

**O3b Limited dba SES Networks**  
**Application for Experimental Special Temporary Authority**

**Narrative Statement**

**(1) Name, address, phone number (also e-mail address and facsimile number, if available) of the applicant.**

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**(2) Description of why an STA is needed.**

O3b Limited (“O3b”), a wholly-owned subsidiary of SES S.A. and an affiliate of SES Americom, Inc. (collectively “SES”), is a satellite operator with a unique non-geostationary orbit (“NGSO”) satellite system<sup>2</sup> that operates in a medium earth orbit 8,062 km above the earth. O3b is. SES operates a fleet of over 50 geostationary orbit (“GSO”) commercial satellites.

O3b hereby seeks experimental special temporary authority to test and demonstrate the capabilities of the ViaSat GAT-5510 (“Viasat G-12”) terminal, which will eventually support communications on mobile platforms, including aeronautical and maritime services. The Viasat G-12 terminal has the potential to deliver high-throughput, low-latency satellite capacity to mobile platforms, particularly small mobile platforms such as UAVs, and is being developed to help enable critical applications for the U.S. Government.

O3b is requesting special temporary authority to conduct on-the-ground tests of the Viasat G-12 terminal for fixed and short-range mobile operations at and around its testing facilities in Manassas, VA, Port St. Lucie, FL, and Grey Butte Airfield, CA. The new terminal will communicate with O3b’s Ka-band NGSO satellite constellation.

**(3) Time and Date of Proposed Operation**

O3b requests temporary authority for 2 years, from March 1, 2021 through March 1, 2023. O3b expects to begin testing in early March and requests authorization prior to this date to ensure that all equipment can be put in place.

O3b will notify any U.S. authorized co-channel Ka-band satellite operators at least one week prior to any transmit testing and provide emergency contact information. O3b certifies that its operations in the test

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<sup>1</sup> Given the on-going COVID-19 pandemic, O3b requests that all correspondence be sent electronically, as physical mail to this address may not be checked regularly.

<sup>2</sup> The FCC has granted market access to the current O3b 20 satellite constellation and authorized the expansion of the constellation to up to 42 satellites. See O3b Limited, Call Sign S2935, File No. SAT-AMD-20171109-00154 (granted June 4, 2018) (“O3b Market Access Grant”).

locations will meet the EPFD levels in Table 22-2 of Article 22, Section II, and Resolution 76 of the ITU Radio Regulations in order to protect secondary GSO operations in the band.

O3b certifies that its proposed operations will comply with all existing or future coordination agreements between O3b and other satellite operators and will abide by all the terms and conditions of the O3b Market Access Grant.

For operations in the 27.5-28.35 GHz band, O3b will conduct a frequency coordination and submit the results to OET. O3b will operate on a non-interference basis and will notify terrestrial licensees 7 days prior to transmit testing and provide emergency contact information.

**(4) Class(es) of station (fixed, mobile, fixed and mobile) and call sign of station (if applicable).**

The transmitting stations will operate as fixed and mobile satellite earth stations.

**(5) Description of the location(s) and, if applicable, geographical coordinates of the proposed operation.**

O3b will operate the terminals at and around SES's testing facilities in Manassas, VA, Port St. Lucie, FL, and Grey Butte Airfield, CA in both fixed and mobile mode. All mobile operations will be conducted within a 1-mile (1.6 km) radius of the designated coordinates listed below:

1. Mobile and fixed testing within 1.6 km of 38° 47' 46.5" N 77° 34' 36.0" W (Manassas, VA);
2. Mobile and fixed testing within 1.6 km of 27° 16' 55.0" N 80° 28' 59.0" W (Port St. Lucie, FL);
3. Mobile and fixed testing within 1.6 km of 34° 33' 44.90" N 117° 40' 41.00" W (Grey Butte Airfield, CA)

**(6) Maximum effective radiated power (ERP) or equivalent isotropically radiated power (EIRP).**

The maximum transmitted EIRP will be 49 dBW.

**(7) Emission Designator**

20M0G7W

**(8) Overall height of antenna of antenna structure above the ground (if greater than 6 meters above the ground or an existing structure, see part 17 of this Chapter concerning notification to the FAA).**

The overall height of the antenna above ground level for mobile testing is 2 meters.

