L-3 Communications, CS-W
Special Temporary Authorization
Date: 07/29/2015
File No.: EL266742
STA File No.: 0836-EX-ST-2015
License: ??????

Application Background:

The purpose of this project is to ground/flight test and experiment with point to point data links for application to mobile communications hotspots for military applications. This application is very similar to (Local) File No.: EL850301; STA File No.: 0427-EX-ST-2015, Call Sign WI9XMX; and (Utah County) File No.: EL349667; STA File No.: 0419-EX-ST-2015, Call Sign WI9XMO. This application includes E-band data links, Discovery data links, and LTE data links. The same equipment was identified in the referenced STAs.

Concept of Operations:

There will be up to 2 ground stations and 1 airborne station operating up to 3 links each. The three links are referred to as the Discovery Link, LTE Link, and E-band Link. Figure 1 illustrates the concept of operations where the green arrow is the Discovery Link, the blue arrow is the LTE Link, and the black arrow is the E-band Link. The ground and airborne stations are defined below:

1. Station #1 and #2 will operate a discovery link, an LTE link, and an E-band link and are ground based.
2. Station #3 will operate a discovery link, an LTE link, and an E-band link and are airborne based on a SHADOW unmanned aerial vehicle.
3. Station #1, 2, and 3 will support LTE commercial off the shelf user equipment radios; Samsung Galaxy S4 handsets and Samsung Galaxy tablets. Up to 5 radios will be operated in the vicinity of Station #1 and 2, and in a fixed geographical area over which Station #3 will fly.

Spectrum Requirements:

The discovery link will operate in the unlicensed 900 MHz ISM band (902.2464-927.8208 MHz). The radio is a commercial off the shelf product (MM2-EX family) made by Freewave Inc. The radio uses a spread spectrum frequency hopping waveform. NTIA dd1494 forms are attached. The radio is connected to an omni antenna.

The LTE link will operate in the LTE Band 7 frequency range. Uplink is defined as from the user equipment to the base station (2500-2570 MHz) and the Downlink is defined as from the base station to the user equipment (2620-2690 MHz). The base station is a commercial off the shelf base station radio P020712 made by Athena Wireless. NTIA dd1494 forms are attached. The radio is connected to an omni antenna.

The E-band link will operate in either the 71-76 GHz or 81-86 GHz frequency bands. L-3 CS-W has an E-band license call sign WQQQ873, file number 0005647760 but this link has not been registered with the 3rd party database managers. The radio is an L-3 custom designed product for these bands. It uses S-OQPSK for the 2 higher data rates and DPSK for the 2 lower data rates. All waveforms use 7/8 LDPC FEC with root raised cosine filtering α=0.33. The radio is connected to an axially displaced ellipse directional tracking antenna with 41 dBi gain, RHCP polarization, and 1.6° 3 dB beamwidth. NTIA dd1494 forms are attached.

