



UNITED STATES OF AMERICA
FEDERAL COMMUNICATIONS COMMISSION

RADIO STATION AUTHORIZATION

Name: Spire Global, Inc.

Call Sign: E170150

Authorization Type: Modification of License

File Number: SES-MFS-20191111-01428

Non Common Carrier

Grant date: 08/11/2020

Expiration Date: 08/13/2033

Nature of Service: Earth Exploration Satellite Service

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)	DLHGS	3401 Technology Drive Duluth, MN 55811	46°49'39.4"N	92°7'49.8"W	420	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 August 13, 2018 (3 AM Eastern Standard Time) and ending August 13, 2033 (3 AM Eastern Standard Time). The required date of completion of construction and commencement of operation is August 11, 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)	2020.0000-2025.0000	R	5M00W1D	Rx	0.00	0.00	SBAND-1		Digital/Data Downlink
2)	449.7500-450.2500	R	15K0F1D	Tx	31.85	26.11	UHF-1		Digital/TT&C Uplink
3)	449.7500-450.2500	R	15K0F1D	Rx			UHF-1		Digital/Data Downlink and TT&C Downlink
4)	402.0000-403.0000	R	15K0F1D	Tx	29.95	24.21	UHF-2		Digital/TT&C Uplink
5)	402.0000-403.0000	R	15K0F1D	Rx			UHF-2		Digital/Data Downlink and TT&C Downlink



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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)	2020.0000-2025.0000	NGSO		10.0-10.0		000.0-360.0		0	SBAND-1
2)	449.7500-450.2500	NGSO		10.0-10.0		000.0-360.0		26.11	UHF-1
3)	402.0000-403.0000	NGSO		10.0-10.0		000.0-360.0		24.21	UHF-2

D) Points of Communications

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

- 1) DLHGS to LEMUR NGSO satellite system (S2946)
- 2) DLHGS to MINAS NGSO satellite system (S3045) in a 385 to 650 km orbit with inclinations from equatorial to polar sun-synchronous (98 degrees) (LUX -licensed)

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)
DLHGS	SBAND-1	1	1.2	ARA; Seavey	C1502;800	420	7.62 AGL/ 427.62 AMSL	
		Max Gains(s): 25.7 dBi @ 2.0225 GHz						
		Maximum total input power at antenna flange (Watts) =		.00				
		Maximum aggregate output EIRP for all carriers (dBW) =		.00				
DLHGS	UHF-1	1	2.46	TACO	H-105	420	7.62 AGL/ 427.62 AMSL	
		Max Gains(s): 13.4 dBi @ 0.4500 GHz						
		Maximum total input power at antenna flange (Watts) =		70.00				
		Maximum aggregate output EIRP for all carriers (dBW) =		31.85				
DLHGS	UHF-2	1	1.85	M2 ANTENNA SYSTEMS	401CP14	420	7.62 AGL/ 427.62 AMSL	
		Max Gains(s): 11.5 dBi @ 0.4025 GHz						
		Maximum total input power at antenna flange (Watts) =		70.00				
		Maximum aggregate output EIRP for all carriers (dBW) =		29.95				



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F) Remote Control Point:

DLHGS

1825 33RD STREET, SUITE 100

Call Sign: N/A

BOULDER, BOULDER, CO 80301

415-563-3400 X307

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.

90440 --- Earth station receive operations in the 2020 - 2025 MHz band are on a non-allocated and non-interference protected basis.

90556 --- Administrations are urged to take all practicable measures to ensure that space-to-space transmissions between two or more non-geostationary satellites, in the space research, space operations and Earth exploration-satellite services in the bands 2025-2110 MHz and 2200-2290 MHz, shall not impose any constraints on Earth-to-space, space-to-Earth and other space-to-space transmissions of those services and in those bands between geostationary and non-geostationary satellites. 5.392.



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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:

- 90558 --- Operations in the 2020-2025 MHz (space-to-Earth) frequency band are non-conforming with respect to the U.S. Table of Frequency allocations and are on an unprotected, non-interference basis. Operations in this band are taken at licensee's own risk.
- 900596 --- In the 2020-2025 MHz band, there is no allocation for satellite service in the space-to-Earth direction, both in the International Table of Frequency Allocations, and the U.S. Tables of Frequency Allocations. Operations in this band are on a non-interference basis under Article 4.4 of the ITU Radio Regulations, i.e., the operations cannot cause harmful interference and cannot claim protection from harmful interference. Operations must cease in the event of interference, and any resulting disruption in service is solely at the risk of the operator.
- 900597 --- Communications between U.S.-licensed earth stations and the MINAS space stations must comply with all existing and future space station coordination agreements reached between Luxembourg and other administrations, including U.S. Federal operators.
- 900598 --- Market access for MINAS satellites operating in the 2020-2025 MHz band is limited to the combined number of LEMUR and MINAS satellites, not greater than 72, that operate with U.S. earth stations.
- 900599 --- Spire's request for a waiver of the United States Table of Frequency Allocations, 47 CFR § 2.106, is GRANTED to permit operations in the 402-403 MHz (Earth-to-space and space-to-Earth) (TT&C and data back up only) and 2020-2025 MHz (space-to-Earth) frequency bands on a non-conforming, non-harmful interference basis. Spire must immediately terminate non-conforming operations upon notification of harmful interference.
- 900600 --- Operations in the 449.75-450.25 MHz band may be used for space telecommand (Earth-to-space) at specific locations, subject to conditions as may be applied on a case-by-case basis, pursuant to US87 of the Table of Frequency Allocations, 47 CFR § 2.106. As of the date of this grant, Spire has earth station authorizations for operations with the LEMUR constellation in the 449.75-450.25 MHz band at three locations in the United States (Charlotte, NC, Call Sign E170171, Duluth, MN, Call Sign E170150, and Naalehu, HI, Call Sign E160037). Operations of MINAS satellites with these earth stations must not occur until Spire seeks and obtains modifications to the earth station licenses to specify the MINAS constellation (S3045) as a point of communication. Spire must take all practical steps to keep the carrier frequency between 450.15 and 450.25 MHz.
- 900601 --- Spire and DOC/NOAA shall work jointly to explore mitigation strategies to avoid interference to NOAA missions in the band 402-403 MHz. As of the date of this grant, Spire has earth station authorizations for operations with the LEMUR constellation in the 402-403 MHz band at the locations listed in Appendix A to this grant and outside the United States. Spire shall coordinate new earth station locations in the U.S. territory operating in 402-403 MHz with DOC/NOAA by providing the location of such stations for DOC/NOAA's review for interference concerns and approval prior to operation of those ground stations.
- 900602 --- Spire must maintain a U.S. point of contact available by telephone 24 hours per day, seven days per week, with the authority and ability to terminate operations that are the subject of this market access grant. The telephone number for this U.S. point of contact must be provided to NTIA (bmitchell@ntia.doc.gov) and DOC/NOAA (dfranc@doc.gov).
- 900603 --- The maximum bandwidth of any transmission in the 402-403 MHz frequency band involving earth stations within the United States is limited to 15 kHz, and all such transmissions in these frequencies shall be within a 200 kHz frequency band centered on 402.7 MHz, i.e. within the 402.6-402.8 MHz frequency band, unless otherwise agreed in a Memorandum of Agreement with DOC/NOAA.



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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:

900604 --- Satellite operations pursuant to this grant of market access must not cause harmful interference to stations operating in the 2025-2110 MHz band in accordance with the United States Table of Frequency Allocations. See 47 CFR § 2.106, Footnote US347.

900605 --- This grant of market access will become null and void if, at any time, there are no MINAS satellites operating.



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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.