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

EXPERIMENTAL	WP9XVV
(Nature of Service)	(Call Sign)
XT MO	0039-EX-TC-2020
(Class of Station)	(File Number)

NAME Orbital Sciences 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.

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 (+/-)
2203.2 MHz	MO	5M93G1D	8.71 W (ERP)	0.00008 %
2287.5 MHz	MO	6M16G1D	5.82 W (ERP)	0.00018 %
2287.5 MHz	MO	4M98G1D 6M16G1D 3M00G1D	3.67 W (ERP)	0.00018 %

This authorization effective February 06, 2020 and
will expire 3:00 A.M. EST July 08, 2020

FEDERAL COMMUNICATIONS COMMISSION

Special Conditions:

(1) This STA is limited to a single Cygnus capsule telemetry, tracking, and command operations for the upcoming Northrop Grumman 13 (NG-13) mission to the International Space Station (ISS). This STA will expire at Cygnus separation from the ISS + two weeks or 7 July 2020, whichever occurs first. Any future missions or long-term on-orbit operations that do not directly support NASA contractual obligations shall submit new applications to the FCC to be re-coordinated with the NTIA.

(2) Orbital Sciences Corporation shall be aware that future requests for Cygnus downlink operations using a frequency of 2287.5 MHz will be considered on a case-by-case basis, and Orbital Sciences Corporation shall have no expectations such requests will be approved. Notification of all scheduled downlink operations shall be provided to the NASA GSFC Spectrum office (NASA-DL-GSFC-Spectrum-Management@nasa.gov), at least 3 days in advance of operation.

(3) All transmissions in the band 2200-2290 MHz shall comply with national and international power flux density limits (PFD), except in cases where expected exceedance are pre-coordinated and agreed. PFD analysis and exceedances shall be included in the FCC STA application and provided in the request to the NTIA for US Government review and assessment.

(4) Due to potential harmful interference to naval activities, Orbital Sciences Corporation operations plan shall be submitted, at least 60 days prior to planned launch date, to the Naval Surface Warfare Center, Dahlgren Division (NSWCDD), Mr. James Moneyhon (540)653-3477, or james.moneyhon@navy.mil, for assessment. Four blackout zones (BOZs) shall be assumed as follows: (1) 1500 nautical mile radius centered at 22N160W; (2) 1500 nautical mile radius centered at 33.25N119.57W; (3) 1500 nautical mile radius centered at 4.11N175.2W; and (4) 1500 nautical mile radius centered at 57.46N152.38W., shall be assumed, unless otherwise coordinated with, and agreed to, by the NSWCDD. Orbital Sciences Corporation must comply with any and all restrictions that may be levied by the NSWCDD. Coordination of the Orbital Sciences Corporation operations schedule and timeline, and any and all restrictions that may be levied by the NSWCDD, including imposition and implementation of a BOZ, shall be coordinated through Cathy Sham (catherine.c.sham@nasa.gov, NASA JSC SMO).

Special Conditions:

(5) As soon as possible, but no later than 60 business days prior to the planned launch, Orbital Sciences Corporation is required to provide, as a minimum, launch date/time/window and planned Cygnus trajectory from launch to capture by the International Space Station (ISS), and transmission frequencies with associated duration/cut-off time to Jimmy Nguyen (jimmy.nguyen@us.af.mil, AFSMO), Felipe Arroyo (felipe.arroyo-1@nasa.gov, NASA WFF SMO), the NASA/GSFC Spectrum office (NASA-DL-GSFC-Spectrum-Management@nasa.gov), Stephen Horan (stephen.j.horan@nasa.gov, NASA LaRC SMO), NOAA Satellite Operations Control Center (philip.l.whaley@noaa.gov), Richard Ontiveros, (richard.ontiveros1@navy.mil, NMSC), and Cathy Sham (catherine.c.sham@nasa.gov, NASA JSC SMO). In the event of last-minute changes, 48-hour notice is required.

(6) Cygnus direct-to-ground transmission using a frequency of 2287.5 MHz and emission designators of 3M00G1D or 4M98G1D is not permitted when in view of the following deep space earth stations: Goldstone Deep Space Communications Complex (GDSCC), Madrid Deep Space Communications Complex (MDSCC), Canberra Deep Space Communications Complex (CDSCC), and New Norcia Station, from horizon to horizon.

(7) Cygnus operations employing 2203.2 MHz shall only be used for proximity operations with the NASA International Space Station (ISS). Any other operation employing this frequency is expressly prohibited.

(8) Cygnus to TDRS return link transmission using frequency of 2287.5 MHz, an emission designator of 6M16G1D, and an ERP of 6.04 watts is not permitted when in view of the following deep space earth stations: Goldstone Deep Space Communications Complex (GDSCC), Madrid Deep Space Communications Complex (MDSCC), Canberra Deep Space Communications Complex (CDSCC), and New Norcia Station, from horizon to horizon. Coordination requests for clearance to transmit shall be provided to Cathy Sham (catherine.c.sham@nasa.gov, NASA JSC SMO) at least 7 business days prior to communication system activation.

(9) At least 7 business days prior to launch, and updated 2 hours after orbit insertion, Orbital Sciences Corporation shall provide a communications plan which precludes use of the Cygnus direct-to-ground transmission using a frequency of 2287.5 MHz and emission designators of 3M00G1D or 4M98G1D when in view of the deep space stations, as specified, to Farzin Manshadi (Farzin.manshadi-1@nasa.gov, NASA JPL SMO), Cathy Sham (catherine.c.sham@nasa.gov, NASA JSC SMO), and Jimmy Nguyen (jimmy.nguyen@us.af.mil, AFSMO). Updates to this communications plan shall be provided every 5 days for the duration of this grant, in order to support radio frequency interference mitigation.

Special Conditions:

(10) During Cygnus on-orbit mission phase (after lift-off/ascent, free flight, or attached to the International Space Station), Orbital Sciences Corporation shall provide the radio frequency operation plan to Cathy Sham (catherine.c.sham@nasa.gov, NASA JSC SMO) for coordination with authorized users at least 7 business days prior to any planned transmission operation.

(11) For Cygnus departure/re-entry operations, including pre-departure checkout, requests for coordination shall be provided to Cathy Sham (catherine.c.sham@nasa.gov, NASA JSC SMO) for coordination with authorized users at least 14 business days prior to communications activation related to pre-departure checkout, departure preparation, or departure operation. Requests for coordination shall include, at a minimum, planned communication timelines with start/end time, receiving station location, transmit/receive parameters/power/bandwidth, and spacecraft trajectory/orbital locations.

(12) The STOP BUZZER POC information for all operations shall be provided to NTIA (bmitchell@ntia.doc.gov). This phone shall be manned 24/7.

(13) Orbital Sciences Corporation shall keep a log of all space-to-earth transmissions in the frequency 2287.5 MHz, and this log shall be provided no later than three (3) weeks after completion of the mission to NASA GSFC Spectrum office (NASA-DL-GSFC-Spectrum-Management@nasa.gov). This log shall include, at a minimum, the date, time, frequency, emission, e.i.r.p density, pointing direction of the antenna(s).