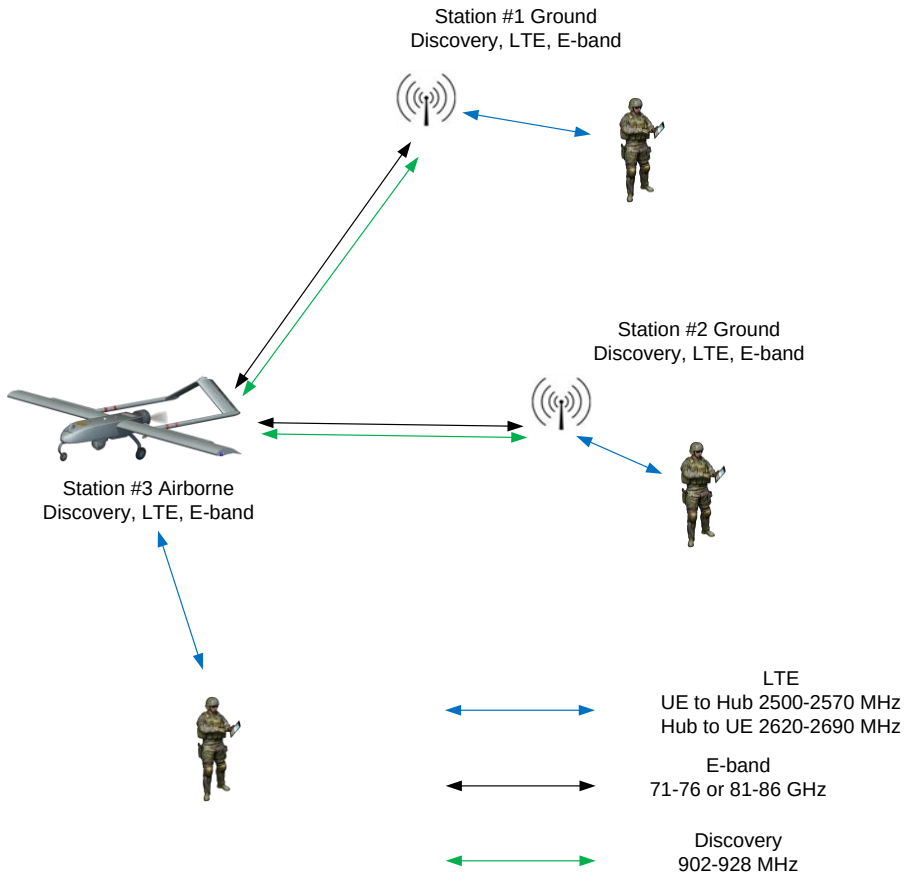

Figure 1 Concept of Operations

Location of Testing:

The locations of the ground stations and the aircraft transmission boundary are shown in Figures 2 and 3. There will be up to 5 LTE user devices in fixed locations within 4km of area of operations for ground stations #1 and #2. There will be up to 5 LTE user devices in fixed locations within the area of operation footprint for airborne station #3.

Ground:
Station #1: Lat: N 34 40 42.0 Lon: W 86 40 58.5, Alt: 637 ft
Station #2: Lat: N 34 39 53.0 Lon: W 86 41 31.0, Alt: 616 ft
Airborne:
Station #3: Lat: N 34 36 11.0 Lon: W 86 39 51.0, Alt: 5,000 to 10,000 ft, 6 km radius
(Air platform location restricted to Redstone Arsenal airspace as outlined in the containment area shown in the red outline in Figure 3)

