SES
beyond frontiers

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August 10, 2017

FILED ELECTRONICALLY

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

Subject: SES Satellites (Gibraltar) Ltd. Market Access Authority for SES-15;
File Nos. SAT-PPL-20160126-00007, SAT-MPL-20160718-00063 (Call Sign S2951)

Dear Ms. Dortch:

SES Satellites (Gibraltar) Ltd ("SES"), pursuant to Section 1.65 of the Commission's rules, 47 C.F.R. § 1.65, hereby updates the record with respect to the grant of U.S. market access for the SES-15 replacement satellite issued in the above-referenced proceedings.[1] Condition 15 of the SES-15 Grant requires SES-15 to begin providing service to the United States at 129.15° W.L. in the conventional Ku-band frequencies before the AMC-1 satellite discontinues service at 129.15° W.L.[2] SES hereby attaches for incorporation into the record a modification application its affiliate, SES Americom, Inc., filed to relocate AMC-1 to 130.9° W.L. in advance of SES-15's arrival at 129.15° W.L.

As explained in the modification application, transfer of traffic from AMC-1 to SES-15 will be unusually complicated for several reasons. AMC-1 is a traditional wide-beam satellite, while SES-15 is a high throughput satellite with multiple spot beams. Dual illumination of the two spacecraft while co-located is not technically feasible as there will be interference between the wide area beam and the spot beams. In addition, the Ku-band payload of AMC-1 has a 26 degree polarization offset. Beyond interference issues, the customers' network configuration is very different on the spot beam satellite, and customers need more time to properly configure and test their networks on SES-15 than on a traditional wide beam satellite. They will need to continue serving their end users during this configuration and testing period. In order to transition traffic with the least impact to customers, SES must provide overlapping services to customers from both orbital locations for an interim period. As a result, the satellites cannot be collocated with one another during the transition. SES therefore has sought authority to relocate AMC-1 to 130.9° W.L. before SES-15 is scheduled to arrive at 129.15° W.L.

1 *See* SES Satellites (Gibraltar) Limited, File No. SAT-MPL-20160718-00063, granted Dec. 14, 2016 (the "SES-15 Grant").
2 *See id*., Attachment to Grant at 4, ¶ 15.

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The relocation will not harm customers and is in fact necessary to ensure service continuity as SES-15 is brought into operations. Moreover, the Ku-band spectrum will be in use and will not lie fallow at any time during the transition process. These traffic transfer arrangements therefore satisfy the underlying purpose of condition 4, which is to prevent disruption of service and guard against spectrum warehousing.

Please address any questions regarding this matter to the undersigned.

Yours Sincerely,

/s/ Petra A. Vorwig

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Approved by OMB
3060-0678

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File Number: SAT-MOD-20170810-00115

FCC APPLICATION FOR SPACE AND EARTH STATION:MOD OR AMD - MAIN FORM **FCC 312 MAIN FORM FOR OFFICIAL USE ONLY**	**FCC Use Only**

APPLICANT INFORMATION

Enter a description of this application to identify it on the main menu:
Modification to reassign AMC-1 (call sign S2445) to 130.9 WL

1-8. Legal Name of Applicant

Name:	SES Americom, Inc.	Phone Number:	202-478-7143
DBA Name:		Fax Number:	202-478-7111
Street:	1129 20th Street NW Suite 1000	E-Mail:	petra.vorwig@ses.com
City:	Washington	State:	DC
Country:	USA	Zipcode:	20036 -
Attention:	Ms Petra A Vorwig		

9-16. Name of Contact Representative

Name:	Karis A. Hastings	Phone Number:	202-599-0975
Company:	SatCom Law LLC	Fax Number:	
Street:	1317 F St NW Suite 400	E-Mail:	karis@satcomlaw.com
City:	Washington	State:	DC
Country:	USA	Zipcode:	20004-
Attention:		Relationship:	

CLASSIFICATION OF FILING

17. Choose the button next to the classification that applies to this filing for both questions a. and b. Choose only one for 17a and only one for 17b.

