



UNITED STATES OF AMERICA
FEDERAL COMMUNICATIONS COMMISSION
RADIO STATION AUTHORIZATION

SpaceX Services, Inc.

Call Sign: E210127

Authorization Type: License

File Number: SES-LIC-20210708-01019

Non Common Carrier

Grant date: 11/10/2021

Expiration Date: 11/10/2036

Nature of Service: Fixed 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)	SpaceX UT2 Blanket	CONTIGUOUS US AK, HI, PR, USVI			0	NA

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 November 10, 2021 (3 AM Eastern Standard Time) and ending November 10, 2036 (3 AM Eastern Standard Time) . The required date of completion of construction and commencement of operation is November 10, 2022 (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)	14000.0000-14500.0000	L	60MD7W	Tx	38.20	-3.50	UT-2		BPSK up to 64QAM; Digital Data
2)	10700.0000-12700.0000	R	240MD7W	Rx	0.00	0.00	UT-2		BPSK up to 64QAM; Digital Data

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)	10700.0000-12700.0000	NGSO		25.0-25.0		360.0-360.0		0	UT-2
2)	14000.0000-14500.0000	NGSO		25.0-25.0		360.0-360.0		-37.3	UT-2



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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) SpaceX UT2 Blanket to SPACEX (2983/S3018) Non-Geo (U.S.-licensed satellite) [550 x 550km @ 53° & 53.8° Inclination, 32 planes per inclination & @ 74° Inclination, 18 planes inclination

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)
SpaceX UT2 Blanket	UT-2	0	0.42	SpaceX	UTA 205/206/207 0		0 AGL/ 0 AMSL	
Max Gains(s): 34.6 dBi @ 14.2500 GHz 33.2 dBi @ 11.8300 GHz								
Maximum total input power at antenna flange (Watts) =						2.44		
Maximum aggregate output EIRP for all carriers (dBW) =						38.20		

F) Remote Control Point:

SpaceX UT2 22908 NE Alder Crest Drive
Blanket

Call Sign: REDMOND

Redmond, King, WA 98053
3103636000

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.

9996 --- Under 47 C.F.R. § 25.146(a), SpaceX must receive a favorable or qualified favorable finding in accordance with Resolution 85 (WRC-03) with respect to its compliance with applicable equivalent power flux-density limits in Article 22 of the ITU Radio Regulations and, in case of an unfavorable finding, adjust its operation to satisfy the ITU requirements. Any operation of SpaceX's system prior to the ITU's finding are at SpaceX's own risk.



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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:

9997 --- Operations:

(a) In the band 14-14.2 GHz, operations within radio line-of-sight of the NASA Tracking and Data Relay Satellite System (TDRSS) earth stations are subject to prior coordination with NTIA in order to minimize harmful interference.

(b) In the band 14.47-14.5 GHz, operations within radio line-of-sight of the National Science Foundation radio astronomy stations are subject to coordination with NTIA in order to minimize harmful interference.

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.

90559 --- 14.47-14.5 GHz* is ALLOCATED (*INDICATES RADIO ASTRONOMY USE FOR SPECTRAL LINE OBSERVATIONS), ALL PRACTICABLE STEPS SHALL BE TAKEN TO PROTECT THE RADIO ASTRONOMY SERVICE FROM HARMFUL INTERFERENCE. EMISSIONS FROM SPACEBORNE OR AIRBORNE STATIONS CAN BE PARTICULARLY SERIOUS SOURCES OF INTERFERENCE TO THE RADIO ASTRONOMY SERVICE (SEE ITU RADIO REGULATIONS AT NOS. 4.5 AND 4.6 AND ARTICLE 29). US342

90560 --- Operations in the 10.7-11.7 GHz (space-to-Earth) frequency band are authorized up to the applicable power flux-density limits in 47 CFR § 25.208(b), and up to the equivalent power flux-density requirements of Article 22 of the ITU Radio Regulations, as well as Resolution 76 (Rev. WRC-15) of the ITU Radio Regulations.

90561 --- In the 10.7-11.7 GHz band, operations must be coordinated with the radio astronomy observatories listed in 47 CFR § 2.106, n.US131, to achieve a mutually acceptable agreement regarding the protection of the radio telescope facilities operating in the 10.6-10.7 GHz band For the purposes of coordination with these listed facilities or the National Radio Quiet Zone, correspondence should be directed to the National Science Foundation Spectrum Management Unit (Email: esm@nsf.gov).

90562 --- Operations in the 11.7-12.2 GHz (space-to-Earth) frequency band are authorized up to the power flux-density limits in Article 21 of the ITU Radio Regulations, and up to the equivalent power flux-density requirements of Article 22 of the ITU Radio Regulations, as well as Resolution 76 (Rev. WRC-15) of the ITU Radio Regulations.

90563 --- Operations in the 12.2-12.7 GHz (space-to-Earth) frequency band are authorized up to the power flux-density limits in 47 CFR § 25.208(o) and Article 21 of the ITU Radio Regulations, and up to the equivalent power flux-density requirements of Article 22 of the ITU Radio Regulations, as well as Resolution 76 (Rev. WRC-15) of the ITU Radio Regulations.



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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:

- 90564 --- SpaceX must cooperate with other NGSO FSS operators in order to ensure that all authorized operations jointly comport with the applicable limits for aggregate equivalent power flux density in the space-to-Earth direction (EPFD down) contained in Article 22 of the ITU Radio Regulations, as well as Resolution 76 (WRC-03) of the ITU Radio Regulations.
- 90674 --- Operations must be consistent with the input parameters, including duty cycle and power levels, represented in Revised Table One of SpaceX's Radiation Hazard Study.
- 90675 --- SpaceX must cooperate with other NGSO FSS operators in order to ensure that all authorized operations jointly comport with the applicable limits for aggregate equivalent power flux density in the space-to-Earth direction (EPFD down) contained in Article 22 of the ITU Radio Regulations, as well as Resolution 76 (WRC-03) of the ITU Radio Regulations.
- 90676 --- Operations are subject to the condition that SpaceX not use more than one satellite beam from any of its satellites in the same frequency in the same or overlapping areas at a time.
- 90677 --- SpaceX must make available to any requesting party the data used as input to the ITU-approved validation software to demonstrate compliance with applicable Equivalent Power Flux Density (EPFD) limits.
- 90678 --- SpaceX must accept any additional interference resulting from this modification compared to its current authorization, from licensees or market access grantees authorized in the Commission's NGSO 2016 Processing Round. SpaceX must also accept any additional interference into its Ka-band uplink resulting from this modification compared to its current authorization, from the Kuiper Systems, LLC NGSO system as authorized in July 2020. For this purpose, the allowable level of uplink interference from Kuiper into SpaceX shall be established by a showing submitted by Kuiper and accepted by the Commission that its operations would not have caused harmful interference to SpaceX's NGSO system at the altitudes where SpaceX would have operated prior to this modification.
- 90680 --- This authorization is for multiple units and does not include a limitation on the number of units, consistent with Section 25.118(b)(2) of the Commission's rules. The listing of zero in the units column of Section E, Antenna Facilities, is due to programming limitations in the FCC filing system.



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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 does not meet each required construction deadline by the required date of completion unless, before such date(s), a specific application is timely filed to request an extension of the construction deadline(s), supported with good cause why that failure to construct 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.