

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

In the Matter of Application of )  
 )  
SES AMERICOM, INC. ) File No. SAT-A/O-\_\_\_\_\_  
 ) Call Sign S2713  
For Authority to Relocate the AMC-18 C-Band )  
Satellite to, and Operate the Satellite at, 139° W.L. )

**APPLICATION OF SES AMERICOM, INC.**

SES Americom, Inc. (“SES Americom,” doing business as “SES”), pursuant to the Communications Act of 1934, as amended, and the Federal Communications Commission’s regulations thereunder, hereby requests drift and operating authority allowing it to relocate the C-band AMC-18 spacecraft from 104.95° W.L., where it has been operating under a Gibraltar license, to 139° W.L., and to operate the satellite thereafter pursuant to a U.S. license. Grant of this application will serve the public interest by allowing AMC-18 to provide back-up capacity for important services being provided by the AMC-8 spacecraft at 139° W.L.

A completed FCC Form 312 is attached, and SES incorporates by reference the technical information previously provided regarding the AMC-18 satellite.<sup>1</sup> Updated technical information relating to the proposed operation of the spacecraft at 139° W.L. is provided on Schedule S and in narrative form pursuant to Section 25.114 of the Commission’s Rules.

**I. BACKGROUND**

A subsidiary of SES Americom, SES Satellites (Gibraltar) Ltd. (“SES Gibraltar”), holds a license from the Gibraltar Regulatory Authority (“GRA”) to operate AMC-18 at

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<sup>1</sup> SES Satellites (Gibraltar) Ltd., Call Sign S2713, File No. SAT-PPL-20061006-00118.

104.95° W.L., and the spacecraft is authorized to serve the United States at that location.<sup>2</sup> AMC-18 has been replaced at 104.95° W.L. by the C-band payload of the SES-11 satellite,<sup>3</sup> and AMC-18 is accordingly available for reassignment. SES plans to relocate AMC-18 to 139° W.L., where the satellite will be available to provide back-up capacity for the C-band AMC-8 spacecraft, which is jointly licensed to SES Americom and Alascom, Inc.<sup>4</sup> and provides important services to Alaska.

SES Americom seeks Commission authority for this relocation and proposes to operate AMC-18 as a U.S.-licensed spacecraft at 139° W.L. Grant of this application will result in the transfer of licensing responsibility for AMC-18 from the GRA to the Commission, and the GRA has advised SES Americom that it has no objection to this change. At 139° W.L., AMC-18 will operate pursuant to International Telecommunication Union filings submitted by the U.S. Administration.

SES Americom is legally and technically qualified to hold a license for AMC-18 as proposed herein. SES Americom is a pioneer and leading provider of satellite capacity in the United States. SES Americom has its headquarters in Princeton, New Jersey, and together with its affiliates provides U.S. and international satellite capacity through a fleet of over 50 geosynchronous communications satellites. SES Americom (then known as RCA American Communications, Inc.) launched its first domestic communications satellite in December 1975. Today, SES Americom and its affiliates operate over two dozen satellites with coverage of the

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<sup>2</sup> SES Satellites (Gibraltar) Ltd., Call Sign S2713, File No. SAT-PPL-20061006-00118, granted Dec. 7, 2006.

<sup>3</sup> SES Satellites (Gibraltar) Limited, Call Sign S2964, File No. SAT-PPL-20160512-0048, granted Dec. 7, 2016.

<sup>4</sup> SES Americom, Inc. and Alascom, Inc., Call Sign S2379, File No. SAT-MOD-20151222-00086, granted Mar. 17, 2016 (extending the AMC-8 license term until June 30, 2020).

United States, providing satellite capacity for broadcast and cable video distribution, VSAT data networks, remote communications, and government agencies.

SES Americom requests a license to relocate AMC-18 to, and operate it at, 139° W.L. in order to ensure continuity of service for C-band customers at that orbital location. As with other satellites in the SES Americom fleet, SES Americom will commercialize the satellite capacity on AMC-18 on a non-common carrier basis by negotiating contracts individually with its customers. Grant of the requested authority will serve the public interest by allowing SES to provide service continuity at 139° W.L.

**II. THE COMMISSION SHOULD GRANT ANY NECESSARY RULE WAIVERS FOR AMC-18**

SES Americom seeks any necessary waiver of Sections 25.114(d)(14)(ii) and 25.283(c) of the Commission’s requirements in connection with the instant application. Grant of the waivers is consistent with Commission policy:

The Commission may waive a rule for good cause shown. Waiver is appropriate if special circumstances warrant a deviation from the general rule and such deviation would better serve the public interest than would strict adherence to the general rule. Generally, the Commission may grant a waiver of its rules in a particular case if the relief requested would not undermine the policy objective of the rule in question and would otherwise serve the public interest.<sup>5</sup>

Sections 25.114(d)(14) and 25.283(c) address requirements relating to venting stored energy sources at the spacecraft’s end of life.<sup>6</sup> AMC-18 is a Lockheed Martin A2100A

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<sup>5</sup> *PanAmSat Licensee Corp.*, 17 FCC Rcd10483, 10492 (Sat. Div. 2002) (footnotes omitted).

