# FCC Test Report

| | |
|---|---|
| Product Name | MOXA IEEE 802.11a/n/ac 4*4 module |
| Model No | WAPC002 |
| FCC ID. | SLE-WAPC002 |

| | |
|---|---|
| Applicant | MOXA Inc. |
| Address | FL.4, NO. 135. LANE 235, BAOQIAO RD. XINDIAN DIST.,NEW TAIPEI CITY, TAIWAN |

| | |
|---|---|
| Date of Receipt | Mar. 29, 2018 |
| Issue Date | Sep. 25, 2019 |
| Report No. | 1870151R-RFUSP33V00 |
| Report Version | V1.0 |

Testing Laboratory
3023

# Test Report

Issue Date: Sep. 25, 2019
Report No.: 1870151R-RFUSP33V00

| | |
|---|---|
| Product Name | MOXA IEEE 802.11a/n/ac 4*4 module |
| Applicant | MOXA Inc. |
| Address | FL.4, NO. 135. LANE 235, BAOQIAO RD. XINDIAN DIST.,NEW TAIPEI CITY, TAIWAN |
| Manufacturer | MOXA Inc. |
| Model No. | WAPC002 |
| EUT Rated Voltage | DC 24~110V |
| EUT Test Voltage | DC 24V |
| Trade Name | MOXA |
| Applicable Standard | FCC CFR Title 47 Part 15 Subpart C: 2017<br>ANSI C63.4: 2014, ANSI C63.10: 2013 |
| Test Result | Complied |

Documented By : Genie Chang

( Senior Adm. Specialist / Genie Chang )

Tested By : Sam Hsu

( Engineer / Sam Hsu )

Approved By :

( Director / Vincent Lin )

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# 1. GENERAL INFORMATION

## 1.1. EUT Description

| | |
|---|---|
| Product Name | MOXA IEEE 802.11a/n/ac 4*4 module |
| Trade Name | MOXA |
| Model No. | WAPC002 |
| FCC ID. | SLE-WAPC002 |
| Frequency Range | 802.11b/g/n-20MHz:2412-2462MHz,802.11n-40MHz:2422-2452MHz |
| Number of Channels | 802.11b/g/n-20MHz: 11, n-40MHz: 7 |
| Data Speed | 802.11b: 1-11Mbps, 802.11a/g: 6-54Mbps, 802.11n: up to 600Mbps |
| Type of Modulation | 802.11b:DSSS, DBPSK, DQPSK, CCK<br>802.11g/n: OFDM, BPSK, QPSK, 16QAM, 64QAM |
| Antenna Type | Panel Antenna, Omni-directional Antenna, Railway Antenna, Sector Antenna, Patch Antenna |
| Antenna Gain | Refer to the table “Antenna List” |
| Channel Control | Auto |
| Contains Module | FCC ID: SLE-WAPC002 |

802.11b/g/n-20MHz Center Frequency of Each Channel:

| Channel | Frequency | Channel | Frequency | Channel | Frequency | Channel | Frequency |
|---|---|---|---|---|---|---|---|
| Channel 01: | 2412 MHz | Channel 02: | 2417 MHz | Channel 03: | 2422 MHz | Channel 04: | 2427 MHz |
| Channel 05: | 2432 MHz | Channel 06: | 2437 MHz | Channel 07: | 2442 MHz | Channel 08: | 2447 MHz |
| Channel 09: | 2452 MHz | Channel 10: | 2457 MHz | Channel 11: | 2462 MHz | | |

802.11n-40MHz (2.4G Band) Center Working Frequency of Each Channel:

| Channel | Frequency | Channel | Frequency | Channel | Frequency | Channel | Frequency |
|---|---|---|---|---|---|---|---|
| Channel 03: | 2422 MHz | Channel 04: | 2427 MHz | Channel 05: | 2432 MHz | Channel 06: | 2437 MHz |
| Channel 07: | 2442 MHz | Channel 08: | 2447 MHz | Channel 09: | 2452 MHz | | |

| Test Condition | | | Test Item | |
|---|---|---|---|---|
| | | | Radiated Emission | |
| Antenna Type | Part No. | Antenna Gain (dBi) | Radiated Emission | Band Edge |
| No.1 Panel | MAT-WDB-PA-NF-2-0708 | 7.63dBi For 2.4GHz<br>8.77dBi for 5.15~5.25GHz<br>8.77dBi for 5.25~5.35GHz<br>8.50dBi for 5.47~5.725GHz<br>8.18dBi for 5.725~5.825GHz | ✓ | ✓ |
| No.14 Omni | ANT-WDB-ARM-02 | 2.04dBi For 2.4GHz<br>0.81dBi for 5GHz | ✓ | ✓ |
| No.20 Railway | MHH-A11-XX110170-X0 | 9dBi For 2.4GHz<br>8.0dBi for 5GHz | ✓ | ✓ |
| No.21 Sector | WI25-A1-1215053-X0 | 12dBi For 2.4GHz<br>15dBi for 5GHz | ✓ | ✓ |
| No.22 Patch | TOP 200 AMR MF-05-4 | 8.2dBi For 2.4GHz<br>8.5dBi for 5GHz | ✓ | ✓ |

Note: The worst case according to the has both 2.4GHz and 5GHz antenna.

Note:

1. This device is a MOXA IEEE 802.11a/n/ac 4*4 module with a built-in 802.11a/b/g/n/ac WLAN ,this report for 2.4GHz WLAN
2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
3. Lowest and highest data rates are tested in each mode. Only worst case is shown in the report. (802.11b is 1Mbps、802.11g is 6Mbps、802.11n(20M-BW) is 28.8Mbps and, 802.11n(40M-BW) is 60Mbps).
4. At result of pretests, module supports dual-channel transmission, only the worst case is shown in the report. (802.11b is chain A, 802.11g is chain A)
5. These tests are conducted on a sample for the purpose of demonstrating compliance of 802.11b/g/n transmitter with Part 15 Subpart C Paragraph 15.247 of spread spectrum devices.
6. This device contains the two signal modules certified FCC ID: SLE-WAPC002 and FCC ID: SLE-WAPN010

| | |
|---|---|
| Test Mode:<br>(Simultaneous Transmit) | Mode 1: Transmit (802.11b 1Mbps) |
| | Mode 2: Transmit (802.11g 6Mbps) |
| | Mode 3: Transmit (802.11n-20BW_28.8Mbps) |
| | Mode 4: Transmit (802.11n-40BW_60Mbps) |

| Test Condition | Test Item | |
|---|---|---|
| | Radiated Emission | |
| Antenna Type | Radiated Emission | Band Edge |
| No.1 Panel | 2.4G b 2437MHz + 5G a 5745MHz | 2.4G n20 2412MHz + 5G ac80 5210MHz<br>5G n20 5745MHz |
| No.14 Omni | 2.4G b 2437MHz + 5G a 5785MHz | 2.4G n20 2462MHz + 5G ac80 5210MHz<br>5G n40 5670MHz |
| No.20 Railway | 2.4G b 2412MHz + 5G a 5700MHz | 2.4G n20 2412MHz + 5G ac80 5290MHz<br>5G n20 5500MHz |
| No.21 Sector | 2.4G b 2437MHz + 5G a 5240MHz | 2.4G g 2412MHz + 5G ac80 5290MHz<br>5G ac80 5530MHz |
| No.22 Patch | 2.4G b 2412MHz + 5G a 5700MHz | 2.4G g 2412MHz + 5G n40 5310MHz<br>5G ac80 5530MHz |

Note: The worst case according to the Original report.

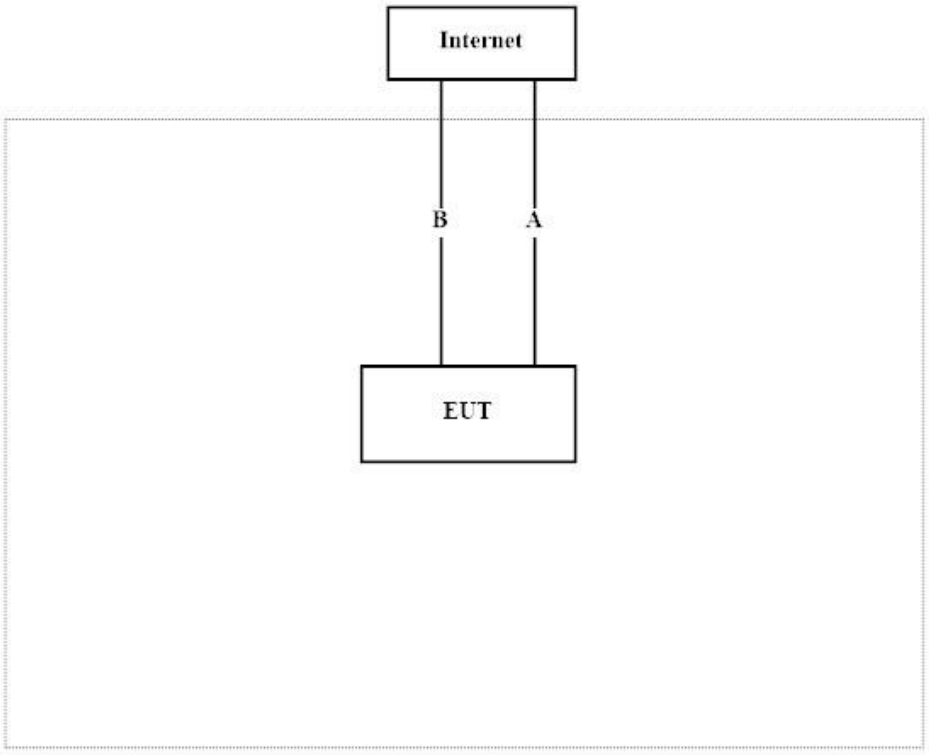
## 1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

| Product | Manufacturer | Model No. | Serial No. | Power Cord |
|---|---|---|---|---|
| N/A | | | | |

| Signal Cable Type | | Signal cable Description |
|---|---|---|
| A | LAN Cable | Shielded, 2m |
| B | RS-232 Cable | Non-shielded, 1.5m |

## 1.4. Configuration of Tested System




## 1.5. EUT Exercise Software

(1) Setup the EUT as shown on 1.4
(2) Execute “QRCT Ver. 3.0.210.0” program on the Notebook PC.
(3) Configure the test mode, the test channel, and the data rate.
(4) Start the continuous transmission.
(5) Verify that the EUT works properly.

