L3Harris BCS
Special Temporary Authorization
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License: ??????

Application Background

The purpose of this experiment is to verify the functionality of hardware provided by Abside Networks, Inc. with over the air transmissions in a real, non-laboratory environment. The hardware consists of multiple Ravelin uE Gateways communicating with multiple eNodeB Base Stations over non-3GPP LTE bands. In some test cases a Relay Node will be used between the Gateways and the Base Stations. LTE is designed to select "best fit" frequencies from the bands to maximize throughput and reduce interference, however they are ultimately under the user's control.

Three frequency bands will be used to avoid unwanted interference. More specifically, the test can ***be performed using any of the bands, however the scope may need to be adjusted if all the bands can't be utilized****. Every attempt has been made to reduce emission levels to avoid potential interference with other users.*

Concept of Operation

General Operation (Case 1): This is a duplex system with multiple fixed Gateway Transceivers (uE) attached to pseudorandom network traffic generators. The uE transmits the traffic to the Gateway Base Stations where it is then combined into a single data stream and relayed over a wired backhaul to a centralized system for analysis. The centralized system will use the return link to send command and control data to each uE to adjust the transceiver frequencies and adjust others settings as required. The test will verify that all the unique links can operate simultaneously and are capable of adjusting bands to compensate for interference from nearby uE in the same band. (see Figure 1)

Case 2: This duplex system will do point to point communication between two uE, where one is connected to the backhaul and the other to a network traffic generator.

Case 3: In this case a Relay Node will be installed between various uE and a Gateway Base Station to demonstrate that it can act as a bridge to extend the transmission range. Due to the limited geographical area of this test the system range extension won't be necessary, however the bands will be configured to force the use of the Relay Node.

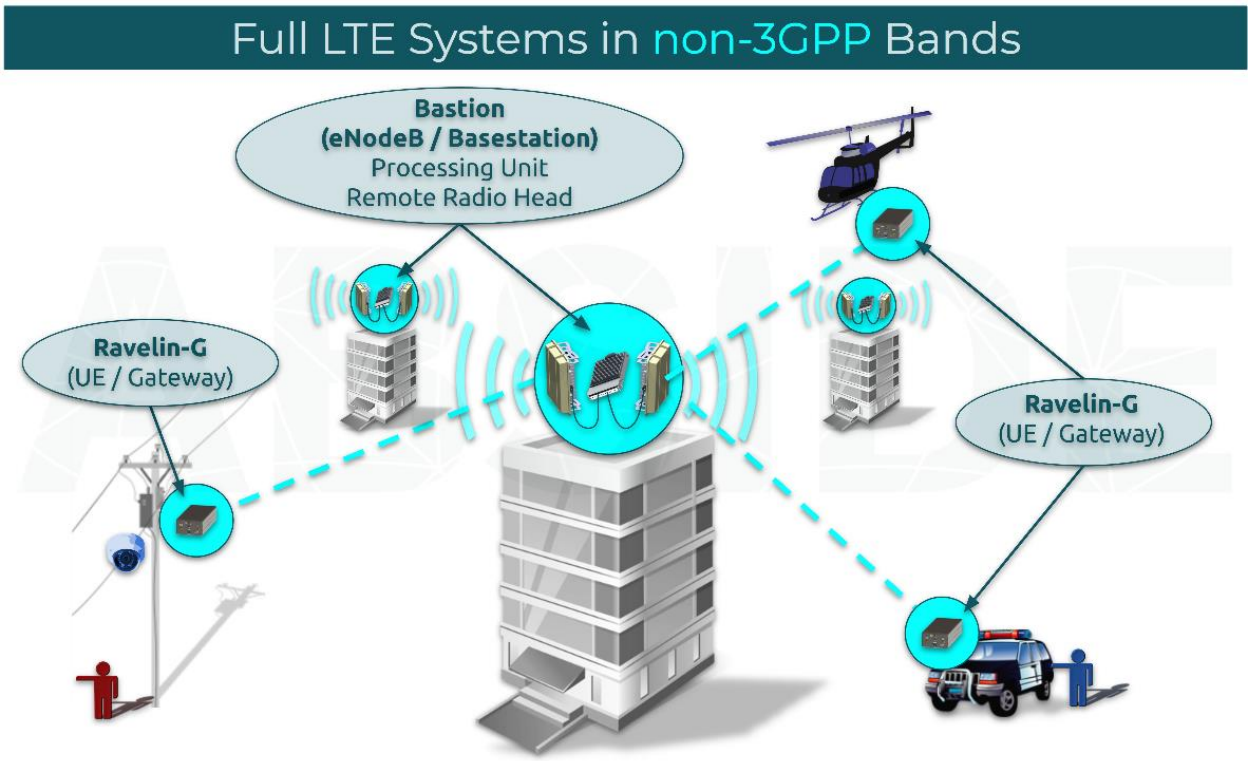

Figure 1. Concept of Operations (see http://www.abside-networks.com/)

The experiment expects to test for a 1 month time frame worst case but actual testing is planned for a one week time frame during daylight hours only. The 1 month time frame allows for scheduling changes due to hardware availability. A second test may be required if problems are found with the measured data from the first test.

