

Applicant:

XCOM-Labs

Supplemental information to support:

1. Proposed band 3300-3400MHz.
2. Proposed transmit power – 200mW (23dBm) EIRP.

Incumbent Band Usage

A scan over the band range 3300 to 3550MHz, 20 minutes duration was conducted. The measurement was conducted outside the application locations. The spectrum analyzer plot below on max hold over a period of 20 minutes. The RBW is 1 MHz – the power level can be interpreted in dBm/MHz. The results show activity from 3400 to 3475 MHz and the range 3300 to 3400 MHz appears clear for the Andover site. The entire 3300 to 3550 appears clear at Billerica site.

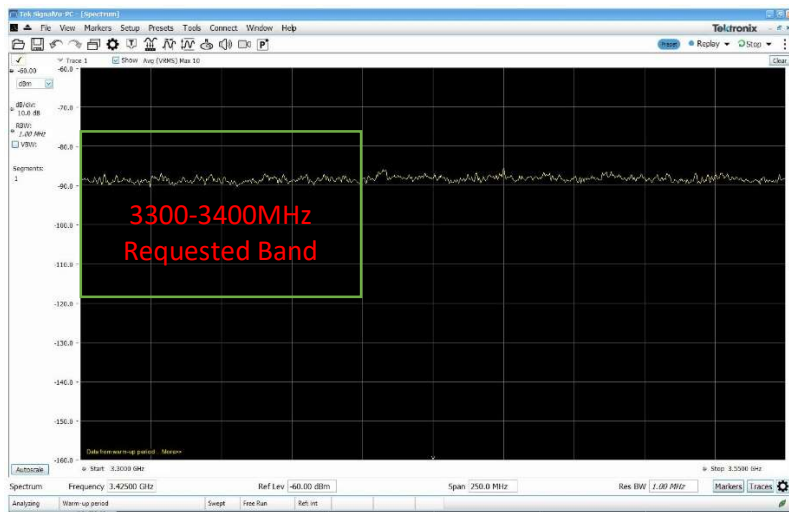


Figure 1 Outdoor scan spectrum usage. Location North Billerica

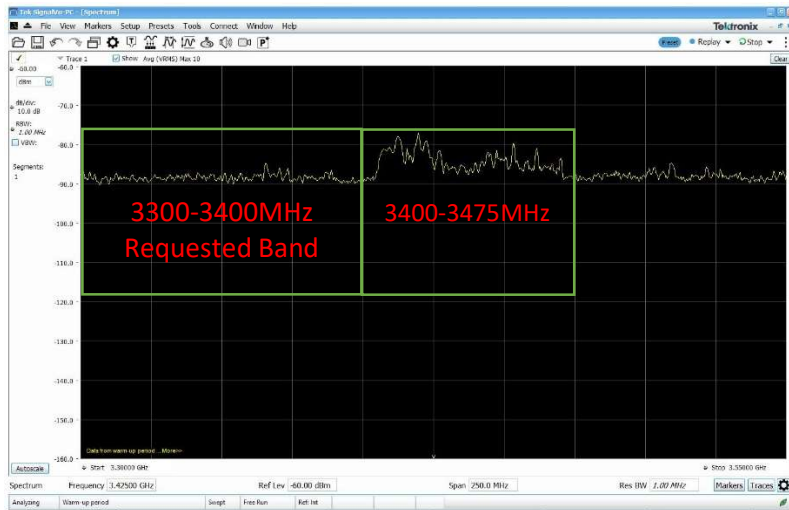


Figure 2 Outdoor scan spectrum usage. Location Andover.

Maximum Outdoor Referred EIRP (Using CBRS measurements as proxy)

In support of previous application 0711-EX-CN-2020 XCOM conducted isolation measurements to quantify the maximum outdoor referred EIRP in CBRS band immediately adjacent. These measurements were conducted with RRU's placed immediately adjacent to exterior window. Practically this is absolute worst case, units are to be mounted in interior labs. Refer to figure below for Andover Location. It is expected this is a good proxy measurement for the expected emission/EIRP in the range 3300-3400MHz.

Maximum Outdoor Referred EIRP

- The system operation is limited to indoor-only locations at XCOM's facility.
- The radio units are ceiling mount design with a downward-facing antenna. Units are tested with a downward-facing antenna. Coverage is limited but is sufficient for testing.
- XCOM has performed calibrated EIRP measurements and determined outdoor referred EIRP is reduced at least 29dB due to the setup antenna orientation and building isolation. (refer to next section on procedures for calibrated measurement of indoor outdoor isolation).
- The outdoor referred EIRP is -26dBm/1MHz (200mW and 100MHz NR). Using the CBRS shared spectrum for reference below the inband spurious emission limit for licensed operation - 25dBm/1MHz. (refer to FCC Emission Limit Part 96.41(e) section).



