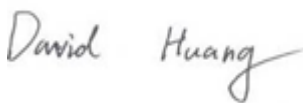


# RF TEST REPORT



Report No.: 17070384-FCC-R4-V1

Supersede Report No.: N/A

|                                                                                                                                      |                                                                                     |                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Applicant                                                                                                                            | Power Idea Technology (Shenzhen) Co., Ltd.                                          |                                                                                       |
| Product Name                                                                                                                         | WCDMA Digital Mobile Phone                                                          |                                                                                       |
| Model No.                                                                                                                            | RG160                                                                               |                                                                                       |
| Serial No.                                                                                                                           | RG400                                                                               |                                                                                       |
| Test Standard                                                                                                                        | FCC Part 15.247: 2016, ANSI C63.10: 2013                                            |                                                                                       |
| Test Date                                                                                                                            | May 27 to August 06, 2017                                                           |                                                                                       |
| Issue Date                                                                                                                           | August 24, 2017                                                                     |                                                                                       |
| Test Result                                                                                                                          | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail              |                                                                                       |
| Equipment complied with the specification <input checked="" type="checkbox"/>                                                        |                                                                                     |                                                                                       |
| Equipment did not comply with the specification <input type="checkbox"/>                                                             |                                                                                     |                                                                                       |
|                                                   |  |  |
| Loren Luo<br>Test Engineer                                                                                                           | David Huang<br>Checked By                                                           |                                                                                       |
| This test report may be reproduced in full only<br>Test result presented in this test report is applicable to the tested sample only |                                                                                     |                                                                                       |

Issued by:

**SIEMIC (SHENZHEN-CHINA) LABORATORIES**

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## Laboratories Introduction

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.



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### Accreditations for Conformity Assessment

| Country/Region | Scope                              |
|----------------|------------------------------------|
| USA            | EMC, RF/Wireless, SAR, Telecom     |
| Canada         | EMC, RF/Wireless, SAR, Telecom     |
| Taiwan         | EMC, RF, Telecom, SAR, Safety      |
| Hong Kong      | RF/Wireless, SAR, Telecom          |
| Australia      | EMC, RF, Telecom, SAR, Safety      |
| Korea          | EMI, EMS, RF, SAR, Telecom, Safety |
| Japan          | EMI, RF/Wireless, SAR, Telecom     |
| Singapore      | EMC, RF, SAR, Telecom              |
| Europe         | EMC, RF, SAR, Telecom, Safety      |

|                 |                    |
|-----------------|--------------------|
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## 1. Report Revision History

| Report No.         | Report Version | Description                      | Issue Date      |
|--------------------|----------------|----------------------------------|-----------------|
| 17070384-FCC-R4    | NONE           | Original                         | August 07, 2017 |
| 17070384-FCC-R4-V1 | V1             | P5 Changed the FCC Test Site No. | August 24, 2017 |
|                    |                |                                  |                 |
|                    |                |                                  |                 |
|                    |                |                                  |                 |
|                    |                |                                  |                 |

## 2. Customer information

|                  |                                                                                                                                                    |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| Applicant Name   | Power Idea Technology (Shenzhen) Co., Ltd.                                                                                                         |
| Applicant Add    | 4th Floor, A Section , Languang Science&technology Building , No.7 Xinxi RD , Hi-Tech Industrial Park North , Nanshan District , ShenZhen , P.R.C. |
| Manufacturer     | Power Idea Technology (Shenzhen) Co., Ltd.                                                                                                         |
| Manufacturer Add | 4th Floor, A Section , Languang Science&technology Building , No.7 Xinxi RD , Hi-Tech Industrial Park North , Nanshan District , ShenZhen , P.R.C. |

## 3. Test site information

Test Lab A:

|                      |                                                                                                                                              |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Lab performing tests | SIEMIC (Shenzhen-China) LABORATORIES                                                                                                         |
| Lab Address          | Zone A, Floor 1, Building 2 Wan Ye Long Technology Park<br>South Side of Zhoushi Road, Bao' an District, Shenzhen, Guangdong China<br>518108 |
| FCC Test Site No.    | 535293                                                                                                                                       |
| IC Test Site No.     | 4842E-1                                                                                                                                      |
| Test Software        | Radiated Emission Program-To Shenzhen v2.0                                                                                                   |

Test Lab B:

|                      |                                                                                       |
|----------------------|---------------------------------------------------------------------------------------|
| Lab performing tests | SIEMIC (Nanjing-China) Laboratories                                                   |
| Lab Address          | 2-1 Longcang Avenue Yuhua Economic and<br>Technology Development Park, Nanjing, China |
| FCC Test Site No.    | 694825                                                                                |
| IC Test Site No.     | 4842B-1                                                                               |

|                 |                    |
|-----------------|--------------------|
| Test Report No. | 17070384-FCC-R4-V1 |
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|               |                      |
|---------------|----------------------|
| Test Software | EZ_EMC(ver.lcp-03A1) |
|---------------|----------------------|

Note: We just perform Radiated Spurious Emission above 18GHz in the test Lab. B.

#### 4. Equipment under Test (EUT) Information

Description of EUT: WCDMA Digital Mobile Phone

Main Model: RG160

Serial Model: RG400

Date EUT received: May 26, 2017

Test Date(s): May 27 to August 06, 2017

Equipment Category : DTS

|               |                          |
|---------------|--------------------------|
|               | GSM850: -1.5dBi          |
|               | PCS1900: 1.7dBi          |
|               | UMTS-FDD Band V: -1.5dBi |
| Antenna Gain: | UMTS-FDD Band II: 2.0dBi |
|               | WIFI: 2.9dBi             |
|               | Bluetooth/BLE: 2.9dBi    |
|               | GPS: 1.9dBi              |

Antenna Type: PIFA antenna

|                     |                                      |
|---------------------|--------------------------------------|
| Type of Modulation: | GSM / GPRS: GMSK                     |
|                     | EGPRS: GMSK                          |
|                     | UMTS-FDD: QPSK                       |
|                     | 802.11b/g/n: DSSS, OFDM              |
|                     | Bluetooth: GFSK, $\pi/4$ QPSK, 8DPSK |
|                     | BLE: GFSK                            |
|                     | GPS: BPSK                            |

RF Operating Frequency (ies):

- GSM850 TX: 824.2 ~ 848.8 MHz; RX: 869.2 ~ 893.8 MHz
- PCS1900 TX: 1850.2 ~ 1909.8 MHz; RX: 1930.2 ~ 1989.8 MHz
- UMTS-FDD Band V TX: 826.4 ~ 846.6 MHz; RX: 871.4 ~ 891.6 MHz
- UMTS-FDD Band II TX: 1852.4 ~ 1907.6 MHz;  
RX: 1932.4 ~ 1987.6 MHz
- WIFI: 802.11b/g/n(20M): 2412-2462 MHz
- WIFI: 802.11n(40M): 2422-2452 MHz
- Bluetooth& BLE: 2402-2480 MHz

|                              |                                                                                                                                                                                               |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                              | GPS: 1575.42 MHz                                                                                                                                                                              |
| Max. Output Power:           | 802.11b: 9.18dBm<br>802.11g: 9.08dBm<br>802.11n(20M): 8.92dBm<br>802.11n(40M): 8.81dBm                                                                                                        |
| Number of Channels:          | GSM 850: 124CH<br>PCS1900: 299CH<br>UMTS-FDD Band V : 102CH<br>UMTS-FDD Band II : 277CH<br>WIFI :802.11b/g/n(20M): 11CH<br>WIFI :802.11n(40M): 7CH<br>Bluetooth: 79CH<br>BLE: 40CH<br>GPS:1CH |
| Port:                        | USB Port, Earphone Port                                                                                                                                                                       |
| Input Power:                 | Adapter:<br>Model: HKC0055010-2D<br>Input: AC100-240V~50/60Hz, 0.2A<br>Output: DC 5.0V, 1.0A<br>Battery<br>Model: BL180DI<br>Spec: 3.7V/1800mAh(6.66Wh)<br>Charge Limit: 4.2Vdc               |
| Trade Name :                 | N/A                                                                                                                                                                                           |
| GPRS/ EGPRS Multi-slot class | 8/10/12                                                                                                                                                                                       |
| FCC ID:                      | ZLE-RG160                                                                                                                                                                                     |



## 5. Test Summary

The product was tested in accordance with the following specifications.

All testing has been performed according to below product classification:

| FCC Rules                       | Description of Test                                                     | Result     |
|---------------------------------|-------------------------------------------------------------------------|------------|
| §15.203                         | Antenna Requirement                                                     | Compliance |
| §15.247 (a)(2)                  | DTS (6 dB&20 dB) CHANNEL BANDWIDTH                                      | Compliance |
| §15.247(b)(3)                   | Conducted Maximum Output Power                                          | Compliance |
| §15.247(e)                      | Power Spectral Density                                                  | Compliance |
| §15.247(d)                      | Band-Edge & Unwanted Emissions into Restricted Frequency Bands          | Compliance |
| §15.207 (a),                    | AC Power Line Conducted Emissions                                       | Compliance |
| §15.205, §15.209,<br>§15.247(d) | Radiated Emissions & Unwanted Emissions into Restricted Frequency Bands | Compliance |

### Measurement Uncertainty

| Emissions                                                                                                                                  |                                                                                                                                                 |               |
|--------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Test Item                                                                                                                                  | Description                                                                                                                                     | Uncertainty   |
| Band-Edge & Unwanted Emissions into Restricted Frequency Bands and Radiated Emissions & Unwanted Emissions into Restricted Frequency Bands | Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m) | +5.6dB/-4.5dB |
| -                                                                                                                                          | -                                                                                                                                               | -             |

## 6. Measurements, Examination And Derived Results

### 6.1 Antenna Requirement

#### **Applicable Standard**

According to § 15.203, 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 shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

- a. Antenna must be permanently attached to the unit.
- b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### **Antenna Connector Construction**

The EUT has 2 antennas:

A permanently attached PIFA antenna for GSM/PCS/ UMTS-FDD Band V/II, the gain is -1.5dBi for GSM850, the gain is 1.7dBi for PCS1900, the gain is -1.5dBi for UMTS-FDD Band V, the gain is 2.0dBi for UMTS-FDD Band II.

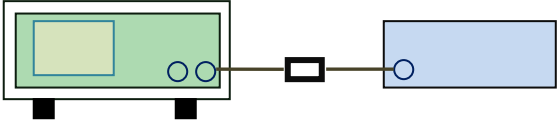
A permanently attached PIFA antenna for Bluetooth/BLE/WIFI/GPS, the gain is 2.9dBi for WIFI/Bluetooth/BLE, the gain is 1.9dBi for GPS.

