**Shenzhen Huaxia Testing Technology Co., Ltd**

1F., Block A of Tongsheng Technology Building, Huahui Road, Dalang Street, Longhua District, Shenzhen, China

Telephone: +86-755-26648640
Fax: +86-755-26648637
Website: www.cqa-cert.com

Report Template Version: V03
Report Template Revision Date: Mar.1st, 2017

# Test Report

| | |
|---|---|
| **Report No. :** | CQASZ20210400543E-01 |
| **Applicant:** | UNIONMAN TECHNOLOGY CO., LTD. |
| **Address of Applicant:** | No.5 Huitai Road, Huinan High-Tech Industrial Park, Huizhou City, Guangdong, China. |
| **Manufacturer:** | UNIONMAN TECHNOLOGY CO., LTD. |
| **Address of Manufacturer:** | No.5 Huitai Road, Huinan High-Tech Industrial Park, Huizhou City, Guangdong, China. |
| **Manufacturer:** | UNIONMAN TECHNOLOGY CO., LTD. |
| **Factory:** | No.5 Huitai Road, Huinan High-Tech Industrial Park, Huizhou City, Guangdong, China. |
| **Address of Factory:** | |
| **Equipment Under Test (EUT):** | |
| **Product:** | WiFi6 CPE |
| **Model No.:** | UNR033H |
| **Series Model:** | UNR032H (The just a different look and a different model) |
| **Brand Name:** | N/A |
| **FCC ID:** | 2ATGV-UNR032H |
| **Standards:** | 47 CFR Part 15, Subpart C |
| **Date of Test:** | 2021-04-15 to 2021-05-07 |
| **Date of Issue:** | 2021-05-12 |
| **Test Result :** | **PASS*** |

***Tested By:*** lewis zhou

***(Lewis Zhou)***

***Reviewed By:*** Juh Li

***(Sheek Luo)***

***Approved By:*** Sheek. Luo

***(Sheek Luo)***

SHENZHEN HUAXIA TESTING TECHNOLOGY CO., LTD. 华夏准测 APPROVED

* In the configuration tested, the EUT complied with the standards specified above.

The test report is effective only with both signature and specialized stamp, The result(s) shown in this report refer only to the sample(s) tested. Without written approval of CQA, this report can't be reproduced except in full.

# 1 Version

**Revision History Of Report**

| Report No. | Version | Description | Issue Date |
|---|---|---|---|
| CQASZ20210400543E-01 | Rev.01 | Initial report | 2021-5-24 |

# 2 Test Summary

| Test Item | Test Requirement | Test method | Result |
|---|---|---|---|
| **Antenna Requirement** | 47 CFR Part 15, Subpart C Section 15.203/15.247 (c) | ANSI C63.10 2013 | PASS |
| **AC Power Line Conducted Emission** | 47 CFR Part 15, Subpart C Section 15.207 | ANSI C63.10 2013 | PASS |
| **Conducted Peak & Average Output Power** | 47 CFR Part 15, Subpart C Section 15.247 (b)(3) | ANSI C63.10 2013 | PASS |
| **6dB Occupied Bandwidth** | 47 CFR Part 15, Subpart C Section 15.247 (a)(2) | ANSI C63.10 2013 | PASS |
| **Power Spectral Density** | 47 CFR Part 15, Subpart C Section 15.247 (e) | ANSI C63.10 2013 | PASS |
| **Radiated Spurious Emissions** | 47 CFR Part 15, Subpart C Section 15.205/15.209 | ANSI C63.10 2013 | PASS |
| **Restricted bands around fundamental frequency (Radiated Emission)** | 47 CFR Part 15, Subpart C Section 15.205/15.209 | ANSI C63.10 2013 | PASS |

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# 4 General Information

## 4.1 Client Information

| | |
|---|---|
| Applicant: | UNIONMAN TECHNOLOGY CO., LTD. |
| Address of Applicant: | No.5 Huitai Road, Huinan High-Tech Industrial Park, Huizhou City, Guangdong, China. |
| Manufacturer: | UNIONMAN TECHNOLOGY CO., LTD. |
| Address of Manufacturer: | No.5 Huitai Road, Huinan High-Tech Industrial Park, Huizhou City, Guangdong, China. |
| Factory: | UNIONMAN TECHNOLOGY CO., LTD |
| Address of Factory: | No.5 Huitai Road, Huinan High-Tech Industrial Park, Huizhou City, Guangdong, China. |

## 4.2 General Description of EUT

| | |
|---|---|
| Product Name: | WiFi6 CPE |
| Model No.: | UNR033H |
| Series Model: | UNR032H |
| Trade Mark: | N/A |
| Type of Modulation: | IEEE 802.11b mode: DSSS(CCK,QPSK, BPSK)<br>IEEE 802.11g mode: OFDM (BPSK/QPSK/16QAM/64QAM)<br>IEEE 802.11n HT20 MHz mode: OFDM (BPSK/QPSK/16QAM/64QAM)<br>IEEE 802.11n HT40 MHz mode: OFDM (BPSK/QPSK/16QAM/64QAM) |
| Channel Spacing: | IEEE 802.11b/g/n(HT20):20MHz<br>IEEE 802.11n(HT40):40MHz |
| Operation Frequency: | |

IEEE 802.11b;IEEE 802.11g;IEEE 802.11n HT20

| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---|---|---|---|---|---|
| 1 | 2412 | 6 | 2437 | 11 | 2462 |
| 2 | 2417 | 7 | 2442 | | |
| 3 | 2422 | 8 | 2447 | | |
| 4 | 2427 | 9 | 2452 | | |
| 5 | 2432 | 10 | 2457 | | |

IEEE 802.11n HT40

| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---|---|---|---|---|---|
| 3 | 2422 | 6 | 2437 | 9 | 2452 |
| 4 | 2427 | 7 | 2442 | | |
| 5 | 2432 | 8 | 2447 | | |

| | |
|---|---|
| Antenna Type: | internal antenna with ipex connector |

<table>
<tr><td>Antenna:</td><td>
<table>
<tr><td>Frequency Range</td><td>Antenna 1</td><td>Antenna 2</td></tr>
<tr><td>2400~2483.5MHz</td><td>2dBi</td><td>2dBi</td></tr>
</table>
2.4G Directional gain: 5.01dBi<br>
Note: KDB 662911D01 Multiplr Transmitter Output v02r01<br>
11a,b,g,n,ac uses Antenna 1/ Antenna 2</td></tr>
<tr><td>Power Supply:</td><td>DC 12V from Adapter Input AC 120V/60Hz</td></tr>
</table>

| IEEE 802.11b;IEEE 802.11g;IEEE 802.11n HT20 | | | | | |
|---|---|---|---|---|---|
| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| 1 | 2412 | 6 | 2437 | 11 | 2462 |
| 2 | 2417 | 7 | 2442 | | |
| 3 | 2422 | 8 | 2447 | | |
| 4 | 2427 | 9 | 2452 | | |
| 5 | 2432 | 10 | 2457 | | |
| IEEE 802.11n HT40 | | | | | |
| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| 3 | 2422 | 6 | 2437 | 9 | 2452 |
| 4 | 2427 | 7 | 2442 | | |
| 5 | 2432 | 8 | 2447 | | |

For 802.11b/g/n (HT20,HT40):

| Test mode | Low Channel | Middle Channel | High Channel |
|---|---|---|---|
| IEEE 802.11b;IEEE 802.11g;IEEE 802.11n HT20 | 2412MHz | 2437MHz | 2462MHz |
| IEEE 802.11n HT40 | 2422MHz | 2437MHz | 2452MHz |

Note:

1. Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

2.In radiated measurement,the EUT had been pre-scan on the positioned of each 3 axis(X,Y,Z), the worst case was found when positioned on X-plane.

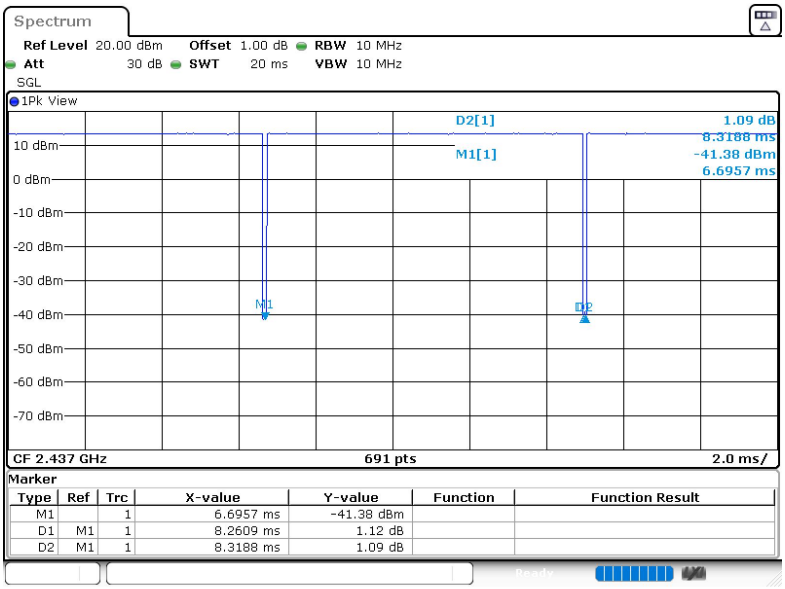
## 4.3 Duty Cycle

| Temperature | 25℃ | Relative Humidity | 55% | Test Voltage | 120V/60Hz |
|---|---|---|---|---|---|
| Mode | Fre(MHz) | On time(ms) | Total Time(ms) | Duty Cycle | Duty Factor |
| 802.11b | 2437 | 8.26090 | 8.31880 | 99.30% | 0.00 |
| 802.11g | 2437 | 1.37681 | 1.53623 | 89.62% | 0.48 |
| 802.11n HT20 | 2437 | 1.28986 | 1.38406 | 93.19% | 0.31 |
| 802.11n HT40 | 2437 | 0.64058 | 0.75942 | 84.35% | 0.74 |

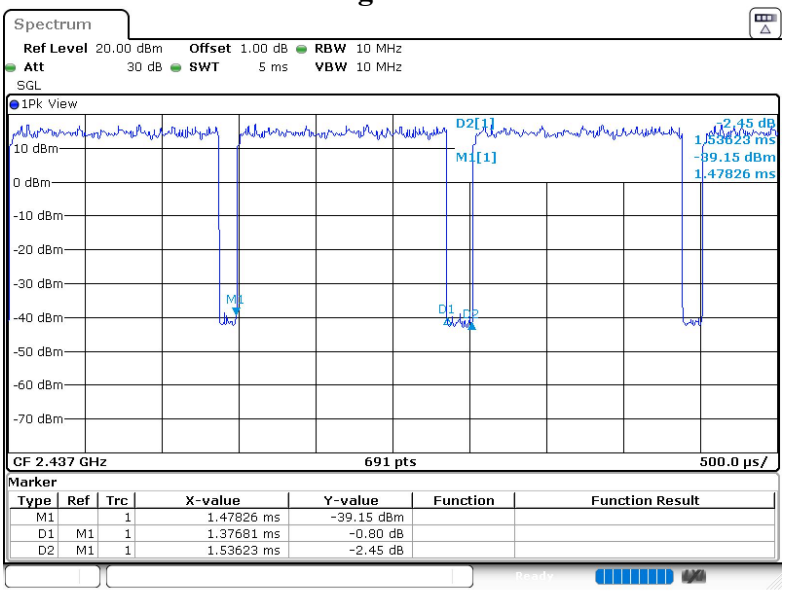
Note:

1. If duty cycle <98 %, the conducted average output power and average power spectral density should be add duty factor.
2. If duty cycle⩾98 %,the EUT is consider to be transmitting continuously,the conducted average output power and average power spectral density no need to add duty factor(consider to be zero).
3. The conducted peak output power and peak power spectral density no need to consider duty factor.
4. The on-time time is transmission duration(T).

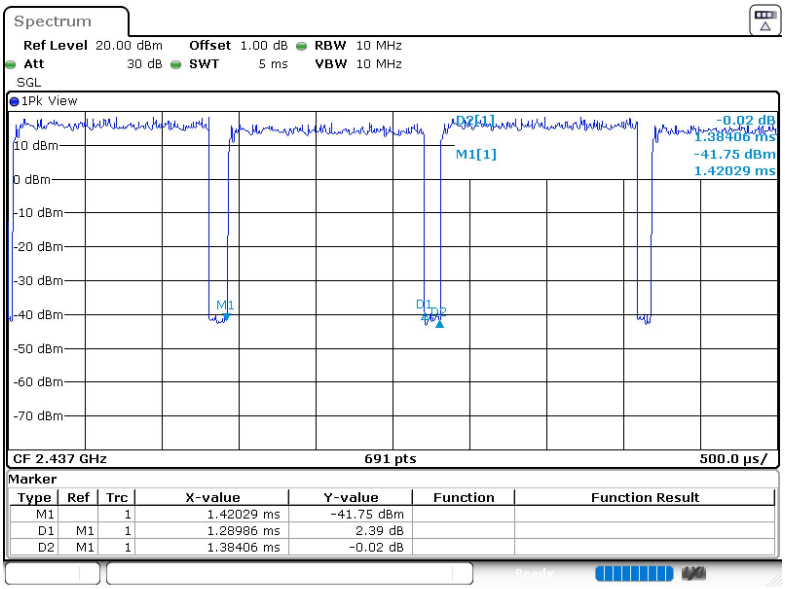
## 802.11b 2437MHz



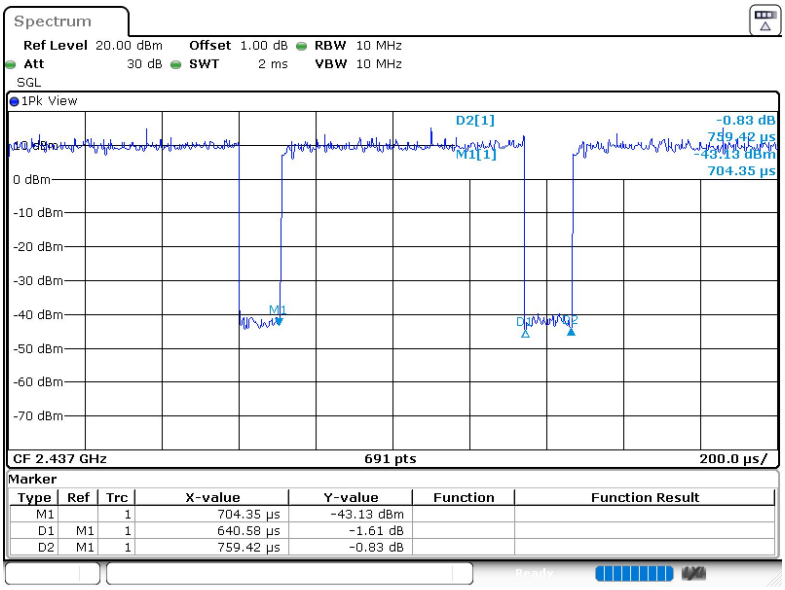

## 802.11g 2437MHz



## 802.11n HT20 2437MHz




## 802.11n HT40 2437MHz



## 4.4 Description of Support Units

The EUT has been tested with associated equipment below.

| Description | Manufacturer | Model No. | Remark | FCC certification |
|---|---|---|---|---|
| Adapter | Apple | A1265 | Provide by lab | DOC |

## 4.5 Test Location

All tests were performed at:

**Shenzhen Huaxia Testing Technology Co., Ltd.,**

1F., Block A of Tongsheng Technology Building, Huahui Road, Dalang Street, Longhua New District, Shenzhen, Guangdong, China

## 4.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L5785)**

CNAS has accredited Shenzhen Huaxia Testing Technology Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **ISED Registration No.: 22984-1**

The 3m Semi-anechoic chamber of Shenzhen Huaxia Testing Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

- **A2LA (Certificate No. 4742.01)**

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 4742.01.

- **FCC Registration No.: 522263**

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.:522263

## 4.7 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate.

The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities.

The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the **Shenzhen Huaxia Testing Technology Co., Ltd.** quality system acc. to DIN EN ISO/IEC 17025.

Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for CQA laboratory is reported:

| No. | Item | Uncertainty | Notes |
|---|---|---|---|
| 1 | Radiated Emission (Below 1GHz) | ±5.12dB | (1) |
| 2 | Radiated Emission (Above 1GHz) | ±4.60dB | (1) |
| 3 | Conducted Disturbance (0.15~30MHz) | ±3.34dB | (1) |
| 4 | Radio Frequency | $3\times10^{-8}$ | (1) |
| 5 | Duty cycle | 0.6 %. | (1) |
| 6 | Occupied Bandwidth | 1.1% | (1) |
| 7 | RF conducted power | 0.86dB | (1) |
| 8 | RF power density | 0.74 | (1) |
| 9 | Conducted Spurious emissions | 0.86dB | (1) |
| 10 | Temperature test | 0.8℃ | (1) |
| 11 | Humidity test | 2.0% | (1) |
| 12 | Supply voltages | 0.5 %. | (1) |
| 13 | time | 0.6 %. | (1) |
| 14 | Frequency Error | 5.5 Hz | (1) |

(1)This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

## 4.8 Deviation from Standards

None.

