom Law LLC
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Marguerite Elias
Executive Vice President & General Counsel
AC BidCo LLC
111 North Canal Street
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Dated: January 9, 2017

ANNEX 1: Table of Information Required by Section 25.227

Section 25.227 Requirement	Citation to Information Provided
25.227(a)(4) & 25.227(b)(5)	N/A: no use of a contention protocol is proposed.
25.227(a)(5) & 25.227(b)(6)	The 24/7 point of contact information remains the same. The phone number is +1 866-943-4662 and the e-mail address is noc@gogoair.com . The street address is: AC BidCo Network Operations Center, 111 North Canal Street, Chicago, IL, 60606, as specified in Form 312 Schedule B, Items E2-E9.
25.227(a)(15)	AC BidCo certifications are in Annex 5 attached.
25.227(b)(2)(i)	Off-axis EIRP density information regarding the AeroSat and ThinKom terminals licensed for use by AC BidCo was previously provided to the Commission. Operations with the additional satellites included in this application will not involve any increase in the maximum off-axis EIRP density levels previously described to the Commission for the AeroSat and ThinKom terminals and authorized in the AC BidCo ESAA license.
25.227(b)(2)(ii)	Target satellite operator certifications are in Annex 3 attached.
25.227(b)(2)(iii) & (iv)	A demonstration that the AC BidCo system will comply with coordination agreements and requirements to cease emissions is provided in Annex 4 attached.
25.227(b)(4)	The ESAA network will operate in U.S. airspace, foreign airspace, and in the airspace over international waters. Coverage areas for the specific satellites to be used in the ESAA network are already on file with the Commission.
25.227(b)(7)	AC BidCo certifications are in Annex 5 attached.
25.227(b)(8)	No change to previously filed Radiation Hazard analyses.
25.227(c)	AC BidCo's coordination agreement with NASA was filed February 1, 2013 in File Nos. SES-LIC-20120619-00574 <i>et al.</i>
25.227(d)	AC BidCo's coordination agreement with NSF was included as Amendment Exhibit B in File No. SES-AMD-20120731-00709.

ANNEX 2:

Updated Spacecraft and Teleport Tables

Satellite	Location	Beam Coverage Area	Tx (GHz)	Rx (GHz)	Use in US airspace?	Satellite Operator
AMC-1	129.15W	North America	14-14.5	11.7-12.2	Yes	SES
AMC-6¹	67W	North America	14-14.5	11.7-12.2	Yes	
AMC-21	124.9W	United States	14-14.5	11.7-12.2	Yes	
ASTRA 4A	4.8E	Europe	14-14.25	11.7-12.2; 12.2-12.75	No	
SES-1	101W	North America	14-14.5	11.7-12.2	Yes	
SES-3	103W	North America	14-14.5	11.7-12.2	Yes	
SES-4	22W	Europe	14-14.5	12.5-12.75	No	
SES-6	40.5W	East Atlantic Ocean	14-14.5	10.95-11.2; 11.45-11.7	No	
		West Atlantic Ocean	14-14.5	10.95-11.2; 11.45-11.7	Yes	
Galaxy 17	91W	North America	14-14.5	11.7-12.2	Yes	
Galaxy 28	89W	Brazil	14-14.5	11.7-12.2	No	
IS-14	45W	North and South America excludes Brazil	14-14.5	11.7-12.2	Yes	
IS-18	180E	South Pacific	14-14.5	12.25-12.75	No	
IS-19	166E	Northeast Pacific	14-14.5	12.25-12.75	Yes	
		Northwest Pacific	14-14.5	12.25-12.75	No	
		Australia				
		Southwest Pacific				
IS-20	68.5E	Middle East	14-14.5	10.95-11.2; 11.45-11.7; 12.5-12.75	No	
IS-21	58W	Brazil	14-14.5	11.7-12.2	No	
		South Atlantic Ocean	14-14.5	11.45-11.7	No	
IS-22	72.1E	Mobility from Mideast to Japan and to Australia	14-14.5	12.25-12.5	No	
IS-29e	50W	United States	14-14.5	10.95-11.7; 11.7-12.2	Yes	
IS-33e	60E	Africa, Asia, and Europe	14-14.5	10.95-11.2; 11.45-11.7; 11.7-12.2; 12.5-12.6	No	
IS-904	60E	Spot 1 - Western Russia	14-14.5	10.95-11.2; 11.45-11.7	No	
IS-907	27.5W	East Pacific	14-14.5	10.95-11.2; 11.45-11.7	Yes	

