

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

EXPERIMENTAL
(Nature of Service)

WK9XHU
(Call Sign)

XT FX MO
(Class of Station)

0099-EX-TC-2018
(File Number)

NAME The Boeing Company

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.

Station Locations

- (1) MOBILE: Low Earth Orbit
- (2) Naalehu (HAWAII), HI - NL 19-00-50; WL 155-39-47

Frequency Information

MOBILE: Low Earth Orbit

Frequency	Station Class	Emission Designator	Authorized Power	Frequency Tolerance (+/-)
2249.43-2250.93 MHz	MO	1M50G1D	3.3 W (ERP)	0.0001 %

Naalehu (HAWAII), HI - NL 19-00-50; WL 155-39-47

Frequency	Station Class	Emission Designator	Authorized Power	Frequency Tolerance (+/-)
2071.991-2072.031 MHz	FX	40K0G1D	96.6 kW (ERP)	

Special Conditions:

- (1) In lieu of frequency tolerance, the occupied bandwidth of the emission shall not extend beyond the band limits set forth above.

This authorization effective September 05, 2018 and
will expire 3:00 A.M. EST November 16, 2018

**FEDERAL
COMMUNICATIONS
COMMISSION**



Special Conditions:

- (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) Operations are granted on an experimental, unprotected, and non-interference basis to authorized federal users.
- (4) Prior to operation in 2071.991-2072.031 MHz band, licensee must successfully coordinate with the local Society of Broadcast Engineer Inc.
- (5) Following launch of the satellite, the licensee must notify the FCC through electronic submission to the license file, of the status of the satellite (transmissions commenced, etc.), not later than 7 days after commencement or expected commencement of transmissions, and of termination of transmissions, not later than three months after such termination.
- (6) Upon receipt of a conjunction warning from the JSpOC or other source, the licensee must review the warning and take all possible steps to assess and, if necessary, to mitigate collision risk, including, but not limited to: contacting the operator of any active spacecraft involved in such warning; sharing ephemeris data and other appropriate operational information with any such operator; modifying spacecraft attitude and/or operations.
- (7) POINT OF COMMUNICATION: ALTAIR CubeSat.
- (8) Millennium Space Systems should be aware that the band 2200-2290 MHz is allocated for federal satellite and fixed line-sight operations.
- (9) No uplink transmission to the ALTAIR CubeSat shall occur when NASA International Space Station (ISS) (NORAD designation 25544 or international spacecraft ID 1998-067A) is within horizon-to-horizon view of that ground station nor during ISS mission critical periods without explicit clearance consent from the NASA Johnson Space Center (JSC) Spectrum Manager, Cathy Sham (catherine.c.sham@nasa.gov), or NASA JSC Deputy Spectrum Manager, Alan Chu (alan.h.chu@nasa.gov). This condition is applicable to ALTAIR support ground stations in Hawaii (19-00-50N, 155-39-47W), Western Australia (29-03S, 114-54E) (29.08S, 115.35E), Santiago, Chile (33-08S, 70-40W), and any future uplink ground station.
- (10) Uplink transmission in the 2071.991 – 2072.031 MHz frequency band is restricted to no greater than 96.6KW ERP (52 dBW EIRP).
- (11) At least 14 days prior to desired communications operation, planned uplink schedule dates and times, scheduled transmission power out of the antenna (EIRP), and uplink transmission cessation times required to comply with the previous condition shall be provided to the NASA JSC Spectrum Manager, Cathy Sham (catherine.c.sham@nasa.gov), and NASA JSC Deputy Spectrum Manager, Alan Chu (alan.h.chu@nasa.gov), for review and approval.
- (12) Millennium Space Systems, Inc. is solely responsible for ensuring the operators of the Hawaii, Santiago, Chile, Western Australia, and any other ground stations transmitting to ALTAIR comply with the required uplink transmission cessation times and uplink transmission ERP restriction, and assumes full liability for any adverse impacts to federal system resulting from non-compliant operations.

Special Conditions:

- (13) Prior to operation of ALTAIR under this license, Stop Buzzer POC for Hawaii, Santiago, Chile, Western Australia, and any other ground stations transmitting to ALTIAR shall be provided to the NASA JSC Spectrum Manager, Cathy Sham (catherine.c.sham@nasa.gov), and NASA JSC Deputy Spectrum Manager, Alan Chu (alan.h.chu@nasa.gov). This phone shall be manned at all times during ground station uplink operations.

- (14) Millennium Space Systems, Inc. must coordinate with the Naval Surface Warfare Center, Dahlgren Division (NSWCDD), Mr. James Moneyhon, (540) 653-3477, or james.moneyhon@navy.mil, prior to any operations, to mitigate harmful interference to Navy and Marine Corps operations. The spacecraft provider must also comply with any and all restrictions that may be levied by the Naval Surface Warfare Center, Dahlgren Division (NSWCDD).