## 4.9 Abnormalities from Standard Conditions

None.

## 4.10 Other Information Requested by the Customer

None.

## 4.11 Equipment List

| Test Equipment | Manufacturer | Model No. | Instrument No. | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| EMI Test Receiver | R&S | ESR7 | CQA-005 | 2020/9/26 | 2021/9/25 |
| Spectrum analyzer | R&S | FSU26 | CQA-038 | 2020/10/28 | 2021/10/27 |
| Preamplifier | MITEQ | AFS4-00010300-18-10P-4 | CQA-035 | 2020/9/26 | 2021/9/25 |
| Preamplifier | MITEQ | AMF-6D-02001800-29-20P | CQA-036 | 2020/11/2 | 2021/11/1 |
| Loop antenna | Schwarzbeck | FMZB1516 | CQA-087 | 2019/10/28 | 2021/10/27 |
| Bilog Antenna | R&S | HL562 | CQA-011 | 2019/9/26 | 2021/9/25 |
| Horn Antenna | R&S | HF906 | CQA-012 | 2019/9/26 | 2021/9/25 |
| Horn Antenna | Schwarzbeck | BBHA 9170 | CQA-088 | 2019/9/26 | 2021/9/25 |
| Coaxial Cable (Above 1GHz) | CQA | N/A | C019 | 2020/9/26 | 2021/9/25 |
| Coaxial Cable (Below 1GHz) | CQA | N/A | C020 | 2020/9/26 | 2021/9/25 |
| Antenna Connector | CQA | RFC-01 | CQA-080 | 2020/9/26 | 2021/9/25 |
| RF cable(9KHz~40GHz) | CQA | RF-01 | CQA-079 | 2020/9/26 | 2021/9/25 |
| Power Sensor | KEYSIGHT | U2021XA | CQA-30 | 2020/9/26 | 2021/9/25 |
| N1918A Power Analysis Manager Power Panel | Agilent | N1918A | CQA-074 | 2020/9/26 | 2021/9/25 |
| Power divider | MIDWEST | PWD-2533-02-SMA-79 | CQA-067 | 2020/9/26 | 2021/9/25 |
| EMI Test Receiver | R&S | ESPI3 | CQA-013 | 2020/9/26 | 2021/9/25 |
| LISN | R&S | ENV216 | CQA-003 | 2020/11/5 | 2021/11/4 |
| Coaxial cable | CQA | N/A | CQA-C009 | 2020/9/26 | 2021/9/25 |

Note:

The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

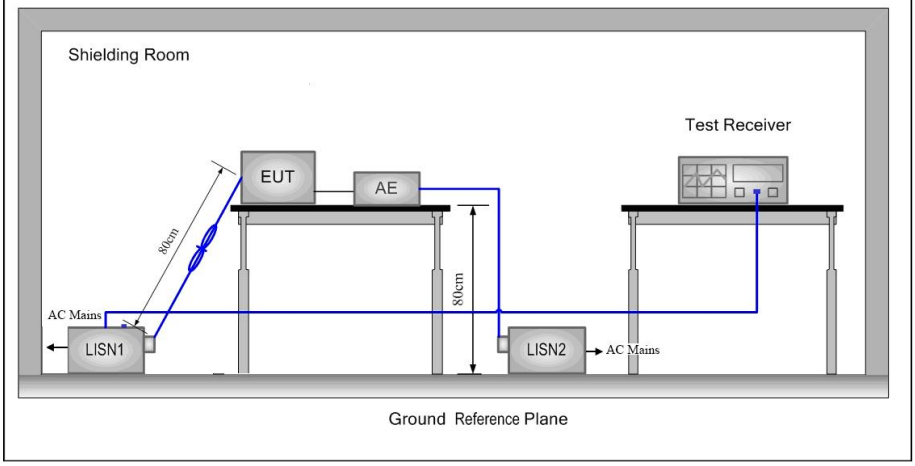
# 5 Test results and Measurement Data

## 5.1 Antenna Requirement

| **Standard requirement:** | 47 CFR Part 15C Section 15.203 /247(c) |
|---|---|
| 15.203 requirement:<br>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.<br>15.247(b) (4) requirement:<br>The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi. | |
| **EUT Antenna:** | |
| The antenna is a internal antenna with ipex connector. The best case gain of the Antenna Gain 1: 2.4G Antenna gain:2dBi ; 5G Antenna gain:2dBi ;Antenna Gain 2:2.4G Antenna gain: 2dBi ; 5G Antenna gain:3dBi ; | |

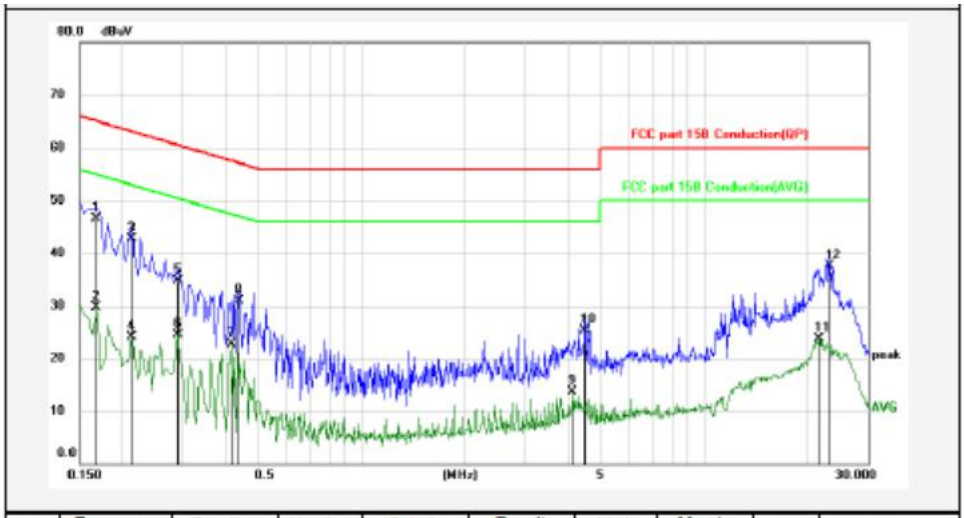
## 5.2 Conducted Emissions

<table>
<tr><td>Test Requirement:</td><td>47 CFR Part 15C Section 15.207,</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10: 2013</td></tr>
<tr><td>Test Frequency Range:</td><td>150kHz to 30MHz</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><td rowspan="2">Frequency range (MHz)</td><td colspan="2">Limit (dBuV)</td></tr>
<tr><td>Quasi-peak</td><td>Average</td></tr>
<tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr>
<tr><td>0.5-5</td><td>56</td><td>46</td></tr>
<tr><td>5-30</td><td>60</td><td>50</td></tr>
</table>
* Decreases with the logarithm of the frequency.</td></tr>
<tr><td>Test Procedure:</td><td>1) The mains terminal disturbance voltage test was conducted in a shielded room.<br>2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.<br>3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,<br>4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.<br>5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.</td></tr>
</table>

| | |
|---|---|
| Test Setup: |  |
| Exploratory Test Mode: | Transmitting with all kind of modulations, data rates |
| Final Test Mode: | Through Pre-scan, find at lowest channel is the worst case.<br>Only the worst case is recorded in the report. |
| Test Voltage: | AC120V/60Hz |
| Test Results: | Pass |

**Measurement Data**

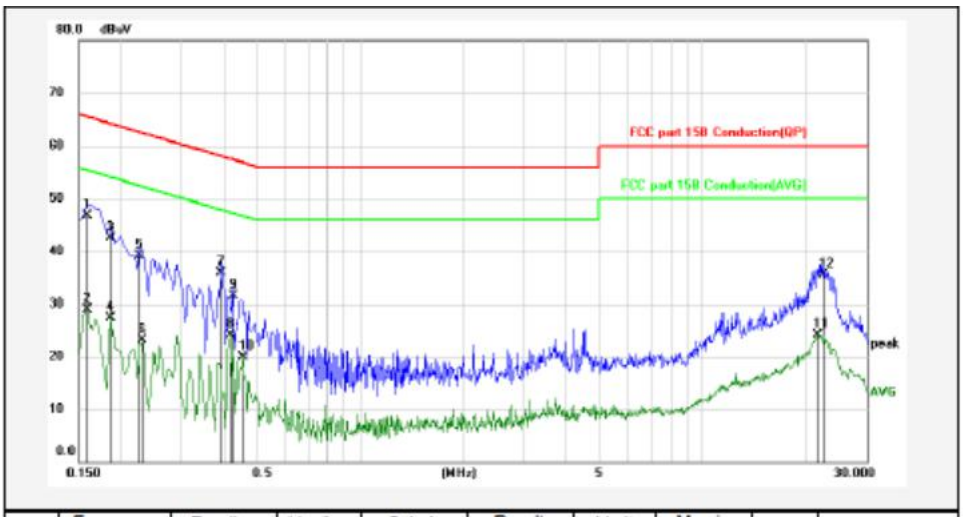
Live Line:




| No. | Frequency (MHz) | Reading (dBuV) | Lisn/Isn (dB) | Cab_L (dB) | Result (dBuV) | Limit dBuV | Margin (dB) | Detector | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.1680 | 35.94 | 10.44 | 0.22 | 46.60 | 65.06 | -18.46 | QP | |
| 2 | 0.1680 | 19.07 | 10.44 | 0.22 | 29.73 | 55.06 | -25.33 | AVG | |
| 3 | 0.2130 | 32.13 | 10.44 | 0.23 | 42.80 | 63.09 | -20.29 | QP | |
| 4 | 0.2130 | 13.50 | 10.44 | 0.23 | 24.17 | 53.09 | -28.92 | AVG | |
| 5 | 0.2895 | 24.12 | 10.44 | 0.24 | 34.80 | 60.54 | -25.74 | QP | |
| 6 | 0.2895 | 13.89 | 10.44 | 0.24 | 24.57 | 50.54 | -25.97 | AVG | |
| 7 | 0.4155 | 12.02 | 10.44 | 0.24 | 22.70 | 47.54 | -24.84 | AVG | |
| 8 | 0.4380 | 20.22 | 10.44 | 0.24 | 30.90 | 57.10 | -26.20 | QP | |
| 9 | 4.1145 | 2.93 | 10.5 | 0.21 | 13.64 | 46.00 | -32.36 | AVG | |
| 10 | 4.4880 | 14.59 | 10.5 | 0.21 | 25.30 | 56.00 | -30.70 | QP | |
| 11 | 21.7095 | 12.74 | 10.77 | 0.2 | 23.71 | 50.00 | -26.29 | AVG | |
| 12 | 23.1944 | 26.64 | 10.75 | 0.21 | 37.60 | 60.00 | -22.40 | QP | |

Remarks: 1. Result=Reading+Lisn+Cab_L
2. If the average limit is met when using a quasi-peak detector. the EUT shall be deemed to meet both limits and measurement with average detctor is unnecessary.

Neutral Line:




| No. | Frequency (MHz) | Reading (dBuV) | Lisn/Isn (dB) | Cab_L (dB) | Result (dBuV) | Limit dBuV | Margin (dB) | Detector | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.1590 | 36.04 | 10.44 | 0.22 | 46.70 | 65.52 | -18.82 | QP | |
| 2 | 0.1590 | 18.19 | 10.44 | 0.22 | 28.85 | 55.52 | -26.67 | AVG | |
| 3 | 0.1860 | 31.94 | 10.44 | 0.22 | 42.60 | 64.21 | -21.61 | QP | |
| 4 | 0.1864 | 16.57 | 10.44 | 0.22 | 27.23 | 54.20 | -26.97 | AVG | |
| 5 | 0.2265 | 28.43 | 10.44 | 0.23 | 39.10 | 62.58 | -23.48 | QP | |
| 6 | 0.2310 | 12.49 | 10.44 | 0.23 | 23.16 | 52.41 | -29.25 | AVG | |
| 7 | 0.3930 | 25.32 | 10.44 | 0.24 | 36.00 | 58.00 | -22.00 | QP | |
| 8 | 0.4155 | 13.43 | 10.44 | 0.24 | 24.11 | 47.54 | -23.43 | AVG | |
| 9 | 0.4245 | 20.82 | 10.44 | 0.24 | 31.50 | 57.36 | -25.86 | QP | |
| 10 | 0.4515 | 9.15 | 10.44 | 0.24 | 19.83 | 46.85 | -27.02 | AVG | |
| 11 | 21.6825 | 13.17 | 10.77 | 0.2 | 24.14 | 50.00 | -25.86 | AVG | |
| 12 | 22.4475 | 24.54 | 10.76 | 0.2 | 35.50 | 60.00 | -24.50 | QP | |

Remarks: 1. Result=Reading+Lisn+Cab_L
2. If the average limit is met when using a quasi-peak detector. the EUT shall be deemed to meet both limits and measurement with average detctor is unnecessary.

## 5.3 Conducted Peak Output Power

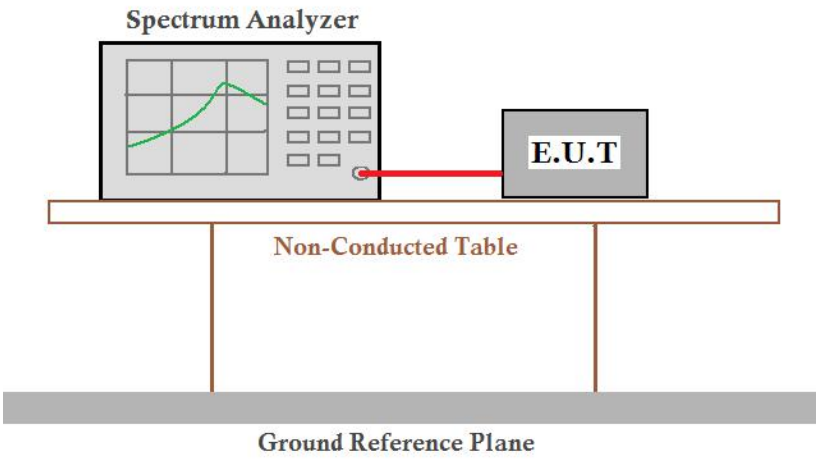
| | |
|---|---|
| Test Requirement: | 47 CFR Part 15C Section 15.247 (b)(3) |
| Test Method: | ANSI C63.10: 2013 |
| Test Setup: | |
| Exploratory Test Mode: | Transmitting with all kind of modulations, data rates |
| Final Test Mode: | Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b;<br>6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20/HT40) ; Only the worst case is recorded in the report. |
| Limit: | 30dBm |
| Test Results: | Pass |

**Measurement Data**

| Test Mode | CH | Conducted Power （dBm） | Limit (dBm) |
|---|---|---|---|
| IEEE 802.11 b SISO (ANT 1) | CH1 | 12.80 | 30 |
| | CH6 | 12.42 | 30 |
| | CH11 | 12.50 | 30 |
| IEEE 802.11 g SISO (ANT 1) | CH1 | 10.23 | 30 |
| | CH6 | 10.51 | 30 |
| | CH11 | 10.14 | 30 |
| IEEE 802.11 b SISO (ANT 2) | CH1 | 12.72 | 30 |
| | CH6 | 12.85 | 30 |
| | CH11 | 12.16 | 30 |
| IEEE 802.11 g SISO (ANT 2) | CH1 | 9.80 | 30 |
| | CH6 | 9.10 | 30 |
| | CH11 | 9.40 | 30 |
| Conclusion：PASS | | | |

| Test mode | CH | | | Conducted Power （dBm） | Limit (dBm) | Result |
|---|---|---|---|---|---|---|
| | | ANT 1 （dBm） | ANT 2 （dBm） | | | |
| IEEE802.11 n MIMO HT20 | CH1 | 11.11 | 8.63 | 13.05 | **30** | Pass |
| | CH6 | 10.85 | 8.83 | 12.96 | | Pass |
| | CH11 | 10.38 | 8.76 | 12.65 | | Pass |
| IEEE802.11 n MIMO HT40 | CH3 | 8.88 | 6.71 | 10.94 | | Pass |
| | CH6 | 7.73 | 6.43 | 10.14 | | Pass |
| | CH9 | 7.78 | 6.60 | 10.24 | | Pass |

