

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

In the Matter of)	
)	
SES AMERICOM, INC.)	File No. SAT-MOD-_____
)	Call Sign S2135
Application for Modification of AMC-4)	
Fixed-Satellite Space Station License)	

APPLICATION OF SES AMERICOM, INC.

SES Americom, Inc. (“SES”) hereby respectfully requests modification of its license for the AMC-4 C/Ku-band fixed-satellite space station to reassign the spacecraft to 134.9° W.L. Specifically, SES seeks authority to: (1) drift AMC-4 from its current position at 67.0° W.L. to 134.9° W.L. and maintain it at that location using certain C-band and conventional Ku-band frequencies for Telemetry, Tracking and Command (“TT&C”);¹ (2) operate AMC-4 in the C-band, conventional Ku-band, and extended Ku-band frequencies at 134.9° W.L.; and (3) extend the AMC-4 license term to February 28, 2022.

Reassignment of AMC-4 will serve the public interest by allowing SES to use AMC-4 to add Ku-band capacity at an orbital location where those frequencies are not currently in use to facilitate the delivery of in-flight broadband service to passengers and crew members traveling on U.S. airlines. The reassignment will also augment C-band capacity currently

¹ The AMC-4 TT&C frequencies and nominal polarizations are as follows:
Command: 6423.5 MHz (horizontal polarization; uplink)
Telemetry: 3700.5 MHz (horizontal polarization; downlink),
4199.5 MHz (vertical polarization; downlink),
11702.0 MHz (horizontal polarization; downlink), and
12198.0 MHz (vertical polarization; downlink).

available in the western region of the geostationary arc. Grant of the requested license extension will facilitate the continued use of the AMC-4 satellite for service to customers.

A completed Form 312 is attached, and SES incorporates by reference the technical information previously provided in support of AMC-4.² In addition, SES is providing here technical information relating to the proposed modification to the AMC-4 license on Schedule S and in narrative form pursuant to Section 25.114 of the Commission's Rules.

MODIFICATION

AMC-4 is a U.S.-licensed hybrid C/Ku-band satellite that is assigned to 67° W.L. with a license term that expires on December 22, 2018.³ At that position, AMC-4 is operating under the International Telecommunication Union ("ITU") satellite network filings of the Colombian Administration. SES's affiliate, New Skies Satellites B.V., recently successfully launched its SES-10 satellite, which has commenced operations at 66.9° W.L.⁴ With the arrival of SES-10, AMC-4 is available for relocation.

Reassignment to 134.9° W.L.: SES has a customer requirement to provide aeronautical service over the Pacific Ocean. Relocating AMC-4 will support this requirement by adding Ku-band capacity at an orbital location where such capacity is not available today. Furthermore, AMC-4 C-band operations at 134.9° W.L. will complement the C-band capacity currently provided by SES's AMC-10 satellite.

² The most recent technical information regarding AMC-4 is found in File Nos. SAT-AMD-20110802-00142; SAT-MOD-20110510-00086; & SAT-MOD-20100623- 00144.

³ See File No. SAT-MOD-20140606-00059, granted Sept. 23, 2014.

⁴ See New Skies Satellites B.V., Call Sign S2950, File No. SAT-MPL-20170108-00002, granted Mar. 22, 2017.

Grant of the requested authority to relocate and operate AMC-4 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.”⁵ 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.⁶

Here, the proposed change will allow SES to make efficient use of AMC-4 in order to expand C-band coverage and add conventional and extended Ku-band capacity at the nominal 135° W.L. orbital location. Because SES-10 will provide follow-on service at the nominal 67° W.L. orbital location, the relocation of AMC-4 will not have any impact on existing services.

Reassignment of AMC-4 to 134.9° W.L. degrees will not adversely affect other operators. The only satellites positioned at the nominal 135° W.L. orbital location are operated by SES, and SES will internally manage the stationkeeping of its satellites at that position to ensure safe and efficient operation. SES will operate only the TT&C frequencies of AMC-4 during the drift and will follow standard industry practices for coordination of TT&C transmissions during the relocation process. The Technical Appendix certifies that the AMC-4

⁵ *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).

