

**ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT  
INTENTIONAL RADIATOR CERTIFICATION TO  
FCC PART 15 SUBPART C REQUIREMENT**

*OF*

**Electrothermic household appliance**

**Model No.: B20+**

**FCC ID: 2ANZUB20**

**Trademark: Brewie**

**Report No.: ES180123002E**

**Issue Date: February 01, 2018**

*Prepared for*

**Newity Kft.  
Királyi Pál utca 13/A 1053 Budapest, Hungary.**

*Prepared by*

**EMTEK(SHENZHEN) CO., LTD.**

**Bldg 69, Majialong Industry Zone, Nanshan District, Shenzhen,  
Guangdong, China.**

**TEL: 86-755-26954280**

**FAX: 86-755-26954282**

**This report shall not be reproduced, except in full, without the written approval of  
EMTEK(SHENZHEN) CO., LTD.**

## VERIFICATION OF COMPLIANCE

|                      |                                                                                               |
|----------------------|-----------------------------------------------------------------------------------------------|
| Applicant:           | Newity Kft.<br>Királyi Pál utca 13/A 1053 Budapest, Hungary.                                  |
| Manufacturer:        | Dongguan Winn Technology CO., Ltd.<br>Xianghe Rd, Xinmin Area, Chang'an, Dongguan, GuangDong. |
| Product Description: | Electrothermic household appliance                                                            |
| Model Number:        | B20+                                                                                          |
| Input Rating:        | AC 120V, 60Hz                                                                                 |

### We hereby certify that:

The above equipment was tested by EMTEK(SHENZHEN) CO., LTD. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10-2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.247(2017).

Date of Test : January 23, 2018 to January 30, 2018

Prepared by :

*Yaping Shen*

Yaping Shen/Editor

Reviewer :

*Joe Xia*

Joe Xia/Supervisor

Approved & Authorized Signer :

*Lisa Wang*

Lisa Wang/Manager

## Modified Information

| Version | Summary         | Revision Date | Report No.   |
|---------|-----------------|---------------|--------------|
| Ver.1.0 | Original Report | /             | ES180123002E |
|         |                 |               |              |
|         |                 |               |              |
|         |                 |               |              |
|         |                 |               |              |
|         |                 |               |              |
|         |                 |               |              |
|         |                 |               |              |
|         |                 |               |              |

## Table of Contents

|                                                        |           |
|--------------------------------------------------------|-----------|
| <b>1. GENERAL INFORMATION.....</b>                     | <b>6</b>  |
| 1.1 PRODUCT DESCRIPTION .....                          | 6         |
| <b>2. SYSTEM TEST CONFIGURATION .....</b>              | <b>7</b>  |
| 2.1 EUT CONFIGURATION .....                            | 7         |
| 2.2 EUT EXERCISE .....                                 | 7         |
| 2.3 TEST PROCEDURE .....                               | 7         |
| 2.4 CONFIGURATION OF TESTED SYSTEM.....                | 7         |
| <b>3. DESCRIPTION OF TEST MODES .....</b>              | <b>8</b>  |
| <b>4. SUMMARY OF TEST RESULTS .....</b>                | <b>9</b>  |
| <b>5. TEST METHODOLOGY.....</b>                        | <b>9</b>  |
| <b>6. TEST FACILITY .....</b>                          | <b>10</b> |
| <b>7. TEST SYSTEM UNCERTAINTY.....</b>                 | <b>11</b> |
| <b>8. CONDUCTED EMISSIONS TEST .....</b>               | <b>12</b> |
| 8.1 MEASUREMENT PROCEDURE .....                        | 12        |
| 8.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION).....  | 12        |
| 8.3 MEASUREMENT EQUIPMENT USED .....                   | 12        |
| 8.4 CONDUCTED EMISSION LIMIT .....                     | 12        |
| 8.5 MEASUREMENT RESULT .....                           | 12        |
| <b>9. RADIATED EMISSION TEST .....</b>                 | <b>15</b> |
| 9.1 MEASUREMENT PROCEDURE .....                        | 15        |
| 9.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION).....  | 16        |
| 9.3 MEASUREMENT EQUIPMENT USED .....                   | 17        |
| 9.4 RADIATED EMISSION LIMIT .....                      | 18        |
| 9.5 MEASUREMENT RESULT .....                           | 19        |
| <b>10. 6DB BANDWIDTH TEST.....</b>                     | <b>24</b> |
| 10.1 MEASUREMENT PROCEDURE .....                       | 24        |
| 10.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)..... | 24        |
| 10.3 MEASUREMENT EQUIPMENT USED .....                  | 24        |
| 10.4 MEASUREMENT RESULTS .....                         | 24        |
| <b>11. MAXIMUM PEAK OUTPUT POWER TEST .....</b>        | <b>33</b> |
| 11.1 MEASUREMENT PROCEDURE .....                       | 33        |
| 11.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)..... | 33        |
| 11.3 MEASUREMENT EQUIPMENT USED .....                  | 33        |
| 11.4 PEAK POWER OUTPUT LIMIT .....                     | 33        |
| 11.5 MEASUREMENT RESULTS.....                          | 33        |
| <b>12. BAND EDGE TEST.....</b>                         | <b>34</b> |
| 12.1 MEASUREMENT PROCEDURE .....                       | 34        |
| 12.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)..... | 35        |
| 12.3 MEASUREMENT EQUIPMENT USED .....                  | 35        |
| 12.4 MEASUREMENT RESULTS .....                         | 35        |
| <b>13. MAXIMUM POWER SPECTRAL DENSITY .....</b>        | <b>41</b> |
| 13.1 TEST EQUIPMENT .....                              | 41        |
| 13.2 MEASURING INSTRUMENTS AND SETTING .....           | 41        |
| 13.3 TEST PROCEDURES .....                             | 41        |
| 13.4 BLOCK DIAGRAM OF TEST SETUP .....                 | 41        |

|                                              |           |
|----------------------------------------------|-----------|
| 13.5 LIMIT .....                             | 41        |
| 13.6 TEST RESULT .....                       | 42        |
| <b>14. ANTENNA PORT EMISSION .....</b>       | <b>50</b> |
| 14.1 TEST EQUIPMENT .....                    | 50        |
| 14.2 MEASURING INSTRUMENTS AND SETTING ..... | 50        |
| 14.3 TEST PROCEDURES .....                   | 50        |
| 14.4 LOCK DIAGRAM OF TEST SETUP .....        | 50        |
| 14.5 TEST RESULT .....                       | 50        |
| <b>15. ANTENNA APPLICATION .....</b>         | <b>57</b> |
| 15.1 ANTENNA REQUIREMENT .....               | 57        |
| 15.2 RESULT .....                            | 57        |

## APPENDIX I (PHOTOS OF EUT)(13PAGES)

## 1. General Information

### 1.1 Product Description

| Characteristics           | Description                                                                                 |
|---------------------------|---------------------------------------------------------------------------------------------|
| Product Name              | Electrothermic household appliance                                                          |
| Model number              | B20+                                                                                        |
| Power Supply              | AC 120V, 60Hz                                                                               |
| Modulation                | 802.11b: DSSS(DBPSK/DQPSK/CCK)<br>802.11g/n: OFDM(BPSK/QPSK/16QAM/64QAM)                    |
| Operating Frequency Range | 2412-2462MHz for 802.11b/g/n(HT20)<br>2422-2452MHz for 802.11n(HT40)                        |
| Number of Channels        | 11 for 20MHz bandwidth;<br>7 for 40MHz bandwidth                                            |
| Transmit Power Max        | 802.11b: 16.63dBm<br>802.11g: 14.28 dBm<br>802.11n(HT20): 10.23Bm<br>802.11n(HT40): 8.24dBm |
| Antenna Type              | Internal antenna                                                                            |
| Antenna Gain              | 2.0dBi                                                                                      |

**Note:** for more details, please refer to the User's manual of the EUT.

## 2. System Test Configuration

### 2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

### 2.2 EUT Exercise

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

### 2.3 Test Procedure

#### 2.3.1 Conducted Emissions

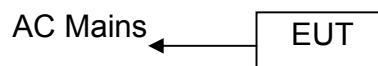
The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode.

#### 2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. Emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013.

### 2.4 Configuration of Tested System

**Fig. 2-1 Configuration of Tested System**



**Table 2-1 Equipment Used in Tested System**

| Item | Equipment                          | Trademark | Model No. | FCC ID   | Note |
|------|------------------------------------|-----------|-----------|----------|------|
| 1.   | Electrothermic household appliance | Brewie    | B20+      | 2ANZUB20 | EUT  |

**Note:**

- (1) Unless otherwise denoted as EUT in 『Remark』 column, device(s) used in tested system is a support equipment.

### 3. Description of Test Modes

The EUT has been tested under its typical operating condition.

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

Test of channel included the lowest and middle and highest frequency to perform the test, then record on this report.

Those data rates (802.11b: 1 Mbps; 802.11g: 6 Mbps; 802.11n (HT20 ): MCS0; 802.11n (HT40 ): MCS0) were used for all test.

Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Frequency and Channel list for 802.11 b/g/n (HT20):

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

Frequency and Channel list for 802.11 n (HT40):

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

Test Frequency and Channel for 802.11 b/g/n (HT20):

| Lowest Frequency |                 | Middle Frequency |                 | Highest Frequency |                 |
|------------------|-----------------|------------------|-----------------|-------------------|-----------------|
| Channel          | Frequency (MHz) | Channel          | Frequency (MHz) | Channel           | Frequency (MHz) |
| 1                | 2412            | 6                | 2437            | 11                | 2462            |

Test Frequency and channel for 802.11 n (HT40):

| Lowest Frequency |                 | Middle Frequency |                 | Highest Frequency |                 |
|------------------|-----------------|------------------|-----------------|-------------------|-----------------|
| Channel          | Frequency (MHz) | Channel          | Frequency (MHz) | Channel           | Frequency (MHz) |
| 3                | 2422            | 6                | 2437            | 9                 | 2452            |



#### 4. Summary of Test Results

| FCC Rules           | Description Of Test         | Result |
|---------------------|-----------------------------|--------|
| §15.247(a)(2)       | 6dB bandwidth               | Pass   |
| §15.247(b)(3)       | Max Peak output Power test  | Pass   |
| §15.247(e)          | Power density               | Pass   |
| §15.247(d)          | Band edge test              | Pass   |
| §15.207             | AC Power Conducted Emission | Pass   |
| §15.247(d), §15.209 | Radiated Emission           | Pass   |
| §15.247(d)          | Antenna Port Emission       | Pass   |
| §15.247(b)&§15.203  | Antenna Application         | Pass   |

#### RELATED SUBMITTAL(S) / GRANT(S):

This submittal(s) (test report) is intended for FCC ID: 2ANZUB20 filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

The system is compliance with Subpart B is authorized under a DOC procedure

#### 5. Test Methodology

According to its specifications, the EUT must comply with the requirements of the following standards:

FCC 47 CFR Part 2, Subpart J

FCC 47 CFR Part 15, Subpart C

FCC KDB 558074 DTS D01 Meas. Guidance v04

FCC KDB 662911 D01 Multiple Transmitter Output v01

FCC KDB 662911 D02 MIMO With Cross Polarized Antenna V01

## 6. Test Facility

### Site Description

EMC Lab : Accredited by CNAS, 2016.10.24  
The certificate is valid until 2022.10.28  
The Laboratory has been assessed and proved to be  
in compliance with CNAS-CL01:2006 (identical to  
ISO/IEC 17025:2005)  
The Certificate Registration Number is L2291.

Accredited by TUV Rheinland Shenzhen 2016.5.19  
The Laboratory has been assessed according to the  
requirements ISO/IEC 17025.

Accredited by FCC, August 03, 2017  
Designation Number: CN1204  
Test Firm Registration Number: 882943

Accredited by Industry Canada, November 24, 2015  
The Certificate Registration Number is 4480A.

Accredited by A2LA, July 31, 2017  
The Certificate Number is 4321.01.

Name of Firm : EMTEK(SHENZHEN) CO., LTD.  
Bldg 69, Majialong Industry Zone, Nanshan District,  
Shenzhen, Guangdong, China.

## 7. TEST SYSTEM UNCERTAINTY

The following measurement uncertainty levels have been estimated for tests performed on the apparatus:

| Parameter                      | Uncertainty               |
|--------------------------------|---------------------------|
| Radio Frequency                | $\pm 1 \times 10^{-5}$    |
| Maximum Peak Output Power Test | $\pm 1.0\text{dB}$        |
| Conducted Emissions Test       | $\pm 2.0\text{dB}$        |
| Radiated Emission Test         | $\pm 2.0\text{dB}$        |
| Power Density                  | $\pm 2.0\text{dB}$        |
| Occupied Bandwidth Test        | $\pm 1.0\text{dB}$        |
| Band Edge Test                 | $\pm 3\text{dB}$          |
| All emission, radiated         | $\pm 3\text{dB}$          |
| Antenna Port Emission          | $\pm 3\text{dB}$          |
| Temperature                    | $\pm 0.5^{\circ}\text{C}$ |
| Humidity                       | $\pm 3\%$                 |

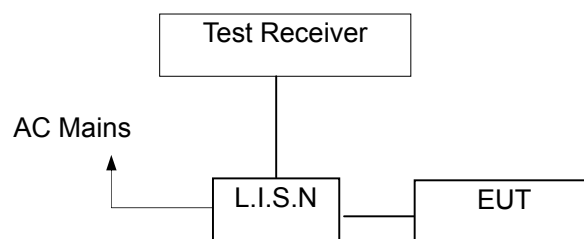
Measurement Uncertainty for a level of Confidence of 95%

## 8. Conducted Emissions Test

### 8.1 Measurement Procedure

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

### 8.2 Test SET-UP (Block Diagram of Configuration)



### 8.3 Measurement Equipment Used

| Conducted Emission Test Site |                 |              |               |            |            |
|------------------------------|-----------------|--------------|---------------|------------|------------|
| EQUIPMENT TYPE               | MFR             | MODEL NUMBER | SERIAL NUMBER | Last Cal.  | Due date   |
| Test Receiver                | Rohde & Schwarz | ESCS30       | 100018        | 05/16/2017 | 05/15/2018 |
| L.I.S.N                      | Rohde & Schwarz | ENV216       | 100017        | 05/16/2017 | 05/15/2018 |
| RF Switching Unit            | CDS             | RSU-M2       | 38401         | 05/16/2017 | 05/15/2018 |
| Coaxial Cable                | CDS             | 79254        | 46107086      | 05/16/2017 | 05/15/2018 |

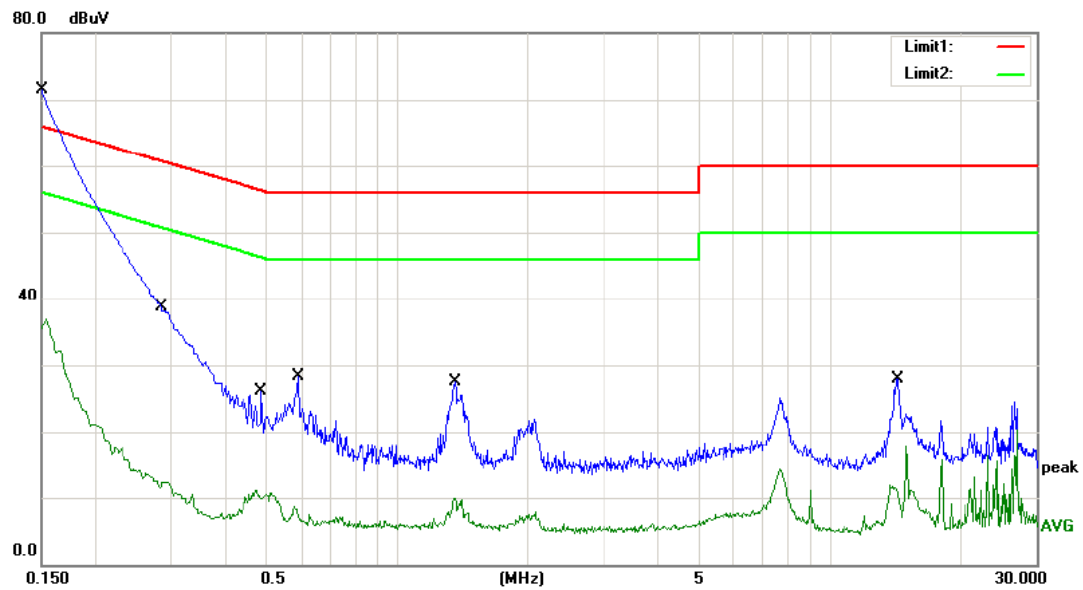
### 8.4 Conducted Emission Limit

| Conducted Emission Frequency(MHz) | Quasi-peak | Average |
|-----------------------------------|------------|---------|
| 0.15-0.5                          | 66-56      | 56-46   |
| 0.5-5.0                           | 56         | 46      |
| 5.0-30.0                          | 60         | 50      |

**Note:** 1. The lower limit shall apply at the transition frequencies  
 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

### 8.5 Measurement Result

All the modulation modes were tested the data of the worst mode (TX 802.11b 2462MHz) are recorded in the following pages and the others modulation methods do not exceed the limits. Please refer to following pages.

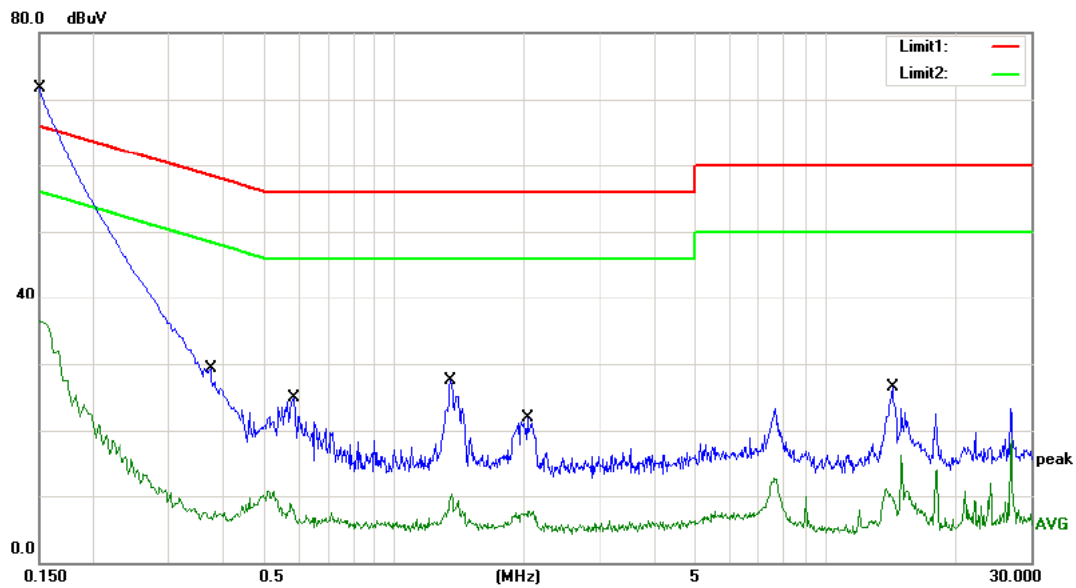


Site site #1  
 Limit: (CE)FCC PART 15 C\_QP  
 Mode: TX2462  
 Note:

Phase: **L1**  
 Power: AC 120V/60Hz  
 Temperature: 25  
 Humidity: 55 %

| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV | Limit<br>dBuV | Over<br>dB | Detector | Comment |
|-----|-----|--------------|--------------------------|-------------------------|--------------------------|---------------|------------|----------|---------|
| 1   | *   | 0.1500       | 52.42                    | 9.78                    | 62.20                    | 66.00         | -3.80      | QP       |         |
| 2   |     | 0.1500       | 25.77                    | 9.78                    | 35.55                    | 56.00         | -20.45     | AVG      |         |
| 3   |     | 0.2863       | 25.40                    | 9.80                    | 35.20                    | 60.63         | -25.43     | QP       |         |
| 4   |     | 0.2863       | 2.42                     | 9.80                    | 12.22                    | 50.63         | -38.41     | AVG      |         |
| 5   |     | 0.4860       | 13.46                    | 9.84                    | 23.30                    | 56.24         | -32.94     | QP       |         |
| 6   |     | 0.4860       | 0.13                     | 9.84                    | 9.97                     | 46.24         | -36.27     | AVG      |         |
| 7   |     | 0.5900       | 15.76                    | 9.84                    | 25.60                    | 56.00         | -30.40     | QP       |         |
| 8   |     | 0.5900       | -1.86                    | 9.84                    | 7.98                     | 46.00         | -38.02     | AVG      |         |
| 9   |     | 1.3540       | 14.66                    | 9.84                    | 24.50                    | 56.00         | -31.50     | QP       |         |
| 10  |     | 1.3540       | 0.08                     | 9.84                    | 9.92                     | 46.00         | -36.08     | AVG      |         |
| 11  |     | 14.3220      | 14.51                    | 10.09                   | 24.60                    | 60.00         | -35.40     | QP       |         |
| 12  |     | 14.3220      | 0.39                     | 10.09                   | 10.48                    | 50.00         | -39.52     | AVG      |         |

\*:Maximum data    x:Over limit    !:over margin    Comment: Factor build in receiver.    Operator: Washington



Site site #1

Phase: **N**

Temperature: 25

Limit: (CE)FCC PART 15 C\_QP

Power: AC 120V/60Hz

Humidity: 55 %

Mode: TX2462

Note:

| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV | Limit<br>dBuV | Over<br>dB | Detector | Comment |
|-----|-----|--------------|--------------------------|-------------------------|--------------------------|---------------|------------|----------|---------|
| 1   | *   | 0.1500       | 53.22                    | 9.78                    | 63.00                    | 66.00         | -3.00      | QP       |         |
| 2   |     | 0.1500       | 26.68                    | 9.78                    | 36.46                    | 56.00         | -19.54     | AVG      |         |
| 3   |     | 0.3740       | 17.48                    | 9.82                    | 27.30                    | 58.41         | -31.11     | QP       |         |
| 4   |     | 0.3740       | -3.08                    | 9.82                    | 6.74                     | 48.41         | -41.67     | AVG      |         |
| 5   |     | 0.5860       | 12.66                    | 9.84                    | 22.50                    | 56.00         | -33.50     | QP       |         |
| 6   |     | 0.5860       | -2.07                    | 9.84                    | 7.77                     | 46.00         | -38.23     | AVG      |         |
| 7   |     | 1.3500       | 14.76                    | 9.84                    | 24.60                    | 56.00         | -31.40     | QP       |         |
| 8   |     | 1.3500       | -0.44                    | 9.84                    | 9.40                     | 46.00         | -36.60     | AVG      |         |
| 9   |     | 2.0380       | 9.96                     | 9.84                    | 19.80                    | 56.00         | -36.20     | QP       |         |
| 10  |     | 2.0380       | -2.92                    | 9.84                    | 6.92                     | 46.00         | -39.08     | AVG      |         |
| 11  |     | 14.2980      | 13.81                    | 10.09                   | 23.90                    | 60.00         | -36.10     | QP       |         |
| 12  |     | 14.2980      | -0.85                    | 10.09                   | 9.24                     | 50.00         | -40.76     | AVG      |         |

\*:Maximum data    x:Over limit    !:over margin    Comment: Factor build in receiver.    Operator: Washington

## 9. Radiated Emission Test

### 9.1 Measurement Procedure

1. Below 1000MHz, The EUT was placed on a turn table which is 0.8m above ground plane, And above 1000MHz, The EUT was placed on a styrofoam table which is 1.5m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured was complete.