**The antenna meets up with the ANTENNA REQUIREMENT.**

**Result:** Compliance.

## 6.2 DTS (6 dB&20 dB) Channel Bandwidth

|                      |               |
|----------------------|---------------|
| Temperature          | 24 °C         |
| Relative Humidity    | 53%           |
| Atmospheric Pressure | 1010mbar      |
| Test date :          | June 15, 2017 |
| Tested By :          | Loren Luo     |

| Spec                             | Item                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Requirement                                     | Applicable                          |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|-------------------------------------|
| § 15.247(a)(2)<br>RSS Gen(4.6.1) | a)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 6dB BW ≥ 500kHz; 20dB BW ≥ 500kHz;              | <input checked="" type="checkbox"/> |
|                                  | b)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 99% BW: For FCC reference only; required by IC. | <input checked="" type="checkbox"/> |
| Test Setup                       |  <p style="text-align: center;">Spectrum Analyzer                      EUT</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                 |                                     |
| Test Procedure                   | <p>558074 D01 DTS MEAS Guidance v03r03, 8.1 DTS bandwidth</p> <p><u>6dB bandwidth</u></p> <ol style="list-style-type: none"> <li>Set RBW = 100 kHz.</li> <li>Set the video bandwidth (VBW) ≥ 3 × RBW.</li> <li>Detector = Peak.</li> <li>Trace mode = max hold.</li> <li>Sweep = auto couple.</li> <li>Allow the trace to stabilize.</li> <li>Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.</li> </ol> <p><u>20dB bandwidth</u></p> <p>C63.10 Occupied Bandwidth (OBW=20dB bandwidth)</p> <ol style="list-style-type: none"> <li>Set RBW = 1%-5% OBW.</li> <li>Set the video bandwidth (VBW) ≥ 3 x RBW.</li> <li>Set the span range between 2 times and 5 times of the OBW.</li> <li>Sweep time=Auto, Detector=PK, Trace=Max hold.</li> <li>Once the reference level is established, the equipment is conditioned with typical modulating signals to produce the worst-</li> </ol> |                                                 |                                     |

|        |                                                                                                                                                                                 |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        | case (i.e., the widest) bandwidth. Unless otherwise specified for an unlicensed wireless device, measure the bandwidth at the 20 dB levels with respect to the reference level. |
| Remark |                                                                                                                                                                                 |
| Result | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail                                                                                                          |

Test Data ☒ Yes ☐ N/A

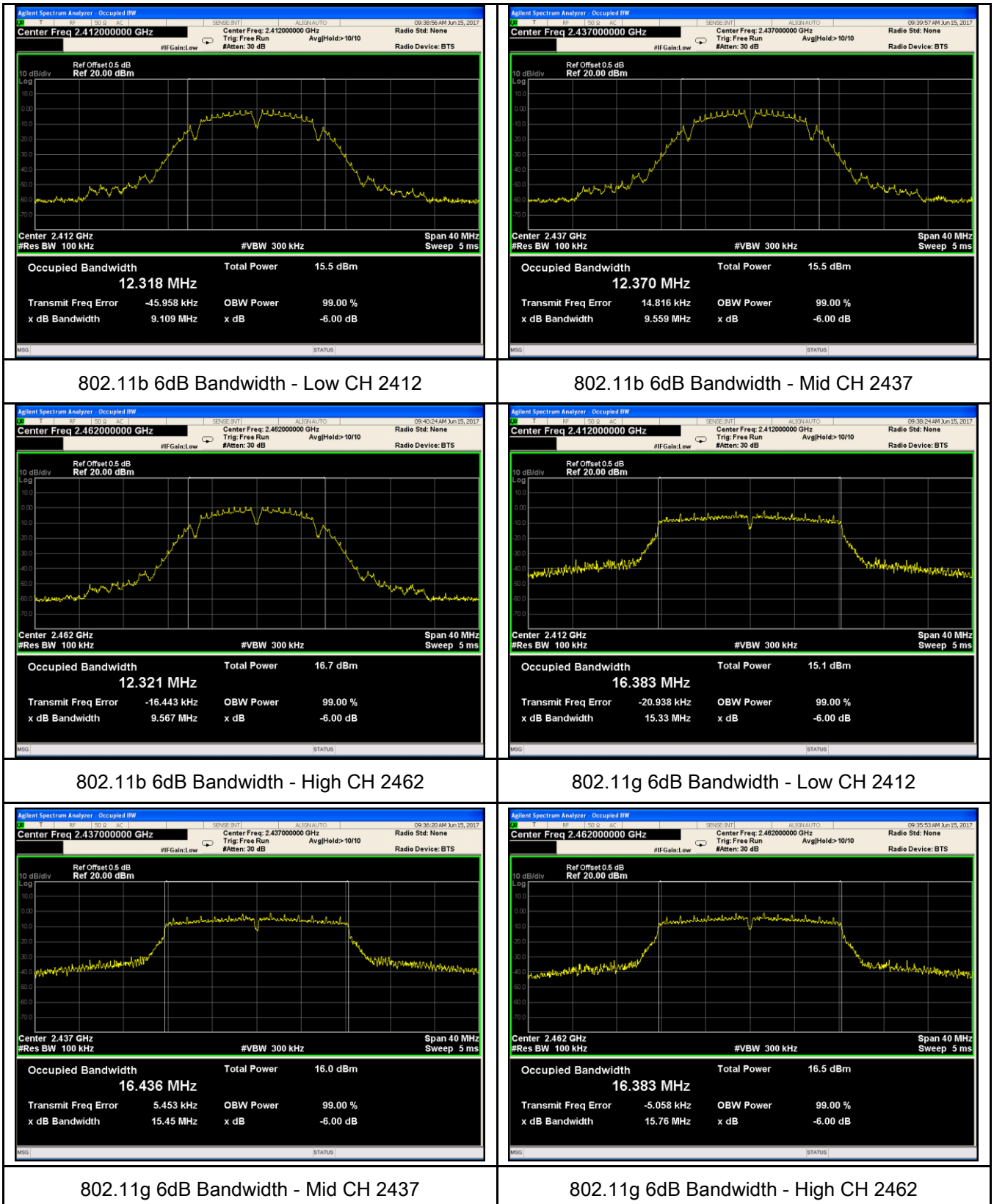
Test Plot ☒ Yes (See below) ☐ N/A

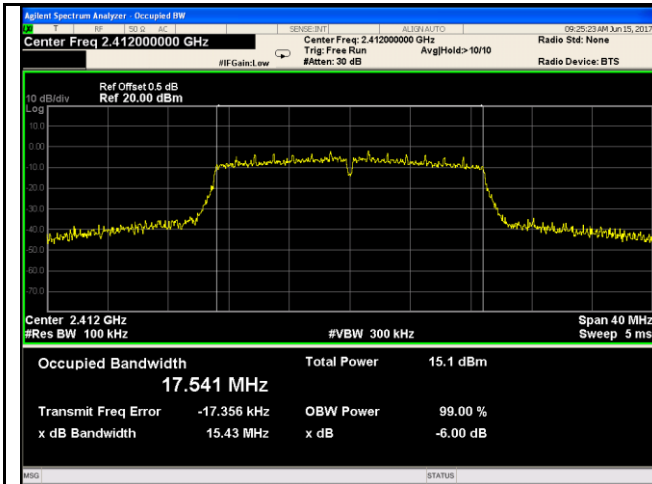
### Measurement result

| Test mode        | CH   | Freq (MHz) | 6dB Bandwidth (MHz) | 20dB Bandwidth (MHz) | Limit (MHz) |
|------------------|------|------------|---------------------|----------------------|-------------|
| 802.11b          | Low  | 2412       | 9.109               | 14.22                | $\geq 0.5$  |
|                  | Mid  | 2437       | 9.559               | 14.24                | $\geq 0.5$  |
|                  | High | 2462       | 9.567               | 14.23                | $\geq 0.5$  |
| 802.11g          | Low  | 2412       | 15.33               | 18.84                | $\geq 0.5$  |
|                  | Mid  | 2437       | 15.45               | 18.77                | $\geq 0.5$  |
|                  | High | 2462       | 15.76               | 18.60                | $\geq 0.5$  |
| 802.11n<br>(20M) | Low  | 2412       | 15.43               | 19.36                | $\geq 0.5$  |
|                  | Mid  | 2437       | 15.95               | 19.25                | $\geq 0.5$  |
|                  | High | 2462       | 15.89               | 19.10                | $\geq 0.5$  |
| 802.11n<br>(40M) | Low  | 2422       | 35.48               | 39.46                | $\geq 0.5$  |
|                  | Mid  | 2437       | 36.26               | 39.39                | $\geq 0.5$  |
|                  | High | 2452       | 35.18               | 39.13                | $\geq 0.5$  |

