

**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 In-Orbit Testing for SES-10 at 68.5° W.L.)

REQUEST FOR SPECIAL TEMPORARY AUTHORITY

By this application, SES Americom, Inc. (“SES Americom” or “SES”) respectfully requests special temporary authority (“STA”) for a period of 30 days, beginning 11 days following launch of SES-10, to permit SES to perform in-orbit testing of the SES-10 satellite at 68.5° W.L. using its new antenna in Woodbine, MD. The satellite is currently scheduled to launch mid-February 2017 and will ultimately operate at 66.9° W.L.¹ 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 earth station with SES-10 at 66.9° W.L.

SES Americom’s affiliate, New Skies Satellites B.V. (“NSS”), received authority to provide service into the United States using SES-10 at 67° W.L. on June 23, 2016.² NSS has

¹ 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 of its authority 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.

² *Id.* SES Americom incorporates by reference the technical information submitted in the SES-10 Petition.

requested that SES Americom assist with testing the satellite at 68.5°W.L. SES Americom, therefore, requests STA to use its earth station to test the SES-10 communications payloads using the following frequencies:

| | |
|----------|----------------|
| Uplink | 13.75-14.0 GHz |
| Uplink | 14.0-14.5 GHz |
| Uplink | 17.3-17.55 GHz |
| Downlink | 10.95-11.2 GHz |
| Downlink | 11.45-11.7 GHz |
| 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. The requested authority to test SES-10 will ensure it is capable of providing valuable services once it begins full operation.

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 in the C- and 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 maximum EIRP density identified in Attachment 1 will also not be exceeded, except in the case of certain tests involving high-powered continuous wave (“CW”) carriers.³ The drift

³ 47 C.F.R. § 25.275(e).

of the spacecraft will be coordinated with other satellite operators consistent with industry practice.⁴

As demonstrated in the assessment provided in Attachment 2, operations in 13.75-14.0 GHz will not cause harmful interference to U.S. Navy radar stations of NASA TDRSS stations.

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.⁵

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.⁶ 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

⁴ 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.

⁵ *PanAmSat Licensee Corp.*, 17 FCC Rcd 10483, 10492 (Sat. Div. 2002) (footnotes omitted).

⁶ *See SES Petition.*

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 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.⁷ SES-10 will meet the power flux density limits on the ground to protect FS operations⁸ 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.

⁷ See 47 C.F.R § 2.106, Footnote NG52. This policy was previously codified in footnote NG104.

⁸ See *SES Petition*.

For the foregoing reasons, SES Americom respectfully requests special temporary authority for its earth station to communicate with SES-10 for a period of up to 30 days to test the communications payload at 68.5° W.L. as described herein. Grant of the requested authority will promote safe operation of the satellite during and after it is tested.

Respectfully submitted,

SES AMERICOM, INC.

By: /s/ Petra Vorwig

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Dated: January 9, 2017

ATTACHMENT 1

Call Sign: New earth station (WBK11)

Site Details

Contact Information:

Mark Rathert
410-970-7501

Address:

2323 Grimville Rd
Mt. Airy, MD
21771

Geographic Coordinates:

Latitude: 39° 22' 38.8" N

Longitude: 77° 04' 52.97" W

Site Elevation:

194.0 meters

Antenna Details

| | |
|----------------------------------|---|
| Antenna ID: | WBK11 |
| 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: | 203.7 meters |
| Total Input Power at the Flange: | 3000 watts |
| Total EIRP for all Carriers: | 94.87 dBW |

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 | 1M24G7W | 71.0 | 46.1 |
| 13750-14000 | T | Horizontal and Vertical | 54M0G7W | 84.99 | 43.69 |
| 14000-14500 | T | Horizontal and Vertical | 100KG7W | 60.08 | 46.1 |
| 14000-14500 | T | Horizontal and Vertical | 54M0G7W | 87.09 | 45.79 |
| 14000-14500 | T | Horizontal and Vertical | N0N | 46.1 | 46.1 |

| | | | | | |
|-------------|---|-------------------------|---------|-------|-------|
| 17300-17550 | T | Horizontal and Vertical | 100KG7W | 63.93 | 49.96 |
| 17300-17550 | T | Horizontal and Vertical | 36M0G7W | 89.5 | 49.96 |
| 17300-17550 | T | Horizontal and Vertical | N0N | 71 | 71 |
| 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 Woodbine, MD**

**Exhibit For
SES Americom, LLC
Woodbine, Maryland
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 Woodbine, Maryland 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): 39° 22' 38.8" N, 77° 04' 52.9" 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: Digital
- Maximum Aggregate Uplink EIRP: 46.1 dBW for the N0N Carrier
60.0 dBW for the 100 kHz Carriers
70.0 dBW for the 1 MHz Carriers
85.0 dBW for the 36 MHz Carriers
85.0 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)
-14.0 dBW or -14.0 dBW/4 kHz (Maximum)

- RF power into Antenna Flange (Continued)
 - 100 kHz
-0.1 dBW
or -14.0 dBW/4 kHz
 - 1 MHz
9.9 dBW
or -14.0 dBW/4 kHz (Maximum)
 - 36 MHz
24.9 dBW
or -14.6 dBW/4 kHz (Maximum)
 - 54 MHz
24.9 dBW
or -16.4 dBW/4 kHz (Maximum)
- Minimum Elevation Angle: Woodbine, Md
 - 43.6° @ 166.6° Az. (SES 10) at 68.5° W
- Side Lobe Antenna Gain:
 - 32 - 25*log(θ)

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 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/m²/4 kHz.