## 5.4 6dB Occupy Bandwidth

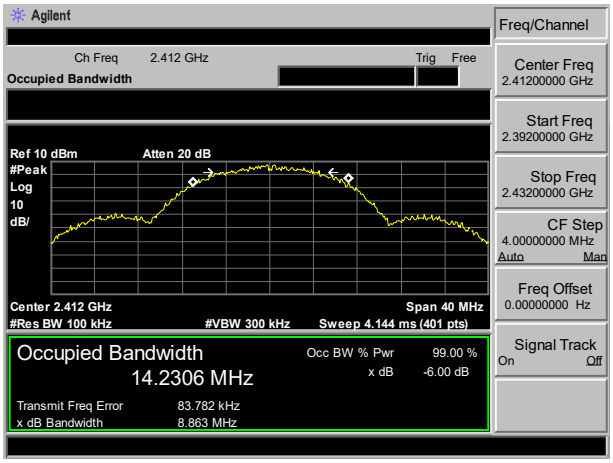
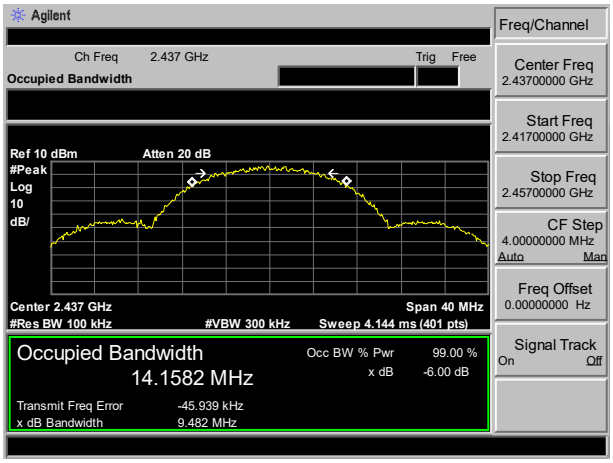
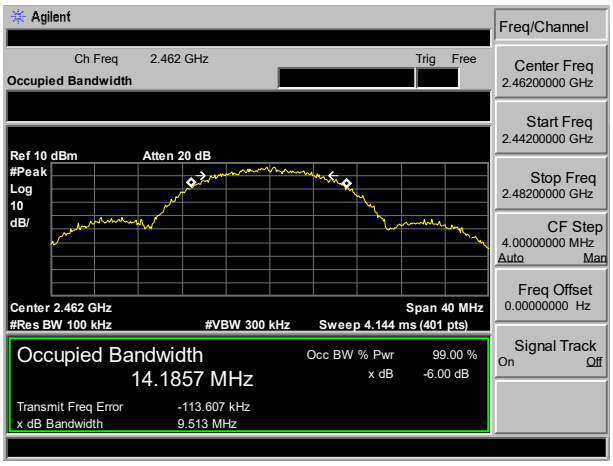
| | |
|---|---|
| Test Requirement: | 47 CFR Part 15C Section 15.247 (a)(2) |
| Test Method: | ANSI C63.10: 2013 |
| Test Setup: |  <br>Offset=cable loss+ attenuation factor |
| Exploratory Test Mode: | Transmitting with all kind of modulations, data rates |
| Final Test Mode: | Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b;<br>6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20) ,802.11n(HT40)Only the worst case is recorded in the report. |
| Limit: | ≥ 500 kHz |
| Test Results: | Pass |

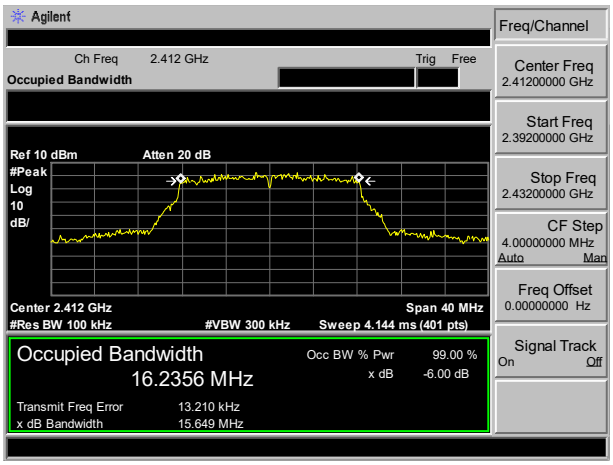
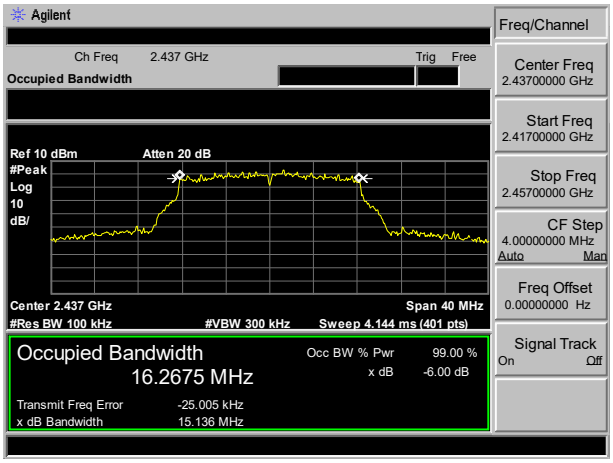
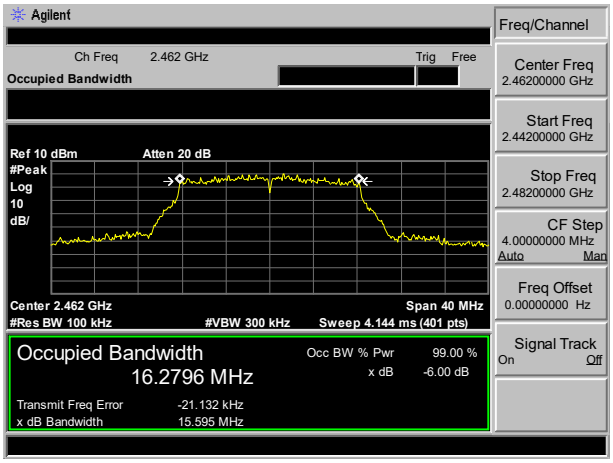
**Measurement Data**

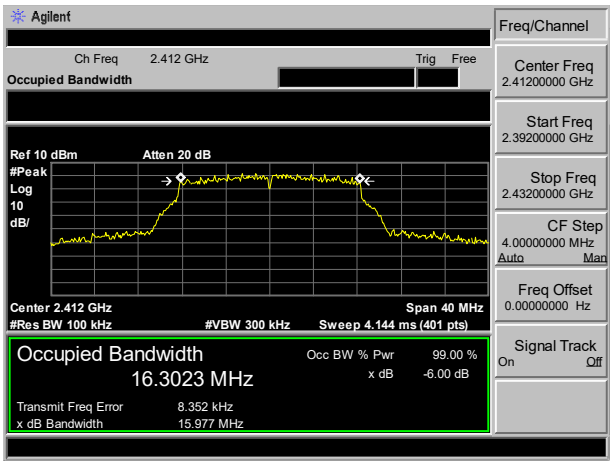
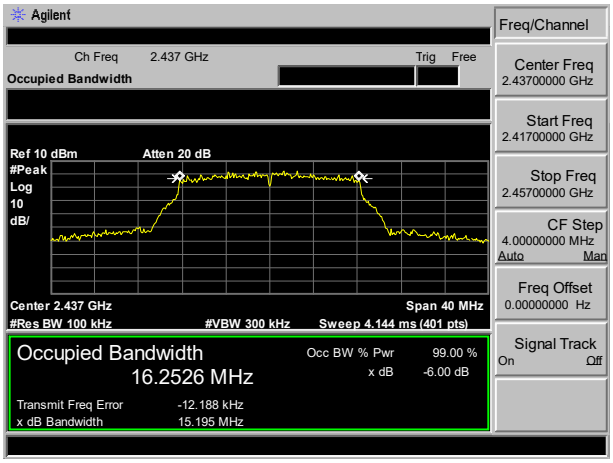
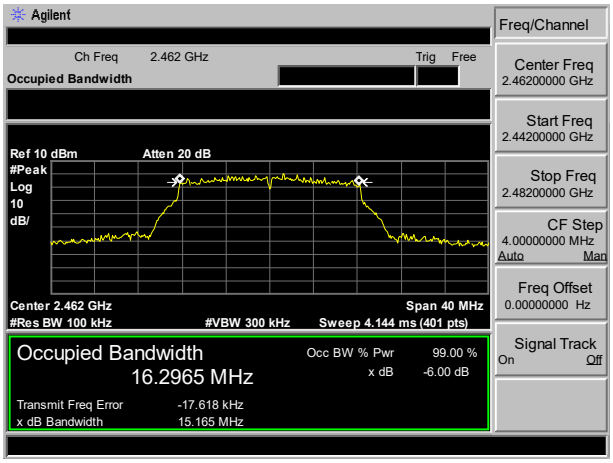
| Test Mode | CH | 6dB bandwidth（MHz） | Limit (KHz) |
|---|---|---|---|
| IEEE 802.11 b (ANT 1) | CH1 | 8.863 | >500 |
| | CH6 | 9.482 | >500 |
| | CH11 | 9.513 | >500 |
| IEEE 802.11 g (ANT 1) | CH1 | 15.649 | >500 |
| | CH6 | 15.136 | >500 |
| | CH11 | 15.595 | >500 |
| IEEE 802.11 n HT 20(ANT 1) | CH1 | 15.977 | >500 |
| | CH6 | 15.195 | >500 |
| | CH11 | 15.165 | >500 |
| IEEE 802.11 n HT 40(ANT 1) | CH1 | 35.115 | >500 |
| | CH4 | 35.078 | >500 |
| | CH7 | 35.072 | >500 |

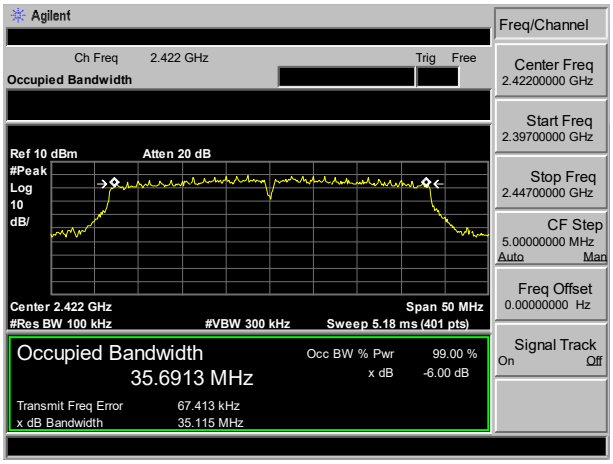
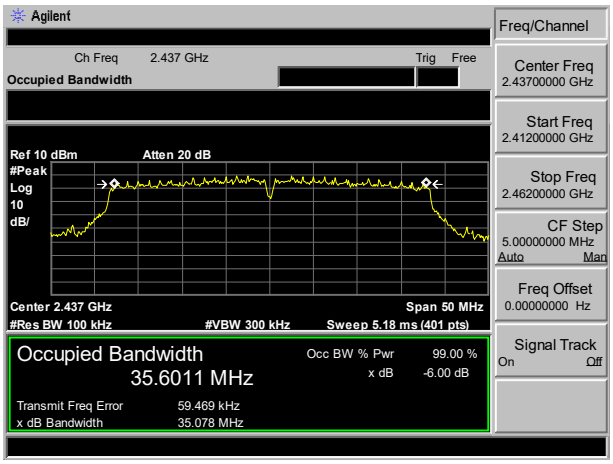
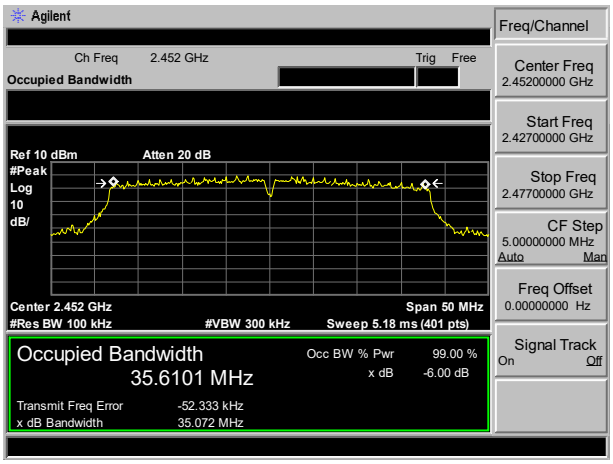
| Test Mode | CH | 6dB bandwidth（MHz） | Limit (KHz) |
|---|---|---|---|
| IEEE 802.11 b (ANT 2) | CH1 | 9.055 | >500 |
| | CH6 | 9.619 | >500 |
| | CH11 | 9.538 | >500 |
| IEEE 802.11 g (ANT 2) | CH1 | 15.136 | >500 |
| | CH6 | 15.689 | >500 |
| | CH11 | 15.839 | >500 |
| IEEE 802.11 n HT 20(ANT 2) | CH1 | 15.197 | >500 |
| | CH6 | 14.985 | >500 |
| | CH11 | 15.166 | >500 |
| IEEE 802.11 n HT 40(ANT 2) | CH1 | 35.125 | >500 |
| | CH4 | 35.066 | >500 |
| | CH7 | 35.055 | >500 |

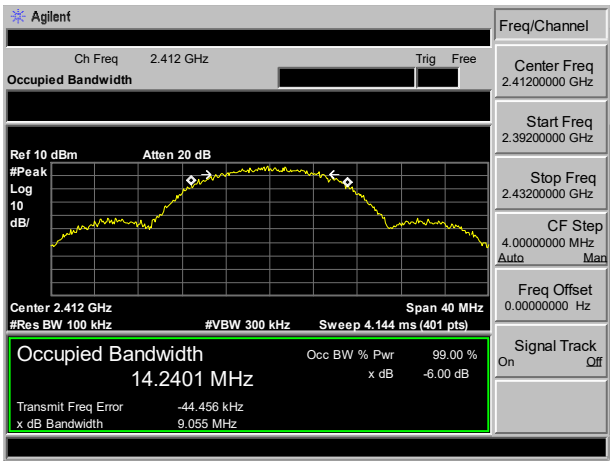
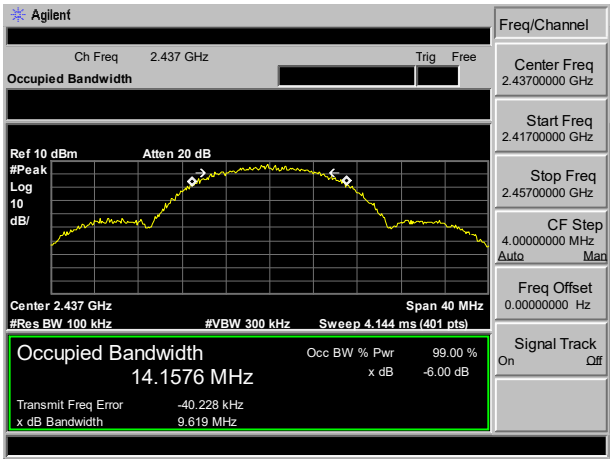
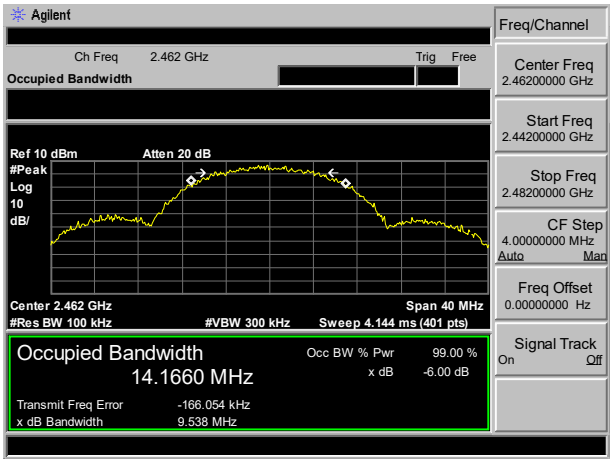
**Test plot as follows:**

