



**UNITED STATES OF AMERICA  
FEDERAL COMMUNICATIONS COMMISSION**

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**RADIO STATION AUTHORIZATION**

Name: O3b Limited  
 Authorization Type: License  
 Non Common Carrier

Call Sign: E100088  
 File Number: SES-LIC-20100723-00952  
 Grant date: 09/25/2012    Expiration Date: 09/25/2027

Nature of Service: Fixed Satellite Service

Class of Station: Fixed Earth Stations

**A) Site Location(s)**

#	Site ID	Address	Latitude	Longitude	Elevation (Meters)	NAD	Special Provisions (Refer to Section H)
1)	Hawaii Gateway	58-350 Kamehameha Hwy Haleiwa, Honolulu, HI 96712	21°40'17.8"N	158°1'54.9"W	140	83	
Licensee certifies antenna(s) comply with gain patterns specified in Section 25.209							

*Subject to the provisions of the Communications Act of 1934, The Communications Satellite Act of 1962, subsequent acts and treaties, and all present and future regulations made by this Commission, and further subject to the conditions and requirements set forth in this license, the grantee is authorized to construct, use and operate the radio facilities described below for radio communications for the term beginning September 25, 2012 (3 AM Eastern Standard Time) and ending September 25, 2027 (3 AM Eastern Standard Time). The required date of completion of construction and commencement of operation is September 25, 2013 (3 AM Eastern Standard Time). Grantee must file with the Commission a certification upon completion of construction and commencement of operation.*

**B) Particulars of Operations**

The General Provision 1010 applies to all receiving frequency bands.  
 The General Provision 1900 applies to all transmitting frequency bands.  
 For the text of these provisions, refer to Section H.

#	Frequency (MHz)	Polarization Code	Emission	Tx/Rx Mode	Max EIRP /Carrier (dBW)	Max EIRP Density /Carrier (dBW/4kHz)	Associated Antenna	Special Provisions (Refer to Section H)	Modulation/ Services
1)	29087.8000-29089.1000	L	500KG2D	Rx	85.14	72.13	Ant 1-3		TT&C
2)	28600.0000-29100.0000	L,R	216MG7D	Tx	87.29	39.97	Ant 1-3		DVB-S2 (QPSK, 16APSK, 32APSK); Digital Data Link
3)	28600.0000-29100.0000	L,R	307KG7D	Tx	52.29	33.44	Ant 1-3		DVB-S2 (QPSK, 16APSK, 32APSK); Digital Data Link
4)	28600.0000-29100.0000	L,R	40M0G7D	Tx	87.29	47.29	Ant 1-3		DVB-S2 (QPSK, 16APSK, 32APSK); Digital Data Link
5)	27600.0000-28400.0000	L,R	216MX7D	Tx	87.29	39.97	Ant 1-3		DVB-S2 (QPSK, 16APSK, 32APSK); Digital Data Link



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6)	27600.0000-28400.0000	L,R	307KG7D	Tx	52.29	33.44	Ant 1-3		DVB-S2 (QPSK, 16APSK, 32APSK); 8APSK, Digital Data Link
7)	19296.2000-19299.9000	L,R	300KG1D	Rx	0.00	0.00	Ant 1-3		TT&C
8)	18800.0000-19300.0000	L,R	216MG7D	Rx	0.00	0.00	Ant 1-3		DVB-S2 (QPSK, 16APSK, 32APSK); 8APSK, Digital Data Link
9)	18800.0000-19300.0000	L,R	307KG7D	Rx	0.00	0.00	Ant 1-3		DVB-S2 (QPSK, 16APSK, 32APSK); 8APSK, Digital Data Link
10)	18800.0000-19300.0000	L,R	40M0G7D	Rx	0.00	0.00	Ant 1-3		DVB-S2 (QPSK, 16APSK, 32APSK); 8APSK, Digital Data Link
11)	17800.0000-18600.0000	L,R	216MG7D	Rx	0.00	0.00	Ant 1-3		DVB-S2 (QPSK, 16APSK, 32APSK); 8APSK, Digital Data Link
12)	17800.0000-18600.0000	L,R	307KG7D	Rx	0.00	0.00	Ant 1-3		DVB-S2 (QPSK, 16APSK, 32APSK); 8APSK, Digital Data Link