¹ This satellite is only used for communications with the ThinKom antenna system.

Satellite	Location	Beam Coverage Area	Tx (GHz)	Rx (GHz)	Use in US airspace?	Satellite Operator
Eutelsat 115WB	114.9W	North America	14-14.5	11.7-12.2	Yes	Eutelsat
Eutelsat 117WA	116.8W	Central and South America	14-14.5	11.7-12.2	Yes	
E172A²	172E	North Pacific and Northeastern Russia	14-14.5	10.95-11.2; 11.45-11.7; 12.2-12.75	No	
T-11N	37.5W	Africa	14-14.5	10.95-11.2; 11.45-11.7; 12.5-12.75	No	Telesat
		Atlantic	14-14.5	11.45-11.7	No	
T-12V	15W	Brazil	14-14.5	11.7-12.2	No	
T-18	138E	Asia	14-14.5	12.2-12.75	No	
JCSAT-2B	154E	South Pacific	14-14.5	11.45-11.7; 12.25-12.75	Yes	JSAT
JCSAT-5A²	132E	Japan	14-14.5	12.25-12.75	No	
Yamal 300K	183E (177W)	North Pacific Ocean	14-14.5	10.95-11.2; 11.45-11.7; 12.5-12.75	Yes	Gazprom Space Systems
Yamal 401	90E	Russia	14-14.5	10.95-11.2; 11.45-11.7; 12.5-12.75	No	
Asiasat 7	105.5E	China	14-14.5	12.25-12.75	No	AsiaSat

² These satellites are only used for communications with the Aerosat antenna system.

Satellite	Teleport Location	FCC Call Sign
AMC-1	Woodbine, MD	E900448
AMC-6	Perris, CA	E940448
AMC-21	Woodbine, MD	E900448
ASTRA 4A	Betzdorf, Luxembourg	N/A
SES-1	Woodbine, MD	E920698
SES-3	Woodbine, MD	E140059
SES-4	Bristow, VA	E020071
	Bristow, VA	E000696
SES-6	Betzdorf, Luxembourg	N/A
Galaxy 17	Atlanta, GA ATL-K26	E990214
Galaxy 28	Rio de Janeiro, Brazil	N/A
IS-14	ATL teleport ATL-C06	E940333
	ATL teleport ATL-K15	E090093
IS-18	Napa teleport NAP-K22	E990224
IS-19	Perth, Australia	N/A
	Napa teleport NAP-K31	E980460
	Napa teleport NAP-C30	E980467
IS-20	Fuchsstadt, Germany	N/A
IS-21	Rio de Janeiro, Brazil	N/A
	Mobility: MTN teleport MTN-K02	E030051
IS-22	Kumsan, Korea	N/A
IS-29e	Hagerstown, MD	E030103
IS-33e	Fuchsstadt, Germany	N/A
	Moscow, Russia	N/A
IS-904	Moscow, Russia	N/A
IS-907	Hagerstown, MD	E030103
Eutelsat 115WB	Brewster, WA	E120043
Eutelsat 117WA	Brewster, WA	E060416
E172a	Khabarovsk, Russia	N/A
T-11N	Aflenz, Austria	N/A
T-12V	Rio de Janeiro, Brazil	N/A
T-18	China (City TBD)	N/A
JCSAT-2B	Kapolei, HI	E010236
JCSAT-5A	Yokohama, Japan	N/A
Yamal 300K	Brewster, WA BRW-05C	E120043
Yamal 401	Moscow, Russia	N/A
Asiasat 7	Beijing, China	N/A

