

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

In the Matter of Application by )  
 )  
SES AMERICOM, INC. ) SES-STA-\_\_\_\_\_ - \_\_\_\_\_  
 ) Call Sign \_\_\_\_\_  
For Special Temporary Authority to Perform IOT )  
And Provide TT&C for SES-10 at 68.5° W.L. )  
and During Drift to 66.9° W.L. )

**REQUEST FOR SPECIAL TEMPORARY AUTHORITY**

By this application, SES Americom, Inc. (“SES Americom” or “SES”) respectfully requests earth station special temporary authority (“STA”) for a period of 30 days, beginning 11 days following launch of SES-10, to use a new antenna in Somis, California to communicate with the SES-10 satellite. Specifically, SES seeks STA to perform in-orbit testing (“IOT”) activities at 68.5° W.L. and to provide associated Tracking, Telemetry and Command (“TT&C”) services while SES-10 is at 68.5° W.L. and during the drift to the satellite’s regular orbital position once IOT is complete. The satellite is currently scheduled to launch mid-March 2017, and SES seeks action on the STA consistent with that schedule. Grant of the requested authority will serve the public interest by facilitating the testing of SES-10 before it commences regular operations.

SES Americom’s affiliate, New Skies Satellites B.V. (“NSS”), has been authorized to use the SES-10 satellite to provide service into the United States.<sup>1</sup> SES-10 will be

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<sup>1</sup> See *New Skies Satellites B.V. Market Access Application*, File No. SAT-PPL-20160117-00005 (“SES-10 Petition”), granted on June 23, 2016 (“SES-10 Grant”). The grant was based on SES-10 operating at 67.0° W.L., but NSS has filed a modification seeking to operate the satellite at 66.9° W.L. pursuant to the Commission’s expedited process set out in Section 25.117(h)(1). *New Skies Satellites B.V. Modification*, File No. SAT-MPL-20170108-00002, (Call Sign S2950), filed Jan. 8, 2017.

located at 68.5° W.L. +/- 0.1 degrees during IOT. The relaxed stationkeeping tolerance will minimize interruptions to the payload testing operations due to stationkeeping maneuvers, which would delay the satellite's on-station start of operations. The proposed stationkeeping volume will not overlap with any other satellite at 68.5° W.L. Following the completion of in-orbit testing at 68.5° W.L., SES-10 will drift to its final orbital location at 66.9° W.L. SES Americom will separately seek authority to allow ongoing operation of the new antenna with SES-10 at 66.9° W.L.

NSS has requested that SES Americom assist with testing the satellite and provide TT&C during the tests at 68.5°W.L. and during the drift to the nominal 67° W.L. orbital location. The earth station will operate in the below bands and as further described in Attachment 1.

IOT and TT&C Uplink (low-power tests only)	13.75-14.0 GHz
IOT and TT&C Uplink	14.0-14.5 GHz
IOT Uplink	17.3-17.55 GHz
IOT and TT&C Downlink	10.95-11.2 GHz
IOT and TT&C Downlink	11.45-11.7 GHz
IOT and TT&C Downlink	11.7-12.2 GHz

The proposed operations will be coordinated with all satellite operators that use the same frequency bands within six degrees of 68.5° W.L. and those within the drift path. All operators of potentially affected satellites will be provided with an emergency phone number where the licensee can be reached in the event harmful interference occurs.

***Grant of STA Will Serve the Public Interest.*** Grant of this STA request is in the public interest. Permitting testing of SES-10 will ensure the satellite is capable of providing valuable services once it begins full operation, and the requested authority to provide TT&C services while SES-10 is tested at 68.5° W.L. and drifts to its final orbital location will facilitate the safe operation of SES-10.

***No Harmful Interference to Other Spacecraft.*** All operations with SES-10 while it is located at 68.5° W.L. will be on a non-harmful interference basis. SES has commenced coordinating the proposed IOT operations with the Ku-band satellites positioned near 68.5° W.L., including Nimiq 5 (72.7° W.L.), Arsat 1 (71.8° W.L.), Star One C2 (70° W.L.), Star One C4 (70° W.L.), Star One C1 (65° W.L.), Eutelsat 65 West A (65.2° W.L.), and Telstar 14R (63° W.L.). The drift of the spacecraft to 66.9° W.L. also will be coordinated with other satellite operators consistent with industry practice.<sup>2</sup>

SES will perform low-power tests in the 13.75-14.0 GHz band, and operations will comply with the power limits described in the assessment provided in Attachment 2. As demonstrated in the attachment, operations in the 13.75-14.0 GHz band will not cause harmful interference to U.S. Navy radar stations or NASA TDRSS stations.

