

**United States of America
FEDERAL COMMUNICATIONS COMMISSION
EXPERIMENTAL
SPECIAL TEMPORARY AUTHORIZATION**

EXPERIMENTAL

(Nature of Service)

XT MO

(Class of Station)

WI9XWL

(Call Sign)

0465-EX-ST-2019

(File Number)

NAME O3b Limited

This Special Temporary Authorization is granted upon the express condition that it may be terminated by the Commission at any time without advance notice or hearing if in its discretion the need for such action arises. Nothing contained herein shall be construed as a finding by the Commission that the authority herein granted is or will be in the public interest beyond the express terms hereof.

This Special Temporary Authorization shall not vest in the grantee any right to operate the station nor any right in the use of the frequencies designated in the authorization beyond the term hereof, nor in any other manner than authorized herein. Neither the authorization nor the right granted hereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934. This authorization is subject to the right of use of control the Government of the United States conferred by Section 706 of the Communications Act of 1934.

Special Temporary Authority is hereby granted to operate the apparatus described below:

Purpose Of Operation:

O3b and its customers will continue to evaluate how the multi-band, multi-orbit maritime terminals respond to this new service delivery method and troubleshoot any complications that may arise.

Station Locations

- (1) MOBILE: Maritime vessels along the U.S. east coast and around U.S. territories in the Caribbean

Frequency Information

MOBILE: Maritime vessels along the U.S. east coast and around U.S. territories in the Caribbean

Frequency	Station Class	Emission Designator	Authorized Power	Frequency Tolerance (+/-)
5.925-6.425 GHz	MO	54M0G7D 36M0G7D	1798.87 kW (ERP)	1.0E-6 %
14-14.5 GHz	MO	54M0G7D 36M0G7D	668.34 kW (ERP)	1.0E-6 %

This authorization effective April 12, 2019 and
will expire 3:00 A.M. EST September 27, 2019

**FEDERAL
COMMUNICATIONS
COMMISSION**



Frequency Information

MOBILE: Maritime vessels along the U.S. east coast and around U.S. territories in the Caribbean

Frequency	Station Class	Emission Designator	Authorized Power	Frequency Tolerance (+/-)
28.35-28.4 GHz	MO	1M00G7D 50M0G7D	2317.39 kW (ERP)	0.0003 %
28.6-29.1 GHz	MO	1M00G7D 216MG7D	2540.97 kW (ERP)	0.0003 %

Special Conditions:

- (1) All customers participating in the experiment shall be informed that this operation is for experimental purposes only and can be cancelled at any time.
- (2) All transmitting and/or receiving equipment used in the study shall be owned by the licensee.
- (3) 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.
- (4) Licensee is required to ensure that trial devices are either rendered inoperable or retrieved by them from trial participants at the conclusion of the trial. Licensee is required to notify trial participants in advance that operation of the trial device is subject to this condition.
- (5) In lieu of frequency tolerance, the occupied bandwidth of the emission shall not extend beyond the band limits set forth above.
- (6) The stop buzzer contact for this project is Will Lewis, Phone: 202-813-4033, Email: will.lewis@ses.com
- (7) Licensee is authorized to operate 6 unites of 2.4 meter multi-band antenna on board ships (ESV) that can be used to communicate with SES's conventional C-band and Ku-band GSO satellites and O3b's Ka-band NGSO satellites.
- (8) In accordance with Article 4.4 of the ITU Radio Regulations, the operations authorized herein shall not cause harmful interference to, and shall not claim protection from harmful interference caused by, a station operating in accordance with the provisions of the ITU Constitution, the ITU Convention, and the ITU Radio Regulations

Special Conditions:

