

REQUEST FOR SPECIAL TEMPORARY AUTHORITY

O3b Limited (“O3b”), pursuant to Section 25.120 of the Commission’s rules, hereby respectfully requests special temporary authority (“STA”) to operate an earth station in Isabela, Puerto Rico¹ (“PR 1.2m Earth Station”) that will communicate with its satellite system, which has been authorized to serve the U.S. market.² In this filing, O3b seeks a 30-day STA for the period between October 13, 2017 and November 12, 2017.

The PR 1.2m Earth Station will be integrated into a temporary system with other operators to help restore local wireless service in Puerto Rico. As discussed below, grant of the requested authority is in the public interest as it will allow O3b to provide internet connectivity to its customer, a large employer on Puerto Rico, while the terrestrial infrastructure is being repaired.

Operational Details and Public Interest Showing

The PR 1.2m Earth Station will communicate with O3b’s UK-authorized, Ka-band, Medium Earth Orbit, non-geostationary satellite orbit (“NGSO”) Fixed-Satellite Service (“FSS”) system and O3b’s gateway earth station in Hortlandia, Brazil.

The frequencies to be used by the PR 1.2m Earth Station are:

- 27.6-28.4 GHz (uplink)
- 17.8-18.6 GHz (downlink)

The PR 1.2m Earth Station will consist of two (2) 1.2-m AvL antennas. O3b has previously been granted a license through the Commission’s Office of Engineering and Technology (“OET”) to operate identical 1.2-m earth stations in the U.S., including Puerto Rico.³

In the aftermath of Hurricane Maria, Puerto Rico lost most of its wireless coverage across the island, leaving residents without cellphone service.⁴ In recent reports, the Commission estimates that the vast majority of cell sites remain out of service.⁵ Grant of this STA request will serve the public interest because the PR 1.2m Earth Station will be used to allow its customer to provide internet connectivity throughout its Puerto Rican facility. This will allow a large local employer to resume its normal business operations and provide an economic boost to the region as it recovers from the impact of the recent storms.

Earth Station Technical Parameters

The following documents containing technical details of the operations proposed under the requested STA are attached:

- Annex 1: A copy of the documentation related to the O3b’s OET license for the AvL 1.2-m earth station.

¹ The exact coordinates of the earth station site are 18° 28' 57" N, 67° 1' 56.28" W.

² See Applications of O3b Limited, Call Sign S2935, IBFS File Nos. SAT-LOI-20141029-00118 and SAT-AMD-20150115-00004 (the “U.S. Market Access Petition”), granted Jan. 22, 2015 (the “Market Access Grant”).

³ O3b Limited, Call Sign W12XKR, File No. 0438-EX-PL-2016 (granted Aug. 31, 2016) (“O3b OET License”).

⁴ See Elizabeth Weise, *Puerto Rico is nearly entirely cut off from cellphone service, leading to low tech solutions*, (Sept. 28, 2017), <https://www.usatoday.com/story/tech/2017/09/28/puerto-rico-cell-phone-service-tmobile-att-hurricane/710775001/>.

⁵ See, e.g., “Communications Status Report for Areas Impacted by Hurricane Maria,” (rel. Oct. 7, 2017), available at: https://apps.fcc.gov/edocs_public/attachmatch/DOC-347131A1.pdf.

Further, O3b incorporates by reference the information regarding the technical parameters of the O3b satellite system that O3b submitted with its U.S. Market Access Petition as well as the technical data for the 1.2m antenna O3b supplied to the Commission in a previous application.⁶

Proposed Spectrum Use

Operations of O3b's proposed PR 1.2m Earth Station in shared bands are consistent with the Commission's rules and policies. O3b addresses each of these bands below.

