

# TEST REPORT

**Reference No.**..... : WTN19S09066646W001  
**FCC ID**..... : 2AUPR-XJ-W1A  
**Applicant**..... : Ningbo xiaojiang Internet of Things Technology Co.,Ltd  
**Address**..... : Romm 2302-2303, Jiayin Building, No.455, keji Road,Yinzhou District, Ningbo, China  
**Manufacturer**..... : Ningbo xiaojiang Internet of Things Technology Co.,Ltd  
**Address**..... : Romm 2302-2303, Jiayin Building, No.455, keji Road,Yinzhou District, Ningbo, China  
**Product**..... : XJ-W1A  
**Model(s)**..... : XJ-W1A  
**Standards**..... : FCC CFR47 Part 15 C Section 15.247: 2019  
**Date of Receipt sample**.... : 2019-09-25  
**Date of Test**..... : 2019-09-26 to 2019-10-14  
**Date of Issue**..... : 2019-10-24  
**Test Result**..... : **Pass**

**Remarks:**

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company.  
The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

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## 2. Revision History

| Test report #      | Date of Receipt sample | Date of Test                   | Date of Issue | Purpose  | Comment | Approved |
|--------------------|------------------------|--------------------------------|---------------|----------|---------|----------|
| WTN19S09066644W001 | 2019-09-25             | 2019-09-26<br>to<br>2019-10-14 | 2019-10-24    | original | -       | Valid    |

## 2 General Information

### 2.1 General Description of E.U.T

|                       |                                                                                                                                                                             |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product:              | XJ-W1A                                                                                                                                                                      |
| Model(s):             | XJ-W1A                                                                                                                                                                      |
| Operation Frequency:  | 802.11b/g/n HT20: 2412MHz ~ 2462MHz<br>802.11n HT40: 2422MHz~2452MHz                                                                                                        |
| Antenna installation: | PCB Printed Antenna                                                                                                                                                         |
| Antenna Gain:         | 2.0dBi                                                                                                                                                                      |
| Type of modulation:   | IEEE 802.11b (CCK/QPSK/BPSK,11Mbps max.)<br>IEEE 802.11g (BPSK/QPSK/16QAM/64QAM,54Mbps max.)<br>IEEE 802.11n (BPSK/QPSK/16QAM/64QAM,HT20:72Mbps max.,<br>HT40:150Mbps max.) |

### 2.2 Details of E.U.T

|         |                 |
|---------|-----------------|
| Ratings | DC 3.0V to 3.6V |
|---------|-----------------|

### 2.3 Channel List

WIFI

| Channel No. | Frequency (MHz) | Channel No. | Frequency (MHz) | Channel No. | Frequency (MHz) | Channel No. | Frequency (MHz) |
|-------------|-----------------|-------------|-----------------|-------------|-----------------|-------------|-----------------|
| 1           | 2412            | 2           | 2417            | 3           | 2422            | 4           | 2427            |
| 5           | 2432            | 6           | 2437            | 7           | 2442            | 8           | 2447            |
| 9           | 2452            | 10          | 2457            | 11          | 2462            | 12          | -               |

## 2.4 Test Mode

Table 1 Tests Carried Out Under FCC part 15.247

| Test Items                     | Mode         | Data Rate | Channel | TX/RX |
|--------------------------------|--------------|-----------|---------|-------|
| Maximum Peak Output Power      | 802.11b      | 11 Mbps   | 1/6/11  | TX    |
|                                | 802.11g      | 54 Mbps   | 1/6/11  | TX    |
|                                | 802.11n HT20 | 108 Mbps  | 1/6/11  | TX    |
|                                | 802.11n HT40 | 150 Mbps  | 3/6/9   | TX    |
| Conducted Spurious Emissions   | 802.11b      | 11 Mbps   | 1/6/11  | TX    |
|                                | 802.11g      | 54 Mbps   | 1/6/11  | TX    |
|                                | 802.11n HT20 | 108 Mbps  | 1/6/11  | TX    |
|                                | 802.11n HT40 | 150 Mbps  | 3/6/9   | TX    |
| Band Edge                      | 802.11b      | 11 Mbps   | 1/11    | TX    |
|                                | 802.11g      | 54 Mbps   | 1/11    | TX    |
|                                | 802.11n HT20 | 108 Mbps  | 1/11    | TX    |
|                                | 802.11n HT40 | 150 Mbps  | 3/9     | TX    |
| Power Spectral Density         | 802.11b      | 11 Mbps   | 1/6/11  | TX    |
|                                | 802.11g      | 54 Mbps   | 1/6/11  | TX    |
|                                | 802.11n HT20 | 108 Mbps  | 1/6/11  | TX    |
|                                | 802.11n HT40 | 150 Mbps  | 3/6/9   | TX    |
| Frequency Range                | 802.11b      | 11 Mbps   | 1/11    | TX    |
|                                | 802.11g      | 54 Mbps   | 1/11    | TX    |
|                                | 802.11n HT20 | 108 Mbps  | 1/11    | TX    |
|                                | 802.11n HT40 | 150 Mbps  | 3/9     | TX    |
| Transmitter Spurious Emissions | 802.11b      | 11 Mbps   | 1/6/11  | TX    |
|                                | 802.11g      | 54 Mbps   | 1/6/11  | TX    |
|                                | 802.11n HT20 | 108 Mbps  | 1/6/11  | TX    |
|                                | 802.11n HT40 | 150 Mbps  | 3/6/9   | TX    |

**Note** :Parameters set by test software during channel & power tests, the software provided by the customer was used to set the operating channels as well as the output power level. The RF output power set is the power expected by the manufacturer and is going to be fixed on the firmware of the final product.

### 3 Equipment Used during Test

#### 3.1 Equipments List

| Conducted Emissions Test Site                    |                            |                       |             |                 |                       |                      |
|--------------------------------------------------|----------------------------|-----------------------|-------------|-----------------|-----------------------|----------------------|
| Item                                             | Equipment                  | Manufacturer          | Model No.   | Serial No.      | Last Calibration Date | Calibration Due Date |
| 1                                                | EMI Test Receiver          | R&S                   | ESCI        | 101155          | 2019-09-15            | 2020-09-14           |
| 2                                                | LISN                       | SCHWARZBECK           | NSLK 8128   | 8128-259        | 2019-09-15            | 2020-09-14           |
| 3                                                | Limiter                    | CYBERTEK              | EM5010      | 261115-001-0024 | 2019-09-15            | 2020-09-14           |
| 4                                                | Cable                      | Laplace               | RF300       | -               | 2019-07-18            | 2020-07-17           |
| 3m Semi-anechoic Chamber for Radiation Emissions |                            |                       |             |                 |                       |                      |
| Item                                             | Equipment                  | Manufacturer          | Model No.   | Serial No.      | Last Calibration Date | Calibration Due Date |
| 1                                                | Spectrum Analyzer          | R&S                   | FSP30       | 100091          | 2019-04-19            | 2020-04-18           |
| 2                                                | Amplifier                  | Agilent               | 8447D       | 2944A10178      | 2019-04-19            | 2020-04-18           |
| 4                                                | Trilog Broadband Antenna   | SCHWARZBECK           | VULB9163    | 336             | 2019-04-28            | 2020-04-27           |
| 5                                                | Coaxial Cable (below 1GHz) | Top                   | TYPE16(13M) | -               | 2018-10-15            | 2019-10-14           |
| 6                                                | Broad-band Horn Antenna    | SCHWARZBECK           | BBHA 9120 D | 667             | 2019-04-19            | 2020-04-18           |
| 7                                                | Broad-band Horn Antenna    | SCHWARZBECK           | BBHA 9170   | 335             | 2018-10-25            | 2019-10-24           |
| 8                                                | Broadband Preamplifier     | COMPLIANCE DIRECTION  | PAP-1G18    | 2004            | 2019-04-19            | 2020-04-18           |
| 9                                                | Coaxial Cable (above 1GHz) | ZT26-NJ-NJ-8M/FA      | 1GHz-18GHz  | NA              | 2019-04-19            | 2020-04-18           |
| 10                                               | Broad-band Horn Antenna    | SCHWARZBECK           | BBV 9721    | 100472          | 2018-10-25            | 2019-10-24           |
| 11                                               | Spectrum Analyzer          | R&S                   | FSP40       | 100501          | 2018-11-13            | 2019-11-12           |
| 12                                               | Coaxial Cable              | ZT40-2.92J-2.92J-2.0M | 10MHz-40GHz | 17100919        | 2018-10-15            | 2019-10-14           |
| 1                                                | Spectrum Analyzer          | R&S                   | FSP30       | 100091          | 2019-04-19            | 2020-04-18           |
| 3m Semi-anechoic Chamber for Radiation Emissions |                            |                       |             |                 |                       |                      |
| Item                                             | Equipment                  | Manufacturer          | Model No.   | Serial No       | Last Calibration Date | Calibration Due Date |
| 1                                                | Test Receiver              | R&S                   | ESCI        | 101296          | 2019-04-20            | 2020-04-19           |
| 2                                                | Trilog Broadband Antenna   | SCHWARZBECK           | VULB9160    | 9160-3325       | 2019-05-24            | 2020-05-23           |
| 3                                                | Active Loop Antenna        | Com-Power Corp.       | AL-130R     | 10160007        | 2019-04-28            | 2020-04-27           |
| 4                                                | Amplifier                  | ANRITSU               | MH648A      | M43381          | 2019-04-19            | 2020-04-18           |
| 5                                                | Cable                      | HUBER+SUHNER          | CBL2        | 525178          | 2019-04-20            | 2020-04-19           |
| RF Conducted Testing                             |                            |                       |             |                 |                       |                      |

| Item | Equipment          | Manufacturer | Model No.     | Serial No. | Last Calibration Date | Calibration Due Date |
|------|--------------------|--------------|---------------|------------|-----------------------|----------------------|
| 1.   | Spectrum Analyzer  | R&S          | FSP30         | 100091     | 2019-04-19            | 2020-04-18           |
| 2.   | Coaxial Cable      | Top          | 10Hz-30GHz    | -          | 2019-09-12            | 2020-09-11           |
| 3    | Antenna Connector* | Realacc      | 45RSm         | -          | 2019-09-12            | 2020-09-11           |
| 4    | DC Block           | Gwave        | GDCB-3G-N-SMA | 140307001  | 2019-09-12            | 2020-09-11           |

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

### 3.2 Measurement Uncertainty

| Parameter                         | Uncertainty                           |
|-----------------------------------|---------------------------------------|
| Radio Frequency                   | $\pm 1 \times 10^{-6}$                |
| RF Power                          | $\pm 1.0$ dB                          |
| RF Power Density                  | $\pm 2.2$ dB                          |
| Radiated Spurious Emissions test  | $\pm 5.03$ dB (30M~1000MHz)           |
|                                   | $\pm 5.47$ dB (1000M~25000MHz)        |
| Conducted Spurious Emissions test | $\pm 3.64$ dB (AC mains 150KHz~30MHz) |

### 3.3 Test Equipment Calibration

All the test equipments used are valid and calibrated by GUANG ZHOU GRG METROLOGY & TEST CO., LTD. address is No.163, Pingyun Rd. West of Huangpu Ave, Tianhe District, Guangzhou, Guangdong, China.

## 4 Test Summary

| Test Items                                                                | Test Requirement                 | Result |
|---------------------------------------------------------------------------|----------------------------------|--------|
| Spurious Radiated Emissions                                               | 15.247<br>15.205(a)<br>15.209(a) | C      |
| Conducted Emissions                                                       | 15.207(a)                        | C      |
| Conducted Spurious Emissions                                              | 15.247                           | C      |
| Bandwidth                                                                 | 15.247(a)(2)                     | C      |
| Maximum Peak Output Power                                                 | 15.247(b)(3),(4)                 | C      |
| Power Spectral Density                                                    | 15.247(e)                        | C      |
| Band Edge                                                                 | 15.247(d)                        | C      |
| Antenna Requirement                                                       | 15.203                           | C      |
| Maximum Permissible Exposure<br>(Exposure of Humans to RF Fields)         | 1.1307(b)(1)                     | C      |
| Note: C=Compliance; NC=Not Compliance; NT=Not Tested; N/A=Not Applicable. |                                  |        |

## 5 Conducted Emission

|                   |                                                                                                                        |
|-------------------|------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC CFR 47 Part 15 Section 15.207                                                                                      |
| Test Method:      | ANSI C63.10:2013                                                                                                       |
| Test Result:      | PASS                                                                                                                   |
| Frequency Range:  | 150kHz to 30MHz                                                                                                        |
| Class/Severity:   | Class B                                                                                                                |
| Limit:            | 66-56 dB $\mu$ V between 0.15MHz & 0.5MHz<br>56 dB $\mu$ V between 0.5MHz & 5MHz<br>60 dB $\mu$ V between 5MHz & 30MHz |
| Detector:         | Peak for pre-scan (9kHz Resolution Bandwidth)                                                                          |

### 5.1 E.U.T. Operation

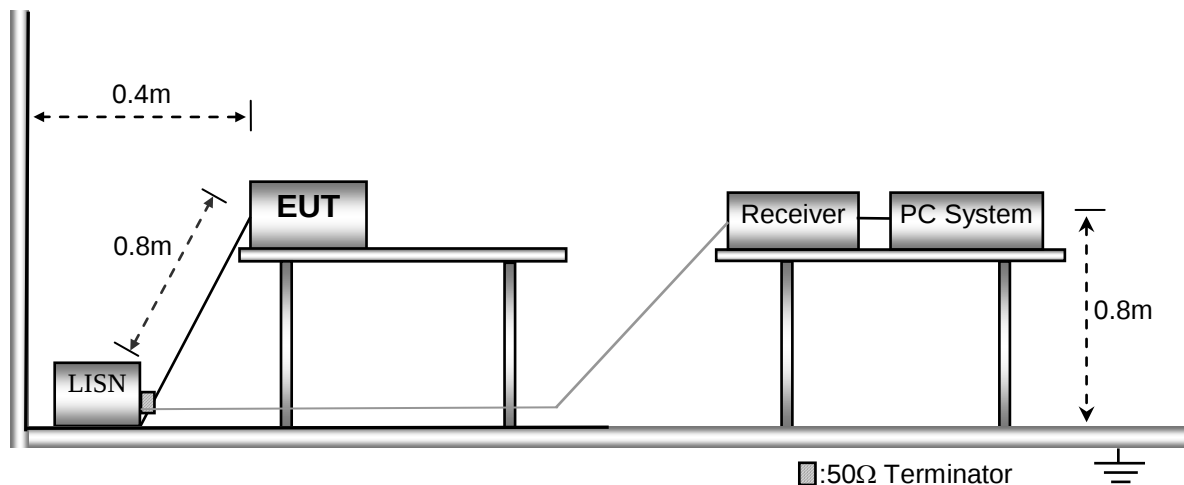
Operating Environment :

|                       |                   |
|-----------------------|-------------------|
| Temperature:          | 21.5 °C           |
| Humidity:             | 51.9 % RH         |
| Atmospheric Pressure: | 101.2kPa          |
| EUT Operation:        | Transmitting mode |

The test was performed in Transmitting mode, Only the worst case 802.11b mode were record in the report.

### 5.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.10.



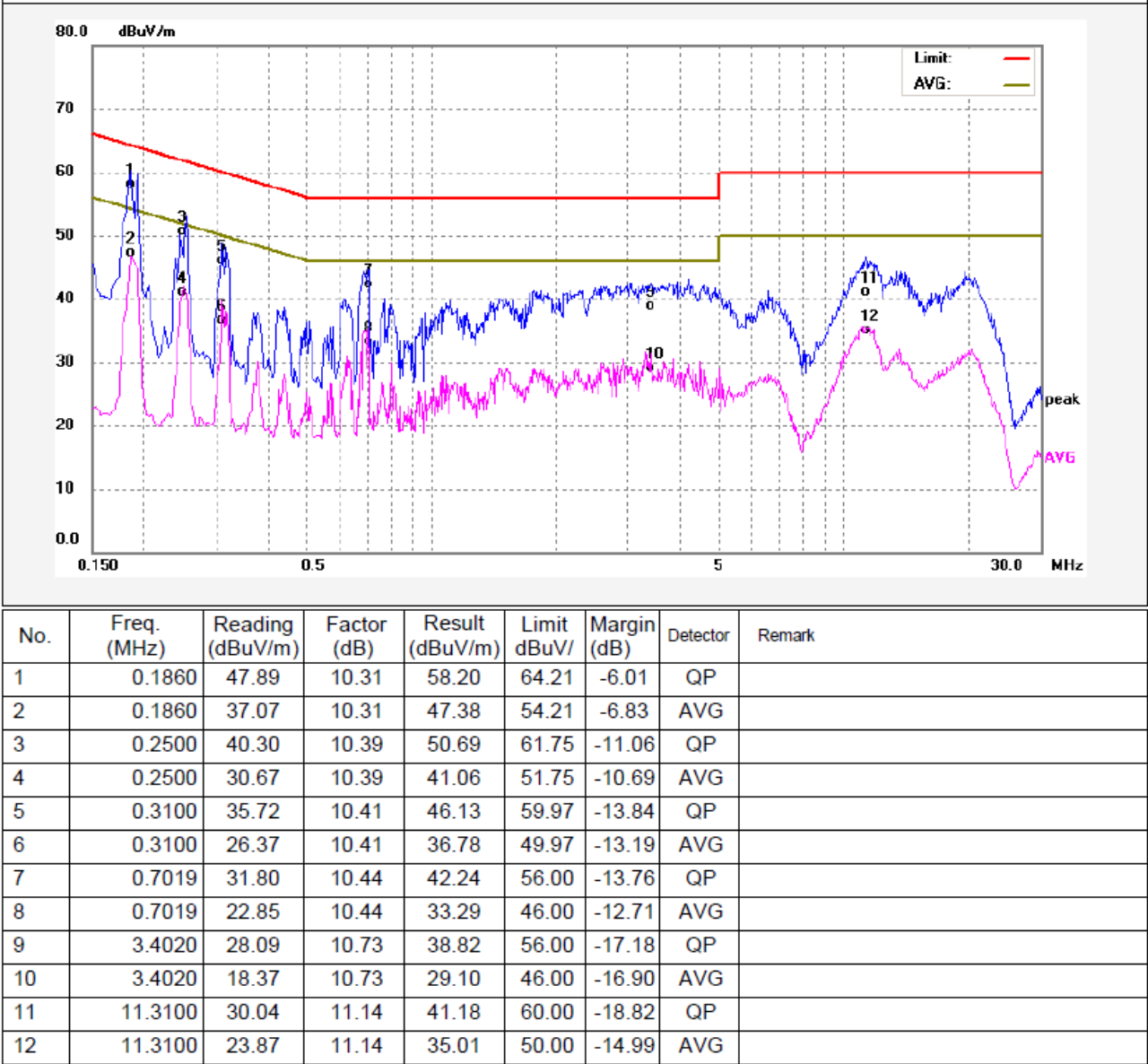
### 5.3 Measurement Description

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

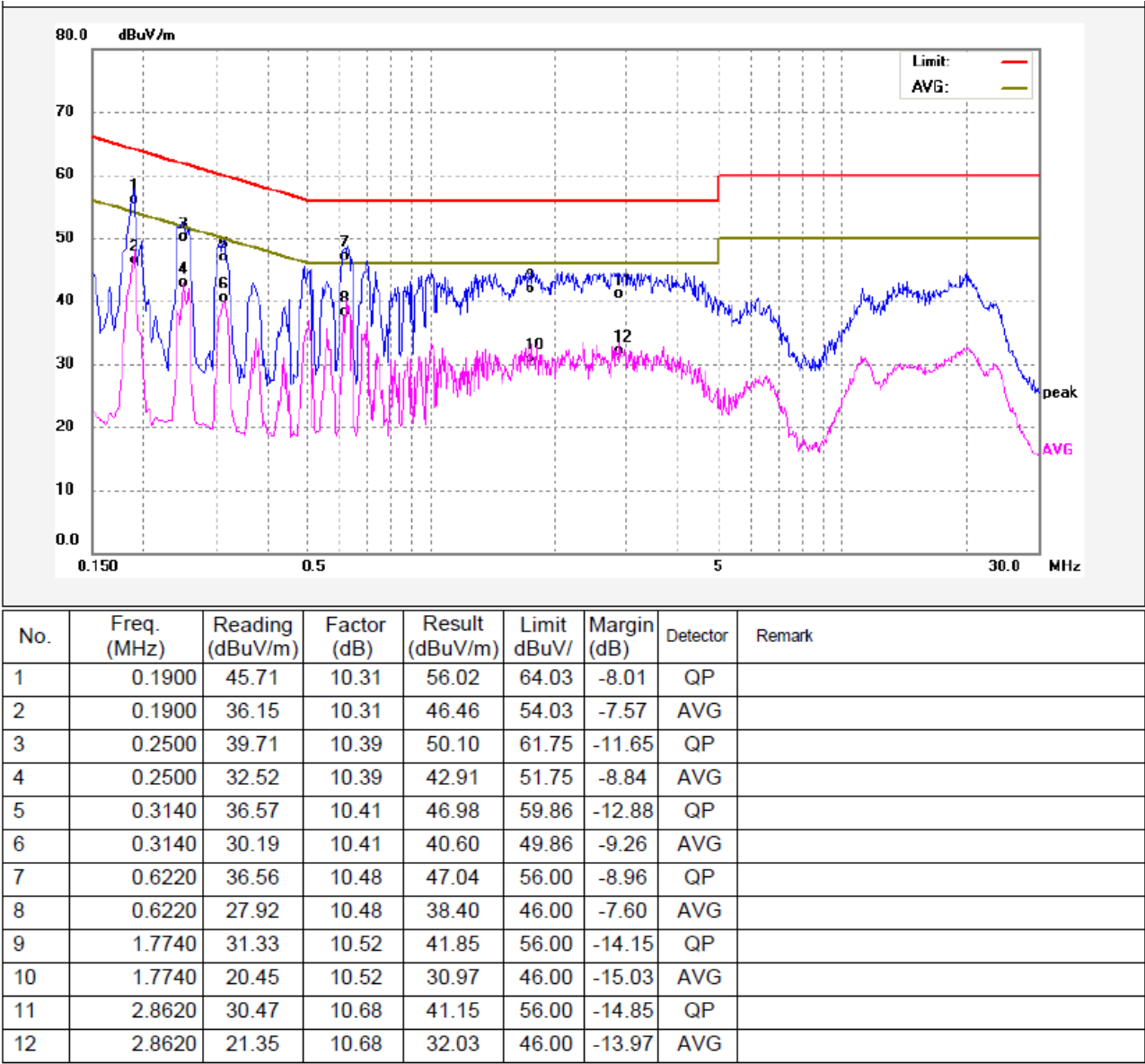
5.4 Conducted Emission Test Result

An initial pre-scan was performed on the live and neutral lines.