- ○ a1. Earth Station
- ◉ a2. Space Station

(N/A) b1. Application for License of New Station
(N/A) b2. Application for Registration of New Domestic Receive-Only Station
- ○ b3. Amendment to a Pending Application
- ◉ b4. Modification of License or Registration

b5. Assignment of License or Registration
b6. Transfer of Control of License or Registration
- ○ b7. Notification of Minor Modification

(N/A) b8. Application for License of New Receive-Only Station Using Non-U.S. Licensed Satellite
(N/A) b9. Letter of Intent to Use Non-U.S. Licensed Satellite to Provide Service in the United States
(N/A) b10. Other (Please specify)
(N/A) b11. Application for Earth Station to Access a Non-U.S.satellite Not

	Currently Authorized to Provide the Proposed Service in the Proposed Frequencies in the United States.

17c. Is a fee submitted with this application?

◉ If Yes, complete and attach FCC Form 159.

If No, indicate reason for fee exemption (see 47 C.F.R.Section 1.1114).

○ Governmental Entity ○ Noncommercial educational licensee

○ Other(please explain):

17d.

Fee Classification BFY - Space Station Modification(Geostationary)

18. If this filing is in reference to an existing station, enter:	19. If this filing is an amendment to a pending application enter both fields, if this filing is a modification please enter only the file number:
(a) Call sign of station: S2445	(a) Date pending application was filed: (b) File number: SATMOD2016081600083

TYPE OF SERVICE

20. NATURE OF SERVICE: This filing is for an authorization to provide or use the following type(s) of service(s): Select all that apply:

☒ a. Fixed Satellite

☐ b. Mobile Satellite

☐ c. Radiodetermination Satellite

☐ d. Earth Exploration Satellite

☒ e. Direct to Home Fixed Satellite

☐ f. Digital Audio Radio Service

☐ g. Other (please specify)

21. STATUS: Choose the button next to the applicable status. Choose only one.	22. If earth station applicant, check all that apply.
○ Common Carrier ◉ Non-Common Carrier	☐ Using U.S. licensed satellites ☐ Using Non-U.S. licensed satellites

23. If applicant is providng INTERNATIONAL COMMON CARRIER service, see instructions regarding Sec. 214 filings. Choose one. Are these facilities:

○ Connected to a Public Switched Network ○ Not connected to a Public Switched Network ◉ N/A

24. FREQUENCY BAND(S): Place an 'X' in the box(es) next to all applicable frequency band(s).

☒ a. C-Band (4/6 GHz) ☒ b. Ku-Band (12/14 GHz)

☐ c.Other (Please specify upper and lower frequencies in MHz.)

Frequency Lower: Frequency Upper: (Please specify additional frequencies in an attachment)

TYPE OF STATION

25. CLASS OF STATION: Choose the button next to the class of station that applies. Choose only one.

○ a. Fixed Earth Station

○ b. Temporary-Fixed Earth Station

○ c. 12/14 GHz VSAT Network

○ d. Mobile Earth Station

◉ e. Geostationary Space Station

○ f. Non-Geostationary Space Station

○ g. Other (please specify)

26. TYPE OF EARTH STATION FACILITY:
○ Transmit/Receive ○ Transmit-Only ○ Receive-Only ◉ N/A
"For Space Station applications, select N/A."

PURPOSE OF MODIFICATION

27. The purpose of this proposed modification is to: (Place an 'X' in the box(es) next to all that apply.)

☐ a -- authorization to add new emission designator and related service
☐ b -- authorization to change emission designator and related service
☐ c -- authorization to increase EIRP and EIRP density
☐ d -- authorization to replace antenna
☐ e -- authorization to add antenna
☐ f -- authorization to relocate fixed station
☐ g -- authorization to change frequency(ies)
☐ h -- authorization to add frequency
☐ i -- authorization to add Points of Communication (satellites & countries)
☐ j -- authorization to change Points of Communication (satellites & countries)
☐ k -- authorization for facilities for which environmental assessment and radiation hazard reporting is required
☒ l -- authorization to change orbit location
☐ m -- authorization to perform fleet management
☐ n -- authorization to extend milestones
☒ o -- Other (Please specify)