Uplink

27.6 - 28.35 GHz – Secondary uplink band shared with primary terrestrial stations

The 27.6 - 28.35 GHz uplink band is allocated to the Upper Microwave Flexible Use Service ("UMFUS") on a primary basis. FSS operations are allocated on a secondary basis in the same band. Accordingly, O3b's proposed operations in this band must not cause harmful interference to primary UMFUS stations.

O3b does not seek a protected interference zone for its operations in this band. O3b will operate the PR 1.2m Earth Station on a secondary basis and immediately shut down transmit transmissions in the event of harmful interference to primary terrestrial operations.

However, as noted below, O3b requests a waiver of the coordination requirements articulated in 47 C.F.R. 25.136(c)(4) and 47 C.F.R. 101.103(d). The required coordination report would take a significant amount of time to procure, and delivering the O3b service in a timely manner is critical to the population of Puerto Rico. Additionally, due to the state of the terrestrial infrastructure in Puerto Rico, it is unlikely that there are any in-band terrestrial operations at this time with which O3b transmissions could interfere.

28.35 - 28.4 GHz – Secondary uplink band shared with primary GSO FSS stations

The U.S. Market Access Grant authorized the O3b satellite system to use the 28.35 - 28.4 GHz band, which has a primary allocation for GSO FSS systems, pursuant to the secondary allocation for NGSO FSS systems. O3b's PR 1.2m Earth Station transmissions in this band will be consistent with their secondary status vis-à-vis GSO FSS transmissions.

As a secondary user of the 28.35 - 28.4 GHz band in the United States, O3b makes no claim of protection from interference from U.S.-licensed GSO FSS networks in this band segment. O3b's uplink operations in the 28.35 - 28.4 GHz band comply with applicable ITU equivalent power flux density ("EPFD_{up}") limits designed to protect co-frequency GSO FSS operations from unacceptable interference from NGSO FSS systems operating in the same frequencies. O3b previously demonstrated that earth stations operating above 17.9°N when operating at the authorized power levels will meet the applicable ITU EPFD_{up} limits in all frequency ranges where these limits apply, due to the inherent angular separation between the O3b and geostationary orbits when viewed from the Earth at latitudes away

⁶ O3b OET License.

from the equator.⁷ The PR 1.2m Earth Station is located further north in latitude than 17.9°N,⁸ which results in an even greater angular separation between the O3b and geostationary orbits as viewed from the Earth and an even greater assurance that the applicable ITU EPFD_{up} limits will be met by O3b's proposed operations.

Downlink

17.8 - 18.6 GHz

The 17.8 - 18.3 GHz frequency band is allocated on a primary basis to the terrestrial fixed service. The 18.3 - 18.6 GHz band is allocated in the United States on a primary basis to GSO FSS. O3b's space stations transmit in this band pursuant to the Market Access Grant, and operations of the space stations with the PR 1.2m Earth Station will comply with the conditions specified in that authorization.⁹

Waivers Requested

Waiver of Coordination Requirements in Sections 25.136(c)(4) and 101.103(d)

FSS earth stations in the 27.6-28.35 GHz band are typically required to coordinate with primary terrestrial licensees pursuant to 47 C.F.R. §§ 25.136 and 101.103(d). O3b requests a temporary waiver of this requirement in order to provide its service in the above-mentioned time frame.

It is in the public interest for the Commission to waive the coordination requirement for short term O3b operations in Puerto Rico in the 27.5-28.35 GHz band. Local terrestrial operators are not likely to be providing service in Puerto Rico during the term of this STA under the current circumstances. O3b is in the process of seeking a coordination report for extended operations in Puerto Rico, and will cease transmissions in the event that it receives a complaint of harmful interference.

Conclusion

The requested STA will allow O3b to help restore connectivity to its customer's facility in Puerto Rico as the local terrestrial networks are being repaired. Accordingly, and for good cause shown, O3b respectfully requests that its STA be granted in time for it to commence testing under this 30-day STA on October 13, 2017.

