

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

EXPERIMENTAL

(Nature of Service)

XT MO

(Class of Station)

WH9XRI

(Call Sign)

0020-EX-TC-2015

(File Number)

NAME Orbital Sciences Corporation

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: Spacecraft-350km altitude-51.6 degrees inclination

Frequency Information

MOBILE: Spacecraft-350km altitude-51.6 degrees inclination

Frequency	Station Class	Emission Designator	Authorized Power	Frequency Tolerance (+/-)
2202.9-2207.1 MHz	MO	4M20G1D	0.98 W (ERP)	0.00045 %
2216 MHz	MO	16K0G1D 32K0G1D 3M00G1D 6M00G1D	2.2 W (ERP)	0.00003 %
2287.5 MHz	MO	6M16G1D	4.54 W (ERP)	0.00003 %

This authorization effective February 03, 2015 and
will expire 3:00 A.M. EST March 16, 2015

**FEDERAL
COMMUNICATIONS
COMMISSION**



Frequency Information

MOBILE: Spacecraft-350km altitude-51.6 degrees inclination

Frequency	Station Class	Emission Designator	Authorized Power	Frequency Tolerance (+/-)
2287.5 MHz	MO	4M98G1D	4.54 W (ERP)	0.00003 %
2287.5 MHz	MO	3M00G1D	4.54 W (ERP)	0.00003 %
2287.5 MHz	MO	32K0G1D	4.54 W (ERP)	0.00003 %
2287.5 MHz	MO	16K0G1D	4.54 W (ERP)	0.00003 %

Special Conditions:

- (1) All Orbital Sciences operations are granted on an experimental basis and shall be conducted on an unprotected, non-interference basis to authorized federal stations.
- (2) Cygnus 2287.5 MHz transmission (to the TDRS or direct to a supporting ground station) is not permitted when in view of the following deep space earth stations: Goldstone Deep Space Communications Complex (GDSCC), Madrid DSCC, Canberra DSCC and New Norcia Station, from horizon to horizon.
- (3) Use of this STA is limited to this single mission, launch of the mission of Orbital Sciences Cygnus cargo vehicle to the International Space Station (ISS). This STA is limited to a single Cygnus scheduled no earlier than September 15, 2014 and ending no later than March 15, 2015. This STA will expire as soon as this Cygnus mission (Orb-3) is completed, typically 8 hours after separation from the ISS as the Cygnus spacecraft burns up during its reentry to the Earth's atmosphere. The Cygnus spacecraft is not reusable and does not return to the Earth for retrieval. Any future launches will need to submit applications to the FCC to be re-coordinated with NTIA.
- (4) Orbital Sciences shall be aware that future non-federal launches will be considered on a case-by-case basis, especially for requests in the band 2200-2290 MHz, and Orbital Sciences shall have no expectations that future non-federal launches will be approved.
- (5) Orbital Sciences shall coordinate and schedule their launch operations at least 48 hours prior to planned operation with Jimmy.Nguyen@us.af.mil (301-225-3729), Philip.L.Whaley@noaa.gov (757-824-7331), vincent.s.galbraith@nasa.gov (301-286-5089) and catherine.c.sham@nasa.gov (281-222-1117).
- (6) During prelaunch/launch operations at Wallops Flight Facility, Orbital Sciences shall coordinate and schedule their operations through NASA POC's as specified in NASA/OSC service agreements and copy WFF Spectrum Manager, Felipe Arroyo, felipe.arroyo-1@nasa.gov, 757-824-1623.

Special Conditions:

- (7) For on-orbit operation, a communications plan for 2287.5 MHz to inhibit transmissions when in view of the deep space stations, specified under condition #2, shall be provided, at least 10 days prior to launch and updated 2 hours after orbit insertion to /
vincent.s.galbraith@nasa.gov(301-286-5089)farzin.manshadi-1@nasa.gov
(818-354-0068), rdrummond@gdsc.nasa.gov (760-255-8218) and
catherine.c.sham@nasa.gov (281-222-1117). Updates to this communications plan shall be provided at least 72 hours before a planned flight trajectory deviation from the post orbit insertion plan.
- (8) The U.S. Navy has identified a potential conflict for the use of 2287.5 MHz over the Pacific region. To prevent interference to the Navy systems, possible blackout zones may need to be incorporated during Orbital Sciences Corporation's operation. Be advised that coordination with the Naval Surface Warfare Center, Dahlgren Division (NSWCDD), Mr. James Moneyhon (540)653-3477, or james.moneyhon@navy.mil a minimum of 30-days prior to any operations is required to mitigate harmful interference to Navy and Marine Corps operations. Orbital Sciences must also comply with any and all restrictions that may be levied by the Naval Surface Warfare Center, Dahlgren Division (NSWCDD).
- (9) The STOP BUZZER POC information, both for ground testing and for launch/on-orbit/reentry operations, is:
Operations Director (OD) Phone numbers: 703-948 -2029, 703-948 -2031 (alternate #1), 703-948-2032 (alternate #2).
Email: missiondirector@orbital.com. This phone shall be manned by the staff communications coordinator 24/7.
- (10) When docked to the ISS, the operations plan for Cygnus following operations shall be provide to NASA/JSC Spectrum Manager, Catherine Sham, catherine.c.sham@nasa.gov, 281-222-1117
- (11) All transmissions in the band 2200-2290 MHz will comply with national and international power flux-density limits.
- (12) Operations of the Cygnus Orb-3 GHz space-to-Earth transmission are limited to transmission when a fixed ground station is within line of sight of the spacecraft.
- (13) Orbital Sciences shall keep a log of all transmissions in the band 2200-2290 MHz that would be provided to NTIA after the mission. This log should include at least date, time, frequency, eirp density, and pointing direction of the antenna. The log should be provided to the following people at NTIA: Bmitchell@ntia.doc.gov and edrocella@ntia.doc.gov.
- (14) As soon as possible, but no later than ten days prior to the planned launch, Orbital Sciences is required to provide Mr. Jimmy Nguyen (jimmy.nguyen@us.af.mil, (301-225- 3729), Air Force Spectrum Management Office (AFSMO), Scott Galbraith (vincent.s.galbraith@nasa.gov, 301-286-5089, NASA GSFC SMO), Catherine Sham (catherine.c.sham@nasa.gov, NASA JSC SMO), the NOAA Satellite Operations Control Center (SOCC) Shift Supervisor (301) 817-4198, Johnnie Best (johnnie.w.best1@navy.mil, NMSC) with the planned launch date/time/window/duration. In the event of last minute changes, 72 hour notice is requested.
- (15) This license issued 8/26/14 supersedes previous granted license.