



UNITED STATES OF AMERICA
FEDERAL COMMUNICATIONS COMMISSION
RADIO STATION AUTHORIZATION

Name: Swarm Technologies, Inc.

Call Sign: E190859

Authorization Type: License

File Number: SES-LIC-20191022-01365

Non Common Carrier

Grant date: 01/13/2020

Expiration Date: 01/13/2035



Nature of Service: Mobile Satellite Service

Class of Station: Fixed Earth Stations

A) Site Location(s)

#	Site ID	Address	Latitude	Longitude	Elevation (Meters)	Special Provisions NAD (Refer to Section H)
1)	Wailuku HI Gateway	640 Luakalae Place Wailuku, Maui, HI 96793	20°54'1.9"N	156°30'16.6"W	74	83

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 January 13, 2020 (3 AM Eastern Standard Time) and ending January 13, 2035 (3 AM Eastern Standard Time). The required date of completion of construction and commencement of operation is January 13, 2021 (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)	148.2500-149.9500	V	7K80F1D	Tx	15.50	12.60	COLINEAR		FSK / data (non-voice)
2)	148.2500-148.5850	V	250KF1D	Tx	15.50	-2.50	COLINEAR		FSK / data (non-voice)
3)	137.8125-138.0000	V	125KF1D	Rx	0.00	0.00	COLINEAR		FSK / data (non-voice)
4)	137.0250-138.0000	V	7K80F1D	Rx	0.00	0.00	COLINEAR		FSK / data (non-voice)
5)	148.2500-149.9500	L	7K80F1D	Tx	10.00	7.10	QFH		FSK / data (non-voice)
6)	148.2500-148.5850	L	250KF1D	Tx	10.00	-8.00	QFH		FSK / data (non-voice)
7)	137.8125-138.0000	L	125KF1D	Rx	0.00	0.00	QFH		FSK / data (non-voice)
8)	137.0250-138.0000	L	7K80F1D	Rx	0.00	0.00	QFH		FSK / data (non-voice)
9)	148.2500-149.9500	V	7K80F1D	Tx	12.00	9.10	W1/2		FSK / data (non-voice)



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10)	148.2500-148.5850	V	250KF1D	Tx	12.00	-6.00	W1/2		FSK / data (non-voice)
11)	137.8125-138.0000	V	125KF1D	Rx	0.00	0.00	W1/2		FSK / data (non-voice)
12)	137.0250-138.0000	V	7K80F1D	Rx	0.00	0.00	W1/2		FSK / data (non-voice)
13)	148.2500-149.9500	V	7K80F1D	Tx	12.00	9.10	W1/4		FSK / data (non-voice)
14)	148.2500-148.5850	V	250KF1D	Tx	12.00	-6.00	W1/4		FSK / data (non-voice)
15)	137.8125-138.0000	V	125KF1D	Rx	0.00	0.00	W1/4		FSK / data (non-voice)
16)	137.0250-138.0000	V	7K80F1D	Rx	0.00	0.00	W1/4		FSK / data (non-voice)
17)	148.2500-149.9500	V	7K80F1D	Tx	21.00	18.10	YAGI		FSK / data (non-voice)
18)	148.2500-148.5850	V	250KF1D	Tx	21.00	3.00	YAGI		FSK / data (non-voice)
19)	137.8125-138.0000	V	125KF1D	Rx	0.00	0.00	YAGI		FSK / data (non-voice)
20)	137.0250-138.0000	V	7K80F1D	Rx	0.00	0.00	YAGI		FSK / data (non-voice)

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)	148.2500-149.9500	NGSO		05.0-05.0		000.0-000.0		-35.9	QFH
2)	137.0250-138.0000	NGSO		05.0-05.0		000.0-000.0		0	QFH
3)	148.2500-149.9500	NGSO		05.0-05.0		000.0-000.0		-39.9	W1/2
4)	137.0250-138.0000	NGSO		05.0-05.0		000.0-000.0		0	W1/2
5)	148.2500-149.9500	NGSO		05.0-05.0		000.0-000.0		-44.9	COLINEAR
6)	137.0250-138.0000	NGSO		05.0-05.0		000.0-000.0		0	COLINEAR
7)	148.2500-149.9500	NGSO		05.0-05.0		000.0-000.0		-47.9	YAGI
8)	137.0250-138.0000	NGSO		05.0-05.0		000.0-000.0		0	YAGI
9)	148.2500-149.9500	NGSO		05.0-05.0		000.0-000.0		-39.9	W1/4
10)	137.0250-138.0000	NGSO		05.0-05.0		000.0-000.0		0	W1/4



