

**United States of America
FEDERAL COMMUNICATIONS COMMISSION
EXPERIMENTAL
RADIO STATION CONSTRUCTION PERMIT
AND LICENSE**

EXPERIMENTAL
(Nature of Service)

WK2XLK
(Call Sign)

XT MO
(Class of Station)

0517-EX-CN-2019
(File Number)

NAME Space Exploration Holdings, LLC

Subject to the provisions of the Communications Act of 1934, subsequent acts, and treaties, and all regulations heretofore or hereafter made by this Commission, and further subject to the conditions and requirements set forth in this license, the licensee hereof is hereby authorized to use and operate the radio transmitting facilities hereinafter described for radio communications in accordance with the program of experimentation described by the licensee in its application for license.

Operation: In accordance with Sec. 5.3(j) of the Commission's Rules

Station Locations

- (1) MOBILE: United States (nationwide)
- (2) MOBILE: Washington State
- (3) MOBILE: United States (nationwide)

Frequency Information

MOBILE: United States (nationwide)

Frequency	Station Class	Emission Designator	Authorized Power	Frequency Tolerance (+/-)
14000-14500 MHz	MO	62M5D7W	4.06 W (Output Power)	0.001 %

MOBILE: Washington State

Frequency	Station Class	Emission Designator	Authorized Power	Frequency Tolerance (+/-)
14000-14500 MHz	MO	62M5D7W	4.06 W (Output Power)	0.001 %

This authorization effective August 27, 2019 and will expire 3:00 A.M. EST September 01, 2020

**FEDERAL
COMMUNICATIONS
COMMISSION**



Frequency Information

MOBILE: United States (nationwide)

Frequency	Station Class	Emission Designator	Authorized Power	Frequency Tolerance (+/-)
14000-14500 MHz	MO	62M5D7W	0.65 W (Output Power)	0.001 %

Special Conditions:

- (1) The station identification requirements of Section 5.115 of the Commission's Rules are waived.
- (2) 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.
- (3) The designated point-of-contact to terminate transmissions if interference occurs is Kristi Key
Phone Number: 3109708116
E-Mail Address: kristina.key@spacex.com
- (4) POINT OF COMMUNICATION: Space Exploration Technologies Corp. ("SpaceX")'s Ku-band non-geostationary-orbit (NGSO) satellites.
- (5) Licensee is authorized to operate 70 user terminals (0.48m phased array SpaceX antenna and 1m parabolic SpaceX antenna) throughout the United States and up to 200 user terminals (0.48m phased array SpaceX antenna) located within the state of Washington.

Special Conditions:

(6) The 0.48m and 1m SpaceX stations are authorized to conduct tests using the 14.0-14.5 GHz frequency band. The operations are subject to the following conditions:

a. Operations in the 14.0-14.5 GHz frequency band must be in compliance with the equivalent power flux-density limit (-160 dBW/m²/40 kHz) of 47 CFR § 25.208(k) and Article 22.5D of the ITU Radio Regulations.

b. The authorized stations must not transmit signals until SpaceX's NGSO satellites in view on the horizon above a minimum elevation angle of 25 degrees. Operations in the 14.0-14.5 GHz frequency band must be in compliance with the following:

Frequency	Emission Designator	Maximum Authorized Power	Maximum EIRP
14.0-14.5 GHz	62M5D7W	1540 W (ERP)	34 dBW
Maximum EIRP density -7.95 dBW/4kHz			

For 0.48m antenna with antenna gain of 30.6 dBi, the maximum transmit power at antenna flange at maximum slant must not exceed 2.19 W.

For 1.0m antenna with antenna gain of 40.1 dBi, the maximum transmit power at antenna flange at maximum slant must not exceed 0.246 W.

c. The stations are authorized, on a non-protected and non-harmful interference basis, to transmit to the non-geostationary-orbit space stations using the 14.0-14.5 GHz frequency band that are authorized by the Commission. 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.

d. Operations granted in this license are limited by existing and future coordination agreements between the SpaceX's NGSO satellites and other satellite operators.

e. In the 14.47-14.5 GHz band, operations are subject to footnote US342 to the U.S. Table of Frequency Allocations, 47 CFR § 2.106, and all practicable steps must be taken to protect the radio astronomy service from harmful interference.

f. The licensee shall not operate in the band 14.0-14.2 GHz within 125 km of the NASA TDRSS facilities on: Guam(latitude 13°36'55" N, longitude 144°51'22" E); White Sands, New Mexico (latitude 32°20'59" N, longitude 106°36'31" W and latitude 32°32'40" N, longitude 106°36'48" W); Blossom Point, Maryland (latitude 38° 25' 44" N.L. longitude 77° 05' 02" W.L.) unless and until it enters into an agreement with NASA that NTIA has approved. The licensee must conform its operations to the terms of any coordination agreement with NASA.

g. The licensee shall not operate in the band 14.47-14.50 GHz within (a) 45 km of the radio observatory on St. Croix, Virgin Islands (located at latitude 17°46' N, longitude 64°35' W); (b) 125 km of the radio observatory on Mauna Kea, Hawaii

Special (located at latitude 19°48 N, longitude 155°28 W); and (c) 90 km of the Arecibo Observatory on Puerto Rico (located at latitude 18°20'46 W, longitude 66°45'11 N) unless and until the licensee enters into an agreement with the National Science Foundation that has been approved by NTIA. The licensee must conform its operations to the terms of any coordination agreement with the National Science Foundation.

h. The licensee shall not operate in the vicinity of radio observatories of Radio Astronomy Service (RAS) in the band 14.47-14.50 GHz unless and until the licensee enters into an agreement with the National Science Foundation that has been approved by NTIA. The licensee must conform its operations to the terms of any coordination agreement with the National Science Foundation. The appropriate NSF contact point to initiate coordination is Electromagnetic Spectrum Manager, NSF, 4201 Wilson Blvd., Suite 1045, Arlington, VA 22203, fax 703-292-9034, e-mail esm@nsf.gov. See also a list of each applicable RAS site, its location, and the applicable coordination zone on Table-1: Applicable RAS Facilities and Associated Coordination Distances, 47 C.F.R. 25.226(d)(2).