ENVIRONMENTAL POLICY

28. Would a Commission grant of any proposal in this application or amendment have a significant environmental impact as defined by 47 CFR 1.1307? If YES, submit the statement as required by Sections 1.1308 and 1.1311 of the Commission's rules, 47 C.F.R. 1.1308 and 1.1311, as an exhibit to this application.A Radiation Hazard Study must accompany all applications for new transmitting facilities, major modifications, or major amendments.	○ **Yes** ◉ **No**

ALIEN OWNERSHIP Earth station applicants not proposing to provide broadcast, common carrier, aeronautical en route or aeronautical fixed radio station services are not required to respond to Items 30-34.

29. Is the applicant a foreign government or the representative of any foreign government?	○ **Yes** ◉ **No**
30. Is the applicant an alien or the representative of an alien?	○ **Yes** ◉ **No** ○ **N/A**
31. Is the applicant a corporation organized under the laws of any foreign government?	○ **Yes** ◉ **No** ○ **N/A**
32. Is the applicant a corporation of which more than one-fifth of the capital stock is owned of record or voted by aliens or their representatives or by a foreign government or representative thereof or by any corporation organized under the laws of a foreign country?	○ **Yes** ◉ **No** ○ **N/A**
33. Is the applicant a corporation directly or indirectly controlled by any other corporation of which more than one-fourth of the capital stock is owned of record or voted by aliens, their representatives, or by a foreign government or representative thereof or by any corporation organized under the laws of a foreign country?	◉ **Yes** ○ **No** ○ **N/A**
34. If any answer to questions 29, 30, 31, 32 and/or 33 is Yes, attach as an exhibit an identification of the aliens or foreign entities, their nationality, their relationship to the applicant, and the percentage of stock they own or vote.	Exhibit A

BASIC QUALIFICATIONS

35. Does the Applicant request any waivers or exemptions from any of the Commission's Rules? If Yes, attach as an exhibit, copies of the requests for waivers or exceptions with supporting documents.	○ **Yes** ◉ **No**
36. Has the applicant or any party to this application or amendment had any FCC station authorization or license revoked or had any application for an initial, modification or renewal of FCC station authorization, license, or construction permit denied by the Commission? If Yes, attach as an exhibit, an explination of circumstances.	○ **Yes** ◉ **No**
37. Has the applicant, or any party to this application or amendment, or any party directly or indirectly controlling the applicant ever been convicted of a felony by any state or federal court? If Yes, attach as an exhibit, an explination of circumstances.	○ **Yes** ◉ **No**
38. Has any court finally adjudged the applicant, or any person directly or indirectly controlling the applicant, guilty of unlawfully monopolizing or attemptiing unlawfully to monopolize radio communication, directly or indirectly, through control of manufacture or sale of radio apparatus, exclusive traffic arrangement or any other means or unfair methods of competition?If Yes, attach as an exhibit, an explanation of circumstances	○ **Yes** ◉ **No**
39. Is the applicant, or any person directly or indirectly controlling the applicant, currently a party in any pending matter referred to in the preceding two items? If yes, attach as an exhinit, an explanation of the circumstances.	○ **Yes** ◉ **No**
40. If the applicant is a corporation and is applying for a space station license, attach as an exhibit the names, address, and citizenship of those stockholders owning a record and/or voting 10 percent or more of the Filer's voting stock and the percentages so held. In the case of fiduciary control, indicate the beneficiary(ies) or class of beneficiaries. Also list the names and addresses of the officers and directors of the Filer.	**Exhibit B**
41. By checking Yes, the undersigned certifies, that neither applicant nor any other party to the application is subject to a denial of Federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Act of 1988, 21 U.S.C. Section 862, because of a conviction for possession or distribution of a controlled substance. *See 47 CFR 1.2002(b) for the meaning of "party to the application" for these purposes.*	◉ **Yes** ○ **No**
42a. Does the applicant intend to use a non-U.S. licensed satellite to provide service in the United States? If Yes, answer 42b and attach an exhibit providing the information specified in *47 C.F.R. 25.137, as appropriate*. If No, proceed to question 43.	○ **Yes** ◉ **No**
42b. What administration has licensed or is in the process of licensing the space station? If no license will be issued, what administration has coordinated or is in the process of coordinating the space station?	

