

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 system² 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 an experimental special temporary authority to test and demonstrate the capabilities of a new class of satellite antenna, the GetSat Millisat H terminal, which will eventually support communications on mobile platforms, including aeronautical and maritime services. The GetSat Millisat H 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 GetSat Millisat H terminal for fixed and short-range mobile operations at and around its testing facilities in Manassas, VA and Port St. Lucie, FL. 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 February 1, 2021 through February 1, 2023.

O3b will operate the terminals at and around SES's testing facility in Manassas, VA and Port St. Lucie, FL 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 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.

² 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").

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. Fixed testing within +/- 30 feet of 39° 10' 43.6" N 77° 14' 48.9" W (Germantown, MD).

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 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 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.

Mobile/Fixed Testing: O3b will operate the terminals at SES's testing facilities in Manassas, VA and Port St. Lucie, FL and within a 1-mile (1.6 km) radius of the designated coordinates on the application listed below:

Manassas, VA: 38° 47' 46.5" N 77° 34' 36.0" W
Port St. Lucie, FL: 27° 16' 55.0" N 80° 28' 59.0" W

Fixed Testing: O3b will operate one terminal at the Hughes Networks facility in Germantown, MD within +/- 30 ft. of the coordinates below:

Germantown, MD: 39°10'43.6"N 77°14'48.9"W

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

The maximum transmitted EIRP will be 49 dBW.

(7) Emission Designator

6M00G7D

(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. The fixed testing in Germantown, MD will be operated at ground level.

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=1.3 degrees and El=2.2 degrees
 - ii. Orientation in horizontal plane (degrees): Azimuth from 167.9 – 134.9 degrees
 - iii. Orientation in vertical plane (degrees): Elevation from 27.6 – 16.3 degrees

Annex B: GetSat Millisat H compliance with EPFD uplink limits

The following Figures 1 (a) and (b) illustrate the GetSat Millisat H 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 55°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.