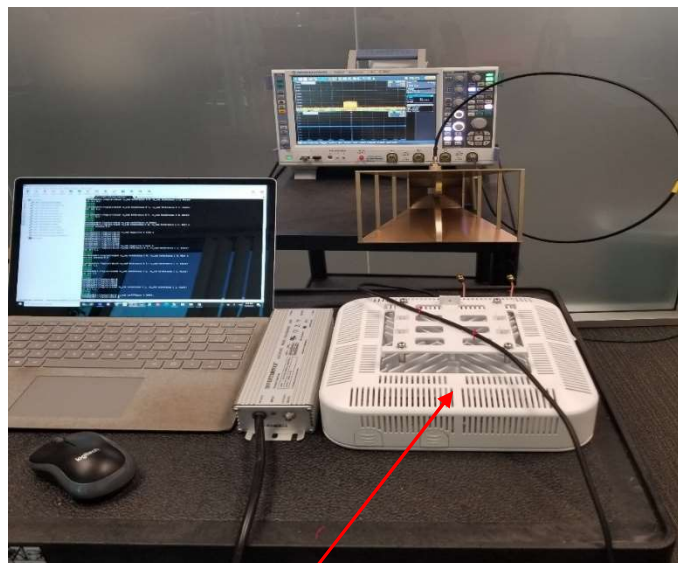
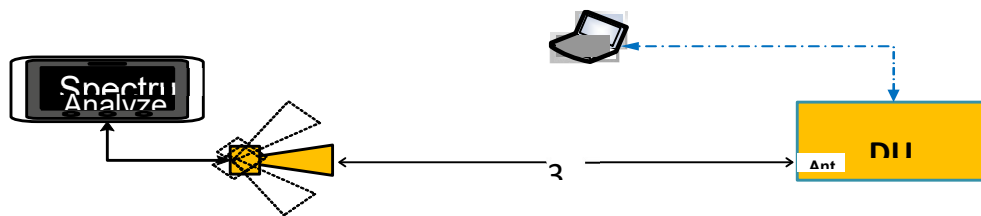
Andover location internal lab network deployment (red box). Not adjacent to any external walls, very high isolation to outside.



Billerica Building 3 location internal lab network deployment (red box)

Description of Calibrated measurement of indoor-outdoor isolation

- Measurements – Calibrated EIRP
 - Indoor to outdoor isolation was estimated from the differential between calibrated EIRP of the radio unit (RU) measured indoor at 3m reference distance and outdoor at 3m reference distance.
 - Measurements were made at two locations A and B representative of each end of the lab and closest to the exterior wall.
 - The test was conducted at the max EIRP of RU. Note this is NOT the proposed operational transmit power, only used for measurement.
 - RU EIRP indoor = 24.4dBm
 - RU EIRP outdoor maximum = -4.9dBm
 - Indoor to outdoor isolation = $24.4 - (-4.9) = 29.3\text{dB}$.
- Calibration of the Xcom RRU device under test (DUT)
 - Calibration of the DUT to determine the EIRP at maximum conducted output power. Refer to 'Test Setup and Calibration' pictures of the calibration setup:
 - DUTs were tested in the CBRS band.
 - All field strength measurements dBuV/m integrated in 1MHz.
 - All EIRP measurements dBm integrated in the modulation BW; 18MHz.
 - Nominal Conducted TX output power during calibration; 23.32 dBm.
 - Measured Field Strength during calibration at 3m; 107.1 dBuV/m.
 - DUT EIRP 24.4 dBm.



DUT ceiling mount orientation.

- **Measured Field Strength, outside building in a typical setup.**

- The lab which will house all devices during development, is on the outside wall of the building. The calibrated DUT was placed in two locations closest to the outside wall where a 3m radiated measurement was possible. Measurement locations A and B are shown below.
- Measured Field Strength location A building 3m from DUT; 77.79 dBuV/m.
- Measured Field Strength location B building 3m from DUT; 73.39 dBuV/m.
- DUT at location A EIRP; -4.9 dBm.
- DUT at location B EIRP; -9.28 dBm.
- Isolation location A $(24.4 - -4.9) = 29.3\text{dB}$
- Isolation location B $(24.4 - -9.28) = 33.68\text{dB}$
- Minimum isolation 29dB.

Location A



Location B