The maximum EIRP density identified for all bands in Attachment 1 will also not be exceeded, except in the case of certain tests involving high-powered continuous wave (“CW”) carriers transmitted in the 14.0-14.5 GHz and 17.3-17.55 GHz bands.<sup>3</sup> Furthermore, TT&C transmissions during drift of SES-10 will be on a non-harmful interference basis.

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<sup>2</sup> The 24/7 point of contact for the proposed SES-10 operations is the SES Payload Management Operations Centre (PMOC) in Woodbine, MD, 1 800 772 2363 or 1 410 970 7570; e-mail: [PMOC@ses.com](mailto:PMOC@ses.com).

<sup>3</sup> 47 C.F.R. § 25.275(e).

**Waiver Requests.** SES requests limited waivers of the Commission's requirements in connection with the instant STA request. Grant of these 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>4</sup>

Section 2.106 and Footnote US271. The SES-10 Grant included a waiver of Section 2.106 and footnote US271 permitting NSS to provide service into the United States at 67° W.L. using the 17.3-17.55 GHz band, which is allocated for the fixed-satellite service but limited to use by broadcasting-satellite service ("BSS") feeder links.<sup>5</sup> The only other BSS satellite within the coordination arc is Nimiq 5, which is more than four degrees away at 72.7° W.L. A similar waiver is justified to support in-orbit testing. As described in the SES-10 Petition, BSS feeder links are similar to other FSS operations using large earth station antennas that can share on a roughly two degree spacing basis. Furthermore, operations in the 17.3-17.55 GHz band will be on an unprotected, non-interference basis. Thus, granting a waiver will not undermine Commission policy because BSS operations will be fully protected.

Section 2.106 Footnote NG52. SES Americom also seeks a waiver of footnote NG52 to permit the reception of U.S. domestic services in the 10.95-11.2 GHz and 11.45-11.7 GHz bands on an unprotected, non-interference basis for purposes of testing the SES-10

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<sup>4</sup> *PanAmSat Licensee Corp.*, 17 FCC Rcd 10483, 10492 (Sat. Div. 2002) (footnotes omitted).

<sup>5</sup> See SES-10 Grant, Attachment to Grant at 2, ¶ 5.

payload. The Commission has granted a waiver for SES-10 to provide domestic service in these bands, and SES Americom needs to ensure the payload is operating properly. Footnote NG52 was intended to preserve access to the 10.7-11.7 GHz spectrum for terrestrial fixed service (“FS”) stations by limiting FSS use of the band to international operations only.<sup>6</sup> SES-10 will meet the power flux density limits on the ground to protect FS operations,<sup>7</sup> and the requested tests will be for a limited duration of time. Therefore, grant of the requested waiver will not undermine the purpose of the rule.

For the foregoing reasons, SES Americom respectfully requests special temporary authority for a period of up to 30 days for its earth station to communicate with SES-10 in order to conduct IOT at 68.5° W.L. and provide TT&C to maintain the satellite at 68.5° W.L. and drift the spacecraft to 66.9° W.L., as described herein. Grant of the requested authority will promote safe operation of the satellite during and after testing.

Respectfully submitted,

SES AMERICOM, INC.

By: /s/ Petra Vorwig

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<sup>6</sup> See 47 C.F.R § 2.106, Footnote NG52. This policy was previously codified in footnote NG104.

<sup>7</sup> See SES-10 Grant, Attachment to Grant at 1-2, ¶ 3.

## Attachment 1

**Call Sign:** New earth station

### Site Details

**Contact Information:**

David Coyle  
805-386-2712

**Address:**

5990 Solano Verde Dr.  
Somis, California  
93066

**Geographic Coordinates:**

Latitude: 34° 19' 31.2" N

Longitude: 118° 59' 43.6"W

**Site Elevation:**

308.0 meters

### Antenna Details

Antenna ID: SMK-5  
Manufacture/Model: GD Satcom/Vertex  
Antenna Size: 9m  
Antenna Gain Transmit: 60.1 dBi at 14.125 GHz  
61.96 dBi at 17.5 GHz  
Antenna Gain Receive: 58.5 dBi at 11.725 GHz  
Height Above Ground Level: 9.7 meters  
Height Above Sea Level: 317.7 meters  
Total Input Power at the Flange: 3000 watts  
Total EIRP for all Carriers: 94.87 dBW