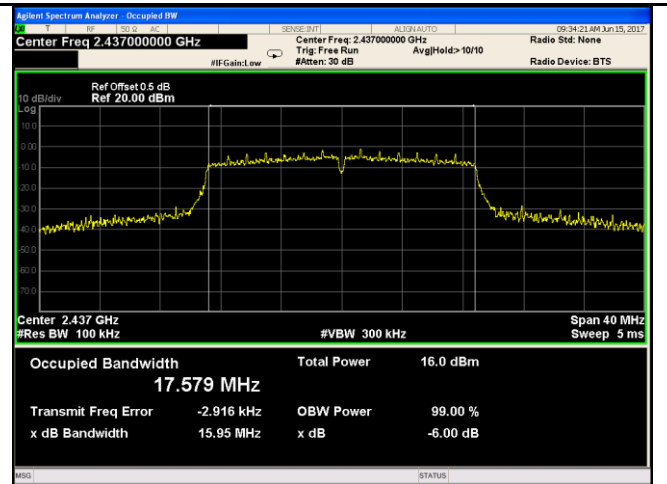
## Test Plots

### 6dB Bandwidth measurement result

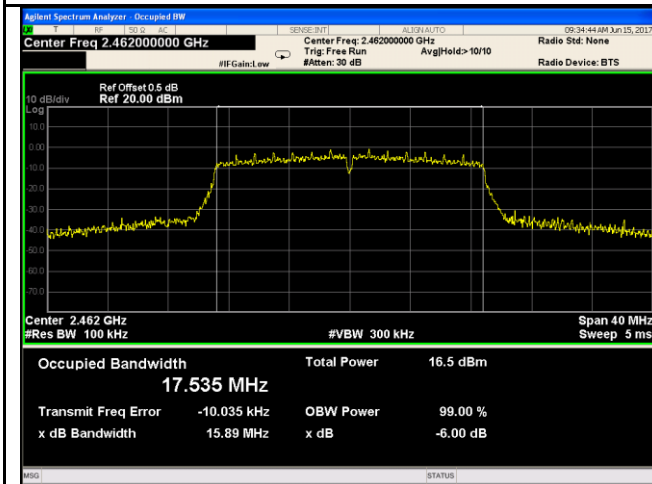




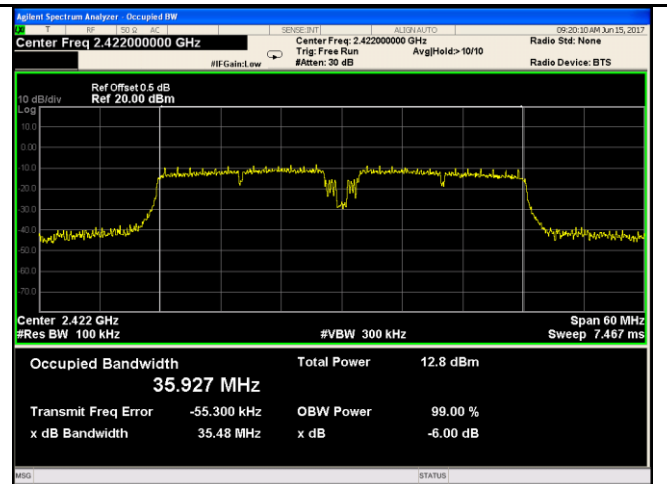
802.11n20 6dB Bandwidth - Low CH 2412



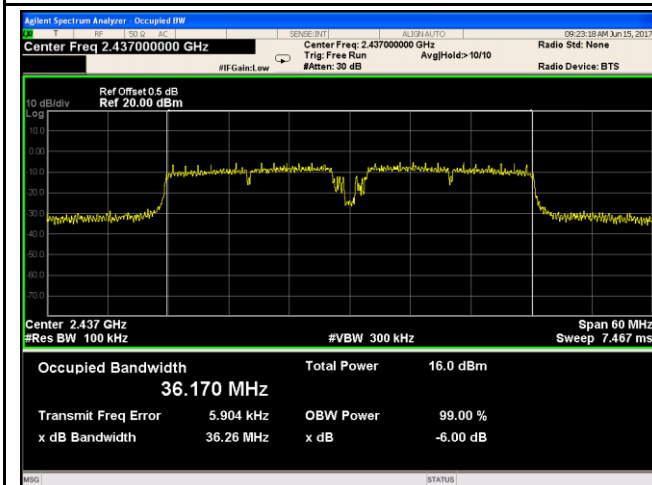
802.11n20 6dB Bandwidth - Mid CH 2437



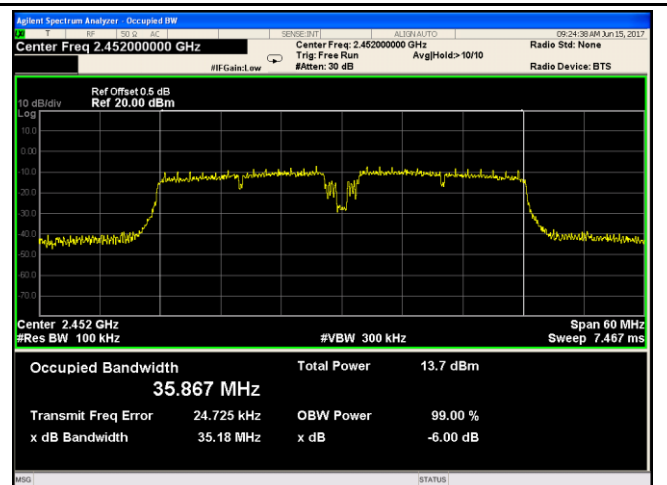
802.11n20 6dB Bandwidth - High CH 2462



802.11n40 6dB Bandwidth - Low CH 2422

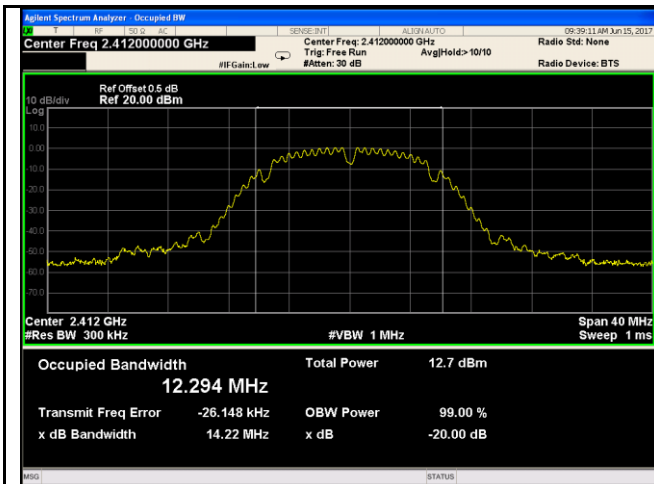


802.11n40 6dB Bandwidth - Mid CH 2437

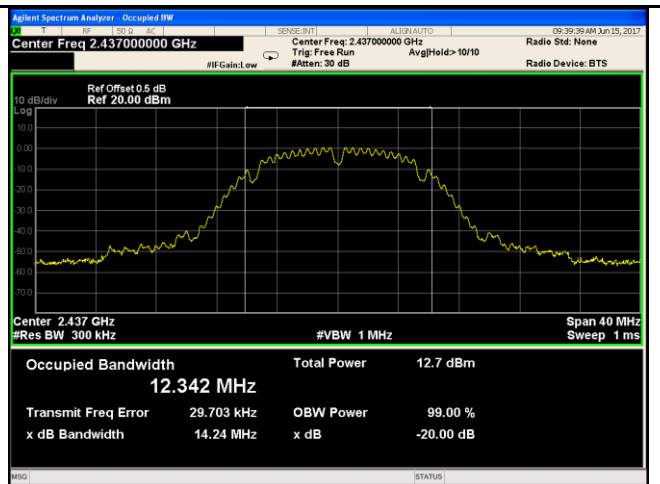


802.11n40 6dB Bandwidth - High CH 2452

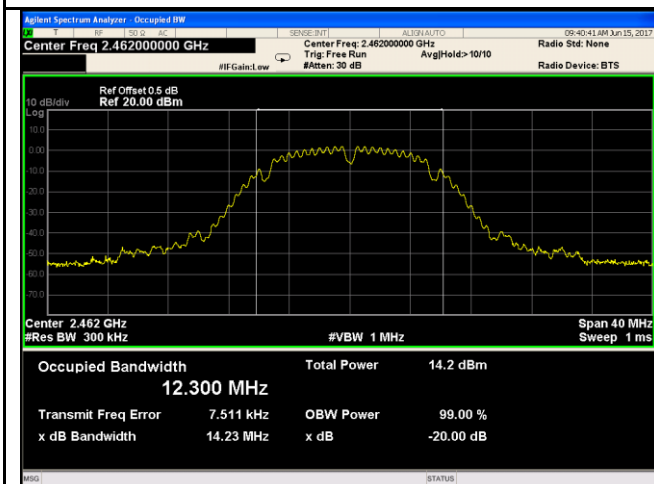
## 20 dB Bandwidth measurement result



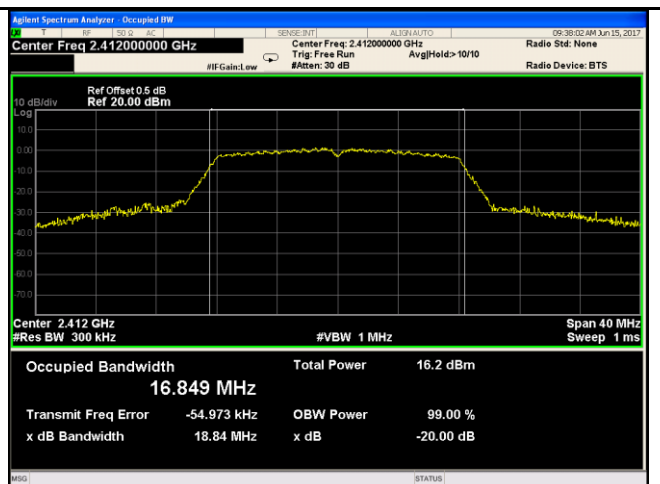
802.11b 20dB Bandwidth - Low CH 2412



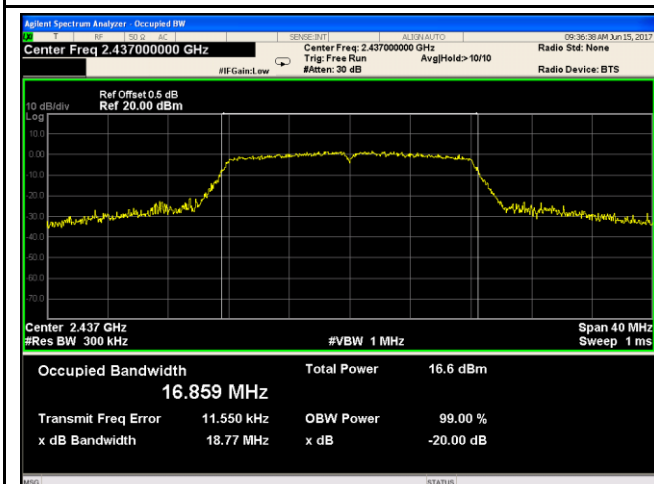
802.11b 20dB Bandwidth - Mid CH 2437



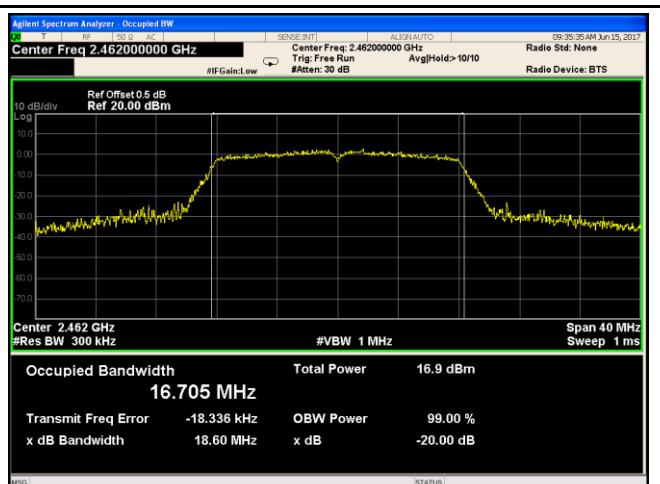
802.11b 20dB Bandwidth - High CH 2462



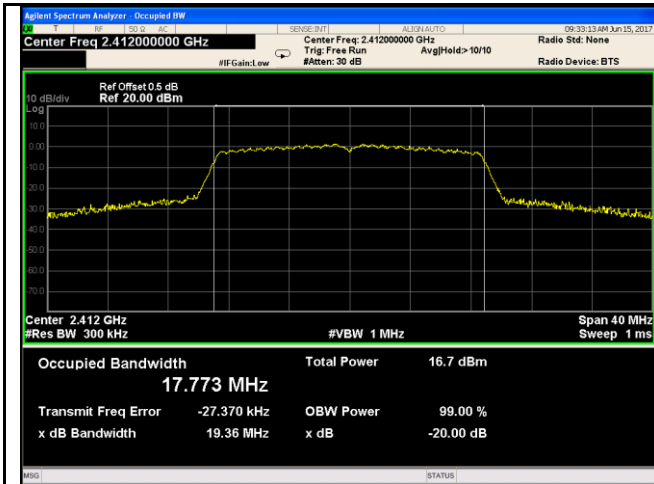
802.11g 20dB Bandwidth - Low CH 2412



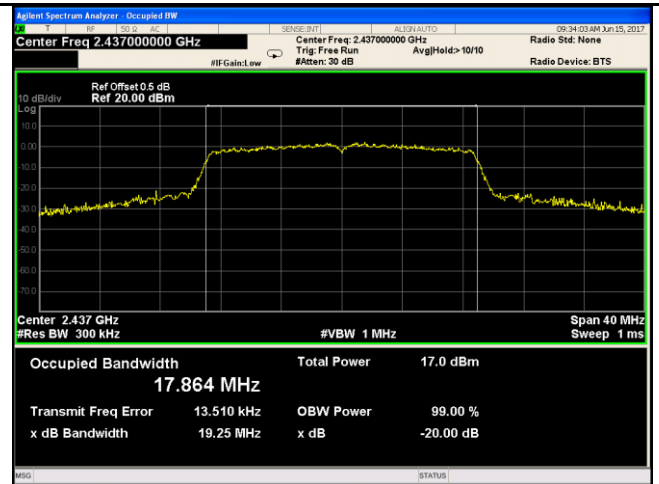
802.11g 20dB Bandwidth - Mid CH 2437



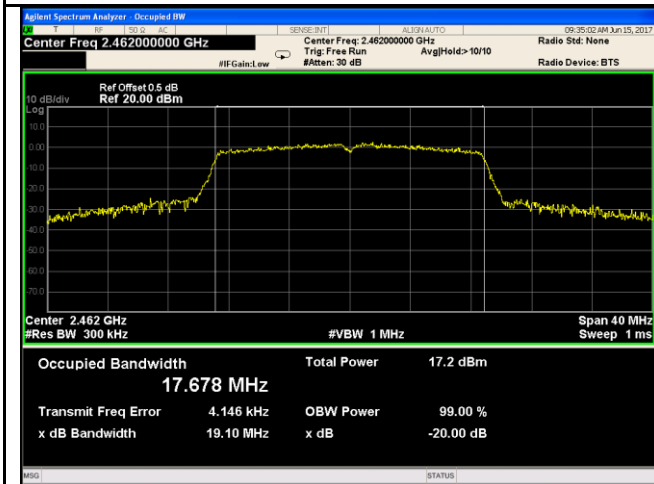
802.11g 20dB Bandwidth - High CH 2462



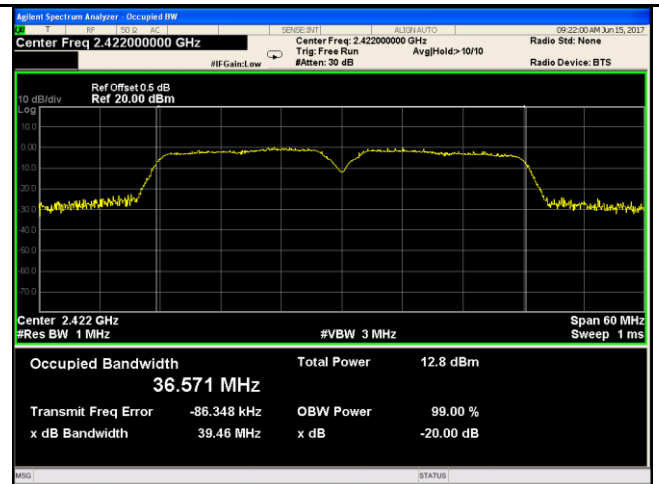
802.11n20 20dB Bandwidth - Low CH 2412



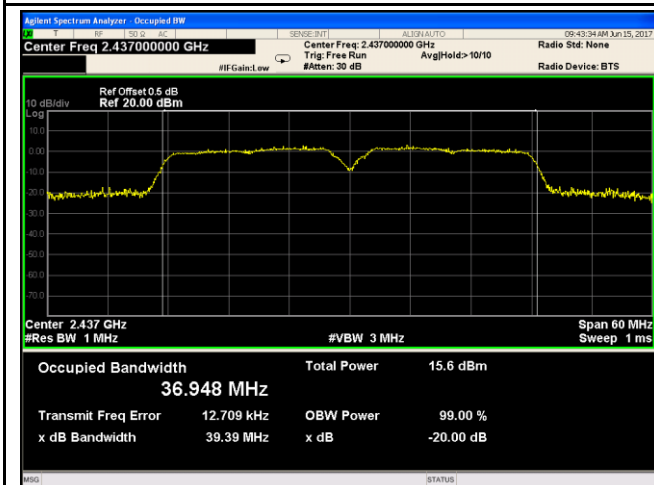
802.11n20 20dB Bandwidth - Mid CH 2437



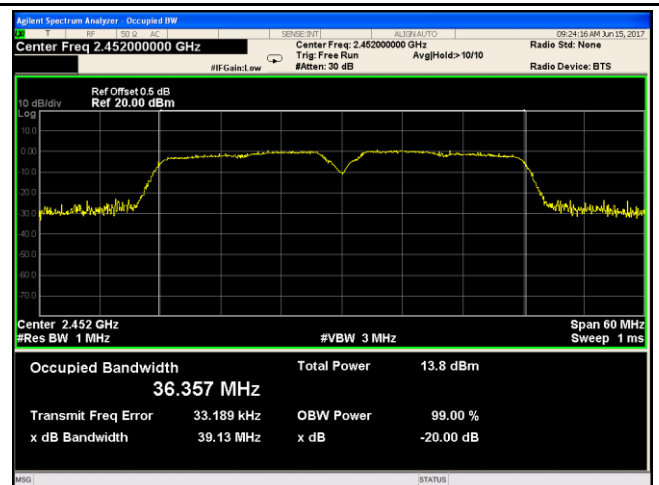
802.11n20 20dB Bandwidth - High CH 2462



802.11n40 20dB Bandwidth - Low CH 2422



802.11n40 20dB Bandwidth - Mid CH 2437



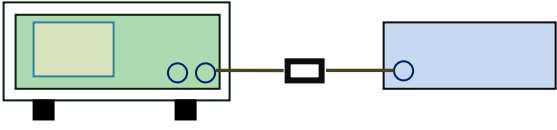
802.11n40 20dB Bandwidth - High CH 2452



### 6.3 Maximum Output Power

|                      |               |
|----------------------|---------------|
| Temperature          | 24 °C         |
| Relative Humidity    | 53%           |
| Atmospheric Pressure | 1010mbar      |
| Test date :          | June 15, 2017 |
| Tested By :          | Loren Luo     |

#### Requirement(s):

| Spec                               | Item                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Requirement                                                          | Applicable                          |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|-------------------------------------|
| §15.247(b)<br>(3),RSS210<br>(A8.4) | a)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | FHSS in 2400-2483.5MHz with $\geq 75$ channels: $\leq 1$ Watt        | <input type="checkbox"/>            |
|                                    | b)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | FHSS in 5725-5850MHz: $\leq 1$ Watt                                  | <input type="checkbox"/>            |
|                                    | c)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | For all other FHSS in the 2400-2483.5MHz band: $\leq 0.125$ Watt.    | <input type="checkbox"/>            |
|                                    | d)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | FHSS in 902-928MHz with $\geq 50$ channels: $\leq 1$ Watt            | <input type="checkbox"/>            |
|                                    | e)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | FHSS in 902-928MHz with $\geq 25$ & $<50$ channels: $\leq 0.25$ Watt | <input type="checkbox"/>            |
|                                    | f)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | DTS in 902-928MHz, 2400-2483.5MHz: $\leq 1$ Watt                     | <input checked="" type="checkbox"/> |