Live line:



Neutral line:



## 6 Radiated Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.209 & 15.247

Test Method: ANSI C63.10:2013

Test Result: PASS

Measurement Distance: 3m

Limit:

| Frequency<br>(MHz) | Field Strength        |                 | Field Strength Limit at 3m Measurement Dist |                                       |
|--------------------|-----------------------|-----------------|---------------------------------------------|---------------------------------------|
|                    | uV/m                  | Distance<br>(m) | uV/m                                        | dBuV/m                                |
| 0.009 ~ 0.490      | $2400/F(\text{kHz})$  | 300             | $10000 * 2400/F(\text{kHz})$                | $20\log^{(2400/F(\text{kHz}))} + 80$  |
| 0.490 ~ 1.705      | $24000/F(\text{kHz})$ | 30              | $100 * 24000/F(\text{kHz})$                 | $20\log^{(24000/F(\text{kHz}))} + 40$ |
| 1.705 ~ 30         | 30                    | 30              | $100 * 30$                                  | $20\log^{(30)} + 40$                  |
| 30 ~ 88            | 100                   | 3               | 100                                         | $20\log^{(100)}$                      |
| 88 ~ 216           | 150                   | 3               | 150                                         | $20\log^{(150)}$                      |
| 216 ~ 960          | 200                   | 3               | 200                                         | $20\log^{(200)}$                      |
| Above 960          | 500                   | 3               | 500                                         | $20\log^{(500)}$                      |

### 6.1 EUT Operation

Operating Environment :

Temperature: 23.5 °C

Humidity: 52.1 % RH

Atmospheric Pressure: 101.2kPa

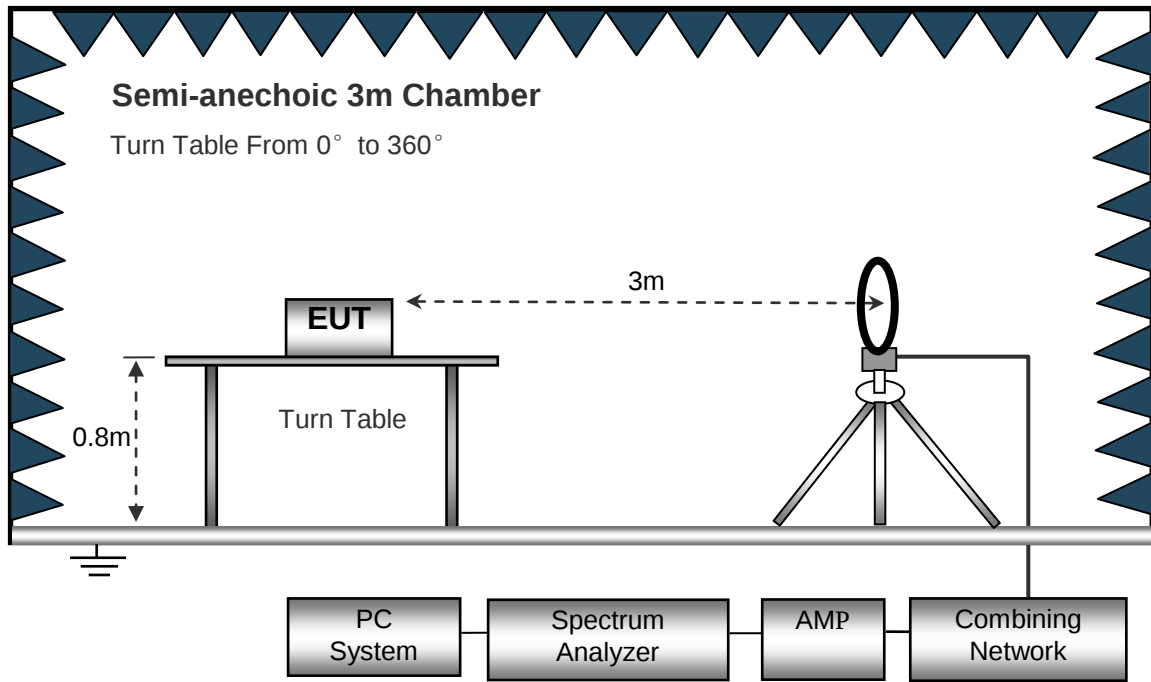
EUT Operation: Transmitting mode

The test was performed in transmitting mode, the test data were shown in the report.

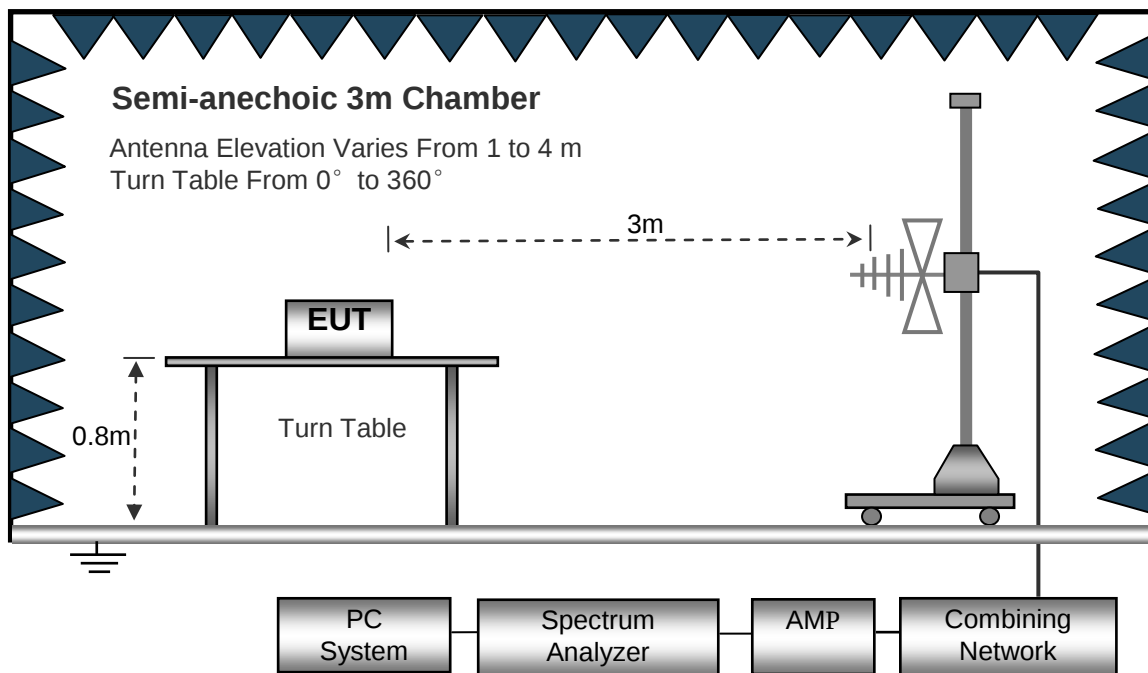
## 6.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.10.

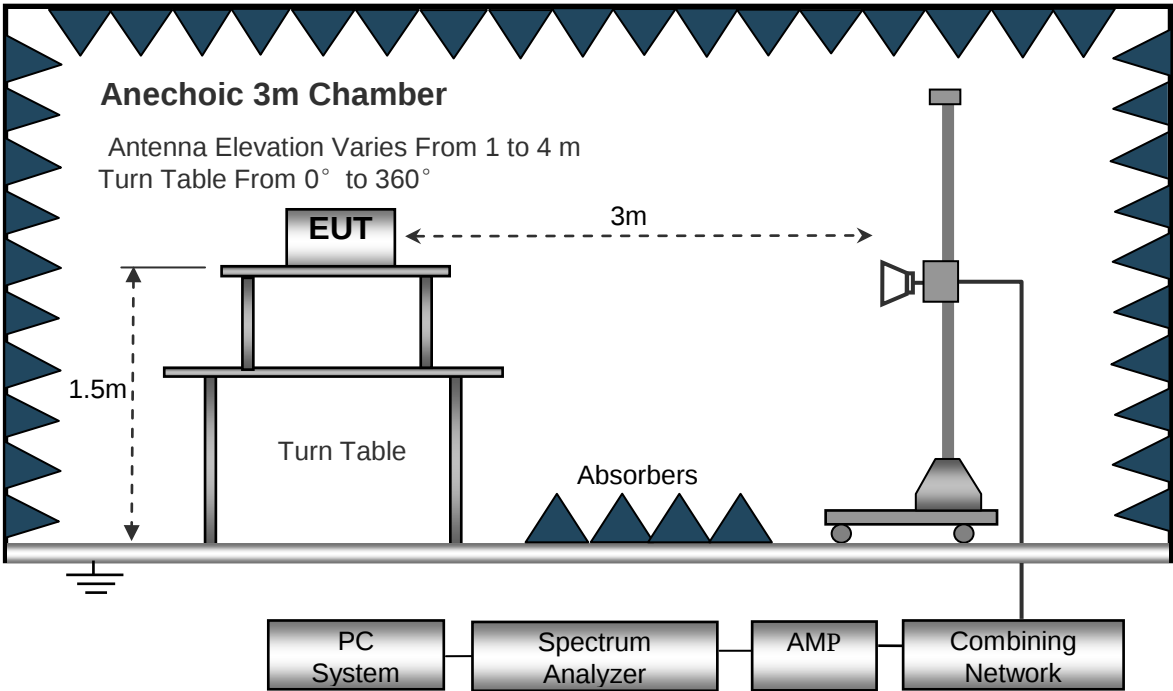
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.



6.3 Spectrum Analyzer Setup

Below 30MHz

- Sweep Speed .....Auto
- IF Bandwidth .....10kHz
- Video Bandwidth .....10kHz
- Resolution Bandwidth .....10kHz

30MHz ~ 1GHz

- Sweep Speed .....Auto
- Detector .....PK
- Resolution Bandwidth .....100kHz
- Video Bandwidth .....300kHz

Above 1GHz

- Sweep Speed .....Auto
- Detector .....PK
- Resolution Bandwidth .....1MHz
- Video Bandwidth .....3MHz
- Detector .....Ave.
- Resolution Bandwidth .....1MHz
- Video Bandwidth .....10Hz

## 6.4 Test Procedure

1. The EUT is placed on a turntable. For below 1GHz, the EUT is 0.8m above ground plane;  
For above 1GHz, the EUT is 1.5m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The radiation measurements are performed in X,Y and Z axis positioning(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand),the worst condition was tested putting the eut in X axis,so the worst data were shown as follow.
8. A 2.4GHz high –pass filter is used during radiated emissions above 1GHz measurement.

## 6.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Limit}$$

## 6.6 Summary of Test Results

### Test Frequency: 9kHz ~ 30MHz

The measurements were more than 20 dB below the limit and not reported.

### Test Frequency : 30MHz ~ 18GHz

| Frequency                    | Receiver Reading | Detector    | Turn table Angle | RX Antenna |       | Corrected Factor | Corrected Amplitude | FCC Part 15.247/209/205 |        |
|------------------------------|------------------|-------------|------------------|------------|-------|------------------|---------------------|-------------------------|--------|
|                              |                  |             |                  | Height     | Polar |                  |                     | Limit                   | Margin |
| (MHz)                        | (dBμV)           | (PK/QP/Ave) | Degree           | (m)        | (H/V) | (dB)             | (dBμV/m)            | (dBμV/m)                | (dB)   |
| 802.11b: Low Channel 2412MHz |                  |             |                  |            |       |                  |                     |                         |        |
| 191.75                       | 59.28            | QP          | 323              | 1.3        | H     | -18.78           | 40.50               | 43.50                   | -3.00  |
| 191.75                       | 46.51            | QP          | 26               | 1.3        | V     | -18.78           | 27.73               | 43.50                   | -15.77 |
| 4824.00                      | 55.30            | PK          | 200              | 1.3        | V     | -1.06            | 54.24               | 74.00                   | -19.76 |
| 4824.00                      | 40.50            | Ave         | 200              | 1.3        | V     | -1.06            | 39.44               | 54.00                   | -14.56 |
| 7236.00                      | 47.59            | PK          | 86               | 1.5        | H     | 1.33             | 48.92               | 74.00                   | -25.08 |
| 7236.00                      | 39.65            | Ave         | 86               | 1.5        | H     | 1.33             | 40.98               | 54.00                   | -13.02 |
| 2329.95                      | 46.84            | PK          | 268              | 1.1        | V     | -13.19           | 33.65               | 74.00                   | -40.35 |
| 2329.95                      | 39.84            | Ave         | 268              | 1.1        | V     | -13.19           | 26.65               | 54.00                   | -27.35 |
| 2389.71                      | 42.98            | PK          | 74               | 1.3        | H     | -13.14           | 29.84               | 74.00                   | -44.16 |
| 2389.71                      | 36.74            | Ave         | 74               | 1.3        | H     | -13.14           | 23.60               | 54.00                   | -30.40 |
| 2498.43                      | 43.25            | PK          | 277              | 1.7        | V     | -13.08           | 30.17               | 74.00                   | -43.83 |
| 2498.43                      | 36.65            | Ave         | 277              | 1.7        | V     | -13.08           | 23.57               | 54.00                   | -30.43 |

| Frequency                       | Receiver Reading | Detector    | Turn table Angle | RX Antenna |       | Corrected Factor | Corrected Amplitude | FCC Part 15.247/209/205 |        |
|---------------------------------|------------------|-------------|------------------|------------|-------|------------------|---------------------|-------------------------|--------|
|                                 |                  |             |                  | Height     | Polar |                  |                     | Limit                   | Margin |
| (MHz)                           | (dBμV)           | (PK/QP/Ave) | Degree           | (m)        | (H/V) | (dB)             | (dBμV/m)            | (dBμV/m)                | (dB)   |
| 802.11b: Middle Channel 2437MHz |                  |             |                  |            |       |                  |                     |                         |        |
| 191.75                          | 57.81            | QP          | 346              | 1.9        | H     | -18.78           | 39.03               | 43.50                   | -4.47  |
| 191.75                          | 45.35            | QP          | 254              | 1.8        | V     | -18.78           | 26.57               | 43.50                   | -16.93 |
| 4874.00                         | 56.24            | PK          | 144              | 1.0        | V     | -0.62            | 55.62               | 74.00                   | -18.38 |
| 4874.00                         | 41.46            | Ave         | 144              | 1.0        | V     | -0.62            | 40.84               | 54.00                   | -13.16 |
| 7311.00                         | 48.11            | PK          | 236              | 1.3        | H     | 2.21             | 50.32               | 74.00                   | -23.68 |
| 7311.00                         | 40.76            | Ave         | 236              | 1.3        | H     | 2.21             | 42.97               | 54.00                   | -11.03 |
| 2320.56                         | 45.95            | PK          | 197              | 2.0        | V     | -13.19           | 32.76               | 74.00                   | -41.24 |
| 2320.56                         | 37.74            | Ave         | 197              | 2.0        | V     | -13.19           | 24.55               | 54.00                   | -29.45 |
| 2352.17                         | 44.64            | PK          | 357              | 1.6        | H     | -13.14           | 31.50               | 74.00                   | -42.50 |
| 2352.17                         | 36.47            | Ave         | 357              | 1.6        | H     | -13.14           | 23.33               | 54.00                   | -30.67 |
| 2494.73                         | 44.33            | PK          | 98               | 1.7        | V     | -13.08           | 31.25               | 74.00                   | -42.75 |
| 2494.73                         | 36.96            | Ave         | 98               | 1.7        | V     | -13.08           | 23.88               | 54.00                   | -30.12 |

| Frequency                     | Receiver Reading | Detector    | Turn table Angle | RX Antenna |       | Corrected Factor | Corrected Amplitude | FCC Part 15.247/209/205 |        |
|-------------------------------|------------------|-------------|------------------|------------|-------|------------------|---------------------|-------------------------|--------|
|                               |                  |             |                  | Height     | Polar |                  |                     | Limit                   | Margin |
| (MHz)                         | (dBμV)           | (PK/QP/Ave) | Degree           | (m)        | (H/V) | (dB)             | (dBμV/m)            | (dBμV/m)                | (dB)   |
| 802.11b: High Channel 2462MHz |                  |             |                  |            |       |                  |                     |                         |        |
| 191.75                        | 59.10            | QP          | 1                | 1.2        | H     | -18.78           | 40.32               | 43.50                   | -3.18  |
| 191.75                        | 48.06            | QP          | 75               | 1.1        | V     | -18.78           | 29.28               | 43.50                   | -14.22 |
| 4924.00                       | 54.80            | PK          | 79               | 1.6        | V     | -0.24            | 54.56               | 74.00                   | -19.44 |
| 4924.00                       | 40.30            | Ave         | 79               | 1.6        | V     | -0.24            | 40.06               | 54.00                   | -13.94 |
| 7386.00                       | 48.21            | PK          | 6                | 1.3        | H     | 2.84             | 51.05               | 74.00                   | -22.95 |
| 7386.00                       | 38.77            | Ave         | 6                | 1.3        | H     | 2.84             | 41.61               | 54.00                   | -12.39 |
| 2327.43                       | 45.94            | PK          | 33               | 1.8        | V     | -13.19           | 32.75               | 74.00                   | -41.25 |
| 2327.43                       | 39.43            | Ave         | 33               | 1.8        | V     | -13.19           | 26.24               | 54.00                   | -27.76 |
| 2363.16                       | 43.56            | PK          | 163              | 1.8        | H     | -13.14           | 30.42               | 74.00                   | -43.58 |
| 2363.16                       | 37.38            | Ave         | 163              | 1.8        | H     | -13.14           | 24.24               | 54.00                   | -29.76 |
| 2496.54                       | 43.15            | PK          | 39               | 1.2        | V     | -13.08           | 30.07               | 74.00                   | -43.93 |
| 2496.54                       | 38.76            | Ave         | 39               | 1.2        | V     | -13.08           | 25.68               | 54.00                   | -28.32 |