## 1.6. Test Facility

Ambient conditions in the laboratory:

| Items | Required (IEC 68-1) | Actual |
|---|---|---|
| Temperature (°C) | 15-35 | 20-35 |
| Humidity (%RH) | 25-75 | 50-65 |
| Barometric pressure (mbar) | 860-1060 | 950-1000 |

**USA : FCC Registration Number: TW3023**

**Canada : IC Registration Number: 4075A**

Site Description: Accredited by TAF
Accredited Number: 3023

Test Laboratory: DEKRA Testing and Certification Co., Ltd
Address: No.5-22, Ruishukeng, Linkou Dist., New Taipei City 24451, Taiwan, R.O.C.
Phone number: 886-2-8601-3788
Fax number: 886-2-8601-3789
Email address: info.tw@dekra.com
Website: http://www.dekra.com.tw

## 1.7. List of Test Equipment

**For Conducted measurements /CB3/SR8**

| | Equipment | Manufacturer | Model No. | Serial No. | Cali. Date | Due. Date |
|---|---|---|---|---|---|---|
| | Temperature Chamber | WIT GROUP | TH-1S-B | EQ-201-00146 | 2019/02/26 | 2020/02/25 |
| | Spectrum Analyzer | Agilent | N9010A | MY48030495 | 2018/09/27 | 2019/09/26 |
| | Peak Power Analyzer | Keysight | 8990B | MY51000410 | 2019/07/30 | 2020/07/29 |
| | Wideband Power Sensor | Keysight | N1923A | MY56080003 | 2019/07/30 | 2020/07/29 |
| | Wideband Power Sensor | Keysight | N1923A | MY56080004 | 2019/07/30 | 2020/07/29 |
| | EMI Test Receiver | R&S | ESCS 30 | 100369 | 2018/11/19 | 2019/11/18 |
| | LISN | R&S | ESH3-Z5 | 836679/017 | 2019/04/10 | 2020/04/09 |
| | LISN | R&S | ENV216 | 100097 | 2019/04/10 | 2020/04/09 |
| | Coaxial Cable | DEKRA | RG 400 | LC018-RG | 2018/06/21 | 2019/06/20 |

**For Radiated measurements /Site3/CB8**

| | Equipment | Manufacturer | Model No. | Serial No. | Cali. Date | Due. Date |
|---|---|---|---|---|---|---|
| X | Spectrum Analyzer | R&S | FSP40 | 100170 | 2019/03/11 | 2020/03/10 |
| X | Loop Antenna | Teseq | HLA6121 | 37133 | 2017/10/13 | 2019/10/12 |
| X | Bilog Antenna | Schaffner Chase | CBL6112B | 2707 | 2019/06/23 | 2020/06/22 |
| X | Coaxial Cable | DEKRA | RG 214 | LC003-RG | 2019/06/13 | 2020/06/12 |
| X | Pre-Amplifier | Jet-Power | JPA-10M1G33 | 170101000330010 | 2019/06/13 | 2020/06/12 |
| X | Horn Antenna | ETS-Lindgren | 3117 | 00135205 | 2019/04/30 | 2020/04/29 |
| X | Pre-Amplifier | EMCI | EMC012630SE | 980210 | 2018/12/18 | 2019/12/17 |
| X | Coaxial Cable | DEKRA | SF-106 | LC035/37/41-SF | 2019/04/16 | 2020/04/15 |
| X | Amplifier + Cable | EMCI | EMC184045SE | 980370 | 2019/01/19 | 2020/01/18 |
| X | Horn Antenna | Com-Power | AH-840 | 101043 | 2019/03/27 | 2020/03/26 |
| X | Filter | MicroTRON | BRM50701 | 019 | 2019/08/08 | 2020/08/07 |
| X | Filter | Microwave Circuits | N0257881 | 36681 | 2019/08/08 | 2020/08/07 |

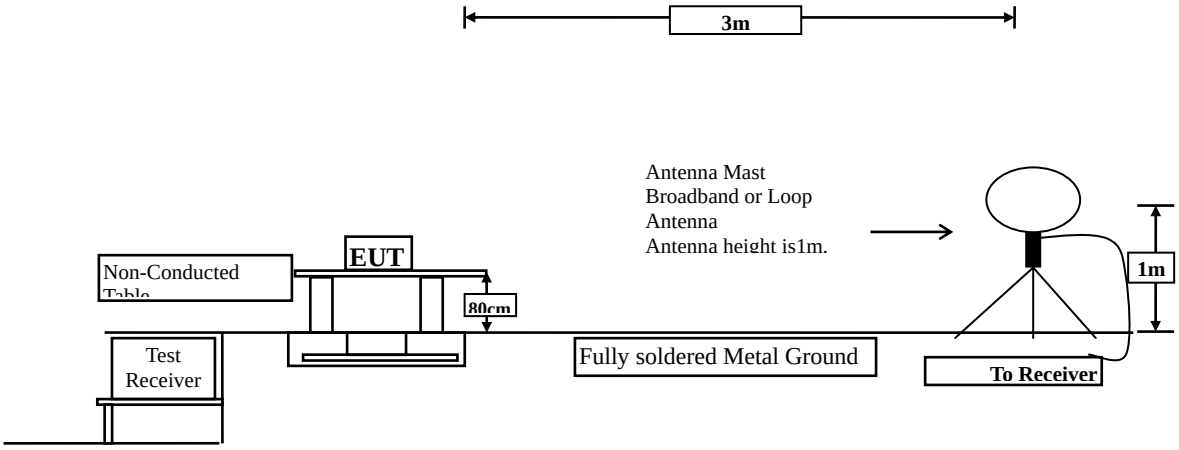
Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with “X” are used to measure the final test results.
3. Test Software version :QuieTek EMI 2.0 V2.1.113.

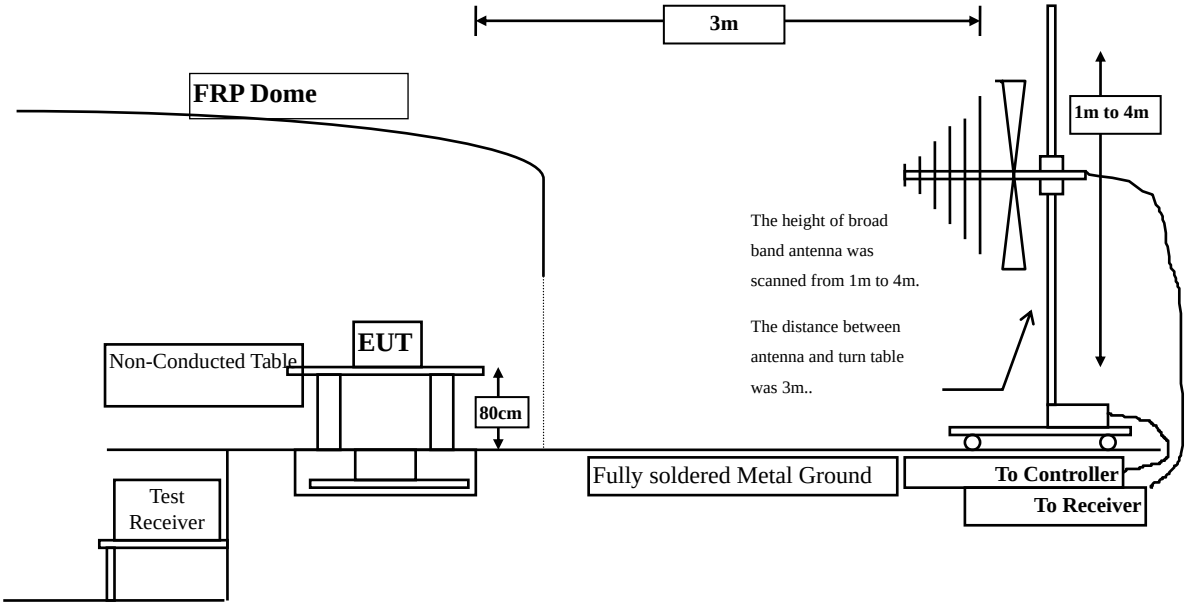
## 2. Radiated Emission

### 2.1. Test Setup

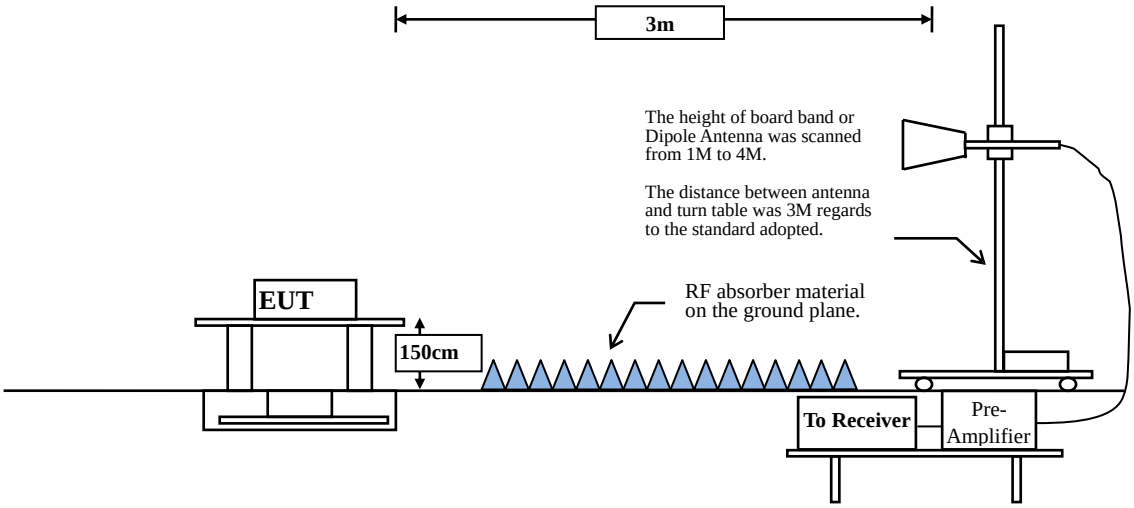
Radiated Emission Under 30MHz




Radiated Emission Below 1GHz



Radiated Emission Above 1GHz




## 2.2. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

| **FCC Part 15 Subpart C Paragraph 15.209(a) Limits** | | |
|---|---|---|
| Frequency MHz | Field strength (microvolts/meter) | Measurement distance (meter) |
| 0.009-0.490 | 2400/F(kHz) | 300 |
| 0.490-1.705 | 24000/F(kHz) | 30 |
| 1.705-30 | 30 | 30 |
| 30-88 | 100 | 3 |
| 88-216 | 150 | 3 |
| 216-960 | 200 | 3 |
| Above 960 | 500 | 3 |

Remarks: E field strength (dBuV/m) = 20 log E field strength (uV/m)

## 2.3. Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

Measuring the frequency range below 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground,when measuring the frequency range above 1GHz, the EUT is placed on a turn table which is 1.5 meter above ground.

The turn table is rotated 360 degrees to determine the position of the maximum emission level.

The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2013 on radiated measurement.

The resolution bandwidth below 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz.

Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

The worst radiated emission is measured in the Open Area Test Site on the Final Measurement.

The measurement frequency range form 9kHz - 10th Harmonic of fundamental was investigated.

**RBW and VBW Parameter setting:**

According to KDB 558074 section 12.2.4. Peak power measurement procedure

RBW = as specified in Table 1.

VBW ≥ 3 x RBW.

**Table 1 —RBW as a function of frequency**

| Frequency | RBW |
|---|---|
| 9-150 kHz | 200-300 Hz |
| 0.15-30 MHz | 9-10 kHz |
| 30-1000 MHz | 100-120 kHz |
| > 1000 MHz | 1 MHz |

According to KDB 558074 section 12.2.5. Average power measurement procedure

RBW = 1MHz.