<sup>6</sup> Section 25.283(c) contains the substantive venting requirement, and Section 25.114(d)(14)(ii) requires applicants to submit information that addresses “whether stored energy will be removed at the spacecraft’s end of life.” 47 C.F.R. § 25.114(d)(14)(ii).

model spacecraft. As described in more detail in the attached Orbital Debris Mitigation Statement, the oxidizer tanks on the spacecraft were sealed following completion of the launch phase and will therefore retain residual pressure when the spacecraft is retired. Given the spacecraft design, it is physically impossible for SES to vent the oxidizer tanks.

Under Commission precedent, grant of a waiver is warranted. In a number of cases involving various spacecraft models with similar limitations, the Commission has waived Section 25.283(c) to permit launch and operation of spacecraft that do not allow for full venting of pressure vessels at end of life, based on a finding that modifying the space station design at a late stage of construction would pose an undue hardship.<sup>7</sup> SES would have faced the same hardship if it had been required to alter the design of AMC-18 to conform to Section 25.283(c) prior to launch of the spacecraft.

With AMC-18 already in orbit and operational, there is no question of bringing the satellite into compliance with the rule. The Commission has expressly recognized this, finding a waiver of Section 25.283(c) to be justified for in-orbit spacecraft that cannot satisfy the rule's requirements. For example, in a decision involving the AMC-2 satellite, the Commission waived the rule on its own motion, observing that venting the spacecraft's sealed oxidizer tanks "would require direct retrieval of the satellite, which is not currently possible."<sup>8</sup>

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<sup>7</sup> See, e.g., *EchoStar Satellite Operating Corp.*, File No. SAT-LOA-20071221-00183, Call Sign S2746, grant-stamped Mar. 12, 2008, Attachment at ¶ 4 (granting a partial waiver of Section 25.283(c) for AMC-14, a Lockheed Martin A2100 model spacecraft, on grounds that requiring modification of satellite would present an undue hardship); *DIRECTV Enterprises LLC*, File No. SAT-LOA-20090807-00086, Call Sign S2797, grant-stamped Dec. 15, 2009, Attachment at ¶ 4 (same for DIRECTV 12, a Boeing 702 model spacecraft); *PanAmSat Licensee Corp.*, File Nos. SAT-MOD-20070207-00027, SAT-AMD-20070716-00102, Call Sign S2237, grant-stamped Oct. 4, 2007, Attachment at ¶ 7 (same for Intelsat 11, an Orbital Sciences Star model spacecraft).

<sup>8</sup> File No. SAT-MOD-20101215-00261, Call Sign S2134, grant-stamped Mar. 8, 2011, Attachment at ¶ 4. See also *XM Radio Inc.*, File No. SAT-MOD-20100722-00165, Call Sign

The same practical obstacle is present here. Because AMC-18 is already in orbit, SES can do nothing to enable full venting of residual pressure in the oxidizer tanks. Given this reality, a waiver is clearly warranted.

### **III. CONCLUSION**

For the foregoing reasons, SES seeks Commission authority to relocate AMC-18 to, and operate the satellite at, 139° W.L. Grant of this application will serve the public interest, convenience, and necessity by allowing SES to provide follow-on capacity to ensure service continuity at the 139° W.L. orbital location.

Respectfully submitted,

SES AMERICOM, INC.

By: /s/ Nancy J. Eskenazi

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S2616, grant-stamped Oct. 14, 2010, Attachment at ¶ 2 (waiving Section 25.283(c) for XM-4, a Boeing 702 model spacecraft, because “modification of the spacecraft would present an undue hardship, since XM-4 is an in-orbit space station and venting XM-4’s helium and xenon tanks would require direct retrieval of the satellite, which is not currently possible”).

## TECHNICAL APPENDIX

### AMC-18 AT 139.0° W.L.

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

This technical appendix is submitted in support of the application of SES Americom, Inc. (“SES”) seeking drift and operating authority to relocate AMC-18 to 139.0° W.L. from its current orbital position of 104.95° W.L. and to operate the satellite thereafter pursuant to a U.S. license at 139.0° W.L. SES incorporates by reference the technical information already on file with respect to AMC-18,<sup>1</sup> and provides here technical information relating to operation of AMC-18 at 139° W.L. as proposed. AMC-18 is equipped with twenty-four 36 MHz C-band transponders. At 139° W.L., the spacecraft’s C-band transponders will provide coverage of western North America and parts of the Pacific Ocean. The TT&C frequencies of AMC-18 are in C-band.

#### 2.0 Schedule S (§25.114(c))

The Schedule S database is included with this filing. Consistent with §25.114(c)(4)(vi)(A), the gain characteristics for the global horn antenna (“CMD”) and (“CTM”) 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 minimum and maximum saturation flux densities is not applicable for the Global Horn Antenna, and as such, values of -999.9 and -999 were entered in the Min Saturation Flux Density and Max Saturation Flux Density fields of Schedule S, respectively, for this antenna.