### TT&C Operational Details

Frequency (MHz)	Transmit/Receive	Polarization	Emissions Designator	Max EIRP per Carrier (dBW)	Max EIRP Density per Carrier (dBW/4kHz)
13750-14000	T	Horizontal and Vertical	2M83F9W	68	39.5
13750-14000	T	Horizontal and Vertical	54M0F9W	80.8	39.5
14000-14500	T	Horizontal and Vertical	800KF9W	75.1	52.1
14000-14500	T	Horizontal and Vertical	1M0F9W	76	52.1
14000-14500	T	Horizontal and Vertical	N0N	52.1	52.1
10950-11200	R	Horizontal and Vertical	800KF9W		

10950-11200	R	Horizontal and Vertical	1M0F9W		
11450-11700	R	Horizontal and Vertical	800KF9W		
11450-11700	R	Horizontal and Vertical	1M0F9W		
11700-12200	R	Horizontal and Vertical	800KF9W		
11700-12200	R	Horizontal and Vertical	1M0F9W		

### **IOT Operational Details**

<b>Frequency (MHz)</b>	<b>Transmit/Receive</b>	<b>Polarization</b>	<b>Emissions Designator</b>	<b>Max EIRP per Carrier (dBW)</b>	<b>Max EIRP Density per Carrier (dBW/4kHz)</b>
13750-14000	T	Horizontal and Vertical	2M83G7W	68	39.5
13750-14000	T	Horizontal and Vertical	54M0G7W	80.8	39.5
14000-14500	T	Horizontal and Vertical	100KG7W	60.0	46.1
14000-14500	T	Horizontal and Vertical	54M0G7W	87.4	46.1
14000-14500	T	Horizontal and Vertical	N0N	46.1	46.1
17300-17550	T	Horizontal and Vertical	100KG7W	63.96	49.98
17300-17550	T	Horizontal and Vertical	36M0G7W	89.52	49.98
17300-17550	T	Horizontal and Vertical	N0N	49.98	49.98
10950-11200	R	Horizontal and Vertical	100KG7W		
10950-11200	R	Horizontal and Vertical	54M0G7W		
11450-11700	R	Horizontal and Vertical	100KG7W		
11450-11700	R	Horizontal and Vertical	54M0G7W		
11700-12200	R	Horizontal and Vertical	100KG7W		
11700-12200	R	Horizontal and Vertical	54M0G7W		

## **Attachment 2**

### **Compliance with FCC Report & Order (FCC 96-377) for the 13.75-14.0 GHz Band Analysis and Calculations for 9 Meter Antenna at Somis, CA**



**Exhibit For  
SES Americom, LLC  
South Mountain (Somis), California  
Vertex Corporation 9 Meter Earth Station**

**Compliance with FCC Report & Order (FCC96-377) for the 13.75 - 14.0 GHz Band  
Analysis and Calculations**

**1. Background**

This Exhibit is presented to demonstrate the extent to which the SES Americom, LLC satellite earth station in South Mountain (Somis), California is in compliance with FCC REPORT & ORDER 96-377. The potential interference from the earth station to US Navy shipboard radiolocation operations (RADAR) and the NASA space research activities in the 13.75 - 14.0 GHz Band is addressed in this exhibit. The parameters for the earth station are:

**Table 1. Earth Station Characteristics**

- Coordinates (NAD83): 34° 19' 31.77" N, 118° 59' 43.8" W
- Satellite Location for Earth Station: SES 10 (68.5° W)
- Frequency Band: 13.75-14.0 GHz for uplink
- Polarizations: Linear
- Emissions: N0N, 100KG7W, 1M00G7W, 36M0G7W and 54M0G7W
- Modulation: No Modulation and Digital
- Maximum Aggregate Uplink EIRP:
  - 39.5 dBW for the N0N Carrier
  - 53.5 dBW for the 100 kHz Carriers
  - 63.5 dBW for the 1 MHz Carriers
  - 79.0 dBW for the 36 MHz Carriers
  - 80.8 dBW for the 54 MHz Carriers
- Transmit Antenna Characteristics
  - Antenna Size: 9.0 meters in Diameter
  - Antenna Type/Model: Vertex Corporation
  - Gain: 60.1 dBi
- RF power into Antenna Flange:
  - No Modulation (N0N)
  - 20.6 dBW
  - or -20.6 dBW/4 kHz (Maximum)