When spectrum scanned from 30MHz to 1GHz setting resolution bandwidth 120KHz and video bandwidth 300KHz:

| EMI Test Receiver | Setting  |
|-------------------|----------|
| Attenuation       | Auto     |
| RBW               | 120KHz   |
| VBW               | 300KHz   |
| Detector          | QP       |
| Trace             | Max hold |

When spectrum scanned above 1GHz setting resolution bandwidth 1MHz, video bandwidth 3MHz:

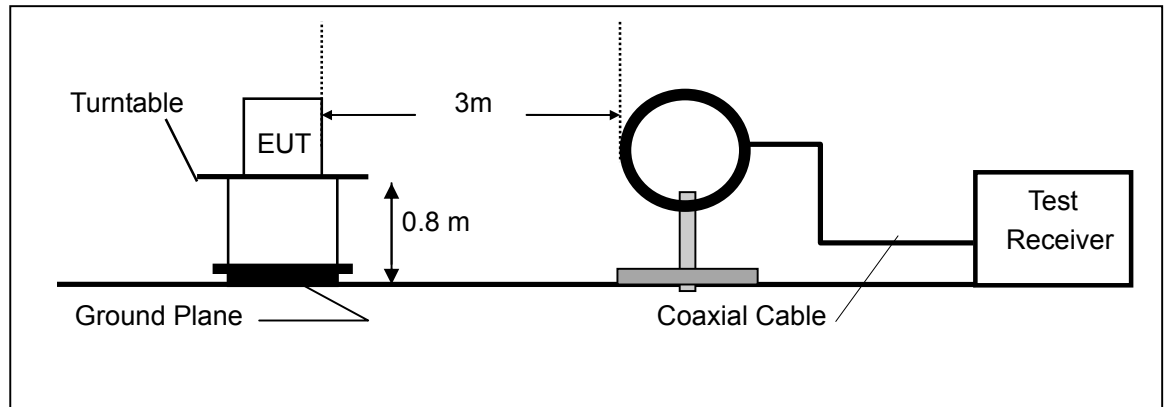
| EMI Test Receiver | Setting  |
|-------------------|----------|
| Attenuation       | Auto     |
| RBW               | 1MHz     |
| VBW               | 3MHz     |
| Detector          | Peak     |
| Trace             | Max hold |

When spectrum scanned above 1GHz setting resolution bandwidth 1MHz, video bandwidth 10Hz:

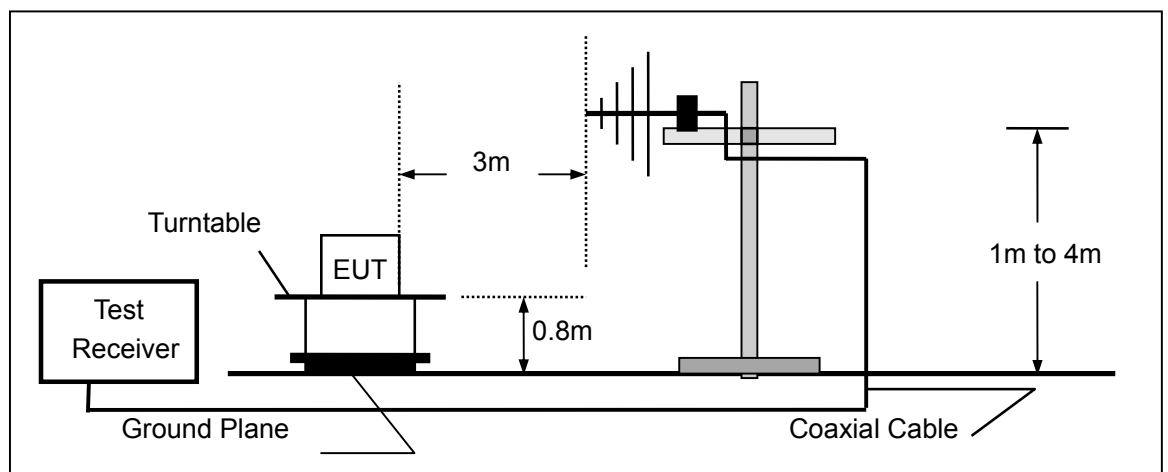
| EMI Test Receiver | Setting  |
|-------------------|----------|
| Attenuation       | Auto     |
| RBW               | 1MHz     |
| VBW               | 10Hz     |
| Detector          | Peak     |
| Trace             | Max hold |

## 9.2 Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-Up, Frequency Below 30MHz

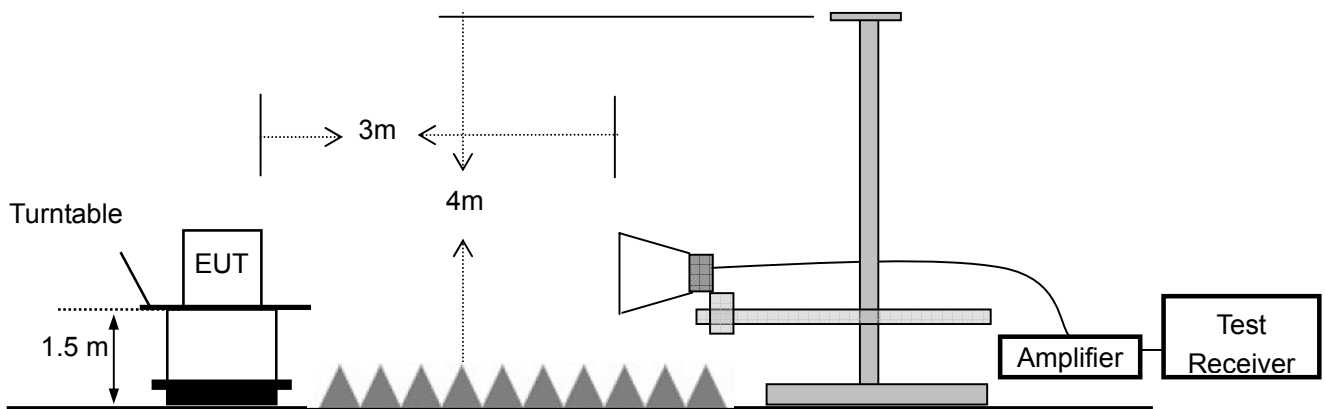


(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz





(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



**9.3 Measurement Equipment Used**

| Item | Equipment                      | Manufacturer    | Model No.  | Serial No.   | Last Cal.  | Cal. Interval |
|------|--------------------------------|-----------------|------------|--------------|------------|---------------|
| 1.   | Test Receiver                  | Rohde & Schwarz | ESCI       | 1166.5950.03 | 05/16/2017 | 1 Year        |
| 2.   | Bilog Antenna                  | Schwarzbeck     | VULB9163   | 000141       | 05/16/2017 | 1 Year        |
| 3.   | Power Amplifier                | CDS             | RSU-M352   | 818          | 05/16/2017 | 1 Year        |
| 4.   | Power Amplifier                | HP              | 8447F      | OPT H64      | 05/16/2017 | 1 Year        |
| 5.   | Color Monitor                  | SUNSPO          | SP-140A    | N/A          | 05/16/2017 | 1 Year        |
| 6.   | Single Line Filter             | JIANLI          | XL-3       | N/A          | 05/16/2017 | 1 Year        |
| 7.   | Single Phase Power Line Filter | JIANLI          | DL-2X100B  | N/A          | 05/16/2017 | 1 Year        |
| 8.   | 3 Phase Power Line Filter      | JIANLI          | DL-4X100B  | N/A          | 05/16/2017 | 1 Year        |
| 9.   | DC Power Filter                | JIANLI          | DL-2X50B   | N/A          | 05/16/2017 | 1 Year        |
| 10.  | Cable                          | Schwarzbeck     | PLF-100    | 549489       | 05/16/2017 | 1 Year        |
| 11.  | Cable                          | Rosenberger     | CIL02      | A0783566     | 05/16/2017 | 1 Year        |
| 12.  | Cable                          | Rosenberger     | RG 233/U   | 525178       | 05/16/2017 | 1 Year        |
| 13.  | Signal Analyzer                | Rohde & Schwarz | FSV30      | 103040       | 05/16/2017 | 1 Year        |
| 14.  | Horn Antenna                   | Schwarzbeck     | BBHA9120D  | 9120D-1272   | 05/16/2017 | 1 Year        |
| 15.  | Power Amplifier                | LUNAR EM        | LNA1G18-40 | J10100000081 | 05/16/2017 | 1 Year        |
| 16.  | Cable                          | H+S             | CBL-26     | N/A          | 05/16/2017 | 1 Year        |
| 17.  | Cable                          | H+S             | CBL-26     | N/A          | 05/16/2017 | 1 Year        |
| 18.  | Cable                          | H+S             | CBL-26     | N/A          | 05/16/2017 | 1 Year        |

#### 9.4 Radiated Emission Limit

The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table 15.209(a):

| Frequencies<br>(MHz) | Field Strength<br>(micorvolts/meter) | Measurement Distance<br>(meters) |
|----------------------|--------------------------------------|----------------------------------|
| 0.009~0.490          | 2400/F(KHz)                          | 300                              |
| 0.490~1.705          | 24000/F(KHz)                         | 30                               |
| 1.705~30.0           | 30                                   | 30                               |
| 30~88                | 100                                  | 3                                |
| 88~216               | 150                                  | 3                                |
| 216~960              | 200                                  | 3                                |
| Above 960            | 500                                  | 3                                |

Restricted bands of operation

| MHz                        | MHz                   | MHz             | GHz              |
|----------------------------|-----------------------|-----------------|------------------|
| 0.090 - 0.110              | 16.42 - 16.423        | 399.9 - 410     | 4.5 - 5.15       |
| <sup>1</sup> 0.495 - 0.505 | 16.69475 - 16.69525   | 608 - 614       | 5.35 - 5.46      |
| 2.1735 - 2.1905            | 16.80425 - 16.80475   | 960 - 1240      | 7.25 - 7.75      |
| 4.125 - 4.128              | 25.5 - 25.67          | 1300 - 1427     | 8.025 - 8.5      |
| 4.17725 - 4.17775          | 37.5 - 38.25          | 1435 - 1626.5   | 9.0 - 9.2        |
| 4.20725 - 4.20775          | 73 - 74.6             | 1645.5 - 1646.5 | 9.3 - 9.5        |
| 6.215 - 6.218              | 74.8 - 75.2           | 1660 - 1710     | 10.6 - 12.7      |
| 6.26775 - 6.26825          | 108 - 121.94          | 1718.8 - 1722.2 | 13.25 - 13.4     |
| 6.31175 - 6.31225          | 123 - 138             | 2200 - 2300     | 14.47 - 14.5     |
| 8.291 - 8.294              | 149.9 - 150.05        | 2310 - 2390     | 15.35 - 16.2     |
| 8.362 - 8.366              | 156.52475 - 156.52525 | 2483.5 - 2500   | 17.7 - 21.4      |
| 8.37625 - 8.38675          | 156.7 - 156.9         | 2690 - 2900     | 22.01 - 23.12    |
| 8.41425 - 8.41475          | 162.0125 - 167.17     | 3260 - 3267     | 23.6 - 24.0      |
| 12.29 - 12.293             | 167.72 - 173.2        | 3332 - 3339     | 31.2 - 31.8      |
| 12.51975 - 12.52025        | 240 - 285             | 3345.8 - 3358   | 36.43 - 36.5     |
| 12.57675 - 12.57725        | 322 - 335.4           | 3600 - 4400     | ( <sup>2</sup> ) |

Remark 1. Emission level in dBuV/m=20 log (uV/m)

- : 2. Measurement was performed at an antenna to the closed point of EUT distance of meters.  
3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of § 15.205, and the emissions located in restricted bands also comply with 15.209 limit.

## 9.5 Measurement Result

### Below 30MHz:

All the modulation modes were tested the data of the test mode are recorded in the following pages.

|                    |            |               |                  |
|--------------------|------------|---------------|------------------|
| Operation Mode:    | TX Mode    | Test Date :   | January 24, 2018 |
| Frequency Range:   | 9KHz~30MHz | Temperature : | 28°C             |
| Test Result:       | PASS       | Humidity :    | 60 %             |
| Measured Distance: | 3m         | Test By:      | John             |

| Freq.<br>(MHz) | Ant.Pol.<br>H/V | Emission Level<br>(dBuV/m) | Limit 3m<br>(dBuV/m) | Over<br>(dB) |
|----------------|-----------------|----------------------------|----------------------|--------------|
| --             | --              | --                         | --                   | --           |

Note: the amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

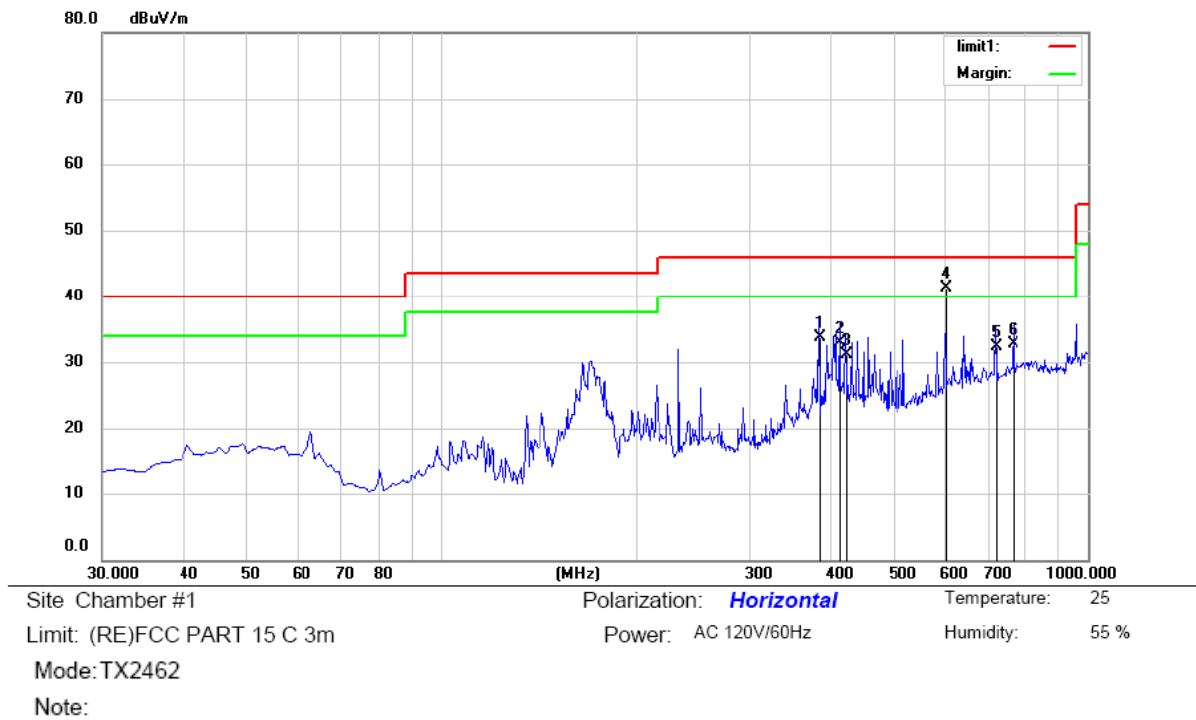
Distance extrapolation factor =  $40\log(\text{Specific distance/ test distance})$  (dB);

Limit line = Specific limits(dBuV) + distance extrapolation factor.

### Below 1000MHz:

All the modulation modes were tested the data of the worst mode (TX 802.11b 2462MHz) are recorded in the following pages and the others modulation methods do not exceed the limits.

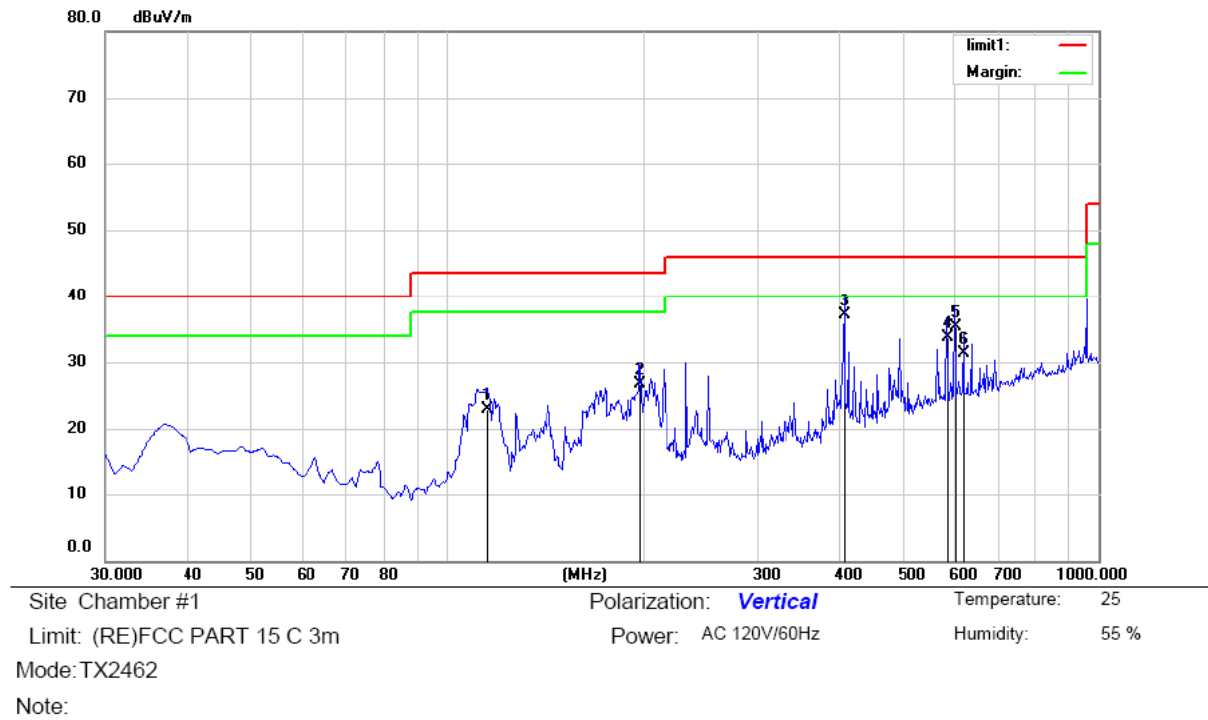
Please refer to the following test plots:



| No. | Mk. | Freq.    | Reading Level | Correct Factor | Measurement | Limit  | Over   | Antenna Height | Table Degree |         |
|-----|-----|----------|---------------|----------------|-------------|--------|--------|----------------|--------------|---------|
|     |     | MHz      | dBuV          | dB             | dBuV/m      | dBuV/m | dB     | cm             | degree       | Comment |
| 1   |     | 384.0500 | 44.95         | -11.28         | 33.67       | 46.00  | -12.33 | QP             |              |         |
| 2   |     | 414.1200 | 43.50         | -10.68         | 32.82       | 46.00  | -13.18 | QP             |              |         |
| 3   |     | 422.8500 | 41.64         | -10.45         | 31.19       | 46.00  | -14.81 | QP             |              |         |
| 4   | *   | 603.2700 | 47.38         | -6.16          | 41.22       | 46.00  | -4.78  | QP             |              |         |
| 5   |     | 720.6400 | 36.50         | -4.15          | 32.35       | 46.00  | -13.65 | QP             |              |         |
| 6   |     | 768.1700 | 36.31         | -3.54          | 32.77       | 46.00  | -13.23 | QP             |              |         |