ANNEX 3:
Satellite Company Letters



January 5, 2017

Federal Communication Commission
International Bureau
445 12th Street SW
Washington, DC 20554

Re: Engineering Certification of Intelsat for Galaxy-28 Satellite

To Whom It May Concern:

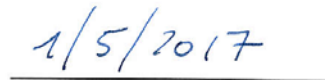
This letter certifies that Intelsat is aware that AC BidCo LLC ("AC BidCo") is planning to seek a modification to its blanket authorization, from the Federal Communications Commission ("FCC"), to operate the Ku-band transmit/receive terminals AES1 and AES2 for the provision of Aeronautical Mobile Satellite Service (Call Sign E120106). AC BidCo seeks additional authorization for these aeronautical Ku-band earth stations to also utilize Galaxy-28 at 89W, under the current rules for Earth Stations Aboard Aircraft (ESAA), including Section 25.227.

Intelsat certifies that the use of the ESAA transmit/receive terminals AES1 and AES2 by AC BidCo, installed and operated in accordance with the AC BidCo application and the above conditions, is consistent with existing coordination agreements with all adjacent satellite operators within +/- 6 degrees of orbital separation from Galaxy-28. Intelsat also acknowledges that the use of the above referenced terminals by AC BidCo has the potential to receive harmful interference from adjacent satellite networks that may be unacceptable.

If the FCC authorizes the operations proposed by AC BidCo in its application, Intelsat will include the power density levels, as described above, in all future satellite network coordinations with other adjacent satellite operators. AC BidCo shall comply with all such coordination agreements reached by the satellite operators.

Sincerely,


Alexander Gerdénitsch
Manager, Spectrum Policy, Americas
Intelsat


Date



Federal Communications Commission
International Bureau
445 12th Street, S.W.
Washington, D.C. 20554
United States

21 October 2016

Subject: Engineering Certification of SES for the SES-3 satellite

To whom it may concern,

This letter confirms that SES is aware that AC BidCo LLC ("AC BidCo"), licensed by the Federal Communications Commission ("FCC") as AC BidCo LLC, is planning to file an application seeking a modification to its blanket authorization (the "Modification Application") to operate Ku-band Earth Stations Aboard Aircraft ("ESAA") transmit/receive terminals (Call Sign E120106) pursuant to ITU RR 5.504A and Section 25.227 of the Commission's rules, on domestic and international flights. Among other changes, the Modification Application will seek authority for AC BidCo's ESAA terminals to communicate with the SES-3 satellite at 103°W.L., under the current ESAA rules, including Section 25.227.

Based upon the representations made to SES by AC BidCo concerning how it will operate on SES-3 according to its letter dated 19 October 2016:

- SES certifies that it has completed coordination as required under the FCC's rules and that the power density levels specified by AC BidCo are consistent with existing coordination agreements to which SES is a party with all adjacent satellite operators within +/- 6 degrees of orbital separation from SES-3.
- If the FCC authorizes the operations proposed by AC BidCo, SES will include the power density levels specified by AC BidCo in all future satellite network coordination with other operators of satellites adjacent to SES-3.

Yours Sincerely,

Kimberly M. Baum

Date

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1601 Telesat Court
Ottawa, ON, K1B 5P4

6 January 2017

Federal Communications Commission
International Bureau
445 12th Street, S.W.
Washington, D.C. 20554

Re: AC BidCo LLC Application for earth stations aboard aircraft ("ESAA") terminals

To Whom It May Concern:

This letter certifies that Telesat is aware that AC BidCo LLC ("AC BidCo") is planning to seek authorization from the Federal Communications Commission ("FCC") to operate Ku-band transmit/receive earth stations aboard aircraft ("ESAA") terminals to communicate with the T12V satellite at the 15°W orbital location. Specifically, Telesat understands that AC BidCo seeks to operate two types of Ku-band ESAA terminals consistent with the FCC's Part 25 rules, including Section 25.227.