| Frequency                    | Receiver Reading | Detector    | Turn table Angle | RX Antenna |       | Corrected Factor | Corrected Amplitude | FCC Part 15.247/209/205 |        |
|------------------------------|------------------|-------------|------------------|------------|-------|------------------|---------------------|-------------------------|--------|
|                              |                  |             |                  | Height     | Polar |                  |                     | Limit                   | Margin |
| (MHz)                        | (dBμV)           | (PK/QP/Ave) | Degree           | (m)        | (H/V) | (dB)             | (dBμV/m)            | (dBμV/m)                | (dB)   |
| 802.11g: Low Channel 2412MHz |                  |             |                  |            |       |                  |                     |                         |        |
| 191.75                       | 59.18            | QP          | 201              | 1.7        | H     | -18.78           | 40.40               | 43.50                   | -3.10  |
| 191.75                       | 45.31            | QP          | 268              | 1.9        | V     | -18.78           | 26.53               | 43.50                   | -16.97 |
| 4824.00                      | 53.27            | PK          | 251              | 1.6        | V     | -1.06            | 52.21               | 74.00                   | -21.79 |
| 4824.00                      | 41.98            | Ave         | 251              | 1.6        | V     | -1.06            | 40.92               | 54.00                   | -13.08 |
| 7236.00                      | 47.60            | PK          | 246              | 1.2        | H     | 1.33             | 48.93               | 74.00                   | -25.07 |
| 7236.00                      | 38.63            | Ave         | 246              | 1.2        | H     | 1.33             | 39.96               | 54.00                   | -14.04 |
| 2347.91                      | 45.58            | PK          | 280              | 1.8        | V     | -13.19           | 32.39               | 74.00                   | -41.61 |
| 2347.91                      | 37.57            | Ave         | 280              | 1.8        | V     | -13.19           | 24.38               | 54.00                   | -29.62 |
| 2370.63                      | 42.63            | PK          | 90               | 1.9        | H     | -13.14           | 29.49               | 74.00                   | -44.51 |
| 2370.63                      | 36.10            | Ave         | 90               | 1.9        | H     | -13.14           | 22.96               | 54.00                   | -31.04 |
| 2486.52                      | 42.33            | PK          | 355              | 1.3        | V     | -13.08           | 29.25               | 74.00                   | -44.75 |
| 2486.52                      | 38.00            | Ave         | 355              | 1.3        | V     | -13.08           | 24.92               | 54.00                   | -29.08 |

| Frequency                       | Receiver Reading | Detector    | Turn table Angle | RX Antenna |       | Corrected Factor | Corrected Amplitude | FCC Part 15.247/209/205 |        |
|---------------------------------|------------------|-------------|------------------|------------|-------|------------------|---------------------|-------------------------|--------|
|                                 |                  |             |                  | Height     | Polar |                  |                     | Limit                   | Margin |
| (MHz)                           | (dBμV)           | (PK/QP/Ave) | Degree           | (m)        | (H/V) | (dB)             | (dBμV/m)            | (dBμV/m)                | (dB)   |
| 802.11g: Middle Channel 2437MHz |                  |             |                  |            |       |                  |                     |                         |        |
| 191.75                          | 58.51            | QP          | 193              | 2.0        | H     | -18.78           | 39.73               | 43.50                   | -3.77  |
| 191.75                          | 44.67            | QP          | 38               | 1.5        | V     | -18.78           | 25.89               | 43.50                   | -17.61 |
| 4874.00                         | 57.40            | PK          | 92               | 1.7        | V     | -0.62            | 56.78               | 74.00                   | -17.22 |
| 4874.00                         | 39.44            | Ave         | 92               | 1.7        | V     | -0.62            | 38.82               | 54.00                   | -15.18 |
| 7311.00                         | 46.95            | PK          | 54               | 1.1        | H     | 2.21             | 49.16               | 74.00                   | -24.84 |
| 7311.00                         | 38.33            | Ave         | 54               | 1.1        | H     | 2.21             | 40.54               | 54.00                   | -13.46 |
| 2321.91                         | 45.84            | PK          | 99               | 1.9        | V     | -13.19           | 32.65               | 74.00                   | -41.35 |
| 2321.91                         | 38.33            | Ave         | 99               | 1.9        | V     | -13.19           | 25.14               | 54.00                   | -28.86 |
| 2387.96                         | 43.62            | PK          | 271              | 1.5        | H     | -13.14           | 30.48               | 74.00                   | -43.52 |
| 2387.96                         | 37.90            | Ave         | 271              | 1.5        | H     | -13.14           | 24.76               | 54.00                   | -29.24 |
| 2491.72                         | 43.16            | PK          | 153              | 1.0        | V     | -13.08           | 30.08               | 74.00                   | -43.92 |
| 2491.72                         | 37.60            | Ave         | 153              | 1.0        | V     | -13.08           | 24.52               | 54.00                   | -29.48 |

| Frequency                     | Receiver Reading | Detector    | Turn table Angle | RX Antenna |       | Corrected Factor | Corrected Amplitude | FCC Part 15.247/209/205 |        |
|-------------------------------|------------------|-------------|------------------|------------|-------|------------------|---------------------|-------------------------|--------|
|                               |                  |             |                  | Height     | Polar |                  |                     | Limit                   | Margin |
| (MHz)                         | (dBμV)           | (PK/QP/Ave) | Degree           | (m)        | (H/V) | (dB)             | (dBμV/m)            | (dBμV/m)                | (dB)   |
| 802.11g: High Channel 2462MHz |                  |             |                  |            |       |                  |                     |                         |        |
| 191.75                        | 58.68            | QP          | 209              | 1.9        | H     | -18.78           | 39.90               | 43.50                   | -3.60  |
| 191.75                        | 46.47            | QP          | 335              | 1.3        | V     | -18.78           | 27.69               | 43.50                   | -15.81 |
| 4924.00                       | 54.56            | PK          | 156              | 2.0        | V     | -0.24            | 54.32               | 74.00                   | -19.68 |
| 4924.00                       | 42.25            | Ave         | 156              | 2.0        | V     | -0.24            | 42.01               | 54.00                   | -11.99 |
| 7386.00                       | 46.28            | PK          | 36               | 1.7        | H     | 2.84             | 49.12               | 74.00                   | -24.88 |
| 7386.00                       | 39.07            | Ave         | 36               | 1.7        | H     | 2.84             | 41.91               | 54.00                   | -12.09 |
| 2347.42                       | 45.28            | PK          | 37               | 1.6        | V     | -13.19           | 32.09               | 74.00                   | -41.91 |
| 2347.42                       | 38.20            | Ave         | 37               | 1.6        | V     | -13.19           | 25.01               | 54.00                   | -28.99 |
| 2387.29                       | 44.82            | PK          | 240              | 1.5        | H     | -13.14           | 31.68               | 74.00                   | -42.32 |
| 2387.29                       | 38.89            | Ave         | 240              | 1.5        | H     | -13.14           | 25.75               | 54.00                   | -28.25 |
| 2484.77                       | 44.11            | PK          | 76               | 1.4        | V     | -13.08           | 31.03               | 74.00                   | -42.97 |
| 2484.77                       | 36.98            | Ave         | 76               | 1.4        | V     | -13.08           | 23.90               | 54.00                   | -30.10 |

| Frequency                         | Receiver Reading | Detector    | Turn table Angle | RX Antenna |       | Corrected Factor | Corrected Amplitude | FCC Part 15.247/209/205 |        |
|-----------------------------------|------------------|-------------|------------------|------------|-------|------------------|---------------------|-------------------------|--------|
|                                   |                  |             |                  | Height     | Polar |                  |                     | Limit                   | Margin |
| (MHz)                             | (dBμV)           | (PK/QP/Ave) | Degree           | (m)        | (H/V) | (dB)             | (dBμV/m)            | (dBμV/m)                | (dB)   |
| 802.11n HT20: Low Channel 2412MHz |                  |             |                  |            |       |                  |                     |                         |        |
| 191.75                            | 58.17            | QP          | 246              | 1.0        | H     | -18.78           | 39.39               | 43.50                   | -4.11  |
| 191.75                            | 47.55            | QP          | 165              | 1.5        | V     | -18.78           | 28.77               | 43.50                   | -14.73 |
| 4824.00                           | 54.81            | PK          | 170              | 1.7        | V     | -1.06            | 53.75               | 74.00                   | -20.25 |
| 4824.00                           | 38.69            | Ave         | 170              | 1.7        | V     | -1.06            | 37.63               | 54.00                   | -16.37 |
| 7236.00                           | 47.38            | PK          | 353              | 1.4        | H     | 1.33             | 48.71               | 74.00                   | -25.29 |
| 7236.00                           | 39.90            | Ave         | 353              | 1.4        | H     | 1.33             | 41.23               | 54.00                   | -12.77 |
| 2343.52                           | 46.28            | PK          | 74               | 1.6        | V     | -13.19           | 33.09               | 74.00                   | -40.91 |
| 2343.52                           | 37.58            | Ave         | 74               | 1.6        | V     | -13.19           | 24.39               | 54.00                   | -29.61 |
| 2357.34                           | 43.15            | PK          | 289              | 1.6        | H     | -13.14           | 30.01               | 74.00                   | -43.99 |
| 2357.34                           | 37.79            | Ave         | 289              | 1.6        | H     | -13.14           | 24.65               | 54.00                   | -29.35 |
| 2493.32                           | 42.27            | PK          | 24               | 1.9        | V     | -13.08           | 29.19               | 74.00                   | -44.81 |
| 2493.32                           | 37.93            | Ave         | 24               | 1.9        | V     | -13.08           | 24.85               | 54.00                   | -29.15 |

| Frequency                            | Receiver Reading | Detector    | Turn table Angle | RX Antenna |       | Corrected Factor | Corrected Amplitude | FCC Part 15.247/209/205 |        |
|--------------------------------------|------------------|-------------|------------------|------------|-------|------------------|---------------------|-------------------------|--------|
|                                      |                  |             |                  | Height     | Polar |                  |                     | Limit                   | Margin |
| (MHz)                                | (dBμV)           | (PK/QP/Ave) | Degree           | (m)        | (H/V) | (dB)             | (dBμV/m)            | (dBμV/m)                | (dB)   |
| 802.11n HT20: Middle Channel 2437MHz |                  |             |                  |            |       |                  |                     |                         |        |
| 191.75                               | 56.54            | QP          | 343              | 1.4        | H     | -18.78           | 37.76               | 43.50                   | -5.74  |
| 191.75                               | 46.99            | QP          | 358              | 1.9        | V     | -18.78           | 28.21               | 43.50                   | -15.29 |
| 4874.00                              | 52.00            | PK          | 289              | 1.8        | V     | -0.62            | 51.38               | 74.00                   | -22.62 |
| 4874.00                              | 43.47            | Ave         | 289              | 1.8        | V     | -0.62            | 42.85               | 54.00                   | -11.15 |
| 7311.00                              | 48.05            | PK          | 292              | 1.7        | H     | 2.21             | 50.26               | 74.00                   | -23.74 |
| 7311.00                              | 42.77            | Ave         | 292              | 1.7        | H     | 2.21             | 44.98               | 54.00                   | -9.02  |
| 2329.73                              | 46.49            | PK          | 164              | 1.6        | V     | -13.19           | 33.30               | 74.00                   | -40.70 |
| 2329.73                              | 37.05            | Ave         | 164              | 1.6        | V     | -13.19           | 23.86               | 54.00                   | -30.14 |
| 2363.98                              | 42.47            | PK          | 117              | 1.2        | H     | -13.14           | 29.33               | 74.00                   | -44.67 |
| 2363.98                              | 38.04            | Ave         | 117              | 1.2        | H     | -13.14           | 24.90               | 54.00                   | -29.10 |
| 2489.89                              | 42.93            | PK          | 97               | 2.0        | V     | -13.08           | 29.85               | 74.00                   | -44.15 |
| 2489.89                              | 37.02            | Ave         | 97               | 2.0        | V     | -13.08           | 23.94               | 54.00                   | -30.06 |

| Frequency                          | Receiver Reading | Detector    | Turn table Angle | RX Antenna |       | Corrected Factor | Corrected Amplitude | FCC Part 15.247/209/205 |        |
|------------------------------------|------------------|-------------|------------------|------------|-------|------------------|---------------------|-------------------------|--------|
|                                    |                  |             |                  | Height     | Polar |                  |                     | Limit                   | Margin |
| (MHz)                              | (dBμV)           | (PK/QP/Ave) | Degree           | (m)        | (H/V) | (dB)             | (dBμV/m)            | (dBμV/m)                | (dB)   |
| 802.11n HT20: High Channel 2462MHz |                  |             |                  |            |       |                  |                     |                         |        |
| 191.75                             | 58.06            | QP          | 72               | 2.0        | H     | -18.78           | 39.28               | 43.50                   | -4.22  |
| 191.75                             | 51.69            | QP          | 82               | 1.2        | V     | -18.78           | 32.91               | 43.50                   | -10.59 |
| 4924.00                            | 58.03            | PK          | 175              | 1.4        | V     | -0.24            | 57.79               | 74.00                   | -16.21 |
| 4924.00                            | 40.97            | Ave         | 175              | 1.4        | V     | -0.24            | 40.73               | 54.00                   | -13.27 |
| 7386.00                            | 46.05            | PK          | 36               | 1.6        | H     | 2.84             | 48.89               | 74.00                   | -25.11 |
| 7386.00                            | 43.40            | Ave         | 36               | 1.6        | H     | 2.84             | 46.24               | 54.00                   | -7.76  |
| 2327.24                            | 46.92            | PK          | 131              | 1.6        | V     | -13.19           | 33.73               | 74.00                   | -40.27 |
| 2327.24                            | 37.85            | Ave         | 131              | 1.6        | V     | -13.19           | 24.66               | 54.00                   | -29.34 |
| 2359.56                            | 43.15            | PK          | 44               | 1.7        | H     | -13.14           | 30.01               | 74.00                   | -43.99 |
| 2359.56                            | 36.27            | Ave         | 44               | 1.7        | H     | -13.14           | 23.13               | 54.00                   | -30.87 |
| 2489.62                            | 42.38            | PK          | 202              | 2.0        | V     | -13.08           | 29.30               | 74.00                   | -44.70 |
| 2489.62                            | 38.87            | Ave         | 202              | 2.0        | V     | -13.08           | 25.79               | 54.00                   | -28.21 |

| Frequency                         | Receiver Reading | Detector    | Turn table Angle | RX Antenna |       | Corrected Factor | Corrected Amplitude | FCC Part 15.247/209/205 |        |
|-----------------------------------|------------------|-------------|------------------|------------|-------|------------------|---------------------|-------------------------|--------|
|                                   |                  |             |                  | Height     | Polar |                  |                     | Limit                   | Margin |
| (MHz)                             | (dBμV)           | (PK/QP/Ave) | Degree           | (m)        | (H/V) | (dB)             | (dBμV/m)            | (dBμV/m)                | (dB)   |
| 802.11n HT40: Low Channel 2422MHz |                  |             |                  |            |       |                  |                     |                         |        |
| 191.75                            | 55.97            | QP          | 158              | 1.2        | H     | -18.78           | 37.19               | 43.50                   | -6.31  |
| 191.75                            | 49.86            | QP          | 305              | 1.7        | V     | -18.78           | 31.08               | 43.50                   | -12.42 |
| 4844.00                           | 57.42            | PK          | 251              | 1.9        | V     | -1.06            | 56.36               | 74.00                   | -17.64 |
| 4844.00                           | 38.15            | Ave         | 251              | 1.9        | V     | -1.06            | 37.09               | 54.00                   | -16.91 |
| 7266.00                           | 44.67            | PK          | 205              | 1.3        | H     | 1.33             | 46.00               | 74.00                   | -28.00 |
| 7266.00                           | 34.67            | Ave         | 205              | 1.3        | H     | 1.33             | 36.00               | 54.00                   | -18.00 |
| 2345.95                           | 45.43            | PK          | 45               | 2.0        | V     | -13.19           | 32.24               | 74.00                   | -41.76 |
| 2345.95                           | 37.83            | Ave         | 45               | 2.0        | V     | -13.19           | 24.64               | 54.00                   | -29.36 |
| 2359.44                           | 44.67            | PK          | 220              | 1.1        | H     | -13.14           | 31.53               | 74.00                   | -42.47 |
| 2359.44                           | 38.40            | Ave         | 220              | 1.1        | H     | -13.14           | 25.26               | 54.00                   | -28.74 |
| 2485.21                           | 44.85            | PK          | 328              | 2.0        | V     | -13.08           | 31.77               | 74.00                   | -42.23 |
| 2485.21                           | 38.84            | Ave         | 328              | 2.0        | V     | -13.08           | 25.76               | 54.00                   | -28.24 |

| Frequency                            | Receiver Reading | Detector    | Turn table Angle | RX Antenna |       | Corrected Factor | Corrected Amplitude | FCC Part 15.247/209/205 |        |
|--------------------------------------|------------------|-------------|------------------|------------|-------|------------------|---------------------|-------------------------|--------|
|                                      |                  |             |                  | Height     | Polar |                  |                     | Limit                   | Margin |
| (MHz)                                | (dBμV)           | (PK/QP/Ave) | Degree           | (m)        | (H/V) | (dB)             | (dBμV/m)            | (dBμV/m)                | (dB)   |
| 802.11n HT40: Middle Channel 2437MHz |                  |             |                  |            |       |                  |                     |                         |        |
| 191.75                               | 58.86            | QP          | 180              | 1.8        | H     | -18.78           | 40.08               | 43.50                   | -3.42  |
| 191.75                               | 43.40            | QP          | 223              | 1.6        | V     | -18.78           | 24.62               | 43.50                   | -18.88 |
| 4874.00                              | 51.30            | PK          | 317              | 1.3        | V     | -0.62            | 50.68               | 74.00                   | -23.32 |
| 4874.00                              | 41.24            | Ave         | 317              | 1.3        | V     | -0.62            | 40.62               | 54.00                   | -13.38 |
| 7311.00                              | 46.33            | PK          | 225              | 1.9        | H     | 2.21             | 48.54               | 74.00                   | -25.46 |
| 7311.00                              | 38.89            | Ave         | 225              | 1.9        | H     | 2.21             | 41.10               | 54.00                   | -12.90 |
| 2346.32                              | 46.68            | PK          | 208              | 1.5        | V     | -13.19           | 33.49               | 74.00                   | -40.51 |
| 2346.32                              | 39.52            | Ave         | 208              | 1.5        | V     | -13.19           | 26.33               | 54.00                   | -27.67 |
| 2359.32                              | 43.04            | PK          | 86               | 1.5        | H     | -13.14           | 29.90               | 74.00                   | -44.10 |
| 2359.32                              | 36.13            | Ave         | 86               | 1.5        | H     | -13.14           | 22.99               | 54.00                   | -31.01 |
| 2499.47                              | 44.18            | PK          | 169              | 1.4        | V     | -13.08           | 31.10               | 74.00                   | -42.90 |
| 2499.47                              | 38.88            | Ave         | 169              | 1.4        | V     | -13.08           | 25.80               | 54.00                   | -28.20 |

| Frequency                          | Receiver Reading | Detector    | Turn table Angle | RX Antenna |       | Corrected Factor | Corrected Amplitude | FCC Part 15.247/209/205 |        |
|------------------------------------|------------------|-------------|------------------|------------|-------|------------------|---------------------|-------------------------|--------|
|                                    |                  |             |                  | Height     | Polar |                  |                     | Limit                   | Margin |
| (MHz)                              | (dBμV)           | (PK/QP/Ave) | Degree           | (m)        | (H/V) | (dB)             | (dBμV/m)            | (dBμV/m)                | (dB)   |
| 802.11n HT40: High Channel 2452MHz |                  |             |                  |            |       |                  |                     |                         |        |
| 191.75                             | 55.54            | QP          | 111              | 1.5        | H     | -18.78           | 36.76               | 43.50                   | -6.74  |
| 191.75                             | 44.76            | QP          | 211              | 2.0        | V     | -18.78           | 25.98               | 43.50                   | -17.52 |
| 4904.00                            | 55.09            | PK          | 56               | 1.3        | V     | -0.24            | 54.85               | 74.00                   | -19.15 |
| 4904.00                            | 36.72            | Ave         | 56               | 1.3        | V     | -0.24            | 36.48               | 54.00                   | -17.52 |
| 7356.00                            | 43.41            | PK          | 43               | 1.8        | H     | 2.84             | 46.25               | 74.00                   | -27.75 |
| 7356.00                            | 36.40            | Ave         | 43               | 1.8        | H     | 2.84             | 39.24               | 54.00                   | -14.76 |
| 2340.84                            | 46.75            | PK          | 305              | 1.9        | V     | -13.19           | 33.56               | 74.00                   | -40.44 |
| 2340.84                            | 37.29            | Ave         | 305              | 1.9        | V     | -13.19           | 24.10               | 54.00                   | -29.90 |
| 2385.65                            | 44.07            | PK          | 30               | 1.7        | H     | -13.14           | 30.93               | 74.00                   | -43.07 |
| 2385.65                            | 36.80            | Ave         | 30               | 1.7        | H     | -13.14           | 23.66               | 54.00                   | -30.34 |
| 2484.33                            | 42.35            | PK          | 212              | 1.8        | V     | -13.08           | 29.27               | 74.00                   | -44.73 |
| 2484.33                            | 38.73            | Ave         | 212              | 1.8        | V     | -13.08           | 25.65               | 54.00                   | -28.35 |

**Test Frequency: 18GHz~25GHz**

The measurements were more than 20 dB below the limit and not recorded.