43. Description. (Summarize the nature of the application and the services to be provided). SES Americom, Inc. hereby applies for a modification of the license for its AMC-1 spacecraft, call sign S2445, to reassign the satellite to 130.9 degrees W.L. and to extend the satellite's license term to June 30, 2021. See attached narrative.Narrative

43a. Geographic Service Rule Certification By selecting A, the undersigned certifies that the applicant is not subject to the geographic service or geographic coverage requirements specified in 47 C.F.R. Part 25.	◉ **A**
By selecting B, the undersigned certifies that the applicant is subject to the geographic service or geographic coverage requirements specified in 47 C.F.R. Part 25 and will comply with such requirements.	○ **B**
By selecting C, the undersigned certifies that the applicant is subject to the geographic service or geographic coverage requirements specified in 47 C.F.R. Part 25 and will not comply with such requirements because it is not feasible as a technical matter to do so, or	○ **C**

that, while technically feasible, such services would require so many compromises in satellite design and operation as to make it economically unreasonable. A narrative description and technical analysis demonstrating this claim are attached.

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CERTIFICATION

The Applicant waives any claim to the use of any particular frequency or of the electromagnetic spectrum as against the regulatory power of the United States because of the previous use of the same, whether by license or otherwise, and requests an authorization in accordance with this application. The applicant certifies that grant of this application would not cause the applicant to be in violation of the spectrum aggregation limit in 47 CFR Part 20. All statements made in exhibits are a material part hereof and are incorporated herein as if set out in full in this application. The undersigned, individually and for the applicant, hereby certifies that all statements made in this application and in all attached exhibits are true, complete and correct to the best of his or her knowledge and belief, and are made in good faith.

44. Applicant is a (an): (Choose the button next to applicable response.)

- ○ Individual
- ○ Unincorporated Association
- ○ Partnership
- ◉ Corporation
- ○ Governmental Entity
- ○ Other (please specify)

45. Name of Person Signing	46. Title of Person Signing
Petra A. Vorwig	Senior Legal & Regulatory Counsel

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

In the Matter of	)	
	)	
SES AMERICOM, INC.	)	File No. SAT-MOD-_____
	)	Call Sign S2445
Application for Modification of AMC-1 Fixed-Satellite Space Station License	)	
	)	

APPLICATION OF SES AMERICOM, INC.

SES Americom, Inc. ("SES") hereby respectfully requests modification of its license for the AMC-1 C/Ku-band fixed-satellite space station to reassign the spacecraft to 130.9º W.L. ("SES Modification Application"). Specifically, SES seeks authority to: (1) drift AMC-1 from its current position at 129.15° W.L. to 130.9º W.L. in the beginning of December 2017 in advance of the arrival of SES-15 at 129.15° W.L.; (2) allow SES to operate the AMC-1 Ku-band communications payload during the drift period; (3) maintain AMC-1 at 130.9° W.L. in inclined orbit using certain C-band and conventional Ku-band frequencies for Telemetry, Tracking and Command ("TT&C");[1] (4) operate AMC-1 in the C- and Ku-band frequencies at 130.9° W.L.; and (5) extend the license term for the satellite to June 30, 2021.

AMC-1 will be replaced by SES-15 at 129.15° W.L. at the end of 2017 or early in 2018.[2] Reassignment of AMC-1 in advance of SES-15's arrival will serve the public interest by

[1] The AMC-1 TT&C frequencies and nominal polarizations are as follows:
Command: 6423.5 MHz (horizontal and vertical polarization; uplink)
Telemetry: 3700.5 MHz (vertical polarization; downlink),
4199.5 MHz (vertical and horizontal polarization; downlink), and
12198.0 MHz (horizontal polarization; downlink).