⁷ See *O3b Limited*, Call Sign E140101, File No. SES-LIC-20141001-00781 (granted June 8, 2015) ("O3b Blanket License Application"), Technical Annex at A7 (demonstrating that earth stations communicating with the O3b system can protect GSO systems down to 17.9° N).

⁸ The PR 1.2m Earth Station latitude is 18° 28' 57" N.

⁹ Market Access Grant, Paragraph 4.

ANNEX 1 – O3b AvL 1.2m Terminal OET License Documentation

O3b's OET license application and grant for the AvL 1.2m are provided on the following pages.

O3b Networks
Application for Experimental License to Operate Earth Stations Manufactured by AvL

Narrative Statement

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

Name: Suzanne Malloy
O3b Limited
900 17th Street NW
Suite 300
Washington, DC 20006
Phone: 202-813-4026
Mobile: 202-368-9045
E-mail: Suzanne.malloy@o3bnetworks.com

(2) Description of why an experimental license is needed

O3b is a satellite startup with a unique non-geostationary satellite (“NGSO”) system¹ that orbits the earth in a medium earth orbit 8,062 km above the earth. The system uses high powered spot beams to transmit communications between earth station terminals and O3b’s satellites. Because O3b’s system architecture differs from that of other satellite operators, manufacturers are developing earth stations to suit the O3b system. O3b and potential customers are in the process of determining which applications the system may be able to support.

AvL is developing a microwave antenna technology for the O3b system that could significantly improve performance and lower costs in commercial deployments. Grant of this license will allow O3b to test the new AvL terminals with O3b’s NGSO system.

O3b needs to conduct tests on a regular basis to evaluate the performance characteristics of earth station equipment that has been developed for use with its satellite system and to determine whether these earth stations can support applications of potential interest to defense, energy and maritime interests in the government and commercial sectors. In order to facilitate these tests and to reduce the administrative burden on the Commission, O3b seeks an experimental license to cover these operations.

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

O3b Networks seeks experimental authority to test the earth stations that are identified below and to evaluate their capabilities from fixed locations throughout the contiguous United States, Hawaii, Puerto Rico, and the U.S. Virgin Islands. The tests will enable O3b to evaluate the performance characteristics of the earth stations and to determine whether they can support applications of potential interest to defense, energy and maritime interests in the government and commercial sectors.

¹ The FCC has granted market access to the O3b 12 satellite constellation. See O3b Limited, Call Sign S2935, File No. SAT-LOI-20141029-00118 (granted Jan. 22, 2015) (“O3b PDR”).

(4) Time and dates of proposed operation

O3b requests a blanket license for two years, from July 15, 2016 to July 15, 2018. O3b will notify ViaSat, Inc., Hughes/EchoStar, Inmarsat, SES and any other U.S. authorized Ka-band satellite operators at least seven days prior to any transmit testing, and provide emergency contact information. In the event that there is harmful interference, O3b will immediately cease transmissions.

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

The transmitting station will operate in fixed mode.

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

Although O3b selected “United States & Territories” on the OET application form, O3b only requests authority to operate in the contiguous United States, Hawaii, Puerto Rico, and the U.S. Virgin Islands, mimicking the area of operations it requested in its FCC blanket license application.² O3b will notify the FCC of the geographical coordinates of the test site at least seven days prior to testing. In addition, when the earth stations will transmit in spectrum bands shared with terrestrial operators, O3b will complete frequency coordination prior to testing.

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

AvL 1.2m Ka Band Antenna (experimental), 10 units

Please note that each earth station terminal unit will include two technically identical (2) AvL antennas.

(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 61.8 dBW.

For all operations, O3b will comply with the radiofrequency radiation exposure limits in 47 C.F.R. 1.1310 and apply the measures recommended in the FCC’s OET Bulletin 65 to ensure compliance.

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

² See O3b Limited, Call Sign E140101, File No. SES-LIC-20141001-00781 (Granted on June 8, 2015).

