

Request for Experimental STA
Clearwire Spectrum Holdings III, LLC

- a. The complete program of research and experimentation proposed including description of equipment and theory of operation

The radio product consists of the following:

Huawei model DBS3900: tower top radio unit

The purpose of the experimentation is to validate the ability of the equipment to operate satisfactorily in the presence of collocated equipment operating on other frequencies, specifically equipment licensed to Sprint in the 1900 & 800 MHz bands. By “satisfactory operation” we mean that the equipment will neither cause degradation to the operation of the 1900 & 800 MHz equipment nor shall its functions be harmed by emissions from the 1900 & 800 MHz equipment collocated at the test sites. Ten sites have been chosen for this testing which are representative of the field environments wherein these products are proposed to be jointly deployed. Different RF distribution arrangements will be tested at each of the locations to validate satisfactory performance under all anticipated deployment scenarios.

System Operation

Clearwire’s Remote Radio Head (RRH) units are designed to support a wireless broadband access network system optimized for mobility with data throughput speeds exceeding 1 Mbps. It is based on IEEE 802.16e specifications and designed for both business and residential users. The system consists of three main components:

1. A baseband unit (BBU) that resides at the base of the tower and conditions data from an IP network for transmission via the tower mounted radio heads (RRH.) This BBU also receives baseband data from the RRH and conditions it before sending it to the IP network.
2. The tower mounted radio heads that convert the baseband data from the BBU to RF in the 2496 to 2690 MHz band for transmission to remote consumer devices. These same radio heads receive RF data in the same frequency range from the remote consumer devices and convert it to baseband which they send down the tower to the BBU.
3. A subscriber modem is installed at the end user’s computer and provides wireless connection to the base station.

The base stations are a full functioning WiMAX base station designed for tower top mounting. Three units will be deployed at each location and configured to illuminate a 120° sector. The locations will be within coverage range of one another to allow traffic to be “handed-over” between sectors during testing.

The subscriber modem is built on the USB form factor and designed to easily interface with the end-user’s computer. It consists of a transceiver and WIMAX chipset. It can be used for both outdoor and indoor usage.

The air-interface between the base station and the subscriber modem is IEEE 802.16 compliant. The modulation used is orthogonal frequency division multiplexing (OFDM). The signal BW is 10 MHz and the OFDM segments the BW into subcarriers. Each subcarrier is independently modulated using QPSK, 16QAM or 64QAM based on the measured RF channel quality.

The system is based on time division duplexing (TDD) and the downlink/uplink split is configurable in the system.

b. Specific objectives to be accomplished

Clearwire will use the experimentation to:

1. Determine technical requirements necessary to facilitate development of RAN hardware for mobile communications sites.
2. Validate ability of collocated RAN hardware to operate in harsh, multi-band environment.
3. Ascertain the performance of WiMAX technology under conditions that closely resemble that of a real world operational mobile network.

c. How the program has a reasonable promise of contribution to the development, extension, expansion or utilization of the radio art or is along a line not already investigated

This experimentation will allow Clearwire to identify any potential co-site interoperability issues related to shared installations with Sprint wireless services. WiMAX RF equipment will be sharing antenna platforms with Sprint. Knowledge gained through this testing will allow for improvements in efficiency of operations where structures can be reasonably collocated.