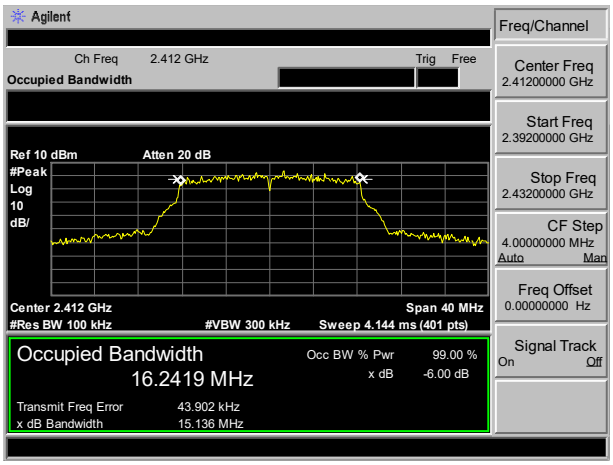
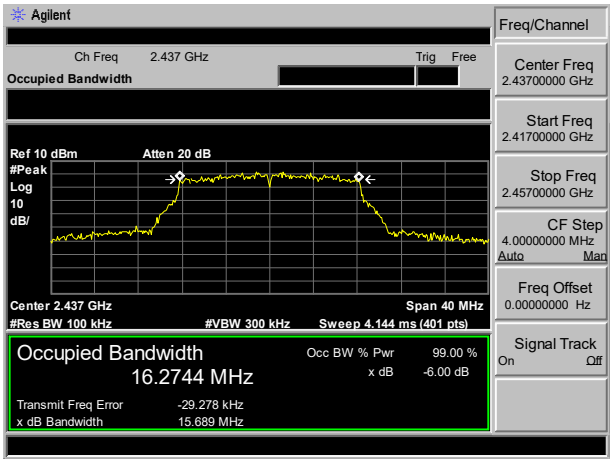
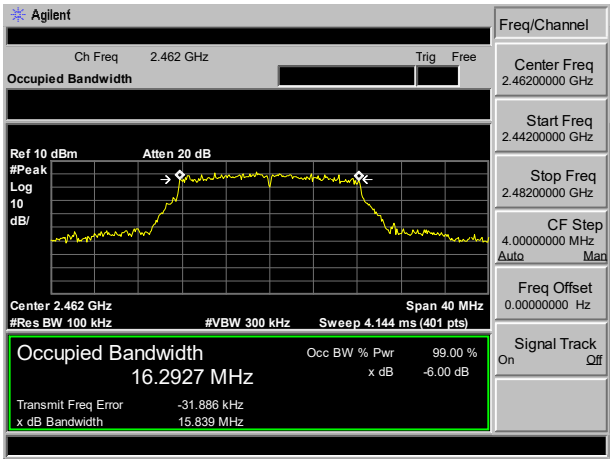
| Graphs_6dB Occupy Bandwidth | |
|---|---|
| IEEE 802.11b<br>2412MHz<br>（ANT 1） |  |
| IEEE 802.11b<br>2437MHz<br>（ANT 1） |  |
| IEEE 802.11b<br>2462MHz<br>（ANT 1） |  |

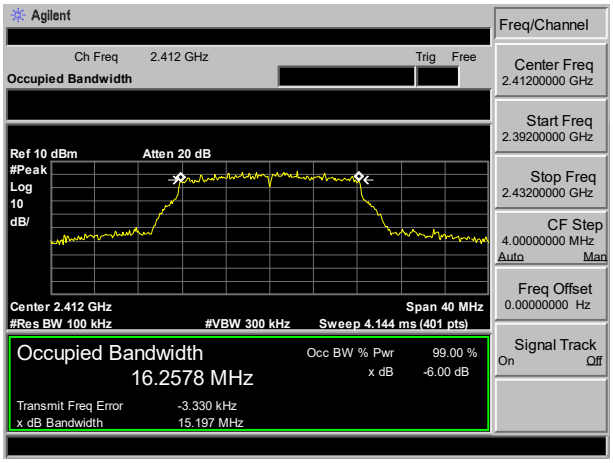
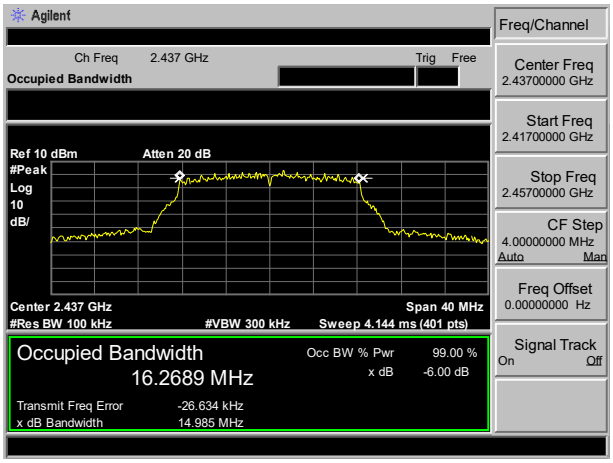
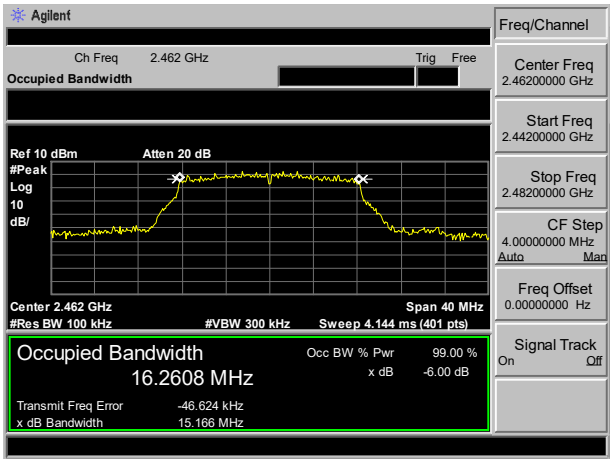
| | |
|---|---|
| IEEE 802.11g<br>2412MHz<br>（ANT 1） |  |
| IEEE 802.11g<br>2437MHz<br>（ANT 1） |  |
| IEEE 802.11g<br>2462MHz<br>（ANT 1） |  |

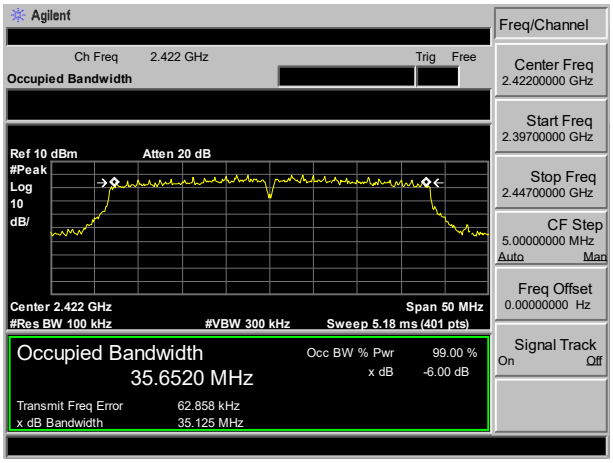
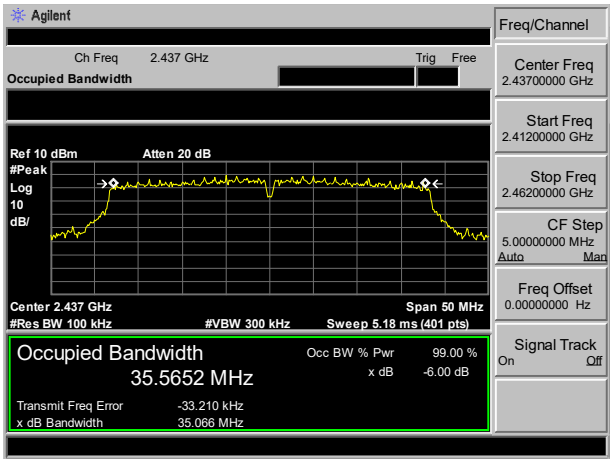
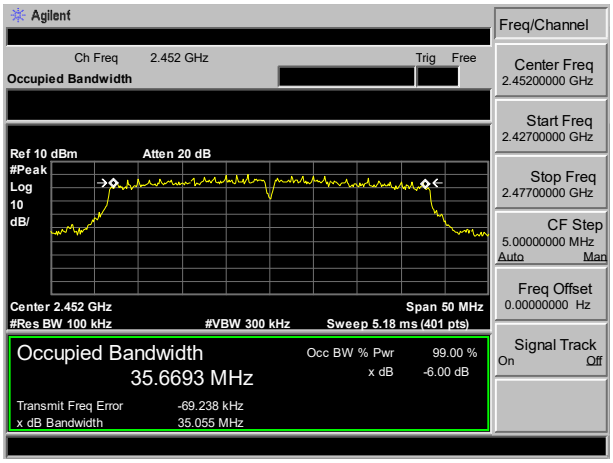
| | |
|---|---|
| IEEE 802.11n<br>HT20 2412MHz<br>（ANT 1） |  |
| IEEE 802.11n<br>HT20 2437MHz<br>（ANT 1） |  |
| IEEE 802.11n<br>HT20 2462MHz<br>（ANT 1） |  |

| | |
|---|---|
| IEEE 802.11n<br>HT40 2422MHz<br>（ANT 1） |  |
| IEEE 802.11n<br>HT40 2437MHz<br>（ANT 1） |  |
| IEEE 802.11n<br>HT40 2452MHz<br>（ANT 1） |  |

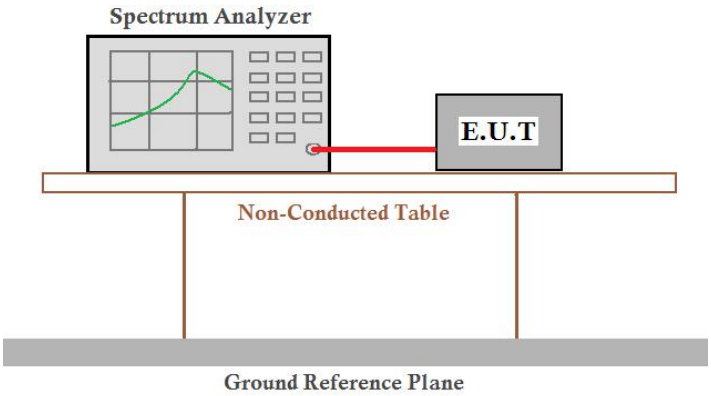
| | |
|---|---|
| IEEE 802.11b<br>2412MHz<br>（ANT 2） |  |
| IEEE 802.11b<br>2437MHz<br>（ANT 2） |  |
| IEEE 802.11b<br>2462MHz<br>（ANT 2） |  |

| | |
|---|---|
| IEEE 802.11g<br>2412MHz<br>（ANT 2） |  |
| IEEE 802.11g<br>2437MHz<br>（ANT 2） |  |
| IEEE 802.11g<br>2462MHz<br>（ANT 2） |  |

| | |
|---|---|
| IEEE 802.11n<br>HT20 2412MHz<br>（ANT 2） |  |
| IEEE 802.11n<br>HT20 2437MHz<br>（ANT 2） |  |
| IEEE 802.11n<br>HT20 2462MHz<br>（ANT 2） |  |

| | |
|---|---|
| IEEE 802.11n<br>HT40 2422MHz<br>（ANT 2） |  |
| IEEE 802.11n<br>HT40 2437MHz<br>（ANT 2） |  |
| IEEE 802.11n<br>HT40 2452MHz<br>（ANT 2） |  |

## 5.5 Power Spectral Density

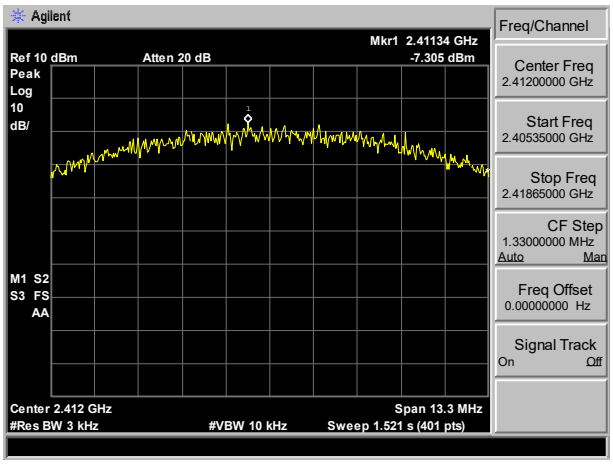
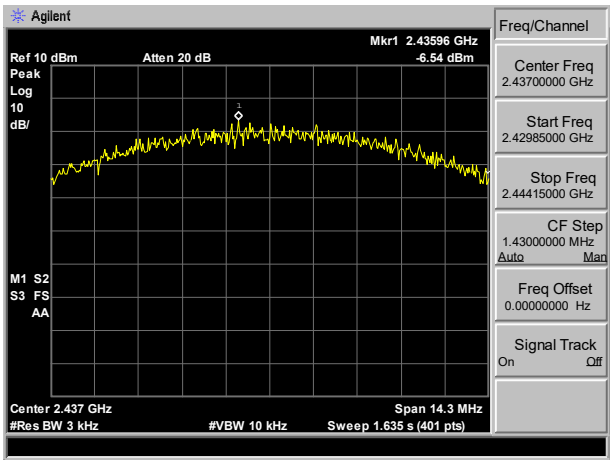
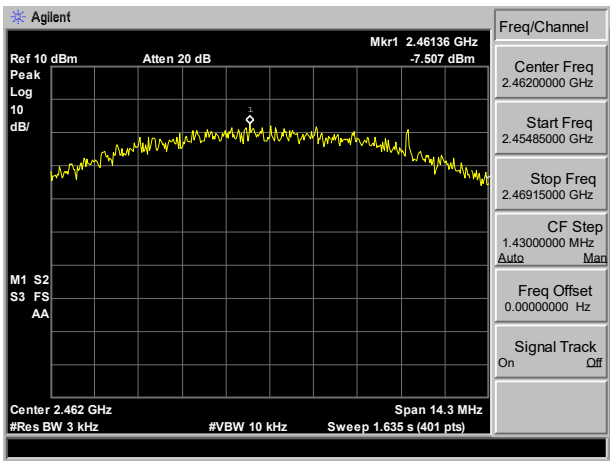
| | |
|---|---|
| Test Requirement: | 47 CFR Part 15C Section 15.247 (e) |
| Test Method: | ANSI C63.10: 2013 |
| Test Setup: |  <br>Offset=cable loss+ attenuation factor |
| Exploratory Test Mode: | Transmitting with all kind of modulations, data rates |
| Final Test Mode: | Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b;<br>6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20/HT40) ; Only the worst case is recorded in the report. |
| Limit: | ≤8.00dBm/3kHz |
| Test Results: | Pass |

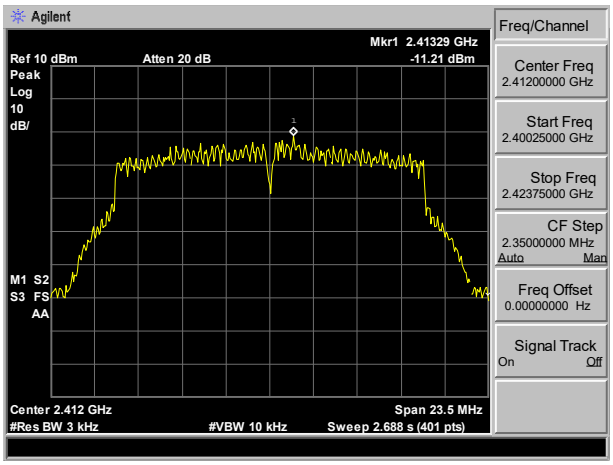
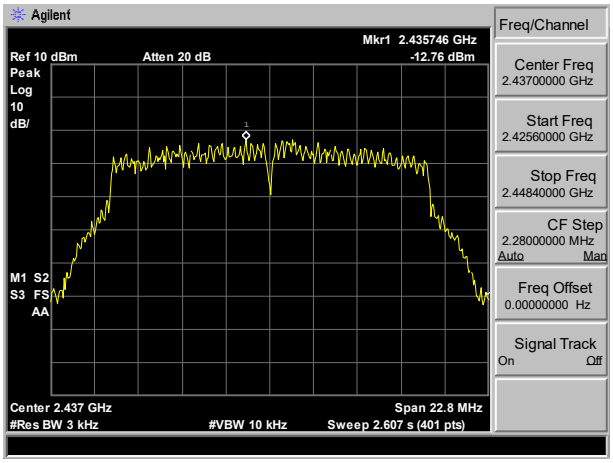
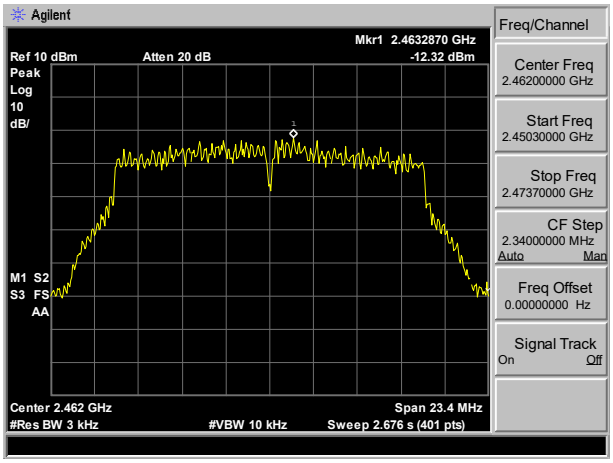
**Measurement Data**