[2] SES Satellites (Gibraltar) Limited, (Call Sign S2951), File No. SAT-PPL-20160126-00007, granted July 12, 2016, and File No. SAT-MPL-20160718-00063, granted Dec. 14, 2016 ("*SES-15 Grant*").

allowing SES to continue serving customers currently using AMC-1 while SES-15 arrives at 129.15° W.L. and commences operations. As explained herein, transitioning traffic from a traditional wide beam satellite to a satellite with a spot beam configuration cannot be performed with co-located spacecraft as is traditionally done with two wide-beam satellites. Furthermore, operation of the AMC-1 Ku-band communications payload during the satellite's drift to 130.9° W.L. will ensure services are not disrupted during the drift as there is no other available satellite to support the customer traffic while AMC-1 is drifting. Once SES-15 is fully operational at 129.15° W.L. and traffic is transferred to SES-15, AMC-1 will be available to provide additional Ku-band capacity at the nominal 131° W.L. orbital location and to supplement the C-band capacity currently provided by AMC-11 at that position.

A completed Form 312 is attached, and SES incorporates by reference the technical information previously provided in support of AMC-1.[3] In addition, SES is providing here technical information relating to the proposed modification to the AMC-1 license on Schedule S and in narrative form pursuant to Section 25.114 of the Commission's Rules.

MODIFICATION

Re-assignment to 130.9º W.L.: AMC-1 is a U.S.-licensed hybrid C/Ku-band satellite that is assigned to 129.15° W.L. with a license term that expires on May 31, 2018.[4] At that position, AMC-1 is operating under the ITU satellite network filings of the Gibraltar Administration. SES's affiliate, SES Satellites (Gibraltar) Limited, has authority from the

[3] The most recent technical information regarding AMC-1 is found in File No SAT-MOD-20140730-00089; as amended by File No. SAT-AMD-20150219-00006. This application also incorporates by reference technical information submitted in File Nos. SAT-MOD-20110718-00130 and SAT-MOD-20160816-00083.

[4] *See* File No. SAT-MOD-20160816-00083, granted Oct. 5, 2016.

Gibraltar Administration to operate the SES-15 satellite at 129.15° W.L.[5] SES-15 was launched on May 18, 2017 and is expected to arrive at 129.15° W.L. by the end of 2017 or early in 2018.

The transfer of traffic from AMC-1 to SES-15 will be unusually complicated for several reasons. AMC-1 is a traditional wide-beam satellite, while SES-15 is a high throughput satellite with multiple spot beams. Dual illumination of the two spacecraft while co-located is not technically feasible as there will be interference between the wide area beam and the spot beams. In addition, the Ku-band payload of AMC-1 has a 26 degree polarization offset. Beyond interference issues, the customers' network configuration is very different on the spot beam satellite, and customers need more time to properly configure and test their networks on SES-15 than on a traditional wide beam satellite. They will need to continue serving their end users during this configuration and testing period. In order to transition traffic with the least impact to customers, SES must provide overlapping services to customers from both orbital locations for an interim period. As a result, the satellites cannot be co-located with one another during the transition.

SES therefore seeks authority to relocate AMC-1 to 130.9° W.L. before SES-15 is scheduled to arrive at 129.15° W.L. Additionally, because SES-15 will not yet have commenced operations at the time AMC-1 is relocated and there are no other satellites capable of taking over the service, SES seeks to operate the AMC-1 Ku-band communications payload during the drift to provide continuous service to certain aeronautical customers. The requested operating authority during drift is needed to prevent an interruption of service to those customers during the two weeks planned for AMC-1 to move from 129.15° W.L. to 130.9° W.L.

[5] *See SES-15 Grant*.