Spectrum Requirements

In order to validate simultaneous functionality, transmissions must be made across multiple frequency bands. For this test the specific frequencies of interest are: 1780-1850 MHz, 2200-2290 MHz, 4400-5000 MHz. The emission designators are: 1M40W7D, 3M00W7D, 5M00W7D, 10M0W7D, 15M0W7D, 20M0W7D

The test frequencies can be anywhere in the bands indicated that allow for the test signal necessary bandwidth. Several emission designators have been provided to provide maximum flexibility. The transceivers can be tuned in 100 KHz steps.

Transmit power for each uE will be +30 dBm maximum into either a monopole whip with 1 dBi gain or a directional antenna with 9 dBi gain. Transmit power will be +33 dBm maximum with a gain of 10 dBi at each Base Station and Relay Node.

Location of Equipment

All tests will be performed within the L3Harris campus, bounded as described in the program experimental license and shown in Figure 2. The base station location is shown in Figure 2 on a roof tower on Building E. The relay equipment will also be mobile but for test purposes it will be fixed at Building X. The user equipment will be mobile and remain within the bounds of the L3Harris campus.

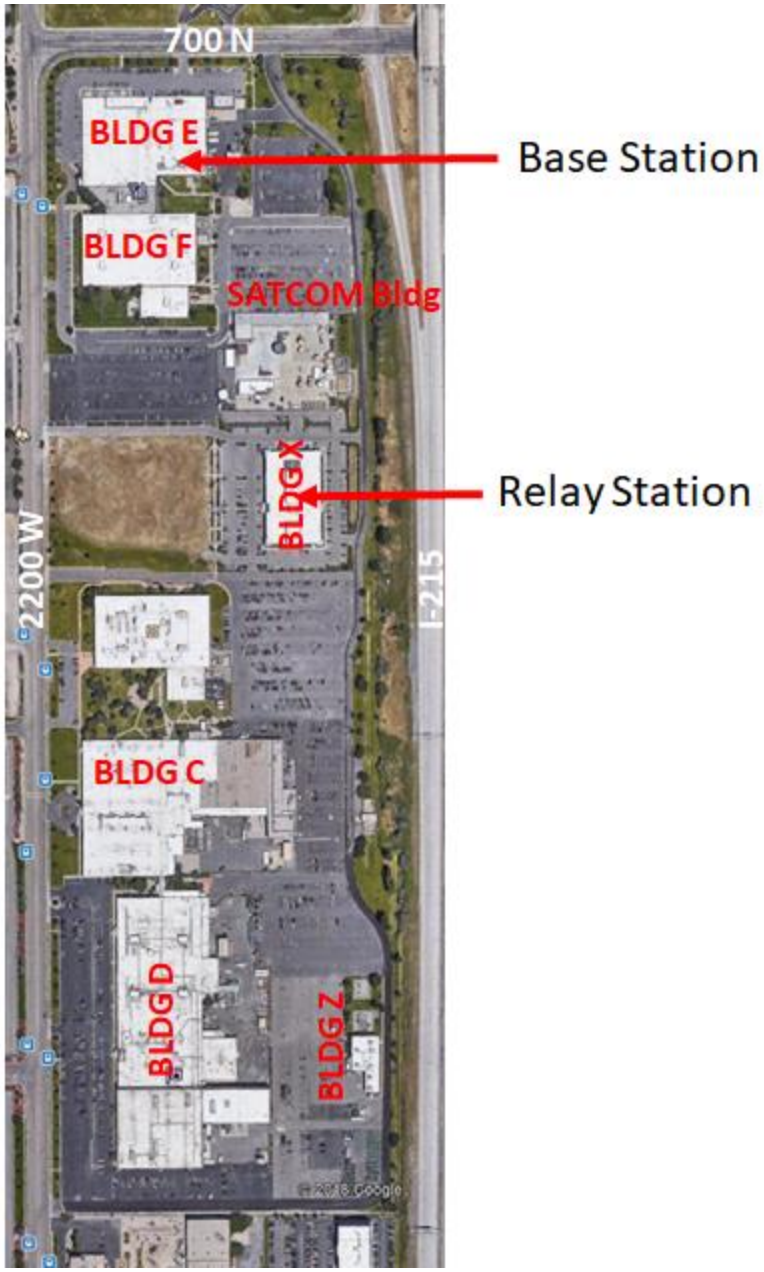

Figure 2. Location of Equipment

Interference Mitigation

Interference mitigation will be accomplished by minimizing the transmit power and the use of directional antennas. The LTE waveform is designed to select “best fit” frequencies from the bands to maximize throughput and reduce interference, however the selected frequencies are ultimately under the user’s control. The stop buzzer point of contact has been identified and will be available in the case of possible interference and for interference resolution.