⁶ *AMSC Subsidiary Corp.*, Order and Authorization, DA 98-493, 13 FCC Rcd 12316 (IB 1998) at 12318, ¶ 8 (footnote omitted).

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 135° W.L. orbital location.⁷ SES will internally coordinate the C-band operations of AMC-4 and its other satellites located at the nominal 135° W.L. orbital location to ensure compatibility.

Operations of AMC-4 at the nominal 135° W.L. orbital location in the C-band will be conducted under U.S. ITU filings. Operations in the conventional and extended Ku-band frequencies at this location will be coordinated under an ITU network filing of the Luxembourg Administration designated LUX-G8-36. SES requests that the United States confirm its non-objection to bringing into use the LUX-G8-36 filing with AMC-4, in accordance with ITU Circular Letter CR/333 (May 2, 2012).

License Extension: SES requests extension of the AMC-4 license term by slightly more than three years to February 28, 2022. SES has calculated that there is sufficient fuel onboard the AMC-4 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 mitigation plan the Commission has previously reviewed for the satellite.⁸ In making these calculations, SES has assumed that standard stationkeeping maneuvers will be performed to maintain AMC-4 within its existing east-west and north-south stationkeeping tolerances.⁹ Furthermore, although SES does not currently contemplate relocating AMC-4 to

⁷ See attached Technical Appendix at 4, Section 4.0.

⁸ 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.

⁹ The calculations do not assume that the spacecraft will be placed into inclined orbit during the requested extension term. If AMC-4 is placed into inclined orbit during this time, the lifetime of the satellite will be extended.

another orbital location, SES has made allowance in its fuel life calculations for the possibility of a single relocation during the requested extension term of the AMC-4 license.¹⁰

As SES has previously reported to the Commission, the AMC-4 satellite has experienced solar array circuit failures that have affected the total power available to the spacecraft. Apart from these issues, the satellite's overall health is good, with all other 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-4 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.

¹⁰ Depending on whether there are any relocations during this time, and the distance and speed of any 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-4 license.

CONCLUSION

For the foregoing reasons, SES seeks modification of the AMC-4 license to reassign the spacecraft to 134.9° W.L. for operations in the C-band, conventional Ku-band, and extended Ku-band frequencies, and to extend the satellite's license term to February 28, 2022, as described in the attached materials.

Respectfully submitted,

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TECHNICAL APPENDIX

AMC-4 AT 134.9° 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-4 to 134.9° W.L. SES incorporates by reference the technical information it has already provided with respect to AMC-4,¹ and provides here technical information relating to operation of AMC-4 at 134.9° W.L consistent with the proposed modification.

AMC-4 is equipped with twenty-four 36 MHz conventional C-band transponders, twenty-four 36 MHz conventional Ku-band transponders, and four 72 MHz extended Ku-band transponders. These C- and Ku-band transponders will provide coverage of North America, the Pacific Ocean and the Caribbean. The Telemetry, Tracking and Command (“TT&C”) capabilities in the C- and Ku-band will be used as described in previous applications.² The interconnectivity of the AMC-4 uplink and downlink transponders and the satellite’s detailed frequency plan are described in previous applications.³

2.0 Schedule S (§25.114(c))

The Schedule S database is included with this filing. Pursuant to Section 25.114(c)(4)(vi)(A), the gxt diagrams for the global telecommand receive beam (“CMD”) and telemetry transmit beam (“CTM”) are not included because for each of these beams the contour at 8 dB below peak falls entirely beyond the edge of the visible Earth.

Two features of the online Schedule S must be noted. First, the orbital location is automatically rounded to 135.0° W.L., but the requested orbital location is 134.9° W.L. Second, representative

¹ The most recent technical information regarding AMC-4 is found in File Nos. SAT-AMD-20110802-00142; SAT-MOD-20110510-00086; & SAT-MOD-20100623- 00144.

² See File No. SAT-MOD-20100623-00144, Technical Appendix at 8-10.

³ See *id.*, Technical Appendix at 3-6.