Grant of the requested authority to relocate and operate AMC-1 will serve the public interest and is consistent with Commission precedent. The Commission has repeatedly observed that its policy is to allow "satellite operators to rearrange satellites in their fleet to reflect business and customer considerations where no public interest factors are adversely affected."[6] As the International Bureau has explained:

> the Commission attempts, when possible, to leave spacecraft design decisions to the space station licensee because the licensee is in a better position to determine how to tailor its system to meet the particular needs of its customers. Consequently the Commission will generally grant a licensee's request to modify its system, provided there are no compelling countervailing public interest considerations.[7]

Here, the proposed reassignment will allow SES to make efficient use of AMC-1 in order to add Ku-band capacity and supplement C-band operations at the nominal 131° W.L. orbital location. Because SES intends to relocate AMC-1 in advance of SES-15's arrival and proposes to operate the Ku-band communications payload during the drift, the relocation of AMC-1 will not have any impact on existing services.

The Commission has previously authorized satellite operators to operate satellite communications payloads during drift maneuvers. For example, the Commission authorized XM Radio to continue operating the communications payload of the XM-4 satellite as it relocated

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[6] *SES Americom, Inc.*, Order and Authorization, DA 06-757 (IB rel. Apr. 7, 2006) at 4, ¶ 8, *citing Amendment of the Commission's Space Station Licensing Rules and Policies*, Second Report and Order, 18 FCC Rcd 12507, 12509, ¶ 7 (2003).

[7] *AMSC Subsidiary Corp.*, Order and Authorization, DA 98-493, 13 FCC Rcd 12316 (IB 1998) at 12318, ¶ 8 (footnote omitted).

from 115.0° W.L. to 115.25° W.L.[8] The Commission has also recognized the public interest value in maintaining continuity of service.[9]

Reassignment of AMC-1 to 130.9º W.L. degrees will not adversely affect other operators. The only satellite positioned at the nominal 131° W.L. orbital location, AMC-11, is operated by SES, and SES will internally manage the joint stationkeeping of its spacecraft. Furthermore, there are no other satellites operating in the Ku-band fixed-satellite service frequencies between 129.15° W.L. and 130.9° W.L. and therefore, operations of the AMC-1 communications payload during the drift will not affect any other operators. SES will also follow standard industry practices for coordination of transmissions in advance of and during the relocation process. The Technical Appendix certifies that the AMC-1 network is compliant with Commission rules for operation in a two-degree spacing environment and is compatible with co-frequency satellites adjacent to the nominal 131° W.L. orbital location.

License Extension: SES also requests a roughly three-year extension of the AMC-1 license term to June 30, 2021. SES has calculated that there is sufficient fuel onboard the AMC-1 spacecraft for the spacecraft to continue providing reliable service during the proposed extended license term and to deorbit the spacecraft consistent with the orbital debris

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[8] *See XM Radio, Inc.*, (Call Sign S2616), File No. SAT-MOD-20100722-00165, granted Oct. 14, 2010.

[9] *See, e.g., DIRECTV Enterprises, LLC, Request for Special Temporary Authority to Conduct Telemetry, Tracking and Control During the Relocation of DIRECTV 1 to the 72.5º W.L. Orbital Location*, Order and Authorization, DA 05-1890 (Sat. Div. rel. July 14, 2005) at ¶ 18 (granting STA to relocate spacecraft to a location where it will replace a satellite with failing solar panels "will enable DIRECTV to maintain continuity of DBS service to its customers"); *DIRECTV Enterprises, LLC, Application for Authorization to Operate DIRECTV 5, a Direct Broadcast Satellite, at the 109.8º W.L. Orbital Location*, Order and Authorization, DA 05-2654 (Sat. Div. rel. Oct. 5, 2005) at ¶ 8 ("DIRECTV's proposal to provide DBS service from this location will serve the public interest, convenience and necessity in that it will ensure continuity of service to DIRECTV subscribers").

plan the Commission has previously approved for the satellite.[10] In making these calculations, SES has assumed inclined orbit operations at 130.9° W.L. and a stationkeeping tolerance of +/- 0.05 degrees. Furthermore, SES has made allowance in its fuel calculations for the possibility of a single relocation during the requested extension term of the AMC-1 license.[11]

The satellite's overall health is good, with all satellite subsystems functioning nominally. There is no single point of failure in the satellite's design; and there is no problem with the satellite's TT&C links, including the back-up TT&C links. As a result, extending the license term for AMC-1 will serve the public interest by allowing SES to continue to use the spacecraft to provide service to customers, promoting the efficient use of satellite and orbital resources.