| Test Setup                         |  <p style="text-align: center;">Spectrum Analyzer                      EUT</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                      |                                     |
| Test Procedure                     | <p>558074 D01 DTS MEAS Guidance v03r03, 9.1.2 Integrated band power method<br/>Maximum output power measurement procedure</p> <ul style="list-style-type: none"> <li>- a) Set span to at least 1.5 times the OBW.</li> <li>- b) Set RBW = 1-5% of the OBW, not to exceed 1 MHz.</li> <li>- c) Set VBW <math>\geq 3 \times</math> RBW.</li> <li>- d) Number of points in sweep <math>\geq 2 \times</math> span / RBW. (This gives bin-to-bin spacing <math>\leq</math> RBW/2, so that narrowband signals are not lost between frequency bins.)</li> <li>- e) Sweep time = auto.</li> <li>- f) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.</li> <li>- g) If transmit duty cycle <math>&lt; 98\%</math>, use a sweep trigger with the level set to enable triggering only on full power pulses. The transmitter shall operate at maximum</li> </ul> |                                                                      |                                     |

|        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        | <p>power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle <math>\geq 98\%</math>, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run".</p> <ul style="list-style-type: none"> <li>- h) Trace average at least 100 traces in power averaging (i.e., RMS) mode.</li> <li>- i) Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function, with band limits set equal to the OBW band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.</li> </ul> |
| Remark |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Result | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

Test Data ☒ Yes ☐ N/A

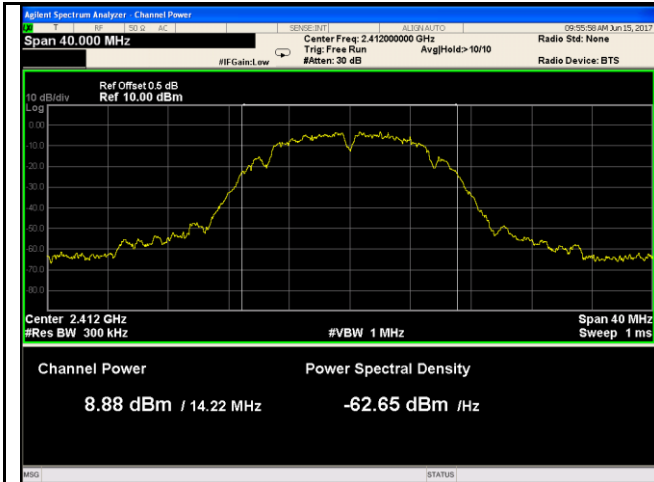
Test Plot ☒ Yes (See below) ☐ N/A

#### Output Power measurement result

| Type         | Test mode     | CH   | Frequency (MHz) | Conducted Power (dBm) | Limit (dBm) | Result |
|--------------|---------------|------|-----------------|-----------------------|-------------|--------|
| Output power | 802.11b       | Low  | 2412            | 8.88                  | 30          | Pass   |
|              |               | Mid  | 2437            | 9.09                  | 30          | Pass   |
|              |               | High | 2462            | <b>9.18</b>           | 30          | Pass   |
|              | 802.11g       | Low  | 2412            | 8.86                  | 30          | Pass   |
|              |               | Mid  | 2437            | 8.62                  | 30          | Pass   |
|              |               | High | 2462            | <b>9.08</b>           | 30          | Pass   |
|              | 802.11n (20M) | Low  | 2412            | 8.77                  | 30          | Pass   |
|              |               | Mid  | 2437            | 8.67                  | 30          | Pass   |
|              |               | High | 2462            | <b>8.92</b>           | 30          | Pass   |
|              | 802.11n (40M) | Low  | 2422            | 8.51                  | 30          | Pass   |
|              |               | Mid  | 2437            | <b>8.81</b>           | 30          | Pass   |
|              |               | High | 2452            | 8.44                  | 30          | Pass   |