## 7 Conducted Spurious Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.247  
Test Method: 558074 D01 15.247 Meas Guidance v05r02  
Test Result: PASS  
Limit:

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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

### 7.1 Test Procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;

2. Set the spectrum analyzer:

Below 30MHz:

RBW = 100kHz, VBW = 300kHz, Sweep = auto

Detector function = peak, Trace = max hold

Above 30MHz:

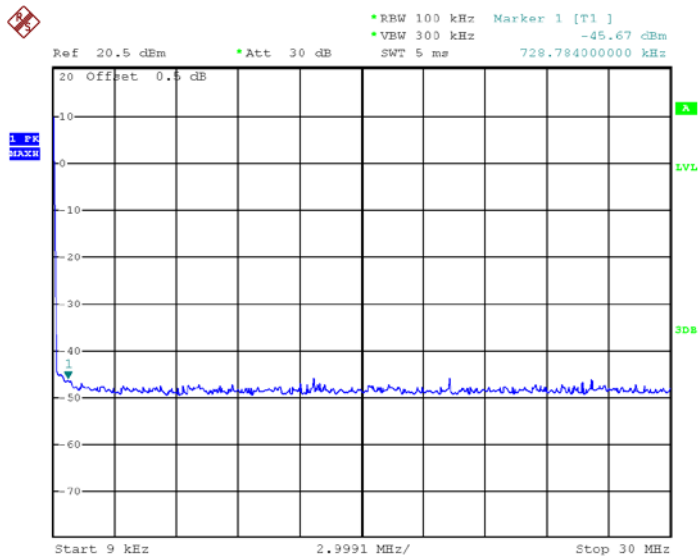
RBW = 1MHz, VBW = 3MHz, Sweep = auto

Detector function = peak, Trace = max hold

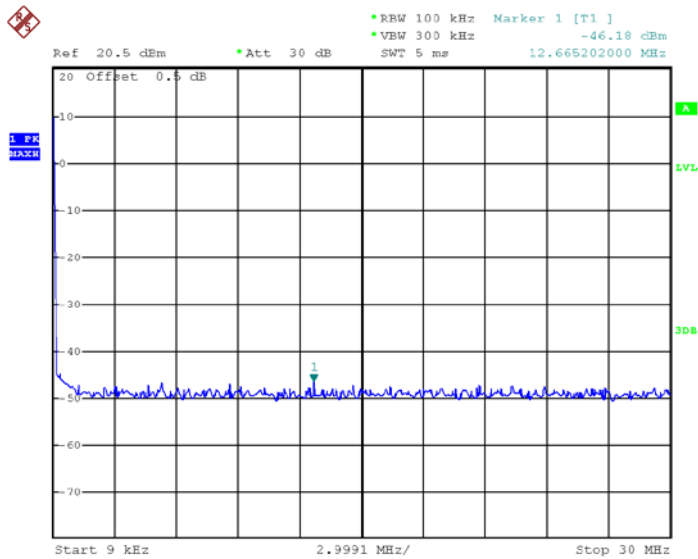
7.2 Test Result

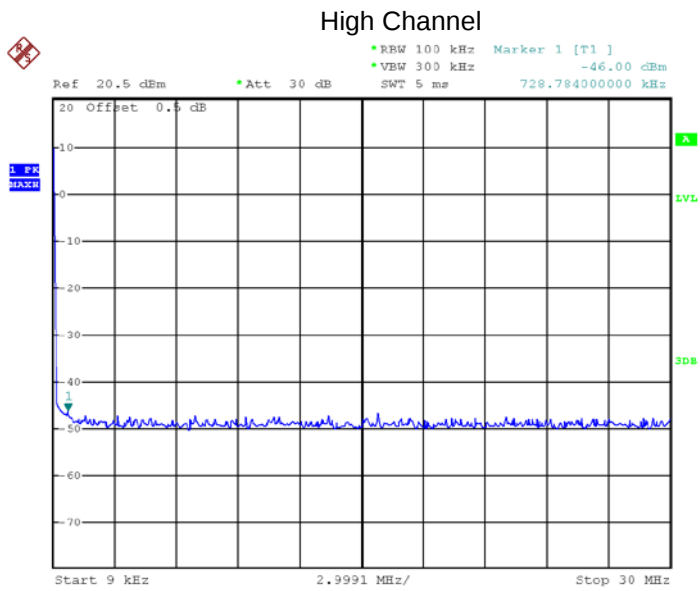
802.11b

Low Channel

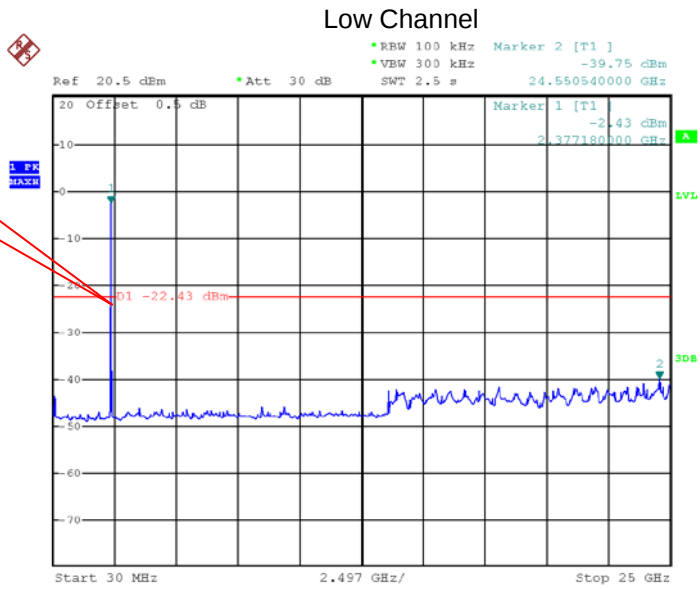


Middle Channel





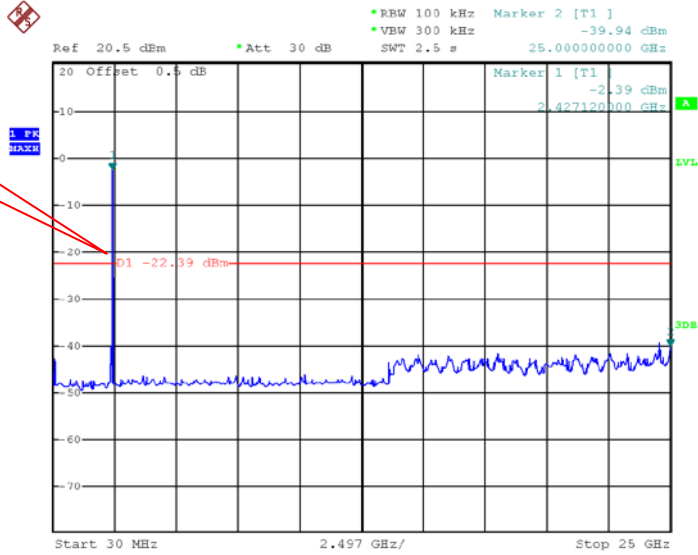
802.11b



Fundamental

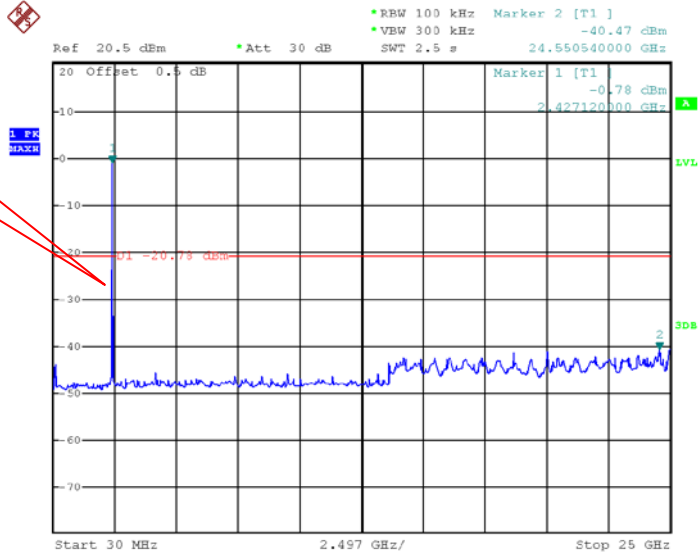
Middle Channel

Fundamental



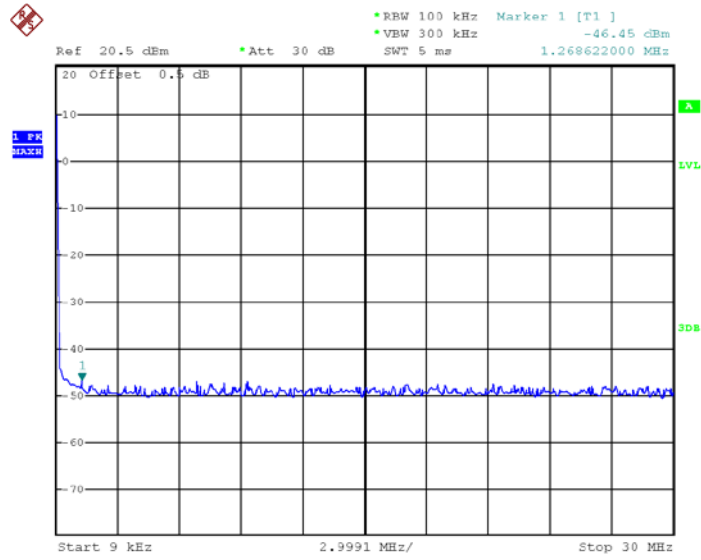
High Channel

Fundamental

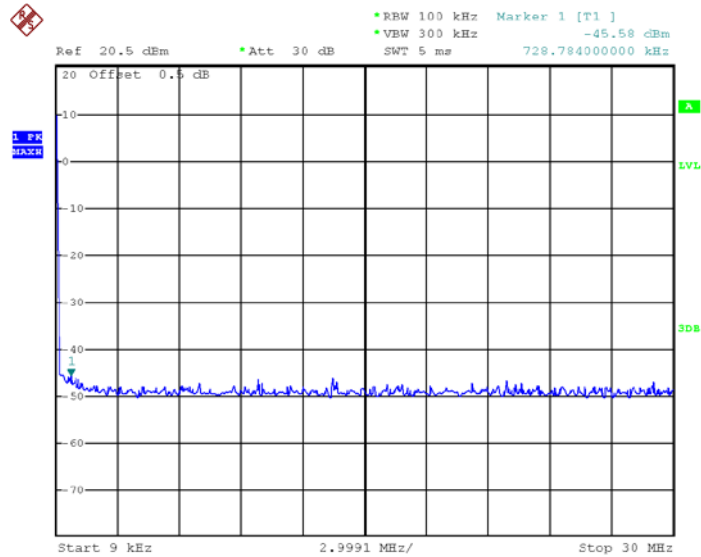


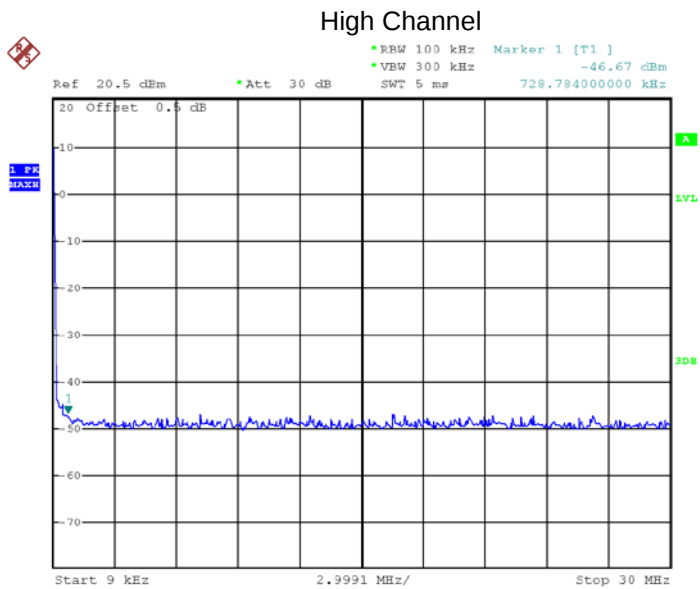
802.11g

### Low Channel



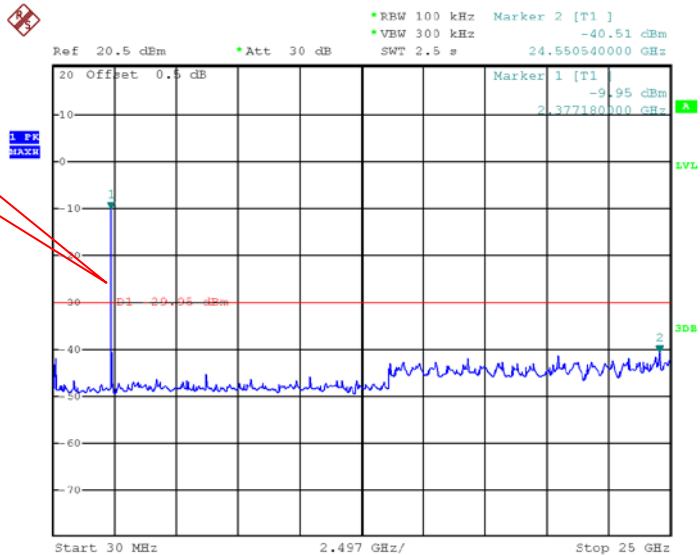
### Middle Channel





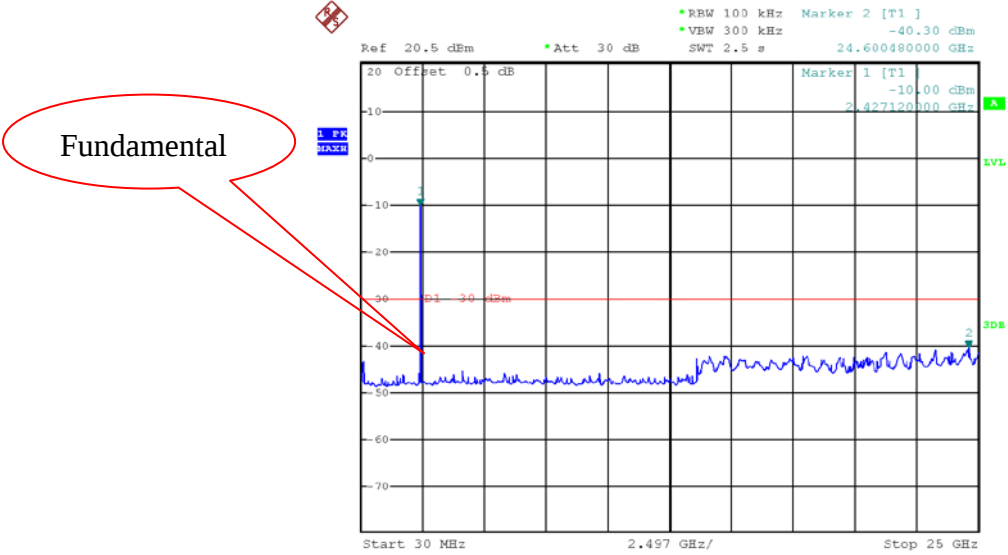
802.11g

Low Channel

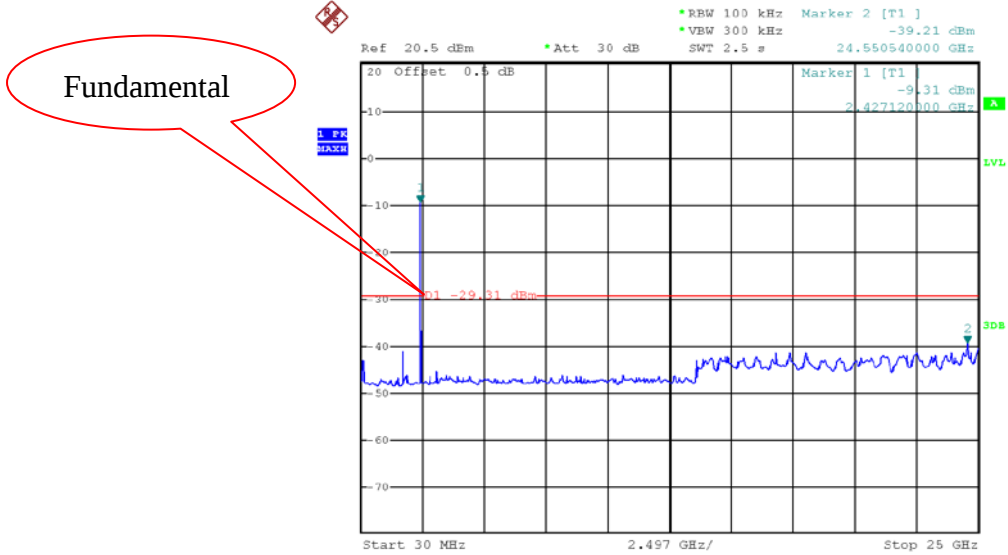


Fundamental

Middle Channel

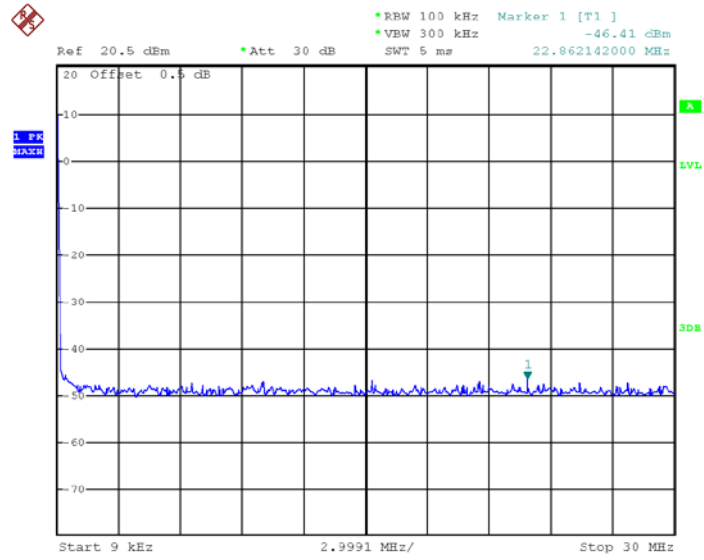


High Channel

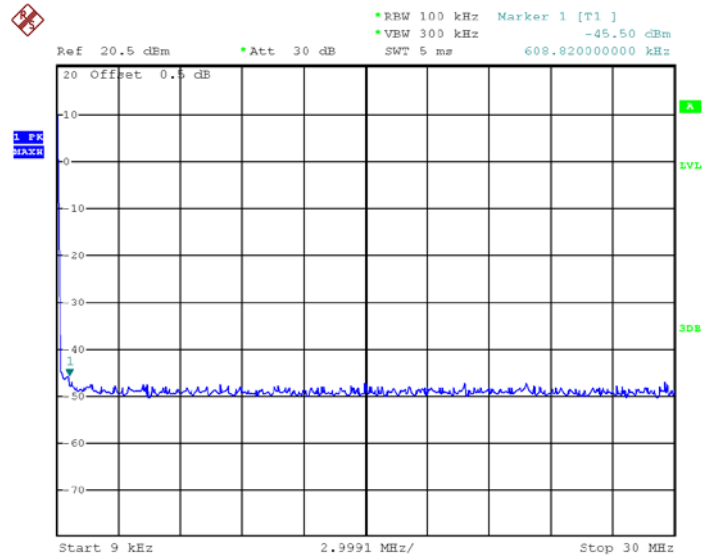


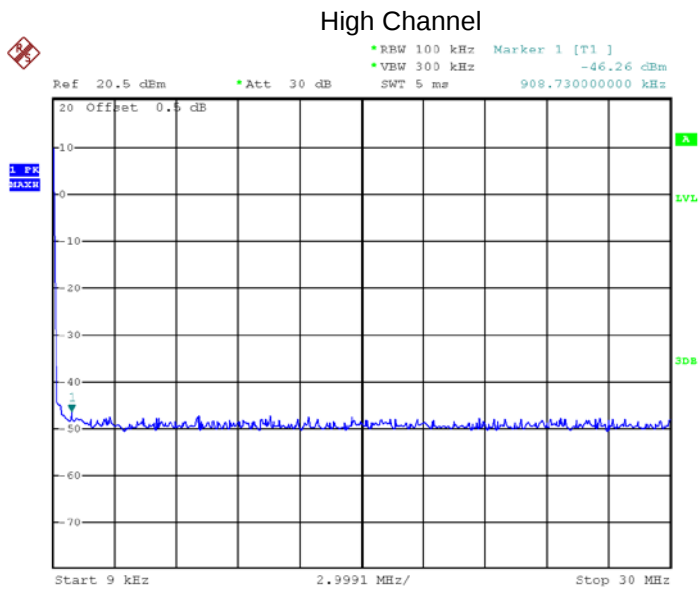