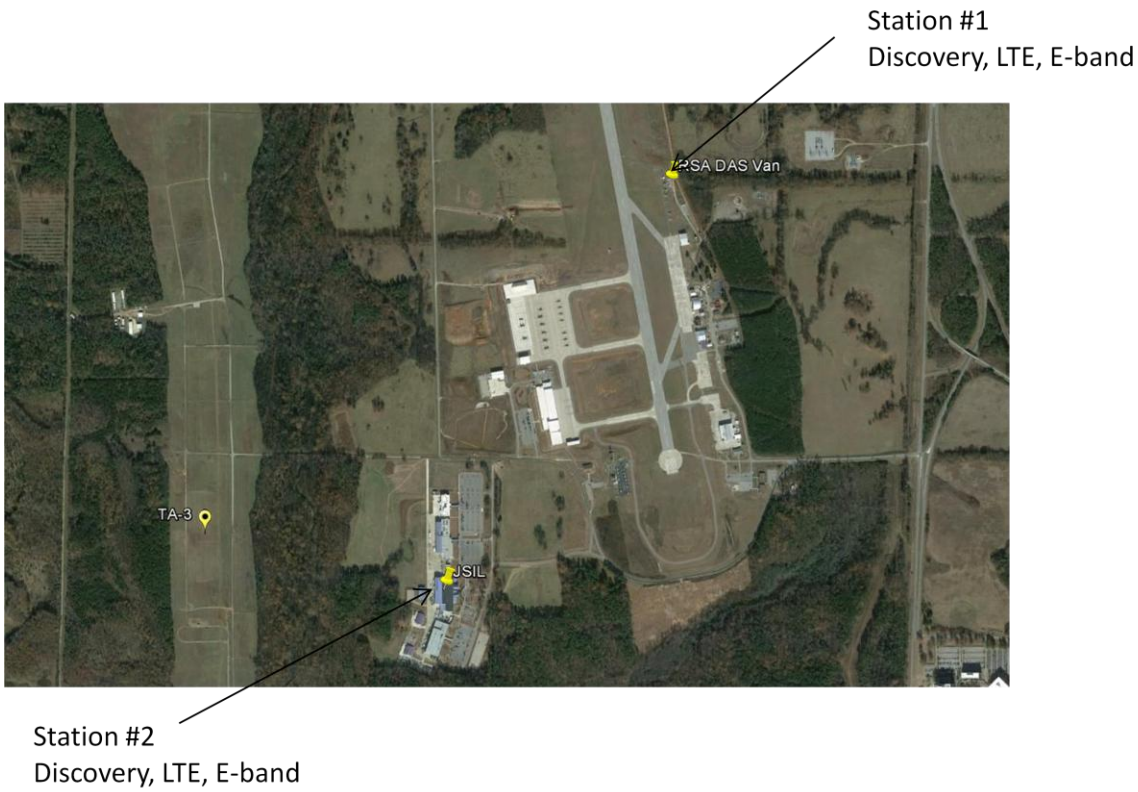

Figure 2 - Location of Testing - Ground

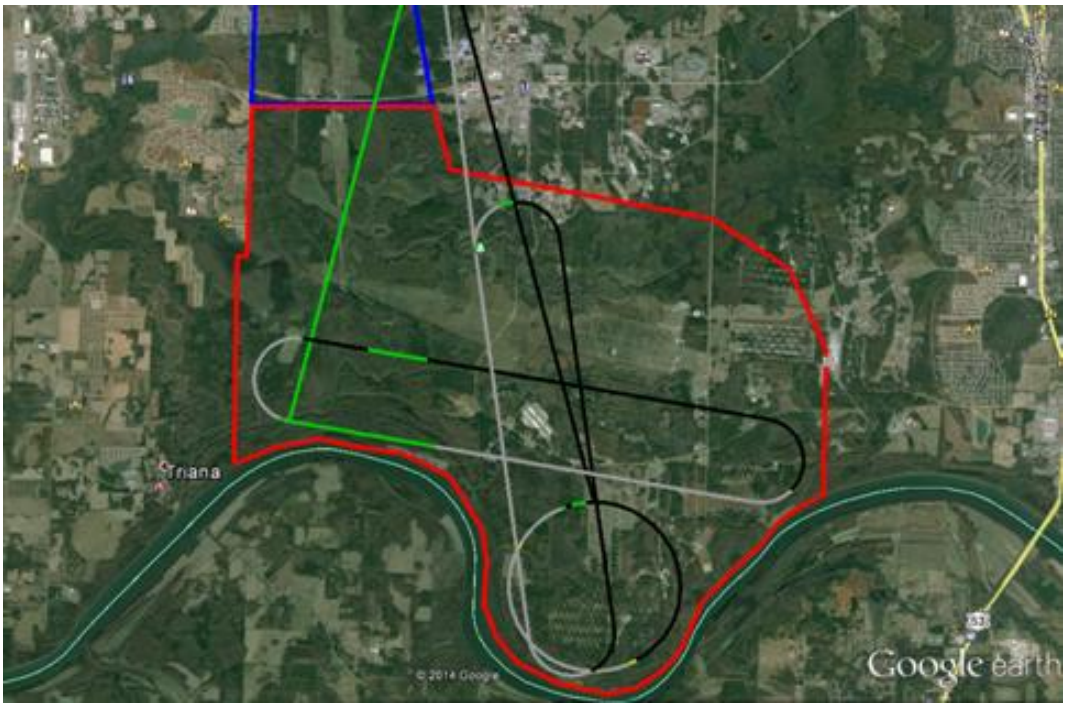

Figure 3 - Location of Testing - Airborne