**C) Frequency Coordination Limits**

#	Frequency Limits (MHz)	Satellite Arc (Deg. Long.)		Elevation (Degrees)		Azimuth (Degrees)		Max EIRP Density toward Horizon (dBW/4kHz)	Associated Antenna(s)
		East Limit	West Limit	East Limit	West Limit	East Limit	West Limit		
1)	17800.0000-18600.0000	NGSO		05.1-05.1		103.9-256.1		0	Ant 1-3
2)	18800.0000-19300.0000	NGSO		05.1-05.1		103.9-256.1		0	Ant 1-3
3)	27600.0000-28400.0000	NGSO		05.1-05.1		103.9-256.1		27.81	Ant 1-3
4)	28600.0000-29100.0000	NGSO		05.1-05.1		103.9-256.1		27.81	Ant 1-3

**D) Points of Communications**

The following stations located in the Satellite orbits consistent with Sections B and C of this Entry:

- 1) Hawaii Gateway to O3b Limited NGSO satellite system (UK licensed)



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**E) Antenna Facilities**

Site ID	Antenna ID	Units	Diameter (meters)	Manufacturer	Model number	Site Elevation (Meters)	Max Antenna Height (Meters)	Special Provisions (Refer to Section H)
Hawaii Gateway	Ant 1-3	3	7.3	Viasat	MEO7	140	9.87 AGL/ 149.87 AMSL	
Max Gains(s):		65.3 dBi @	28.3710 GHz	62.1 dBi @	18.5750 GHz			
Maximum total input power at antenna flange (Watts) =					447.23			
Maximum aggregate output EIRP for all carriers (dBW) =					92.17			

**F) Remote Control Point:**

Hawaii Gateway	L-6815 Chateau de Betzdorf	Call Sign:
	Betzdorf, Grevenmacher,	
	+352 710 725 82	
Hawaii Gateway	8000 Gainsford Court	Call Sign:
	Bristow, Prince William, VA 20136	
	(703) 330-3305	

**G) Antenna Structure marking and lighting requirements:**

None unless otherwise specified under Special and General Provisions

**H) Special and General Provisions**

- A) This RADIO STATION AUTHORIZATION is granted subject to the following special provisions and general conditions:
- 1010 --- Applicable to all receiving frequency bands. Emission designator indicates the maximum bandwidth of received signal at associated station(s). Maximum EIRP and maximum EIRP density are not applicable to receive operations.
  - 1900 --- Applicable to all transmitting frequency bands. Authority is granted to transmit any number of RF carriers with the specified parameters on any discrete frequencies within associated band in accordance with the other terms and conditions of this authorization, subject to any additional limitations that may be required to avoid unacceptable levels of inter-satellite interference.



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## H) Special and General Provisions

A) This RADIO STATION AUTHORIZATION is granted subject to the following special provisions and general conditions:

- 2300 --- Authority is granted to operate this station by remote control provided that: (1) The parameters of the transmissions of this station monitored at the remote control point, and the operational functions sufficient to insure that the operations of this station are in full compliance with the station authorization at all times; (2) upon detection by the grantee, or upon notification from the Commission, of a deviation of the operation of this station shall be immediately suspended until the deviation is corrected, except the transmissions concerning the immediate safety of life or property may be conducted for the duration of such emergency; and (3) the grantee shall have available, at all times, the technical personnel necessary to perform the technical servicing and maintenance of this station expeditiously. See also Public Notice "The International Bureau Provides Guidance Concerning the Relocation of Earth Station Remote Control Points", DA 06-978 (rel. May 4, 2006).
- 2916 --- Transmitter(s) must be turned off during antenna maintenance to ensure compliance with the FCC-specified safety guidelines for human exposure to radiofrequency radiation in the region between the antenna feed and the reflector. Appropriate measures must also be taken to restrict access to other regions in which the earth station's power flux density levels exceed the specified guidelines.
- 2938 --- Upon completion of construction, each licensee must file with the Commission a certification including the following information: name of the licensee, file number of the application, call sign of the antenna, date of the license and certification that the facility as authorized has been completed, that each antenna facility has been tested and is within 2 dB of the pattern specified in Section 25.209 and that the station is operational including the date of commencement of service and will remain operational during the license period unless the license is submitted for cancellation.
- 5208 --- The licensee shall take all necessary measures to ensure that the antenna does not create potential exposure of humans to radiofrequency radiation in excess of the FCC exposure limits defined in 47 CFR 1.1307(b) and 1.1310 wherever such exposures might occur. Measures must be taken to ensure compliance with limits for both occupational/controlled exposure and for general population/uncontrolled exposure, as defined in these rule sections. Compliance can be accomplished in most cases by appropriate restrictions such as fencing. Requirements for restrictions can be determined by predictions based on calculations, modeling or by field measurements. The FCC's OET Bulletin 65 (available on-line at [www.fcc.gov/oet/rfsafety](http://www.fcc.gov/oet/rfsafety)) provides information on predicting exposure levels and on methods for ensuring compliance, including the use of warning and alerting signs and protective equipment for workers.
- 5216 --- All operations shall be on a non-common carrier basis.
- 90033 --- Transmissions between earth station call sign E100088 and O3b Limited NGSO space stations are limited to the provision of gateway and telemetry, tracking, and command (TT&C) services for the O3b Limited NGSO space stations in the 17.8-18.6 GHz (space-to-Earth), 18.8-19.3 GHz (space-to-Earth), 27.6-28.4 GHz (Earth-to-space) and 28.6-29.1 GHz (Earth-to-space) frequency bands. This authorization is limited to earth station call sign E100088, and does not permit O3b space stations to operate with any other earth station in the United States.
- 90034 --- Transmissions between earth station call sign E100088 and O3b Limited NGSO space stations must comply with coordination agreements reached between the United Kingdom and other Administrations, including all coordination agreements reached between the United Kingdom and the United States. (see e.g. UK telefax SSU 2000 dated 29 May 2009)



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## H) Special and General Provisions

A) This RADIO STATION AUTHORIZATION is granted subject to the following special provisions and general conditions:

- 90035 --- O3b Limited must maintain an electronic web site bulletin board listing the ephemeris data for each satellite in the O3b Limited NGSO constellation, using the North American Aerospace Defense Command (NORAD) two-line orbital element format. O3b Limited must update the orbital elements at least once every three days.
- 90036 --- O3b Limited's request for a waiver of the Ka-band Plan and the United States Table of Frequency Allocations, 47 C.F.R. § 2.106, IS GRANTED. Transmissions from the O3b Limited NGSO space stations to earth station call sign E100088 in the 17.8-18.6 GHz frequency band (space-to-Earth) must be on a non-conforming basis. Such non-conforming operations must accept any interference from any authorized non-Federal or Federal station in the 17.8-18.6 GHz frequency band. Further, such operations must not cause harmful interference to any authorized space station operating in compliance with the U.S. Table of Frequency Allocations and the Ka-band Plan, or to any authorized Federal FSS GSO or NGSO system. O3b must immediately terminate non-conforming operations upon notification of harmful interference. In addition, transmissions from O3b Limited NGSO space stations to earth station call sign E100088 in the 17.8-18.6 GHz frequency band are subject to the following conditions:
- Earth station call sign E100088 may not receive transmissions from O3b Limited NGSO space stations in the 17.8-18.6 GHz frequency band until O3b Limited has completed coordination of its NGSO FSS system with all Federal FSS systems in the 17.8-18.6 GHz frequency band pursuant to 47 C.F.R. § 2.106, Footnote US 334.
  - Operations in the 17.8-18.6 GHz frequency band must comply with the applicable equivalent power flux-density requirements in Articles 22.5C and 22.5F of the International Telecommunication Union Radio Regulations.
  - Operations in the 17.8-18.6 GHz frequency band are subject to any rules the Commission adopts governing NGSO FSS satellite operations in spectrum designated for GSO FSS primary use.
- 90037 --- Transmissions from O3b Limited NGSO space stations to earth station call sign E100088 in the 18.8-19.3 GHz frequency band (space-to-Earth) must comply with the power flux-density requirements of 47 C.F.R § 25.208(e) and Article 21 of the International Telecommunication Union Radio Regulations.
- 90038 --- Earth station call sign E100088 may not receive transmissions from O3b Limited NGSO space stations in the 18.8-19.3 GHz frequency band (space-to-Earth) until O3b Limited has completed coordination of its NGSO FSS system with all Federal FSS systems in the 18.8-19.3 GHz frequency band under 47 C.F.R. § 2.106, Footnote US 334.
- 90039 --- Transmissions from earth station call sign E100088 to O3b Limited NGSO space stations in the 27.6-28.4 GHz band (Earth-to-space) shall be on a secondary basis. Such secondary operations must not cause harmful interference to primary users. Further, O3b Limited cannot claim protection from harmful interference caused by primary users.
- 90040 --- Transmissions from earth station call sign E100088 to O3b Limited NGSO space stations in the 27.6-28.4 GHz frequency band must comply with the equivalent power flux-density requirements in Article 22.5D of the International Telecommunication Union Radio Regulations.
- 90041 --- O3b Limited IS GRANTED a waiver of Section 25.210(i)(1) of the Commission's rules, 47 C.F.R § 25.210(i)(1), with respect to the cross-polarization isolation requirements for the O3b Limited NGSO satellite system space station antennas.



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A) This RADIO STATION AUTHORIZATION is granted subject to the following special provisions and general conditions:

- 90042 --- O3b Limited's request for a waiver of Section 25.261 of the Commission's rules, 47 C.F.R § 25.261, IS DISMISSED as unnecessary. Section 25.261 contains procedures for avoiding in-line interference events, and provides that in cases where in-line interference events cannot be avoided and there is no coordination agreement between the affected operators, the bands will be divided among the affected satellite networks. O3b Limited states that in cases where it cannot avoid an in-line interference event and has not reached a coordination agreement with an affected operator, it will comply with the spectrum-dividing procedure in Section 25.261. Consequently, we find that the proposed operations between earth station call sign E100088 and O3b Limited NGSO space stations comply with Section 25.261 of the Commission's rules.
- 90043 --- O3b Limited is GRANTED waivers of Sections 25.137(c) and 25.157 of the Commission's rules, 47 C.F.R §§ 25.137(c) and 25.157, regarding modified processing round and band segmentation procedures. O3b Limited will employ satellite diversity at low to medium latitudes, which will enable it to share spectrum with other NGSO FSS systems. At higher latitudes, O3b Limited will employ a band segmentation approach to accommodate other systems if interference occurs. Given the opportunities for additional entrants to operate in O3b Limited's requested frequency bands, we authorize earth station call sign E100088 to transmit to and receive transmissions from the O3b Limited NGSO space stations throughout the requested frequencies. See, e.g., Northrop Grumman Space & Missions Systems Corp., DA 09-428, Order and Authorization, 24 FCC Rcd 2330, 2342 31-33 (Int'l Bur. 2009); Digital Globe, Inc., DA 05-2640, Order and Authorization, 20 FCC Rcd 15696, 15698-99 6-8 (Int'l Bur. 2005); Space Imaging, LLC, IB Docket No. 02-34, Declaratory Order and Order and Authorization, 20 FCC Rcd 11964, 11968 10 (Int'l Bur. 2005).
- 90044 --- Because this authorization is limited to a single earth station that is providing gateway and TT&C services only, O3b Limited IS GRANTED a waiver of Section 25.145(c) of the Commission's rules, 47 C.F.R § 25.145(c), with respect to the service coverage requirements for the O3b Limited NGSO satellite system. Grant of this waiver is without prejudice to action on any waiver request filed in connection with an application to provide additional services to, from, or within the United States.
- 90045 --- This grant is based upon a finding that O3B Limited is and will be subject to direct and effective regulation by the United Kingdom concerning orbital debris mitigation. Accordingly, O3B's request for waiver of Section 25.283(c) is unnecessary. This grant will become effective and remain effective only to the extent that launch and space operations are authorized by the United Kingdom Space Agency under the United Kingdom Outer Space Act. O3B Limited must file evidence in the public record of this proceeding demonstrating grant of any such authorizations within five business days of action by the United Kingdom Space Agency.