\*:Maximum data    x:Over limit    !:over margin

Operator: John



| No. | Mk. | Freq.    | Reading Level | Correct Factor | Measure-ment | Limit  | Over   | Antenna Height | Table Degree |         |
|-----|-----|----------|---------------|----------------|--------------|--------|--------|----------------|--------------|---------|
|     |     | MHz      | dBuV          | dB             | dBuV/m       | dBuV/m | dB     | cm             | degree       | Comment |
| 1   |     | 115.3600 | 41.39         | -18.39         | 23.00        | 43.50  | -20.50 | QP             |              |         |
| 2   |     | 197.8100 | 44.22         | -17.46         | 26.76        | 43.50  | -16.74 | QP             |              |         |
| 3   | *   | 408.3000 | 48.25         | -11.20         | 37.05        | 46.00  | -8.95  | QP             |              |         |
| 4   |     | 584.8400 | 41.38         | -7.61          | 33.77        | 46.00  | -12.23 | QP             |              |         |
| 5   |     | 603.2700 | 42.61         | -7.31          | 35.30        | 46.00  | -10.70 | QP             |              |         |
| 6   |     | 620.7300 | 38.40         | -7.15          | 31.25        | 46.00  | -14.75 | QP             |              |         |

\*:Maximum data x:Over limit l:over margin

Operator: John

## Above 1000MHz:

Operation Mode: 802.11b Lowest  
Test Voltage: AC 120V/60Hz

Test Date : January 24, 2018  
Test by: John

| Freq.<br>(MHz) | Ant.<br>Pol.<br>H/V | Reading<br>Level(dBuV/m) |       | Correct<br>Factor<br>dB | Emission<br>Level(dBuV/m) |       | Limit<br>3m(dBuV/m) |    | Margin(dB) |        |
|----------------|---------------------|--------------------------|-------|-------------------------|---------------------------|-------|---------------------|----|------------|--------|
|                |                     | PK                       | AV    |                         | PK                        | AV    | PK                  | AV | PK         | AV     |
| 4824           | V                   | 95.48                    | 75.49 | -32.3                   | 63.18                     | 43.19 | 74                  | 54 | -10.82     | -10.81 |
| 7236           | V                   | 99.37                    | 79.37 | -37.2                   | 62.17                     | 42.17 | 74                  | 54 | -11.83     | -11.83 |
| 9648           | V                   | 101.08                   | 81.07 | -39.8                   | 61.28                     | 41.27 | 74                  | 54 | -12.72     | -12.73 |
| 12060          | V                   | 100.77                   | 80.75 | -40.5                   | 60.27                     | 40.25 | 74                  | 54 | -13.73     | -13.75 |
| 14472          | V                   | 101.32                   | 81.22 | -41.7                   | 59.62                     | 39.52 | 74                  | 54 | -14.38     | -14.48 |
| 16884          | V                   | 98.63                    | 78.65 | -40                     | 58.63                     | 38.65 | 74                  | 54 | -15.37     | -15.35 |
| 4824           | H                   | 93.99                    | 74.14 | -31.6                   | 62.39                     | 42.54 | 74                  | 54 | -11.61     | -11.46 |
| 7236           | H                   | 96.78                    | 76.78 | -35.5                   | 61.28                     | 41.28 | 74                  | 54 | -12.72     | -12.72 |
| 9648           | H                   | 98.54                    | 78.59 | -38.3                   | 60.24                     | 40.29 | 74                  | 54 | -13.76     | -13.71 |
| 12060          | H                   | 98.52                    | 78.54 | -39                     | 59.52                     | 39.54 | 74                  | 54 | -14.48     | -14.46 |
| 14472          | H                   | 100.57                   | 80.24 | -42                     | 58.57                     | 38.24 | 74                  | 54 | -15.43     | -15.76 |
| 16884          | H                   | 96.57                    | 76.71 | -39.3                   | 57.27                     | 37.41 | 74                  | 54 | -16.73     | -16.59 |

Operation Mode: 802.11b Middle  
Test Voltage: AC 120V/60Hz

Test Date : January 24, 2018  
Test by: Andy

| Freq.<br>(MHz) | Ant.<br>Pol.<br>H/V | Reading<br>Level(dBuV/m) |       | Correct<br>Factor<br>dB | Emission<br>Level(dBuV/m) |       | Limit<br>3m(dBuV/m) |    | Margin(dB) |        |
|----------------|---------------------|--------------------------|-------|-------------------------|---------------------------|-------|---------------------|----|------------|--------|
|                |                     | PK                       | AV    |                         | PK                        | AV    | PK                  | AV | PK         | AV     |
| 4874           | V                   | 97.15                    | 77.02 | -32.3                   | 64.85                     | 44.72 | 74                  | 54 | -9.15      | -9.28  |
| 7311           | V                   | 100.48                   | 81.15 | -37.2                   | 63.28                     | 43.95 | 74                  | 54 | -10.72     | -10.05 |
| 9688           | V                   | 102.75                   | 81.97 | -39.8                   | 62.95                     | 42.17 | 74                  | 54 | -11.05     | -11.83 |
| 12185          | V                   | 101.97                   | 81.64 | -40.5                   | 61.47                     | 41.14 | 74                  | 54 | -12.53     | -12.86 |
| 14622          | V                   | 101.25                   | 81.46 | -41                     | 60.25                     | 40.46 | 74                  | 54 | -13.75     | -13.54 |
| 17059          | V                   | 100.68                   | 80.64 | -41.1                   | 59.58                     | 39.54 | 74                  | 54 | -14.42     | -14.46 |
| 4874           | H                   | 94.82                    | 74.88 | -31.6                   | 63.22                     | 43.28 | 74                  | 54 | -10.78     | -10.72 |
| 7311           | H                   | 98.44                    | 78.34 | -35.5                   | 62.94                     | 42.84 | 74                  | 54 | -11.06     | -11.16 |
| 9688           | H                   | 99.54                    | 79.95 | -38.3                   | 61.24                     | 41.65 | 74                  | 54 | -12.76     | -12.35 |
| 12185          | H                   | 99.27                    | 79.29 | -39                     | 60.27                     | 40.29 | 74                  | 54 | -13.73     | -13.71 |
| 14622          | H                   | 101.58                   | 81.57 | -42                     | 59.58                     | 39.57 | 74                  | 54 | -14.42     | -14.43 |
| 17059          | H                   | 100.13                   | 80.07 | -41.5                   | 58.63                     | 38.57 | 74                  | 54 | -15.37     | -15.43 |

Operation Mode: 802.11b Highest

Test Date : January 24, 2018

Test Voltage: AC 120V/60Hz

Test by: Andy

| Freq.<br>(MHz) | Ant.<br>Pol. | Reading<br>Level(dBuV/m) |       | Correct<br>Factor<br>dB | Emission<br>Level(dBuV/m) |       | Limit<br>3m(dBuV/m) |    | Over(dB) |        |
|----------------|--------------|--------------------------|-------|-------------------------|---------------------------|-------|---------------------|----|----------|--------|
|                |              | PK                       | AV    |                         | PK                        | AV    | PK                  | AV | PK       | AV     |
| 4924           | V            | 96.17                    | 75.72 | -32.3                   | 63.87                     | 43.42 | 74                  | 54 | -10.13   | -10.58 |
| 7386           | V            | 99.56                    | 80.05 | -37.2                   | 62.36                     | 42.85 | 74                  | 54 | -11.64   | -11.15 |
| 9848           | V            | 101.04                   | 81.75 | -39.8                   | 61.24                     | 41.95 | 74                  | 54 | -12.76   | -12.05 |
| 12310          | V            | 101.07                   | 80.77 | -40.5                   | 60.57                     | 40.27 | 74                  | 54 | -13.43   | -13.73 |
| 14772          | V            | 100.58                   | 80.57 | -41                     | 59.58                     | 39.57 | 74                  | 54 | -14.42   | -14.43 |
| 17234          | V            | 98.67                    | 78.64 | -41.1                   | 57.57                     | 37.54 | 74                  | 54 | -16.43   | -16.46 |
| 4924           | H            | 96.59                    | 75.77 | -31.6                   | 64.99                     | 44.17 | 74                  | 54 | -9.01    | -9.83  |
| 7386           | H            | 99.04                    | 78.78 | -35.5                   | 63.54                     | 43.28 | 74                  | 54 | -10.46   | -10.72 |
| 9848           | H            | 100.38                   | 81.21 | -38.3                   | 62.08                     | 42.91 | 74                  | 54 | -11.92   | -11.09 |
| 12310          | H            | 100.24                   | 80.23 | -39                     | 61.24                     | 41.23 | 74                  | 54 | -12.76   | -12.77 |
| 14772          | H            | 102.27                   | 82.25 | -42                     | 60.27                     | 40.25 | 74                  | 54 | -13.73   | -13.75 |
| 17234          | H            | 100.97                   | 81.07 | -41.5                   | 59.47                     | 39.57 | 74                  | 54 | -14.53   | -14.43 |

**All emissions not reported were more than 20dB below the specified limit or in the noise floor.**

**Note:** (1) All Readings are Peak Value and AV.  
(2) Emission Level= Reading Level+Probe Factor +Cable Loss.  
(3) Data of measurement within this frequency range shown “ – ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

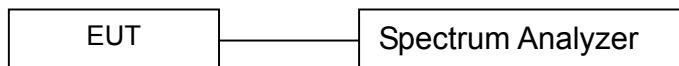
## 10. 6dB Bandwidth Test

### 10.1 Measurement Procedure

The EUT was operating in IEEE 802.11b, 802.11g, 802.11n(HT20), 802.11n(HT40) mode or could be controlled its channel. Printed out the test result from the spectrum by hard copy function.

1. Set resolution bandwidth (RBW) = 100 kHz.
2. Set the video bandwidth (VBW)  $\geq 3 \times$  RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequency) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

### 10.2 Test SET-UP (Block Diagram of Configuration)



### 10.3 Measurement Equipment Used

| EQUIPMENT TYPE    | MFR     | MODEL NUMBER | SERIAL NUMBER | LAST CAL.  | CAL DUE.   |
|-------------------|---------|--------------|---------------|------------|------------|
| Spectrum Analyzer | Agilent | FSV30        | 1321.3008K    | 05/16/2017 | 05/15/2018 |

### 10.4 Measurement Results

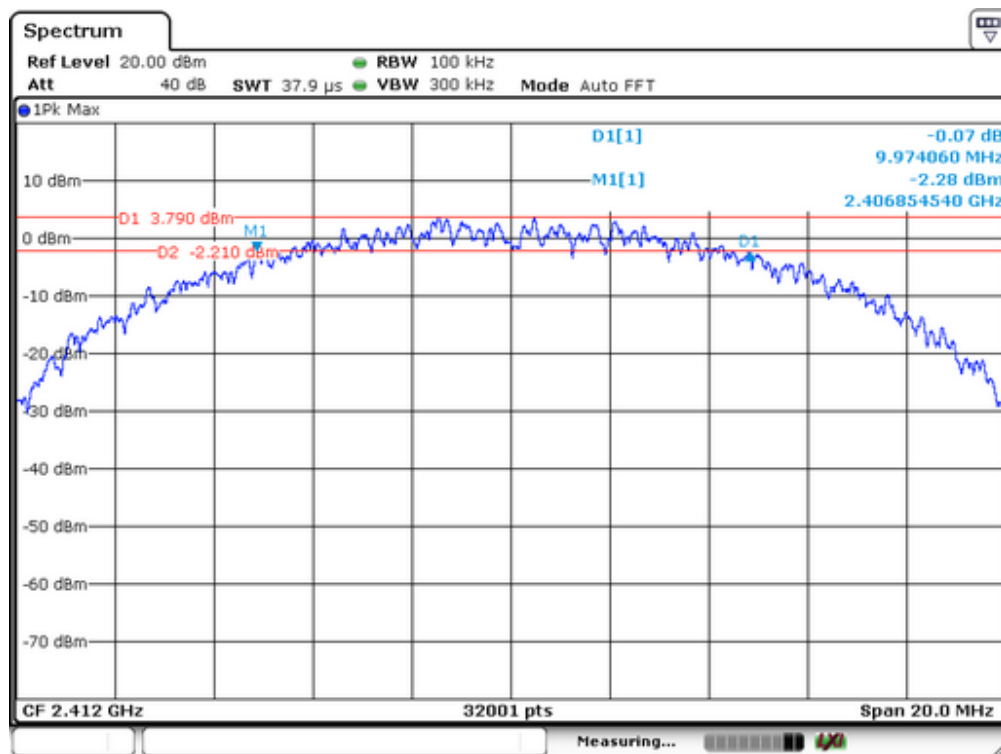
6 Bandwidth Test Data Chart:

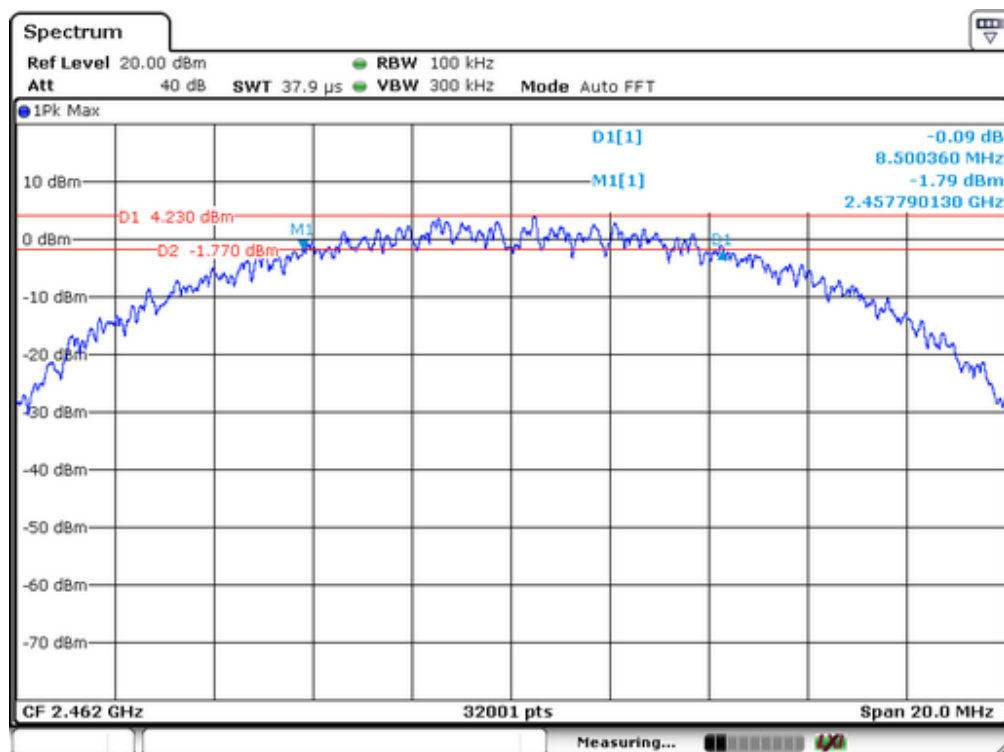
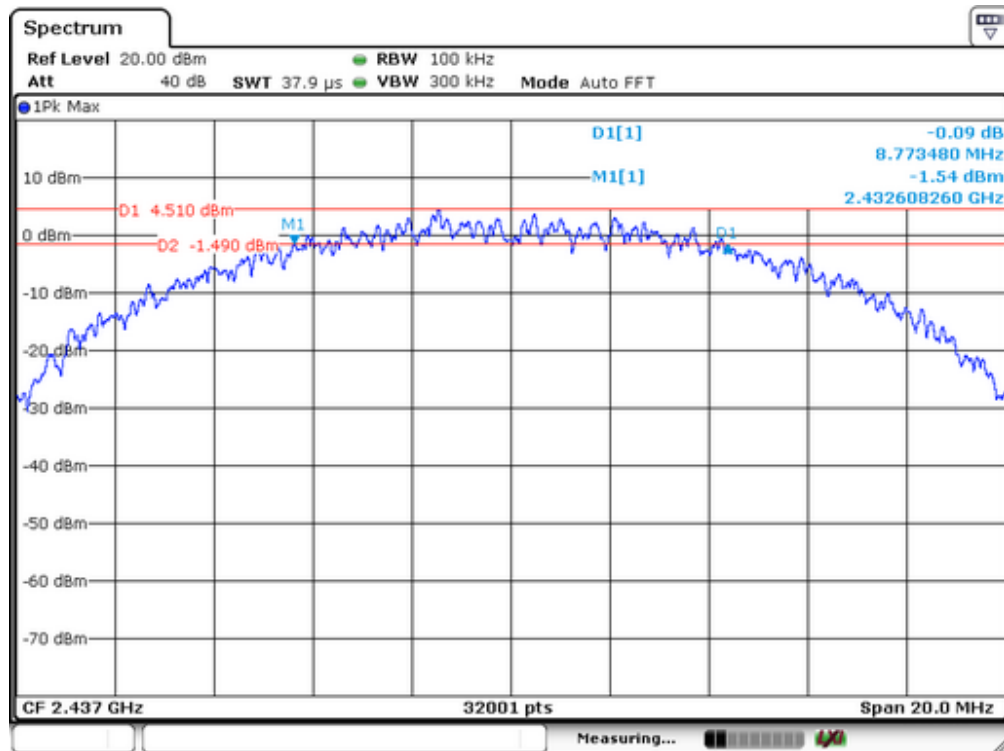
Refer to attached data chart.



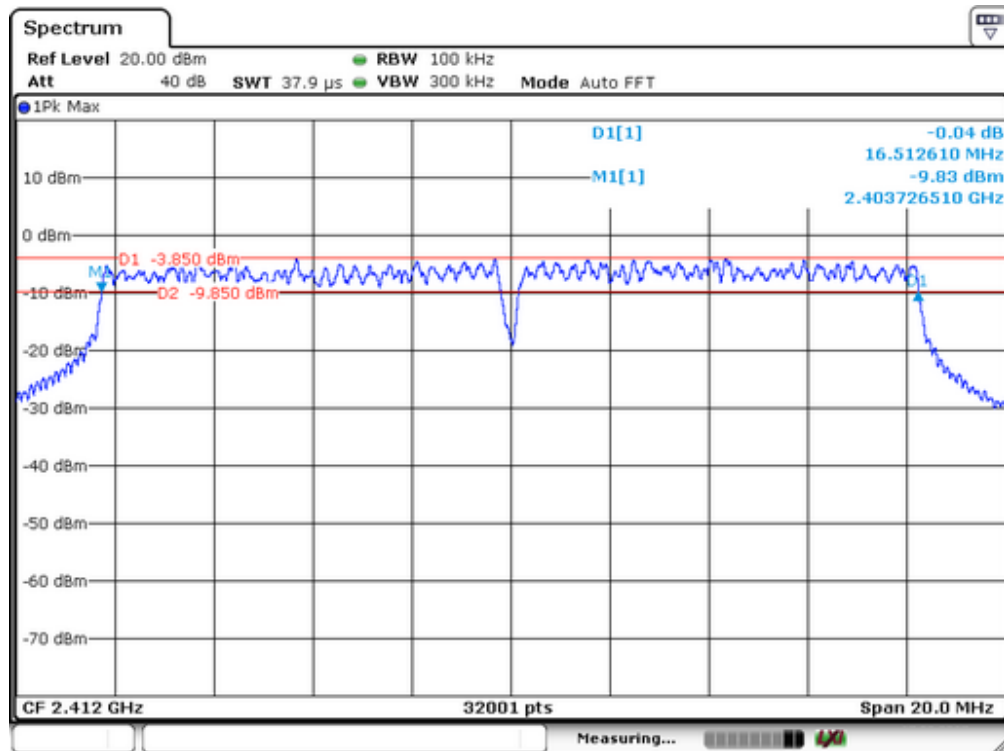
Spectrum Detector: PK      Test Date : January 24, 2018  
 Test By: Yaping Shen      Temperature : 28°C  
 Humidity : 60%