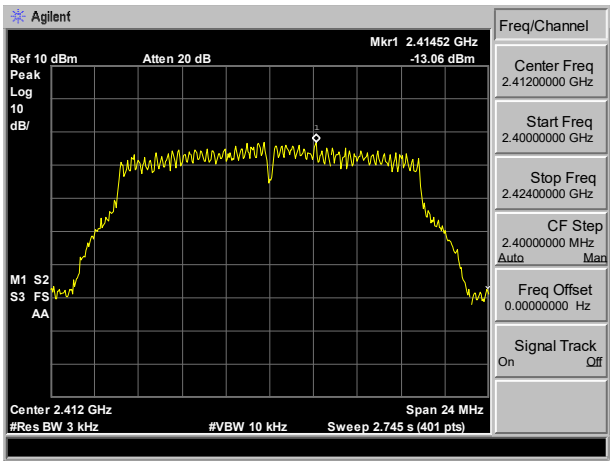
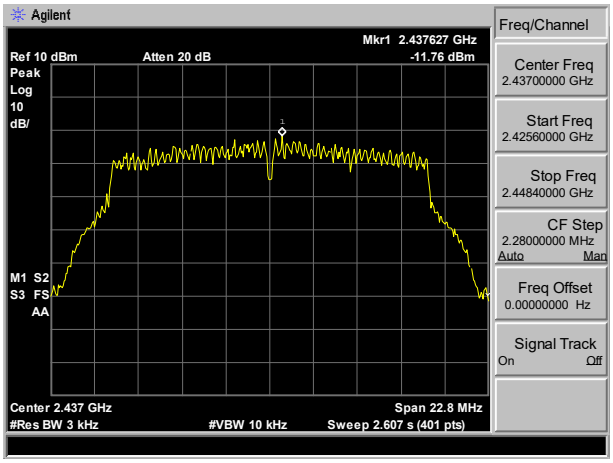
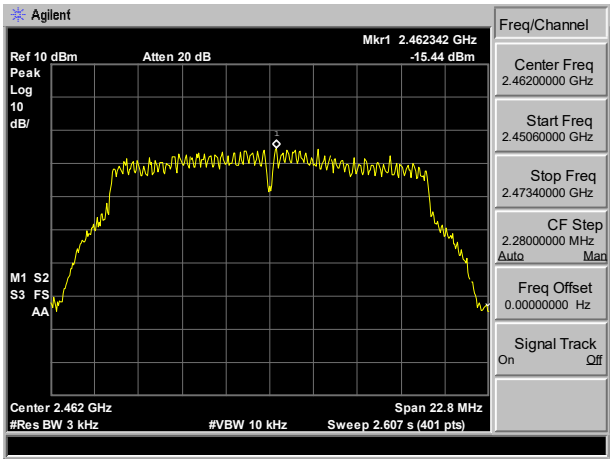
| Test Mode | CH | Power density (dBm/3kHz) | Limit (dBm/3kHz) |
|---|---|---|---|
| IEEE 802.11 b (ANT 1) | CH1 | -7.305 | 8 |
| | CH6 | -6.540 | 8 |
| | CH11 | -7.507 | 8 |
| IEEE 802.11 g (ANT 1) | CH1 | -11.21 | 8 |
| | CH6 | -12.76 | 8 |
| | CH11 | -12.32 | 8 |
| IEEE 802.11 b (ANT 2) | CH1 | -7.273 | 8 |
| | CH6 | -6.713 | 8 |
| | CH11 | -6.698 | 8 |
| IEEE 802.11 g (ANT 2) | CH1 | -11.05 | 8 |
| | CH6 | -12.67 | 8 |
| | CH11 | -12.67 | 8 |
| Conclusion：PASS | | | |

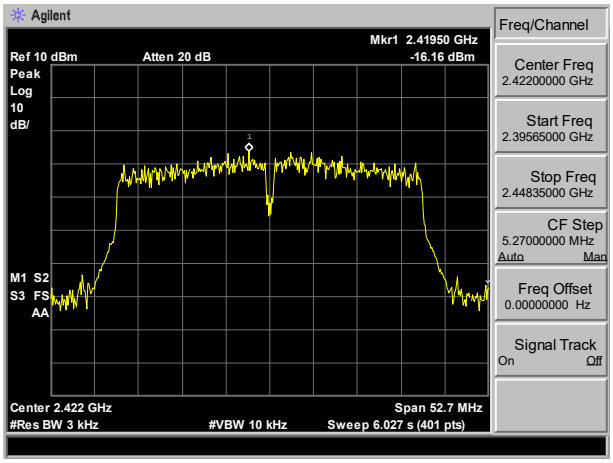
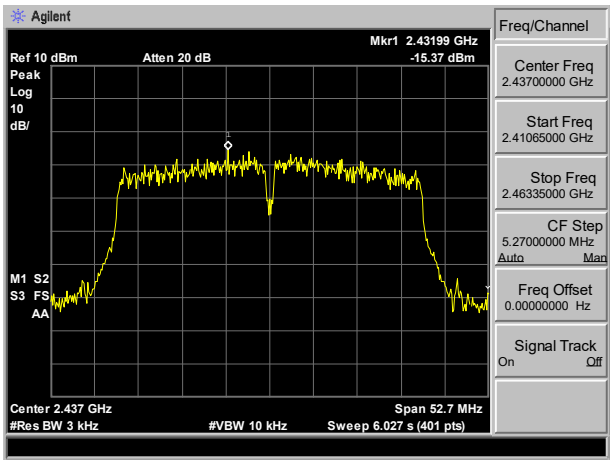
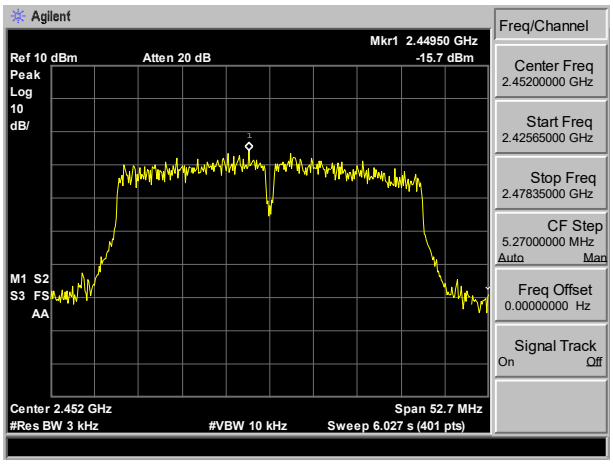
| Test Mode | CH | ANT 1 (dBm/3 kHz） | ANT 2 (dBm/3 kHz） | Power density (dBm/3 kHz） | Limit (dBm/3kHz) | Result |
|---|---|---|---|---|---|---|
| IEEE 802.11n (HT20) | CH1 | -13.06 | -12.38 | -9.71 | **8** | Pass |
| | CH6 | -11.76 | -12.55 | -9.10 | | Pass |
| | CH11 | -15.44 | -13.11 | -11.08 | | Pass |
| IEEE 802.11n (HT40) | CH3 | -16.16 | -16.57 | -13.37 | | Pass |
| | CH6 | -15.37 | -16.42 | -12.84 | | Pass |
| | CH9 | -15.70 | -16.21 | -12.92 | | Pass |
| Conclusion：PASS | | | | | | |

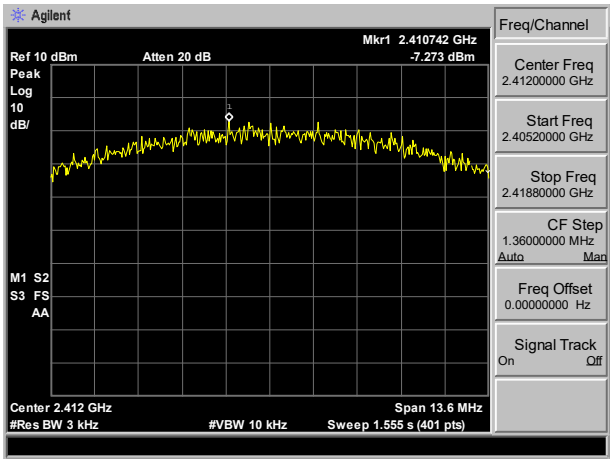
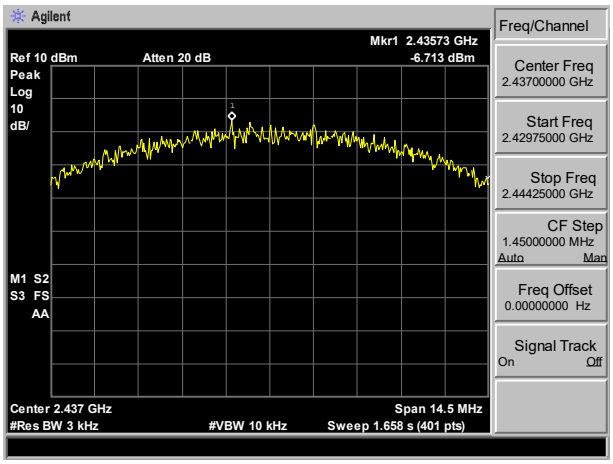
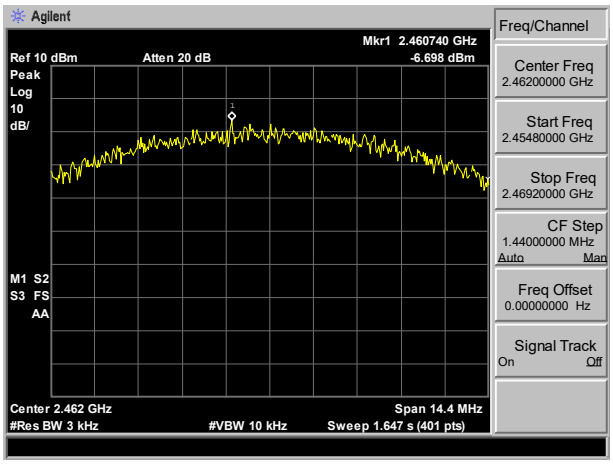
**Test plot as follows:**

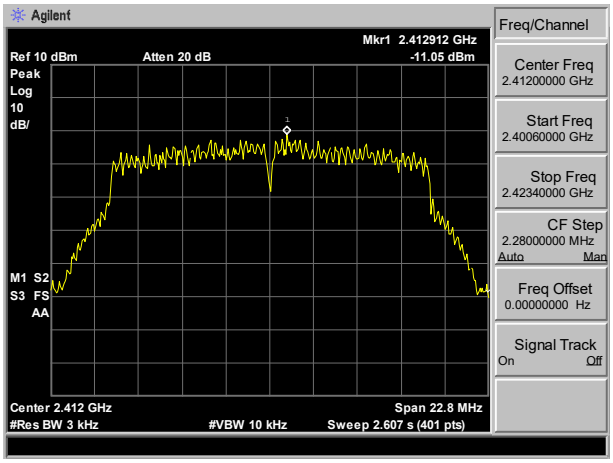
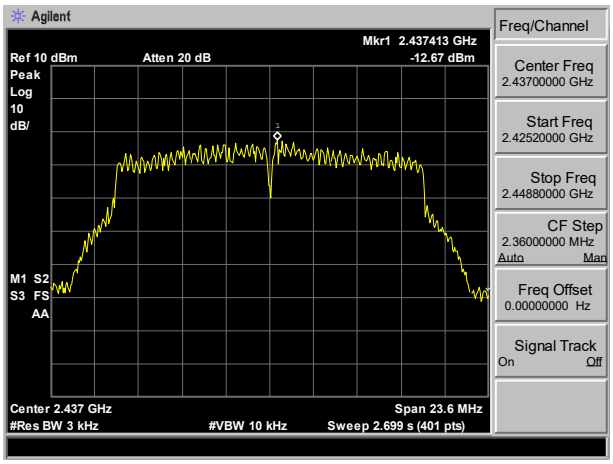
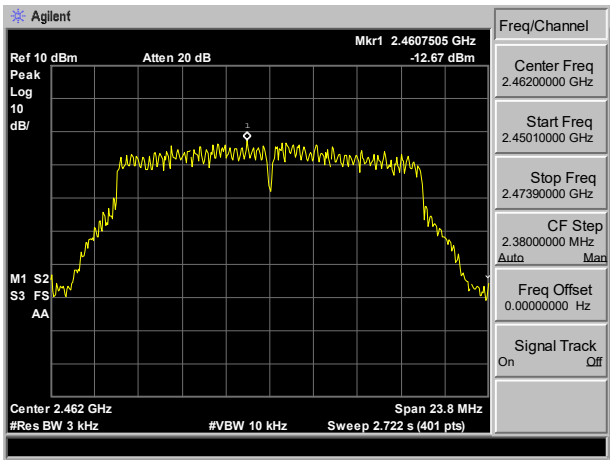
| Graphs | |
|---|---|
| IEEE 802.11b<br>2412MHz<br>(ANT 1) |  |
| IEEE 802.11b<br>2437MHz<br>(ANT 1) |  |
| IEEE 802.11b<br>2462MHz<br>(ANT 1) |  |

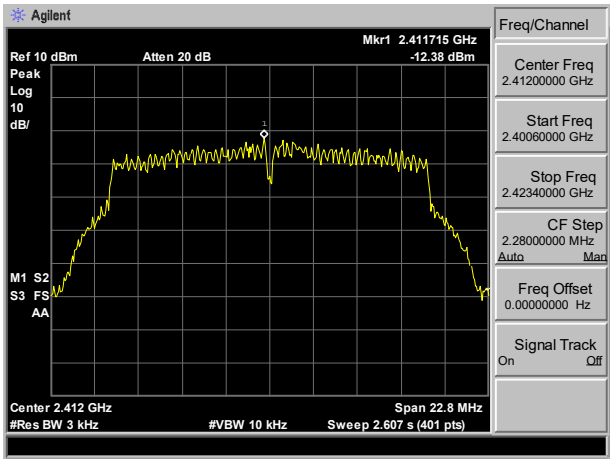
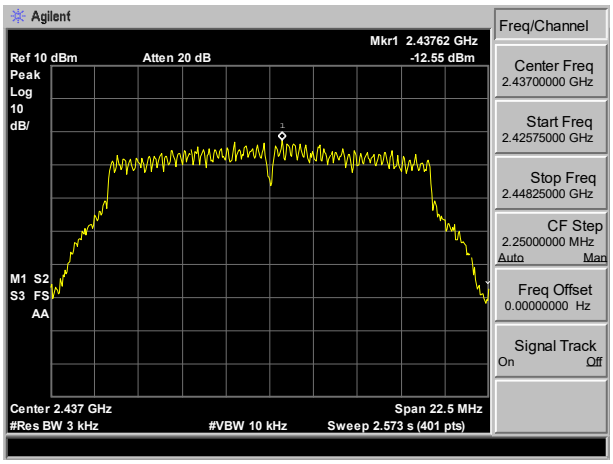
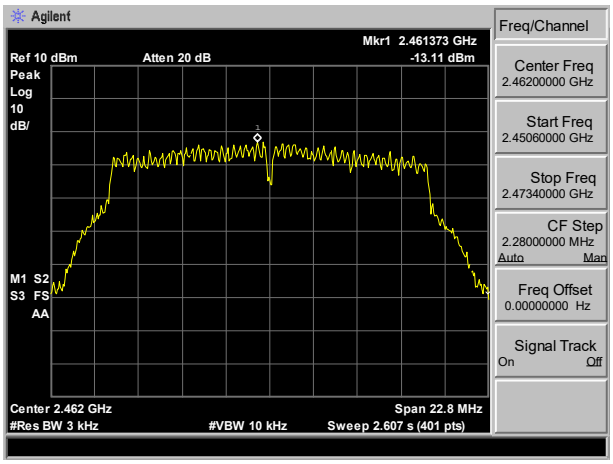
| | |
|---|---|
| IEEE 802.11g<br>2412MHz<br>(ANT 1) |  |
| IEEE 802.11g<br>2437MHz<br>(ANT 1) |  |
| IEEE 802.11g<br>2462MHz<br>(ANT 1) |  |