**O3b Networks**  
**Application for Experimental License Annex A**

- I. Is a directional antenna (other than radar) used? Yes
  - a. If yes, provide the following information
    - i. Width of the beam in degrees at the half power point: Az=2.3 degrees and El= 2.4 degrees
    - ii. Orientation in horizontal plane (degrees): Manassas: 206 to 168 degrees; PSL: 241 to 210 degrees; Grey Butte Airfield, CA: 114.9 to 245.2 degrees
    - iii. Orientation in vertical plane (degrees): Manassas: 24 to 29 degrees; PSL: 19 to 39 degrees; Grey Butte Airfield, CA: 5 to 33.9 degrees

## Annex B: Viasat G-12 compliance with EPFD uplink limits

The following Figures 1 (a) through (c) illustrate the Viasat G-12 antenna pattern in azimuth and elevation with the GSO arc superimposed in az/el coordinates when the antenna boresight is pointing toward an O3b satellite located at 100°W (for example). The colormap shows the antenna gain (units in dBi) as a function of azimuth and elevation angles. The antenna gain data that intersects with the GSO arc is used to determine the gain in the direction of the GSO arc.

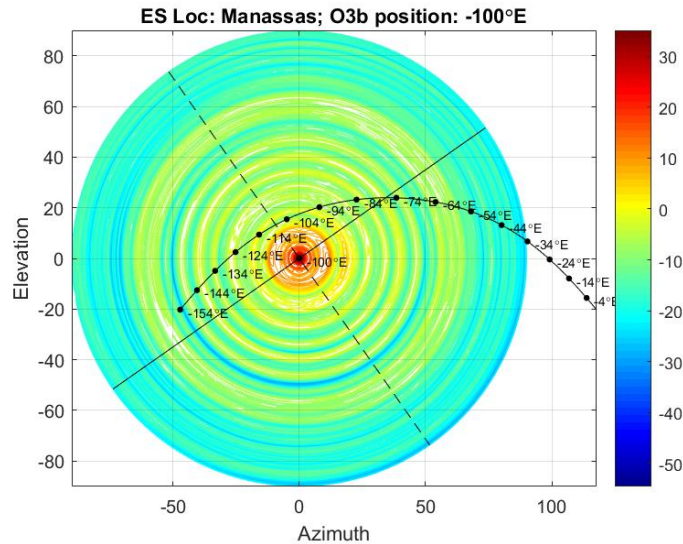


Figure 1 (a) Manassas

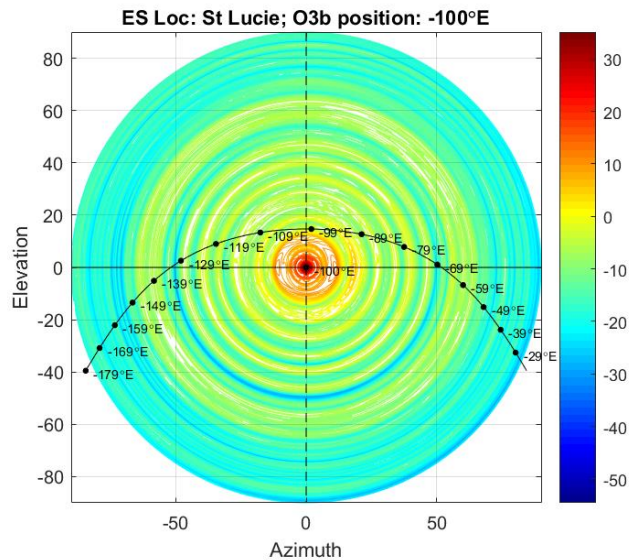


Figure 1 (b) Port St. Lucie

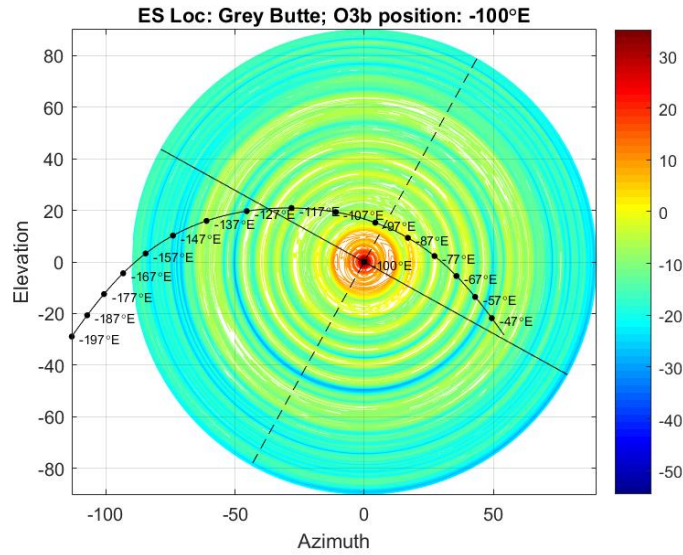


Figure 1 (c) Grey Butte Airfield

The EPFD uplink limit is  $-162 \text{ dBW/m}^2/40 \text{ kHz}$ . The spreading loss determined by the equation

$$\text{spreading loss (dB)} = 10 \log_{10}(4\pi d^2)$$

where  $d$  is the distance to a point on the GSO arc from the location on the Earth of the transmitting earth station. With the spreading loss, input power spectral density and antenna gain in the direction of the GSO arc, the EPFD uplink can be determined. The following graphic illustrates the EPFD $\uparrow$  produced at the GSO arc from the Viasat G-12 antenna.

