

**United States of America
FEDERAL COMMUNICATIONS COMMISSION
EXPERIMENTAL
SPECIAL TEMPORARY AUTHORIZATION**

EXPERIMENTAL

(Nature of Service)

WN9XYY

(Call Sign)

XT FX MO

(Class of Station)

1470-EX-ST-2019

(File Number)

NAME The Boeing Company

This Special Temporary Authorization is granted upon the express condition that it may be terminated by the Commission at any time without advance notice or hearing if in its discretion the need for such action arises. Nothing contained herein shall be construed as a finding by the Commission that the authority herein granted is or will be in the public interest beyond the express terms hereof.

This Special Temporary Authorization shall not vest in the grantee any right to operate the station nor any right in the use of the frequencies designated in the authorization beyond the term hereof, nor in any other manner than authorized herein. Neither the authorization nor the right granted hereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934. This authorization is subject to the right of use of control the Government of the United States conferred by Section 706 of the Communications Act of 1934.

Special Temporary Authority is hereby granted to operate the apparatus described below:

Purpose Of Operation:

Communication with CST-100 Crew Capsule

Station Locations

- (1) Cape Canaveral (BREVARD), FL - NL 28-35-00; WL 80-34-58
- (2) MOBILE: NONGEOSTATIONARY, SP

Frequency Information

Cape Canaveral (BREVARD), FL - NL 28-35-00; WL 80-34-58

Frequency	Station Class	Emission Designator	Authorized Power	Frequency Tolerance (+/-)
2203.2 MHz	FX	6M16D7W	26.12 W (ERP)	
2287.5 MHz	MO	6M16D7W	208.45 W (ERP)	

This authorization effective October 02, 2019 and
will expire 3:00 A.M. EST April 02, 2020

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Special Conditions:

- (1) In lieu of frequency tolerance, the occupied bandwidth of the emission shall not extend beyond the band limits set forth above.
- (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) Future STA requests to extend this authorization will not be considered.
- (4) This STA is limited to the telemetry, tracking, and command operations for a single CST-100 capsule mission, scheduled for launch no earlier than 02 October 2019. This STA expires as soon as the CST-100 capsule completes its re-entry/splashdown operation or 1 April 2020, whichever occurs first. Any future missions shall submit new applications to the FCC to be re-coordinated with the NTIA.
- (5) All CST-100 transmissions using a frequency of 2287.5 MHz shall employ a maximum EIRP of 208.45 W. All CST-100 transmissions using a frequency of 2203.2 MHz shall employ a maximum EIRP of 26.12 W.
- (6) Prior to transmitting at Kennedy Space Center, Florida, Boeing shall coordinate and schedule their operations with Range Scheduling, COMM: (321) 853-5941, email: 1ropschd@us.af.mil, NASA KSC SMO, Jamie Bjornbak James.P.Bjornbak@nasa.gov, (321) 867-6905, and NASA GSFC SMO, Scott Galbraith vincent.s.galbraith@nasa.gov, (301) 286-5089 and provide a copy of FCC license to the 45th Space Wing Spectrum Management Office, (321) 853-8408, email: 45sw.erfmo@us.af.mil".
- (7) As soon as possible, but no later than 60 business days prior to the planned launch, Boeing is required to provide, as a minimum, launch date/time/window and planned CST-100 trajectory from launch to docking with the International Space Station (ISS), transmission frequencies, and associated duration/cut-off times to Jimmy Nguyen (jimmy.nguyen@us.af.mil, AFSMO), Felipe Arroyo (felipe.arroyo-1@nasa.gov, NASA/WFF), Scott Galbraith (vincent.s.galbraith@nasa.gov, NASA GSFC SMO), Kevin Vipavetz (kevin.g.vipavetz@nasa.gov, NASA/LARC), Johnnie Best, (johnnie.w.best1@navy.mil, NMSC), NOAA Satellite Operations Control Center, Wallops Island at (757) 824-7331, philip.l.whaley@noaa.gov, and Cathy Sham (catherine.c.sham@nasa.gov, NASA JSC SMO). In the event of last-minute changes, 48-hour notice is required

Special Conditions:

- (8) All transmissions in the band 2200-2290 MHz shall comply with national and international power flux density limits, unless otherwise coordinated and agreed. PFD analysis and exceedances shall be provided in the FCC application and provided to the NTIA for US Government review.
- (9) Boeing shall be aware the use of the 2200-2290 MHz for future non-federal launches will be considered on a case-by-case basis and Boeing shall have no expectations that future launches will be approved for use in this band.
- (10) Due to potential harmful interference to the Deep Space Network (DSN) ground stations CST-100 transmissions using 2203.2 MHz and 2287.5 MHz links shall not occur when the CST-100 is in view of the following deep space earth stations from horizon to horizon: Goldstone Deep Space Communications Complex (GDSCC) [35° 25' 32.84" N, 116° 53' 22.09" W], Madrid Deep Space Communications Complex (MDSCC) [40° 25' 52.37" N, 04° 14' 52.8" W], Canberra Deep Space Communications Complex (CDSCC) [35° 24' 08.96" S, 148° 58' 52.93" E], and New Norcia Station [31° 02' 53.61" S, 116° 11' 29.4" E]. Coordination requests for clearance to transmit shall be provided to the NASA JSC Spectrum Manager, Cathy Sham (catherine.c.sham@nasa.gov) at least 7 business days prior to communication system activation.
- (11) During CST-100 on-orbit mission phase (after lift-off/ascent, free flight, or attached to the International Space Station), Boeing shall provide the radio frequency operation plan to NASA JSC Spectrum Manager, Cathy Sham (catherine.c.sham@nasa.gov) for coordination with authorized users at least 7 business days prior to any planned transmission operation.
- (12) For CST-100 departure/re-entry operations, including pre-departure checkout, requests for coordination shall be provided to NASA JSC Spectrum Manager, Cathy Sham (catherine.c.sham@nasa.gov) 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.
- (13) Due to potential harmful interference to naval activities, Boeing RF 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. A blackout zone of 1500 nautical mile radius, centered at 22N160W, shall be assumed, unless otherwise coordinated with, and agreed to, by the NSWCDD. Boeing must comply with any and all restrictions that may be levied by the NSWCDD. Coordination of the Boeing 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 NASA JSC Spectrum Manager, Cathy Sham (catherine.c.sham@nasa.gov).

Special Conditions:

- (14) In order to mitigate the potential for interference with these naval activities, 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. These BOZs shall be implemented, unless otherwise coordinated and agreed to by the Naval Surface Warfare Center, Dahlgren Division (NSWCDD). In addition, Boeing must also comply with any and all restrictions that may be levied by NSWCDD. Coordination of the Boeing operations schedule and timeline, and all restrictions levied by NSWCDD, including imposition and implementation of any BOZs, shall be coordinated through NASA JSC Spectrum Manager, Cathy Sham (catherine.c.sham@nasa.gov).
- (15) The STOP BUZZER POC information for launch operations shall be provided to NTIA (bmitchell@ntia.gov). This phone shall be manned 24/7.