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90047 --- Based on the information provided, we find that O3b Limited has met the first three milestones for an NGSO satellite system (execute a non-contingent contract for construction, complete critical design review of the satellite system, and commence construction of the first satellite in the system). As a result, the bond is reduced to \$2 million, pursuant to Section 25.165 of the Commission's rules. Accordingly, authority for earth station call sign E100088 to transmit to and receive transmission from the O3b Limited NGSO space stations for the purpose of gateway and TT&C services will be null and void, with no further action on the Commission's part, if O3b Limited does not meet the following conditions:

A. File a bond with the Commission in the amount of \$2 million, pursuant to the procedures set forth in 47 C.F.R. § 25.165, within 30 days of this grant (October 25, 2012).

B. Launch and place the first satellite in the system into operation within one year of grant (September 25, 2013).

C. Bring all eight satellites into operation within three years, six month of grant (March 25, 2016).

90048 --- O3b Limited is afforded thirty days from date of this grant to decline this authorization as conditioned. Failure to respond within that period will constitute formal acceptance of the authorization as conditioned.



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**B) This RADIO STATION AUTHORIZATION is granted subject to the additional conditions specified below:**

This authorization is issued on the grantee's representation that the statements contained in the application are true and that the undertakings described will be carried out in good faith.

This authorization shall not be construed in any manner as a finding by the Commission on the question of marking or lighting of the antenna system should future conditions require. The grantee expressly agrees to install such marking or lighting as the Commission may require under the provisions of Section 303(q) of the Communications Act. 47 U.S.C. § 303(q).

Neither this authorization nor the right granted by this authorization shall be assigned or otherwise transferred to any person, firm, company or corporation without the written consent of the Commission. This authorization is subject to the right of use or control by the government of the United States conferred by Section 706 of the Communications Act. 47 U.S.C. § 706. Operation of this station is governed by Part 25 of the Commission's Rules. 47 C.F.R. Part 25.

This authorization shall not vest in the licensee any right to operate this station nor any right in the use of the designated frequencies beyond the term of this license, nor in any other manner than authorized herein.

This authorization is issued on the grantee's representation that the station is in compliance with environmental requirements set forth in Section 1.1307 of the Commission's Rules. 47 C.F.R. § 1.1307.

This authorization is issued on the grantee's representation that the station is in compliance with the Federal Aviation Administration (FAA) requirements as set forth in Section 17.4 of the Commission's Rules. 47 C.F.R. § 17.4.

The following condition applies when this authorization permits construction of or modifies the construction permit of a radio station.

This authorization shall be automatically forfeited if the station is not ready for operation by the required date of completion of construction unless an application for modification of authorization to request additional time to complete construction is filed by that date, together with a showing that failure to complete construction by the required date was due to factors not under control of the grantee.

**Licensees are required to pay annual regulatory fees related to this authorization. The requirement to collect annual regulatory fees from regulatees is contained in Public Law 103-66, "The Omnibus Budget Reconciliation Act of 1993." These regulatory fees, which are likely to change each fiscal year, are used to offset costs associated with the Commission's enforcement, public service, international and policy and rulemaking activities. The Commission issues a Report and Order each year, setting the new regulatory fee rates. Receive only earth stations are exempt from payment of regulatory fees.**