1M00G7D to 216MG7D

(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 antennas above ground level and above existing structures will not exceed 6 meters.

Exhibit 1: Directional Antenna Information

	AvL 2.4m
Is a directional antenna (other than radar) used?	Yes
Width of the beam in degrees at the half power point	0.9 degrees receive / 0.6 degrees transmit
Orientation in horizontal plane (degrees)	Azimuth sweep range is from 230 deg. to 130 deg.
Orientation in vertical plane (degrees)	Elevation will vary from 15 deg. up to 33 deg. across the pass

**United States of America
FEDERAL COMMUNICATIONS COMMISSION
EXPERIMENTAL
RADIO STATION CONSTRUCTION PERMIT
AND LICENSE**

EXPERIMENTAL
(Nature of Service)

WI2XKR
(Call Sign)

XT FX
(Class of Station)

0438-EX-PL-2016
(File Number)

NAME O3b Limited

Subject to the provisions of the Communications Act of 1934, subsequent acts, and treaties, and all regulations heretofore or hereafter made by this Commission, and further subject to the conditions and requirements set forth in this license, the licensee hereof is hereby authorized to use and operate the radio transmitting facilities hereinafter described for radio communications in accordance with the program of experimentation described by the licensee in its application for license.

Operation: In accordance with Sec. 5.3(j) of the Commission's Rules

Station Locations

(1) Nationwide, US

Frequency Information

Nationwide, US

Frequency	Station Class	Emission Designator	Authorized Power	Frequency Tolerance (+/-)
27.6-28.4 GHz	FX	216MG7D	1.59 MW (ERP)	0.0003 %
		1M00G7D		
28.6-29.1 GHz	FX	216MG7D	1.59 MW (ERP)	0.0003 %
		1M00G7D		

Special Conditions:

- (1) Licensee should be aware that other stations may be licensed on these frequencies and if any interference occurs, the licensee of this authorization will be subject to immediate shut down.
- (2) Prior to operation, licensee must successfully coordinate with the existing and future Fixed Microwave Service licensees in accordance with 47 CFR, Part 101.103(d).

This authorization effective July 26, 2016 and will expire 3:00 A.M. EST August 01, 2018

**FEDERAL
COMMUNICATIONS
COMMISSION**



Special Conditions:

- (3) Prior to operation, the experimental licensee must notify all authorized satellite earth station operators within 25-mile radius of the testing, seven days in advanced for each test perform and provide a stop buzzer contact person. Consult MyIBFS database to identify all existing authorized earth stations within a 25-mile radius.
- (4) Operations to this authorization, the experimental licensee earth station antenna(s) are limited between 7 and 50 degrees' north latitude.
- (5) Licensee must complete coordination with the National Spectrum Managers Association (NSMA) spectrum manager coordinators prior to operating a demonstration/testing terminal at any location. The spectrum manager coordinators contact information can be found in the website:
http://wireless.fcc.gov/services/index.htm?job=licensing_1&id=microwave.
- (6) This license supersedes previous grant to revise condition 5.

FCC FORM 442 - FEDERAL COMMUNICATIONS COMMISSION
APPLICATION FOR NEW OR MODIFIED RADIO STATION UNDER PART 5 OF FCC RULES -
EXPERIMENTAL RADIO SERVICE (OTHER THAN BROADCAST)

Approved
by OMB
3060 -
0065
Expires
09/30/98

Applicant's Name (company): O3b Limited File No.: 0438-EX-PL-2016

Mailing Address

Attention: 900 17th Street
Street Address: Suite 300
P.O. Box:
City: Washington
State: DC
Country:
Zip Code: 20006
E-Mail Address: Suzanne.malloy@o3bnetworks.com

Application Purpose

Application is for: NEW LICENSE

For Modification indicate below

File No.: Callsign:

Government Contract

Is this authorization to be used for fulfilling the requirement of a government contract with an agency of the United States Government? If "YES", include as an exhibit a narrative statement describing the government project, agency and contract number. No

Foreign Government Use

Is this authorization to be used for the exclusive purpose of developing radio equipment for export to be employed by stations under the jurisdiction of a foreign government? If "YES", include the contract number and the name of the foreign government concerned as an exhibit. No

Research Project

Is this authorization to be used for providing communications essential to a research project? (The radio communication is not the objective of the research project)? If "YES", include as an exhibit the following information:

- a. A description of the nature of the research project being conducted.
- b. A showing that the communications facilities requested are necessary for the research project involved.
- c. A showing that existing communications facilities are inadequate.

No

Exhibit Information

If all the answers to Items 4, 5, 6 are "NO", include as an exhibit a narrative statement describing in detail the following items:

- a. The complete program of research and experimentation proposed including description of equipment and theory of operation.
- b. The specific objectives sought to be accomplished.
- c. How the program of experimentation has a reasonable promise of contribution to the development, extension, expansion or utilization of the radio art, or is along line not already investigated.

Estimated Duration

Give an estimate of the length of time that will be required to complete the program of experimentation proposed in this application: 24 Months

Environmental Impact

Would a commission grant of this application come within Section 1.1307 of the FCC Rules, such that it may have a significant environmental impact? If "YES", include as an exhibit an Environmental Assessment as required by Section 1.1311. No

Manufacturer

List below transmitting equipment to be installed (if experimental, so state) if additional rows are required, please submit equipment list as an exhibit :

Manufacturer	Model Number	No. Of Units	Experimental
AvL Technologies	1.2M-03B	10	Yes

Station ID

Is the equipment listed in Item 10 capable of station identification pursuant to Section 5.115? No

Applicant Type

Applicant is: Corporation

Foreign Government

Is applicant a foreign government or a representative of a foreign government? No

License Denied or Revoked

Has applicant or any party to this application had any FCC station license or permit revoked or any application for permit, license or renewal denied by this Commission?

If "YES", include as an exhibit a statement giving call sign of license or permit revoked and relate circumstances. No

Owner and Operator

Will applicant be owner and operator of the station? Yes

Contact Information

Give the following information of person who can best handle inquiries pertaining to this application: First Name:

Suzanne

Last Name: Malloy

Title: VP of Regulatory Affairs

Phone Number: 202-813-4026

E-Mail Address: Suzanne.malloy@o3bnetworks.com

Drug Abuse Question

APPLICANT ANTI-DRUG ABUSE CERTIFICATION: By checking "YES", the individual applicant certifies that he or she is eligible for this license. This requires that he or she is not subject to a denial of federal benefits, including FCC benefits, as a result of a drug offense conviction pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 862. A non-individual applicant, e.g., corporation, partnership or other unincorporated association, certifies that no party to the application is subject to a denial of federal benefits, pursuant to that section. For definition of a "party" for these purposes, see 47CFR 1.2002(b). Yes

Certification

THE APPLICANT CERTIFIES THAT:

- a. Copies of the FCC Rule Parts 2 and 5 are on hand; and
- b. Adequate financial appropriations have been made to carry on the program of experimentation which will be conducted by qualified personnel; and
- c. All operations will be on an experimental basis in accordance with Part 5 and other applicable rules, and will be conducted in such a manner and at such a time as to preclude harmful interference to any authorized station; and
- d. Grant of the authorization requested herein will not be construed as a finding on the part of the Commission:
 - 1. that the frequencies and other technical parameters specified in the authorization are the best suited for the proposed program of experimentation, and
 - 2. that the applicant will be authorized to operate on any basis other than experimental, and
 - 3. that the Commission is obligated by the results of the experimental program to make provision in its rules including its table of frequency allocations for applicant's type of operation on a regularly licensed basis.

