L-3 Communications, CS-W
Special Temporary Authorization
Date: 05/31/2016
Rev 2 Ground Test

Conf. No.: EL745412
STA File No.: 0824-EX-ST-2016
License: TBD

Application Background:

The purpose of this project is to ground test with point to point data links for application to mobile communications with hotspots for military applications. This application is very similar to File No. EL850301; STA File No.: 0427-EX-ST-2015; License WI9XMX. This new application adds C-band down link and S-band uplink to the scenario. Both ground stations provide similar capabilities for spectrum usage.

Concept of Operations:

There will be up to 4 stations operating up to 3 different simultaneous links. All four stations are ground based. The three links are referred to as the Discovery Link, the E-band link, and the Rover link.

Figure 1 illustrates the concept of operations for ground-to-ground testing where the green arrow is the Discovery Link, the red arrow is the E-band link, and the black arrow is the Rover link.

The ground stations are defined below:

1. Station #1 will operate a discovery link and an E-band link simultaneously and is ground based.

2. Station #2 will operate a discovery link and an E-band link simultaneously and is ground based.

3. Station #3 will operate a Rover link. The Rover link is comprised of two radios; an airborne L-3 Vortex transceiver (DD1494 J/F 12/09626) and an L-3 Tactical Network ROVER (TNR) transceiver. The TNR radio (station #4) will be co-located with station #2 and the Vortex radio (station #3) will be co-located with station #1 for ground testing. DD1494's are available for both radios.

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. 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. The radio is an L-3 custom product (pn?) designed for these bands. Four data rates are included in the E-band radio which 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 39 dBi gain, RHCP polarization, and 1.6° 3 dB beamwidth.

The Rover link will operate in C-band (4400-4940 MHz) for the down link and S-band (2200-2290 MHz) for the uplink. The station #3 radio is an L-3 Vortex transceiver (60065293) and the station #4 radio is a Tactical Network ROVER transceiver (60116572). All waveforms use CEVD r=1/2, RS(247,231) FEC with root raised cosine filtering α=0.33. The radios are both connected to omni antennas.