DTH transmit beams were created in order to accommodate requirements of the Schedule S software. The AMC-4 satellite has two Ku-band beams in each linear polarization that encompass both the conventional Ku-band and extended Ku-band spectrum. SES offers FSS service throughout this spectrum but offers DTH service only in the conventional Ku band segment. As a result, the conventional Ku-band downlink frequencies are included in the FSS operating band but are also identified as a separate operating frequency band with “Direct-to-Home in the Fixed-Satellite Service” designated as the nature of service. Because of this separate band designation, the Schedule S software does not associate the Ku-band beams (*i.e.*, KNTH, KNTV, KSTH, and KSTV) with the DTH service. To correct for this problem, SES input representative DTH beams by replicating the four FSS Ku-band transmitting beams. These DTH beams, designated as DNH, DNV, DSH, and DSV, are simply duplicates and do not represent separate operating beams. Instead, as noted above, the satellite only has four Ku-band downlink beams providing both FSS (in the 11450-12200 MHz band) and DTH service (in the 11700-12200 MHz band).

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. AMC-4 will use the communications antennas (“CTH” and “CTV”) for transmitting telemetry carriers in C-band, and the global horn antenna for receiving the C-band telecommand carrier (“GBLRH”) with a horizontal polarization while on-station. The communications antennas (“NATH” and “NATV”) will be used for transmitting telemetry carriers in Ku-band. All of these carriers are described in the Schedule S.

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

SES certifies that the AMC-4 downlink EIRP density will not exceed 3 dBW/4kHz in the C-band nor 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 134.9° 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 coordinated with operators of authorized co-frequency space stations at assigned locations within six degrees of 134.9° W.L. and except as provided in §25.140(d).

5.0 Maximum Theoretical Operation Levels

AMC-4 will be operated consistently with coordination agreements with adjacent satellites. In any case, in the conventional and extended Ku-bands, the downlink EIRP density of the AMC-4 digital carriers will not exceed -18 dBW/Hz, and the input power density of the uplink digital carriers of earth stations operating with AMC-4 will not exceed -44 dBW/Hz. In the C-band, the downlink EIRP density of the AMC-4 digital carriers will not exceed -30.0 dBW/Hz; and the input power density of the uplink digital carriers of earth stations operating with AMC-4 will not exceed -38.7 dBW/Hz.

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

The information required under Section 25.114(d)(14) of the Commission's Rules is already on file with the Commission and is incorporated by reference herein.⁴ SES hereby submits the following supplemental information regarding orbital debris mitigation.

⁴ SES Americom, Inc., Call Sign S2135, File No. SAT-MOD-20100623-00144, Technical Appendix at 16-19, granted Nov. 4, 2010.

SES proposes to move AMC-4 to 134.9° W.L. and to operate it there with an east-west stationkeeping tolerance of ± 0.05 degrees. The proposed stationkeeping volume for AMC-4 will not overlap with that of any other spacecraft. The closest satellites to AMC-4 will be other SES satellites, AMC-7 and AMC-10, both of which operate at 135.0° W.L. with an east-west stationkeeping tolerance of ± 0.05 degrees. SES is not aware of any other FCC- or non-FCC licensed spacecraft that are operational or planned to be deployed at 134.9° W.L. or to nearby orbital locations such that there would be an overlap with the requested stationkeeping volume of AMC-4.

SES uses the Space Data Center (“SDC”) system from the Space Data Association to monitor the risk of close approach of its satellites with other objects. Any close encounters (separation of less than 10 km) are flagged and investigated in more detail. If required, avoidance maneuvers are performed to eliminate the possibility of collisions. During any relocation, the moving spacecraft is maneuvered such that it is at least 30 km away from the synchronous radius at all times. In most cases, much larger deviation from the synchronous radius is used. In addition, the SDC system is used to ensure no close encounter occurs during the move. When de-orbit of a spacecraft is required, the initial phase is treated as a satellite move, and the same precautions are used to ensure collision avoidance.

DECLARATION

I, Giadira V. León, hereby certify under penalty of perjury that I am the technically qualified person responsible for 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/_____

Giadira V. León
Manager, Spectrum Development
SES

Dated: May 18, 2017