VBW = 10Hz, when duty cycle ≥ 98 %

VBW ≥ 1/T, when duty cycle < 98 %

( T refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.)

| 2.4GHz band | Duty Cycle (%) | T (ms) | 1/T (Hz) | VBW (Hz) |
|---|---|---|---|---|
| 802.11 b | 99.31 | -- | -- | 10 |
| 802.11 g | 95.30 | 2.0580 | 486 | 500 |
| 802.11 n20 | 98.28 | 4.9855 | 201 | 10 |
| 802.11 n40 | 96.51 | 2.4058 | 416 | 500 |

Note: Duty Cycle Refer to Section 9

## 2.4. Uncertainty

± 4.08 dB above 1GHz

± 4.22 dB below 1GHz

## 2.5. Test Result of Radiated Emission

Product : MOXA IEEE 802.11a/n/ac 4*4 module
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Date : 2019/09/18
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2437 MHz) (Antenna No.1)

| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|---|---|---|---|---|---|
| MHz | dB | dBuV | dBuV/m | dB | dBuV/m |
| **Horizontal** | | | | | |
| **Peak Detector:** | | | | | |
| 4874.000 | -14.467 | 55.350 | 40.883 | -33.117 | 74.000 |
| 7311.000 | -12.418 | 66.690 | 54.272 | -19.728 | 74.000 |
| 9748.000 | -10.653 | 63.370 | 52.717 | -21.283 | 74.000 |
| **Average Detector:** | | | | | |
| 7311.000 | -12.418 | 60.280 | 47.862 | -6.138 | 54.000 |
| **Vertical** | | | | | |
| **Peak Detector:** | | | | | |
| 4874.000 | -14.467 | 55.560 | 41.093 | -32.907 | 74.000 |
| 7311.000 | -12.418 | 67.000 | 54.582 | -19.418 | 74.000 |
| 9748.000 | -10.653 | 63.680 | 53.027 | -20.973 | 74.000 |
| **Average Detector:** | | | | | |
| 7311.000 | -12.418 | 61.360 | 48.942 | -5.058 | 54.000 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : MOXA IEEE 802.11a/n/ac 4*4 module
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Date : 2019/09/18
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2462 MHz) (Antenna No.14)

| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|---|---|---|---|---|---|
| MHz | dB | dBuV | dBuV/m | dB | dBuV/m |
| **Horizontal** | | | | | |
| **Peak Detector:** | | | | | |
| 4874.000 | -14.467 | 57.340 | 42.873 | -31.127 | 74.000 |
| 7311.000 | -12.418 | 65.900 | 53.482 | -20.518 | 74.000 |
| 9748.000 | -10.653 | 66.530 | 55.877 | -18.123 | 74.000 |
| **Average Detector:** | | | | | |
| 9748.000 | -10.653 | 58.340 | 47.687 | -6.313 | 54.000 |
| **Vertical** | | | | | |
| **Peak Detector:** | | | | | |
| 4874.000 | -14.467 | 57.720 | 43.253 | -30.747 | 74.000 |
| 7311.000 | -12.418 | 65.950 | 53.532 | -20.468 | 74.000 |
| 9748.000 | -10.653 | 63.660 | 53.007 | -20.993 | 74.000 |
| **Average Detector:** | | | | | |
| -- | | | | | |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : MOXA IEEE 802.11a/n/ac 4*4 module
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Date : 2019/09/19
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2412 MHz) (Antenna No.20)

| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|---|---|---|---|---|---|
| MHz | dB | dBuV | dBuV/m | dB | dBuV/m |
| **Horizontal** | | | | | |
| **Peak Detector:** | | | | | |
| 4824.000 | -15.017 | 56.230 | 41.213 | -32.787 | 74.000 |
| 7236.000 | -11.893 | 64.530 | 52.637 | -21.363 | 74.000 |
| 9648.000 | -11.454 | 62.330 | 50.876 | -23.124 | 74.000 |
| **Average Detector:** | | | | | |
| -- | | | | | |
| **Vertical** | | | | | |
| **Peak Detector:** | | | | | |
| 4824.000 | -15.017 | 56.550 | 41.533 | -32.467 | 74.000 |
| 7236.000 | -11.893 | 65.080 | 53.187 | -20.813 | 74.000 |
| 9648.000 | -11.454 | 60.540 | 49.086 | -24.914 | 74.000 |
| **Average Detector:** | | | | | |
| -- | | | | | |

Note:
1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : MOXA IEEE 802.11a/n/ac 4*4 module
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Date : 2019/09/19
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2437 MHz) (Antenna No.21)

| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|---|---|---|---|---|---|
| MHz | dB | dBuV | dBuV/m | dB | dBuV/m |
| **Horizontal** | | | | | |
| **Peak Detector:** | | | | | |
| 4874.000 | -14.467 | 55.600 | 41.133 | -32.867 | 74.000 |
| 7311.000 | -12.418 | 67.920 | 55.502 | -18.498 | 74.000 |
| 9748.000 | -10.653 | 64.630 | 53.977 | -20.023 | 74.000 |
| **Average Detector:** | | | | | |
| 7311.000 | -12.418 | 62.520 | 50.102 | -3.898 | 54.000 |
| **Vertical** | | | | | |
| **Peak Detector:** | | | | | |
| 4874.000 | -14.467 | 56.460 | 41.993 | -32.007 | 74.000 |
| 7311.000 | -12.418 | 70.780 | 58.362 | -15.638 | 74.000 |
| 9748.000 | -10.653 | 64.450 | 53.797 | -20.203 | 74.000 |
| **Average Detector:** | | | | | |
| 7311.000 | -12.418 | 65.930 | 53.512 | -0.488 | 54.000 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : MOXA IEEE 802.11a/n/ac 4*4 module
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Date : 2019/09/19
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2412MHz) (Antenna No.22)

| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|---|---|---|---|---|---|
| MHz | dB | dBuV | dBuV/m | dB | dBuV/m |
| **Horizontal** | | | | | |
| **Peak Detector:** | | | | | |
| 4824.000 | -15.017 | 56.300 | 41.283 | -32.717 | 74.000 |
| 7236.000 | -11.893 | 64.500 | 52.607 | -21.393 | 74.000 |
| 9648.000 | -11.454 | 61.330 | 49.876 | -24.124 | 74.000 |
| **Average Detector:** | | | | | |
| -- | | | | | |
| **Vertical** | | | | | |
| **Peak Detector:** | | | | | |
| 4824.000 | -15.017 | 56.240 | 41.223 | -32.777 | 74.000 |
| 7236.000 | -11.893 | 65.600 | 53.707 | -20.293 | 74.000 |
| 9648.000 | -11.454 | 60.000 | 48.546 | -25.454 | 74.000 |
| **Average Detector:** | | | | | |
| -- | | | | | |

Note:
1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : MOXA IEEE 802.11a/n/ac 4*4 module
Test Item : General Radiated Emission Data
Test Site : No.3 OATS
Test Date : 2019/09/19
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2437 MHz) (Antenna No.1)

| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|---|---|---|---|---|---|
| MHz | dB | dBuV | dBuV/m | dB | dBuV/m |
| **Horizontal** | | | | | |
| 179.014 | -19.386 | 54.185 | 34.799 | -8.701 | 43.500 |
| 371.609 | -12.315 | 43.497 | 31.182 | -14.818 | 46.000 |
| 499.536 | -10.867 | 43.538 | 32.672 | -13.328 | 46.000 |
| 600.754 | -6.657 | 42.499 | 35.843 | -10.157 | 46.000 |
| 700.565 | -9.152 | 45.860 | 36.708 | -9.292 | 46.000 |
| 839.739 | -8.377 | 37.631 | 29.254 | -16.746 | 46.000 |
| **Vertical** | | | | | |
| 124.188 | -16.558 | 51.363 | 34.805 | -8.695 | 43.500 |
| 249.304 | -17.969 | 46.209 | 28.240 | -17.760 | 46.000 |
| 326.623 | -14.018 | 42.294 | 28.277 | -17.723 | 46.000 |
| 586.696 | -7.204 | 37.158 | 29.954 | -16.046 | 46.000 |
| 800.377 | -8.930 | 39.308 | 30.378 | -15.622 | 46.000 |
| 942.362 | -8.762 | 37.087 | 28.325 | -17.675 | 46.000 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : MOXA IEEE 802.11a/n/ac 4*4 module
Test Item : General Radiated Emission Data
Test Site : No.3 OATS
Test Date : 2019/09/19
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2437 MHz) (Antenna No.14)

| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|---|---|---|---|---|---|
| MHz | dB | dBuV | dBuV/m | dB | dBuV/m |
| **Horizontal** | | | | | |
| 170.580 | -20.172 | 56.475 | 36.302 | -7.198 | 43.500 |
| 249.304 | -17.969 | 49.684 | 31.715 | -14.285 | 46.000 |
| 499.536 | -10.867 | 42.815 | 31.949 | -14.051 | 46.000 |
| 600.754 | -6.657 | 42.572 | 35.916 | -10.084 | 46.000 |
| 700.565 | -9.152 | 46.854 | 37.702 | -8.298 | 46.000 |
| 900.188 | -9.837 | 39.344 | 29.507 | -16.493 | 46.000 |
| **Vertical** | | | | | |
| 127.000 | -16.313 | 52.015 | 35.702 | -7.798 | 43.500 |
| 302.725 | -14.612 | 50.111 | 35.499 | -10.501 | 46.000 |
| 439.087 | -9.871 | 35.845 | 25.974 | -20.026 | 46.000 |
| 592.319 | -6.946 | 36.352 | 29.405 | -16.595 | 46.000 |
| 700.565 | -9.152 | 39.392 | 30.240 | -15.760 | 46.000 |
| 874.884 | -8.407 | 36.756 | 28.349 | -17.651 | 46.000 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : MOXA IEEE 802.11a/n/ac 4*4 module
Test Item : General Radiated Emission Data
Test Site : No.3 OATS
Test Date : 2019/09/19
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2412 MHz) (Antenna No.20)

| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|---|---|---|---|---|---|
| MHz | dB | dBuV | dBuV/m | dB | dBuV/m |
| **Horizontal** | | | | | |
| 187.449 | -18.895 | 50.805 | 31.910 | -11.590 | 43.500 |
| 250.710 | -17.940 | 50.348 | 32.407 | -13.593 | 46.000 |
| 371.609 | -12.315 | 44.160 | 31.845 | -14.155 | 46.000 |
| 600.754 | -6.657 | 42.515 | 35.859 | -10.141 | 46.000 |
| 700.565 | -9.152 | 46.193 | 37.041 | -8.959 | 46.000 |
| 800.377 | -8.930 | 41.468 | 32.538 | -13.462 | 46.000 |
| **Vertical** | | | | | |
| 166.362 | -20.416 | 49.666 | 29.250 | -14.250 | 43.500 |
| 326.623 | -14.018 | 43.397 | 29.380 | -16.620 | 46.000 |
| 440.493 | -9.775 | 36.192 | 26.418 | -19.582 | 46.000 |
| 599.348 | -6.631 | 36.341 | 29.710 | -16.290 | 46.000 |
| 751.174 | -6.727 | 36.744 | 30.017 | -15.983 | 46.000 |
| 815.841 | -9.010 | 36.900 | 27.890 | -18.110 | 46.000 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : MOXA IEEE 802.11a/n/ac 4*4 module
Test Item : General Radiated Emission Data
Test Site : No.3 OATS
Test Date : 2019/09/19
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2437 MHz) (Antenna No.21)

| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|---|---|---|---|---|---|
| MHz | dB | dBuV | dBuV/m | dB | dBuV/m |
| **Horizontal** | | | | | |
| 174.797 | -19.781 | 55.267 | 35.486 | -8.014 | 43.500 |
| 247.899 | -18.059 | 50.101 | 32.041 | -13.959 | 46.000 |
| 373.014 | -12.268 | 42.942 | 30.675 | -15.325 | 46.000 |
| 600.754 | -6.657 | 42.030 | 35.374 | -10.626 | 46.000 |
| 700.565 | -9.152 | 47.017 | 37.865 | -8.135 | 46.000 |
| 800.377 | -8.930 | 41.267 | 32.337 | -13.663 | 46.000 |
| **Vertical** | | | | | |
| 146.681 | -19.104 | 51.639 | 32.535 | -10.965 | 43.500 |
| 302.725 | -14.612 | 50.033 | 35.421 | -10.579 | 46.000 |
| 458.768 | -10.460 | 36.572 | 26.112 | -19.888 | 46.000 |
| 606.377 | -7.066 | 36.808 | 29.742 | -16.258 | 46.000 |
| 749.768 | -6.569 | 37.954 | 31.385 | -14.615 | 46.000 |
| 859.420 | -8.409 | 37.081 | 28.672 | -17.328 | 46.000 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : MOXA IEEE 802.11a/n/ac 4*4 module
Test Item : General Radiated Emission Data
Test Site : No.3 OATS
Test Date : 2019/09/19
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2412 MHz) (Antenna No.22)

| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|---|---|---|---|---|---|
| MHz | dB | dBuV | dBuV/m | dB | dBuV/m |
| **Horizontal** | | | | | |
| 164.957 | -20.490 | 55.734 | 35.245 | -8.255 | 43.500 |
| 373.014 | -12.268 | 44.732 | 32.465 | -13.535 | 46.000 |
| 499.536 | -10.867 | 43.494 | 32.628 | -13.372 | 46.000 |
| 600.754 | -6.657 | 42.810 | 36.154 | -9.846 | 46.000 |
| 700.565 | -9.152 | 46.689 | 37.537 | -8.463 | 46.000 |
| 845.362 | -8.301 | 37.991 | 29.690 | -16.310 | 46.000 |
| **Vertical** | | | | | |
| 142.464 | -18.164 | 52.420 | 34.255 | -9.245 | 43.500 |
| 250.710 | -17.940 | 45.217 | 27.276 | -18.724 | 46.000 |
| 453.145 | -10.262 | 36.645 | 26.384 | -19.616 | 46.000 |
| 595.130 | -6.823 | 36.779 | 29.956 | -16.044 | 46.000 |
| 749.768 | -6.569 | 37.128 | 30.559 | -15.441 | 46.000 |
| 870.667 | -8.416 | 36.522 | 28.106 | -17.894 | 46.000 |