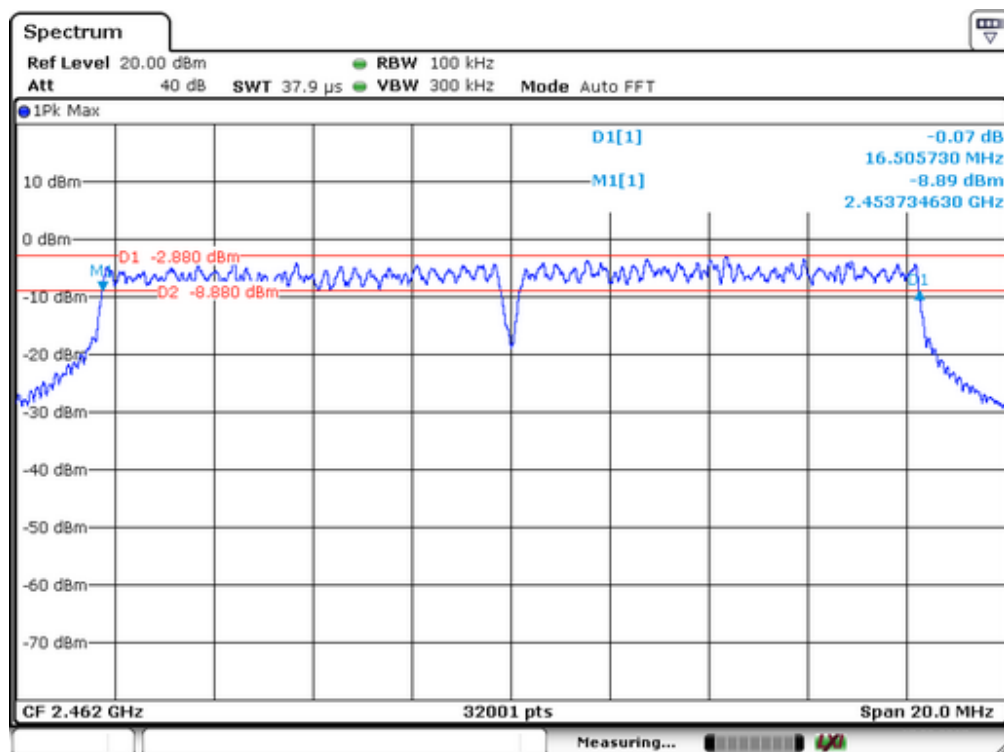
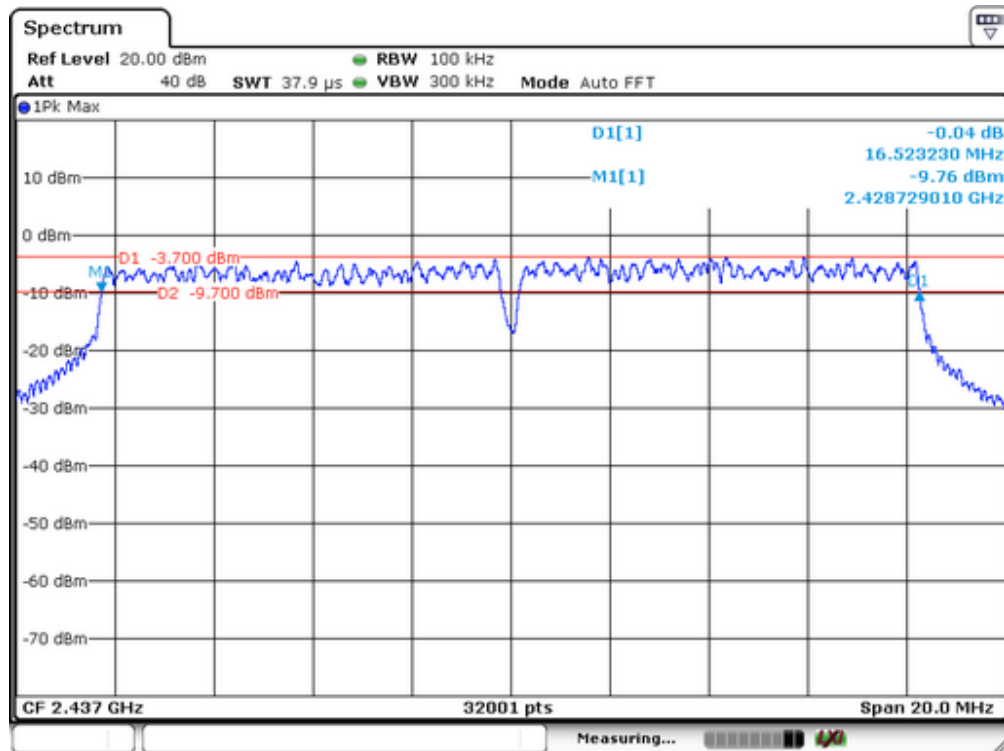
| IEEE 802.11b            |                         |                      |        |
|-------------------------|-------------------------|----------------------|--------|
| Channel frequency (MHz) | Measurement level (KHz) | Required Limit (KHz) | Result |
| 2412                    | 9974                    | >500                 | Pass   |
| 2437                    | 8773                    | >500                 |        |
| 2462                    | 8500                    | >500                 |        |



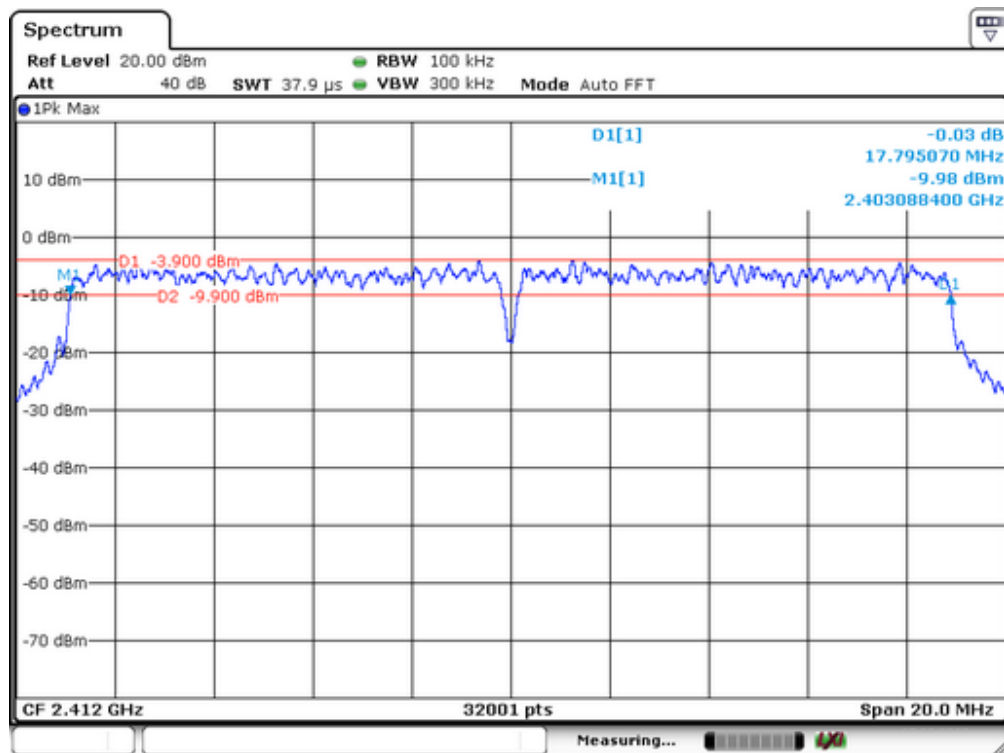


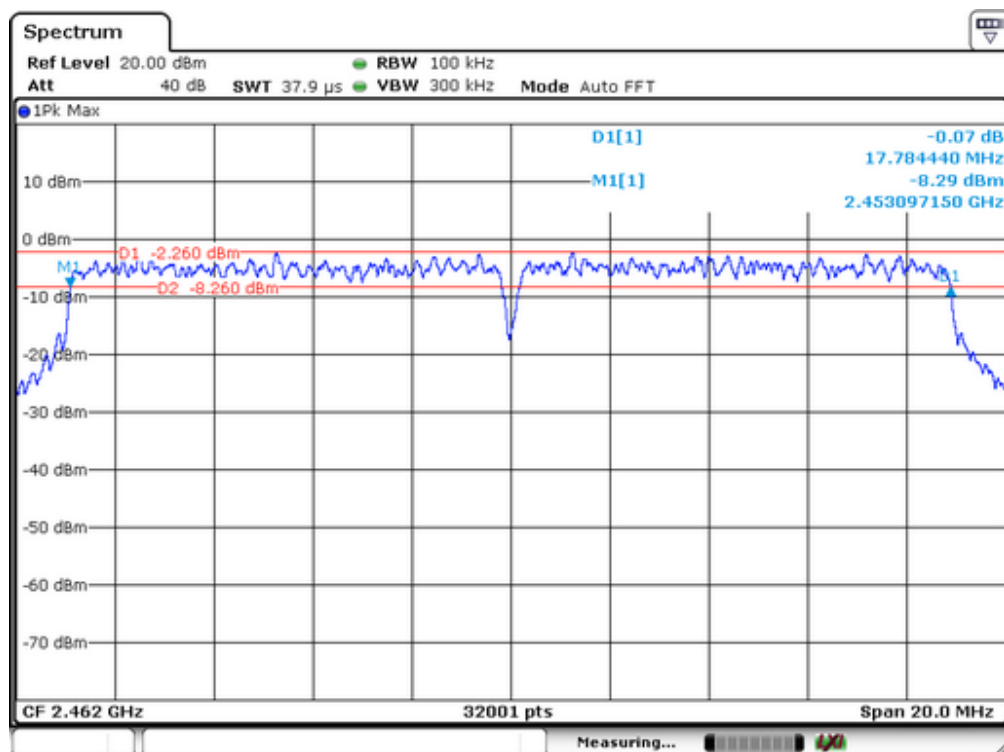
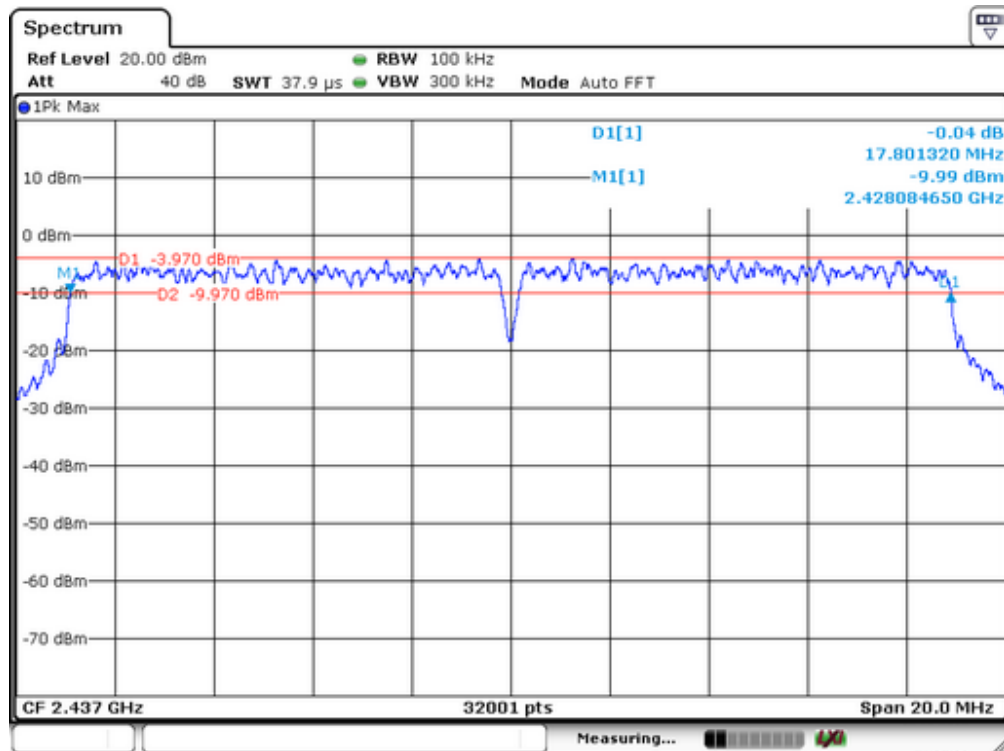
| IEEE 802.11g            |                         |                      |        |
|-------------------------|-------------------------|----------------------|--------|
| Channel frequency (MHz) | Measurement level (KHz) | Required Limit (KHz) | Result |
| 2412                    | 16513                   | >500                 | Pass   |
| 2437                    | 16523                   | >500                 |        |
| 2462                    | 16506                   | >500                 |        |



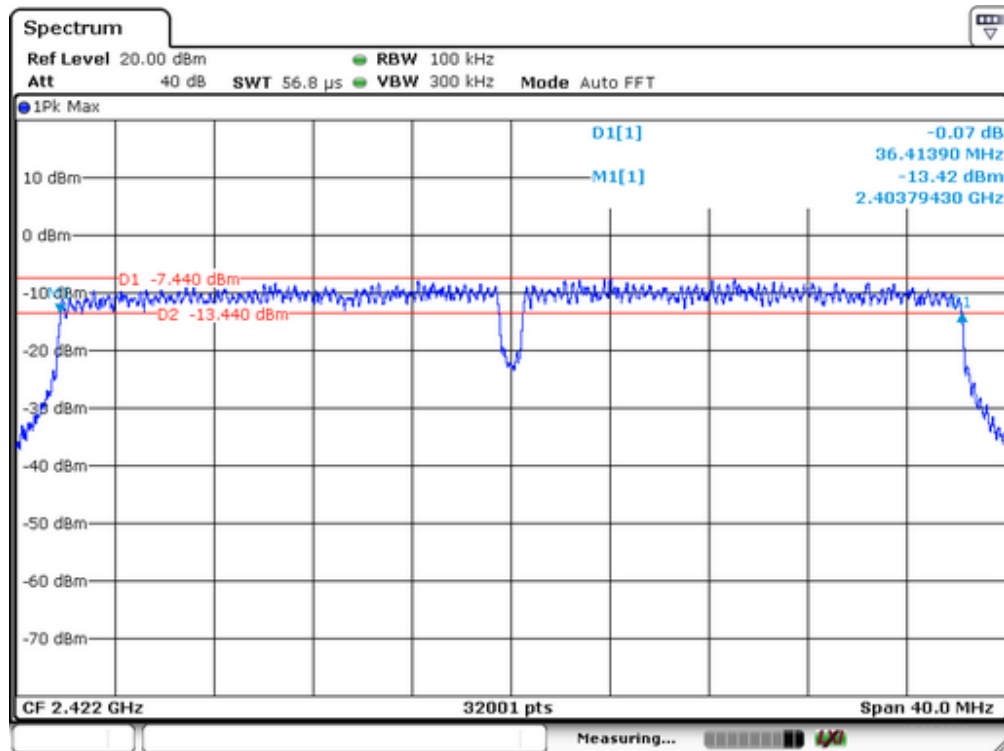


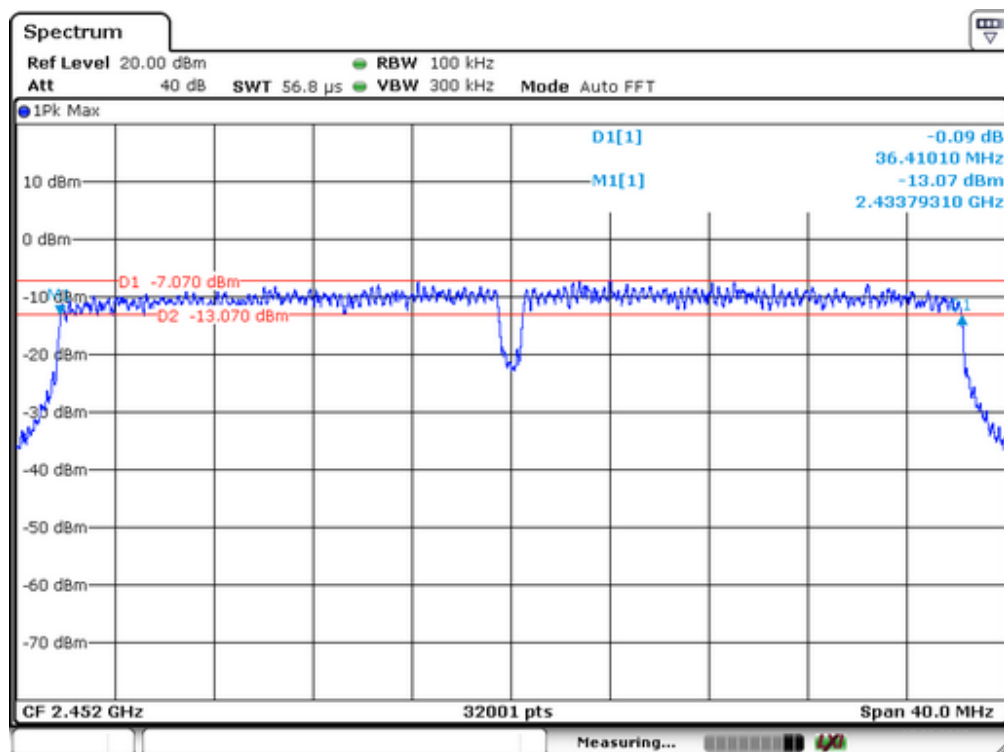
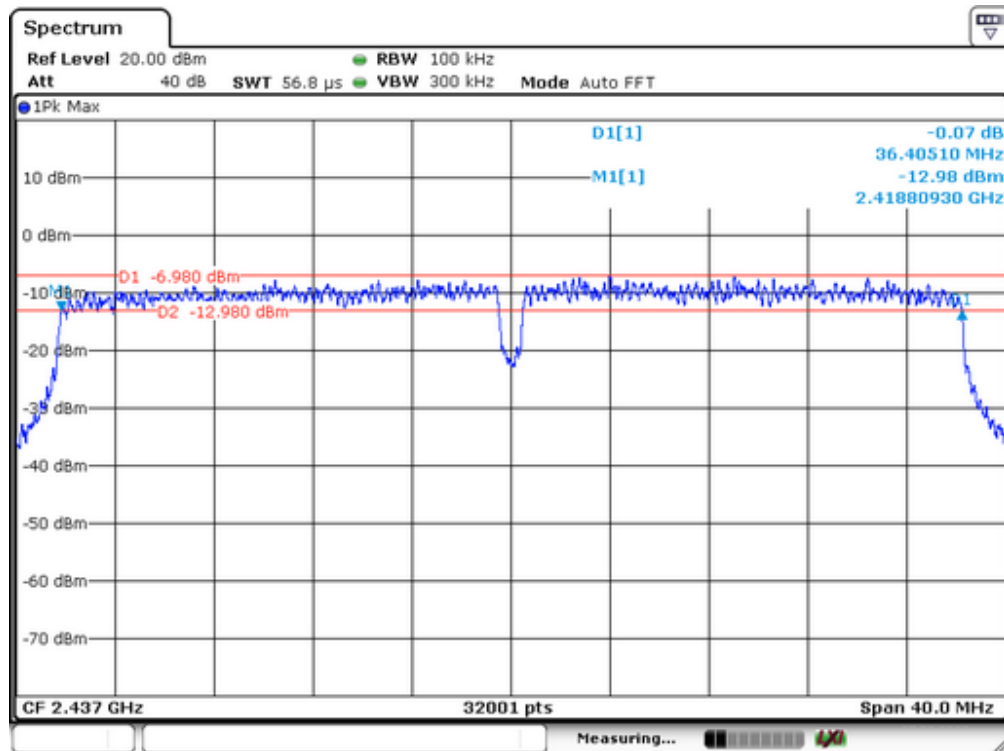
| IEEE 802.11n(HT20)      |                         |                      |        |
|-------------------------|-------------------------|----------------------|--------|
| Channel frequency (MHz) | Measurement level (KHz) | Required Limit (KHz) | Result |
| 2412                    | 17795                   | >500                 | Pass   |
| 2437                    | 17801                   | >500                 |        |
| 2462                    | 17784                   | >500                 |        |





| IEEE 802.11n (HT40)     |                         |                      |        |
|-------------------------|-------------------------|----------------------|--------|
| Channel frequency (MHz) | Measurement level (KHz) | Required Limit (KHz) | Result |
| 2422                    | 36414                   | >500                 | Pass   |
| 2437                    | 36405                   | >500                 |        |
| 2452                    | 36410                   | >500                 |        |







## 11. Maximum Peak Output Power Test

### 11.1 Measurement Procedure

1. The testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v04.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.

### 11.2 Test SET-UP (Block Diagram of Configuration)



### 11.3 Measurement Equipment Used

| EQUIPMENT TYPE | MODEL NUMBER | SERIAL NUMBER | LAST CAL.  | CAL DUE.   |
|----------------|--------------|---------------|------------|------------|
| Power meter    | ML2495A      | 0824006       | 05/16/2017 | 05/15/2018 |
| Power sensor   | MA2411B      | 0738172       | 05/16/2017 | 05/15/2018 |

### 11.4 Peak Power output limit

The maximum peak conducted output power of the intentional radiator for systems using digital modulation in the 2400 - 2483.5 MHz bands shall not exceed: 1 Watt (30dBm).

### 11.5 Measurement Results

Spectrum Detector: PK      Test Date : January 24, 2018  
 Test By: Andy      Temperature : 28°C  
 Test Result: PASS      Humidity : 60%

| Test Channel | Peak Output Power (dBm) |         |               |               | Limit(dBm) | Result |
|--------------|-------------------------|---------|---------------|---------------|------------|--------|
|              | 802.11b                 | 802.11g | 802.11n(HT20) | 802.11n(HT40) |            |        |
| Lowest       | 16.63                   | 14.28   | 10.23         | 8.24          | 30         | Pass   |
| Middle       | 15.28                   | 14.27   | 9.28          | 8.12          |            |        |
| Highest      | 15.39                   | 14.27   | 9.99          | 7.39          |            |        |

## 12. Band Edge Test

### 12.1 Measurement Procedure

#### For Conducted Test

1. The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v04.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. Measure and record the results in the test report.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

#### For Radiated emission Test

1. The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v04.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.
6. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. Repeat above procedures until all frequency measured were complete.