## Test Plots

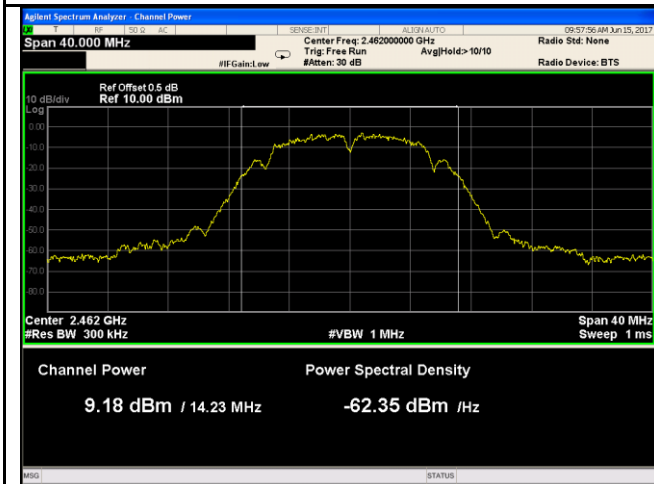
### The Average Power



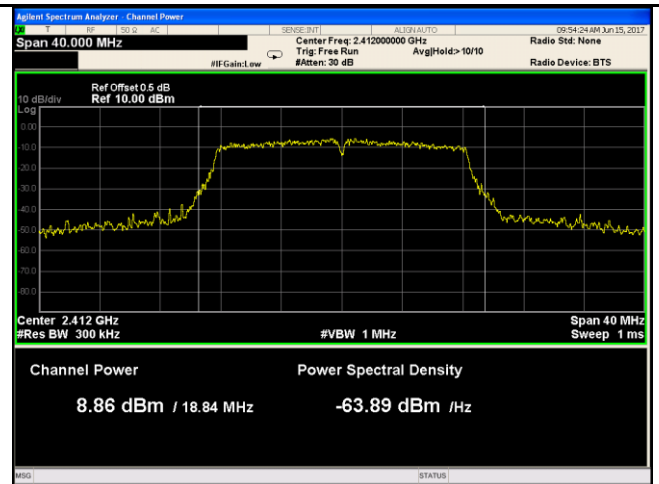
802.11b - AV Output power - Low CH 2412



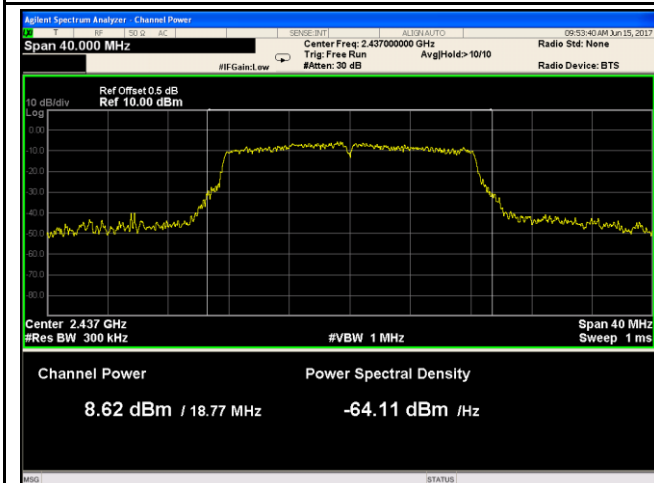
802.11b - AV Output power - Mid CH 2437



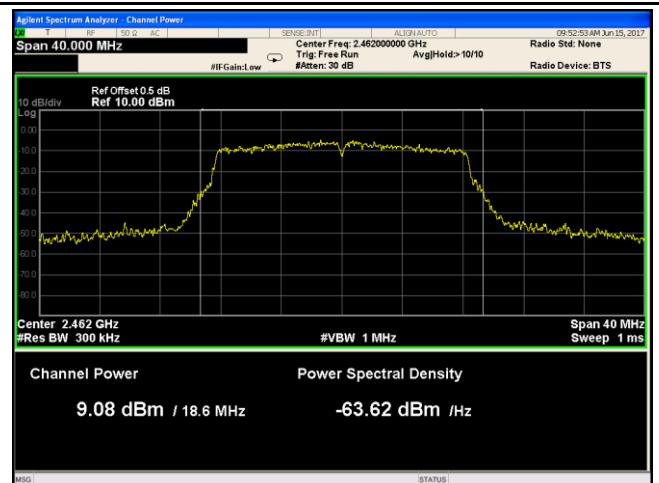
802.11b - AV Output power - High CH 2462



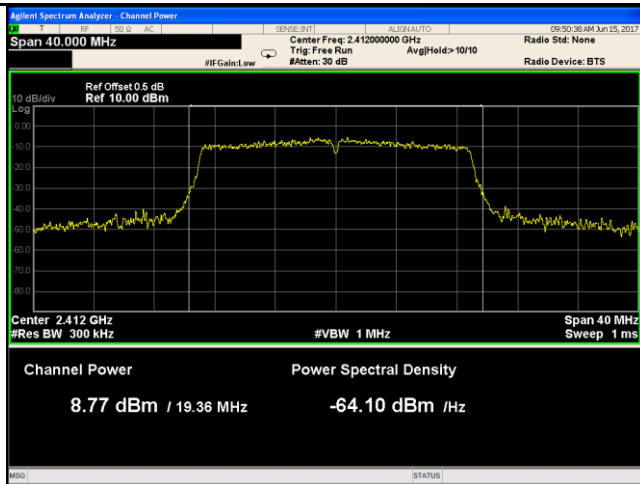
802.11g - AV Output power - Low CH 2412



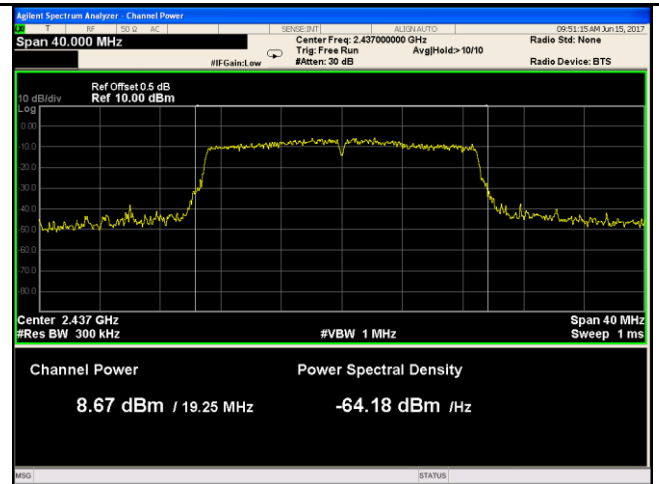
802.11g - AV Output power - Mid CH 2437



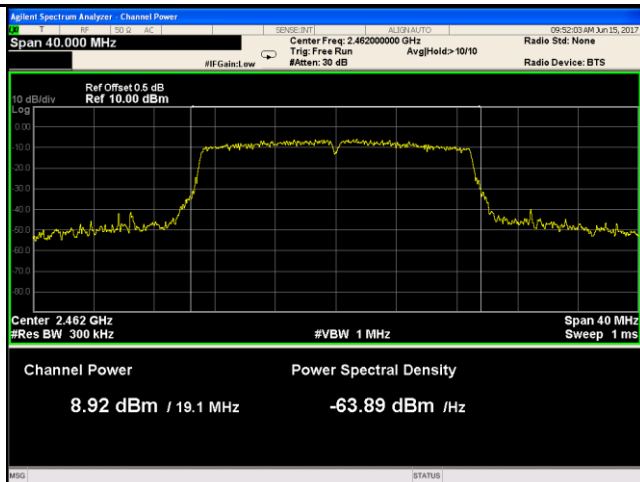
802.11g - AV Output power - High CH 2462



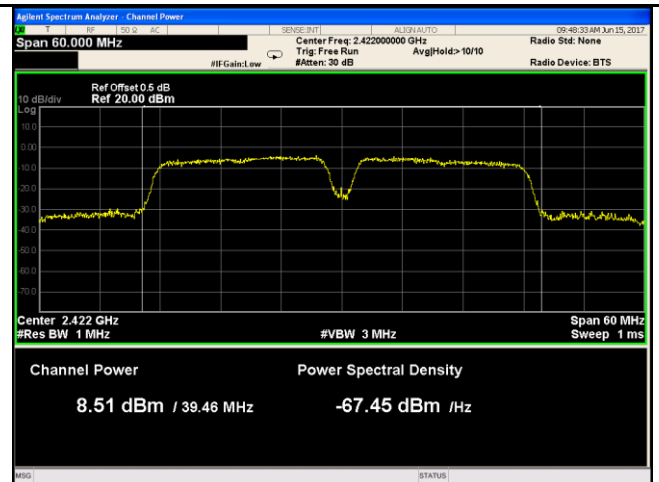
802.11n20 - AV Output power - Low CH 2412



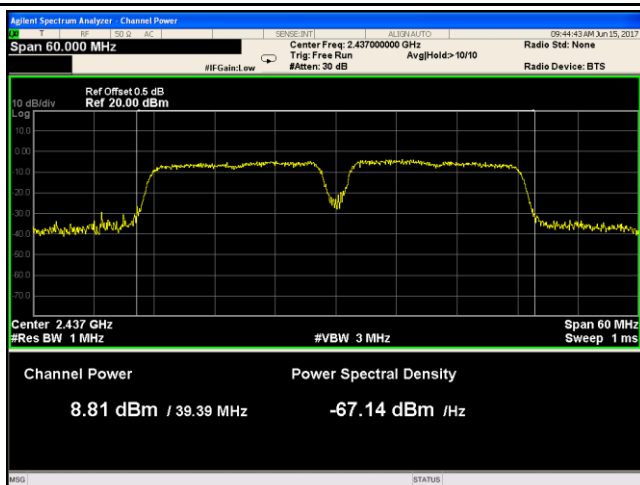
802.11n20 - AV Output power - Mid CH 2437



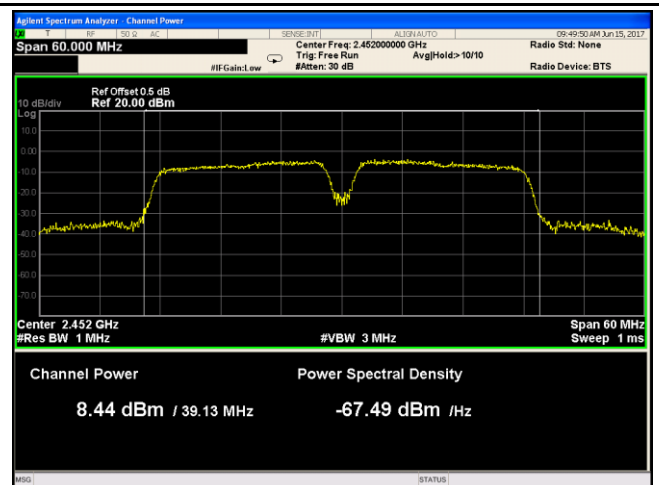
802.11n20 - AV Output power - High CH 2462



802.11n40 - AV Output power - Low CH 2422



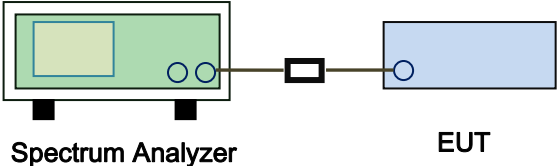
802.11n40 - AV Output power - Mid CH 2437



802.11n40 - AV Output power - High CH 2452

## 6.4 Power Spectral Density

|                      |               |
|----------------------|---------------|
| Temperature          | 24 °C         |
| Relative Humidity    | 53%           |
| Atmospheric Pressure | 1010mbar      |
| Test date :          | June 15, 2017 |
| Tested By :          | Loren Luo     |

| Spec           | Item                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Requirement                                                                                                                                                                              | Applicable                          |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| §15.247(e)     | a)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. | <input checked="" type="checkbox"/> |
| Test Setup     |  <p style="text-align: center;">Spectrum Analyzer                      EUT</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                          |                                     |
| Test Procedure | <p>558074 D01 DTS MEAS Guidance v03r03, 10.2 power spectral density method power spectral density measurement procedure</p> <ul style="list-style-type: none"> <li>- a) Set analyzer center frequency to DTS channel center frequency.</li> <li>- b) Set the span to 1.5 times the DTS bandwidth.</li> <li>- c) Set the RBW to: <math>3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}</math>.</li> <li>- d) Set the VBW <math>\geq 3 \times \text{RBW}</math>.</li> <li>- e) Detector = peak.</li> <li>- f) Sweep time = auto couple.</li> <li>- g) Trace mode = max hold.</li> <li>- h) Allow trace to fully stabilize.</li> <li>- i) Use the peak marker function to determine the maximum amplitude level within the RBW.</li> <li>- j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.</li> </ul> |                                                                                                                                                                                          |                                     |
| Remark         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                          |                                     |
| Result         | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                          |                                     |