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[10] SES developed the nominal lifetime prediction by estimating future fuel consumption, including for the planned deorbiting maneuvers, and taking into account fuel usage predictions based on data from previous maneuvers. SES's calculations use lifetime models that incorporate uncertainty in a number of variables including initial tank loading, fuel usage efficiency, and the oxidizer to fuel ratio.

[11] Depending on whether there are any relocations during this time, and the distance and speed of such relocations, the expected lifetime of the satellite may be longer or shorter than estimated. In any case, SES will de-orbit the spacecraft to at least 150 km above the geostationary arc, regardless of the remaining term of the AMC-1 license.

CONCLUSION

For the foregoing reasons, SES seeks modification of the AMC-1 license to reassign the spacecraft to 130.9º W.L. for operations in the C- and Ku- band frequencies and to extend the satellite's license term, as described in the attached materials.

Respectfully submitted,

SES AMERICOM, INC.

By: */s/ Petra A. Vorwig*

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Dated: August 10, 2017

TECHNICAL APPENDIX

AMC-1 AT 130.9° W.L.

1.0 Overall Description (§25.114(d)(1))

This technical appendix is submitted in support of the modification application of SES Americom, Inc. ("SES") seeking authority to relocate AMC-1 to 130.9° W.L. from its current orbital position of 129.15º W.L. SES incorporates by reference the technical information it has already provided with respect to AMC-1,[1] and provides here technical information relating to operation of AMC-1 at 130.9° W.L. consistent with the proposed modification.

AMC-1 is equipped with twenty-four 36 MHz C-band transponders and twenty-four 36 MHz Ku-band transponders. At 130.9° W.L., the spacecraft's Ku-band transponders will provide coverage of the contiguous United States, Alaska, Hawaii, Mexico, and parts of Canada and the Caribbean. The C-band transponders will supplement and be available to provide back-up capacity for SES's AMC-11 satellite at 131.0° W.L. The TT&C frequencies of AMC-1 are in C-band with a beacon in Ku-band. The Ku-band transponders have a 26° polarization shift away from nominal linear 0° and 90° polarizations.[2]

2.0 Schedule S (§25.114(c))

The Schedule S database is included with this filing. Note that the online Schedule S automatically rounds the orbital location to 131.0° W.L., but the requested orbital location is 130.9° W.L.

Consistent with §25.114(c)(4)(vi)(A), the gain characteristics for the global horn antenna ("GBLH") and ("GBLV") are not provided in a GIMS-readable format with the Schedule S because the 8 dB contour does not fall on the Earth. In addition, the information for the

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[1] The most recent technical information regarding AMC-1 is found in File No SAT-MOD-20140730-00089; as amended by File No. SAT-AMD-20150219-00006. *See also* File Nos. SAT-MOD-20160816-00083 & SAT-MOD-20110718-00130.

[2] *See GTE Spacenet Corp. and GE American Communications, Inc.*, 9 FCC Rcd 1271, 1273-74 (Com. Car. Bur. 1994).

minimum and maximum saturation flux densities is not applicable for the Global Horn Antenna, and as such, dummy values of -999.9 and -999 were entered in the Schedule S for the Min Saturation Flux Density and Max Saturation Flux Density, respectively.

3.0 TT&C frequencies and beams

The telemetry and command subsystem consists of redundant receivers and transmitters which are able to operate through either an omnidirectional antenna system or through the communications antennas. Table 1 below shows the planned TT&C carrier center frequencies, polarizations and bandwidths through the communications antenna.

	Frequency, MHz	Nominal polarization
Command carriers (bandwidth: 800KHz, 1.2 MHz capture range)		
C-band	6423.5	V
Beacons/Telemetry (bandwidth: 300 KHz)		
C-band pair	3700.5	V
	4199.5	H
Ku-band	12198	H

Table 1: TT&C Carrier Frequencies and Polarizations through the Communications Antenna

Table 2 below shows the planned TT&C carrier center frequencies, polarizations and bandwidths through the Global Horn antenna.