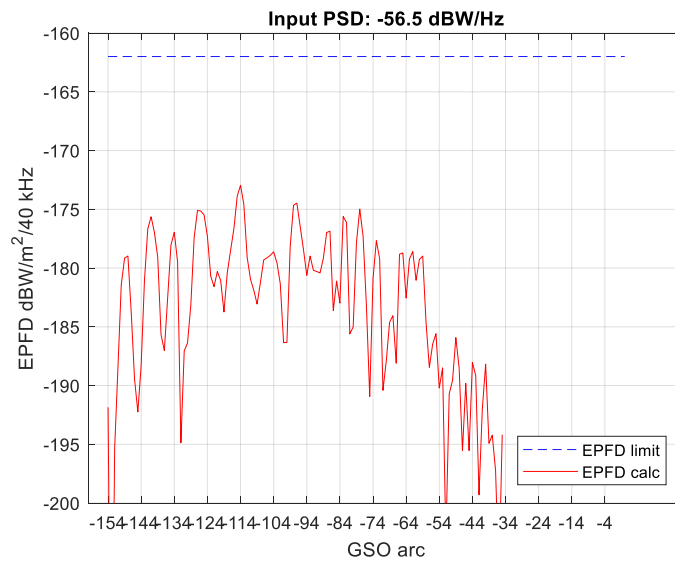


Figure 2 (a) Manassas

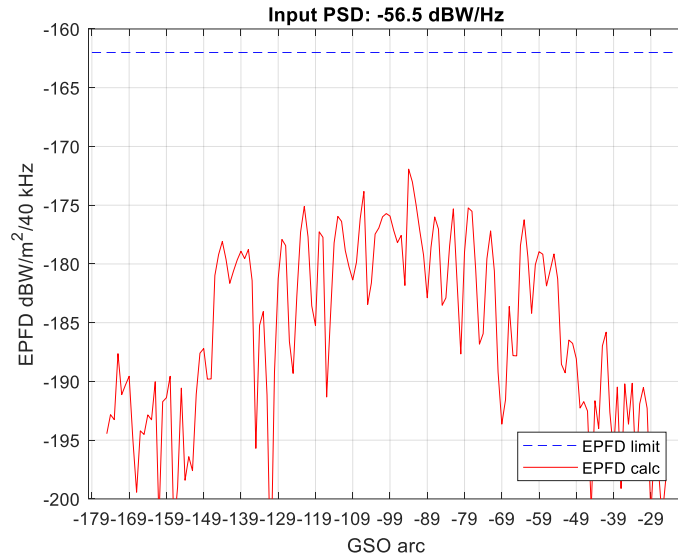


Figure 2 (b) Port St. Lucie

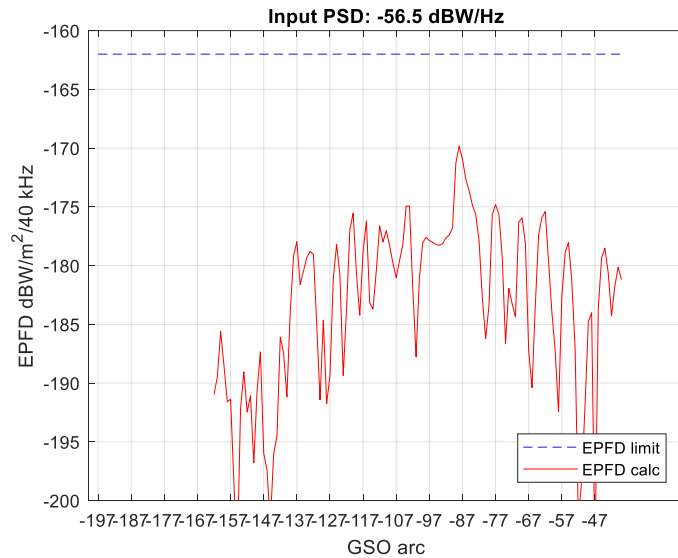


Figure 2 (c) Grey Butte Airfield

As seen in Figures 2 (a) through (c) above, the Viasat G-12 operations are compliant, with margin, with the EPFD uplink limits in Article 22 of the ITU Radio Regulations.<sup>3</sup> This graphic is for when the antenna boresight is pointing toward an O3b satellite located at 100°W. Since this is a moving antenna tracking an O3b satellite, the EPFD uplink limits are confirmed in the same way as demonstrated above for all pointing directions along the O3b orbit.

<sup>3</sup> 47 C.F.R. 25.289. If the applicable EPFD uplink limits are met, the NGSO FSS satellite system is considered to have met its obligations to protect GSO FSS networks from unacceptable interference.