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<sup>1</sup> The most recent technical information regarding AMC-18 is found in File No SAT-PPL-20061006-00118 (the “AMC-18 Market Access Petition”).

### 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. SES plans to operate the TT&C carriers through the horn antenna; however, should an unexpected or emergency situation arise, then SES may need to operate the TT&C through the omnidirectional antennas for extreme attitude excursions. Table 1 below shows the planned TT&C carrier center frequencies, polarizations, and bandwidths through the communications antenna. Polarizations are switchable.

	Frequency, MHz	Nominal polarization
Beacons/Telemetry (bandwidth: 650 kHz)		
C-band	3700.5	H
	4199.5	V

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

Table 2 below shows the TT&C carrier center frequencies, polarizations and bandwidths through the Global Horn antenna. The command polarization is switchable.

	Frequency, MHz	Nominal polarization
Command carriers (bandwidth: 800 kHz, 1.2 MHz capture range)		
C-band	6423.5	H
Beacons/Telemetry (bandwidth: 650 kHz)		
C-band	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-18 downlink EIRP density will not exceed 3 dBW/4kHz for digital transmissions or 8 dBW/4kHz for analog transmissions in the C-band unless higher levels are coordinated with the operators of authorized co-frequency space stations at assigned locations within six degrees of 139.0° W.L. and except as provided in §25.140(d). SES also certifies that the associated uplink EIRP density levels in the C-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 139° W.L. and except as provided in §25.140(d). SES has, however, coordinated a downlink EIRP density level of -30 dBW/Hz with all authorized spacecraft within +/- 6 degrees and hence may operate at that level. It is requested that this application serve as a notification under §25.140(d).

#### **5.0 Maximum Theoretical Operation Levels**

AMC-18 will be operated consistent with coordination agreements with adjacent satellites. In any case, in the 3700-4200 MHz band, the downlink EIRP density of the AMC-18 digital carriers will not exceed -28.0 dBW/Hz; and in the 5925-6425 MHz band, the input power density of the uplink digital carriers of earth stations operating with AMC-18 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.<sup>2</sup> Updates to the information on file are provided below.

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<sup>2</sup> See AMC-18 Market Access Petition, Attachment A at A-16 to A-20.



The AMC-18 satellite was designed and manufactured by Lockheed Martin and was launched in December 2006. SES currently estimates that the satellite has a remaining useful life of approximately 7.5 years.

At the end of operational life, after the satellite has reached its final disposal orbit, onboard sources of stored energy will be depleted or secured, and the batteries will be discharged. However, at the end of AMC-18's operational life, there will be oxidizer remaining in the tanks that cannot be vented. Following insertion of the spacecraft into orbit, the spacecraft manufacturer permanently sealed the oxidizer tanks by firing pyrotechnic valves. This is a design feature of the Lockheed A2100 series spacecraft that cannot now be changed or remedied.

Information regarding the residual oxidizer in the tanks is as follows:

Tank	Volume (l)	Pressure (bar)	Temp. (deg C)	Oxidizer mass (kg)
Ox 1	229.1	17.8	21.2	7.24
Ox 2	229.1	17.8	21.2	7.24

The oxidizer tanks are well shielded, and the residual pressure in the tanks will be well below their maximum rating.

In the narrative portion of this application, SES requests any necessary waiver of Sections 25.114(d)(14)(ii) and 25.283(c) in connection with the residual oxidizer that will remain in these tanks at the end of the satellite's life.

On-station operations require stationkeeping within the +/- 0.05 degree E-W control box, thereby ensuring adequate collision avoidance distance from other satellites in geosynchronous orbit. At 139° W.L., AMC-18 will be collocated with the AMC-8 satellite, which is jointly licensed to SES Americom and Alascom, Inc. During the period of collocation, SES will use the proven Inclination-Eccentricity technique to ensure adequate separation between satellites. This strategy

is presently in use by SES at several orbital locations to ensure proper operation and safety of multiple satellites within one orbital box.

Apart from AMC-8, SES is not aware of any other FCC- or non-FCC licensed spacecraft that are operational or planned to be deployed at 139° W.L. or to nearby orbital locations such that there would be an overlap with the requested stationkeeping volume of AMC-18. DIRECTV has applied to the Commission for authority to relocate the SPACEWAY 1 Ka-band satellite to 138.9° W.L. with an east-west stationkeeping tolerance of +/- 0.05 degrees.<sup>3</sup> At that location the proposed stationkeeping volume of SPACEWAY 1 will be adjacent to, but would not overlap with, that of AMC-18 and AMC-8.

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 deorbit of a spacecraft is required, the initial phase is treated as a satellite move, and the same precautions are used to ensure collision avoidance.

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<sup>3</sup> DIRECTV Enterprises, LLC, Call Sign S2191, File No. SAT-MOD-20170912-00129.

## DECLARATION

I, Donna Wang, 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/ Donna Wang

Donna Wang  
Engineer, Spectrum Management and Development  
SES Americom, Inc.

Dated: December 21, 2017