- RF power into Antenna Flange (Continued)
  - 100 kHz  
-6.6 dBW  
or -20.6 dBW/4 kHz
  - 1 MHz  
3.4 dBW  
or -20.6 dBW/4 kHz (Maximum)
  - 36 MHz  
18.9 dBW  
or -20.6 dBW/4 kHz (Maximum)
  - 54 MHz  
20.7 dBW  
or -20.6 dBW/4 kHz (Maximum)
- Minimum Elevation Angle: Somis, CA
  - 23.7° @ 114.9° Az. (SES 10) at 68.5° W
- Side Lobe Antenna Gain:
  - 32 - 25\*log( $\theta$ )

Because the above uplink spectrum is shared with the Federal Government, coordination in this band requires resolution data pertaining to potential interference between the earth station and both Navy Department and NASA systems. Potential interference from the earth station could impact with the Navy and/or NASA systems in two areas. These areas are noted in FCC Report and Order 96-377 dated September 1996, and consist of (1) Radiolocation and radio navigation, (2) Data Relay Satellites.

Summary of Coordination Issues:

- 1) Potential Impact to Government Radiolocation (Shipboard Radar)
- 2) Potential Impact to NASA Data Relay Satellite Systems (TDRSS)

**2. Potential Impact to Government Radiolocation (Shipboard Radar)**

Radiolocation operations (RADAR) may occur anywhere in the 13.4 – 14.0 GHz frequency band aboard ocean going United States Navy ships. The Federal Communication Commission (FCC) order 96-377 allocates the top 250 MHz of this 600 MHz band to the Fixed Satellite Service (FSS) on a co-primary basis with the radiolocation operations and provides for an interference protection level of -167 dBW/m<sup>2</sup>/4 kHz.

The closest distance to the shoreline from the South Mountain earth station is approximately 28.77 km Southwest toward the Pacific Ocean. The calculation of the power spectral density at this distance is given by:

	<u>N0N</u>	<u>100 kHz</u>	<u>1.0 MHz</u>	<u>36.0 MHz</u>	<u>54 MHz</u>
1. Clear Sky EIRP (dBW):	39.5	53.5	63.5	79.0	80.8
2. Carrier Bandwidth:	CW Signal	100 kHz	1 MHz	36 MHz	54 MHz
3. PD at antenna Input: (dBW/4 kHz)	-20.6	-20.6	-20.6	-20.6	-20.6
4. Transmit Antenna Gain:		60.1 dBi			
5. Antenna Gain Horizon:		FCC Reference Pattern			
6. Antenna Elevation Angle:		23.7°			

The proposed earth station will radiate interference toward the Pacific Ocean according to its off-axis side-lobe performance. A conservative analysis, using FCC standard reference pattern, results in off-axis antenna gains of -4.8 dBi toward the Pacific Ocean.

The signal density at the shoreline, through free space is:

N0N Carriers (CW Carrier)

PFD = Antenna Feed Power density (dBW/4 kHz) + Antenna Off-Axis Gain (dBi) – Spread Loss (dBw-m<sup>2</sup>).

$$\begin{aligned}
 &= -20.6 \text{ dBw/4 kHz} + (-4.8) \text{ dBi} - 10 \cdot \log[4\pi \cdot (28770\text{m})^2] \\
 &= -125.6 \text{ dBW/m}^2/4 \text{ kHz} + \text{Additional Path Losses } (\sim 41.8 \text{ dB}) \\
 &= -167.4 \text{ dBW/m}^2/4 \text{ kHz}
 \end{aligned}$$

100 kHz Carriers

PFD = Antenna Feed Power density (dBW/4 kHz) + Antenna Off-Axis Gain (dBi) – Spread Loss (dBw-m<sup>2</sup>).

$$\begin{aligned}
 &= -20.6 \text{ dBw/4 kHz} + (-4.8) \text{ dBi} - 10 \cdot \log[4\pi \cdot (28770\text{m})^2] \\
 &= -125.6 \text{ dBW/m}^2/4 \text{ kHz} + \text{Additional Path Losses } (\sim 41.8 \text{ dB}) \\
 &= -167.4 \text{ dBW/m}^2/4 \text{ kHz}
 \end{aligned}$$

1 MHz Carriers

PFD = Antenna Feed Power density (dBW/4 kHz) + Antenna Off-Axis Gain (dBi) – Spread Loss (dBw-m<sup>2</sup>).