- (9) The 2.4 meter ESV stations are authorized to conduct tests using the 5.925-6.425 GHz frequency band. The operations are subject to the following conditions:
- a. POINT OF COMMUNICATION: NSS7 @ 20° WL (S2463), AMC-3 @ 72° WL (S2162), SES-4 @ 22° WL (S2828) in the US Permitted Space Station list.
 - b. The authorized stations must be in compliance with the off-axis EIRP power spectral density ("PSD") standards (the "off-axis mask") set forth in 25.218(d) of the Commission's Rules.
 - c. Operations must be in compliance with the requirements set forth in Section 25.212(d) of the Commission's Rules: the input power spectral density into the antenna must not exceed -2.7 dBW/4 kHz.
 - d. Operations must be in compliance with the requirements set forth in Section 25.204(h) of the Commission's Rules: ESV transmissions in the 5925-6425 MHz (Earth-to-space) band shall not exceed an e.i.r.p. spectral density towards the radio-horizon of 17 dBW/MHz, and shall not exceed an e.i.r.p. towards the radio-horizon of 20.8 dBW. The ESV network shall shut-off the ESV transmitter if the e.i.r.p. spectral density towards the radio-horizon or e.i.r.p. towards the radio-horizon are exceeded.
 - e. Operations must be in compliance with the applicable ESVs requirements set forth in Section 25.221 of the Commission's Rules.
 - f. Prior to testing/operation, when the earth stations will transmit in spectrum bands shared with terrestrial operators, O3b Limited must notify the terrestrial operators and complete frequency coordination with terrestrial operators.
 - g. Prior to commencement of operations with each satellite pursuant to this experimental license, O3b Limited shall obtain a certification regarding the notification of all satellite operators with co-frequency operations within 6 degrees longitude of each satellite, generally describing the experimental operations authorized herein, including the term thereof, and providing a point of contact for the purpose of resolving any complaints of interference. O3b Limited shall obtain a similar certification if, during the term of this experimental license, any of the satellites move orbit locations, or if a satellite operator commences co-frequency operations within 6 degrees longitude of each of the satellites. If the point of contact receives a complaint of harmful interference, the party receiving the complaint (if not O3b Limited) will notify O3b Limited , and O3b Limited shall immediately cease such operations or adjust such operations to avoid harmful interference. O3b Limited will submit a copy of these certification(s) to the Commission for incorporation into the record of this file.
 - h. The stations are authorized, on a non-protected and non-harmful interference basis, to transmit to the geostationary-orbit space stations using the 5.925-6.425 GHz frequency band that are authorized by the Commissions. The stations authorized herein must immediately terminate operations upon notification that such operation is causing harmful interference to any other radio system lawfully operating in the 5.925-6.425 GHz frequency band. The stations authorized herein cannot claim protection from harmful interference from any radio system lawfully operating in the 5.925-6.425 frequency band.

Specific

i. Operation pursuant to this authorization must be in compliance with the terms of coordination agreements between the authorized GSO C-band satellite operators operating in the 5.925-6.425 GHz frequency band and operators of other C-band geostationary space stations within six angular degrees of those space stations. In the event that another GSO FSS space station commences operation in the C-band at a location within six degrees of any of these space stations, earth stations operating pursuant to this temporary authority shall cease transmitting to that space station unless and until such operation has been coordinated with the new space station's operator or Licensee demonstrates that such operation will not cause harmful interference to the new co-frequency space station.

j. Communications between authorized station(s) and the NSS7, AMC-3, and SES-4 geostationary space stations must be in compliance with all existing and future space station coordination agreements reached between the NSS7, AMC-3, and SES-4 GSO operators and other administrations.

Special Conditions:

- (10) The 2.4 meter ESV stations are authorized to conduct tests using the 14.0-14.5 GHz frequency band. The operations are subject to the following conditions:

k.POINT OF COMMUNICATION: AMC-3 @ 72° WL (S2162), SES-4 @ 22° WL (S2828) in the US Permitted Space Station list.

l.The authorized stations must be in compliance with the off-axis EIRP power spectral density ("PSD") standards (the "off-axis mask") set forth in 25.218(f) of the Commission's Rules.

m.Operations must be in compliance with the requirements set forth in Section 25.212(c)(2) of the Commission's Rules: the input power spectral density into the antenna must not exceed -14 dBW/4 kHz.