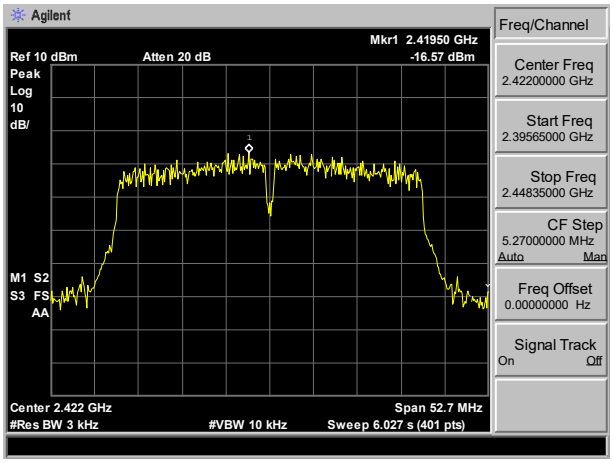
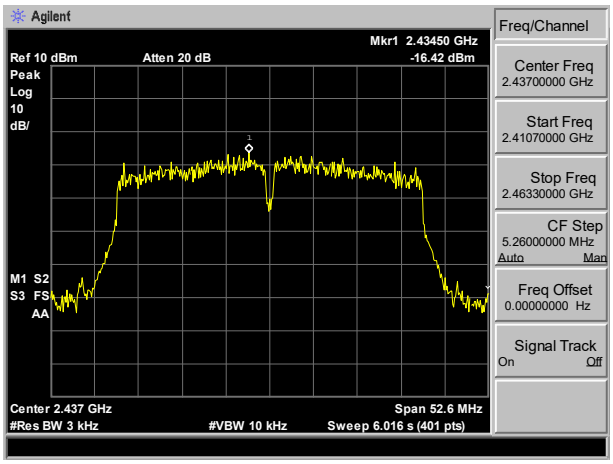
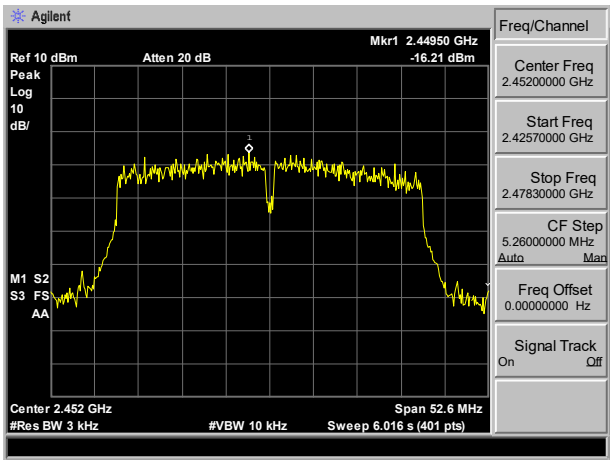
| | |
|---|---|
| IEEE 802.11n HT20 2412MHz (ANT 1) |  |
| IEEE 802.11n HT20 2437MHz (ANT 1) |  |
| IEEE 802.11n HT20 2462MHz (ANT 1) |  |

| | |
|---|---|
| IEEE 802.11n<br>HT40 2422MHz<br>(ANT 1) |  |
| IEEE 802.11n<br>HT40 2437MHz<br>(ANT 1) |  |
| IEEE 802.11n<br>HT40 2452MHz<br>(ANT 1) |  |

| | |
|---|---|
| IEEE 802.11b<br>2412MHz<br>(ANT 2) |  |
| IEEE 802.11b<br>2437MHz<br>(ANT 2) |  |
| IEEE 802.11b<br>2462MHz<br>(ANT 2) |  |

| | |
|---|---|
| IEEE 802.11g<br>2412MHz<br>(ANT 2) |  |
| IEEE 802.11g<br>2437MHz<br>(ANT 2) |  |
| IEEE 802.11g<br>2462MHz<br>(ANT 2) |  |

| | |
|---|---|
| IEEE 802.11n HT20 2412MHz (ANT 2) |  |
| IEEE 802.11n HT20 2437MHz (ANT 2) |  |
| IEEE 802.11n HT20 2462MHz (ANT 2) |  |

| | |
|---|---|
| IEEE 802.11n HT40 2422MHz (ANT 2) |  |
| IEEE 802.11n HT40 2437MHz (ANT 2) |  |
| IEEE 802.11n HT40 2452MHz (ANT 2) |  |

## 5.6 Radiated Spurious Emissions

| | |
|---|---|
| Test Requirement: | 47 CFR Part 15C Section 15.209 and 15.205 |
| Test Method: | ANSI C63.10 2013 |
| Test Site: | Measurement Distance: 3m (Semi-Anechoic Chamber) |

Receiver Setup:

| Frequency | Detector | RBW | VBW | Remark |
|---|---|---|---|---|
| 0.009MHz-0.090MHz | Peak | 10kHz | 30kHz | Peak |
| 0.009MHz-0.090MHz | Average | 10kHz | 30kHz | Average |
| 0.090MHz-0.110MHz | Quasi-peak | 10kHz | 30kHz | Quasi-peak |
| 0.110MHz-0.490MHz | Peak | 10kHz | 30kHz | Peak |
| 0.110MHz-0.490MHz | Average | 10kHz | 30kHz | Average |
| 0.490MHz -30MHz | Quasi-peak | 10kHz | 30kHz | Quasi-peak |
| 30MHz-1GHz | Quasi-peak | 100 kHz | 300kHz | Quasi-peak |
| Above 1GHz | Peak | 1MHz | 3MHz | Peak |
| | Peak | 1MHz | 10Hz | Average |

Limit:

| Frequency | Field strength (microvolt/meter) | Limit (dBuV/m) | Remark | Measurement distance (m) |
|---|---|---|---|---|
| 0.009MHz-0.490MHz | 2400/F(kHz) | - | - | 300 |
| 0.490MHz-1.705MHz | 24000/F(kHz) | - | - | 30 |
| 1.705MHz-30MHz | 30 | - | - | 30 |
| 30MHz-88MHz | 100 | 40.0 | Quasi-peak | 3 |
| 88MHz-216MHz | 150 | 43.5 | Quasi-peak | 3 |
| 216MHz-960MHz | 200 | 46.0 | Quasi-peak | 3 |
| 960MHz-1GHz | 500 | 54.0 | Quasi-peak | 3 |
| Above 1GHz | 500 | 54.0 | Average | 3 |

Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

| Test Setup: | |
|---|---|

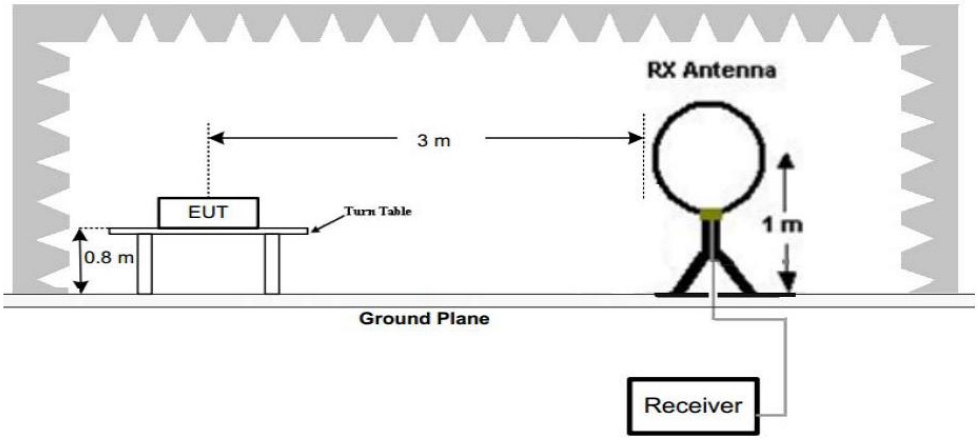



Figure 1. Below 30MHz

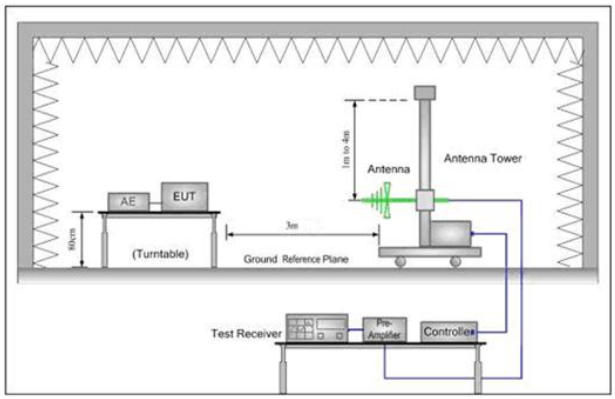



Figure 2. 30MHz to 1GHz

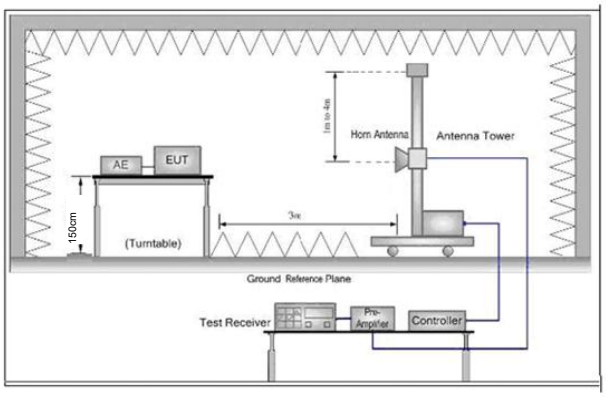


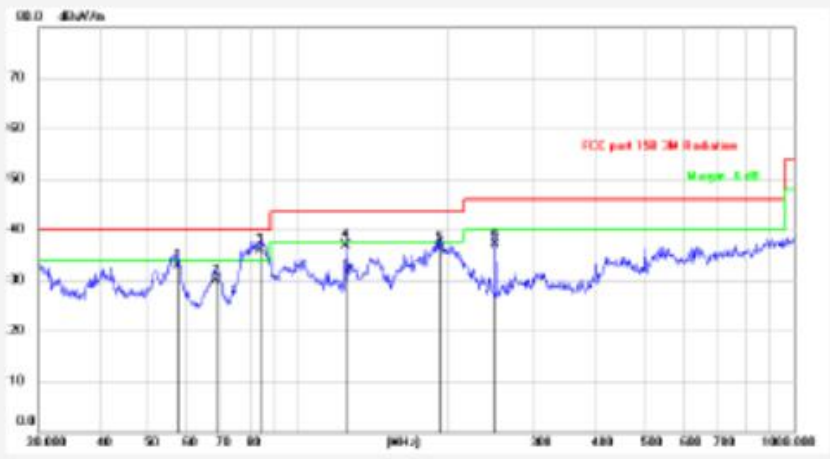

Figure 3. Above 1 GHz

| Test Procedure: | a. 1) Below 1G: The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.<br>2) Above 1G: The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.<br>Note: For the radiated emission test above 1GHz:<br>Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.<br>b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.<br>c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. |
|---|---|

| | |
|---|---|
| | d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters(for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.<br>e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.<br>f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.<br>g. Test the EUT in the lowest channel ,the middle channel ,the Highest channel<br>h. Repeat above procedures until all frequencies measured was complete. |
| Exploratory Test Mode: | Transmitting with all kind of modulations, data rates.<br>Transmitting mode. |
| Final Test Mode: | Pretest the EUT at Transmitting mode<br>Through Pre-scan, 802.11b,802.11g M,802.11n(HT20,HT40)<br>find the 1Mbps of rate of 802.11b at lowest channel is the worst case.<br>Only the worst case is recorded in the report. |
| Test Results: | Pass |

### 5.6.1 Radiated emission below 1GHz

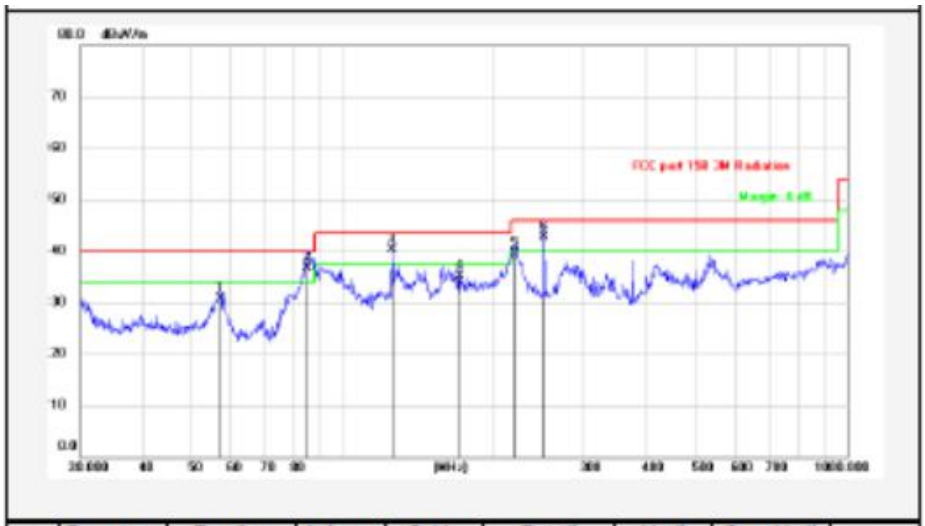
| 30MHz~1GHz | | |
|---|---|---|
| Test mode: | Transmitting | Vertical |



| No. | Frequency (MHz) | Reading (dBuV/m) | Antenna (dB/m) | Cable (dB) | Result (dBuV/m) | Limit (dBuV/m) | Over Limit (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 1 | 57.1914 | 18.91 | 12.66 | 1.43 | 33.00 | 40.00 | -7.00 | QP |
| 2 | 68.3906 | 17.67 | 10.71 | 1.62 | 30.00 | 40.00 | -10.00 | QP |
| 3 | 84.1100 | 25.10 | 8.91 | 1.89 | 35.90 | 40.00 | -4.10 | QP |
| 4 | 125.0066 | 24.20 | 10.4 | 2.3 | 36.90 | 43.50 | -6.60 | QP |
| 5 | 193.0945 | 22.71 | 10.95 | 2.74 | 36.40 | 43.50 | -7.10 | QP |
| 6 | 250.3012 | 21.85 | 12.2 | 3.05 | 37.10 | 46.00 | -8.90 | QP |

Remarks:1. Result=Reading+Antenna+Cable
2. If Peak Result complies with QP Limit, QP Result is deemed to comply with QP Limit.

| Test mode: | Transmitting | Horizontal |
|---|---|---|



| No. | Frequency (MHz) | Reading (dBuV/m) | Antenna (dB/m) | Cable (dB) | Result (dBuV/m) | Limit (dBuV/m) | Over Limit (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 1 | 56.9911 | 16.56 | 12.7 | 1.44 | 30.70 | 40.00 | -9.30 | QP |
| 2 | 84.9993 | 25.80 | 9 | 1.9 | 36.70 | 40.00 | -3.30 | QP |
| 3 | 125.0066 | 27.70 | 10.4 | 2.3 | 40.40 | 43.50 | -3.10 | QP |
| 4 | 170.1947 | 22.77 | 9.82 | 2.61 | 35.20 | 43.50 | -8.30 | QP |
| 5 | 219.0749 | 24.64 | 11.88 | 2.98 | 39.50 | 46.00 | -6.50 | QP |
| 6 | 250.3009 | 27.55 | 12.2 | 3.05 | 42.80 | 46.00 | -3.20 | QP |

Remarks:1. Result=Reading+Antenna+Cable
2. If Peak Result complies with QP Limit, QP Result is deemed to comply with QP Limit.

### 5.6.2 Transmitter emission above 1GHz

| Test mode: ANT 1 | | 802.11b(1Mbps) | | Test channel: | | Lowest | |
|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Over (dB) | Detector Type | Ant. Pol. H/V |
| 4824.000 | 52.31 | -4.03 | 48.28 | 74 | -25.72 | peak | H |
| 4824.000 | 37.72 | -4.03 | 33.69 | 54 | -20.31 | AVG | H |
| 7236.000 | 50.18 | 1.66 | 51.84 | 74 | -22.16 | peak | H |
| 7236.000 | 36.64 | 1.66 | 38.30 | 54 | -15.70 | AVG | H |
| 4824.000 | 53.40 | -4.03 | 49.37 | 74 | -24.63 | peak | V |
| 4824.000 | 38.53 | -4.03 | 34.50 | 54 | -19.50 | AVG | V |
| 7236.000 | 49.89 | 1.66 | 51.55 | 74 | -22.45 | peak | V |
| 7236.000 | 36.45 | 1.66 | 38.11 | 54 | -15.89 | AVG | V |

| Test mode: ANT 1 | | 802.11b(1Mbps) | | Test channel: | | Middle | |
|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Over (dB) | Detector Type | Ant. Pol. H/V |
| 4874.000 | 53.54 | -4.26 | 49.28 | 74 | -24.72 | peak | H |
| 4874.000 | 36.59 | -4.26 | 32.33 | 54 | -21.67 | AVG | H |
| 7311.000 | 51.06 | 1.18 | 52.24 | 74 | -21.76 | peak | H |
| 7311.000 | 37.95 | 1.18 | 39.13 | 54 | -14.87 | AVG | H |
| 4874.000 | 55.76 | -4.26 | 51.50 | 74 | -22.50 | peak | V |
| 4874.000 | 39.81 | -4.26 | 35.55 | 54 | -18.45 | AVG | V |
| 7311.000 | 50.46 | 1.18 | 51.64 | 74 | -22.36 | peak | V |
| 7311.000 | 36.77 | 1.18 | 37.95 | 54 | -16.05 | AVG | V |

| Test mode: ANT 1 | | 802.11b(1Mbps) | | Test channel: | | Highest | |
|---|---|---|---|---|---|---|---|
| Frequency | Meter Reading | Factor | Emission Level | Limits | Over | Detector Type | Ant. Pol. |
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | | H/V |
| 4924.000 | 52.63 | -4.12 | 48.51 | 74 | -25.49 | peak | H |
| 4924.000 | 36.31 | -4.12 | 32.19 | 54 | -21.81 | AVG | H |
| 7386.000 | 49.61 | 1.46 | 51.07 | 74 | -22.93 | peak | H |
| 7386.000 | 35.16 | 1.46 | 36.62 | 54 | -17.38 | AVG | H |
| 4924.000 | 52.32 | -4.12 | 48.20 | 74 | -25.80 | peak | V |
| 4924.000 | 36.04 | -4.12 | 31.92 | 54 | -22.08 | AVG | V |
| 7386.000 | 48.50 | 1.46 | 49.96 | 74 | -24.04 | peak | V |
| 7386.000 | 35.74 | 1.46 | 37.20 | 54 | -16.80 | AVG | V |

Remark:

1) The 1Mbps of rate of ANT 1 802.11b is the worst case.

