

From: Ron Schulze

To: Behnam Ghaffari

Date: August 12, 2014

Subject: FCC File No. 0670-EX-ST-2014

---

Message:

This is a one-way communications test from the ground to an aircraft and eventually a satellite. We are testing a new telemetry waveform for a DoD customer using the Advanced S-Band Transmitter, or "ASTRA." The ASTRA is a self-contained device that houses a radio frequency (RF) transmitter, interfaces, functional control, power control, and timing circuitry. The transmitter receives continuous data and synchronous clock as input. ASTRA is a multimode telemetry transmitter that provides the option of transmitting either pulse-code modulation/frequency modulation (PCM/FM) or shaped-offset quadrature phase shift keyed (SOQPSK) telemetry formats within the IRIG lower S-band of 2200-2290 MHz. ASTRA is compliant with IRIG "TG" variant of SOQPSK.

The ASTRA transmitter is used in the transmission of data to receiving systems that are within communications link. The transmitter accomplishes this function by accepting data and clock, modulating the data onto a programmable RF carrier, and amplifying this modulated carrier. We intend to vary the transmit power (100 mW to 10 Watts) to dynamically stress the telemetry and establish a BER curve of the receiver. We also plan to vary the data rate between 100 kbps to 1.5 Mbps. The aircraft will have a commercial receiver on board and fly radial patterns from APL at altitudes from 1kft agl to 30kft agl in 5kft increments.