

FirstRF Corporation
Application for STA for Experimental License
Testing with O3b from Boulder, CO

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

FirstRF is developing a microwave antenna technology that could significantly improve performance and lower costs in commercial deployments. Grant of the STA will allow FirstRF to test its technology with the O3b non-geostationary satellite system.¹

(3) Description of the operation to be conducted and its purpose

FirstRF will test its antenna technology from a facility in Boulder, Colorado. The purpose of the test is for FirstRF to demonstrate that its antenna system can successfully track the O3b Networks non-geostationary orbit satellite constellation and transmit and receive signals over the satellites and that they meet all of the technical specifications that the tracking antennas were designed to meet.

(4) Time and dates of proposed operation

January 26, 2015 – July 26, 2015. FirstRF will notify ViaSat, Inc., Hughes/EchoStar, Inmarsat, SES and any other U.S. authorized Ka-band satellite operators, at least one week prior to any transmit testing, and will provide emergency contact information. In the event that there is harmful interference, FirstRF will immediately cease transmissions.

Additionally, FirstRF will initiate frequency coordination with terrestrial licensees prior to FirstRF's experimental antennas transmitting in the bands that are allocated for terrestrial use, that is, 27.6-28.35 GHz (uplink).² FirstRF will submit the results of that frequency coordination to the FCC prior to transmitting in these bands.

¹ The Commission previously authorized O3b to operate two FSS earth stations to communicate with O3b's NGSO FSS Ka-band system. The first authorization was for a fixed earth station in Haleiwa, Hawaii, and the second authorization was for a fixed earth station in Vernon, Texas. O3b Limited, IBFS File No. SES-LIC-20130124-00089 (Vernon, Texas, Call Sign E130021), granted June 20, 2013 and IBFS File No. SES-LIC-20100723-00952 (Haleiwa, Hawaii, Call Sign E100088), granted Sept. 25, 2012. The Haleiwa, Hawaii, earth station is authorized to provide gateway and telemetry, tracking and command (TT&C) services and the Vernon, Texas, earth station is authorized to provide gateway and back-up TT&C services.

² In the event that FirstRF's experimental antennas will be receiving bands in that are allocated for terrestrial use, that is, 17.8-18.3 GHz (downlink), O3b previously has shown that transmissions from its satellites protect terrestrial

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

The transmitting station will operate in fixed and mobile mode.

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

FirstRF Corporation
5340 Airport Blvd.
Boulder, CO 80301

Decimal: 40.033 North; 105.2288 W.L.
UTM: 40° 2' 0" North; 105° 13' 44" W.L.

All mobile operations will occur within a one mile radius of the above coordinates.

(7) Transmit equipment to be used, including name of manufacturer, model and number of units.

FirstRF; K/Ka-band Risley Prism Based Satellite Mobile Ground Terminal (12 Inches); 2 units

(8) Frequencies desired.

Transmit:
27.6 – 28.4 GHz
28.6 – 29.1 GHz

Receive:
17.8 – 18.6 GHz
18.8 – 19.3 GHz

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

The maximum transmitted ERP will be 40.5 dBW.

(10) Emission designator (see §2.201 of this chapter) or describe emission (bandwidth, modulation, etc.)

20MG7D
6MG7D

stations by complying with applicable PFD limits at the Earth's surface. O3b Limited, IBFS File No. SES-LIC-20130124-00089 (Vernon, Texas, Call Sign E130021), granted June 20, 2013. See also O3b's pending Petition for Declaratory Ruling where O3b reiterates that transmissions from its satellites protect terrestrial stations by complying with applicable PFD limits at the Earth's surface. O3b Limited, Call Sign S2935, IBFS File No. File No. SAT-LOI-20141029-00118.

(11) 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 will not exceed 6 meters.

**FirstRF Corporation
Application for Antenna Registration for Experimental License
Testing with O3b from Boulder, Colorado**

- 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: 4.5 degrees at 18 GHz;
3.2 degrees at 28 GHz
 - ii. Orientation in horizontal plane (degrees): +/- 1 degree
 - iii. Orientation in vertical plane (degrees): +/- 1 degree
- II. Particulars of Operation
 - a. Power: 20
 - b. Power Units: Watts
 - c. ERP: 40.5
 - d. ERP Units: dB Watts
 - e. Mean/Peak:
 - f. Frequency Tolerance: 4×10^{-7} over 24 hours
- III. Emission Details
 - a. Emission: 20MG7D
6MG7D
 - b. Modulating Signal: QPSK R=1/2
 - c. Necessary Bandwidth: 20 MHz (Forward) and 7 MHz (Return)