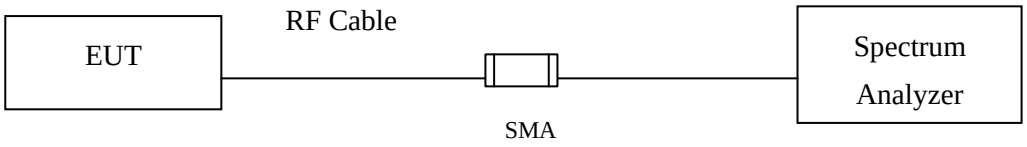
Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

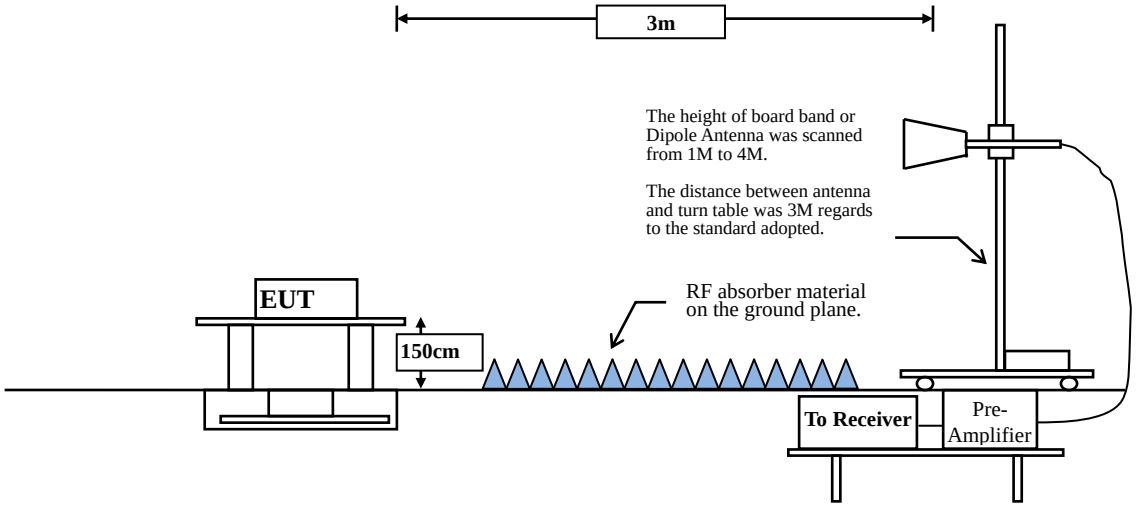
# 3. Band Edge

## 3.1. Test Setup

**RF Conducted Measurement**




**RF Radiated Measurement:**



## 3.2. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

## 3.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 and tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.
The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.

**RBW and VBW Parameter setting:**

According to KDB 558074 section 12.2.4. Peak power measurement procedure

RBW = as specified in Table 1.

VBW ≥ 3 x RBW.

**Table 1 —RBW as a function of frequency**

| Frequency | RBW |
|---|---|
| 9-150 kHz | 200-300 Hz |
| 0.15-30 MHz | 9-10 kHz |
| 30-1000 MHz | 100-120 kHz |
| > 1000 MHz | 1 MHz |

According to KDB 558074 section 12.2.5. Average power measurement procedure

RBW = 1MHz.

VBW = 10Hz, when duty cycle ≥ 98 %

VBW ≥ 1/T, when duty cycle < 98 %

( T refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.)

| 2.4GHz band | Duty Cycle (%) | T (ms) | 1/T (Hz) | VBW (Hz) |
|---|---|---|---|---|
| 802.11 b | 99.31 | -- | -- | 10 |
| 802.11 g | 95.30 | 2.0580 | 486 | 500 |
| 802.11 n20 | 98.28 | 4.9855 | 201 | 500 |
| 802.11 n40 | 96.51 | 2.4058 | 416 | 500 |

Note: Duty Cycle Refer to Section 9

## 3.4. Uncertainty

± 4.08 dB above 1GHz

± 4.22 dB below 1GHz

## 3.5. Test Result of Band Edge

Product : MOXA IEEE 802.11a/n/ac 4*4 module
Test Item : Band Edge
Test Site : No.3 OATS
Test Date : 2019/09/18
Test Mode : Mode 3: Transmit (802.11n-20BW_28.8Mbps) (2412MHz) (Antenna No.1)

**RF Radiated Measurement (Horizontal):**

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBuV) | Emission Level (dBuV/m) | Peak Limit (dBuV/m) | Average Limit (dBuV/m) | Result |
|---|---|---|---|---|---|---|---|
| 01 (Peak) | 2390.000 | 8.763 | 51.222 | 59.985 | 74.00 | 54.00 | Pass |
| 01 (Peak) | 2400.000 | 8.799 | 70.020 | 78.819 | -- | -- | -- |
| 01 (Peak) | 2411.159 | 8.839 | 96.058 | 104.897 | -- | -- | -- |
| 01 (Average) | 2390.000 | 8.763 | 32.247 | 41.010 | 74.00 | 54.00 | Pass |
| 01 (Average) | 2400.000 | 8.799 | 41.650 | 50.449 | -- | -- | -- |
| 01 (Average) | 2414.203 | 8.850 | 82.725 | 91.574 | -- | -- | -- |

**Figure Channel 01: Horizontal (Peak)**

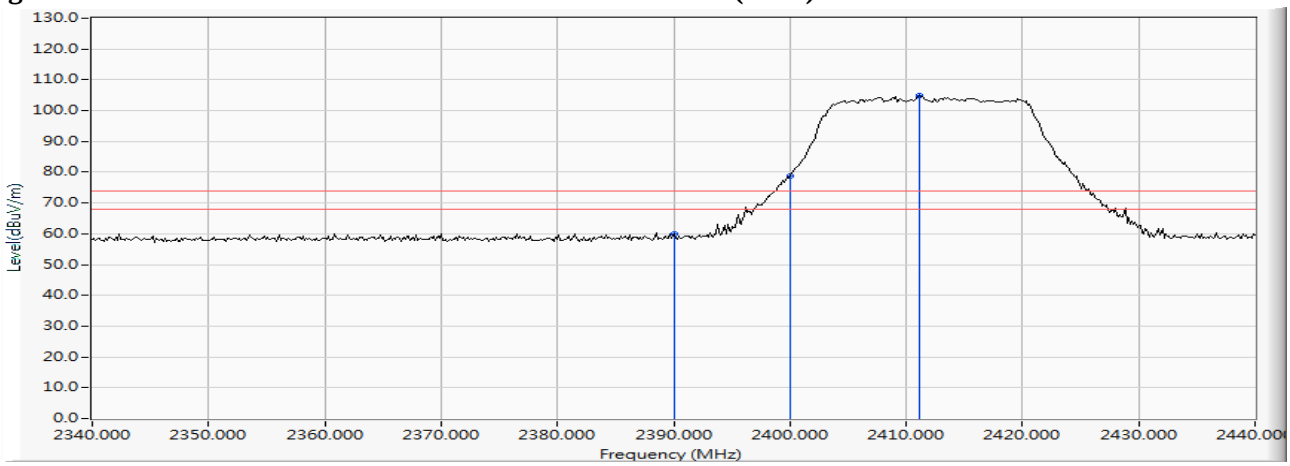
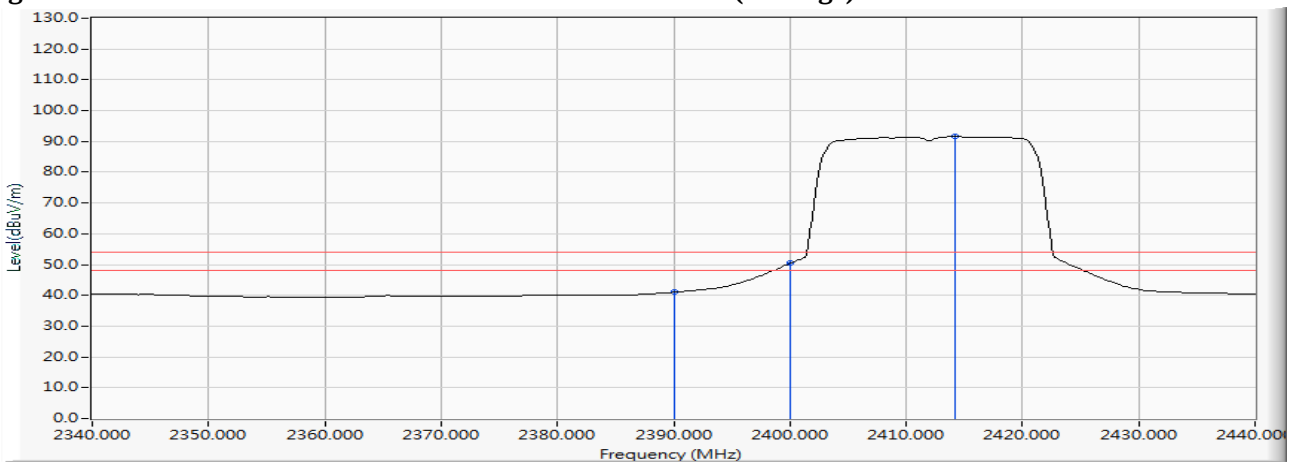



**Figure Channel 01: Horizontal (Average)**




Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection. detection.

