

Numerica Corporation

Narrative Statement

Application for Experimental Authority to Test Radar in the 15.7 – 17.2 GHz Band

Numerica Corporation (Numerica) seeks experimental authorization to test a short-range air defense (SHORAD) radar. The radar is designed to detect unmanned aerial systems (UAS).

Numerica, based in Ft. Collins, CO, has 25+ years of experience supporting the DoD in the areas of space domain awareness, air defense and missile defense. Numerica has been an innovator in counter-UAS SHORAD system development since 2010.

The radar operates in the 15.7 – 17.2 GHz radiolocation band.

The primary testing will be conducted from the Pawnee Sportsmen's Center gun range in Briggsdale, CO, where we can fly drones for full field testing. The station at Fort Collins will be used for brief system checkouts in preparation for longer-duration testing at the gun range.

The radar antenna is directional and only illuminates a 90-degree sector. At most 2 radars will be used, meaning that there will be 180 degrees where the radar is radiating and another 180 degrees where the radiation is essentially zero. During all operation, the radar panel will be pointed in the opposite direction from Denver International Airport (DIA) to ensure no conflict with DIA equipment operating in the 15.7 – 16.2 GHz band.

Numerica will *never* operate the radar in a configuration such that DIA is within the 90-degree sector coverage of the antenna. We are aware of a prior experimental license which was granted under the same conditions: File number 0893-EX-ST-2020; Call Sign WQ9XQG. In that experimental license, access to the 15.7 GHz – 17.2 GHz band was granted under the condition that DIA never be included in the sector of coverage of the panel antenna used.

The radar transmits 64 W of peak power, and has a 33% duty cycle, for 21W average power. The antenna gain is 256 dBi, which leads to an average ERP of 3.33kW (10kW peak). The radar waveform is a standard linear frequency modulated (LFM) pulse train with a pulse duration of 16 us pulse and 64 us pulse repetition interval. The pulse bandwidth is 20 MHz.

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