Test Data ☒ Yes ☐ N/A

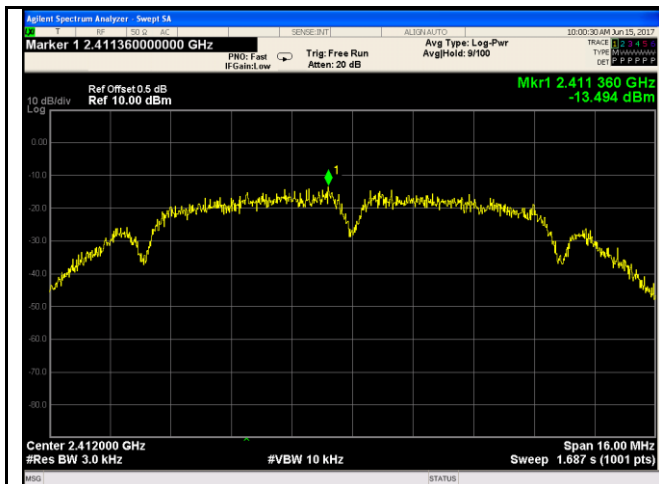
Test Plot ☒ Yes (See below) ☐ N/A

### Power Spectral Density measurement result

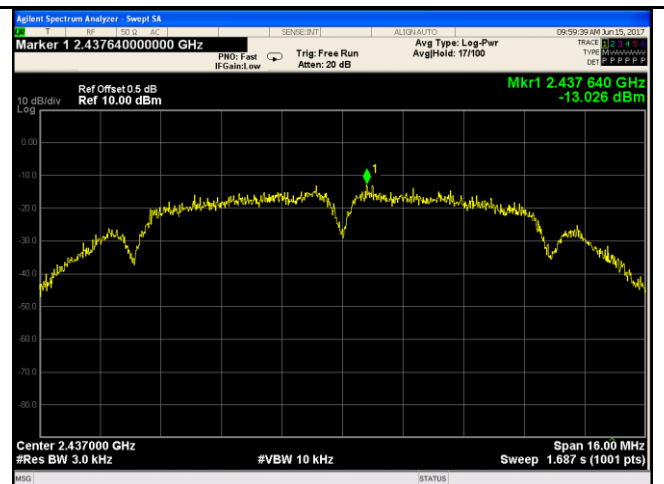
| Type | Test mode        | CH   | Freq<br>(MHz) | PSD     | Limit<br>(dBm) | Result |
|------|------------------|------|---------------|---------|----------------|--------|
|      |                  |      |               | (dBm)   |                |        |
| PSD  | 802.11b          | Low  | 2412          | -13.494 | 8              | Pass   |
|      |                  | Mid  | 2437          | -13.026 | 8              | Pass   |
|      |                  | High | 2462          | -13.505 | 8              | Pass   |
|      | 802.11g          | Low  | 2412          | -14.978 | 8              | Pass   |
|      |                  | Mid  | 2437          | -13.971 | 8              | Pass   |
|      |                  | High | 2462          | -13.411 | 8              | Pass   |
|      | 802.11n<br>(20M) | Low  | 2412          | -14.468 | 8              | Pass   |
|      |                  | Mid  | 2437          | -14.441 | 8              | Pass   |
|      |                  | High | 2462          | -13.772 | 8              | Pass   |
|      | 802.11n<br>(40M) | Low  | 2422          | -20.148 | 8              | Pass   |
|      |                  | Mid  | 2437          | -18.202 | 8              | Pass   |
|      |                  | High | 2452          | -19.184 | 8              | Pass   |

## Test Plots

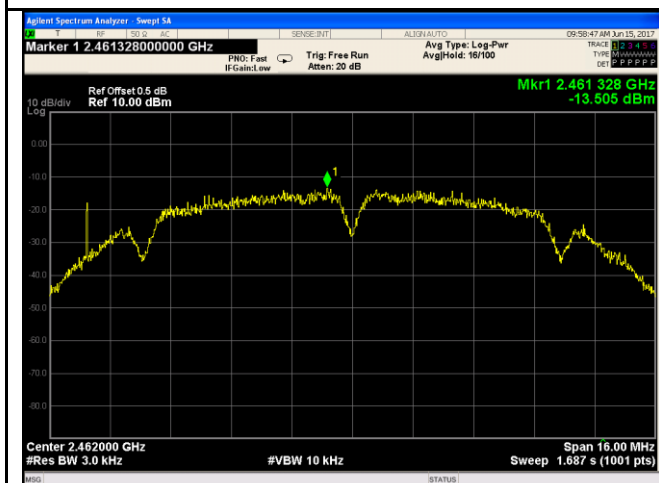
### Power Spectral Density measurement result