Product : MOXA IEEE 802.11a/n/ac 4*4 module
Test Item : Band Edge
Test Site : No.3 OATS
Test Date : 2019/09/18
Test Mode : Mode 3: Transmit (802.11n-20BW_28.8Mbps) (2412MHz) (Antenna No.1)

**RF Radiated Measurement (Vertical):**

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBuV) | Emission Level (dBuV/m) | Peak Limit (dBuV/m) | Average Limit (dBuV/m) | Result |
|---|---|---|---|---|---|---|---|
| 01 (Peak) | 2378.261 | 8.721 | 59.477 | 68.198 | 74.00 | 54.00 | Pass |
| 01 (Peak) | 2390.000 | 8.763 | 57.141 | 65.904 | 74.00 | 54.00 | Pass |
| 01 (Peak) | 2400.000 | 8.799 | 85.758 | 94.557 | -- | -- | -- |
| 01 (Peak) | 2418.986 | 8.867 | 111.796 | 120.663 | -- | -- | -- |
| 01 (Average) | 2390.000 | 8.763 | 43.983 | 52.746 | 74.00 | 54.00 | Pass |
| 01 (Average) | 2400.000 | 8.799 | 56.962 | 65.761 | -- | -- | -- |
| 01 (Average) | 2413.478 | 8.847 | 98.351 | 107.198 | -- | -- | -- |

**Figure Channel 01: Vertical (Peak)**

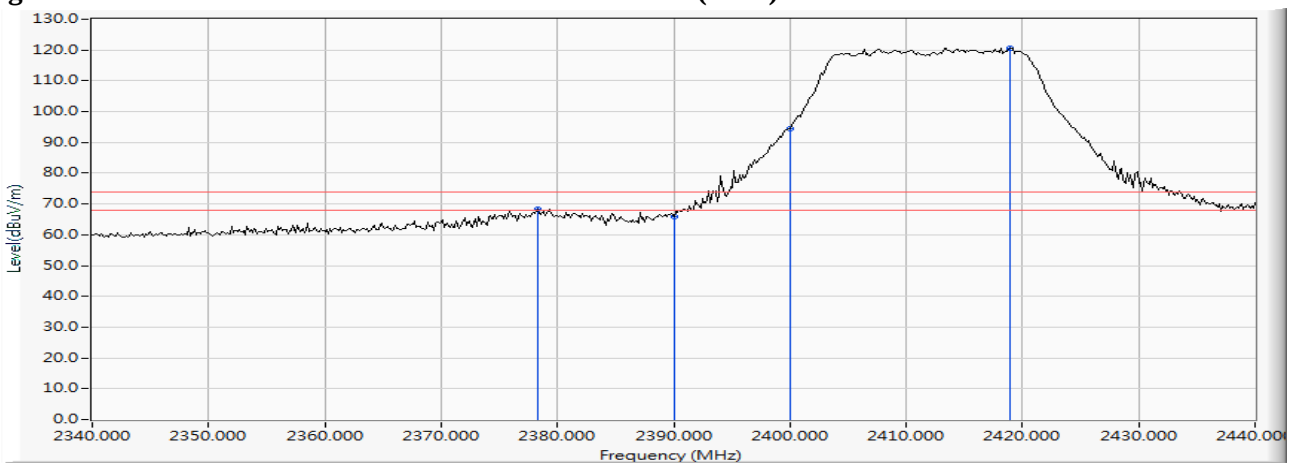
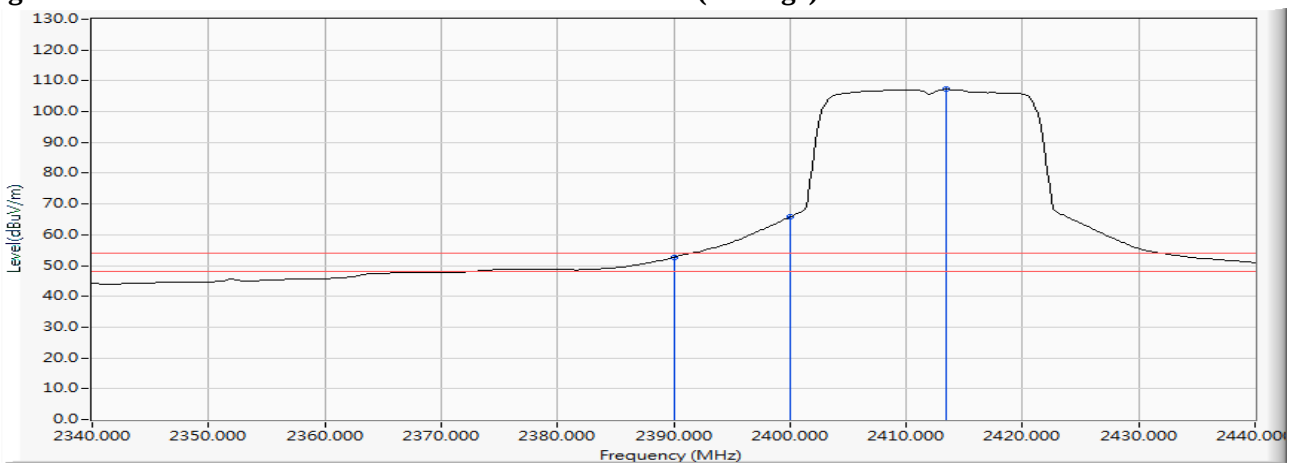



**Figure Channel 01: Vertical (Average)**




Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

| | | |
|---|---|---|
| Product | : | MOXA IEEE 802.11a/n/ac 4*4 module |
| Test Item | : | Band Edge |
| Test Site | : | No.3 OATS |
| Test Date | : | 2019/09/18 |
| Test Mode | : | Mode 3: Transmit (802.11n-20BW_28.8Mbps) (2462MHz) (Antenna No.14) |

**RF Radiated Measurement (Horizontal):**

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBuV) | Emission Level (dBuV/m) | Peak Limit (dBuV/m) | Average Limit (dBuV/m) | Result |
|---|---|---|---|---|---|---|---|
| 01 (Peak) | 2465.819 | 9.035 | 91.408 | 100.444 | -- | -- | -- |
| 01 (Peak) | 2483.500 | 9.100 | 50.903 | 60.002 | 74.00 | 54.00 | Pass |
| 01 (Average) | 2464.225 | 9.031 | 79.060 | 88.090 | -- | -- | -- |
| 01 (Average) | 2483.500 | 9.100 | 31.461 | 40.560 | 74.00 | 54.00 | Pass |

**Figure Channel 01: Horizontal (Peak)**

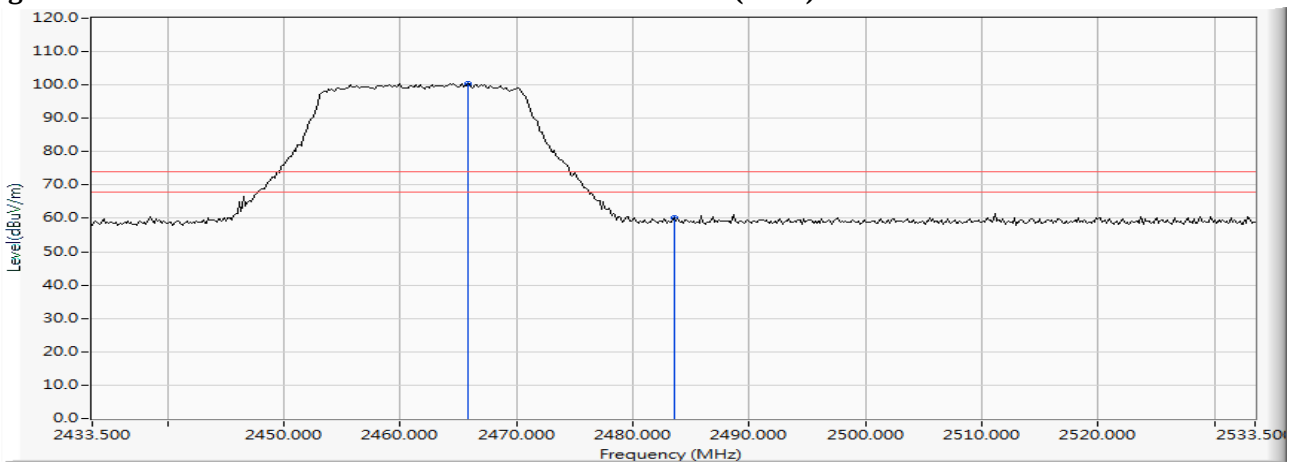
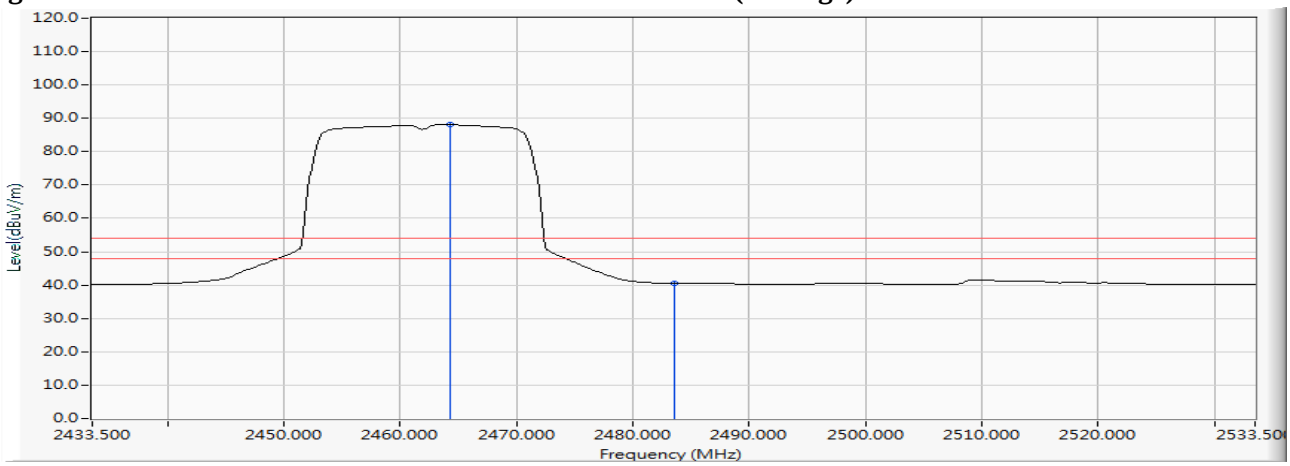



**Figure Channel 01: Horizontal (Average)**




Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection. detection.

| | | |
|---|---|---|
| Product | : | MOXA IEEE 802.11a/n/ac 4*4 module |
| Test Item | : | Band Edge |
| Test Site | : | No.3 OATS |
| Test Date | : | 2019/09/18 |
| Test Mode | : | Mode 3: Transmit (802.11n-20BW_28.8Mbps) (2462MHz) (Antenna No.14) |

**RF Radiated Measurement (Vertical):**

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBuV) | Emission Level (dBuV/m) | Peak Limit (dBuV/m) | Average Limit (dBuV/m) | Result |
|---|---|---|---|---|---|---|---|
| 01 (Peak) | 2466.978 | 9.040 | 106.072 | 115.112 | -- | -- | -- |
| 01 (Peak) | 2483.500 | 9.100 | 56.099 | 65.198 | 74.00 | 54.00 | Pass |
| 01 (Average) | 2464.080 | 9.029 | 93.056 | 102.085 | -- | -- | -- |
| 01 (Average) | 2483.500 | 9.100 | 38.377 | 47.476 | 74.00 | 54.00 | Pass |