802.11n HT20

Low Channel

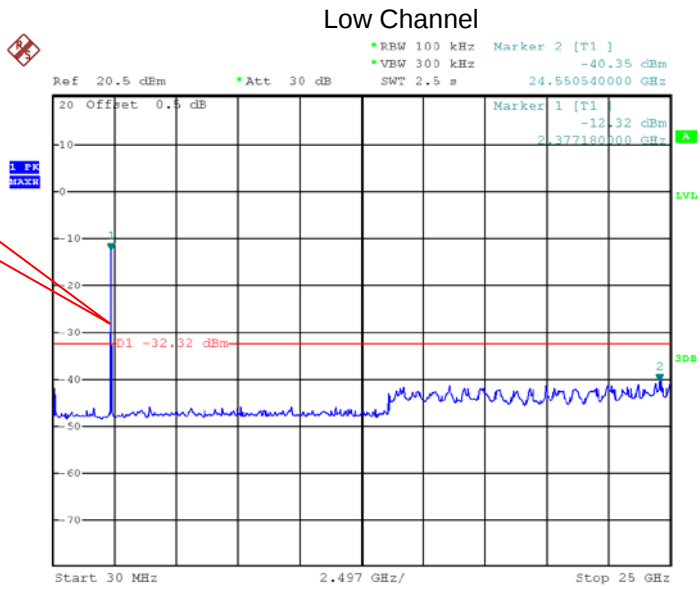


Middle Channel



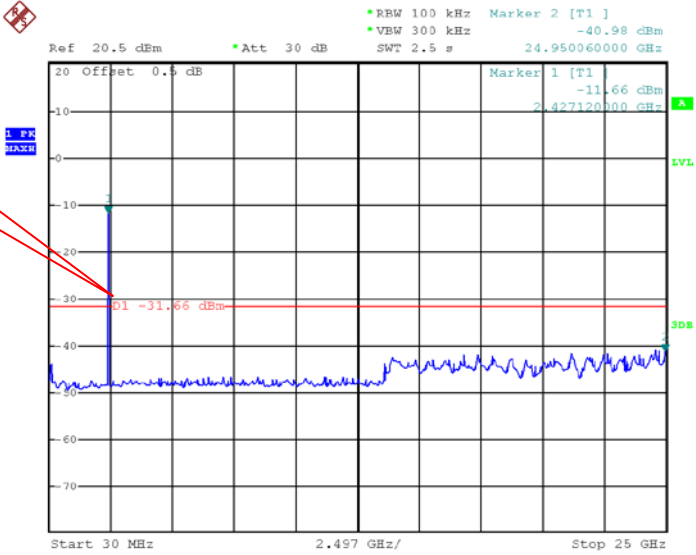


802.11n HT20

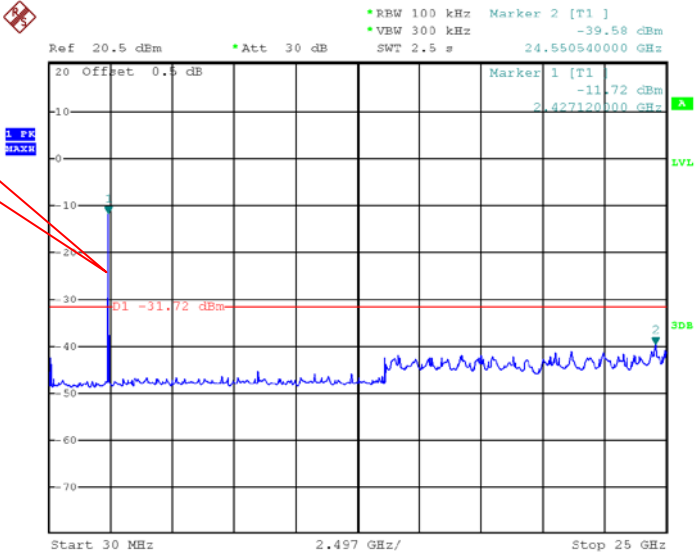


Fundamental

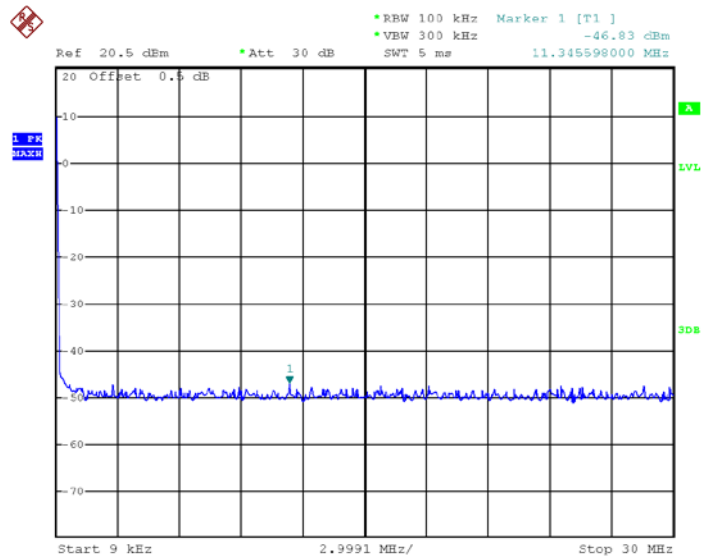
Middle Channel



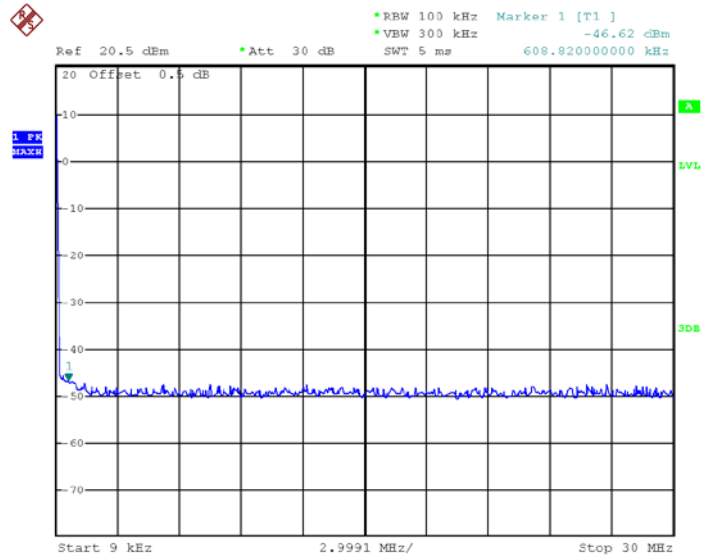
High Channel

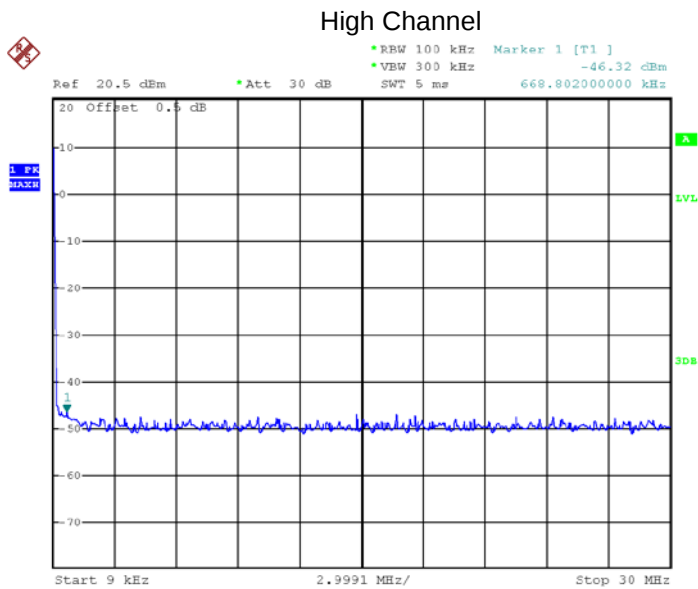


802.11n HT40  
Low Channel



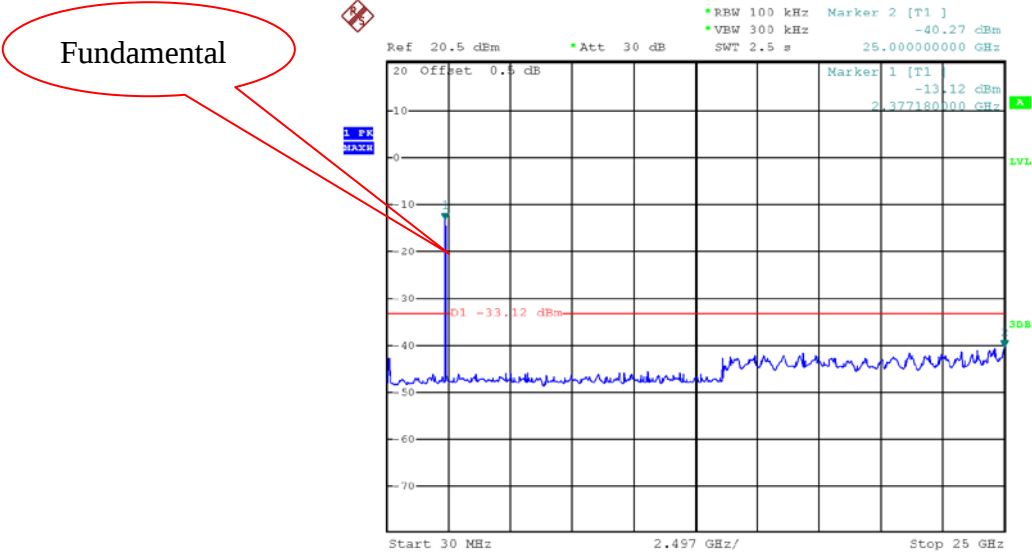
Middle Channel





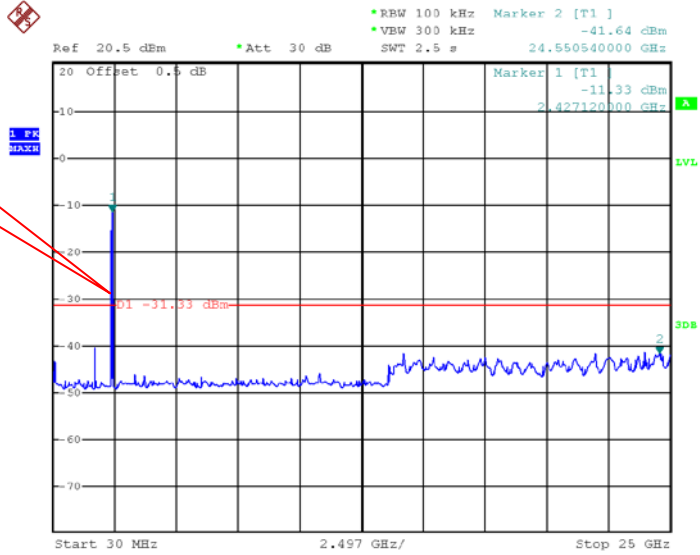
802.11n HT40

Low Channel



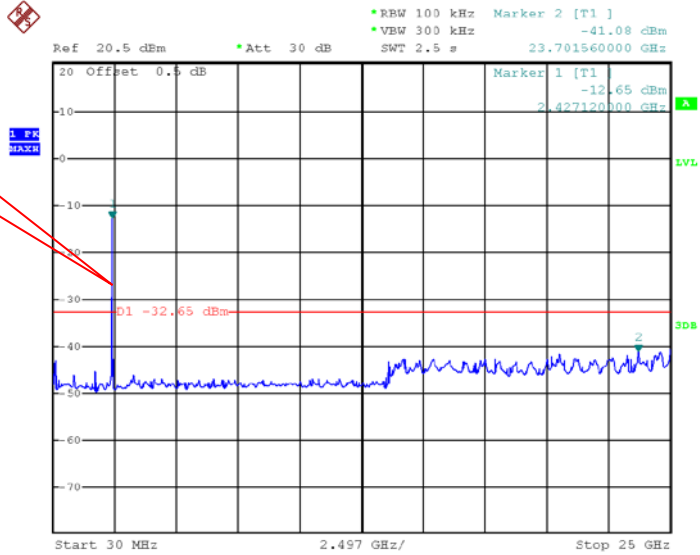
Middle Channel

Fundamental



High Channel

Fundamental



## 8 Band Edge Measurement

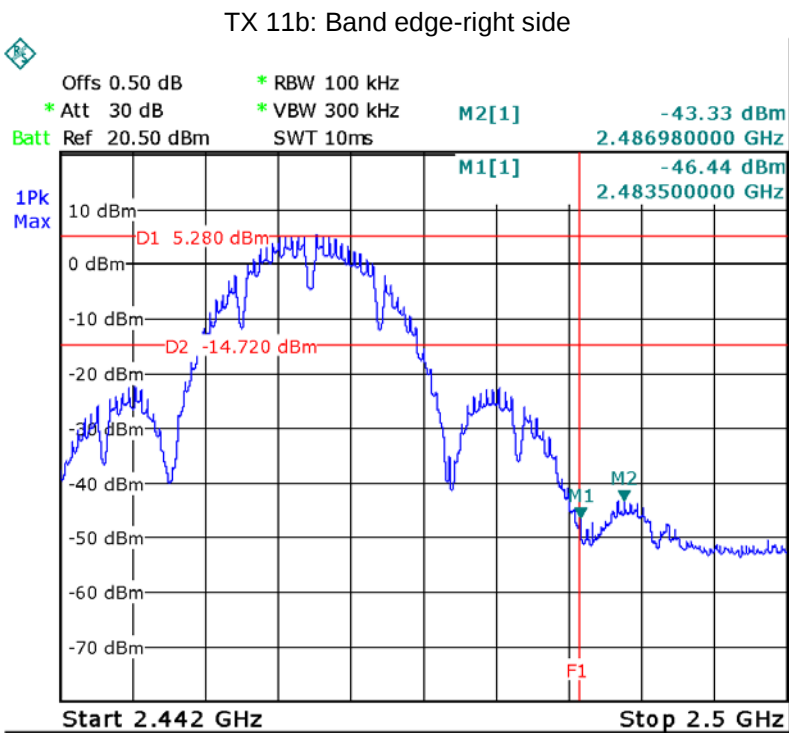
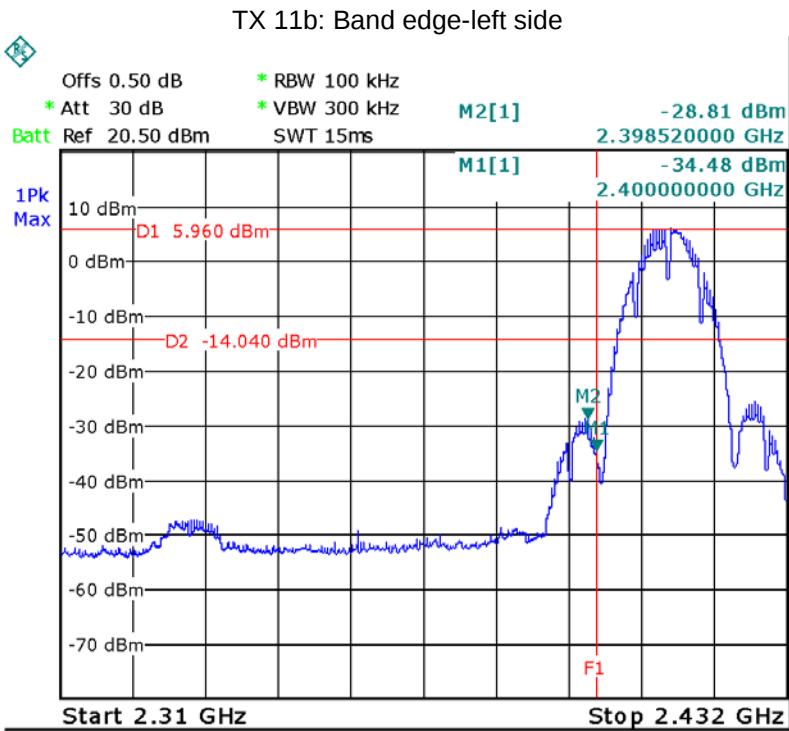
|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC CFR47 Part 15 Section 15.247                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Test Method:      | 558074 D01 15.247 Meas Guidance v05r02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Test Limit:       | Regulation 15.247 (d), 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)). |
| Test Mode:        | Transmitting                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

### 8.1 Test Produce

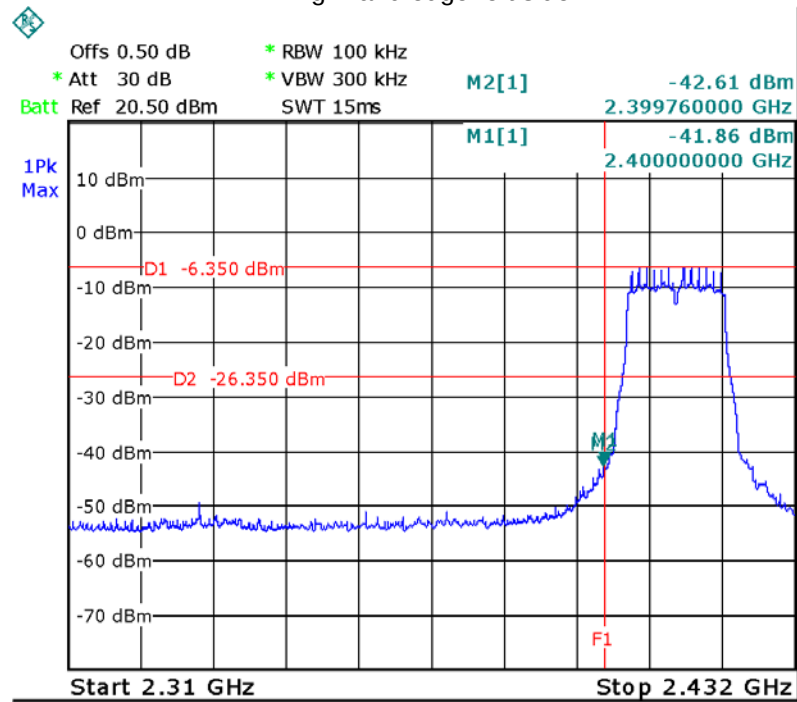
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
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.
5. Repeat above procedures until all measured frequencies were complete.