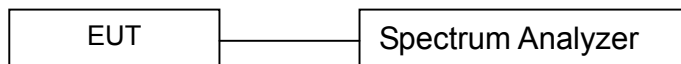
When spectrum scanned above 1GHz setting resolution bandwidth 1MHz, video bandwidth 3MHz.

| EMI Test Receiver | Setting  |
|-------------------|----------|
| Attenuation       | Auto     |
| RBW               | 1MHz     |
| VBW               | 3MHz     |
| Detector          | Peak     |
| Trace             | Max hold |

When spectrum scanned above 1GHz setting resolution bandwidth 1MHz, video bandwidth 10Hz.

|                   |          |
|-------------------|----------|
| EMI Test Receiver | Setting  |
| Attenuation       | Auto     |
| RBW               | 1MHz     |
| VBW               | 10Hz     |
| Detector          | Peak     |
| Trace             | Max hold |

## 12.2 Test SET-UP (Block Diagram of Configuration)



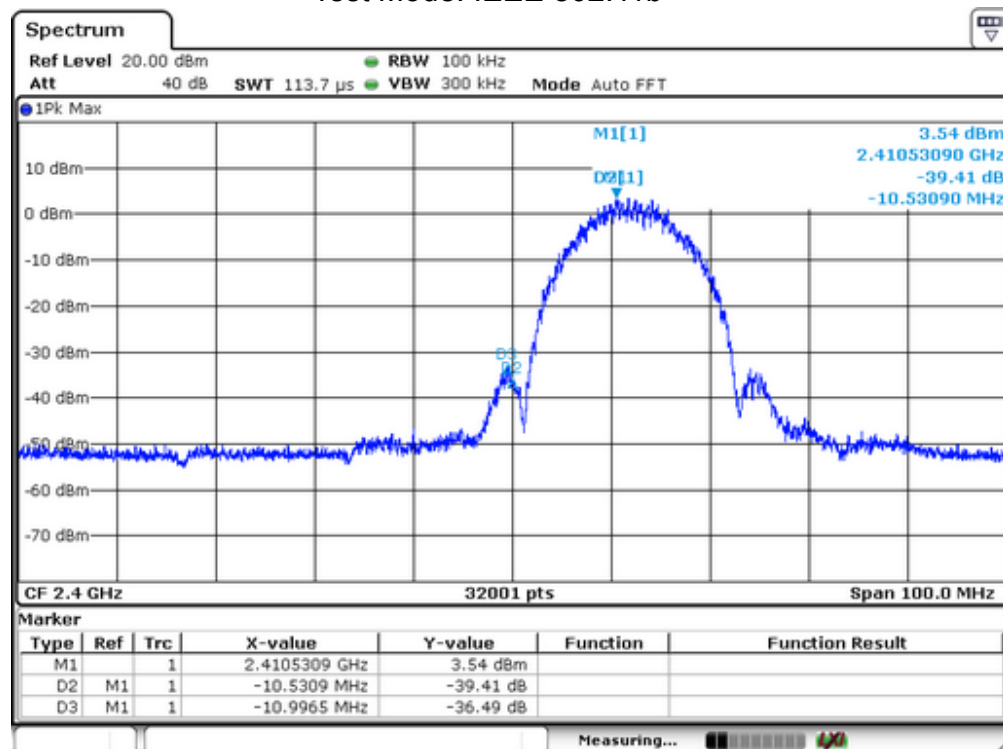
## 12.3 Measurement Equipment Used

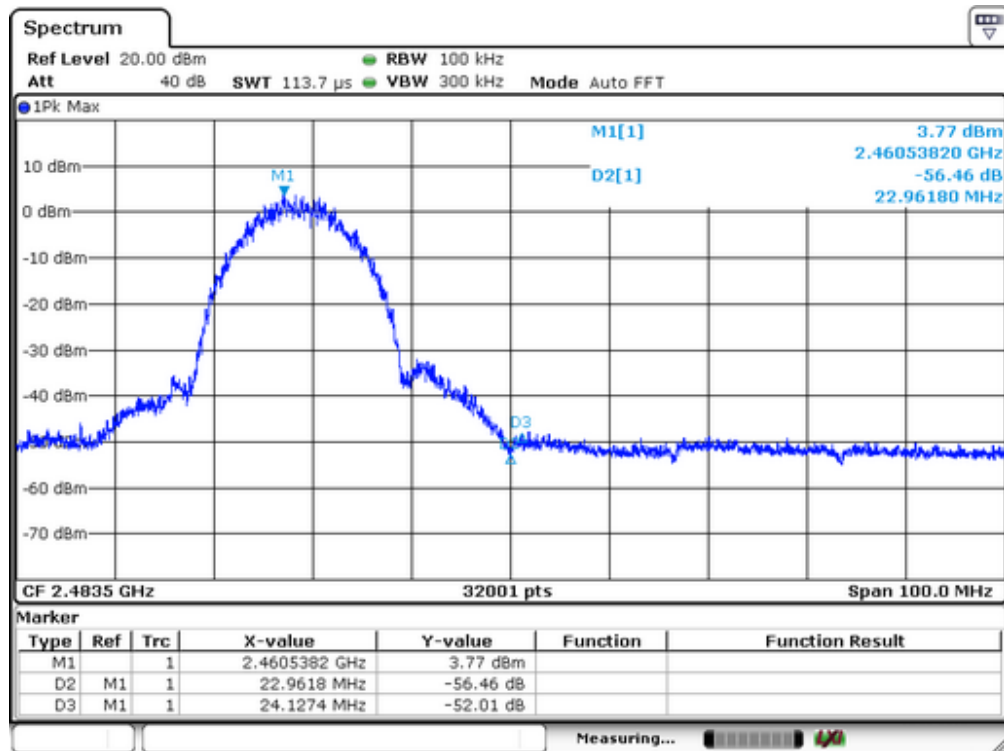
| EQUIPMENT TYPE    | MFR     | MODEL NUMBER | SERIAL NUMBER | LAST CAL.  | CAL DUE.   |
|-------------------|---------|--------------|---------------|------------|------------|
| Spectrum Analyzer | Agilent | FSV30        | 1321.3008K    | 05/16/2017 | 05/15/2018 |

## 12.4 Measurement Results

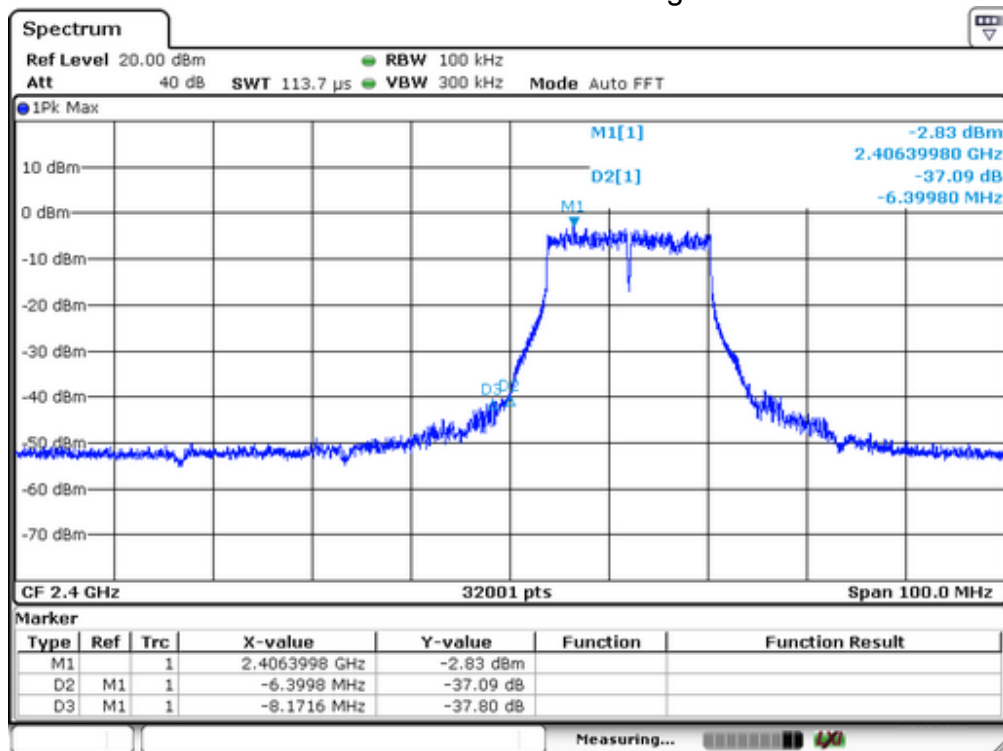
### 1. Conducted Test

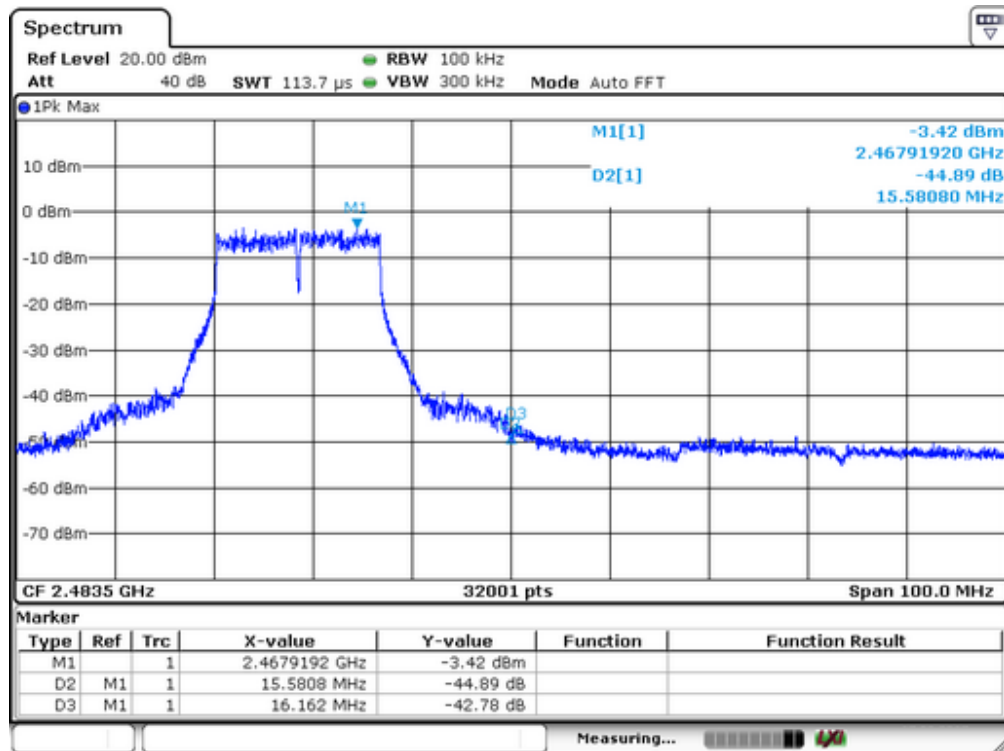
Test Mode: IEEE 802.11b



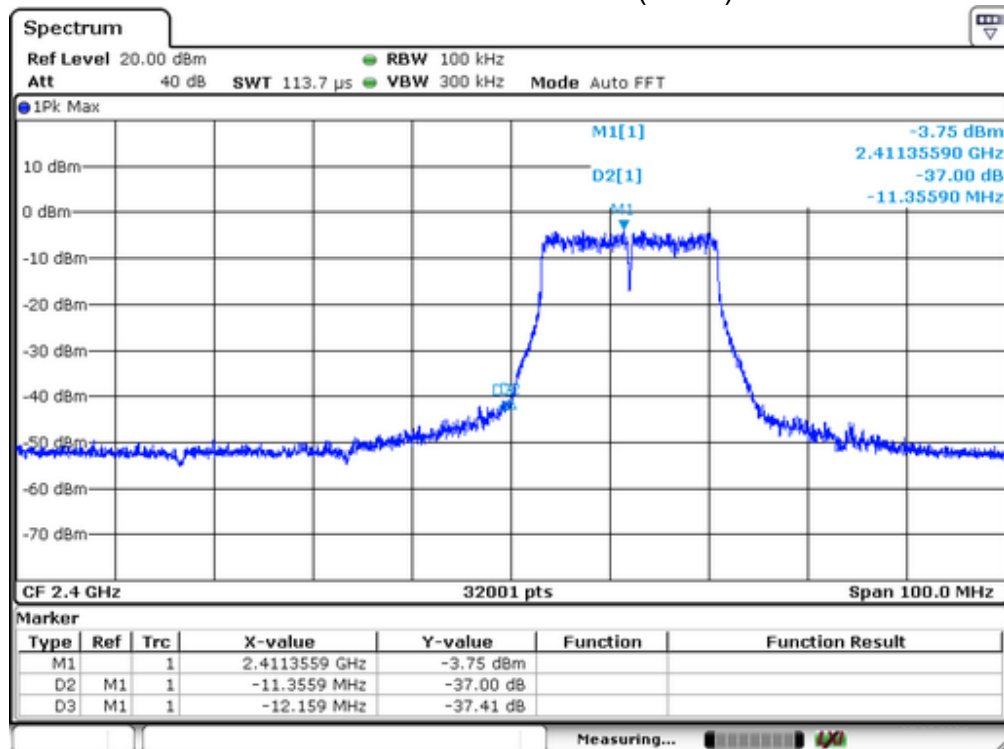


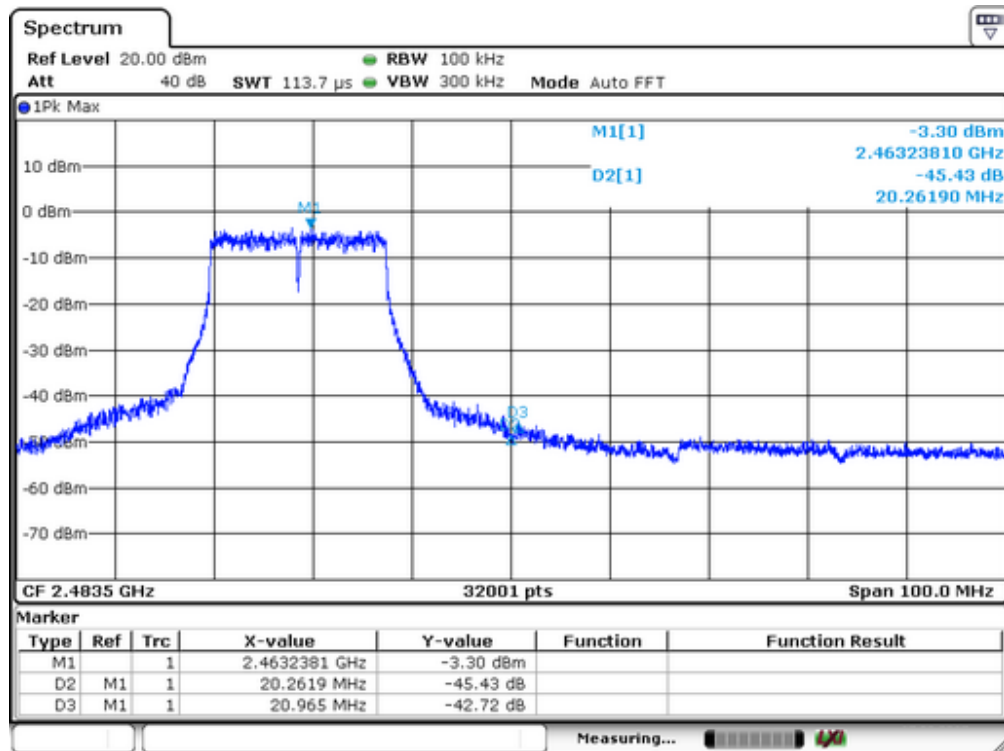
Test Mode: IEEE 802.11g



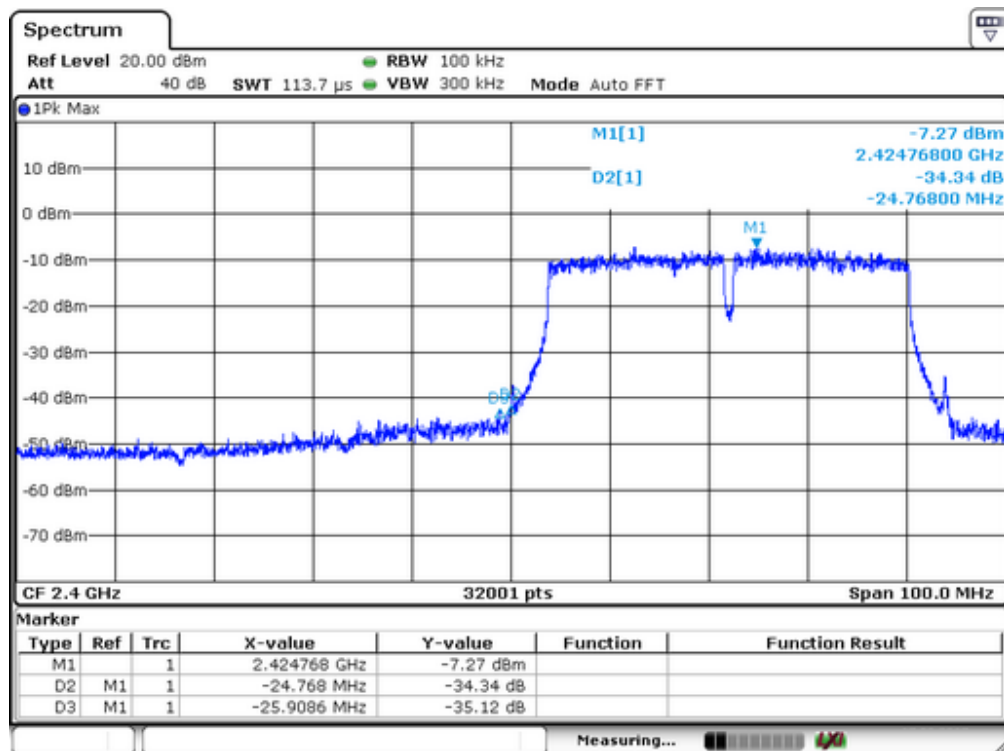


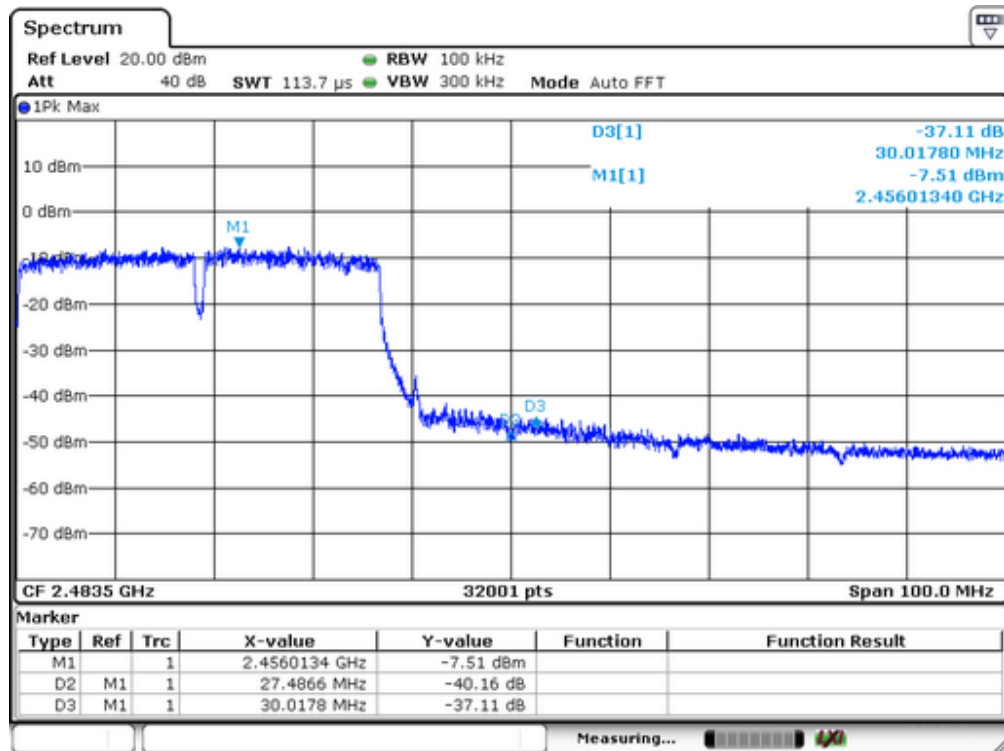
Test Mode: IEEE 802.11n(HT20)





Test Mode: IEEE 802.11n(HT40)





2. Radiated emission Test

Spectrum Detector:

PK/AV

Test Date :

January 24, 2018

Test By:

Andy

Temperature :

28 °C

Humidity :