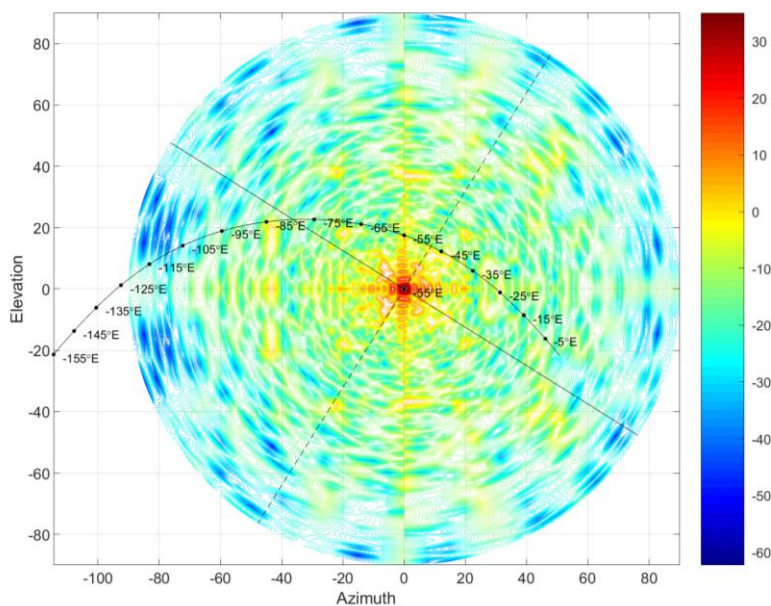


Figure 1 (a) Manassas

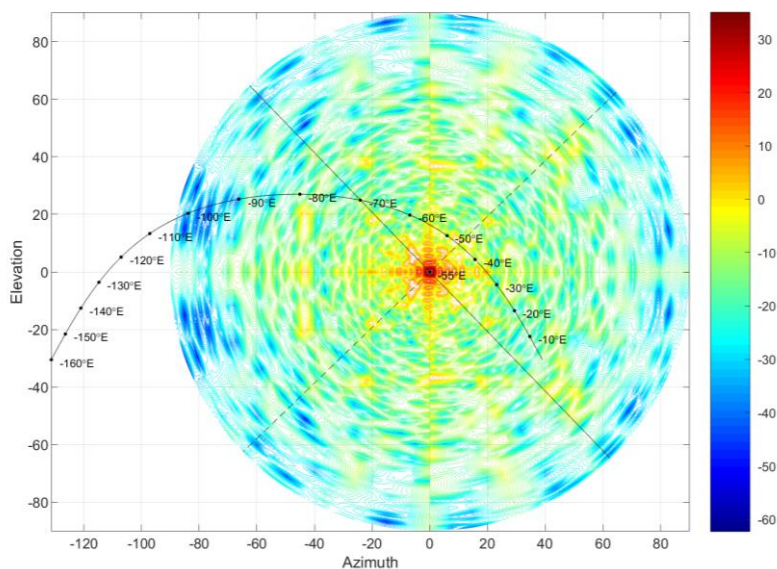


Figure 1 (b) Port St. Lucie

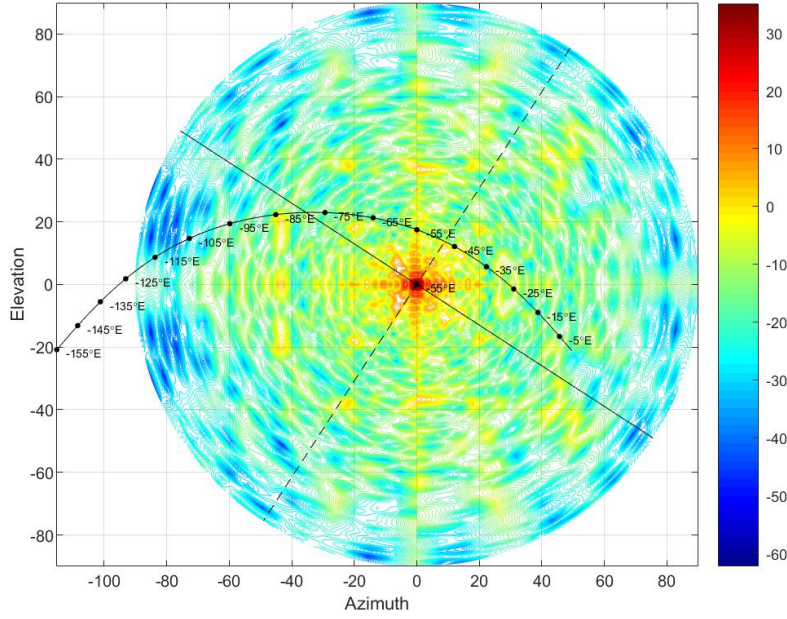


Figure 1 (c) Germantown

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↑ produced at the GSO arc from the GetSat Millisat H antenna.