	Frequency, MHz	Nominal polarization
Command carriers (bandwidth: 800KHz, 1.2 MHz capture range)		
C-band	6423.5	H
Beacons/Telemetry (bandwidth: 300 KHz)		
C-band pair	3700.5	V
	4199.5	V

Table 2: TT&C Carrier Frequencies and Polarizations through the Global Horn Antenna

4.0 Certification with respect to two degree spacing levels (§25.140(a))

SES certifies that the AMC-1 downlink EIRP density will not exceed 3 dBW/4kHz for digital transmissions or 8 dBW/4kHz for analog transmissions in the C-band, nor will the downlink EIRP density exceed 14 dBW/4kHz in the Ku-band unless higher levels are coordinated with the operators of authorized co-frequency space stations at assigned locations within six degrees of 130.9° W.L. and except as provided in §25.140(d). SES also certifies that the associated uplink EIRP density levels in the C-band and in the Ku-band will not exceed the applicable envelopes in §25.218, §25.221(a)(1), §25.222(a)(1), §25.226(a)(1), or §25.227(a)(1) unless appropriately coordinated with operators of authorized co-frequency space stations at assigned locations within six degrees of 130.9° W.L. and except as provided in §25.140(d).

5.0 Maximum Theoretical Operation Levels

AMC-1 will be operated consistent with coordination agreements with adjacent satellites. In any case, in the 11.7-12.2 GHz band, the downlink EIRP density of the AMC-1 digital carriers will not exceed -18 dBW/Hz; and in the 14-14.5 GHz band, the input power density of the uplink digital carriers of earth stations operating with AMC-1 will not exceed -45 dBW/Hz. In the

3700-4200 MHz band, the downlink EIRP density of the AMC-1 digital carriers will not exceed -30.0 dBW/Hz; and in the 5925-6425 MHz band, the input power density of the uplink digital carriers of earth stations operating with AMC-1 will not exceed -38.7 dBW/Hz.

6.0 Mitigation of Orbital Debris (§25.114(d)(14))

The information required under §25.114(d)(14) of the Commission's Rules is already on file with the Commission and is incorporated by reference herein.[3] The only change to that information is that SES proposes to move AMC-1 to the 130.9° W.L orbital location. At 130.9° W.L., AMC-1 will be in inclined orbit.[4]

SES is not aware of any other FCC- or non-FCC licensed spacecraft that are operational or planned to be deployed at 130.9° W.L. or to nearby orbital locations such that there would be an overlap with the requested stationkeeping volume of AMC-1. SES's AMC-11 spacecraft operates at 131.0° W.L. with an east/west stationkeeping tolerance of ±0.05 degrees.

[3] *See* File No. SAT-MOD-20110718-00130, Technical Appendix, Section 3.

[4] AMC-1 began inclined orbit operation at 129.15°W.L and will continue operating at an inclined orbit at 130.9°W.L. The initial inclination will be 1.73 degrees, and the rate of change in inclination per year will be 0.8 degrees. The expected end-of-life of the satellite accounting for inclined orbit operation and the maneuvers specified under §25.283 of the Commission's rules is June 2021. Note that the Inclination Excursion or North/South Station-Keeping Tolerance is actually a range that will vary from 1.73 to 4.8 degrees. In the Schedule S database SES has put in 1.73 degrees since the field does not allow for a range.

DECLARATION

I, Pascale Dumit, hereby certify under penalty of perjury that I am the technically qualified person responsible for preparation of the technical information contained in the foregoing exhibit; that I am familiar with the technical requirements of Part 25; and that I either prepared or reviewed the technical information contained in the exhibit and that it is complete and accurate to the best of my knowledge, information and belief.

_/s/_Pascale Dumit_____

Pascale Dumit
Manager, Spectrum Management and Development
SES Americom, Inc.

Dated: August 10, 2017