65 %

| IEEE 802.11b |           |                       |       |                |                        |       |                  |    |            |        |
|--------------|-----------|-----------------------|-------|----------------|------------------------|-------|------------------|----|------------|--------|
| Freq.        | Ant. Pol. | Reading Level(dBuV/m) |       | Correct Factor | Emission Level(dBuV/m) |       | Limit 3m(dBuV/m) |    | Margin(dB) |        |
| (MHz)        | H/V       | PK                    | AV    | dB             | PK                     | AV    | PK               | AV | PK         | AV     |
| <2400        | H         | 87.38                 | 67.58 | -26.3          | 61.08                  | 41.28 | 74               | 54 | -12.92     | -12.72 |
| <2400        | V         | 84.43                 | 64.75 | -26.1          | 58.33                  | 38.65 | 74               | 54 | -15.67     | -15.35 |
| >2483.5      | H         | 88.77                 | 68.44 | -26.3          | 62.47                  | 42.14 | 74               | 54 | -11.53     | -11.86 |
| >2483.5      | V         | 83.46                 | 63.35 | -26.1          | 57.36                  | 37.25 | 74               | 54 | -16.64     | -16.75 |

| IEEE 802.11g |           |                       |       |                |                        |       |                  |    |            |        |
|--------------|-----------|-----------------------|-------|----------------|------------------------|-------|------------------|----|------------|--------|
| Freq.        | Ant. Pol. | Reading Level(dBuV/m) |       | Correct Factor | Emission Level(dBuV/m) |       | Limit 3m(dBuV/m) |    | Margin(dB) |        |
| (MHz)        | H/V       | PK                    | AV    | dB             | PK                     | AV    | PK               | AV | PK         | AV     |
| <2400        | H         | 89.58                 | 69.58 | -26.3          | 63.28                  | 43.28 | 74               | 54 | -10.72     | -10.72 |
| <2400        | V         | 86.34                 | 66.34 | -26.1          | 60.24                  | 40.24 | 74               | 54 | -13.76     | -13.76 |
| >2483.5      | H         | 90.59                 | 70.47 | -26.3          | 64.29                  | 44.17 | 74               | 54 | -9.71      | -9.83  |
| >2483.5      | V         | 85.68                 | 65.42 | -26.1          | 59.58                  | 39.32 | 74               | 54 | -14.42     | -14.68 |

| IEEE 802.11n(HT20) |           |                       |       |                |                        |       |                  |    |            |        |
|--------------------|-----------|-----------------------|-------|----------------|------------------------|-------|------------------|----|------------|--------|
| Freq.              | Ant. Pol. | Reading Level(dBuV/m) |       | Correct Factor | Emission Level(dBuV/m) |       | Limit 3m(dBuV/m) |    | Margin(dB) |        |
| (MHz)              | H/V       | PK                    | AV    | dB             | PK                     | AV    | PK               | AV | PK         | AV     |
| <2400              | H         | 89.59                 | 69.57 | -26.3          | 63.29                  | 43.27 | 74               | 54 | -10.71     | -10.73 |
| <2400              | V         | 86.37                 | 66.31 | -26.1          | 60.27                  | 40.21 | 74               | 54 | -13.73     | -13.79 |
| >2483.5            | H         | 90.54                 | 70.69 | -26.3          | 64.24                  | 44.39 | 74               | 54 | -9.76      | -9.61  |
| >2483.5            | V         | 86.29                 | 66.31 | -26.1          | 60.19                  | 40.21 | 74               | 54 | -13.81     | -13.79 |

| IEEE 802.11n(HT40) |           |                       |       |                |                        |       |                  |    |            |        |
|--------------------|-----------|-----------------------|-------|----------------|------------------------|-------|------------------|----|------------|--------|
| Freq.              | Ant. Pol. | Reading Level(dBuV/m) |       | Correct Factor | Emission Level(dBuV/m) |       | Limit 3m(dBuV/m) |    | Margin(dB) |        |
| (MHz)              | H/V       | PK                    | AV    | dB             | PK                     | AV    | PK               | AV | PK         | AV     |
| <2400              | H         | 90.58                 | 70.57 | -26.3          | 64.28                  | 44.27 | 74               | 54 | -9.72      | -9.73  |
| <2400              | V         | 86.37                 | 66.34 | -26.1          | 60.27                  | 40.24 | 74               | 54 | -13.73     | -13.76 |
| >2483.5            | H         | 89.59                 | 70.25 | -26.3          | 63.29                  | 43.95 | 74               | 54 | -10.71     | -10.05 |
| >2483.5            | V         | 85.67                 | 65.67 | -26.1          | 59.57                  | 39.57 | 74               | 54 | -14.43     | -14.43 |



## 13. Maximum Power Spectral Density

### 13.1 Test Equipment

| EQUIPMENT TYPE    | MFR     | MODEL NUMBER | SERIAL NUMBER | LAST CAL.  | CAL DUE.   |
|-------------------|---------|--------------|---------------|------------|------------|
| Spectrum Analyzer | Agilent | FSV30        | 1321.3008K    | 05/16/2017 | 05/15/2018 |

### 13.2 Measuring Instruments and Setting

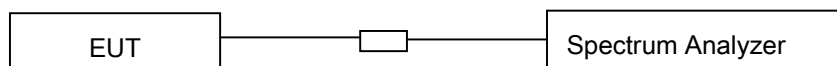
The following table is the setting of spectrum analyzer.

| Spectrum analyzer | Setting                                      |
|-------------------|----------------------------------------------|
| Attenuation       | Auto                                         |
| Span Frequency    | Set the span to 1.5 times the DTS bandwidth. |
| RBW               | 3KHz                                         |
| VBW               | 10KHz                                        |
| Detector          | Peak                                         |
| Trace             | Max hold                                     |
| Sweep Time        | Automatic                                    |

### 13.3 Test Procedures

- The transmitter output (antenna port) was connected to the spectrum analyzer.
- Set analyzer center frequency to DTS channel center frequency.
- Set the analyzer span to a minimum of 1.5 times the DTS bandwidth.
- Set the RBW=3KHz. Set the VBW=10KHz
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level.

### 13.4 Block Diagram of Test Setup



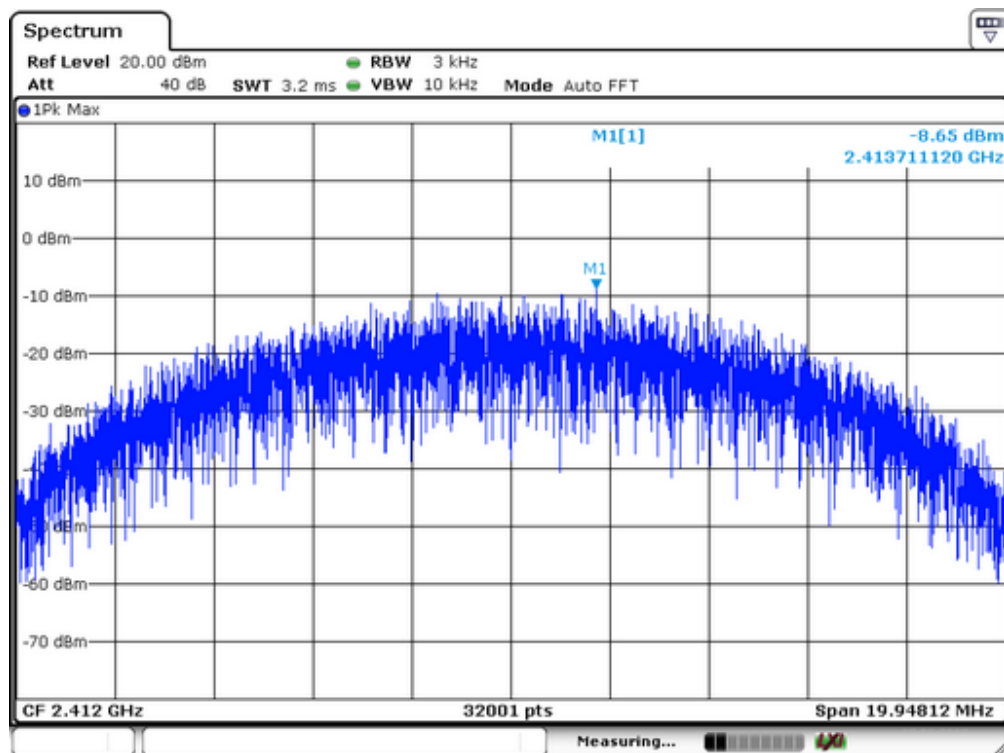
### 13.5 Limit

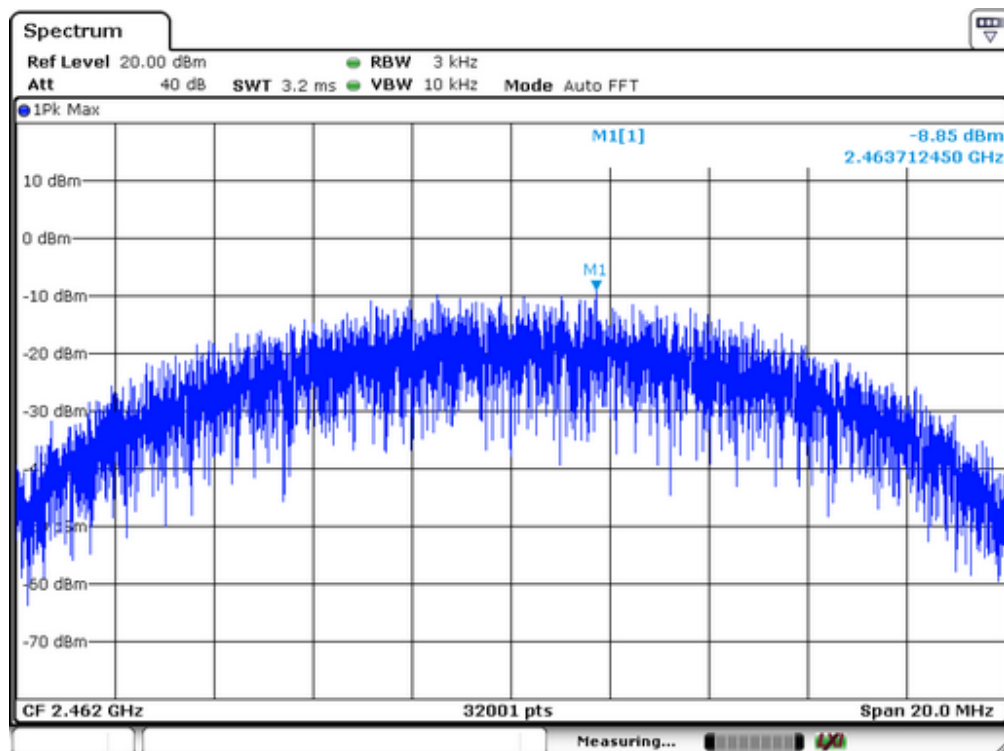
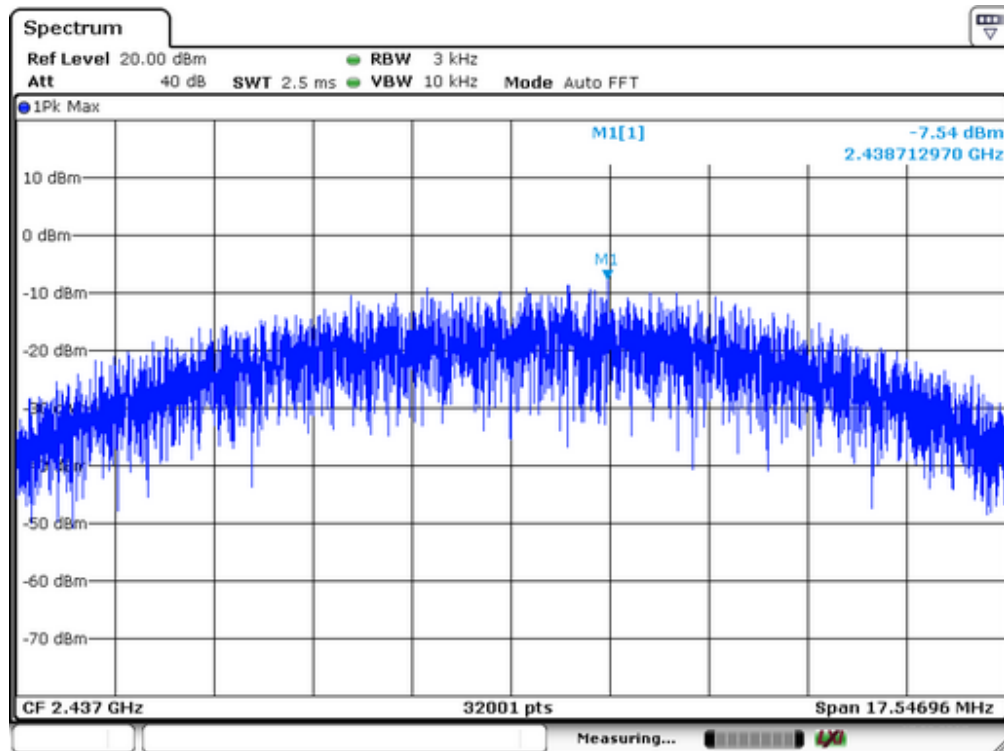
The transmitted power density averaged over any 1 second interval shall not be greater +8dBm in any 3 kHz bandwidth.

### 13.6 Test Result

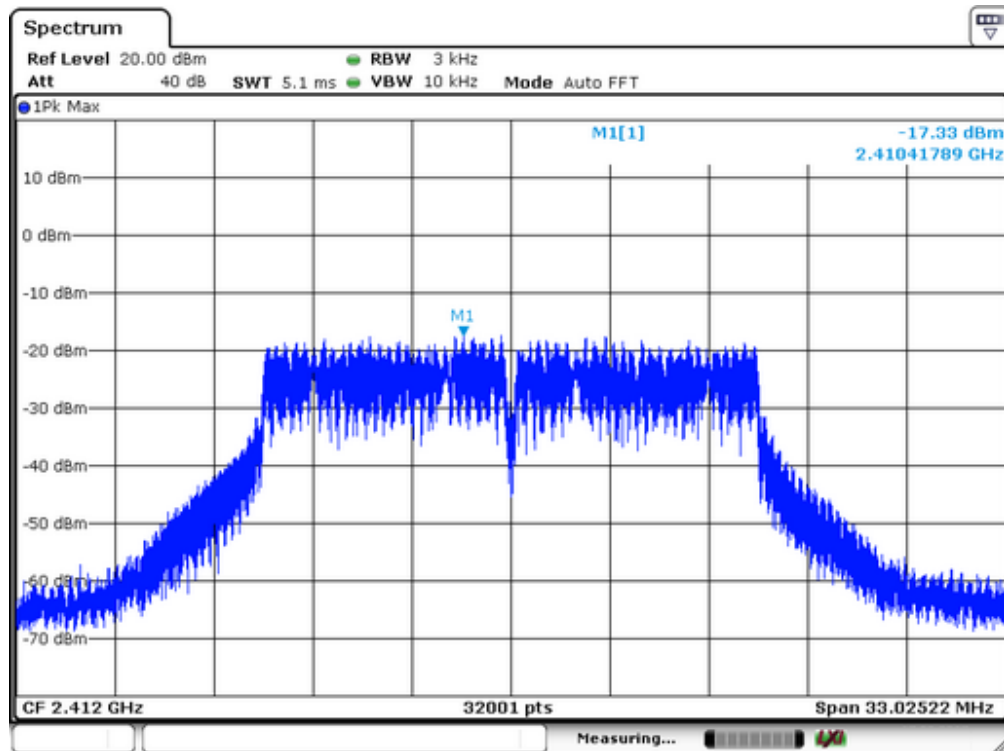
Spectrum Detector: PK                      Test Date : January 24, 2018  
Test By: Andy                      Temperature : 28°C  
Humidity : 60%

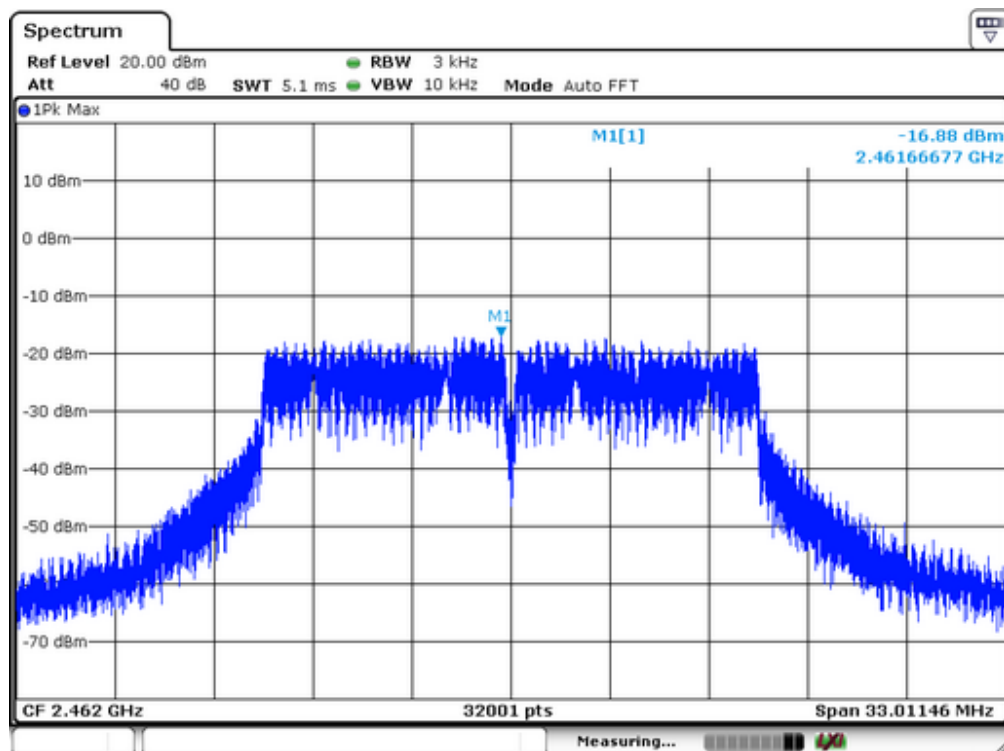
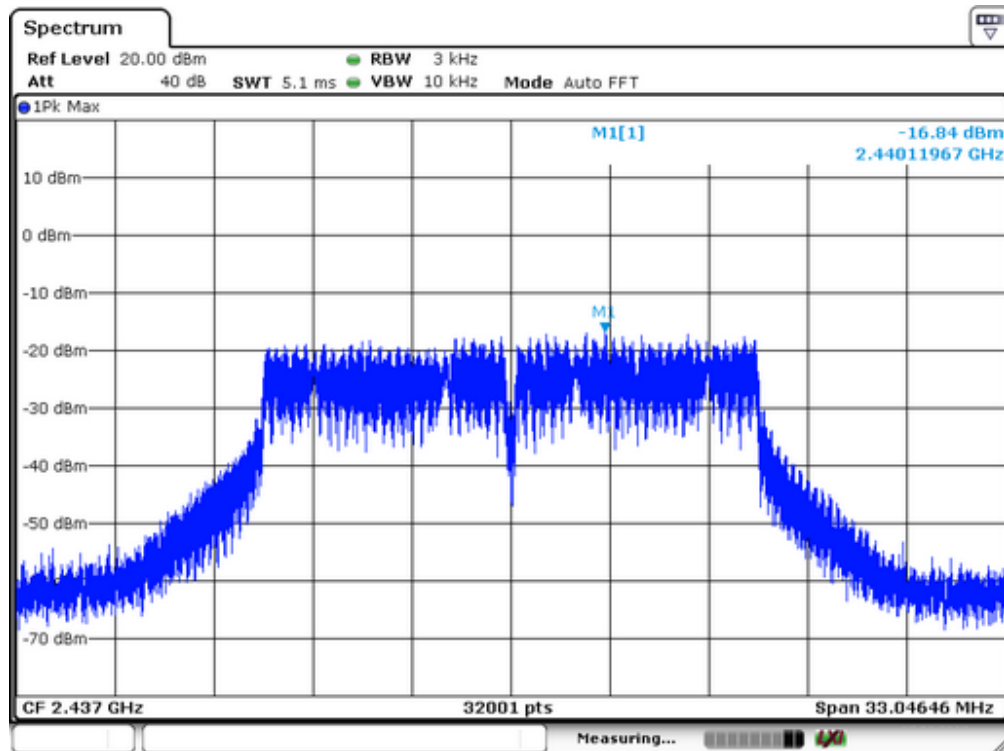
| IEEE 802.11b            |                          |                                |        |
|-------------------------|--------------------------|--------------------------------|--------|
| Channel frequency (MHz) | Power Density (dBm/3kHz) | Power Density Limit (dBm/3kHz) | Result |
| 2412                    | -8.65                    | 8                              | Pass   |
| 2437                    | -7.54                    |                                |        |
| 2462                    | -8.85                    |                                |        |