8.2 Test Result

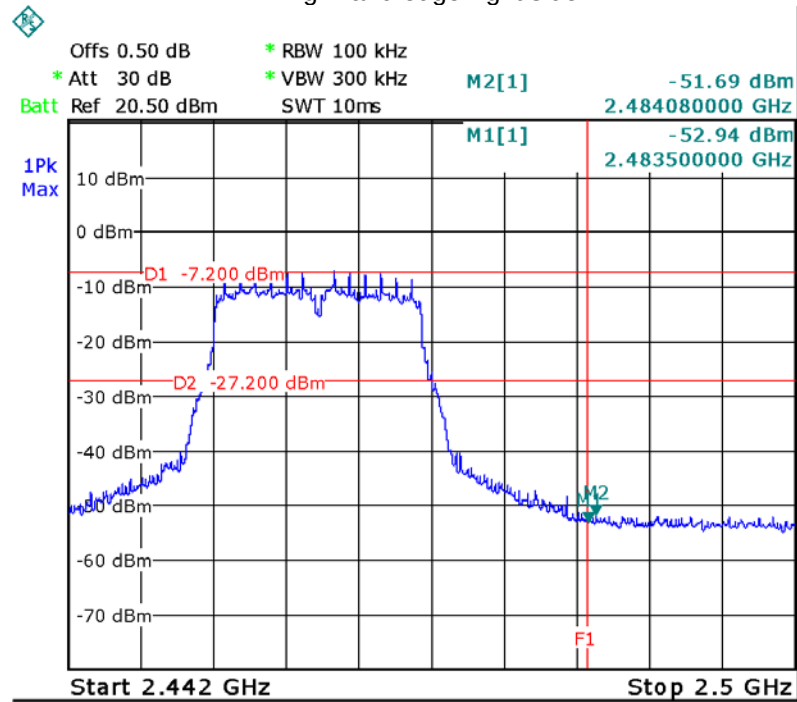
Test result plots shown as follows:



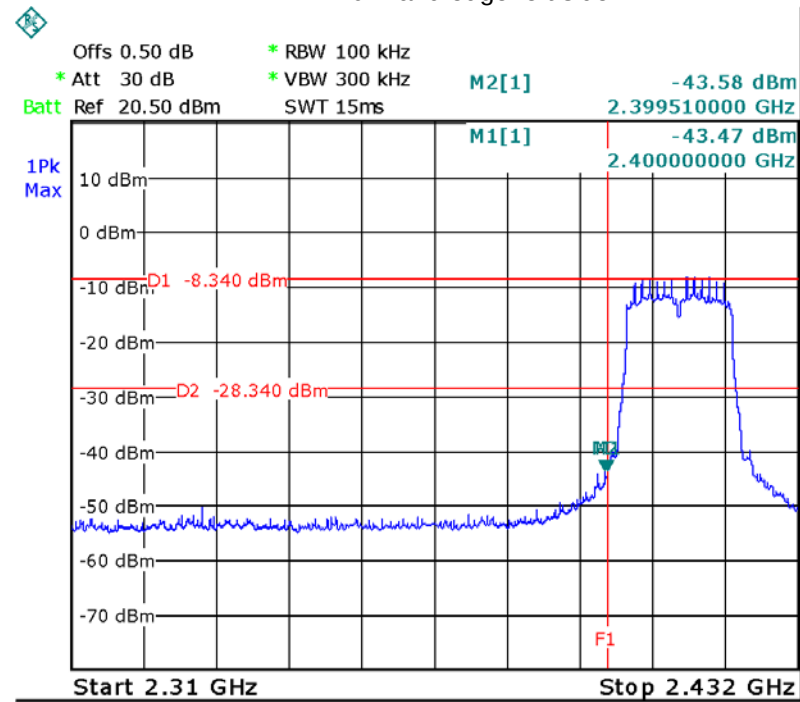
TX 11g: Band edge-left side



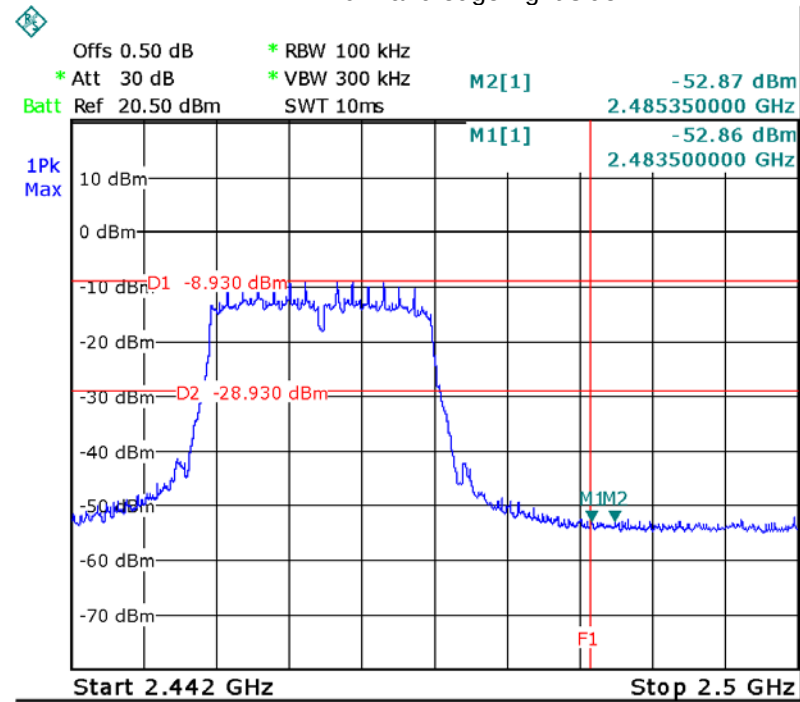
TX 11g: Band edge-right side

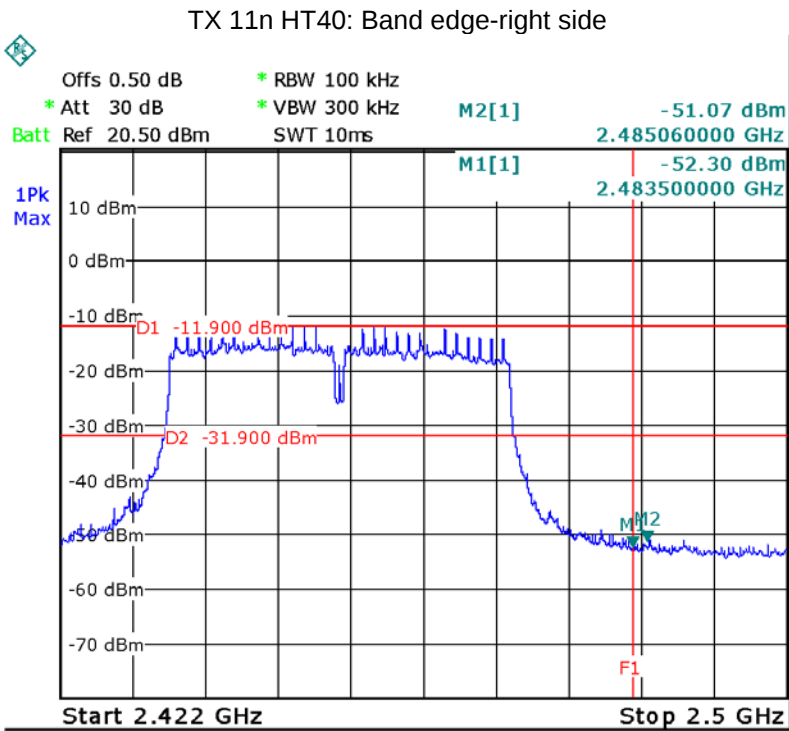
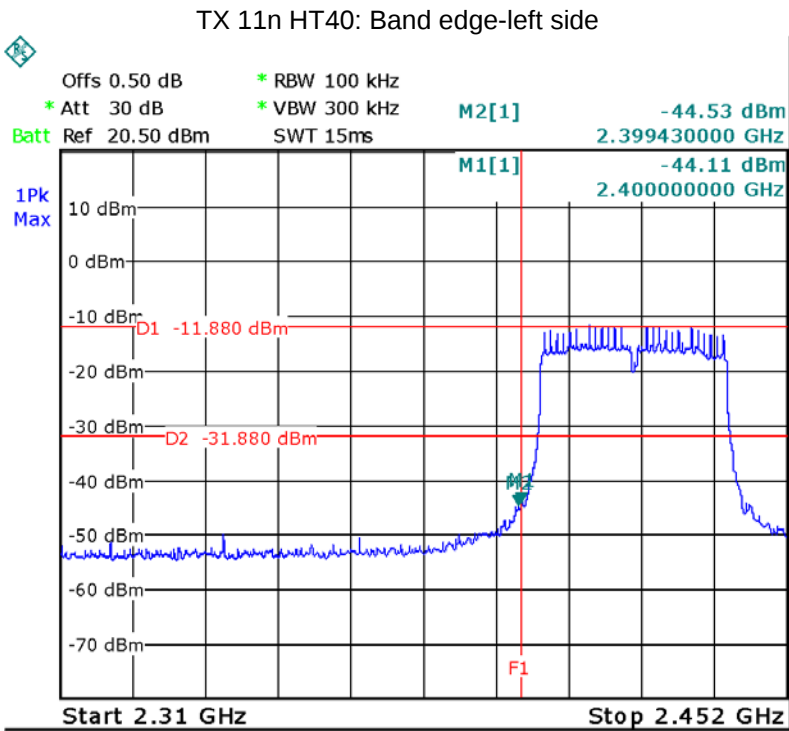


TX 11n HT20: Band edge-left side



TX 11n HT20: Band edge-right side





## 9 Bandwidth Measurement

Test Requirement:

FCC CFR47 Part 15 Section 15.247

Test Method:

558074 D01 15.247 Meas Guidance v05r02

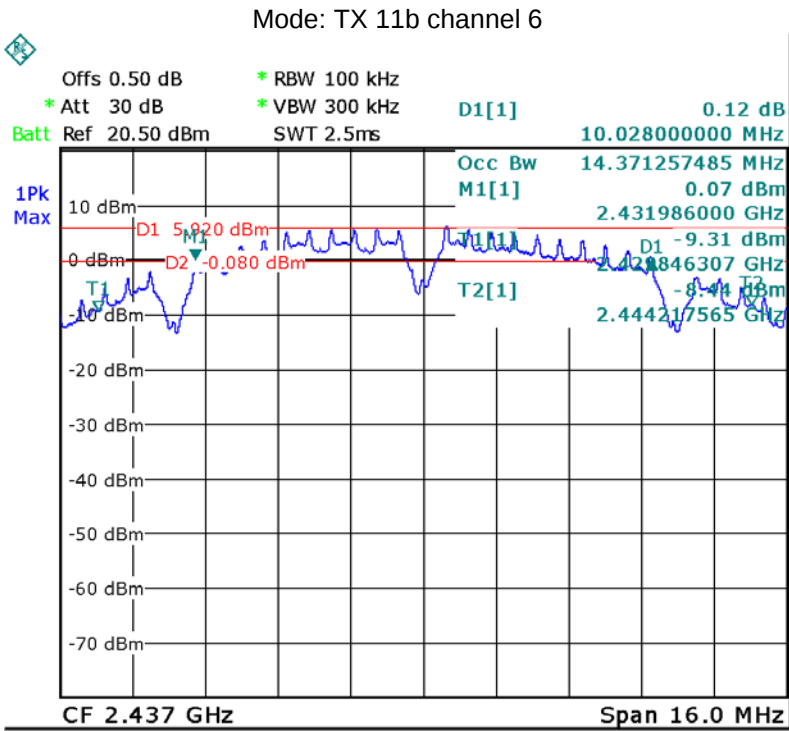
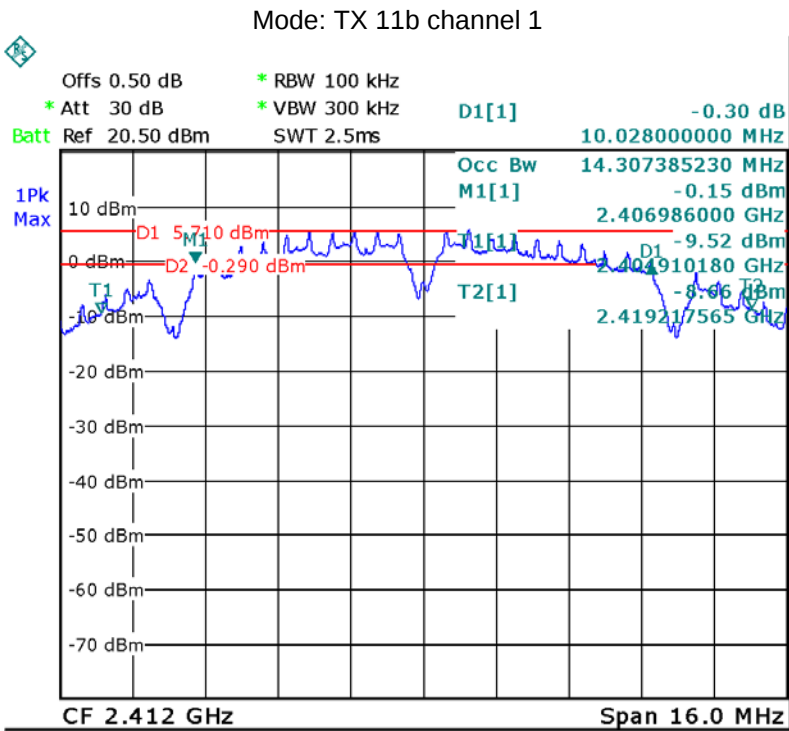
### 9.1 Test Procedure:

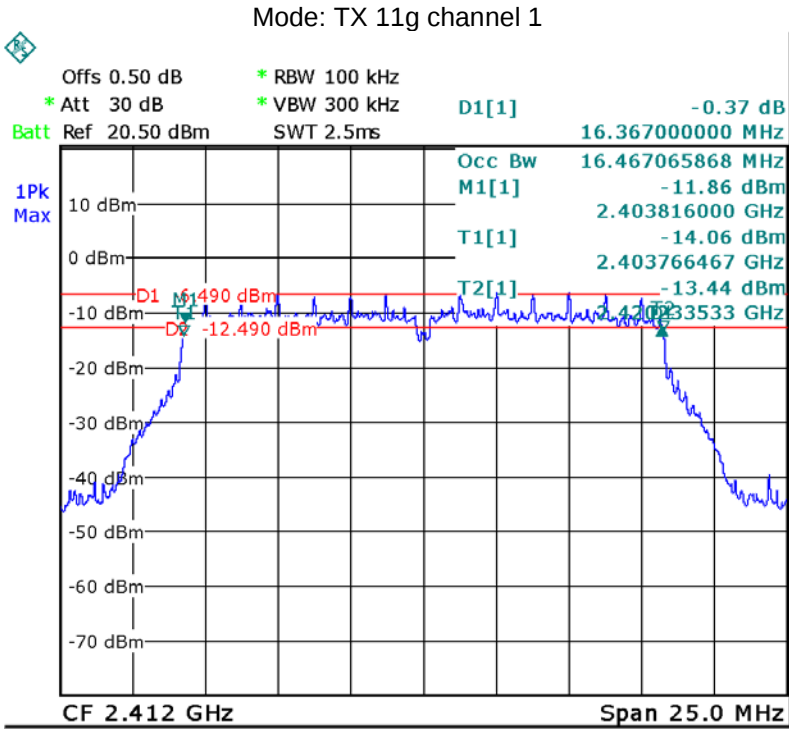
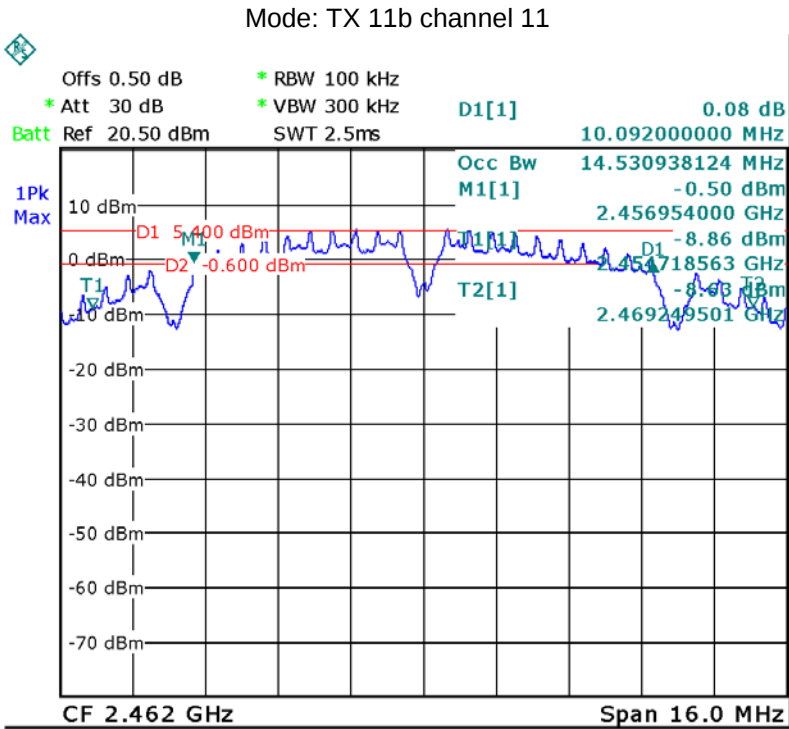
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz

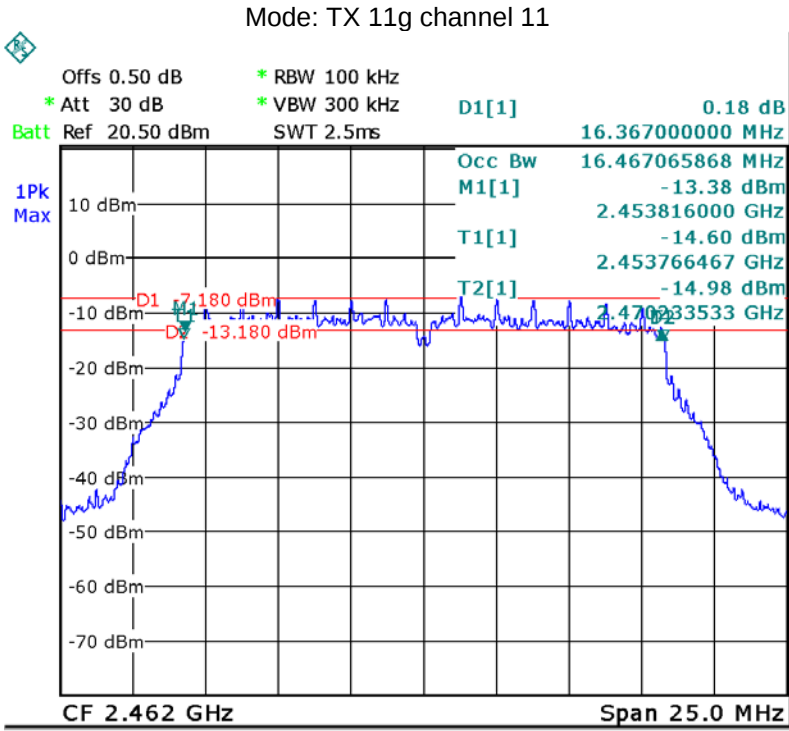
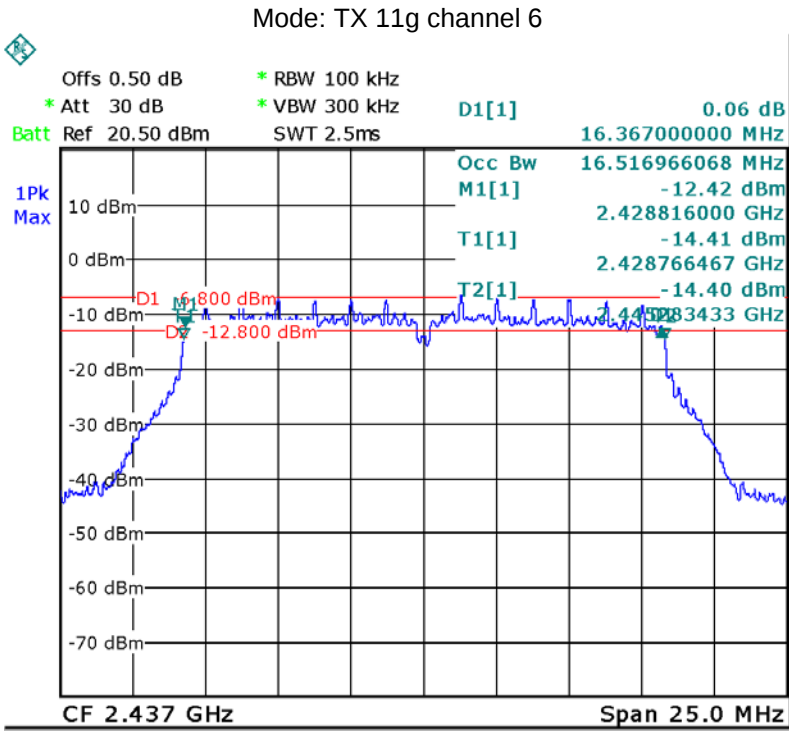
### 9.2 Test Result:

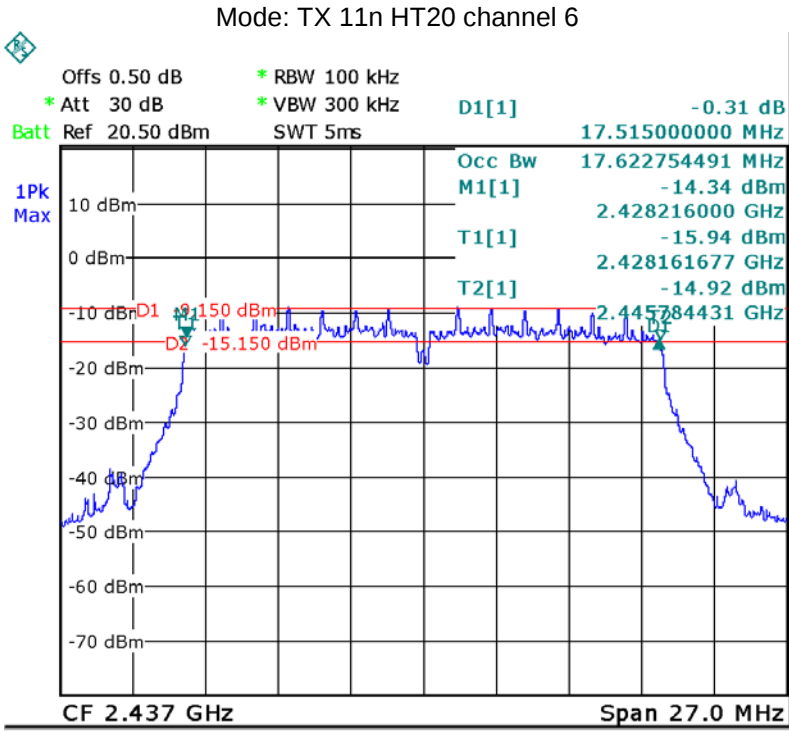
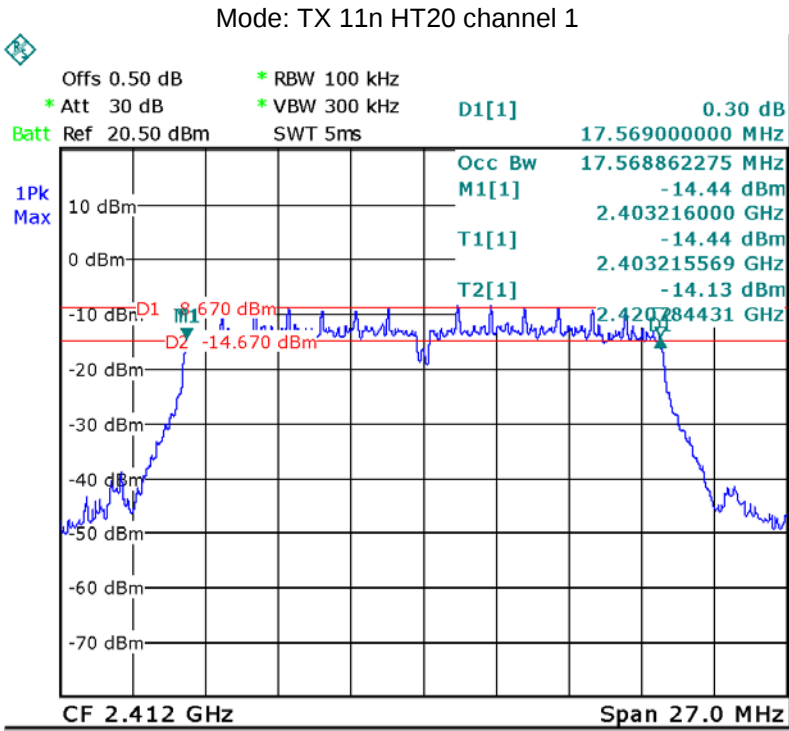
WiFi:

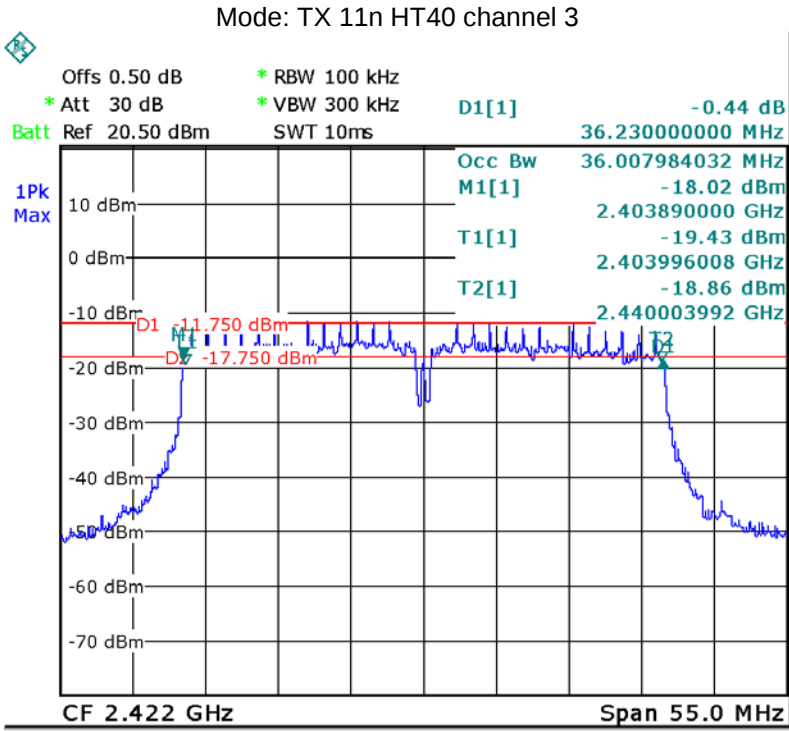
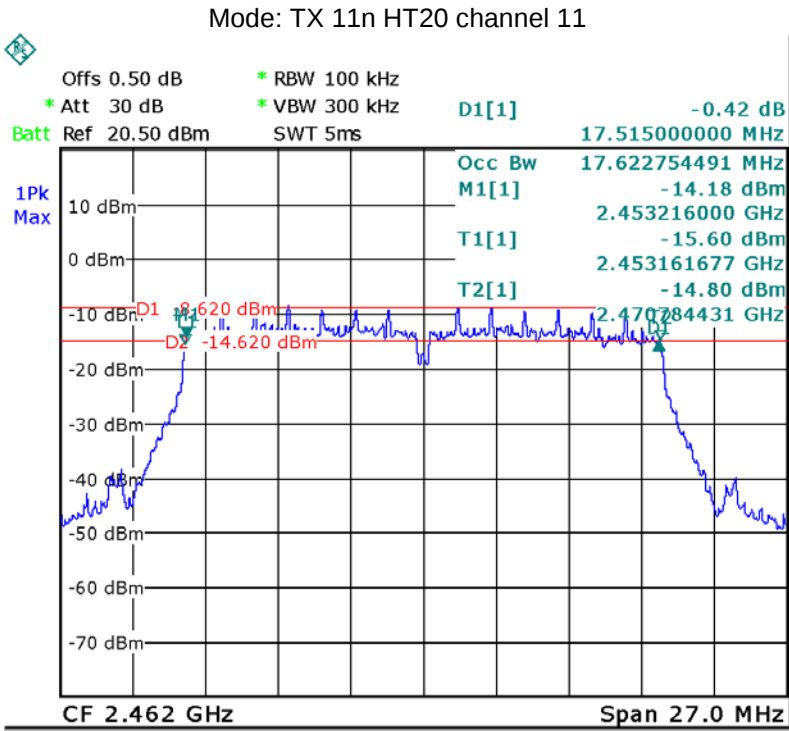
| Operation mode | 6dB Bandwidth (MHz) |           |            | 99% Bandwidth (MHz) |           |            |
|----------------|---------------------|-----------|------------|---------------------|-----------|------------|
| TX 11b         | Channel 1           | Channel 6 | Channel 11 | Channel 1           | Channel 6 | Channel 11 |
|                | 10.028              | 10.028    | 10.092     | 14.307              | 14.371    | 14.530     |
| TX 11g         | Channel 1           | Channel 6 | Channel 11 | Channel 1           | Channel 6 | Channel 11 |
|                | 16.367              | 16.367    | 16.367     | 16.467              | 16.517    | 16.467     |
| TX 11n HT20    | Channel 1           | Channel 6 | Channel 11 | Channel 1           | Channel 6 | Channel 11 |
|                | 17.569              | 17.515    | 17.515     | 17.569              | 17.623    | 17.623     |
| TX 11n HT40    | Channel 3           | Channel 6 | Channel 9  | Channel 3           | Channel 6 | Channel 9  |
|                | 36.230              | 36.010    | 36.010     | 36.008              | 36.118    | 36.118     |

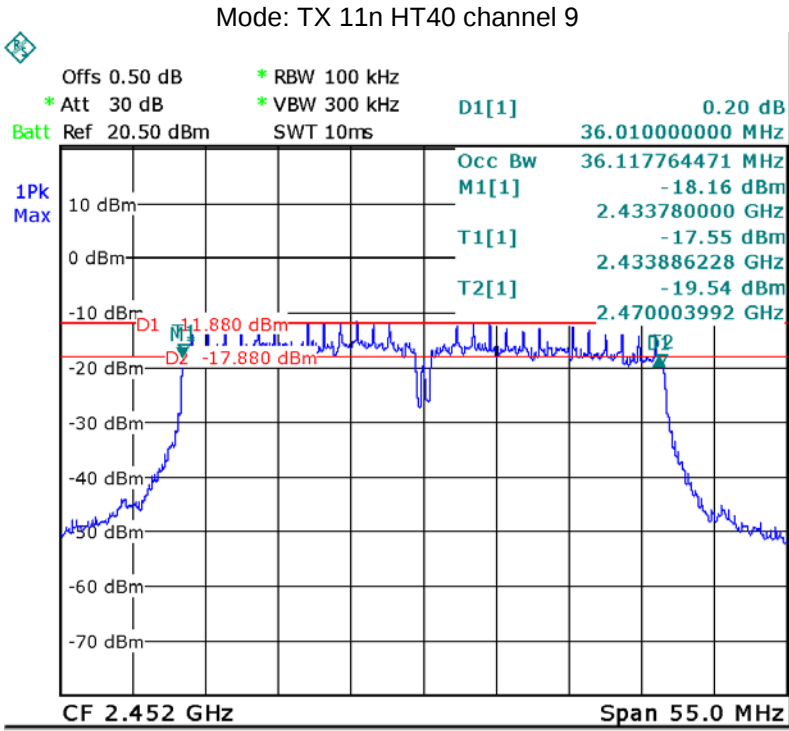
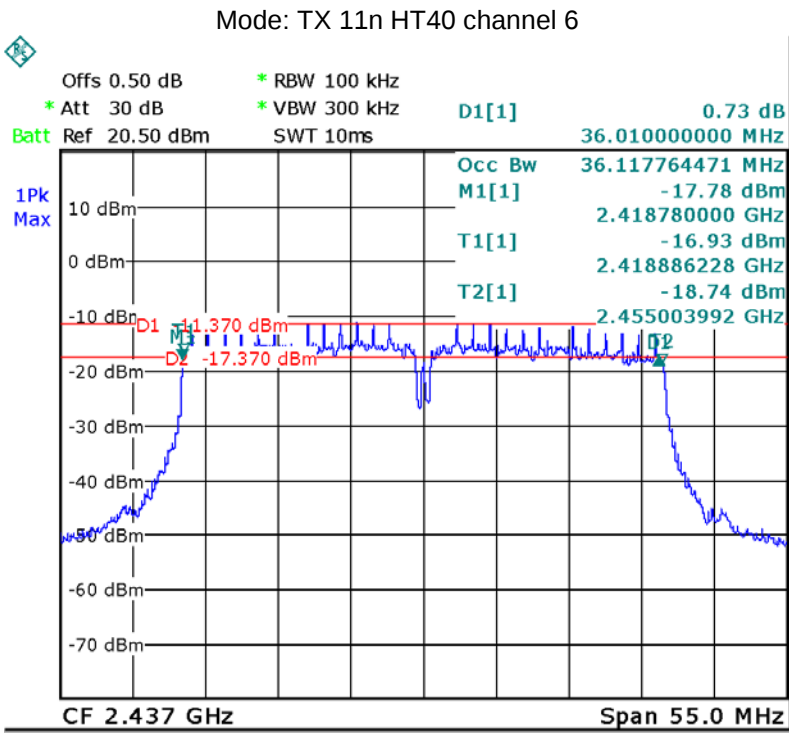












## 10 Maximum Output Power

Test Requirement:

FCC CFR47 Part 15 Section 15.247

Test Method:

558074 D01 15.247 Meas Guidance v05r02

### 10.1 Test Procedure:

558074 D01 15.247 Meas Guidance v05r02

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 1 MHz. VBW = 3 MHz. Sweep = auto; Detector Function = Peak, Set the span to fully encompass the DTS bandwidth.
3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

### 10.2 Test Result:

WiFi

|                                 |         |         |
|---------------------------------|---------|---------|
| Test mode :TX 11b               |         |         |
| Maximum Peak Output Power (dBm) |         |         |
| 2412MHz                         | 2437MHz | 2462MHz |
| 17.56                           | 17.10   | 17.08   |
| Limit: 1W/30dBm                 |         |         |
| Test mode :TX 11g               |         |         |
| Maximum Peak Output Power (dBm) |         |         |
| 2412MHz                         | 2437MHz | 2462MHz |
| 12.78                           | 12.13   | 12.41   |
| Limit: 1W/30dBm                 |         |         |
| Test mode :TX 11n HT20          |         |         |
| Maximum Peak Output Power (dBm) |         |         |
| 2412MHz                         | 2437MHz | 2462MHz |
| 10.34                           | 10.83   | 10.74   |
| Limit: 1W/30dBm                 |         |         |
| Test mode :TX 11n HT40          |         |         |
| Maximum Peak Output Power (dBm) |         |         |
| 2422MHz                         | 2437MHz | 2452MHz |
| 10.13                           | 10.54   | 9.73    |
| Limit: 1W/30dBm                 |         |         |

## 11 Power Spectral density

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: 558074 D01 15.247 Meas Guidance v05r02

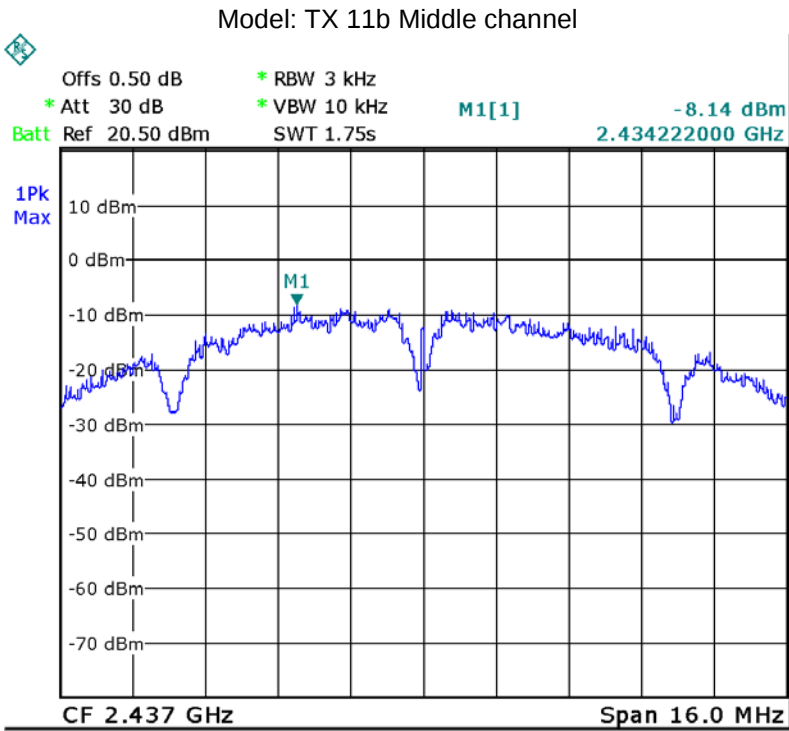
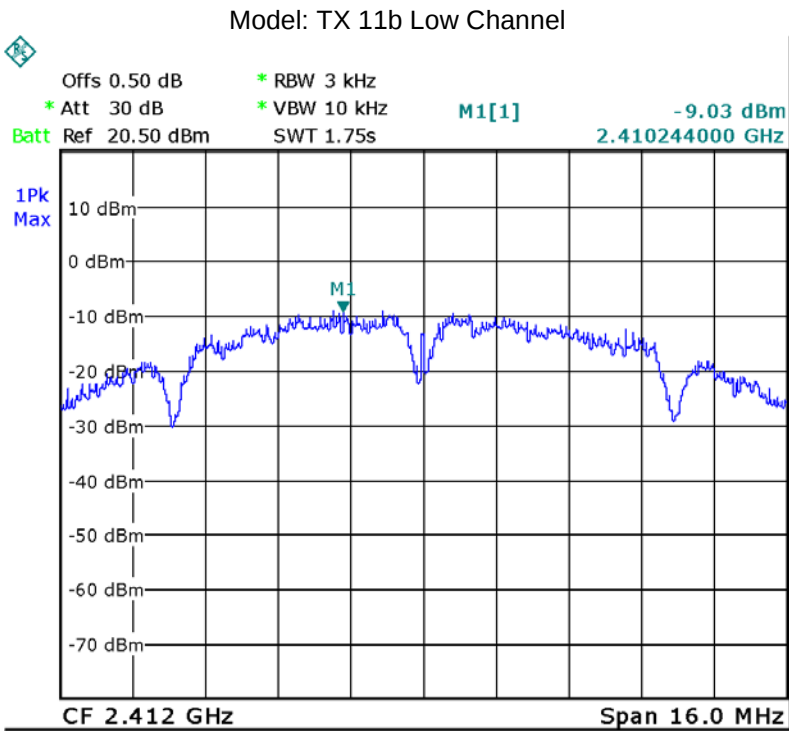
### 11.1 Test Procedure:

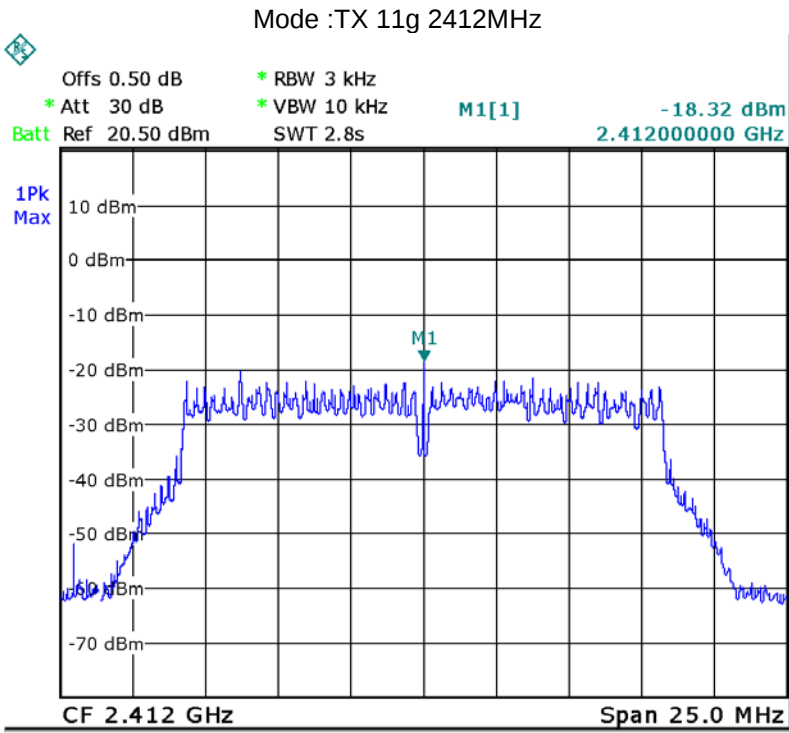
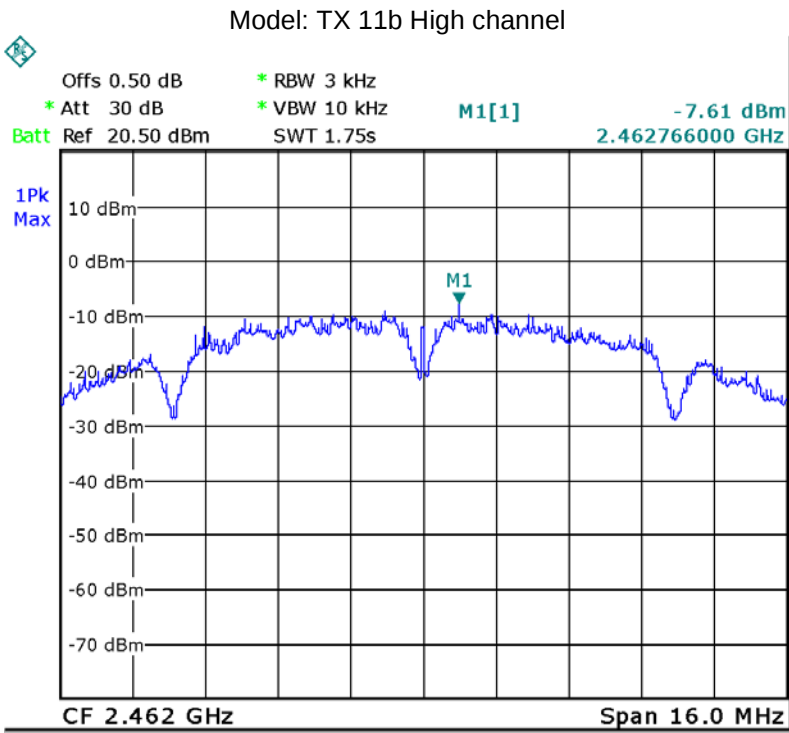
558074 D01 15.247 Meas Guidance v05r02

