

AST&Science
Application for Conventional Experimental License
S Band Antenna

AST&Science seeks experimental authority to use an S Band 2.4 m antenna to aid in testing a novel satellite system. The purpose of the test will be to conduct technical radio research and demonstrate equipment and techniques to determine the performance of a Low-Earth Orbit (LEO) satellite in conjunction with additional portions of the system. Because AST&Science's system is novel, it will need to use the S Band antenna to conduct tests on a recurrent basis by communicating with the satellite to evaluate the performance of the satellite system. AST&Science will file an application for long-term authority to use the antenna for commercial operations. Until the time that that license is granted and commercial operations begin, however, the S Band antenna will be used pursuant to this requested experimental authority for ongoing testing and demonstration activities.

The satellite that will be used in the testing, Blue Walker 1, will operate under the authority of Papua New Guinea. Therefore, AST&Science is not asking for authorization to operate the satellite, and no Section 5.64 statement is required.

AST&Science seeks authority to operate an S Band antenna for telemetry, tracking, and command ("TT&C") with the Blue Walker 1 ("BW1") satellite during testing of the satellite system. The antenna will be located at AST&Science's facility at Midland International Air and Space Port in Midland, Texas. Testing will allow AST&Science to evaluate the performance of the antenna in communicating and controlling the BW1 satellite, and to engage with the satellite as AST&Science conducts testing of other portions of its system.^{1/}

The antenna will be operated as a ground station, and will communicate to and from the BW1 satellite. Uplink (Earth-to-Space) transmissions will occur on the 2033.375 - 2033.625 MHz frequency band using 250 kHz of bandwidth. Downlink (Space-to-Earth) transmissions will occur on the 2207.875 - 2208.525 MHz frequency band using 650 kHz of bandwidth (500 kHz carrier).

The BW1 satellite will orbit approximately 700 km above earth. The S Band antenna will connect with the satellite when it is in orbit over Midland. Transmissions will occur only when the satellite passes over Midland for approximately 10 minutes, twice per day. Testing of the system will be intermittent, however, and will take place on an "as needed" basis, not daily.

Technical Information:

Frequencies: Uplink (Earth-to-Space) 2033.375-2033.625 MHz (250 kHz bandwidth)
Downlink (Space-to-Earth) 2207.875-2208.525 MHz (650 kHz bandwidth)
Width of beam in degrees at the half power point: 5.2 degrees
Orientation in horizontal plane (degrees): Variable: 0 ~ 360 degrees

^{1/} AST&Science has an application on file seeking experimental authority to operate micronsats that it is developing at the same location. See File No. 0884-EX-CN-2018.

Orientation in vertical plane (degrees): Variable: > 20 degrees
Power: 10W
ERP, in watts: 7100W
Frequency tolerance: < 0.0001% (less than 1ppm)
Emission designators: 250KG1W and 500KG1W
Modulating signal: GMSK (a special form of QPSK)
Antenna location: Ground

Protection of other users: In the highly unlikely event that harmful interference is created to another user, AST&Science will cease transmission on the frequency and will work with the FCC and effected party to resolve the interference.

A point of contact for this testing will be physically located at the Midland, TX site and will ensure that operations will cease in the event that any licensed users experience interference or as otherwise directed by the FCC. **AST&Science's "stop buzzer" contact will be:** Huiwen Yao, 5825 University Research Court, Building 2, Suite 2300, College Park, MD 20737, (301) 793-3416, hvao@ast-science.com.

Finally, the equipment will be located at ground level. The installation and operation of the equipment will not have a significant environmental impact. Therefore, no Section 1.311 environmental assessment is necessary.^{2/} And, FAA notification of the antenna height is not required.^{3/}

^{2/} 47 C.F.R. § 1.311.

^{3/} See 47 C.F.R. § 17.7.