Based on the information provided by AC BidCo, Telesat (i) certifies that the power density levels that AC BidCo provided to Telesat are consistent with the existing coordination agreements with all adjacent satellite operators within +/- 6 degrees from T12V; (ii) acknowledges that the proposed operation of these terminals has the potential to receive harmful interference from adjacent satellite networks that may be unacceptable; and (iii) confirms that if the FCC authorizes the operations proposed by AC BidCo, Telesat will take into consideration the power density levels associated with such operations in future satellite network coordination with adjacent satellite operators.

Yours Sincerely,

A handwritten signature in black ink, appearing to be "B. Borna", enclosed within a large, loopy circular scribble.

BAHRAM BORNA
Senior Systems Engineer
Telesat



Federal Communications Commission

International Bureau
445 12th Street, S.W.
Washington, D.C. 20554
United States

8 December 2016

Subject: Engineering Certification of SES for the AMC-6 satellite

To whom it may concern,

This letter confirms that SES is aware that AC BidCo LLC ("AC BidCo"), licensed by the Federal Communications Commission ("FCC") as AC BidCo LLC, is planning to file an application seeking a modification to its blanket authorization (the "Modification Application") to operate Ku-band Earth Stations Aboard Aircraft ("ESAA") transmit/receive terminals (Call Sign E120106) pursuant to ITU RR 5.504A and Section 25.227 of the Commission's rules, on domestic and international flights. Among other changes, the Modification Application will seek authority for AC BidCo's ESAA terminals to communicate with the AMC-6 satellite at 67°W.L., under the current ESAA rules, including Section 25.227.

Based upon the representations made to SES by AC BidCo concerning how it will operate on AMC-6 according to its letter dated 8 December 2016:

- SES certifies that it has completed coordination as required under the FCC's rules and that the power density levels specified by AC BidCo are consistent with existing coordination agreements to which SES is a party with all adjacent satellite operators within +/- 6 degrees of orbital separation from AMC-6.
- If the FCC authorizes the operations proposed by AC BidCo, SES will include the power density levels specified by AC BidCo in all future satellite network coordination with other operators of satellites adjacent to AMC-6.

Yours Sincerely,

Kimberly M. Baum
Vice President
Spectrum Development & Management Americas

Date

ANNEX 4:

The AC BidCo ESAA system will comply with all coordination agreements with satellite operators, and is capable of detecting and automatically ceasing emissions within 100 milliseconds if the off-axis EIRP spectral density (OESD) levels are not confirmed to be within the limits supplied to satellite operators. Furthermore, the system will ensure that any exceedance of the off-axis EIRP density specifications supplied to the target satellite operators resulting from simultaneous operation of two or more ESAA transmitters will cease within less than 100 milliseconds.

The Aeronautical Earth Stations (AESs) operating on the AC BidCo ESAA system incorporate the satellite modem. This system interfaces with the various satellites which comprise the Space Segment (via the Ku band). The satellites in turn communicate with the Ground Segment, which consists of the Gateway Earth Stations and Network Operations Centers (NOCs) that are associated with the satellites and the overall AC BidCo ESAA network. Utilizing input from the aircraft's navigation system ARINC 429 interface, the antenna is steered by the antenna control system and satellite modem as the aircraft maneuvers and travels in the air. AC BidCo's on-board data network interfaces with the satellite modem to provide users with access to online connectivity, as well as to in-flight entertainment content.