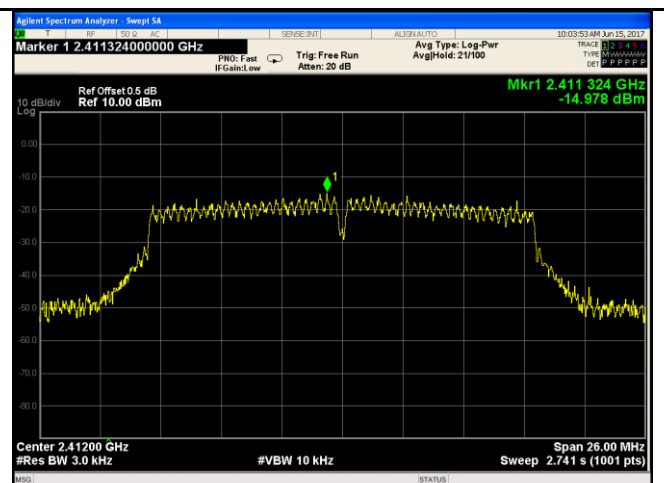
PSD - Low CH 2412 - 802.11b



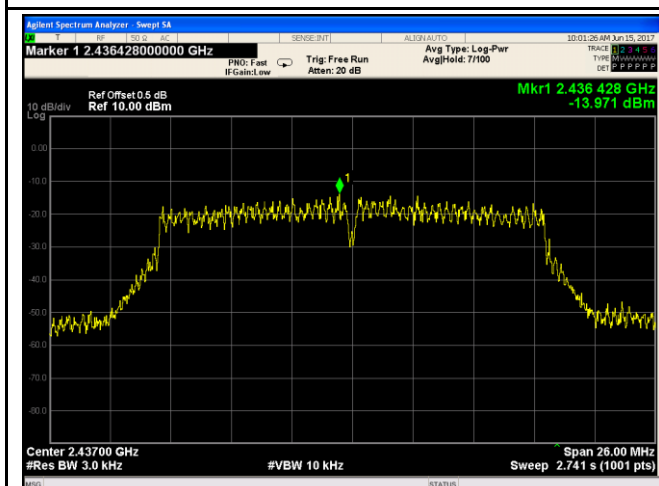
PSD - Mid CH 2437 - 802.11b



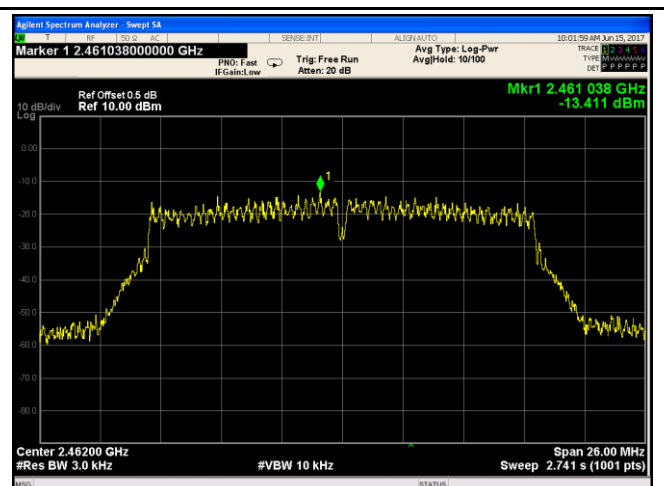
PSD - High CH 2462 - 802.11b



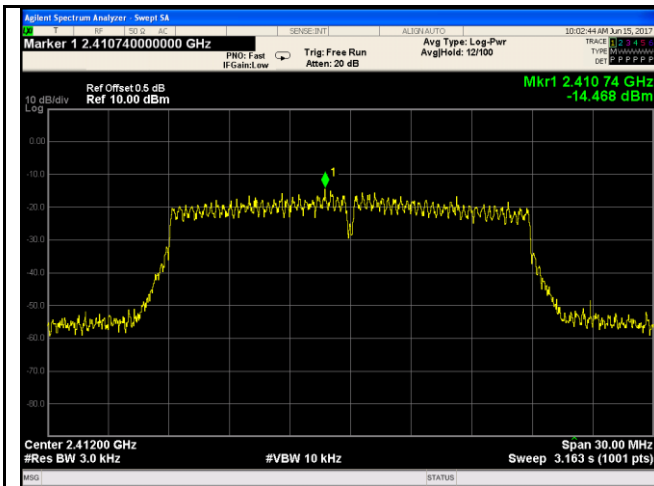
PSD - Low CH 2412 - 802.11g



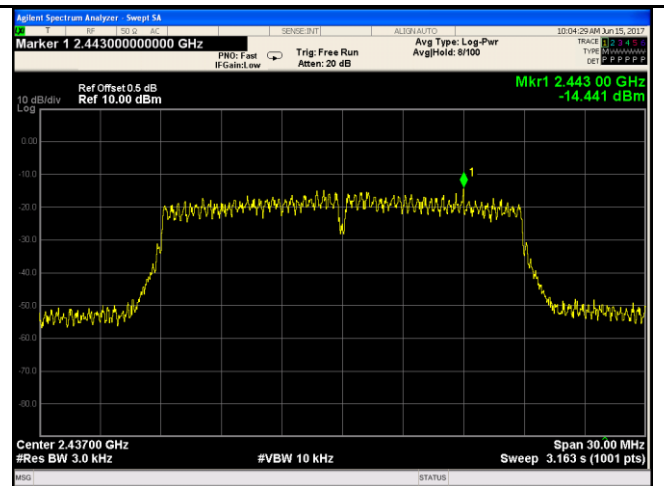
PSD - Mid CH 2437 - 802.11g



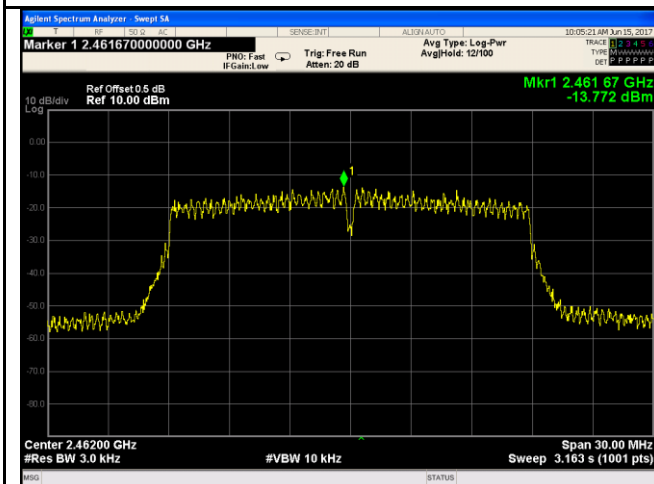
PSD - High CH 2462 - 802.11g



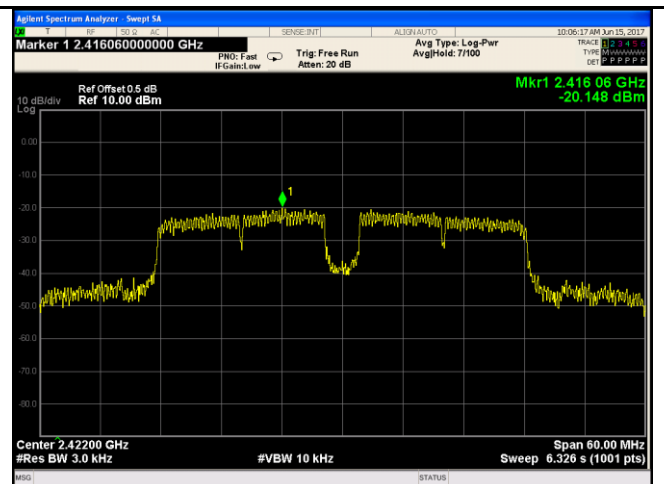
PSD - Low CH 2412 - 802.11n20



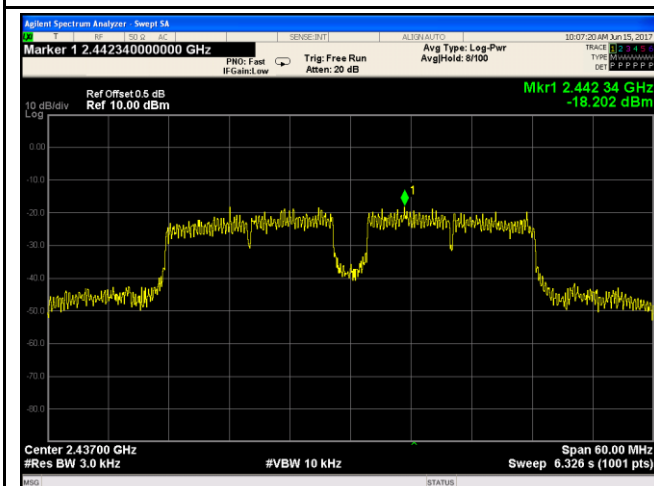
PSD - Mid CH 2437 - 802.11n20



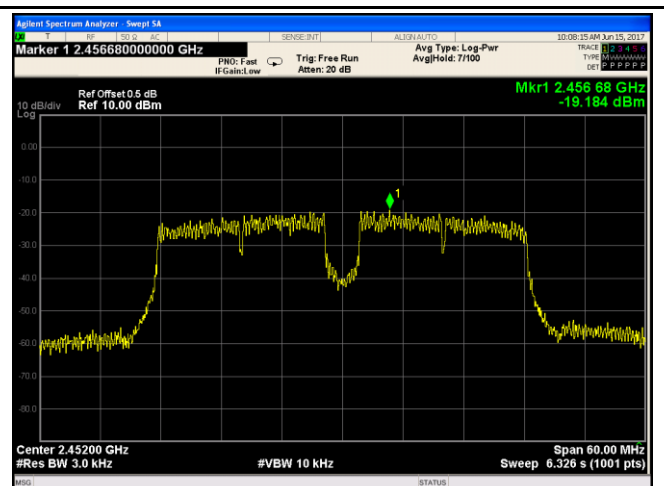
PSD - High CH 2472 - 802.11n20



PSD - Low CH 2422 - 802.11n40



PSD - Mid CH 2437 - 802.11n40



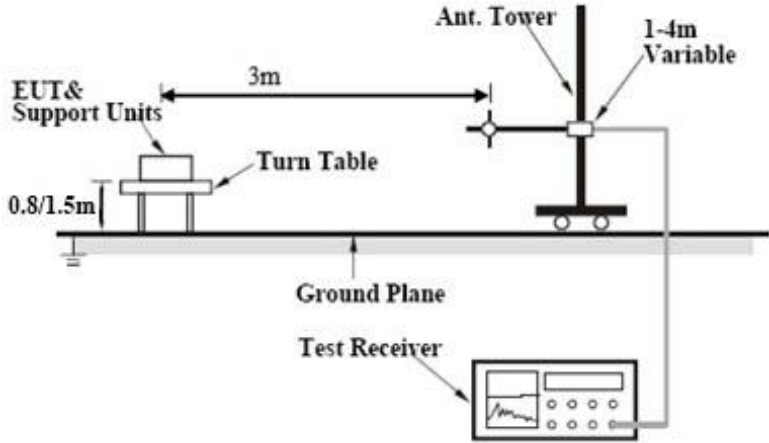
PSD - High CH 2452 - 802.11n40



## 6.5 Band-Edge & Unwanted Emissions into Restricted Frequency Bands

|                      |               |
|----------------------|---------------|
| Temperature          | 24 °C         |
| Relative Humidity    | 55%           |
| Atmospheric Pressure | 1008mbar      |
| Test date :          | June 13, 2017 |
| Tested By :          | Loren Luo     |

### Requirement(s):

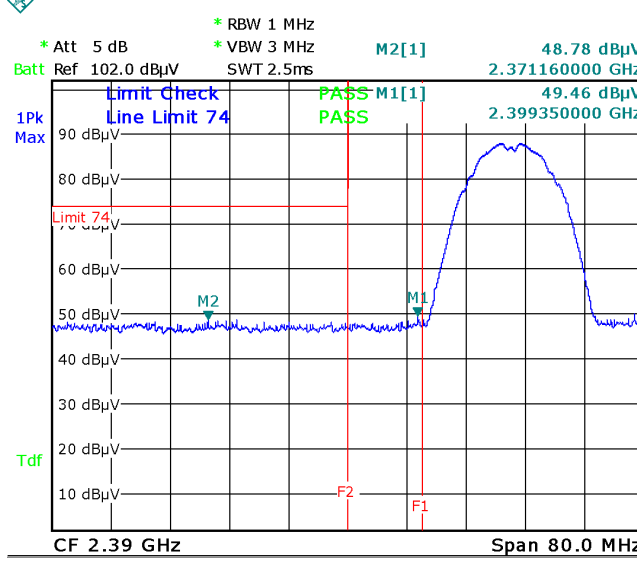
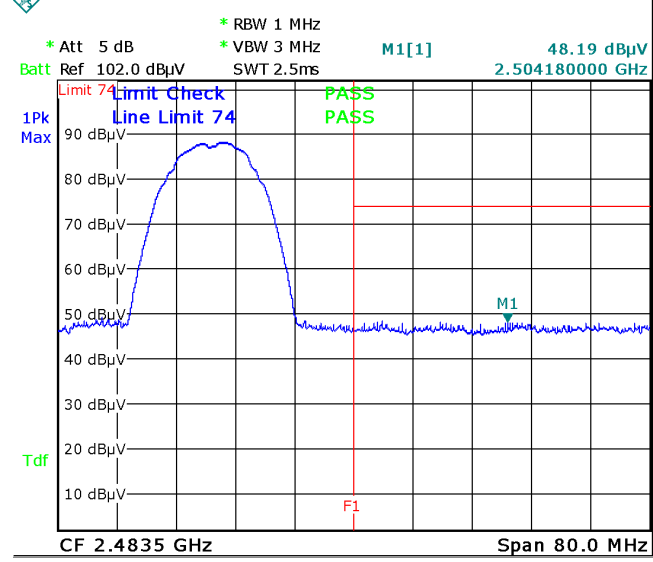
| Spec           | Item                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Applicable                          |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| §15.247(d)     | a)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. | <input checked="" type="checkbox"/> |
| Test Setup     |                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                     |
| Test Procedure | <p>Radiated Method Only</p> <ul style="list-style-type: none"> <li>1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.</li> <li>2. Position the EUT without connection to measurement instrument. Put it on the Rotated table and turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.</li> </ul> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                     |

|        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        | <ul style="list-style-type: none"> <li>- 3. First, set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge, check the emission of EUT, if pass then set Spectrum Analyzer as below:               <ul style="list-style-type: none"> <li>a. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasiy Peak detection at frequency below 1GHz.</li> <li>b. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz with Peak detection for Peak measurement at frequency above 1GHz.</li> <li>c. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz with Peak detection for Average Measurement as below at frequency above 1GHz.</li> </ul> </li> <li>- 4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.</li> <li>- 5. Repeat above procedures until all measured frequencies were complete.</li> </ul> |
| Remark |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Result | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

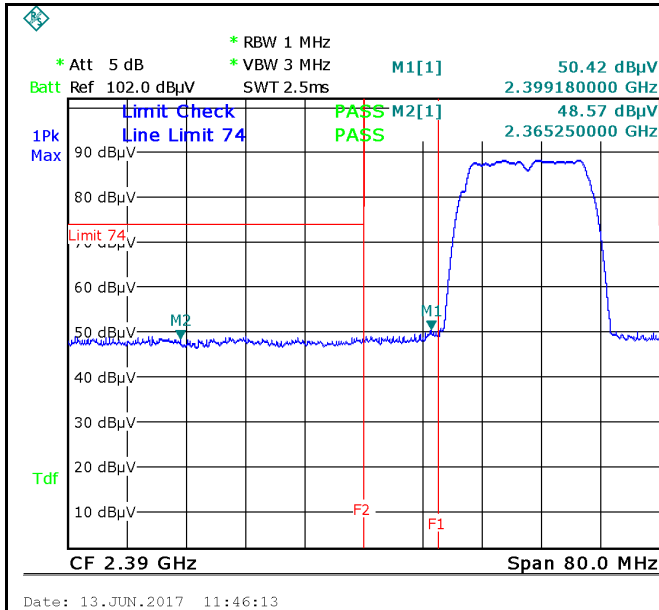
Test Data ☒ Yes ☐ N/A  
 Test Plot ☒ Yes (See below) ☐ N/A

## Test Plots

### Band Edge measurement result

|                                                                                                                      |                                                                                                                       |
|----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
|  <p>Date: 13.JUN.2017 11:48:18</p> |  <p>Date: 13.JUN.2017 11:11:53</p> |
| <p>Band Edge, Left Side (Peak) - 802.11b</p> <p>Note: F1 is frequency 2390MHz; F2 is frequency 2400MHz</p>           | <p>Band Edge, Right Side (Peak) - 802.11b</p> <p>Note: F1 is frequency 2483.5MHz</p>                                  |
| <p>Note: (no need if PK value less than the AV limit)</p>                                                            | <p>Note: (no need if PK value less than the AV limit)</p>                                                             |
| <p>Band Edge, Left Side (Average) - 802.11b</p>                                                                      | <p>Band Edge, Right Side (Average) - 802.11b</p>                                                                      |

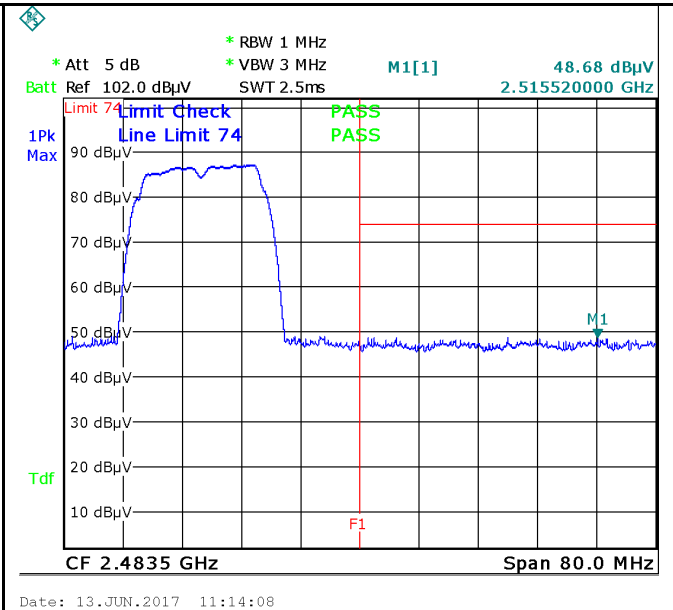
Note: Both Horizontal and vertical polarities were investigated



Band Edge, Left Side (Peak) - 802.11g  
Note: F1 is frequency 2390MHz; F2 is frequency 2400MHz

Note: (no need if PK value less than the AV limit)

Band Edge, Left Side (Average) - 802.11g  
Note: F1 is frequency 2390MHz; F2 is frequency 2400MHz

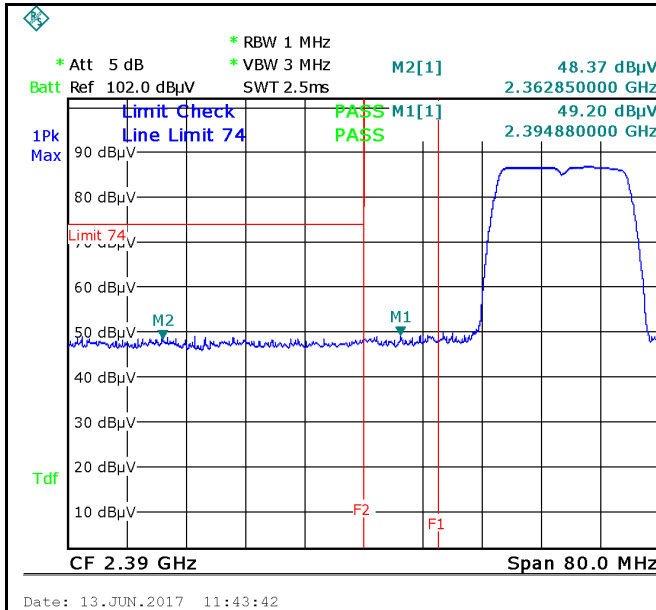


Band Edge, Right Side (Peak) - 802.11g  
Note: F1 is frequency 2483.5MHz

Note: (no need if PK value less than the AV limit)