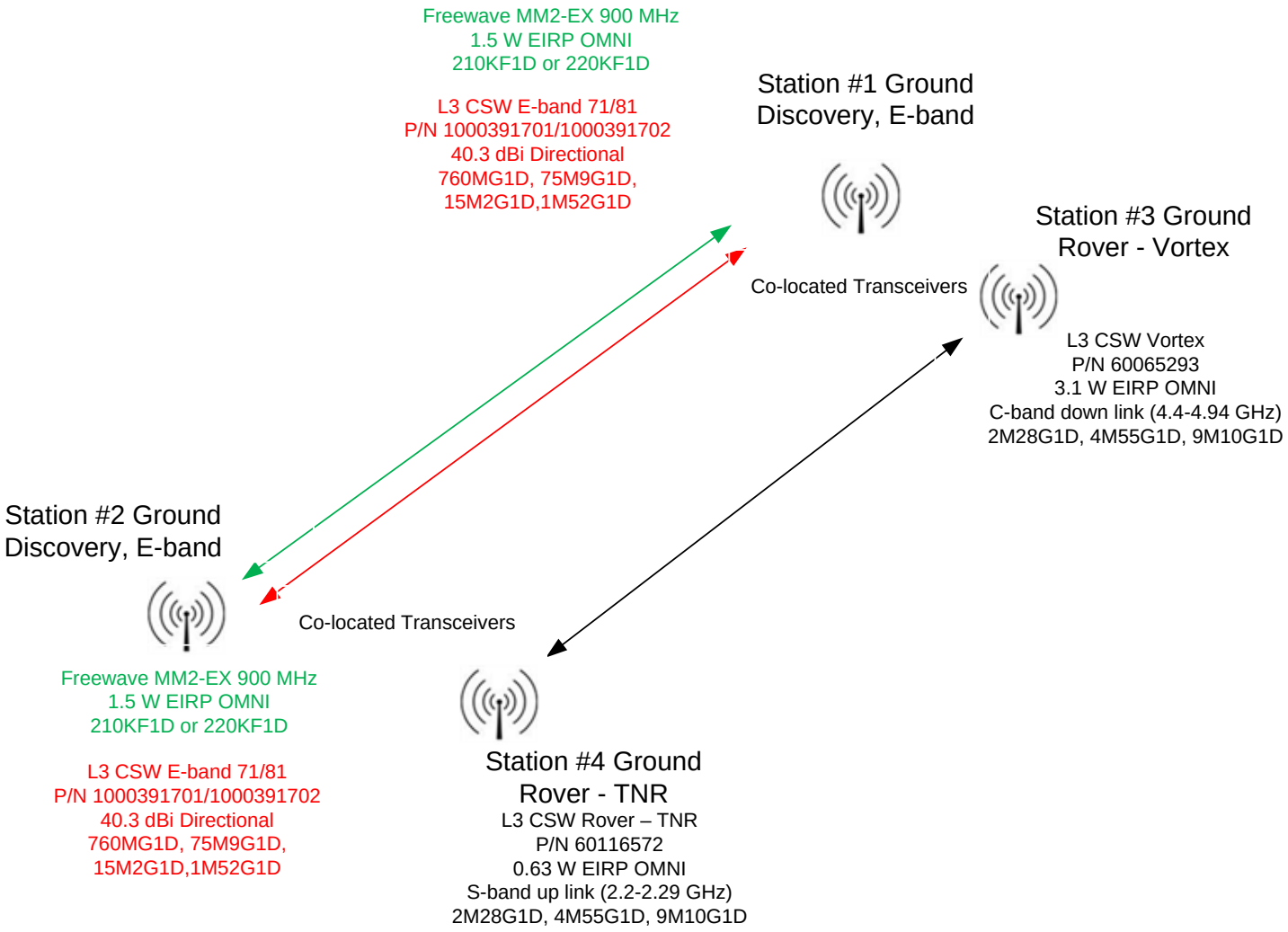

Figure 1 Concept of Operations – Ground Test

Ground Testing Summary

Location of Ground Equipment:

The approximate locations of the ground stations are shown in Figure 2.
Ground station #1 approximate location is Lat: 40°54'39.17"N, Long -111°50'40.42"W, Alt 6357 feet (in the foothills above Bountiful, UT). Station #3 (Vortex radio) will be co-located with station #1 during ground testing.
Ground station #2 approximate location is Lat: 40°47'1.46"N, Long -111°57'7.65"W, Alt 4269 feet (on the L-3 CSW campus). Station #4 (Tactical Network Rover radio) will be co-located with station #2 during ground testing.

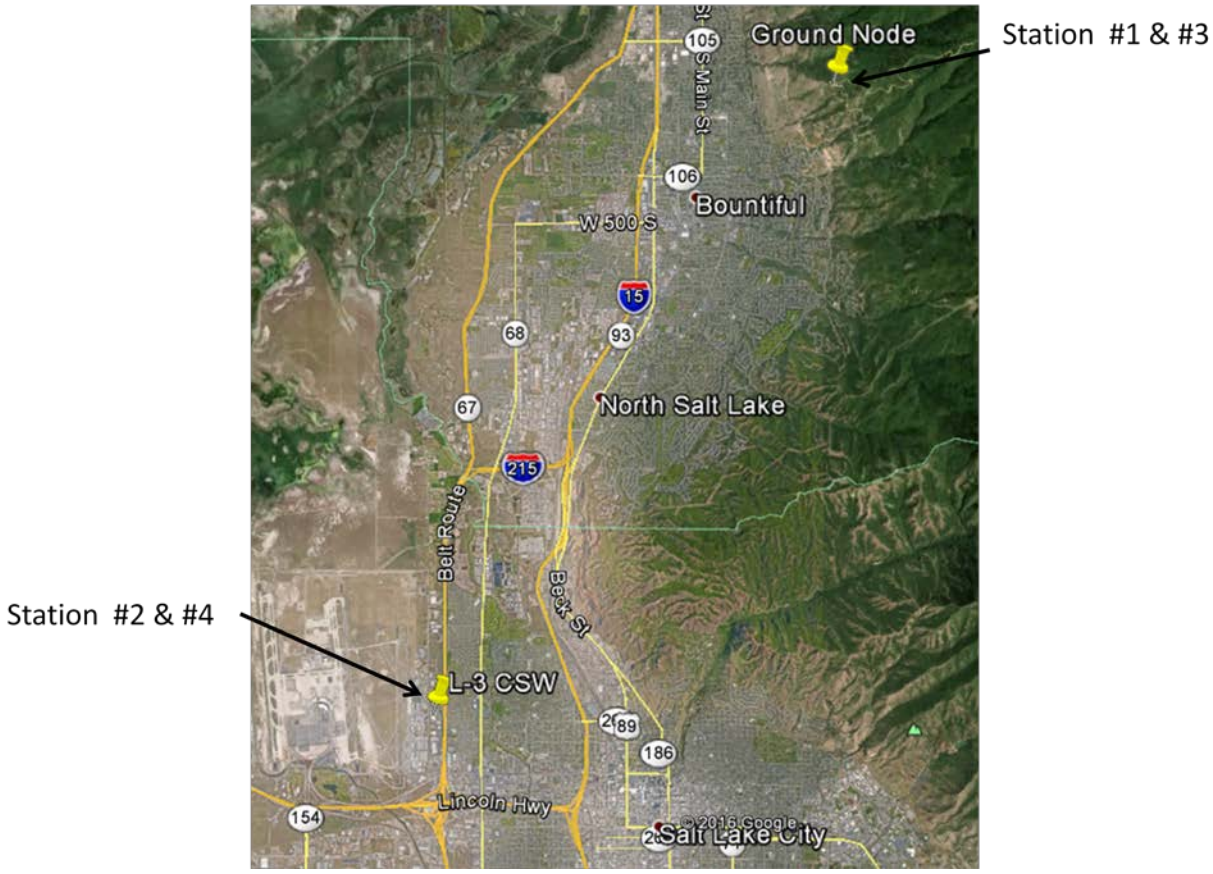

Figure 2 Location of Ground Test Equipment