$$\begin{aligned}
 &= -20.6 \text{ dBw/4 kHz} + (-4.8) \text{ dBi} - 10 \cdot \log[4\pi \cdot (28770\text{m})^2] \\
 &= -125.6 \text{ dBW/m}^2/4 \text{ kHz} + \text{Additional Path Losses } (\sim 41.8 \text{ dB}) \\
 &= -167.4 \text{ dBW/m}^2/4 \text{ kHz}
 \end{aligned}$$

(Continued)

### 36 MHz Carriers

PFD = Antenna Feed Power density (dBW/4 kHz) + Antenna Off-Axis Gain (dBi) – Spread Loss (dBW-m<sup>2</sup>).

$$\begin{aligned} &= -20.6 \text{ dBW/4 kHz} + (-4.8) \text{ dBi} - 10*\log[4\Pi*(28770\text{m})^2] \\ &= -125.6 \text{ dBW/m}^2/4 \text{ kHz} + \text{Additional Path Losses } (\sim 41.8 \text{ dB}) \\ &= -167.4 \text{ dBW/m}^2/4 \text{ kHz} \end{aligned}$$

### 54 MHz Carriers

PFD = Antenna Feed Power density (dBW/4 kHz) + Antenna Off-Axis Gain (dBi) – Spread Loss (dBW-m<sup>2</sup>).

$$\begin{aligned} &= -20.6 \text{ dBW/4 kHz} + (-4.8) \text{ dBi} - 10*\log[4\Pi*(28770\text{m})^2] \\ &= -125.6 \text{ dBW/m}^2/4 \text{ kHz} + \text{Additional Path Losses } (\sim 41.8 \text{ dB}) \\ &= -167.4 \text{ dBW/m}^2/4 \text{ kHz} \end{aligned}$$

Our calculations identified additional path losses of approximately 41.8 dB including absorption loss and earth diffraction loss for the actual path profiles from the earth station to the nearest shoreline.

The worst case calculated PFD including additional path losses to the closest shoreline location is –167.4 dBW/m<sup>2</sup>/4 kHz for the CW Carriers, 100 kHz, 1 MHz, 36 MHz and 54 MHz carriers. This is 0.4 dB below the –167 dBW/ m<sup>2</sup>/4 kHz interference criteria of R&O 96-377. Therefore, there should be no interference to the US Navy RADAR from the South Mountain earth station due to the distance and the terrain blockage between the site and the shore.

### **3. Potential Impact to NASA’s Data Relay Satellite System (TDRSS)**

The geographic location of the SES Americom earth station in South Mountain (Somis), California is outside the 390 km radius coordination contour surrounding NASA’s White Sands, New Mexico ground station complex. Therefore, the TDRSS space-to-earth link will not be impacted by the SES Americom earth station in South Mountain, California.

The TDRSS space-to-space link in the 13.772 to 13.778 GHz band is assumed to be protected if an earth station produces an EIRP less than 71 dBW/6 MHz in this band. The 9 meter earth station antenna will have an EIRP less than 71 dBW/6 MHz for both the CW carrier, 100 kHz and 1 MHz carriers in this band. The total EIRP for the CW Carrier is 39.5 dBW and the equivalent EIRP per 6 MHz segment will remain at 39.5 dBW/6 MHz. The total EIRP for the 100 kHz, carriers is 53.5 dBW. The equivalent EIRP per 6 MHz segment will remain at 53.5 dBW/6 MHz. The total EIRP for the 1 MHz, carriers is 63.5 dBW. The equivalent EIRP per 6 MHz segment will remain at 63.5 dBW/6 MHz. Therefore, there should not be interference to the TDRSS space-to-space link for the CW carriers or the 100 kHz and 1 MHz carriers. For the 36 MHz and 54 MHz carriers, the total EIRP of 79.0 dBW (36 MHz), and 80.8 dBW (54 MHz)

equate to an EIRP per 6 MHz of 73.0 dBW/6 MHz and 74.8 dBW/6 MHz, respectively. To avoid interference to the TDRSS space-to-space link the 36 MHz and 54 MHz carriers will not be used for the transmit spectrum of 13.772 to 13.778 GHz by this earth station.

#### **4. Coordination Issue Result Summary and Conclusions**

The results of the analysis and calculations performed in this exhibit indicate that compatible operation between the earth station at the South Mountain (Somis) facility and the US Navy and NASA systems space-to-earth link are possible for all of the proposed carriers. Operations in NASA systems space-to-space link (13772.0 to 13778.0 MHz) will also be permitted for all of the carriers with the exception of the 36 MHz and 54 MHz emissions.