Statement Of Work

4G Cellular Communications Test bed

1. BACKGROUND

Fourth Generation (4G) Long Term Evolution (LTE) cellular communication technologies allow users to dramatically extend communications capabilities where limited or no communications infrastructure exists. The Naval Research Laboratory (NRL) is investigating 4G LTE technologies for possible future deployment on US Naval platforms.

NRL is seeking to procure a turn-key, deployable, 4G LTE cellular communications network along with the necessary engineering support equipment that is required to allow our engineers to evaluate the suitability of different LTE cellular communication network topologies in a given deployment environment. As this will be a limited use network, we only require the capacity to serve 100 subscribers. The combination of the deployable 4G LTE cellular network, engineering support equipment, and mobile handsets is defined to be a "*4G Cellular Communications Testbed*".

2. 4G CELLULAR COMMUNICATIONS TESTBED REQUIREMENTS

2.1 The system shall be based on 3GPP 4G release 10 technology (backwards compatible to release 8) and support 1800 MHz FDD operation (threshold) and 1800/2600 MHz dual band operation (objective).

2.2 The system shall be transportable and mounted in transit cases for rapid deployment.

2.3 The system shall support at least a 10 MHz bandwidth 4G LTE cellular network that is capable of hosting at least 20 simultaneous users. The minimum required data rates are 37Mbps on the downlink and 16 Mbps on the uplink.

2.4 The system shall include at least a one year commercial warranty.

2.5 The vendor shall provide on-site training for the 4G test bed to include initial system set up, configuration, and maintenance of the system. The training objectives shall include instruction in the completion of tasks set forth in section 4.0.

3. 4G CELLULAR COMMUNICATIONS TESTBED ENGINEERING SUPPORT EQUIPMENT REQUIREMENTS

3.1 The vendor shall provide 15 commercial cell phones that support high speed data rate transfer, i.e., multimedia applications, email, surf the web… These cell phones shall be compatible with the Qualcomm's eXtensible Diagnostic Monitor (QXDM) software and Anite's Nemo diagnostic software (NEMO).

3.2 The vendor shall provide two Engineering Cell phones.

3.3 The vendor shall provide five wireless data modems or dongles compatible with both QXDM and NEMO.

3.4 The vendor shall provide a way to synchronize the cellular network to GPS time.

3.5 The vendor shall provide a way to monitor the real-time performance (RF Signal Levels / Signal quality) of handsets in different deployment environments.

3.6 The vendor shall provide a way to provision new 4G phones and data modems on the supplied 4G network

4. TEST AND ACCEPTANCE PROCEDURES

4.1. The vendor shall demonstrate successful operation of the following minimum capabilities of the 4G Cellular Communications Testbed.

4.1.1. The vendor shall demonstrate the ability to perform mobile-to-mobile voice calls.

4.1.2. The vendor shall demonstrate the ability to perform mobile-to-mobile data transfer. The vendor shall provide a self-contained web server with local audio, video, and data content. The user experience will include the ability to browse the web, video chat, and send text messages.

4.1.3. The vendor shall demonstrate configuration management.

4.1.4. The vendor shall demonstrate subscriber management.

4.1.5. The vendor shall demonstrate provisioning new phones and data modems.

4.1.6. The vendor shall demonstrate real-time status monitoring performance of handsets, (e.g., RF Signal Levels / Signal Quality) using native monitoring tools within the supplied 4G LTE network and supplemented with either QXDM (threshold) or Anite Nemo (objective) diagnostic software. NRL has a current QXDM license that can be used during onsite acceptance testing.

4.1.7. The vendor shall demonstrate system reporting, call history and performance statistics.

4.1.8. The vendor shall demonstrate the cellular network synchronization to GPS time.

4.1.9. The vendor shall demonstrate 4G network cell creation.

4.1.10. The vendor shall demonstrate the network operating in a fully loaded scenario. The eNB has a number of multiple UEs operating simultaneously demonstrating 37 Mbps downlink throughput and 16 Mbps uplink throughout utilizing 4.1.6.

5. REQUIRED DELIVERABLES

5.1. Deployable Standalone 4G LTE Network with the following minimum components:

5.1.1. Core network

5.1.2. 1800 MHz eNB with a minimum 1W transmitter

5.1.3. MIMO antennas for 1800 MHz band of operation.

5.1.4. Power supply to operate from a 120V standard wall outlet.

5.1.5. Installation, Setup, and Training services

5.2. Test Equipment

5.2.1. (100ea) SIM cards provisioned to work with the network

5.2.2. (2ea) 4G LTE Engineering Test Phone compatible with QXDM and NEMO that supports 1800 and 2600 MHz operation. This test phone shall include the necessary applications to monitor network performance, in-call performance, and QoS without the use of an external computer. Data may be stored locally for post processing using either QXDM or NEMO.

5.2.3. (15ea) 4G LTE Commercial phone compatible with QXDM and NEMO that supports 1800 and 2600 MHz operation

5.2.4. (5ea) 4G LTE Commercial Data Modem with USB connector compatible with QXDM and NEMO that supports 1800 and 2600 MHz operation

5.3. Complete commercial documentation on the system and subsystems contained in paragraph 5.1 and 5.2 (paper and electronic copy).

6. OPTIONAL DELIVERABLES

These deliverables enable the 4G Communications Testbed to meet the objective requirements of this SOW. They shall be separately priced. At the time of contract award, a determination will be made as to which options will be exercised (either 0, 1, or 2).

6.1. Dual-Band Support for the 4G Communication Testbed

6.1.1. Deployable 2600 MHz eNB with a minimum 1W transmitter

6.1.2. All necessary interconnect cables

6.1.3. MIMO antennas for the 2600 MHz Band

6.1.4. Demonstrate in-call handovers between 1800 MHz and 2600 MHz bands

6.1.5. Demonstrate an aggregate dual-band (1800/2600) data transfer to a hand set – both uplink and downlink.

6.2. Anite Nemo Network Diagnostic Software that includes:

6.2.1. Anite Nemo Cellular Survey Base Kit – PN 4010

6.2.2. Anite Nemo 4G Terminal Handler – PN 4010-CGL-H