THE APPLICANT FURTHER CERTIFIES THAT:

- e. All the statements in the application and attached exhibits are true, complete and correct to the best of the applicant's knowledge; and
- f. The applicant is willing to finance and conduct the experimental program with full knowledge and understanding of the above limitations; and
- g. The applicant waives any claim to the use of any particular frequency or of the electromagnetic spectrum as against the regulatory power of the USA.

Name of Applicant: O3b Limited
Signature (Authorized person filing form): Suzanne Malloy
Signature Date (Authorized person filing form): 06/15/2016
Title of Person Signing Application: VP of Regulatory Affairs
Classification: Authorized employee

WILLFUL FALSE STATEMENTS MADE ON THIS FORM ARE PUNISHABLE BY FINE AND/OR IMPRISONMENT (U.S. CODE, TITLE 18, SECTION 1001), AND/OR REVOCATION OF ANY STATION LICENSE OR CONSTRUCTION PERMIT (U.S. CODE, TITLE 47, SECTION 312(A)(1)), AND/OR FORFEITURE (U.S. CODE, TITLE 47, SECTION 503).

NOTIFICATION TO INDIVIDUALS UNDER PRIVACY ACT OF 1974 AND THE PAPERWORK REDUCTION ACT OF 1980

Information requested through this form is authorized by the Communications Act of 1934, as amended, and specified by Section 308 therein. The information will be used by Federal Communications Commission staff to determine eligibility for issuing authorizations in the use of the frequency spectrum and to effect the provisions of regulatory responsibilities rendered by the Commission by the Act. Information requested by this form will be available to the public unless otherwise requested pursuant to 47 CFR 0.459 of the FCC Rules and Regulations. Your response is required to obtain this authorization.

Public reporting burden for this collection of information is estimated to average four (4) hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden to the Federal Communications Commission, Records Management Branch, Paperwork Reduction Project (3060-0065), Washington DC 20554. DO NOT send completed applications to this address. Individuals are not required to respond to this collection unless it displays a currently valid OMD control number.

THE FOREGOING NOTICE IS REQUIRED BY THE PRIVACY ACT OF 1974, P.L. 93-579, DECEMBER 31, 1974, 5 U.S.C. 552a(e)(3), AND THE PAPERWORK REDUCTION ACT OF 1980, P.L. 96-511, DECEMBER 11, 1980, 44 U.S.C. 3507.

Station Location

City	State	Latitude	Longitude	Mobile	Street (or other indication of location)	County	Radius of Operation
0	Continental United States	North	West				

Datum: NAD 83

Is a directional antenna (other than radar) used? Yes

Exhibit submitted: Yes

(a) Width of beam in degrees at the half-power point:

(b) Orientation in horizontal plane (degrees from True North):

(c) Orientation in vertical plane (degrees from horizontal):

Will the antenna extend more than 6 meters above the ground, or if mounted on an existing building, will it extend more than 6 meters above the building, or will the proposed antenna be mounted on an existing structure other than a building? No

(a) Overall height above ground to tip of antenna in meters:

(b) Elevation of ground at antenna site above mean sea level in meters:

(c) Distance to nearest aircraft landing area in kilometers:

(d) List any natural formations of existing man-made structures (hills, trees, water tanks, towers, etc.) which, in the

opinion of the applicant, would tend to shield the antenna from aircraft:

Action Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
New 27.60000000-28.40000000 GHz	FX	20.000000 W 1.590000 MW	P	0.00030000 %	1M00G7D	180 Msps
Action Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
New 27.60000000-28.40000000 GHz	FX	20.000000 W 1.590000 MW	P	0.00030000 %	216MG7D	180 Msps
Action Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
New 28.60000000-29.10000000 GHz	FX	20.000000 W 1.590000 MW	P	0.00030000 %	1M00G7D	180 Msps
Action Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
New 28.60000000-29.10000000 GHz	FX	20.000000 W 1.590000 MW	P	0.00030000 %	216MG7D	180 Msps