2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

   Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

3) Scan from 9kHz to 25GHz,The disturbance above 13GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

## 5.7 Restricted bands around fundamental frequency

| | |
|---|---|
| Test Requirement: | 47 CFR Part 15C Section 15.209 and 15.205 |
| Test Method: | ANSI C63.10 2013 |
| Test Site: | Measurement Distance: 3m (Semi-Anechoic Chamber) |
| Limit: | |

| Frequency | Limit (dBuV/m @3m) | Remark |
|---|---|---|
| 30MHz-88MHz | 40.0 | Quasi-peak Value |
| 88MHz-216MHz | 43.5 | Quasi-peak Value |
| 216MHz-960MHz | 46.0 | Quasi-peak Value |
| 960MHz-1GHz | 54.0 | Quasi-peak Value |
| Above 1GHz | 54.0 | Average Value |
| | 74.0 | Peak Value |

Test Setup:

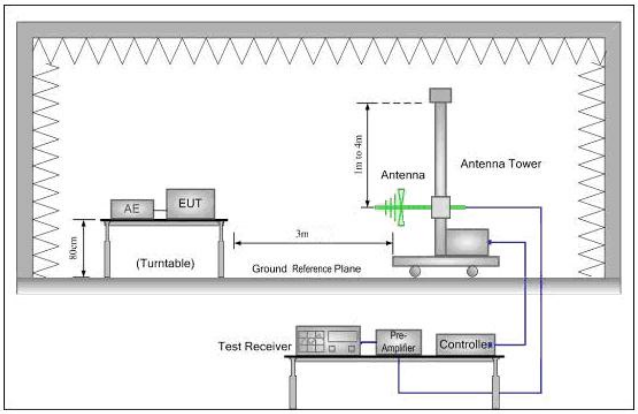



Figure 1. 30MHz to 1GHz

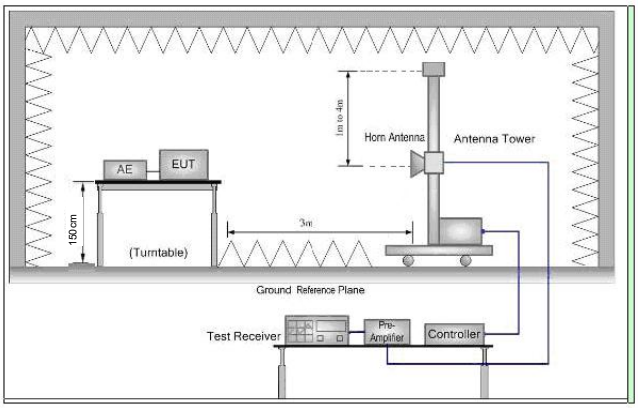



Figure 2. Above 1 GHz

Test Procedure:

a. 1) Below 1G: The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2) Above 1G: The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
Note: For the radiated emission test above 1GHz:
Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

| | |
|---|---|
| | d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.<br>e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.<br>f. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel<br>g. Test the EUT in the lowest channel , the Highest channel<br>h. Repeat above procedures until all frequencies measured was complete. |
| Exploratory Test Mode: | Transmitting with all kind of modulations, data rates.<br>Transmitting mode. |
| Final Test Mode: | Pretest the EUT at Transmitting mode<br>Through Pre-scan, 802.11b,802.11g M,802.11n(HT20,HT40)<br>find the 802.11n HT40 is the worst case.<br>Only the worst case is recorded in the report. |
| Test Results: | Pass |

**Test data:**

| Test mode: ANT 1 | | 802.11n HT40 | | Test channel: | | Lowest | |
|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Over (dB) | Detector Type | Ant. Pol. H/V |
| 2310.000 | 53.54 | -4.26 | 49.28 | 74 | -24.72 | peak | H |
| 2310.000 | 36.59 | -4.26 | 32.33 | 54 | -21.67 | AVG | H |
| 2390.000 | 51.06 | 1.18 | 52.24 | 74 | -21.76 | peak | H |
| 2390.000 | 37.95 | 1.18 | 39.13 | 54 | -14.87 | AVG | H |
| 2310.000 | 55.76 | -4.26 | 51.50 | 74 | -22.50 | peak | V |
| 2310.000 | 39.81 | -4.26 | 35.55 | 54 | -18.45 | AVG | V |
| 2390.000 | 50.46 | 1.18 | 51.64 | 74 | -22.36 | peak | V |
| 2390.000 | 36.77 | 1.18 | 37.95 | 54 | -16.05 | AVG | V |

| Test mode: ANT 1 | | 802.11n HT40 | | Test channel: | | Highest | |
|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Over (dB) | Detector Type | Ant. Pol. H/V |
| 2483.500 | 58.31 | -4.03 | 48.28 | 74 | -19.72 | peak | H |
| 2483.500 | 44.72 | -4.03 | 33.69 | 54 | -14.31 | AVG | H |
| 2500.000 | 45.18 | 1.66 | 51.84 | 74 | -27.16 | peak | H |
| 2500.000 | 31.64 | 1.66 | 38.30 | 54 | -20.70 | AVG | H |
| 2483.500 | 59.40 | -4.03 | 49.37 | 74 | -18.63 | peak | V |
| 2483.500 | 44.53 | -4.03 | 34.50 | 54 | -13.50 | AVG | V |
| 2500.000 | 45.89 | 1.66 | 51.55 | 74 | -27.45 | peak | V |
| 2500.000 | 31.45 | 1.66 | 38.11 | 54 | -20.89 | AVG | V |

Remark:

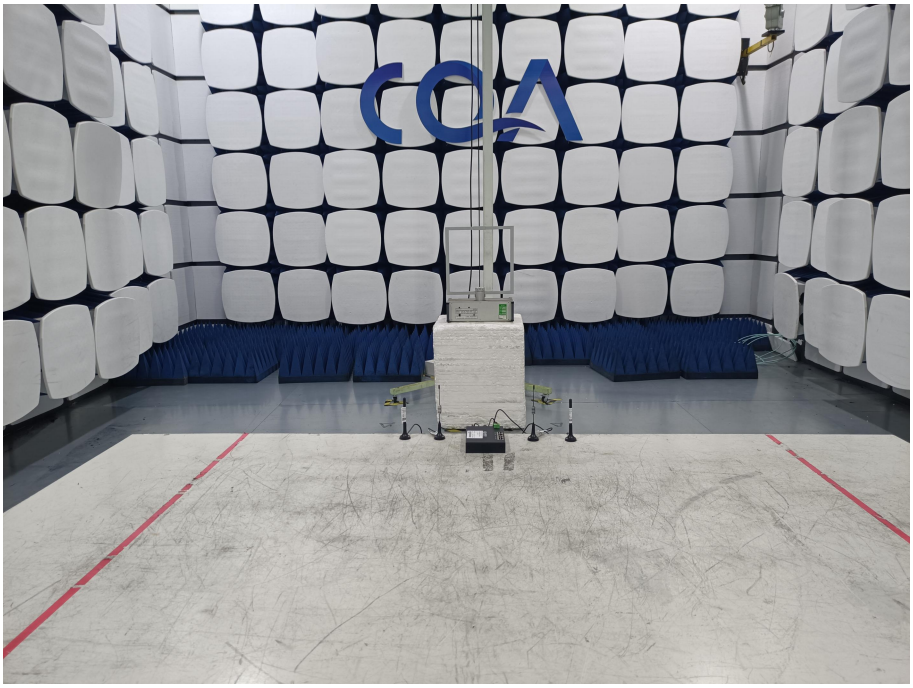
1) The ANT 1 802.11n HT40 is the worst case.
2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

   Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

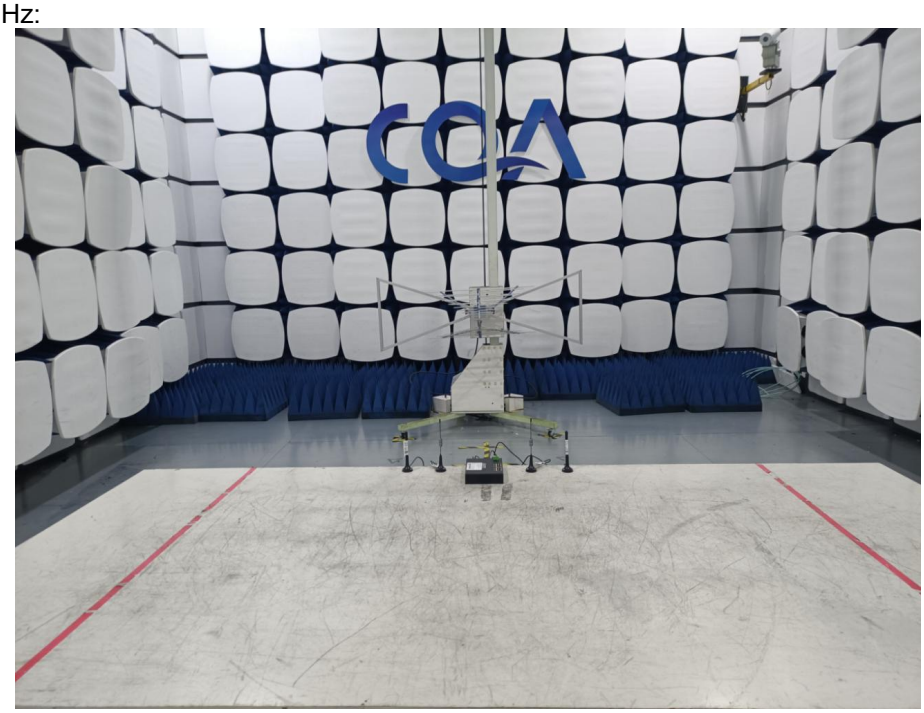
# 6 Photographs - EUT Test Setup

## 6.1 Radiated Spurious Emission

9kHz~30MHz:



30MHz~1GHz:



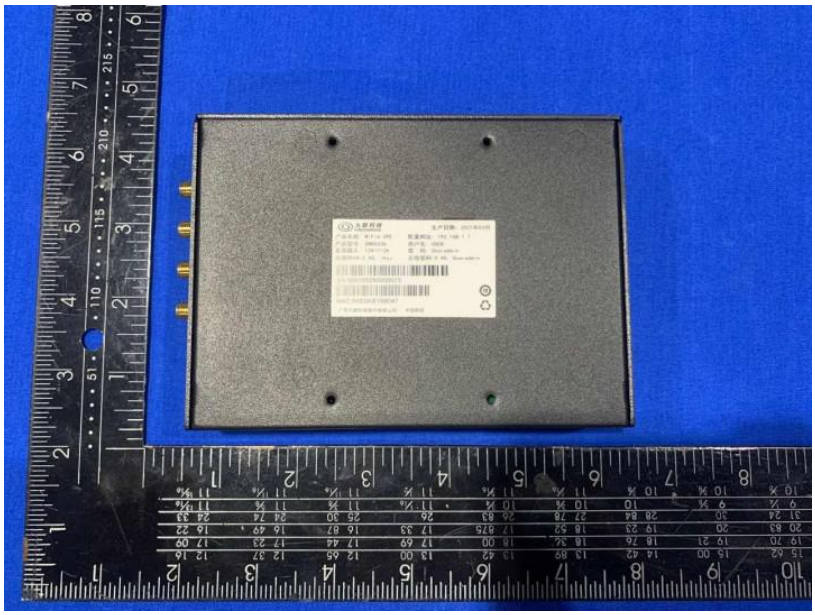
Above 1GHz:

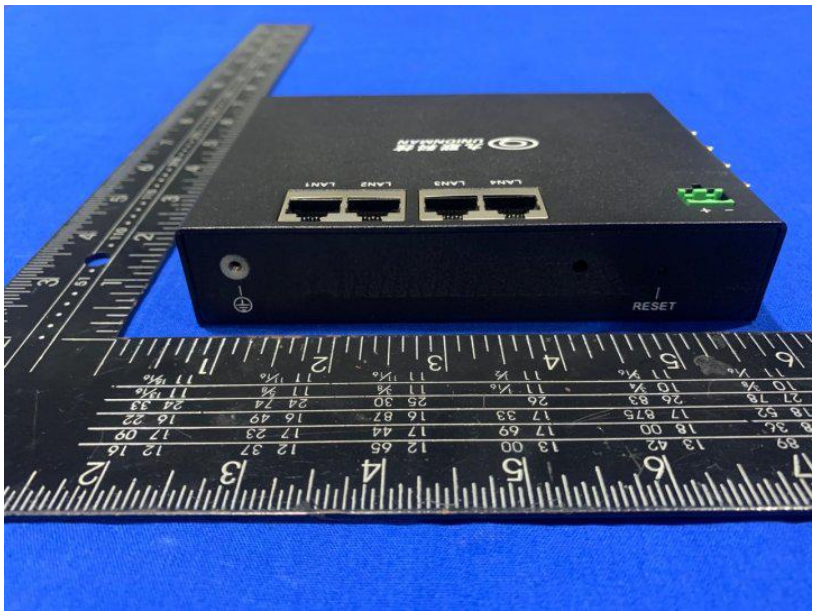
## 6.2 Conducted Emission

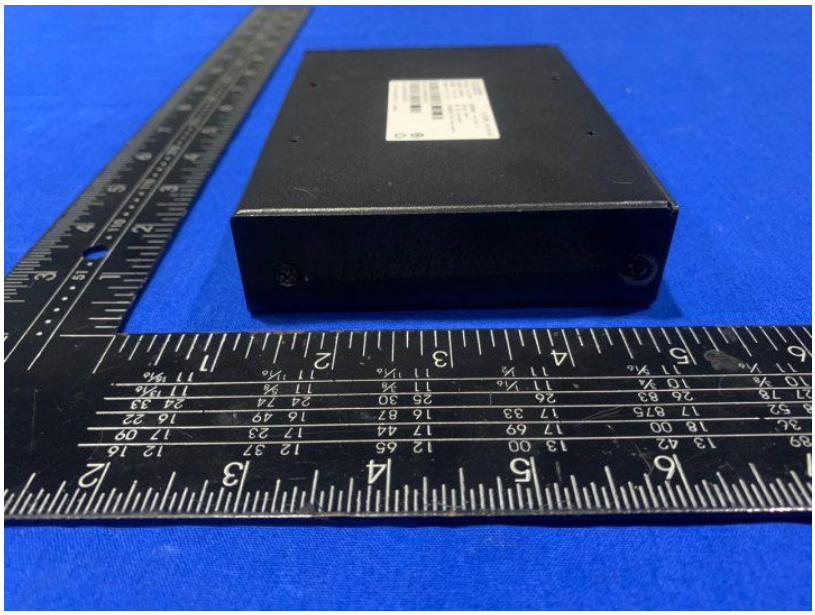
# 7 Photographs - EUT Constructional Details