**Figure Channel 01: Vertical (Peak)**

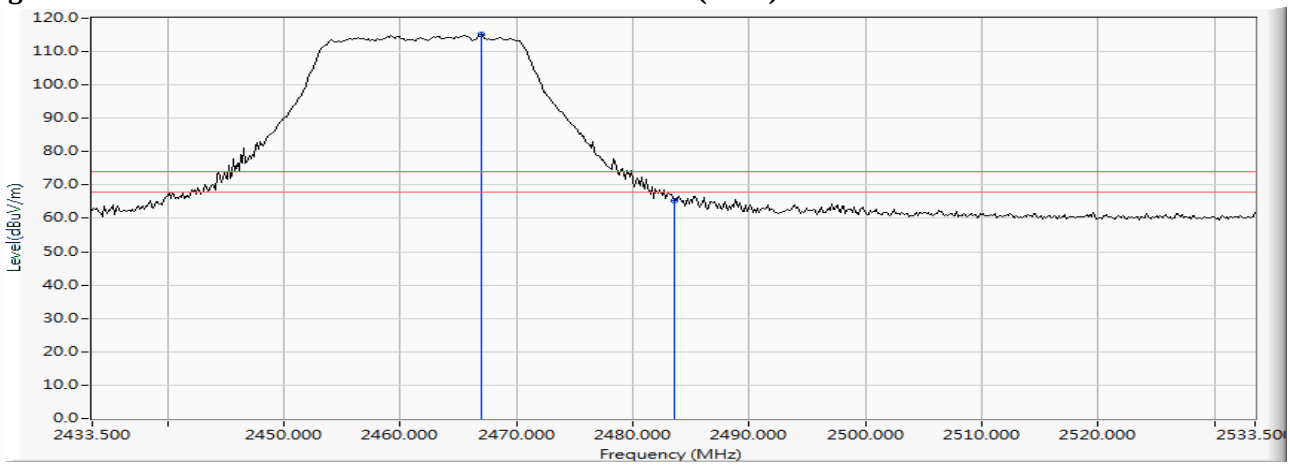
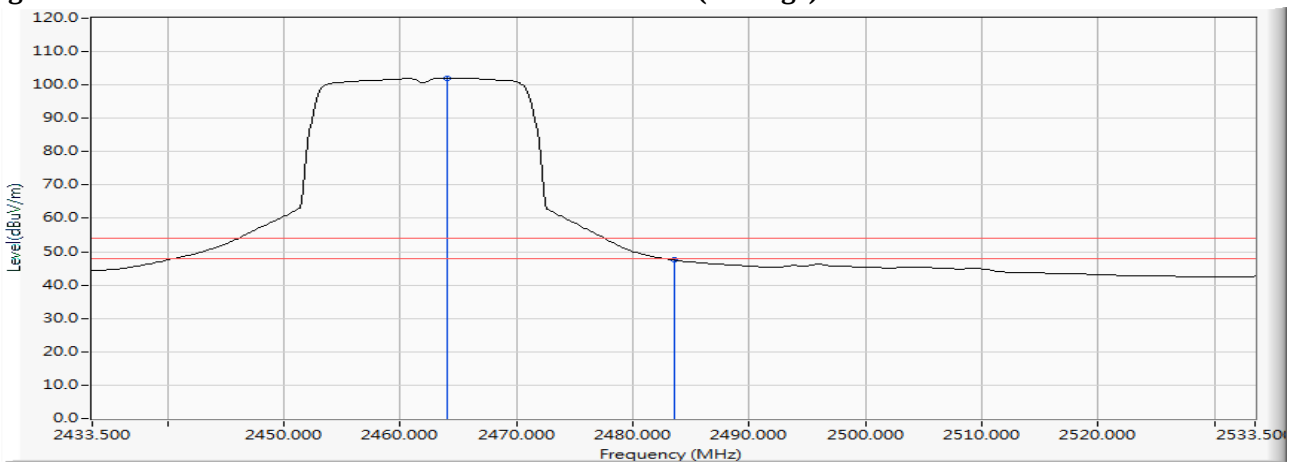



**Figure Channel 01: Vertical (Average)**




Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

| | | |
|---|---|---|
| Product | : | MOXA IEEE 802.11a/n/ac 4*4 module |
| Test Item | : | Band Edge |
| Test Site | : | No.3 OATS |
| Test Date | : | 2019/09/19 |
| Test Mode | : | Mode 3: Transmit (802.11n-20BW_28.8Mbps) (2412MHz) (Antenna No.20) |

**RF Radiated Measurement (Horizontal):**

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBuV) | Emission Level (dBuV/m) | Peak Limit (dBuV/m) | Average Limit (dBuV/m) | Result |
|---|---|---|---|---|---|---|---|
| 11 (Peak) | 2390.000 | 8.763 | 49.481 | 58.244 | 74.00 | 54.00 | Pass |
| 11 (Peak) | 2400.000 | 8.799 | 66.554 | 75.353 | -- | -- | -- |
| 11 (Peak) | 2414.927 | 8.852 | 91.100 | 99.952 | -- | -- | -- |
| 11 (Average) | 2390.000 | 8.763 | 31.035 | 39.798 | 74.00 | 54.00 | Pass |
| 11 (Average) | 2400.000 | 8.799 | 38.314 | 47.113 | -- | -- | -- |
| 11 (Average) | 2413.913 | 8.848 | 78.030 | 86.878 | -- | -- | -- |

**Figure Channel 11: Horizontal (Peak)**

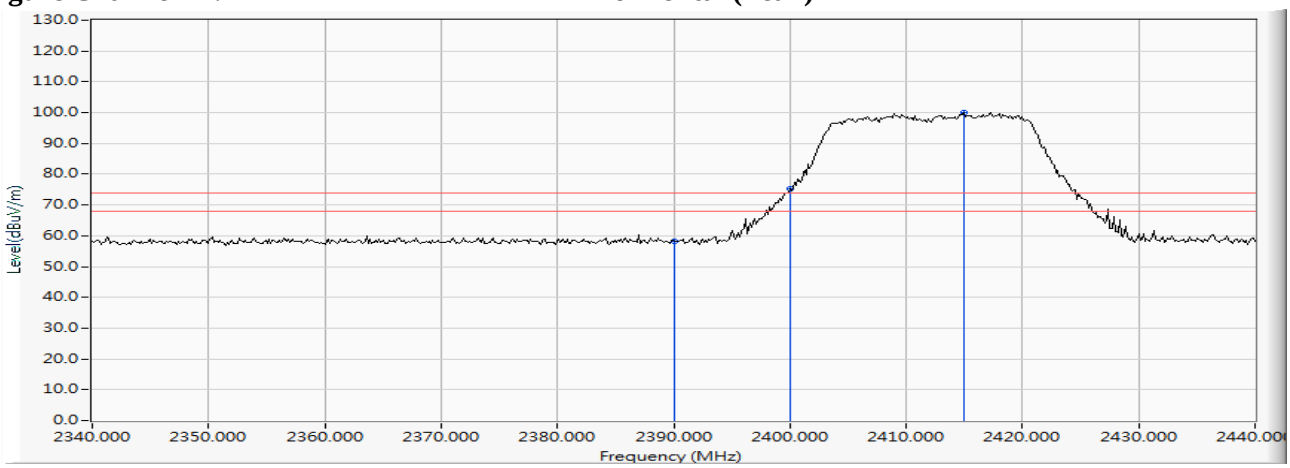
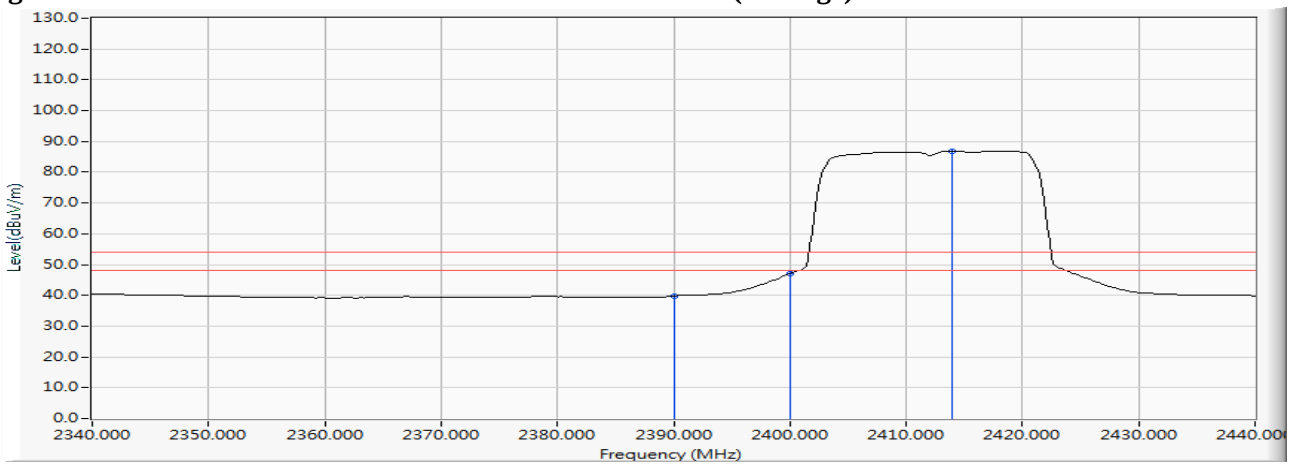



**Figure Channel 11: Horizontal (Average)**




Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : MOXA IEEE 802.11a/n/ac 4*4 module
Test Item : Band Edge
Test Site : No.3 OATS
Test Date : 2019/09/19
Test Mode : Mode 3: Transmit (802.11n-20BW_28.8Mbps) (2412MHz) (Antenna No.20)

**RF Radiated Measurement (Vertical):**

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBuV) | Emission Level (dBuV/m) | Peak Limit (dBuV/m) | Average Limit (dBuV/m) | Result |
|---|---|---|---|---|---|---|---|
| 11 (Peak) | 2379.710 | 8.726 | 56.296 | 65.022 | 74.00 | 54.00 | Pass |
| 11 (Peak) | 2390.000 | 8.763 | 54.025 | 62.788 | 74.00 | 54.00 | Pass |
| 11 (Peak) | 2400.000 | 8.799 | 78.935 | 87.734 | -- | -- | -- |
| 11 (Peak) | 2410.725 | 8.838 | 106.746 | 115.583 | -- | -- | -- |
| 11 (Average) | 2390.000 | 8.763 | 36.553 | 45.316 | 74.00 | 54.00 | Pass |
| 11 (Average) | 2400.000 | 8.799 | 49.816 | 58.615 | -- | -- | -- |
| 11 (Average) | 2417.246 | 8.861 | 91.290 | 100.151 | -- | -- | -- |

**Figure Channel 11: Vertical (Peak)**

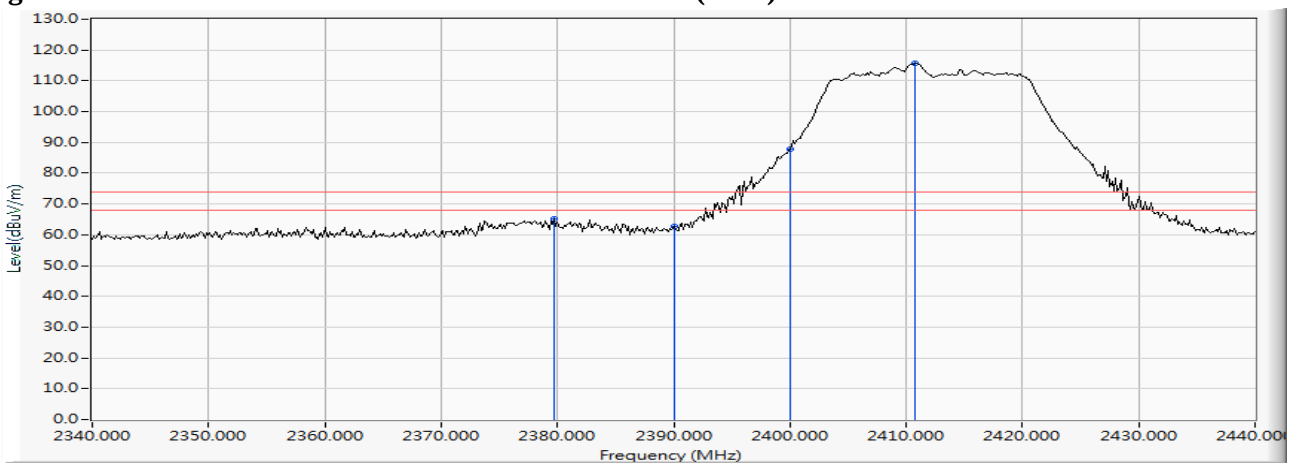
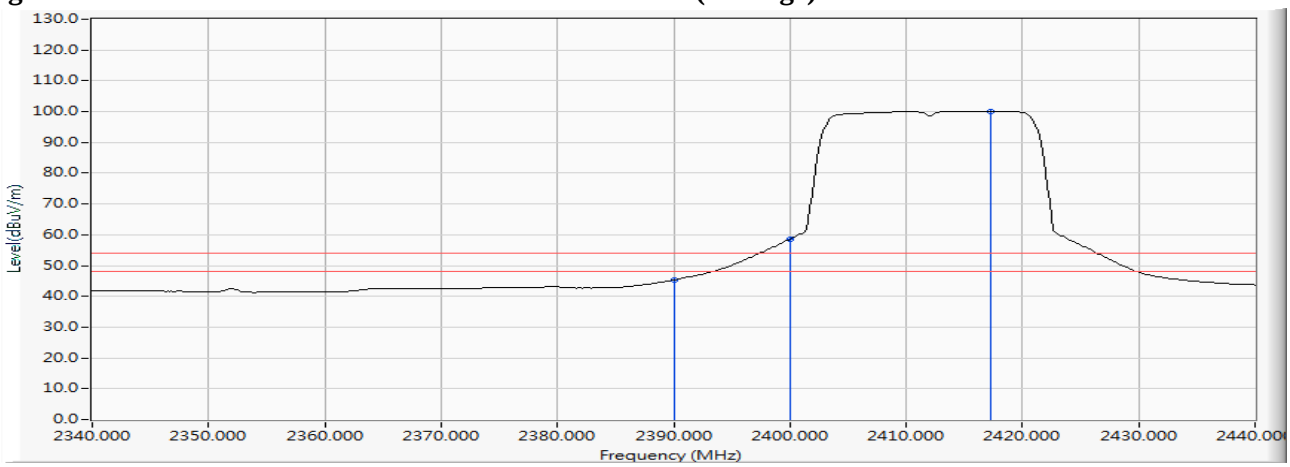