The closest distance to the shoreline from the Woodbine earth station is approximately 65.9 km Southeast toward the Chesapeake Bay. 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): | 46.1 | 60.0 | 70.0 | 85.0 | 85.0 |
| 2. Carrier Bandwidth: | CW Signal | 100 kHz | 1 MHz | 36 MHz | 54 MHz |
| 3. PD at antenna Input: (dBW/4 kHz) | -14.0 | -14.0 | -14.0 | -14.6 | -16.4 |
| 4. Transmit Antenna Gain: | | 60.1 dBi | | | |
| 5. Antenna Gain Horizon: | | FCC Reference Pattern | | | |
| 6. Antenna Elevation Angle: | | 43.6° | | | |

The proposed earth station will radiate interference toward the Chesapeake Bay according to its off-axis side-lobe performance. A conservative analysis, using FCC standard reference pattern, results in off-axis antenna gains of -10.0 dBi toward the Chesapeake Bay.

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-m²).

$$\begin{aligned}
 &= -14.0 \text{ dBw/4 kHz} + (-10.0) \text{ dBi} - 10 \cdot \log[4\pi \cdot (65900\text{m})^2] \\
 &= -131.4 \text{ dBW/m}^2/4 \text{ kHz} + \text{Additional Path Losses } (\sim 63.0 \text{ dB}) \\
 &= -194.4 \text{ dBW/m}^2/4 \text{ kHz}
 \end{aligned}$$

100 kHz Carriers

PFD = Antenna Feed Power density (dBW/4 kHz) + Antenna Off-Axis Gain (dBi) – Spread Loss (dBw-m²).

$$\begin{aligned}
 &= -14.0 \text{ dBw/4 kHz} + (-10.0) \text{ dBi} - 10 \cdot \log[4\pi \cdot (65900\text{m})^2] \\
 &= -131.4 \text{ dBW/m}^2/4 \text{ kHz} + \text{Additional Path Losses } (\sim 63.0 \text{ dB}) \\
 &= -194.4 \text{ dBW/m}^2/4 \text{ kHz}
 \end{aligned}$$

1 MHz Carriers

PFD = Antenna Feed Power density (dBW/4 kHz) + Antenna Off-Axis Gain (dBi) – Spread Loss (dBw-m²).

$$\begin{aligned}
 &= -14.0 \text{ dBw/4 kHz} + (-10.0) \text{ dBi} - 10 \cdot \log[4\pi \cdot (65900\text{m})^2] \\
 &= -131.4 \text{ dBW/m}^2/4 \text{ kHz} + \text{Additional Path Losses } (\sim 63.0 \text{ dB}) \\
 &= -194.4 \text{ dBW/m}^2/4 \text{ kHz}
 \end{aligned}$$

36 MHz Carriers

PF_D = Antenna Feed Power density (dBW/4 kHz) + Antenna Off-Axis Gain (dBi) – Spread Loss (dBW-m²).

$$\begin{aligned} &= -14.6 \text{ dBW/4 kHz} + (-10.0) \text{ dBi} - 10 \cdot \log[4\pi \cdot (65900\text{m})^2] \\ &= -131.9 \text{ dBW/m}^2/4 \text{ kHz} + \text{Additional Path Losses } (\sim 63.0 \text{ dB}) \\ &= -194.9 \text{ dBW/m}^2/4 \text{ kHz} \end{aligned}$$

54 MHz Carriers

PF_D = Antenna Feed Power density (dBW/4 kHz) + Antenna Off-Axis Gain (dBi) – Spread Loss (dBW-m²).

$$\begin{aligned} &= -16.4 \text{ dBW/4 kHz} + (-10.0) \text{ dBi} - 10 \cdot \log[4\pi \cdot (65900\text{m})^2] \\ &= -133.8 \text{ dBW/m}^2/4 \text{ kHz} + \text{Additional Path Losses } (\sim 63.0 \text{ dB}) \\ &= -196.8 \text{ dBW/m}^2/4 \text{ kHz} \end{aligned}$$

Our calculations identified additional path losses of approximately 63.0 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 PF_D including additional path losses to the closest shoreline location is –194.4 dBW/m²/4 kHz for the CW, 100 kHz and 1 MHz carriers and -194.9 dBW/m²/4 kHz for the 36 MHz carriers and -196.8 dBW/m²/4 kHz for the 54 MHz. All carriers are a minimum of 27.4 dB below the –167 dBW/ m²/4 kHz interference criteria of R&O 96-377. Therefore, there should be no interference to the US Navy RADAR from the Woodbine 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 Woodbine, Maryland 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 Woodbine, Maryland.

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 46.1 dBW and the equivalent EIRP per 6 MHz segment will remain at 46.1 dBW/6 MHz. The total EIRP for the 100 kHz, carriers is 60.0 dBW. The equivalent EIRP per 6 MHz segment will remain at 60.0 dBW/6 MHz. The total EIRP for the 1 MHz, carriers is 70.0 dBW. The equivalent EIRP per 6 MHz segment will remain at 70.0 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 85.0 dBW (36 MHz), and 85.0 dBW (54 MHz) equate to an EIRP per 6 MHz of 79.0 dBW/6 MHz and 76.0 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 Woodbine 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.