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D) Points of Communications

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

- 1) Wailuku HI Gateway to Swarm Constellation (S3041) satellites [300 to 500 km circular orbit @ 45°, 10° & 97° Inclination in 9 orbital planes]

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)
Wailuku HI Gateway	COLINEAR	1	3	Swarm	002	74	9 AGL/ 83 AMSL	
Max Gains(s): 5.5 dBi @ 0.1380 GHz 5.5 dBi @ 0.1483 GHz								
Maximum total input power at antenna flange (Watts) =					10.00			
Maximum aggregate output EIRP for all carriers (dBW) =					15.50			
Wailuku HI Gateway	QFH	1	1.6	Swarm	003	74	7.6 AGL/ 81.6 AMSL	
Max Gains(s): 0.0 dBi @ 0.1380 GHz 0.0 dBi @ 0.1483 GHz								
Maximum total input power at antenna flange (Watts) =					10.00			
Maximum aggregate output EIRP for all carriers (dBW) =					10.00			
Wailuku HI Gateway	W1/2	1	1.1	Swarm	001	74	7.1 AGL/ 81.1 AMSL	
Max Gains(s): 2.0 dBi @ 0.1380 GHz 2.0 dBi @ 0.1483 GHz								
Maximum total input power at antenna flange (Watts) =					10.00			
Maximum aggregate output EIRP for all carriers (dBW) =					12.00			
Wailuku HI Gateway	W1/4	1	0.55	Swarm	005	74	6.6 AGL/ 80.6 AMSL	
Max Gains(s): 2.0 dBi @ 0.1380 GHz 2.0 dBi @ 0.1483 GHz								
Maximum total input power at antenna flange (Watts) =					10.00			
Maximum aggregate output EIRP for all carriers (dBW) =					12.00			
Wailuku HI Gateway	YAGI	1	1.7	Swarm	004	74	7.7 AGL/ 81.7 AMSL	
Max Gains(s): 11.0 dBi @ 0.1380 GHz 11.0 dBi @ 0.1483 GHz								
Maximum total input power at antenna flange (Watts) =					10.00			
Maximum aggregate output EIRP for all carriers (dBW) =					21.00			



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F) Remote Control Point:

Wailuku HI 435 N Whisman Road Ste. 100
Gateway

Call Sign: E190610

Mountain View, Santa Clara, CA 94043
608-225-3173

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:

- 4 --- Licensee must ensure that a current listing of the name, title, mailing address, email address, and telephone number of the responsible point of contact are on file at the FCC. Any changes must be filed electronically in the International Bureau Filing System (MyIBFS) using the "Pleadings and Comments" link on the MyIBFS homepage within 10 days of the change.
- 6 --- Licensee must comply with the license modification and notification requirements of 47 CFR § 25.118 to change the coordinates of its authorized earth station.
- 8 --- Licensee must notify the Commission when all earth stations operating under this authorization are no longer operational or when they have not been used to provide any service during any 6-month operation.
- 90398 --- Changes to previously authorized transmitting facilities, operations and devices regulated by the Commission that may have significant environmental impact, and are not excluded by §1.1306, require the preparation of an Environmental Assessment (EA) by the licensee. (See 47 C.F.R. §§1.1307, 1.1308 and 1.1311)
- 90399 --- The licensee shall, at all times, take all necessary measures to ensure that operation of this (these) authorized earth station(s) 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. Physical 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) 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.
- 90550 --- Swarm Technologies, Inc. must comply with the terms and conditions of its space station authorization, IBFS File No. SAT-LOA-20181221-00094 (granted on Oct. 17, 2019) in operating the authorized user terminals.
- 90551 --- Swarm Technologies' earth stations are subject to the requirements of Footnote US323 of the U.S. Table of Frequency Allocations, 47 CFR § 2.106, Footnote US323.
- 90553 --- Frequencies were cleared by NTIA on 12-20-19.



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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.