

Request for Experimental License
Clearwire Spectrum Holdings III, LLC

Clearwire Spectrum Holdings III, LLC, a wholly-owned subsidiary of Clearwire Corporation (“Clearwire”), is planning to trial a new radio product, operating in the 2.4-2.6 GHz band, which is designed to provide in-building broadband wireless services. In addition to using Broadband Radio Service (“BRS”) licenses WHJ897 and WNTQ214, both held by NSAC, LLC, also a wholly-owned subsidiary of Clearwire, it has obtained the consent of two Educational Broadband Service (“EBS”) licensees from whom it currently leases spectrum to use their spectrum for this trial. Those licensees are Mineola Union Free School District, licensee of EBS Station KNZ71, and Connecticut Public Broadcasting, licensee of EBS Station WLX565. Clearwire has the consent of both of these EBS licensees to utilize their spectrum for this temporary, limited purpose.¹ The program of experimentation requested herein includes absolutely no commercial use. Letters from the licensees consenting to Clearwire’s use of their spectrum are attached hereto. As required by the application, the following information is provided in support of Clearwire’s request for an experimental license:

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

The radio product to be tested consists of the following:

- SPI-2330: Ethernet WiMAX in-building base station
- MWC2529E: WiMAX subscriber modem
- DMC-VOIP220: WiMAX VoIP terminal
- PCI Card: WiMAX PCI subscriber card

The purpose of the experimentation is to validate the product’s effectiveness in providing in-building WiMAX coverage and to gather field performance data. The experimentation location provides an ideal venue to perform the experimentation. The location is a six story building and each floor exhibits a different layout, providing Clearwire with an experimentation location with a multitude of indoor environments. During the proposed experimentation, the in-building base stations will be populated throughout the building and provide WiMAX coverage for the entire building

System Operation

Clearwire’s in-building product is a wireless broadband access network system optimized for in-building operation. It is based on IEEE 802.16e specifications and designed for both business and residential users. The system consists of three main components:

¹ Letters from the EBS licensees indicating their consent are either attached hereto or will be filed ASAP.

1. An in-building base station provides wireless access to subscriber units. The in-building base station (SPI-2330) uses conventional Ethernet network to backhaul data traffic to and from the internet
2. Subscriber modem (MWC2529) and PCI Card are installed at the end user's computer and provides wireless connection to the base station
3. A VoIP terminal (DMC-VOIP220) is a hand-held device that provide voice call service using the wireless connection to the base station

The in-building base station is a full functioning WiMAX base station optimized for in-building deployments. It is a single sector (cell) base station whose typical coverage is less than 100 ft. Multiple in-building base stations would normally be needed to provide full in-building coverage.

Both subscriber modem and PCI card designed to easily interface with the end-user's computer, and consist of a transceiver and WIMAX chipset. While the PCI card can be used for both outdoor and indoor usage, the subscriber modem is designed primarily for 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 1024 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. Validate features and quantitatively measure the performance of the in-building WiMAX system
2. Ascertain the performance of the in-building WiMAX product under various in-building interference and loading conditions, and
3. Study the effectiveness of the in-building WiMAX product in extending the outdoor (macro) WiMAX coverage

- 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 help Clearwire to extend WiMAX wireless broadband experience to in-building users. Traditionally, the wireless in-building coverage has been provided by the outdoor networks; however, ubiquitous in-building coverage is hard to achieve due to additional building penetration signal losses. This experimentation will validate a novel concept for providing indoor wireless broadband coverage by placing low powered base stations inside the building.