n.Operations must be in compliance with the requirements set forth in Sections 25.204(i)-(k) of the Commission's Rules. ESV transmissions in the 14.0-14.5 GHz (Earth-to-space) band shall not exceed an e.i.r.p. spectral density towards the radio-horizon and e.i.r.p. towards the radio-horizon limits specified in the Sections 25.204(i)-(k). The ESV network shall shut-off the ESV transmitter if the e.i.r.p. spectral density towards the radio-horizon or e.i.r.p. towards the radio-horizon are exceeded.

o.Operations must be in compliance with the applicable ESVs requirements set forth in Section 25.222 of the Commission's Rules.

p.Prior to commencement of operations with each satellite pursuant to this experimental license, 03b Limited shall obtain a certification regarding the notification of all satellite operators with co-frequency operations within 6 degrees longitude of each satellite, generally describing the experimental operations authorized herein, including the term thereof, and providing a point of contact for the purpose of resolving any complaints of interference. 03b Limited shall obtain a similar certification if, during the term of this experimental license, any of the satellites move orbit locations, or if a satellite operator commences co-frequency operations within 6 degrees longitude of each of the satellites. If the point of contact receives a complaint of harmful interference, the party receiving the complaint (if not 03b Limited) will notify 03b Limited , and 03b Limited shall immediately cease such operations or adjust such operations to avoid harmful interference. 03b Limited will submit a copy of these certification(s) to the Commission for incorporation into the record of this file.

q.The stations are authorized, on a non-protected and non-harmful interference basis, to transmit to the geostationary-orbit space stations using the 14.0-14.5 GHz frequency band that are authorized by the Commissions. The stations authorized herein must immediately terminate operations upon notification that such operation is causing harmful interference to any other radio system lawfully operating in the 14.0-14.5 GHz frequency band. The stations authorized herein cannot claim protection from harmful interference from any radio system lawfully operating in the 14.0-14.5 frequency band.

r.Operation pursuant to this authorization must be in compliance with the terms of coordination agreements between the authorized GSO Ku-band satellite operators operating in the 14.0-14.5 GHz frequency band and operators of other Ku-band

Special geostationary space stations within six angular degrees of those space stations. In the event that another GSO FSS space station commences operation in the Ku-band at a location within six degrees of any of these space stations, earth stations operating pursuant to this temporary authority shall cease transmitting to that space station unless and until such operation has been coordinated with the new space station's operator or Licensee demonstrates that such operation will not cause harmful interference to the new co-frequency space station.

s. Communications between authorized station(s) and the AMC-3 and SES-4 geostationary space stations must be in compliance with all existing and future space station coordination agreements reached between the AMC-3 and SES-4 GSO operators and other administrations; and between the AMC-3, and SES-4 GSO operators and, if any, the Ku-band NGSO (non- geostationary space stations) operators.

Special Conditions:

- (11) The 2.4 meter ESV stations are authorized to conduct tests using the 28.35-28.4 GHz and 28.6-29.1 GHz frequency bands. The operations are subject to the following conditions:
- a. POINT OF COMMUNICATION: O3b Limited's NGSO (non-geostationary orbit space stations) satellites.
 - b. The authorized stations must be in compliance with the off-axis EIRP power spectral density ("PSD") standards (the "off-axis mask") set forth in 25.138(a) of the Commission's Rules.
 - c. Operations in the 28.35-28.4 GHz frequency band must be in compliance with the equivalent power Flux-density limit (-162 dBW/m²/40 KHz) in Article 22.5D of the ITU Radio Regulations.
 - d. Operations in the 28.35-28.4 GHz frequency band are on a secondary basis with respect to GSO FSS operations.
 - e. Antenna elevation for all operations must be at least 5 degrees above the geographic horizon.
 - f. Prior to commencement of operations with each O3b NGSO satellite pursuant to this experimental license, O3b Limited shall obtain a certification regarding the notification of all GSO satellite operators with co-frequency operations within 6 degrees longitude of each satellite, generally describing the experimental operations authorized herein, including the term thereof, and providing a point of contact for the purpose of resolving any complaints of interference. O3b Limited shall obtain a similar certification if, during the term of this experimental license, any of the satellites move orbit locations, or if a satellite operator commences co-frequency operations within 6 degrees longitude of each of the satellites. If the point of contact receives a complaint of harmful interference, the party receiving the complaint (if not O3b Limited) will notify O3b Limited, and O3b Limited shall immediately cease such operations or adjust such operations to avoid harmful interference. O3b Limited will submit a copy of these certification(s) to the Commission for incorporation into the record of this file.
 - g. Operation pursuant to this authorization must be in compliance with the terms of coordination agreements with operators of geostationary orbit Fixed Satellite Service space stations operating in the 28.35-28.4 GHz frequency band and operators of other Ka-band geostationary space stations within six angular degrees of those space stations. In the event that another GSO FSS space station commences operation in the Ka-band at a location within six degrees of any of these space stations, earth stations operating pursuant to this temporary authority shall cease transmitting to that space station unless and until such operation has been coordinated with the new space station's operator or Licensee demonstrates that such operation will not cause harmful interference to the new co-frequency space station.
 - h. O3b Limited's earth stations on maritime vessels authorized herein must be in compliance with the terms of coordination agreements with operators of non-geostationary orbit Fixed Satellite Service space stations operating in the 28.6-29.1 GHz frequency band. In the event another NGSO system commences

Special operations in the U.S. market in the 28.6-29.1 GHz frequency bands, maritime earth stations operating pursuant to this authorization must cease operation unless and until such operation has been coordinated with the new NGSO system operator or O3b Limited demonstrates that such operation will not cause harmful interference to the new NGSO system.

i. Communications between authorized station(s) and the O3b NGSO space stations must comply with all existing and future coordination agreements reached between the United Kingdom and other Administrations, including all coordination agreements reached between the United Kingdom and the United States. In the absence of a coordination agreement, such communications must comply with applicable provisions of ITU Radio Regulations.

- (12) Licensee's stations must employ a tracking algorithm that is resistant to capturing and tracking adjacent satellite signals, and each station must be capable of inhibiting its own transmission in the event it detects unintended satellite tracking.
- (13) Licensee's stations must be monitored and controlled by a ground-based network control and monitoring center. Such stations must be able to receive "enable transmission" and "disable transmission" commands from the network control center and must cease transmission immediately after receiving a "parameter change" command until receiving an "enable transmission" command from the network control center. The network control center must monitor operation of each earth station to determine if it is malfunctioning, and each earth station must self-monitor and automatically cease transmission on detecting an operational fault that could cause harmful interference to a fixed satellite service network
- (14) Licensee must maintain a point of contact available 24 hours per day, seven days per week, with the authority and ability to terminate operations authorized herein, for discussing interference concerns with other licensees, and must submit a letter to be included in its license file with the name and telephone number of the point of contact prior to commencing operation.
- (15) Operation is NOT PERMITTED in international waters
- (16) The authorized stations must be in compliance with the Federal Aviation Administration (FAA) requirements as set forth in Section 17.4 of the Commission's Rules.
- (17) The authorized stations must be in compliance with environmental requirement set forth in Section 1.1307 of the Commission's Rules.
- (18) This authorization is without prejudice to any determination that the Commission may make regarding pending or future experimental satellite earth station applications.
- (19) Operations are on a non-interference basis (NIB) and shall not cause harmful interference to, and shall not claim protection from, interference caused to it by any other lawfully operating station and it shall cease transmission(s) immediately upon notice of such interference and notify the FCC in writing.
- (20) Licensee must successfully coordinate with the Fixed Microwave Service licensees in accordance with 47 CFR, Part 101.103(d) prior to operation in 5.925-6.425 GHz and 28.35-29.1 GHz bands.