**Figure Channel 11: Vertical (Average)**




Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

| | | |
|---|---|---|
| Product | : | MOXA IEEE 802.11a/n/ac 4*4 module |
| Test Item | : | Band Edge |
| Test Site | : | No.3 OATS |
| Test Date | : | 2019/09/19 |
| Test Mode | : | Mode 2: Transmit (802.11g 6Mbps) (2412MHz) (Antenna No.21) |

**RF Radiated Measurement (Horizontal):**

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBuV) | Emission Level (dBuV/m) | Peak Limit (dBuV/m) | Average Limit (dBuV/m) | Result |
|---|---|---|---|---|---|---|---|
| 01 (Peak) | 2390.000 | 8.763 | 58.470 | 67.233 | 74.00 | 54.00 | Pass |
| 01 (Peak) | 2400.000 | 8.799 | 67.790 | 76.589 | -- | -- | -- |
| 01 (Peak) | 2414.783 | 8.851 | 97.446 | 106.298 | -- | -- | -- |
| 01(Average) | 2390.000 | 8.763 | 42.375 | 51.138 | 74.00 | 54.00 | Pass |
| 01(Average) | 2400.000 | 8.799 | 50.116 | 58.915 | -- | -- | -- |
| 01(Average) | 2408.551 | 8.829 | 84.254 | 93.084 | -- | -- | -- |

**Figure Channel 01: Horizontal (Peak)**

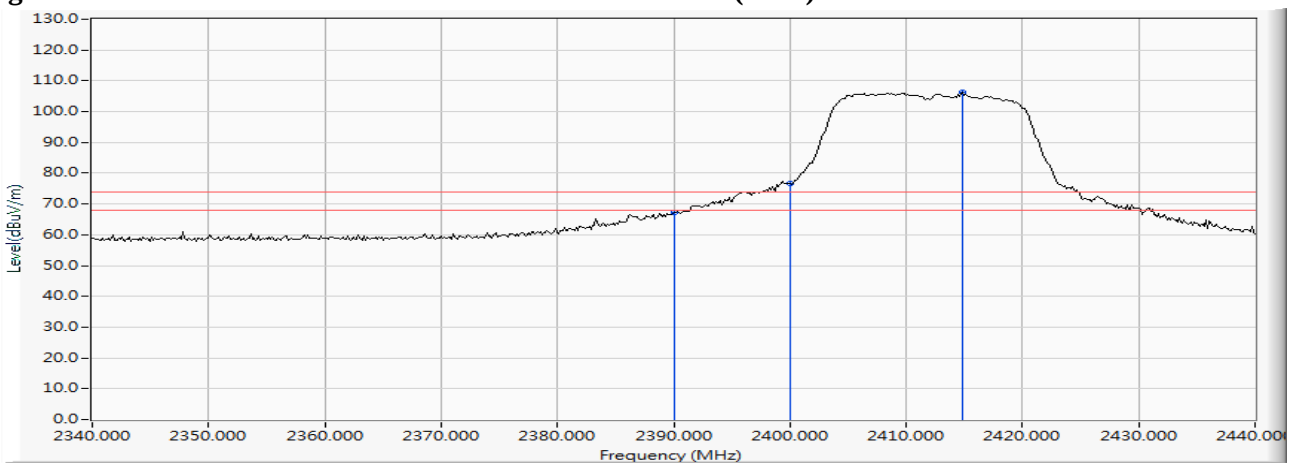
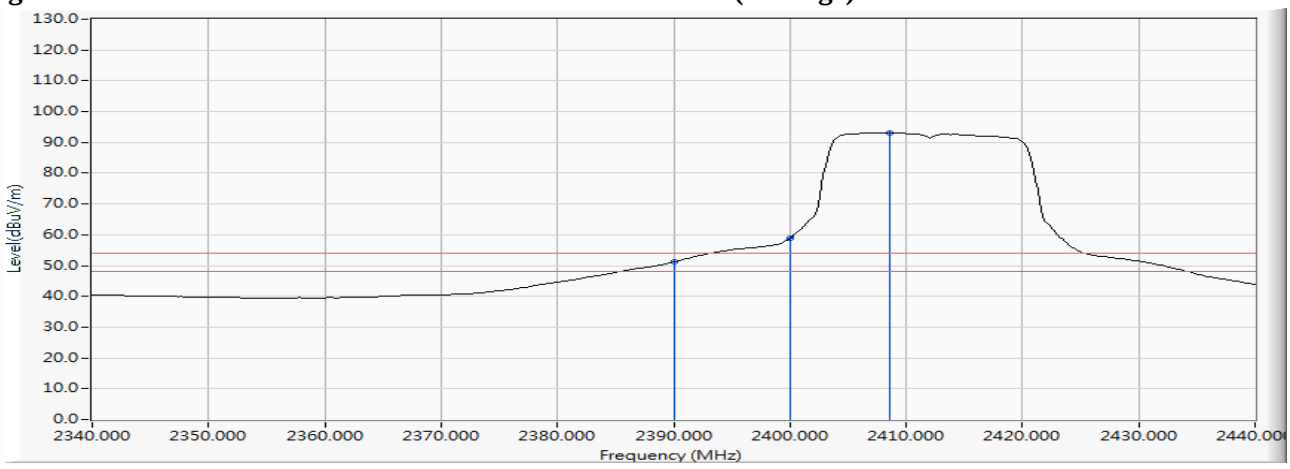



**Figure Channel 01: Horizontal (Average)**




Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

| | | |
|---|---|---|
| Product | : | MOXA IEEE 802.11a/n/ac 4*4 module |
| Test Item | : | Band Edge |
| Test Site | : | No.3 OATS |
| Test Date | : | 2019/09/19 |
| Test Mode | : | Mode 2: Transmit (802.11g 6Mbps) (2412MHz) (Antenna No.21) |

**RF Radiated Measurement (Vertical):**

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBuV) | Emission Level (dBuV/m) | Peak Limit (dBuV/m) | Average Limit (dBuV/m) | Result |
|---|---|---|---|---|---|---|---|
| 01 (Peak) | 2378.116 | 8.721 | 57.916 | 66.636 | 74.00 | 54.00 | Pass |
| 01 (Peak) | 2390.000 | 8.763 | 56.354 | 65.117 | 74.00 | 54.00 | Pass |
| 01 (Peak) | 2400.000 | 8.799 | 66.849 | 75.648 | -- | -- | -- |
| 01 (Peak) | 2414.638 | 8.851 | 105.328 | 114.179 | -- | -- | -- |
| 01 (Average) | 2351.884 | 8.625 | 37.690 | 46.315 | 74.00 | 54.00 | Pass |
| 01 (Average) | 2390.000 | 8.763 | 36.820 | 45.583 | 74.00 | 54.00 | Pass |
| 01 (Average) | 2400.000 | 8.799 | 50.532 | 59.331 | -- | -- | -- |
| 01 (Average) | 2409.130 | 8.832 | 94.228 | 103.060 | -- | -- | -- |

**Figure Channel 01: Vertical (Peak)**

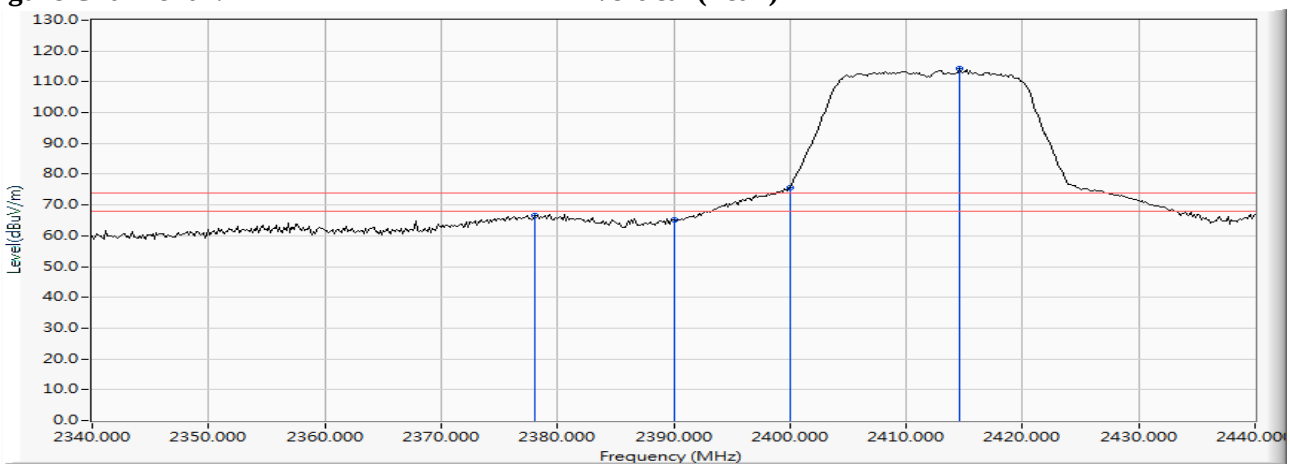
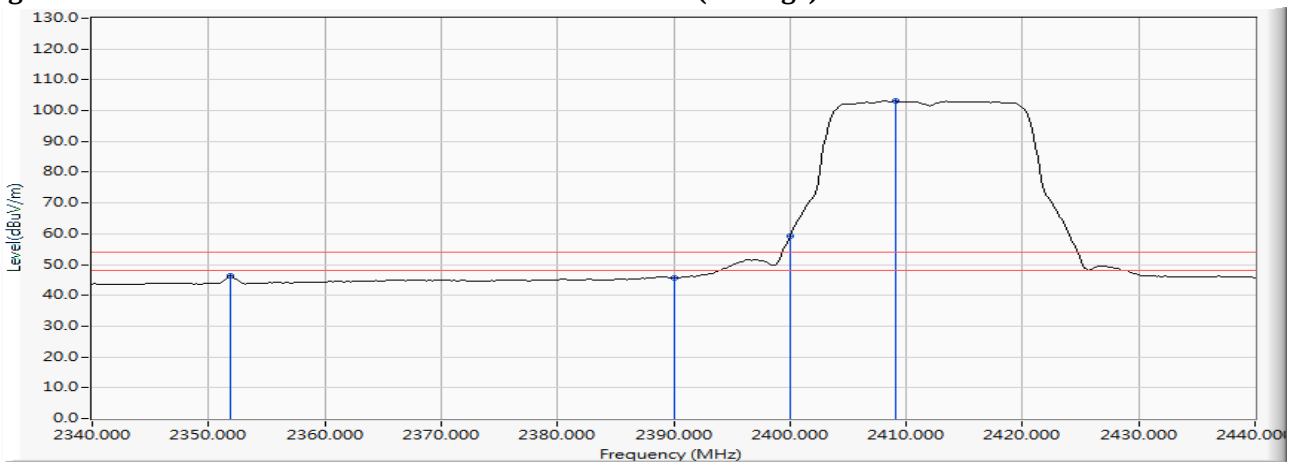