**Test model No.: UNR033H**

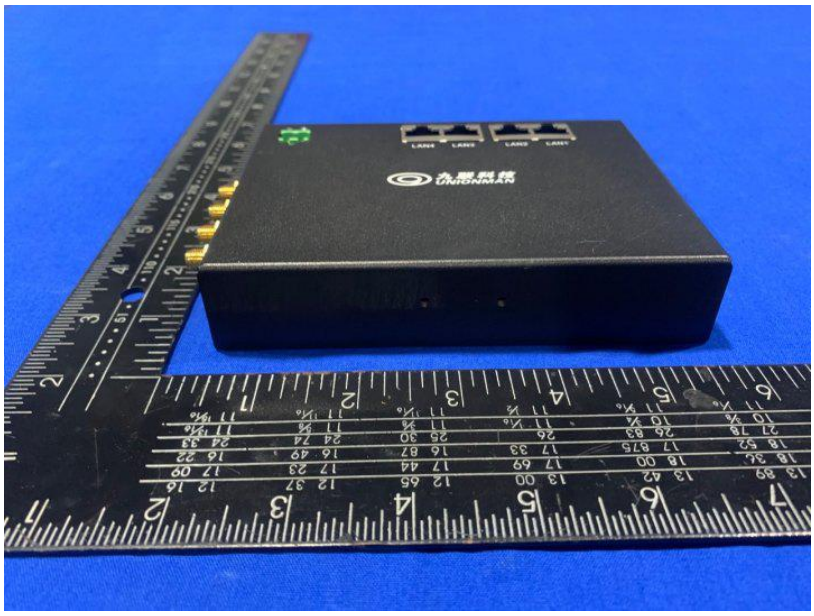
LAN4
LAN3
LAN2
LAN1
九联科技
UNIONMAN

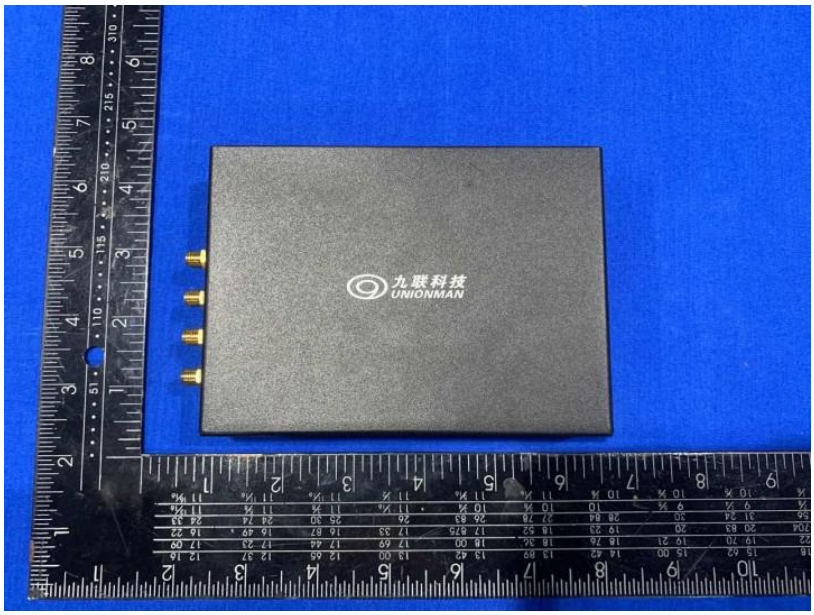


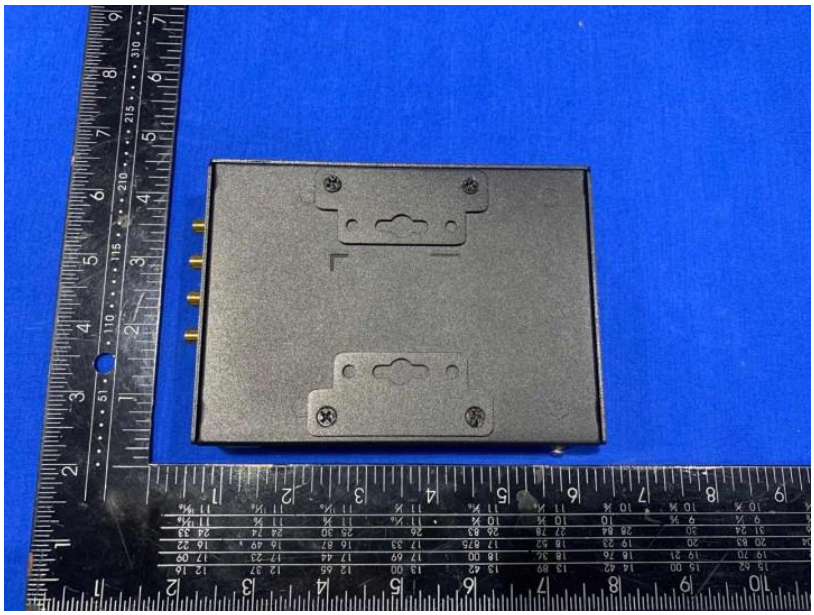

RESET
LAN4
LAN3
LAN2
LAN1



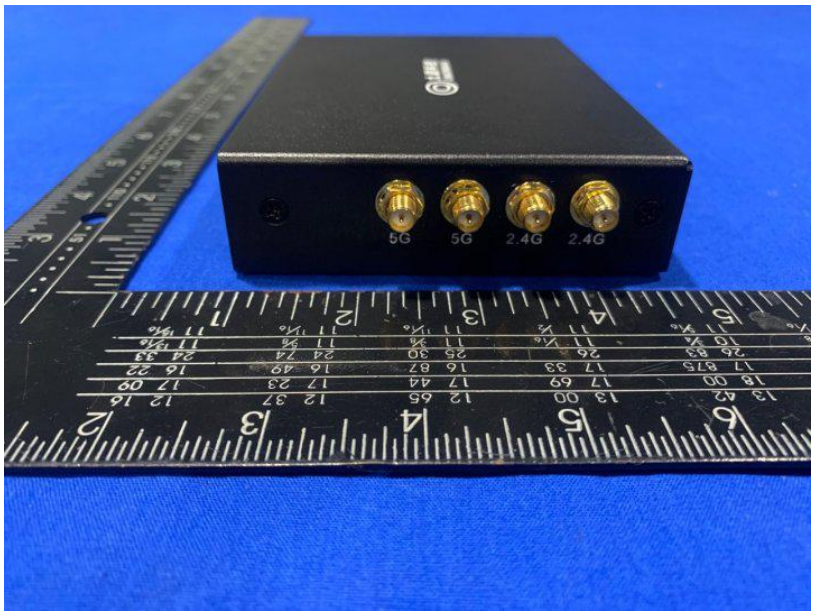
5G
5G
2.4G
2.4G

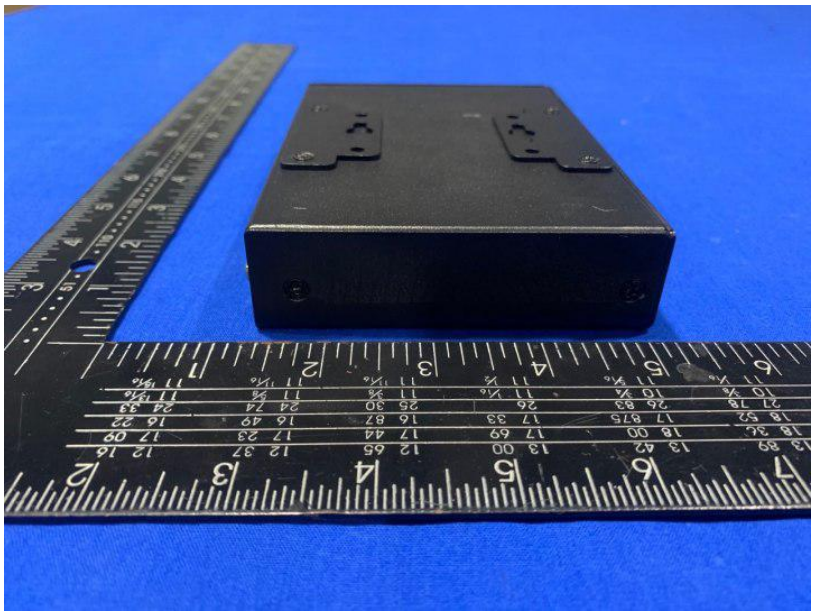

LAN4
LAN3
LAN2
LAN1

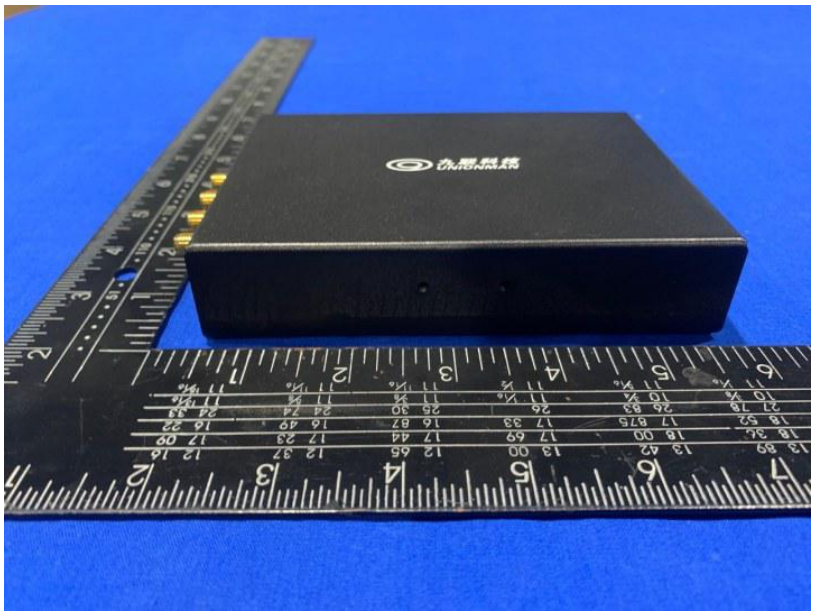

九联科技
UNIONMAN

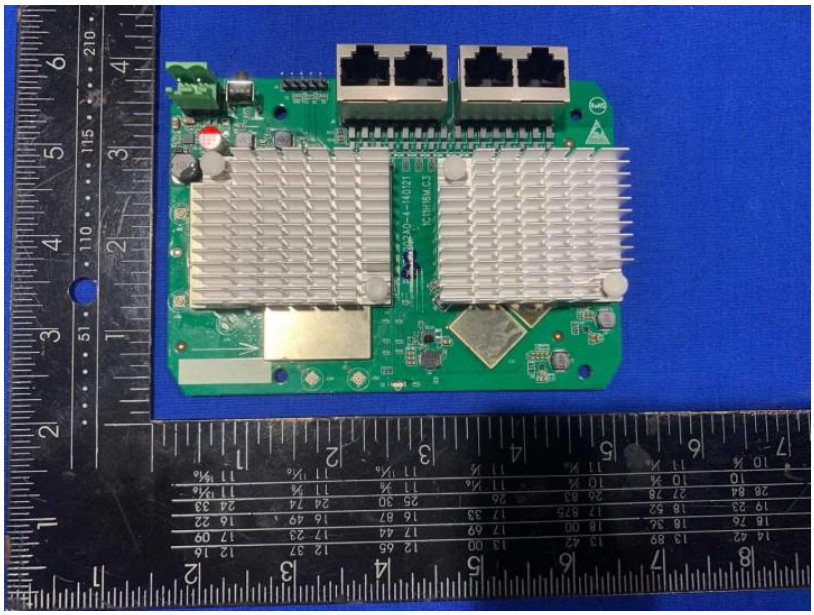


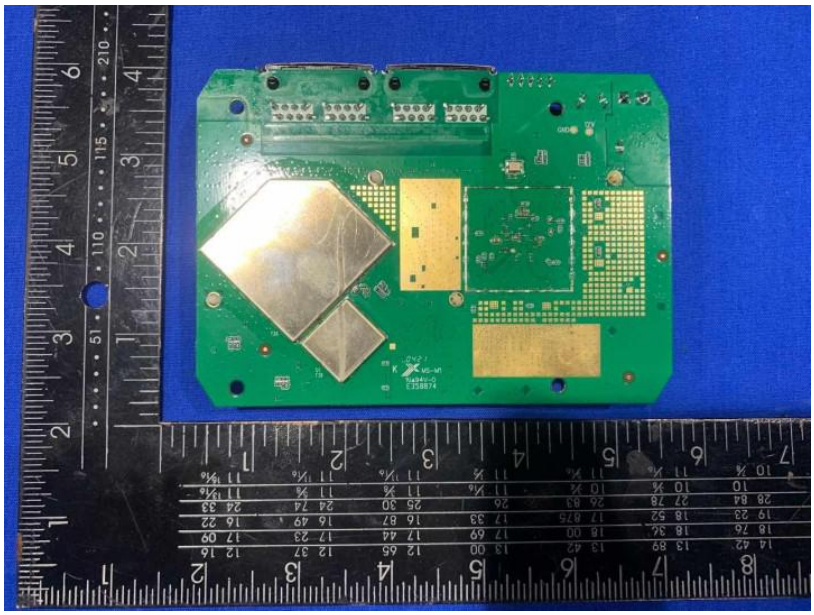
LAN1
LAN2
LAN3
LAN4
RESET

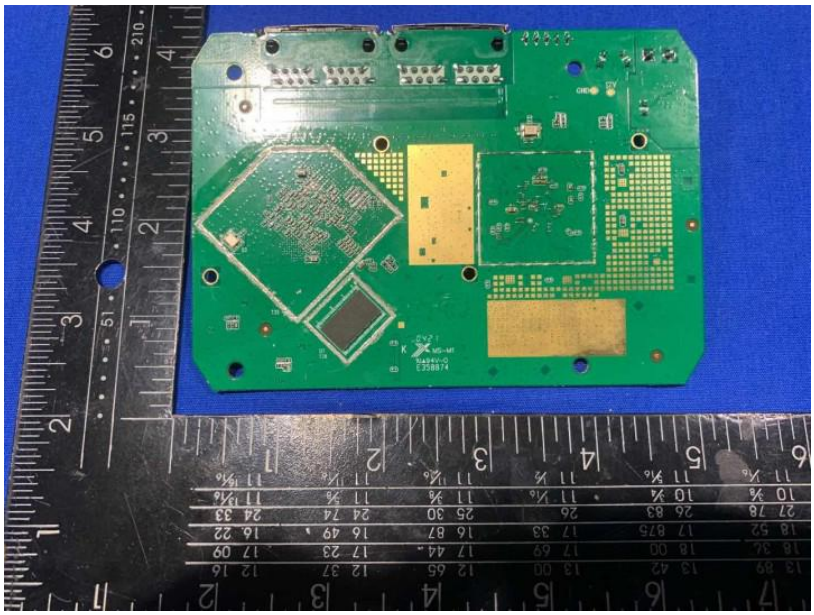

5G
5G
2.4G
2.4G

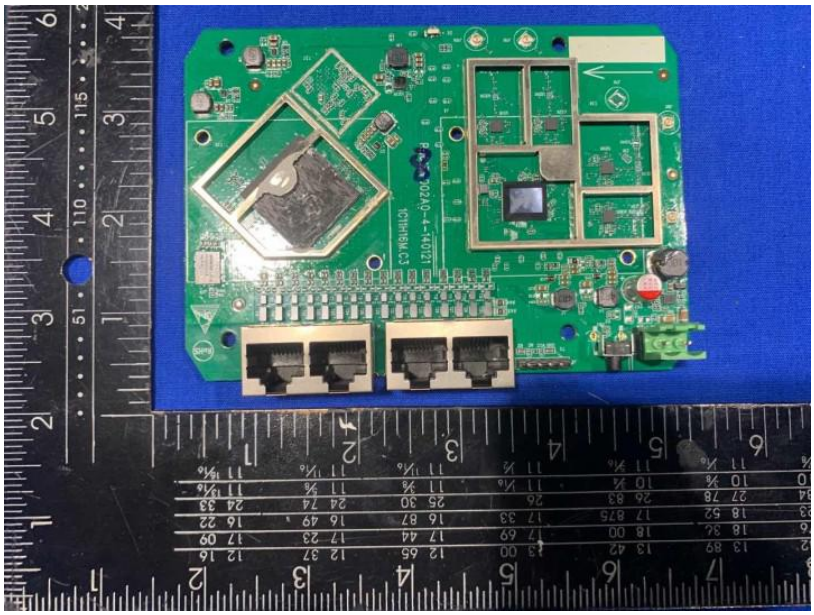




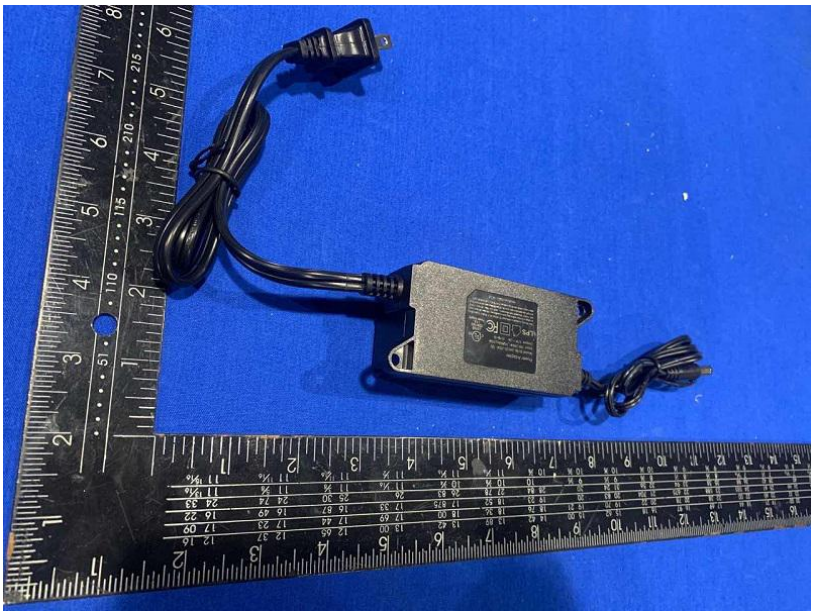








2.4G
Antenna 1
2.4G
Antenna 2
5G
Antenna 1
5G
Antenna 2



**THE END**