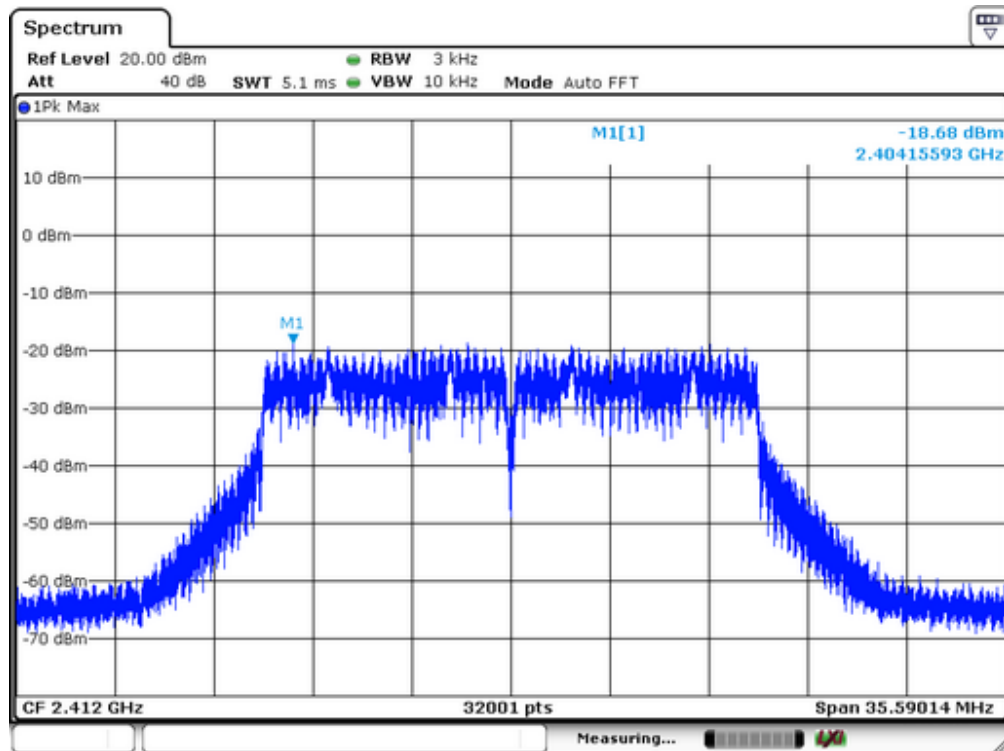


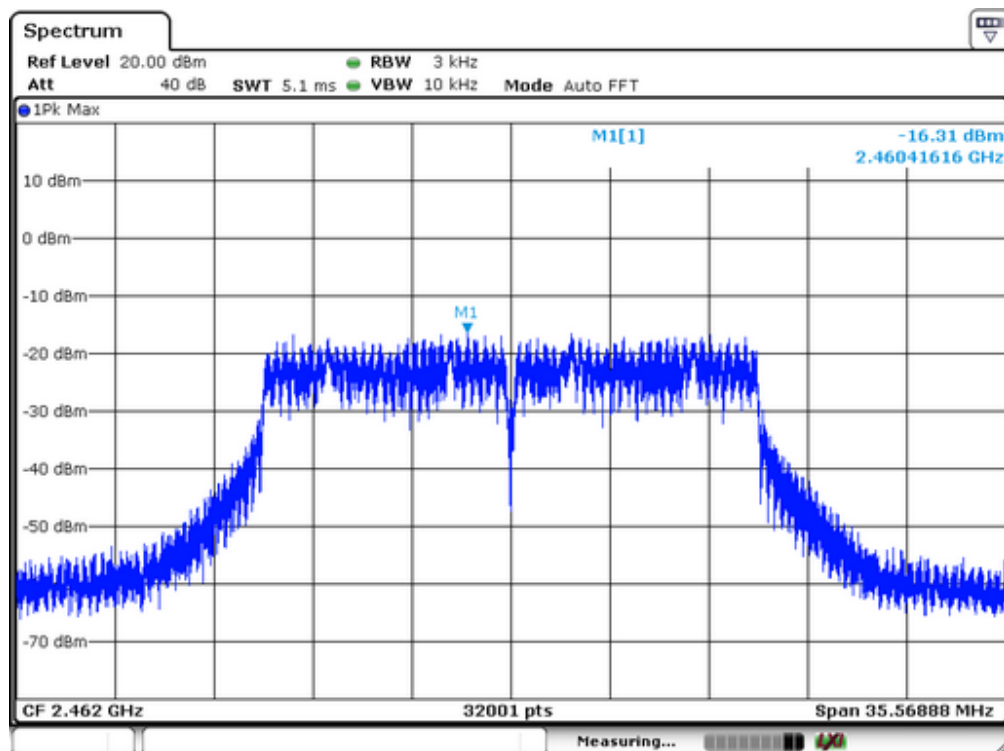
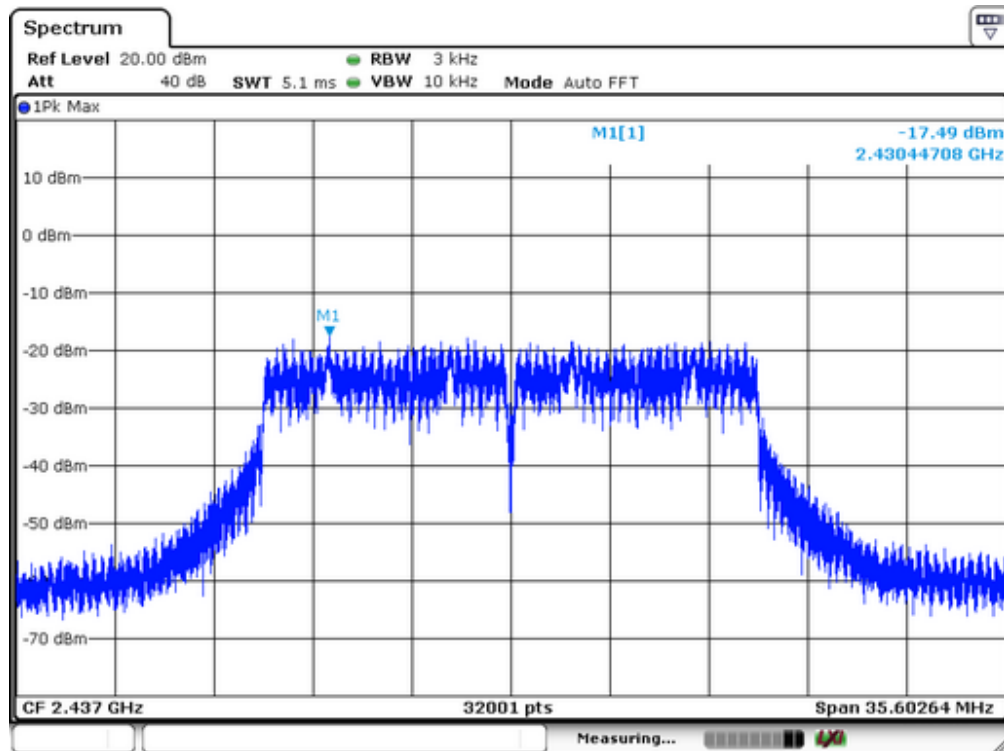
| IEEE 802.11g            |                          |                                |        |
|-------------------------|--------------------------|--------------------------------|--------|
| Channel frequency (MHz) | Power Density (dBm/3kHz) | Power Density Limit (dBm/3kHz) | Result |
| 2412                    | -17.33                   | 8                              | Pass   |
| 2437                    | -16.84                   |                                |        |
| 2462                    | -16.88                   |                                |        |



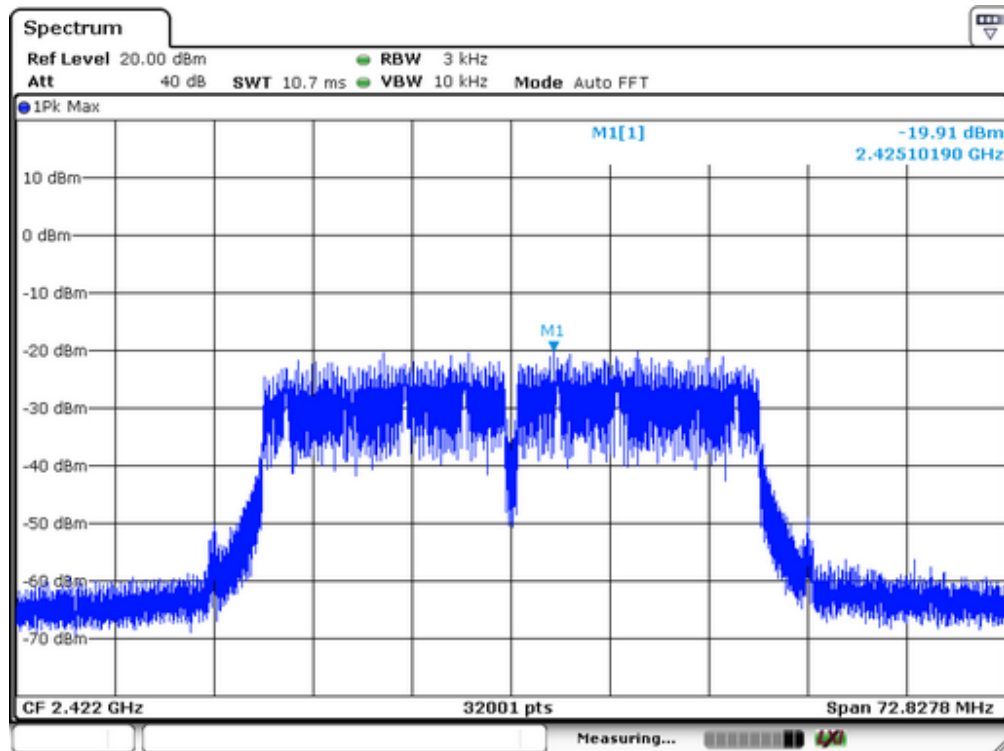


| IEEE 802.11n(HT20)      |                         |            |        |
|-------------------------|-------------------------|------------|--------|
| Channel frequency (MHz) | Measurement level (dBm) | Limit(dBm) | Result |
| 2412                    | -18.68                  | 8          | Pass   |
| 2437                    | -17.49                  |            |        |
| 2462                    | -16.31                  |            |        |

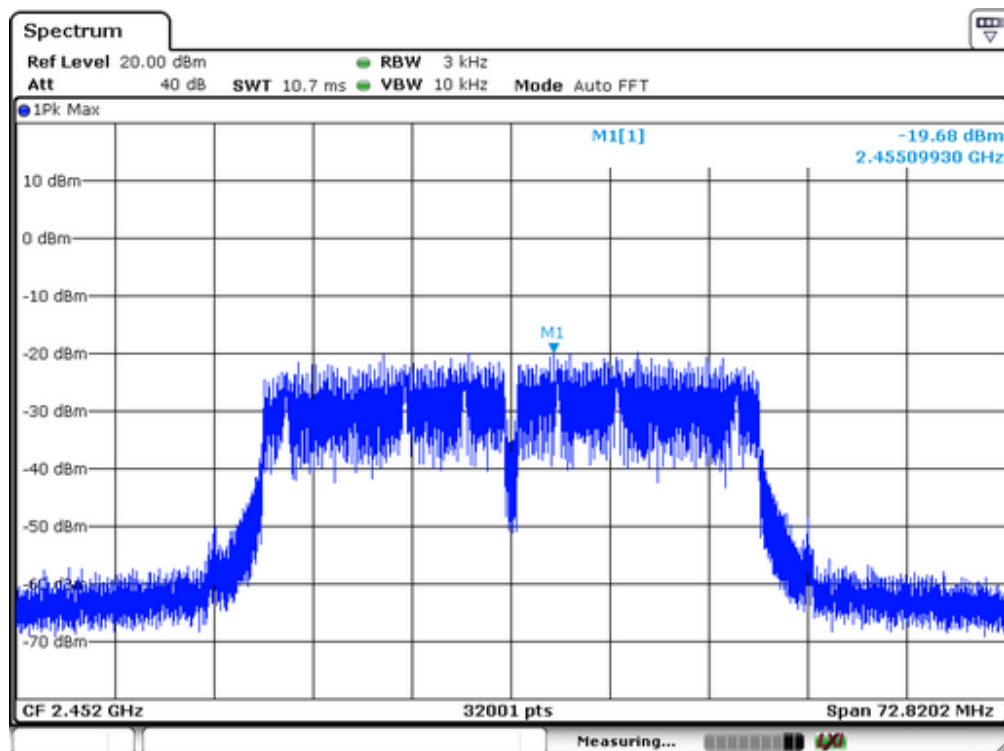
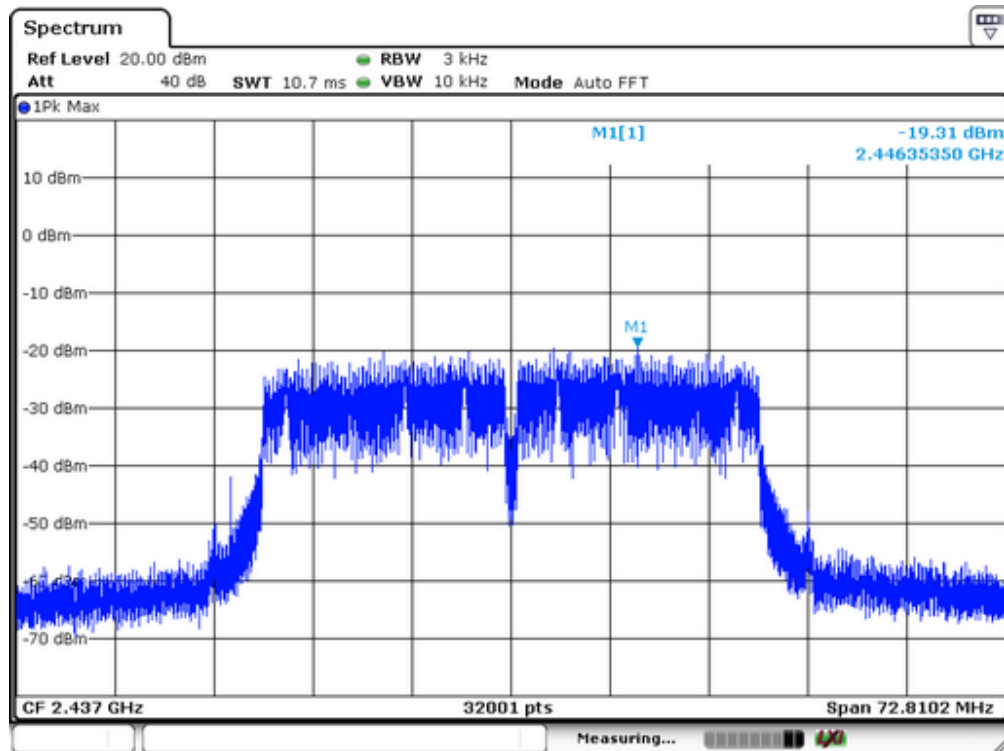




| IEEE 802.11n(HT40)      |                         |            |        |
|-------------------------|-------------------------|------------|--------|
| Channel frequency (MHz) | Measurement level (dBm) | Limit(dBm) | Result |
| 2422                    | -19.91                  | 8          | Pass   |
| 2437                    | -19.31                  |            |        |
| 2452                    | -19.68                  |            |        |







## 14. Antenna Port Emission

### 14.1 Test Equipment

| EQUIPMENT TYPE    | MFR     | MODEL NUMBER | SERIAL NUMBER | LAST CAL.  | CAL DUE.   |
|-------------------|---------|--------------|---------------|------------|------------|
| Spectrum Analyzer | Agilent | FSV30        | 1321.3008K    | 05/16/2017 | 05/15/2018 |

### 14.2 Measuring Instruments and Setting

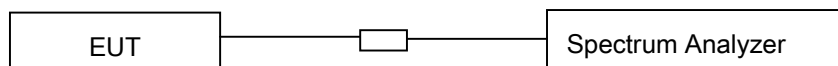
The following table is the setting of spectrum analyzer.

| Spectrum analyzer | Setting  |
|-------------------|----------|
| Attenuation       | Auto     |
| RBW               | 100kHz   |
| VBW               | 300kHz   |
| Detector          | Peak     |
| Trace             | Max hold |

### 14.3 Test Procedures

The conducted spurious emissions were measured conducted using a spectrum analyzer at low, Middle, and high channels, the limit was determined by attenuation 20dB of the RF peak power output.

### 14.4 Block Diagram of Test setup

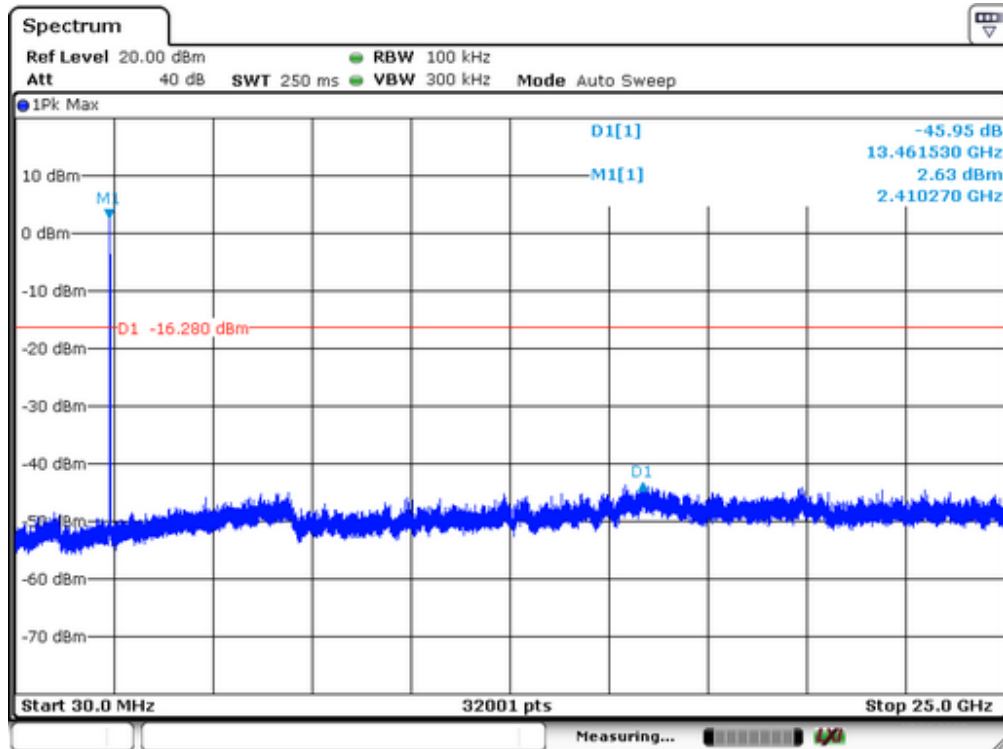


### 14.5 Test Result

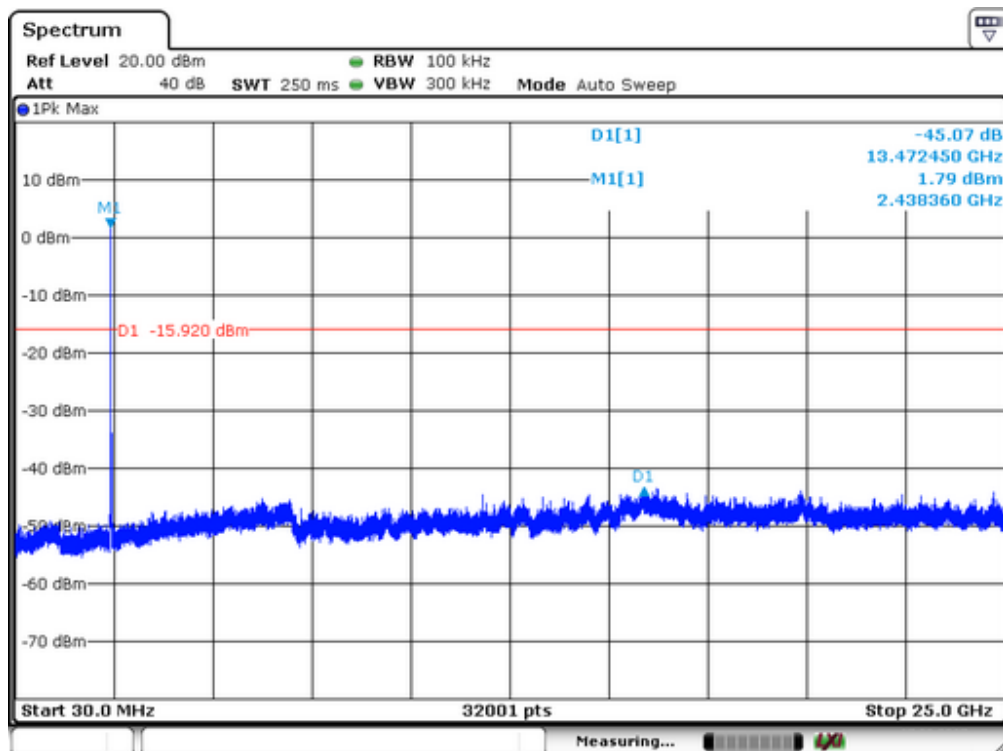
**PASS.**

Please refer to the following pages.