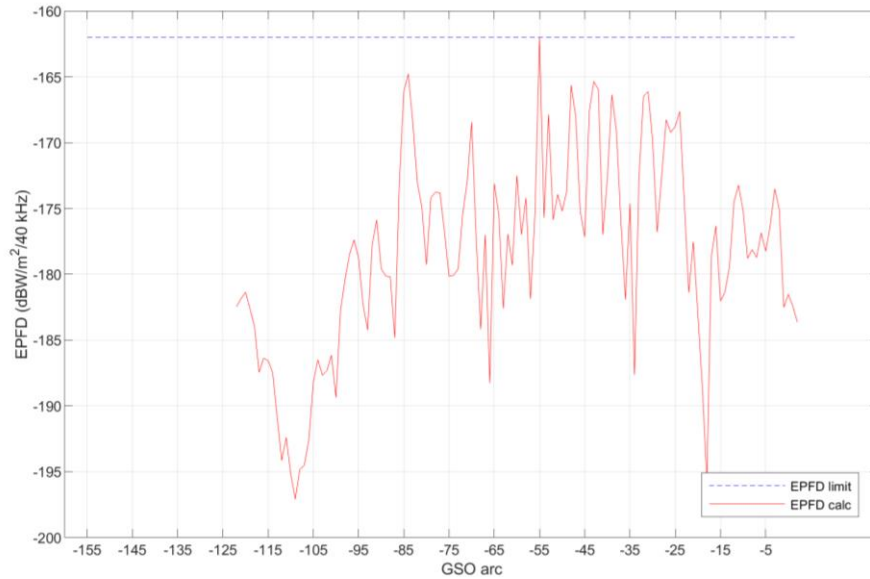


Figure 2 (a) Manassas

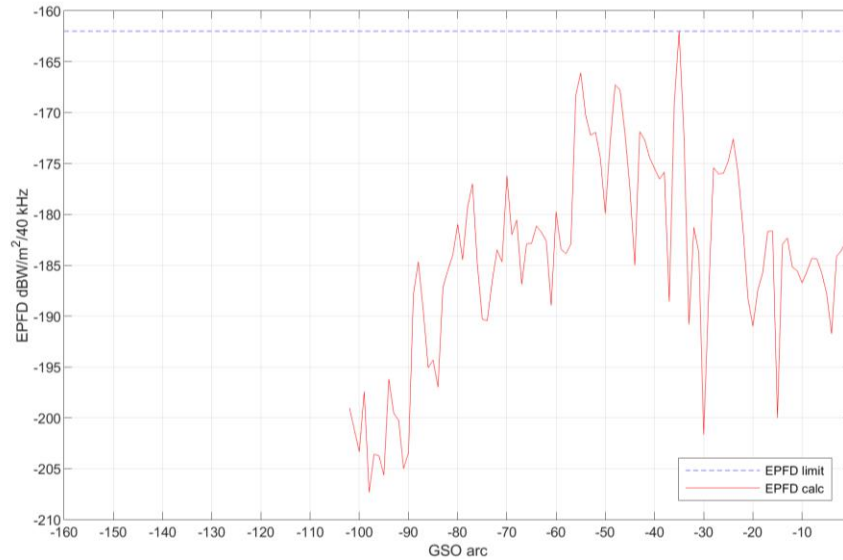


Figure 2 (b) Port St. Lucie

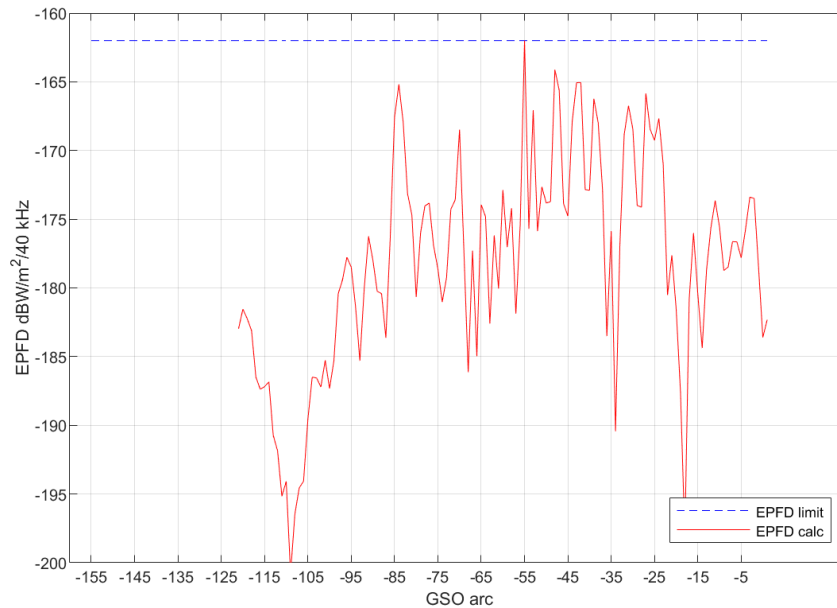


Figure 2 (c) Germantown

As seen in Figures 2 (a) and (b) above, the GetSat Millisat H operations are compliant with the EPFD uplink limits in Article 22 of the ITU Radio Regulations.³ This graphic is for when the antenna boresight is pointing toward an O3b satellite located at 55°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.

³ 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.