**Figure Channel 01: Vertical (Average)**




Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

| | | |
|---|---|---|
| Product | : | MOXA IEEE 802.11a/n/ac 4*4 module |
| Test Item | : | Band Edge |
| Test Site | : | No.3 OATS |
| Test Date | : | 2019/09/19 |
| Test Mode | : | Mode 2: Transmit (802.11g 6Mbps) (2412MHz) (Antenna No.22) |

**RF Radiated Measurement (Horizontal):**

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBuV) | Emission Level (dBuV/m) | Peak Limit (dBuV/m) | Average Limit (dBuV/m) | Result |
|---|---|---|---|---|---|---|---|
| 11 (Peak) | 2390.000 | 8.763 | 63.557 | 72.320 | 74.00 | 54.00 | Pass |
| 11 (Peak) | 2400.000 | 8.799 | 71.600 | 80.399 | -- | -- | -- |
| 11 (Peak) | 2414.638 | 8.851 | 109.834 | 118.685 | -- | -- | -- |
| 11 (Average) | 2390.000 | 8.763 | 43.498 | 52.261 | 74.00 | 54.00 | Pass |
| 11 (Average) | 2400.000 | 8.799 | 53.760 | 62.559 | -- | -- | -- |
| 11 (Average) | 2414.348 | 8.850 | 97.228 | 106.078 | -- | -- | -- |

**Figure Channel 11: Horizontal (Peak)**

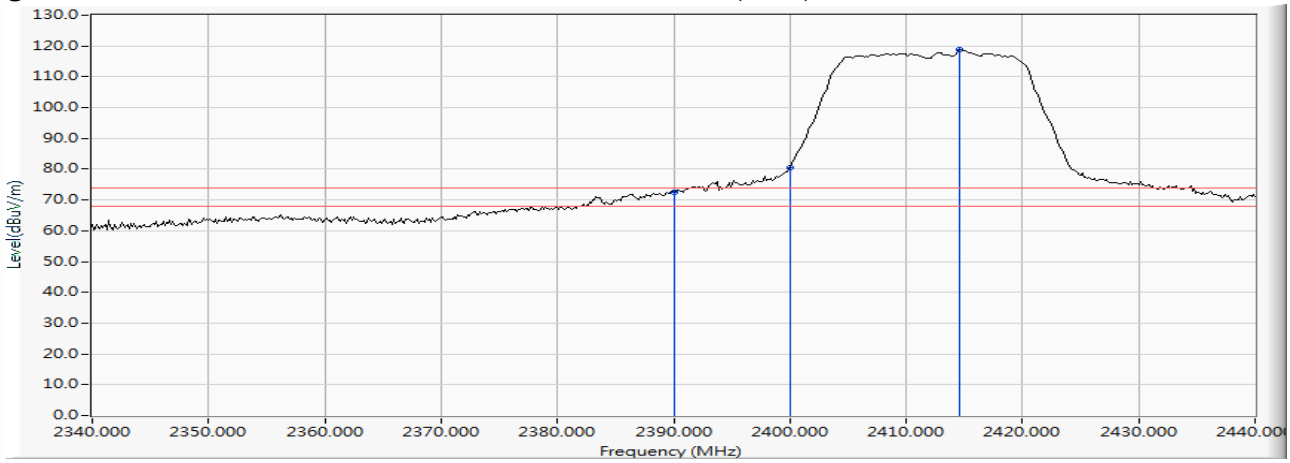
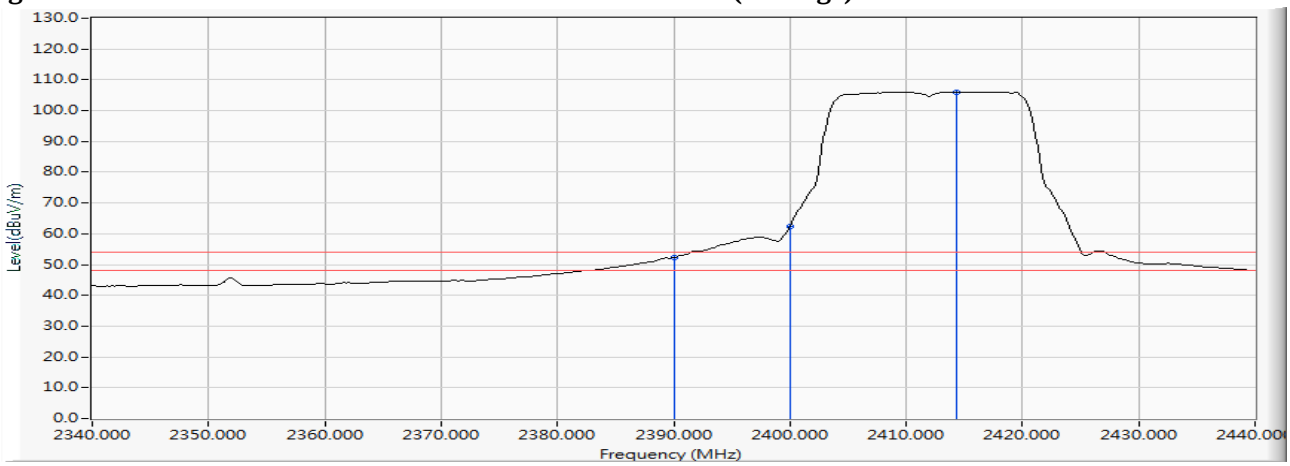



**Figure Channel 11: Horizontal (Average)**




Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

| | | |
|---|---|---|
| Product | : | MOXA IEEE 802.11a/n/ac 4*4 module |
| Test Item | : | Band Edge |
| Test Site | : | No.3 OATS |
| Test Date | : | 2019/09/19 |
| Test Mode | : | Mode 2: Transmit (802.11g 6Mbps) (2412MHz) (Antenna No.22) |

**RF Radiated Measurement (Vertical):**

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBuV) | Emission Level (dBuV/m) | Peak Limit (dBuV/m) | Average Limit (dBuV/m) | Result |
|---|---|---|---|---|---|---|---|
| 11 (Peak) | 2390.000 | 8.763 | 54.125 | 62.888 | 74.00 | 54.00 | Pass |
| 11 (Peak) | 2400.000 | 8.799 | 63.395 | 72.194 | -- | -- | -- |
| 11 (Peak) | 2409.565 | 8.834 | 100.710 | 109.543 | -- | -- | -- |
| 11 (Average) | 2390.000 | 8.763 | 38.872 | 47.635 | 74.00 | 54.00 | Pass |
| 11 (Average) | 2400.000 | 8.799 | 47.397 | 56.196 | -- | -- | -- |
| 11 (Average) | 2409.565 | 8.834 | 90.134 | 98.967 | -- | -- | -- |

**Figure Channel 11: Vertical (Peak)**

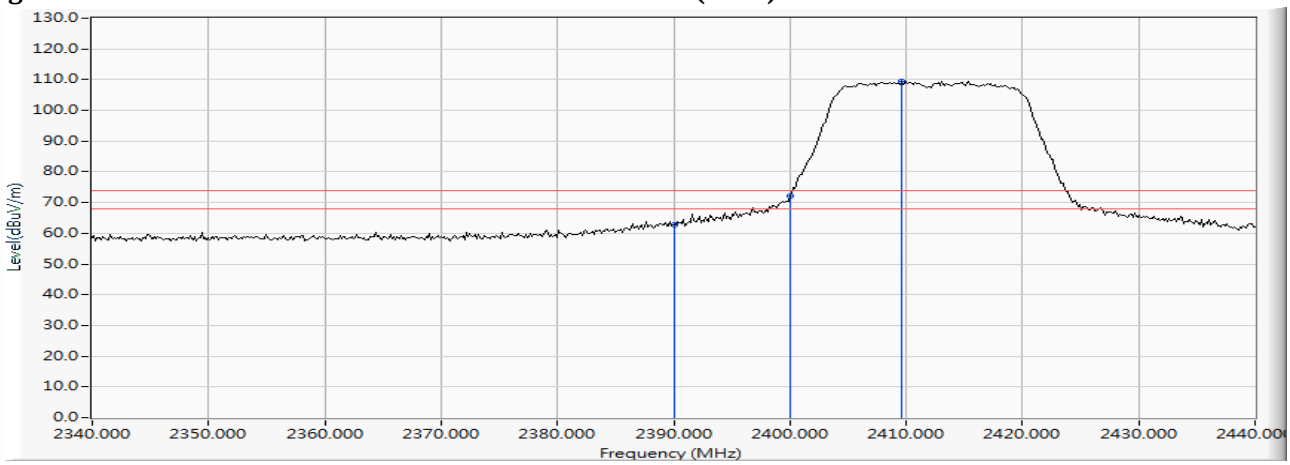
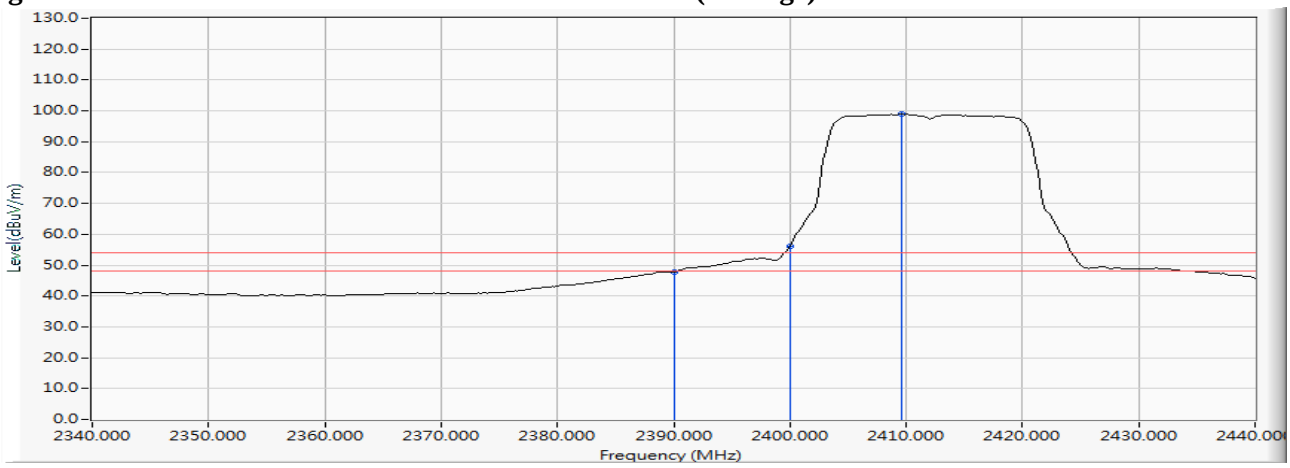



**Figure Channel 11: Vertical (Average)**




Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

## 4. EMI Reduction Method During Compliance Testing

No modification was made during testing.