An AES will not initiate communications with a specific satellite unless its operational characteristics have been confirmed to be within defined limits. The satellite modem allows AC BidCo to use Automatic Beam Selection (ABS) to switch between satellite beams as an aircraft travels between different served areas. This also allows AC BidCo to control the terminal's access to a geographically defined service area. The modem's satellite maps contain the information regarding which satellite and beam is preferred based on the terminal's geographic location. For each service area, operational parameters are defined to ensure that applicable OESD levels are not exceeded within the service area. For example, the maximum skew is set on a service area basis. This parameter will limit the maximum angle of skew that the antenna can tolerate before it mutes its transmission for the given area. The ABS system ensures that terminals only operate within the defined service areas, allows the terminal to select the appropriate adjoining service area when the boundary is approached, and manages the process of switching to the selected service area (permitting continuity of service as service area boundaries are crossed).

Once communication between the AES and a satellite has begun, there are multiple modes of fault detection within the ESAA system that will cause transmissions to be terminated. All emissions automatically cease within 100 milliseconds if the angle between the orbital location of the target satellite and the axis of the main lobe of the antenna exceeds 0.5 degrees, and transmission is not resumed until the angle is less than 0.2 degrees. In addition, if the Antenna Control Modem Unit (ACMU) loses communication with the aircraft inertial reference system, or if there is a failure of the ACMU itself, it will cause the transmitter to immediately mute. If

the reference oscillator fails, the antenna system will cease transmission. If the maximum skew is exceeded within the defined service area, the antenna's transmitter will be muted. Finally, the Antenna System will not transmit unless it sees the appropriate out-route signal from the satellite; if the signal is not received, the Antenna System will not transmit.

Thus, the AC BidCo ESAA system will not commence operations, or will cease operations within 100 milliseconds, if the OESD levels supplied to the target satellite operator are exceeded, as required in Section 25.227(b)(2)(iii).

The system will also ensure immediate termination of transmissions that would cause the aggregate OESD levels of multiple simultaneously transmitting AES terminals to exceed the OESD levels supplied to the target satellite operator. The AC BidCo ESAA system relies on Time Division Multiple Access (TDMA) to control use of assigned frequencies. The TDMA process dynamically allocates individual time slots and frequencies to ensure that once a time slot and carrier have been assigned to an AES, no other terminal will use the same carrier at the same time.

Prior to assignment of a time slot and carrier, it is theoretically possible that two or more AES terminals would simultaneously transmit on the same frequency, but such a collision would be extremely short in duration. Specifically, when an AES commences operation in a beam, it will randomly transmit into one of the designated acquisition time slots, each of which is approximately 1 millisecond in duration. If there is no collision, the AES will be under the control of the hub and will operate using an exclusive time slot and carrier assignment dictated by the hub system. In the event more than one AES terminal transmits in a given acquisition time slot, the terminals will switch to another acquisition time slot and carrier until each one gets a time slot/carrier combination with no collision. Any collision involving multiple transmissions during an acquisition time slot will be limited to the duration of that time slot, approximately 1 millisecond.

As a result, consistent with the requirements of Section 25.227(b)(2)(iv), any exceedance of the levels specified in AC BidCo's arrangements with satellite operators due to aggregate OESD from multiple AES terminals transmitting simultaneously will automatically be terminated within a much shorter time period than 100 milliseconds.

ANNEX 5:

AC BidCo Certifications

AC BidCo LLC (“AC BidCo”), in support of the foregoing application to modify the AC BidCo ESAA License, hereby certifies as follows:

1. AC BidCo’s target space station operators have confirmed that AC BidCo’s proposed ESAA operations over international waters are within coordinated parameters for adjacent satellites up to 6 degrees away on the geostationary arc.
2. AC BidCo will comply with the requirements contained in paragraphs (a)(6), (a)(9), (a)(10), and (a)(11) of Section 25.227 of the Commission’s rules, 47 C.F.R. § 25.227.

By: /s/ Timothy Joyce
Timothy Joyce
VP of RF Engineering, Gogo LLC
for AC BidCo LLC

January 9, 2017