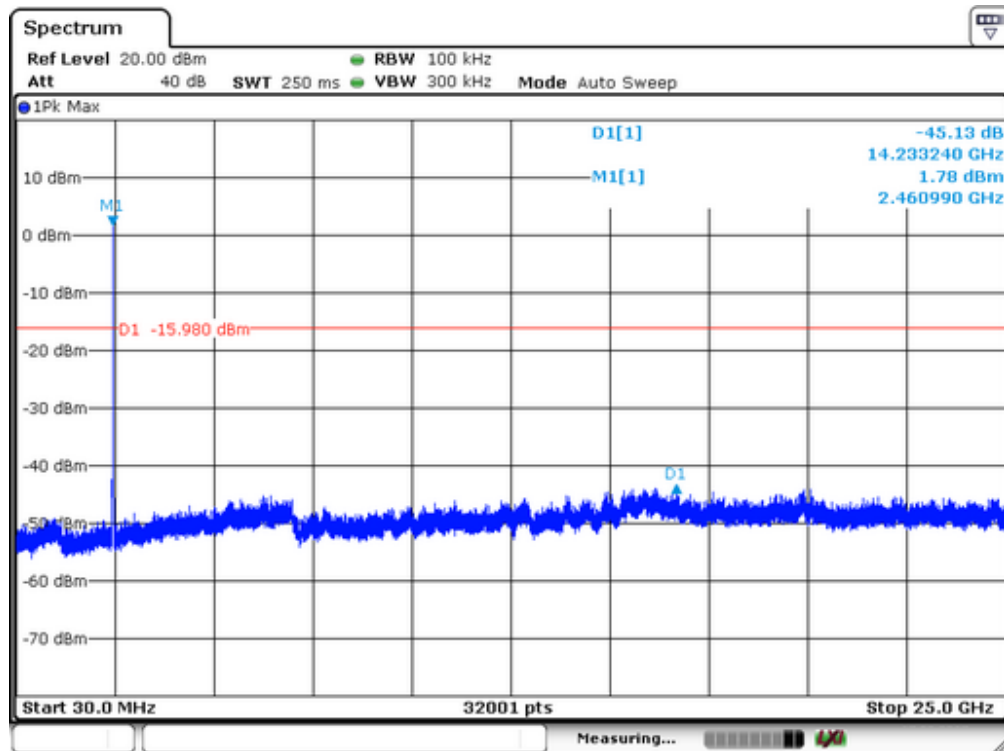
Test Mode: IEEE 802.11b



Lowest Channel

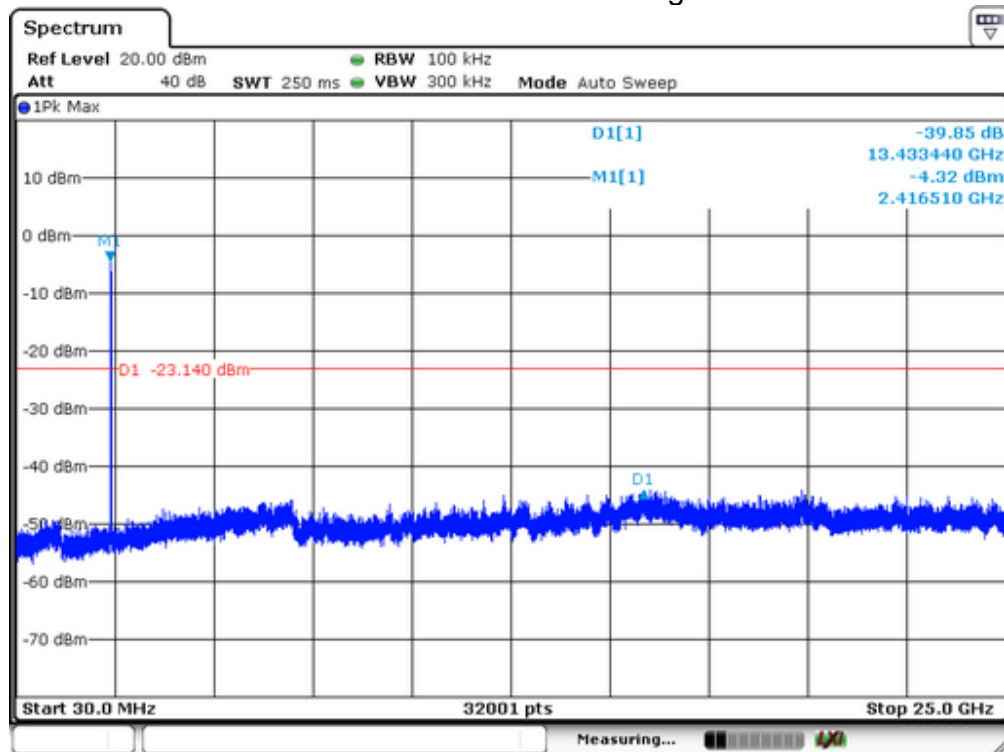


Middel Channel

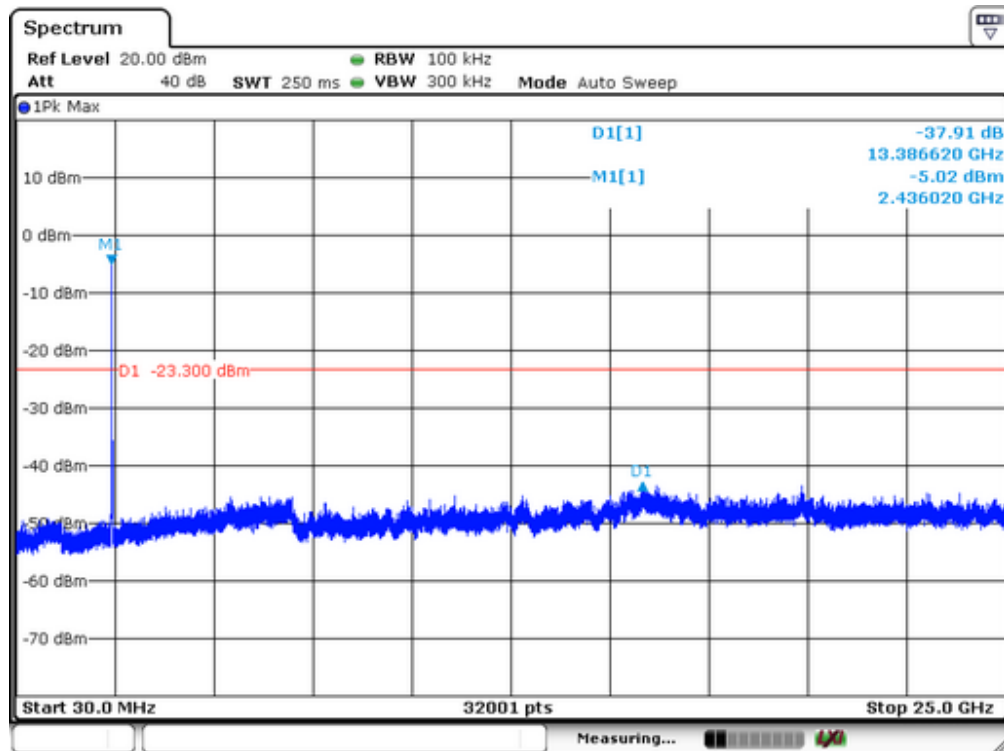


Highest Channel

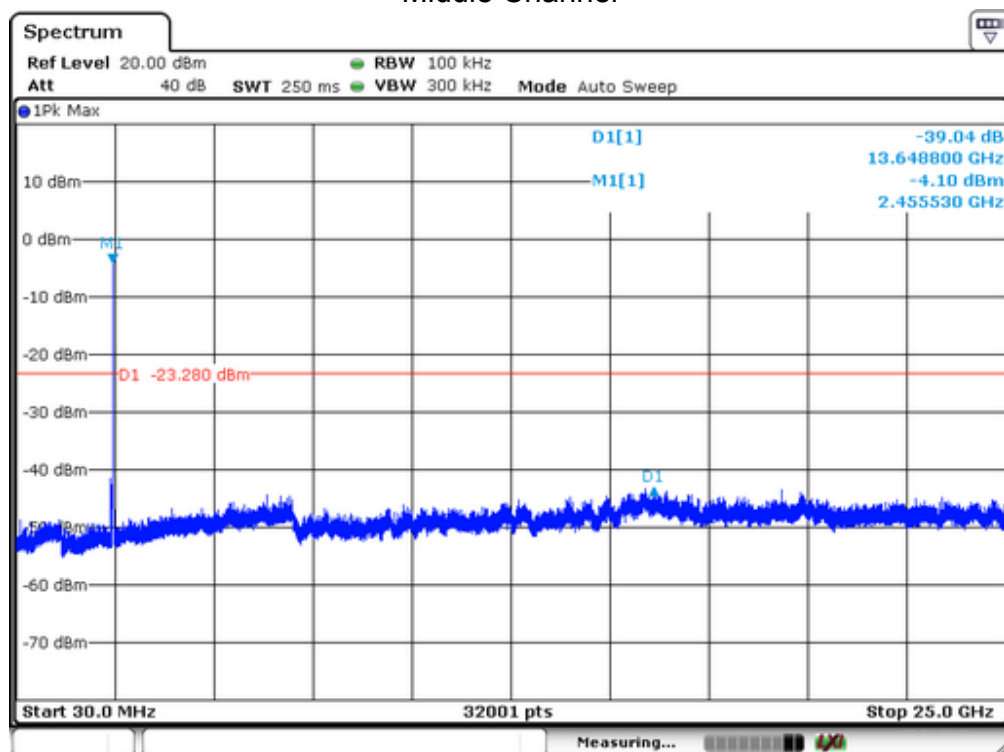
Test Mode: IEEE 802.11g



Lowest Channel

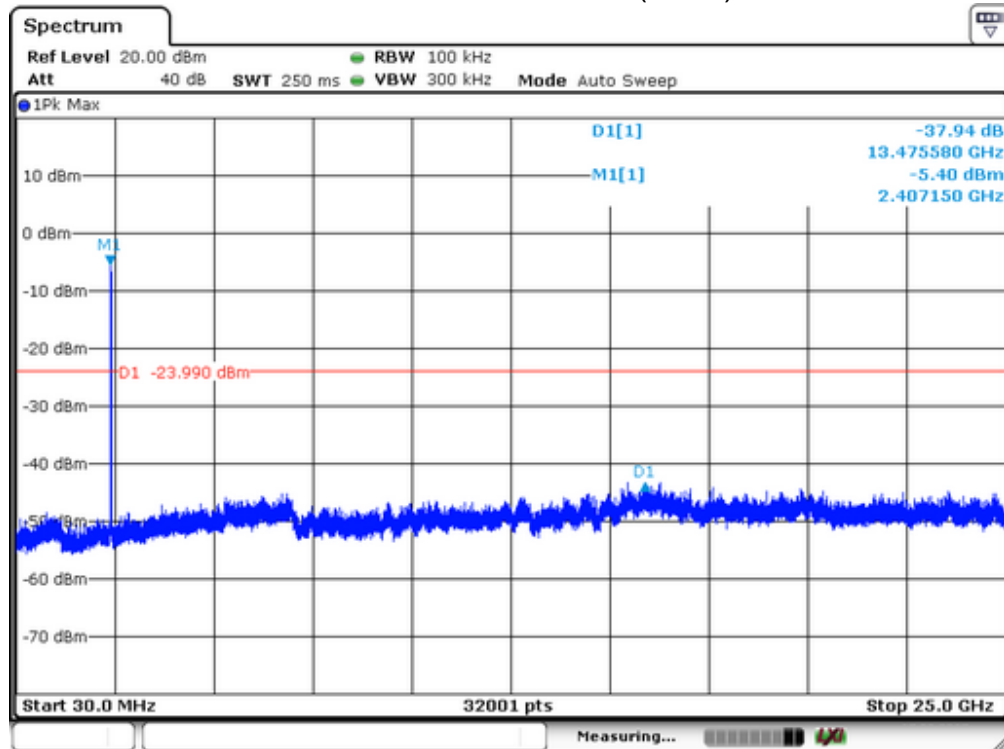


Middle Channel

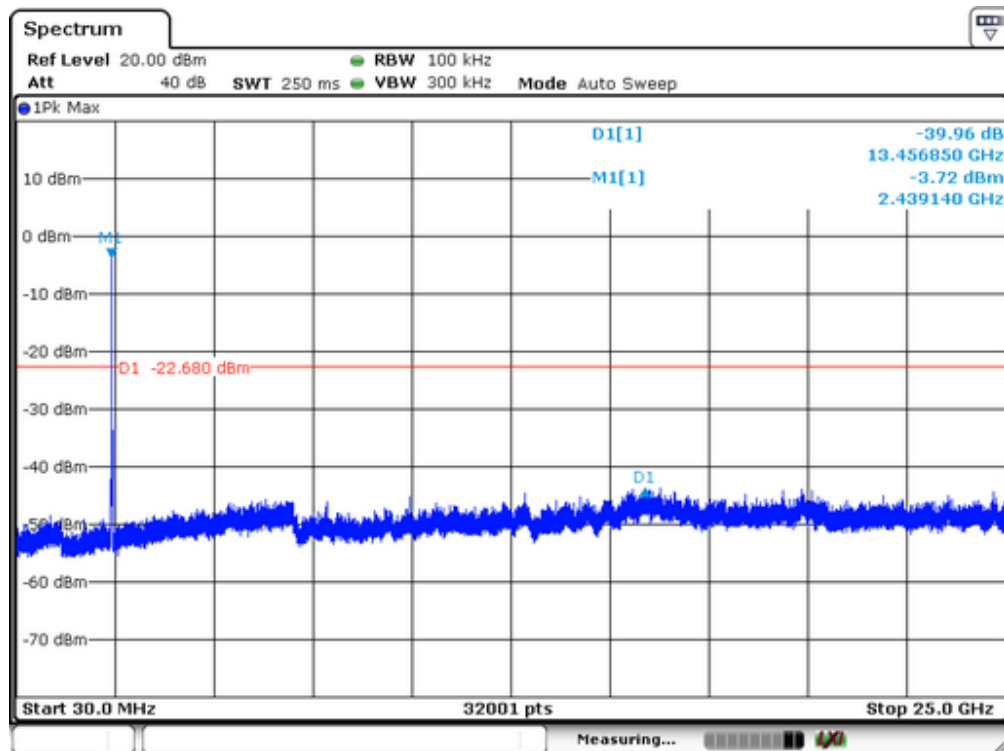


Highest Channel

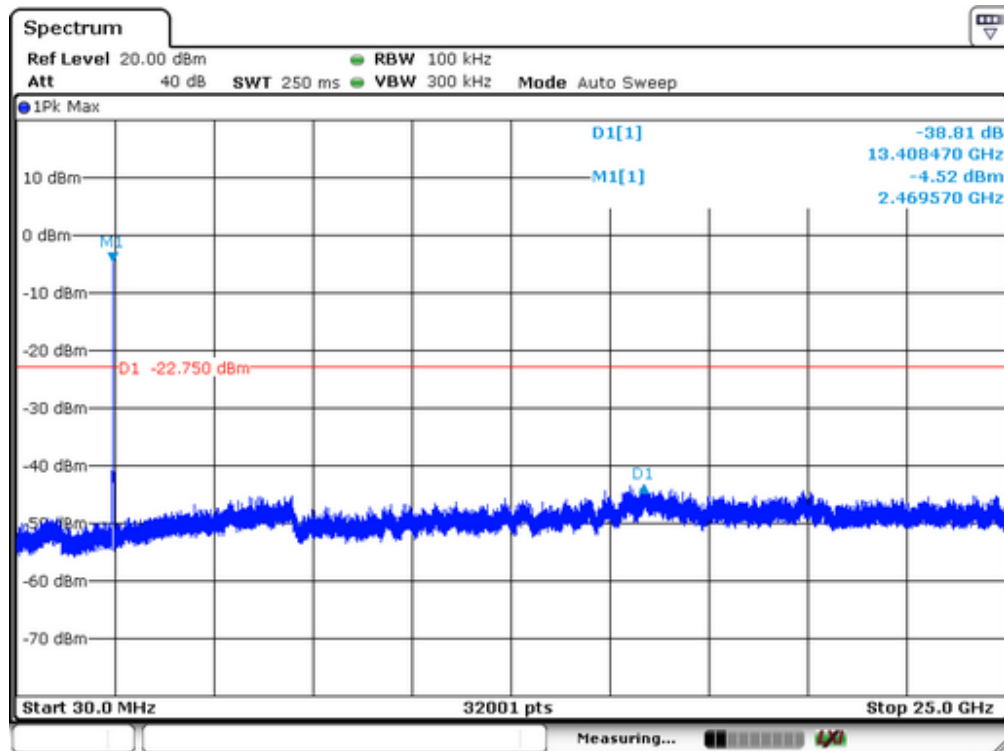
Test Mode: IEEE 802.11n(HT20)



Lowest Channel

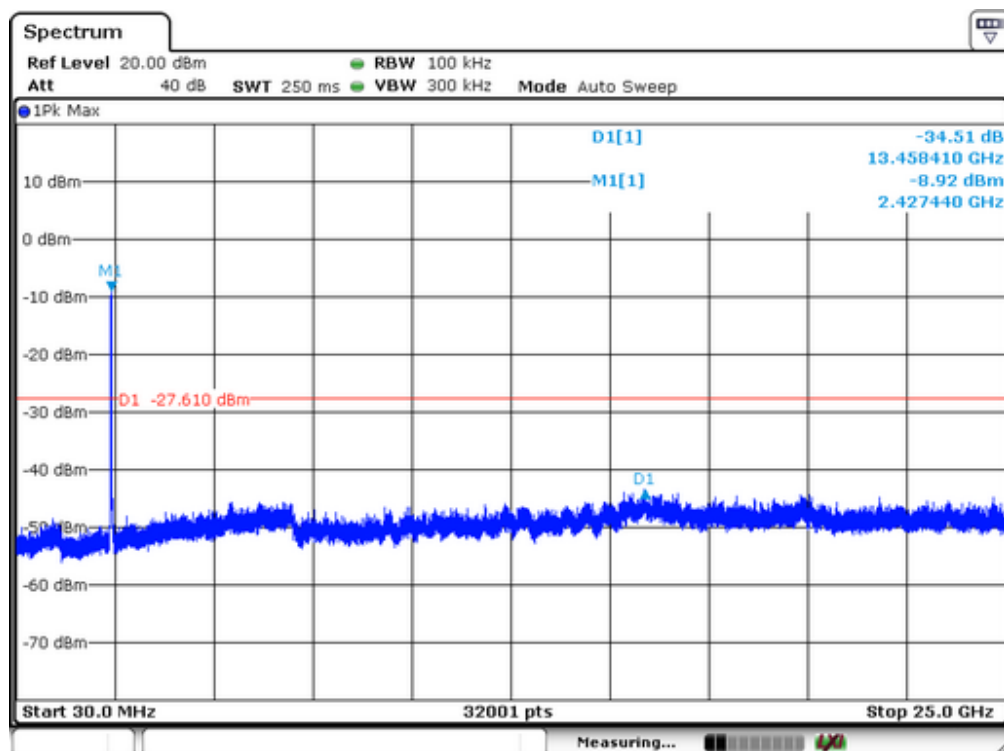


Middle Channel

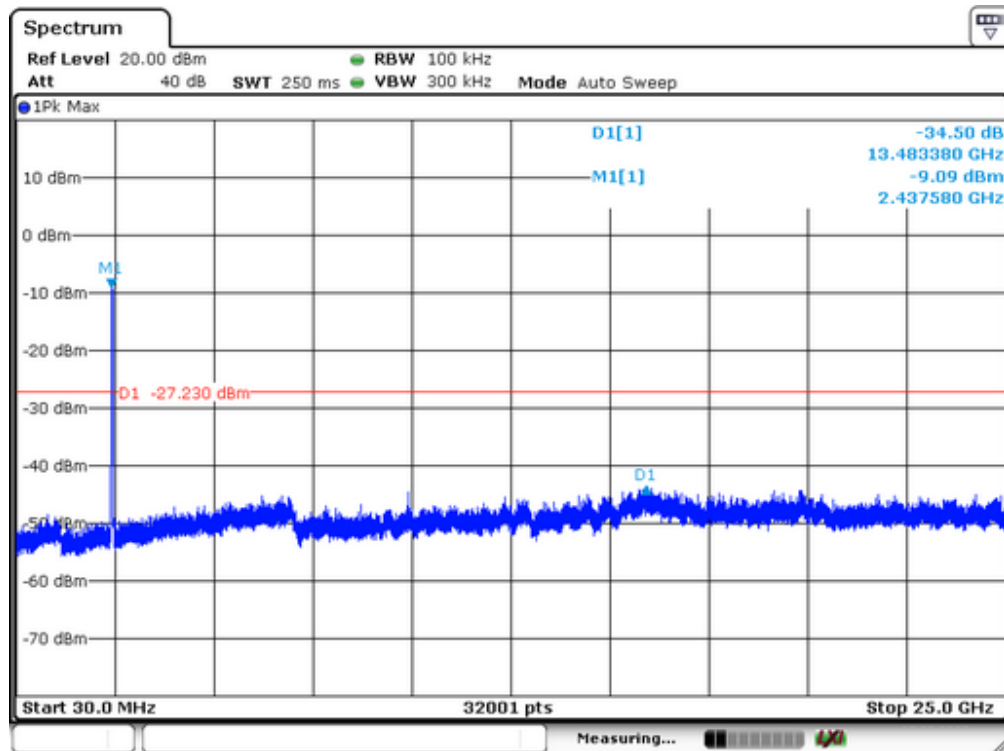


Highest Channel

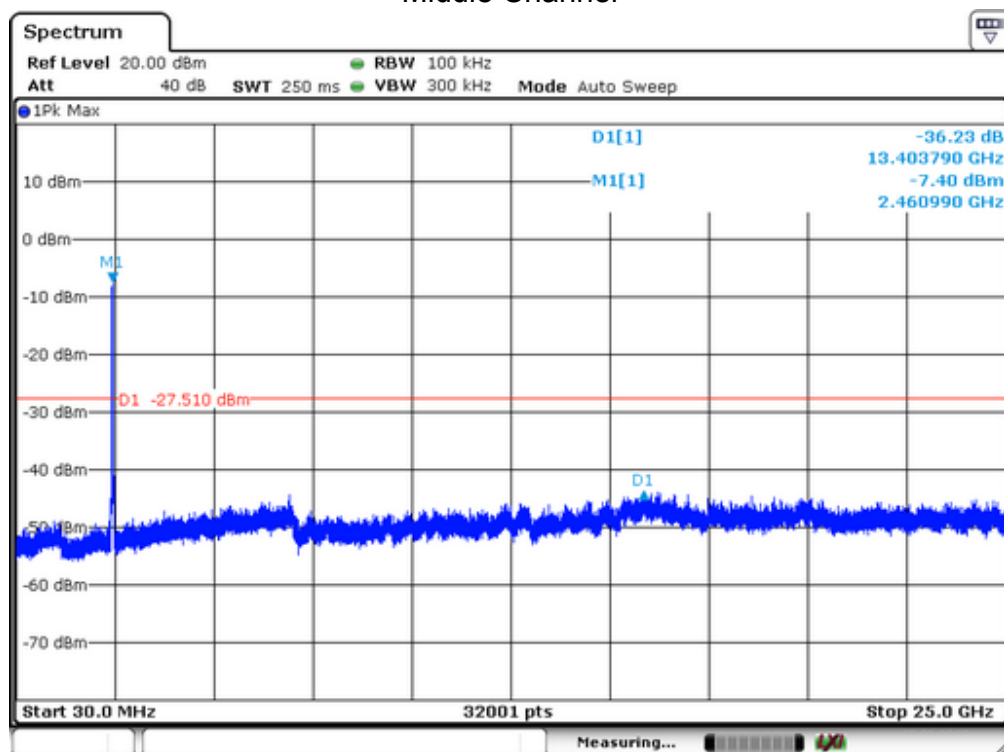
Test Mode: IEEE802.11n(HT40)



Lowest Channel



Middle Channel



Highest Channel



## **15. Antenna Application**

### **15.1 Antenna Requirement**

For intentional device, according to FCC 47 CFR Section 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. And according to FCC 47 CFR Section 15.247 (b), if 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 6dBi.

### **15.2 Result**

The EUT'S antenna, permanent attached antenna, is internal antenna. The antenna's gain is 2dBi and meets the requirement.

# APPENDIX I (PHOTOS OF EUT)