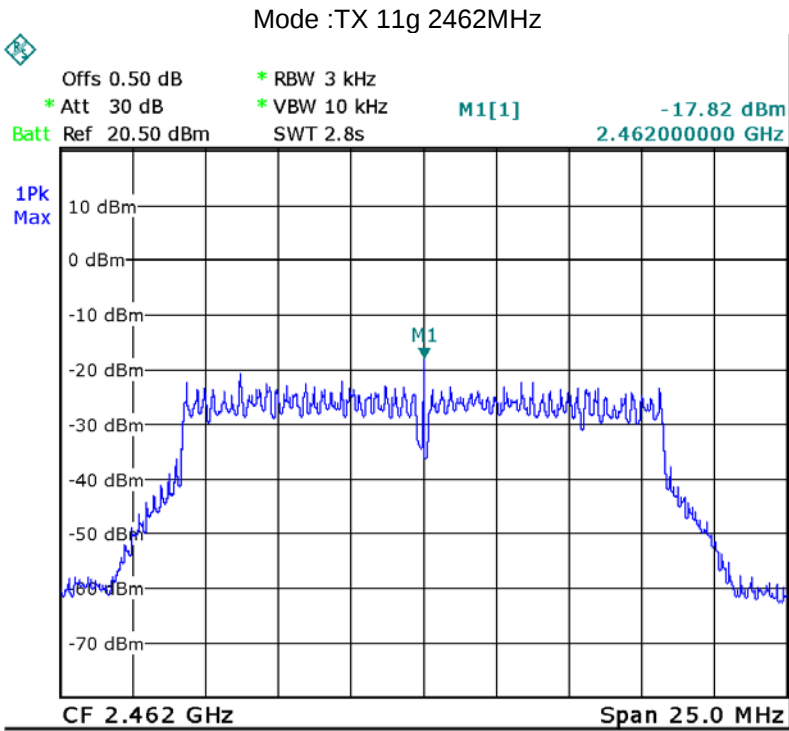
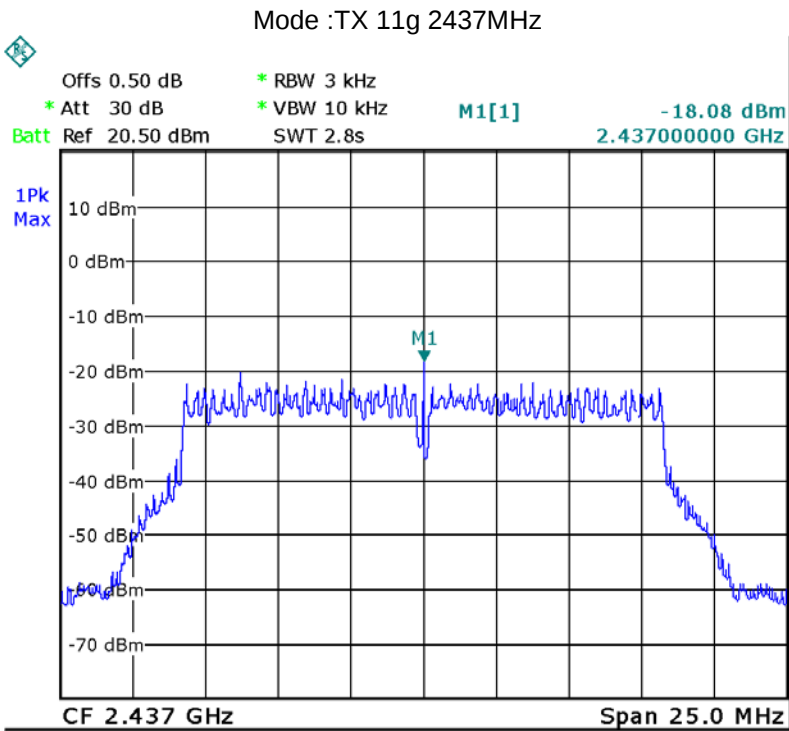
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 3kHz. VBW = 10kHz , Span = 1.5 times the DTS channel bandwidth(6 dB bandwidth). Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section  
Submit this plot.

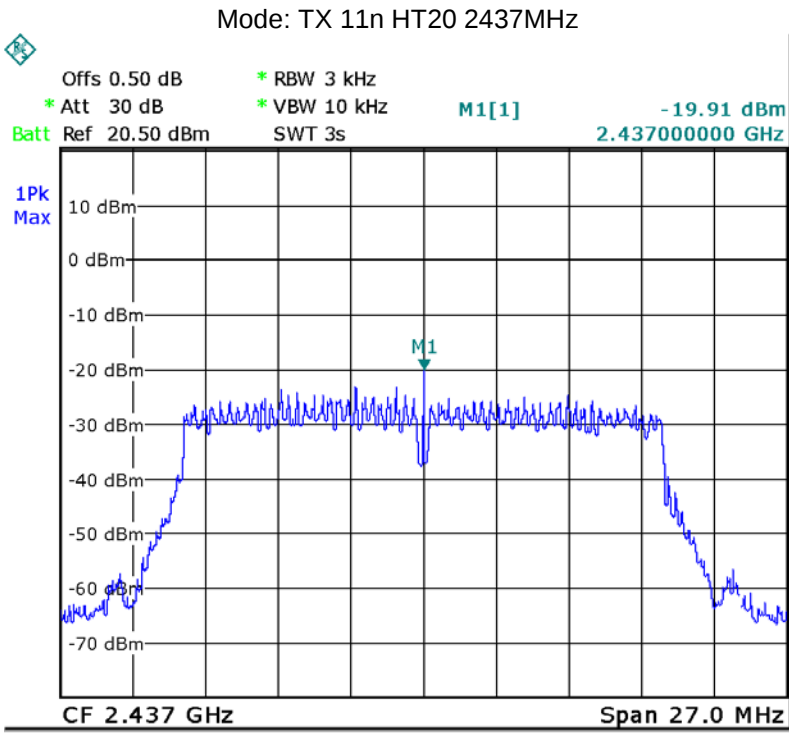
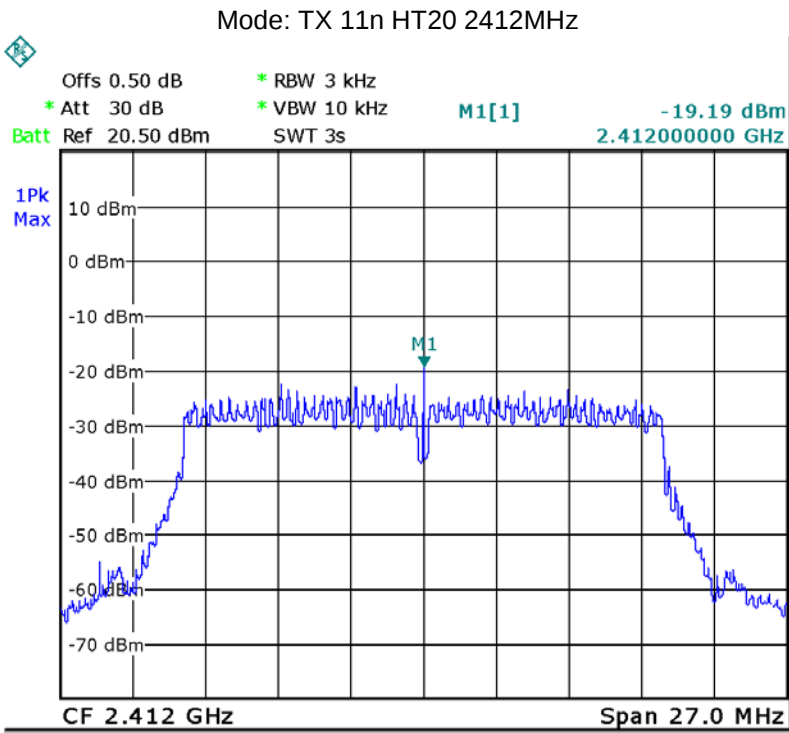
### 11.2 Test Result:

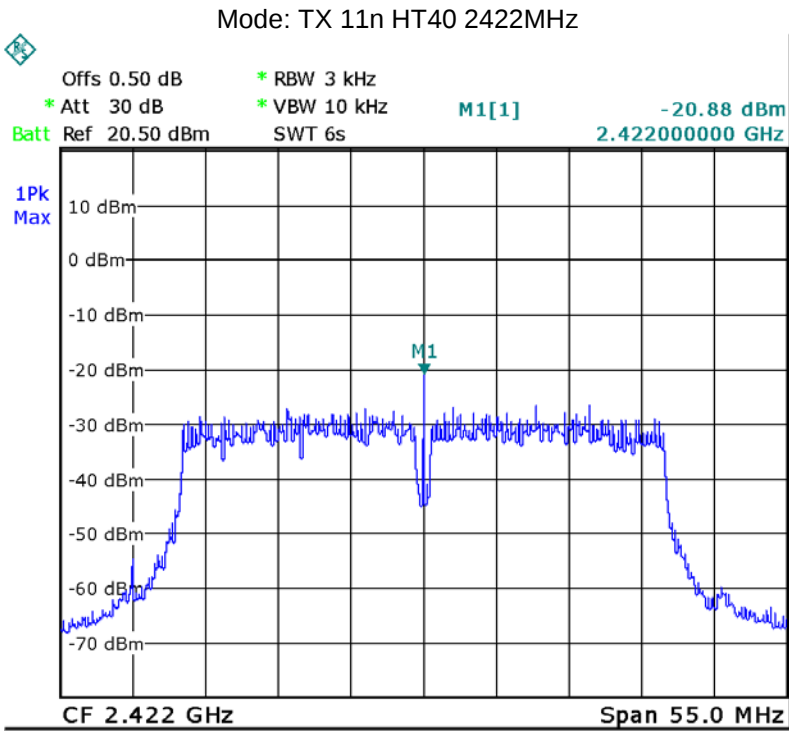
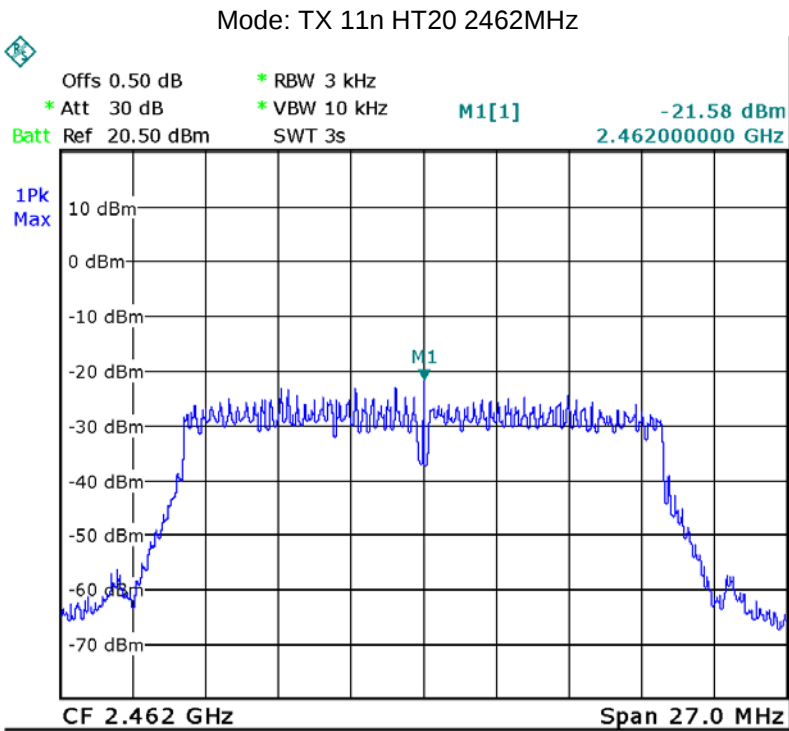
|                               |         |         |
|-------------------------------|---------|---------|
| Test mode :TX 11b             |         |         |
| Power Spectral (dBm per 3kHz) |         |         |
| 2412MHz                       | 2437MHz | 2462MHz |
| -9.03                         | -8.14   | -7.61   |
| Limit: 8dBm per 3kHz          |         |         |
| Test mode :TX 11g             |         |         |
| Power Spectral (dBm per 3kHz) |         |         |
| 2412MHz                       | 2437MHz | 2462MHz |
| -18.32                        | -18.08  | -17.82  |
| Limit: 8dBm per 3kHz          |         |         |
| Test mode :TX 11n HT20        |         |         |
| Power Spectral (dBm per 3kHz) |         |         |
| 2412MHz                       | 2437MHz | 2462MHz |
| -19.19                        | -19.91  | -21.58  |
| Limit: 8dBm per 3kHz          |         |         |
| Test mode :TX 11n HT40        |         |         |
| Power Spectral (dBm per 3kHz) |         |         |
| 2422MHz                       | 2437MHz | 2452MHz |
| -20.88                        | -19.82  | -20.33  |
| Limit: 8dBm per 3kHz          |         |         |

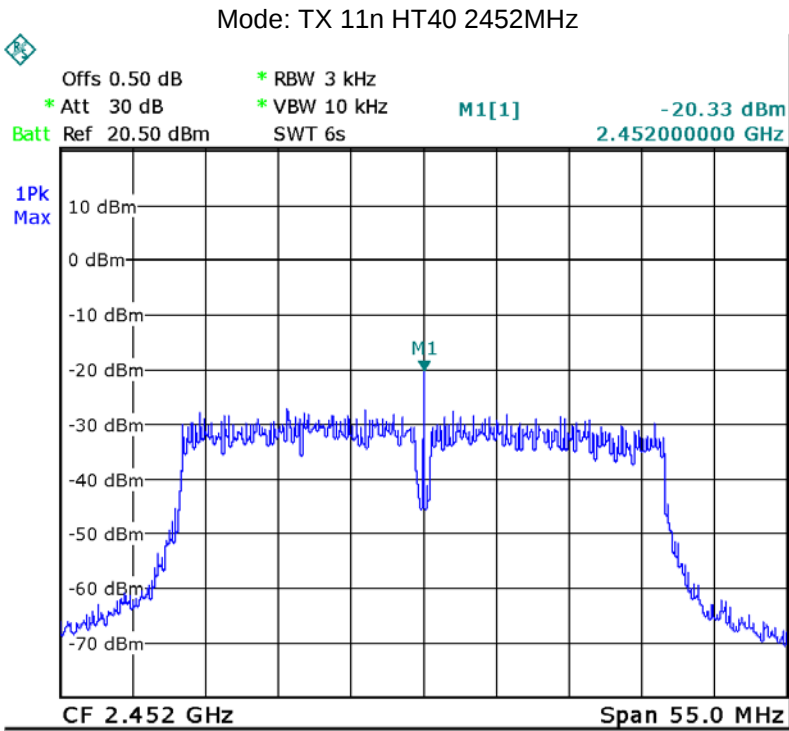
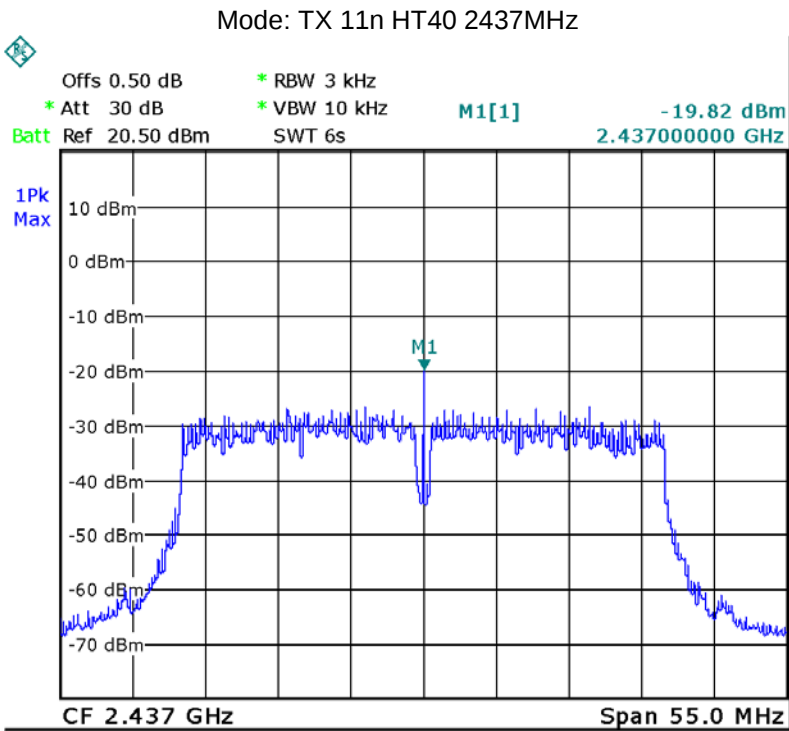












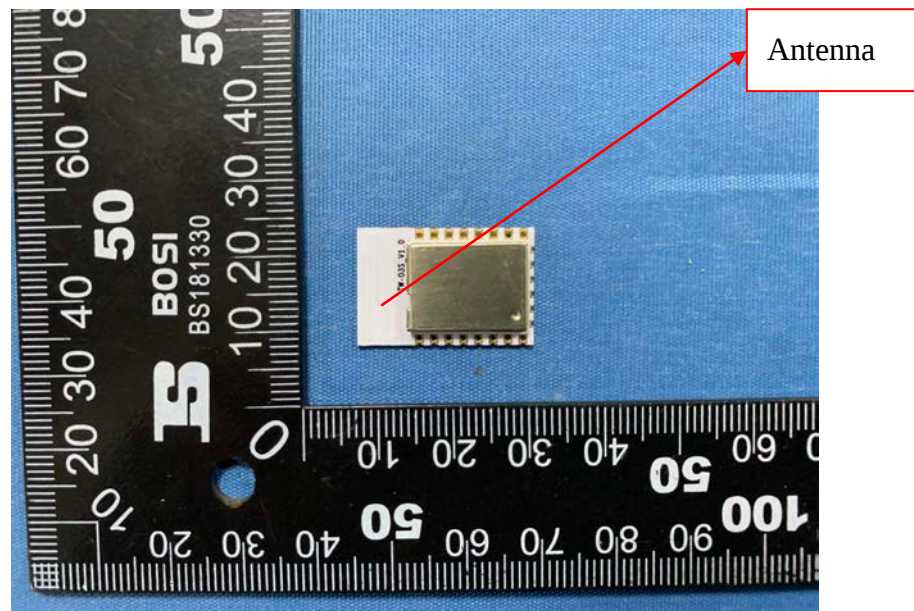
## 12 Antenna Requirement

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 use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

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.

Result:

The EUT have one PCB Printed Antenna, meets the requirements of FCC 15.203.



### **13 FCC ID:2AUPR-XJ-W1A RF Exposure Report**

Note: Please refer to RF Exposure Report: WTN19S09066646W002.

## **14 Photographs - Model XJ-W1A Test Setup Photos**

Note: Refer to the file XJ-W1A\_Test Setup Photos.

## **15 Photographs - Constructional Details**

### **15.1 Model XJ-W1A-External Photos**

Note: Refer to the file XJ-W1A\_External Photos.

### **15.2 Model XJ-W1A-Internal Photos**

Note: Refer to the file XJ-W1A\_Internal Photos.

=====End of Report=====