Band Edge, Right Side (Average) - 802.11g  
Note: F1 is frequency 2483.5MHz

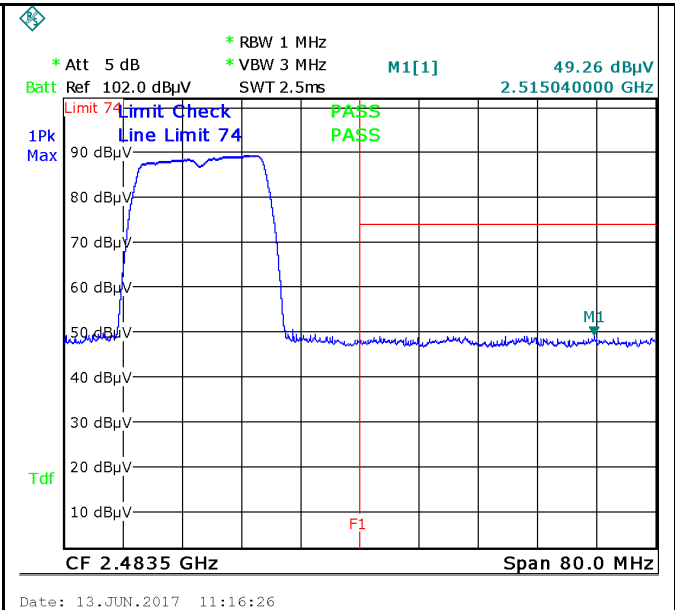
Note: Both Horizontal and vertical polarities were investigated



Band Edge, Left Side (Peak) - 802.11n20  
Note: F1 is frequency 2390MHz; F2 is frequency 2400MHz

Note: (no need if PK value less than the AV limit)

Band Edge, Left Side (Average) - 802.11n20  
Note: F1 is frequency 2390MHz; F2 is frequency 2400MHz

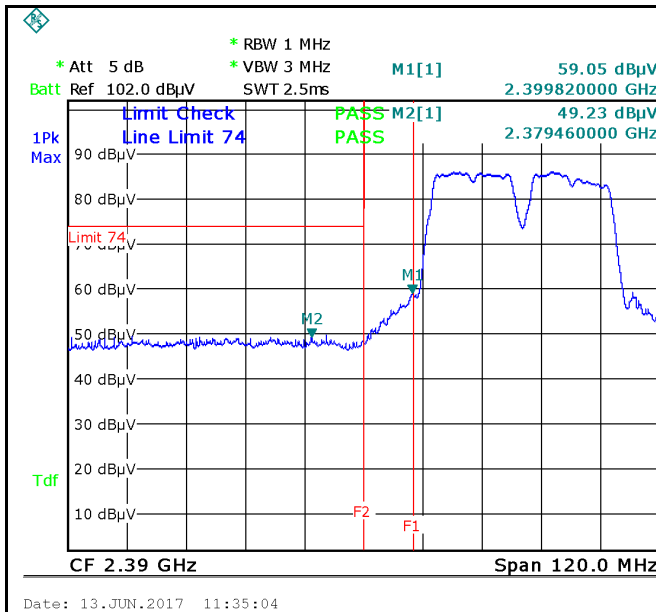


Band Edge, Right Side (Peak) - 802.11n20  
Note: F1 is frequency 2483.5MHz

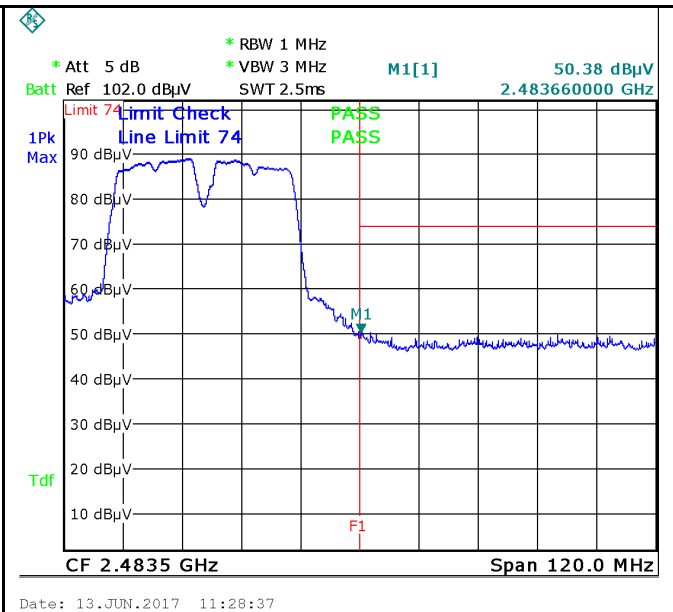
Note: (no need if PK value less than the AV limit)

Band Edge, Right Side (Average) - 802.11n20  
Note: F1 is frequency 2483.5MHz

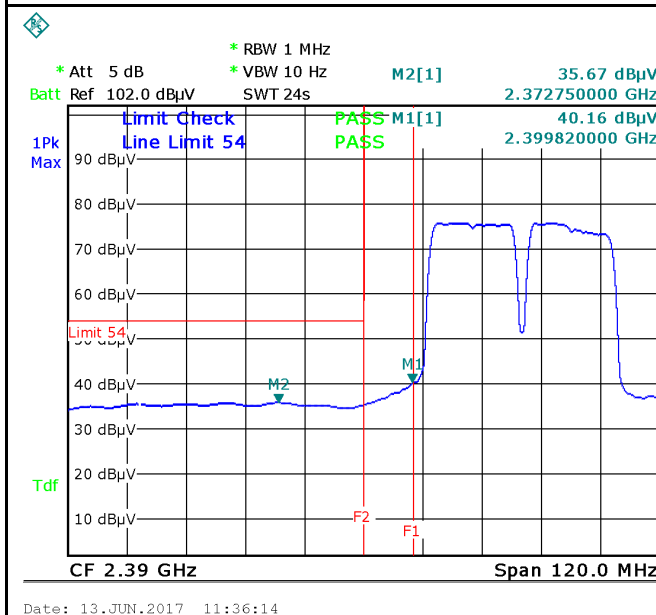
Note: Both Horizontal and vertical polarities were investigated



Band Edge, Left Side (Peak) - 802.11n40  
Note: F1 is frequency 2390MHz; F2 is frequency 2400MHz



Band Edge, Right Side (Peak) - 802.11n40  
Note: F1 is frequency 2483.5MHz



Band Edge, Left Side (Average) - 802.11n40  
Note: F1 is frequency 2390MHz; F2 is frequency 2400MHz

Note: (no need if PK value less than the AV limit)

Band Edge, Right Side (Average) - 802.11n40  
Note: F1 is frequency 2483.5MHz

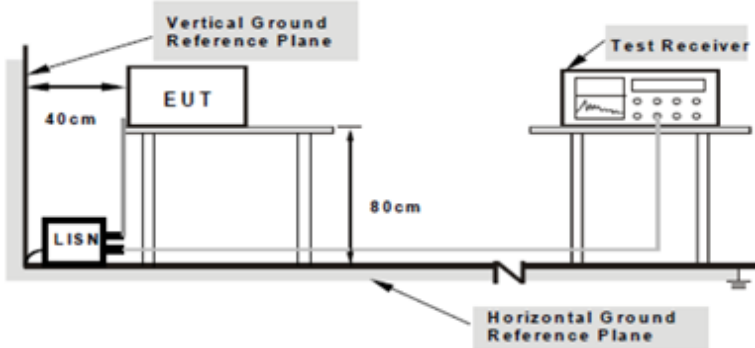
Note: Both Horizontal and vertical polarities were investigated

## 6.6 AC Power Line Conducted Emissions

|                      |               |
|----------------------|---------------|
| Temperature          | 25 °C         |
| Relative Humidity    | 53%           |
| Atmospheric Pressure | 1010mbar      |
| Test date :          | June 12, 2017 |
| Tested By :          | Loren Luo     |

### Requirement(s):

| Spec                        | Item | Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Applicable                                     |                        |              |  |    |         |            |         |         |         |    |    |        |    |    |
|-----------------------------|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|------------------------|--------------|--|----|---------|------------|---------|---------|---------|----|----|--------|----|----|
| 47CFR§15.207, RSS210 (A8.1) | a)   | For Low-power radio-frequency devices that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 [mu] H/50 ohms line impedance stabilization network (LISN). The lower limit applies at the boundary between the frequencies ranges. | <div><input checked="" type="checkbox"/></div> |                        |              |  |    |         |            |         |         |         |    |    |        |    |    |
|                             |      | <table><tr><th rowspan="2">Frequency ranges (MHz)</th><th colspan="2">Limit (dBµV)</th></tr><tr><th>QP</th><th>Average</th></tr><tr><td>0.15 ~ 0.5</td><td>66 – 56</td><td>56 – 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>                                                                                                                                                                          |                                                | Frequency ranges (MHz) | Limit (dBµV) |  | QP | Average | 0.15 ~ 0.5 | 66 – 56 | 56 – 46 | 0.5 ~ 5 | 56 | 46 | 5 ~ 30 | 60 | 50 |
|                             |      | Frequency ranges (MHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                |                        | Limit (dBµV) |  |    |         |            |         |         |         |    |    |        |    |    |
|                             |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                | QP                     | Average      |  |    |         |            |         |         |         |    |    |        |    |    |
|                             |      | 0.15 ~ 0.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                | 66 – 56                | 56 – 46      |  |    |         |            |         |         |         |    |    |        |    |    |
| 0.5 ~ 5                     | 56   | 46                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                |                        |              |  |    |         |            |         |         |         |    |    |        |    |    |
| 5 ~ 30                      | 60   | 50                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                |                        |              |  |    |         |            |         |         |         |    |    |        |    |    |
|                             |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                |                        |              |  |    |         |            |         |         |         |    |    |        |    |    |
|                             |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                |                        |              |  |    |         |            |         |         |         |    |    |        |    |    |
|                             |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                |                        |              |  |    |         |            |         |         |         |    |    |        |    |    |

|            |                                                                                                                                                                                                                                                                       |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Setup |  <p>Note: 1.Support units were connected to second LISN.<br/>2.Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.</p> |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|           |                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Procedure | <ol style="list-style-type: none"> <li>The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table.</li> <li>The power supply for the EUT was fed through a 50W/50mH EUT LISN, connected to filtered mains.</li> <li>The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss</li> </ol> |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                    |
|-----------------|--------------------|
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|        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        | <p>coaxial cable.</p> <ol style="list-style-type: none"> <li>4. All other supporting equipment were powered separately from another main supply.</li> <li>5. The EUT was switched on and allowed to warm up to its normal operating condition.</li> <li>6. A scan was made on the NEUTRAL line (for AC mains) or Earth line (for DC power) over the required frequency range using an EMI test receiver.</li> <li>7. High peaks, relative to the limit line, The EMI test receiver was then tuned to the selected frequencies and the necessary measurements made with a receiver bandwidth setting of 10 kHz.</li> <li>8. Step 7 was then repeated for the LIVE line (for AC mains) or DC line (for DC power).</li> </ol> |
| Remark |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Result | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A