Submitted by David W. Matolak, FCC Registration Number FRN = 0030693089
University of South Carolina
Department of Electrical Engineering
3A28 Swearingen Engineering Center
301 Main Street
Columbia, SC 29208
Office: 803-777-8334

Why an Experimental License is Necessary

A Special Temporary Authorization (STA) is required to support temporary air-ground channel measurements for NASA's Advance Air Mobility program.

Operation Description

Measure air-to-ground (AG) channel characteristics in the C frequency band using a wideband (40 MHz) constant-envelope linear FM chirp signal. Airborne testing will be accomplished with a Ground Station (GS) transmitting from a site at Burke Lakefront Airport (BKL) and a receiver in a general aviation aircraft (likely a Gippsland G8) piloted by the Civil Air Patrol (CAP).

We are requesting one frequency (5240 MHz) to be used in the Cleveland area;s our NASA sponsor is at Cleveland's Glenn Research Center (GRC). This is a project led by Mosaic-ATM, with the University of South Carolina as subcontractor. Since AAM aircraft are envisioned to fly at low altitudes (e.g., 500-3000 feet AGL) near and within urban areas, the Cleveland metropolitan area represents an excellent test site since it has both large buildings and a nearby body of water, Lake Erie, from which very strong multipath reflections will occur. Laboratory and terrestrial field testing will be completed before the flight tests. The flight testing will take place on two consecutive days, with two flights planned per day. Each flight is expected to take approximately 30-60 minutes. NASA will aid in coordination with local FAA, ATC (at Cleveland Hopkins, CLE), BKL, and others to ensure all air traffic safety procedures are strictly followed. Measurements consist of transmission of our 40 MHz signal from the GS to the aircraft (one-way).

Table 1 lists the GS transmitter equipment specifications, including frequency band of operation, transmitter output power, emissions, antenna types and gains, as well as maximum ERP. Table 2 is the analogous table for the aircraft receiver. Figure 1 shows a diagram of the measurement system.

Table 1. Transmitter equipment and frequency parameters.

Frequency Data	
Transmit	5240 MHz
Transmitter Data	
Transmitter Model	Vector Signal Generator & Power Amplifier (PA)
Transmitter Manufacturer	Rohde and Schwarz SMW200A Mini Circuits HPA-50W-63+ PA
Transmitter Power Output	316 milliwatts (average, ~ 25 dBm)
Antenna Type, Gain, Beamwidths	19 dBi panel Azimuth beamwidth 80 degrees Elevation beamwidth 23 degrees
Power Output ERP	25 Watts (44 dBm)
Emission Data	
Emissions	40M0FXNX
Frequency Tolerance	1 ppm

Table 2. Receiver equipment and frequency parameters.

Frequency Data	
Receive	5240 MHz
Receiver Data	
Receiver Model	Signal & Spectrum Analyzer & Low Noise Amplifier (LNA)
Receiver Manufacturer	Rohde and Schwarz FSW43 Mini Circuits ZX60-83LN12+
Receiver Dynamic Range	-90 dBm to 0 dBm
Antenna Type and Gain	0 dBi blade

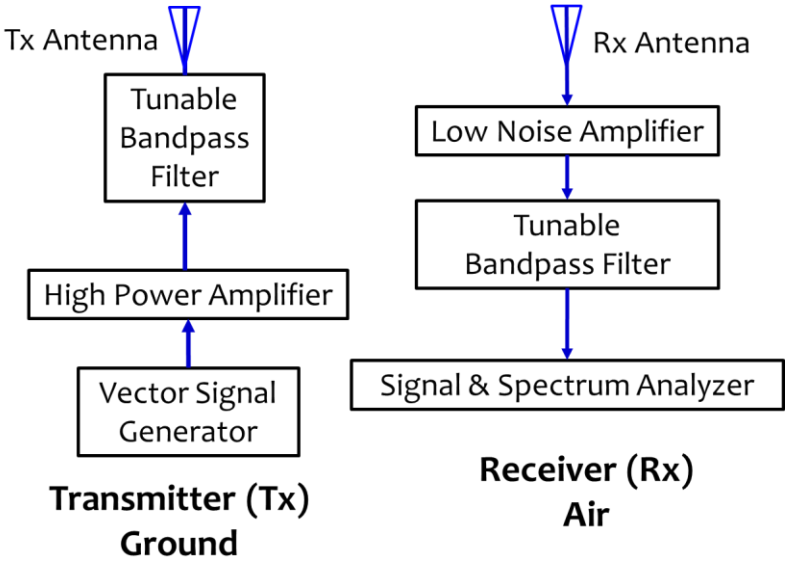

Figure 1. Aircraft and ground site equipment.

Figure 2 shows a plot of the measured power spectrum at the transmitter output. Table (3) lists the location/area of operations, as well as the station class of the operation.

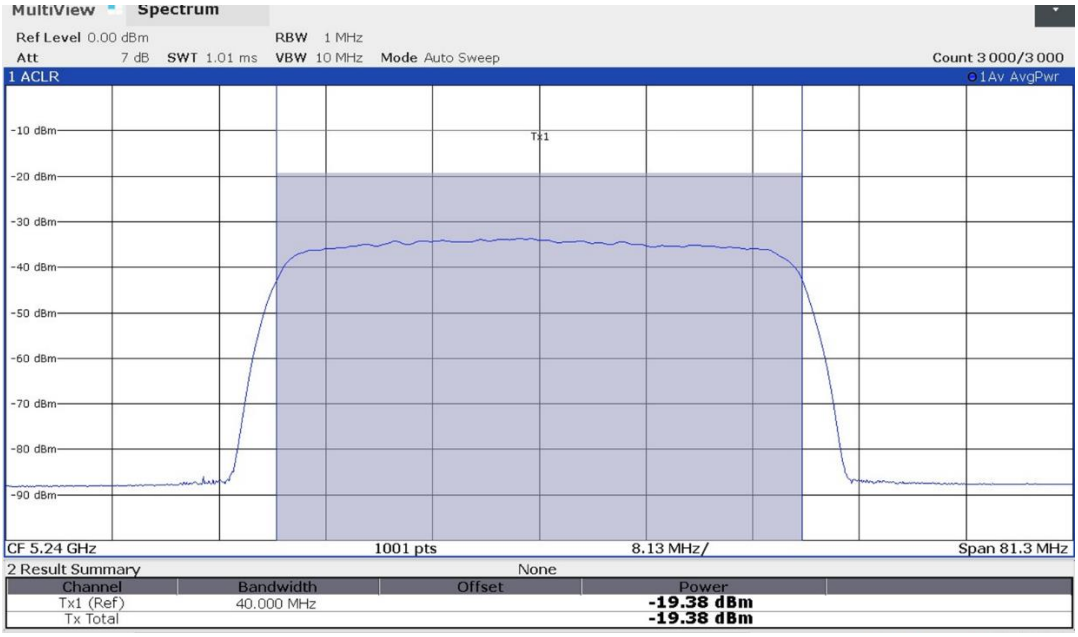

Fig. 2. Measured transmitter power spectrum.

Table 3. Location data.

City	State	Latitude	Longitude	Radius (km)	Station Type	Flight Level (ft)
Cleveland	OH	41-31-04.3 N	081-40-57.5 W	30	Mobile/Airborne	3,000

Start Date: May 01, 2024

Stop Date: June 30, 2024

Stop Buzzer POC

Stop Buzzer for this operation is David W. Matolak at 740-707-2915.