# FCC TEST REPORT (WIFI)

for

Net Simulasyon Cihazlari Tic. Ltd. Sti.

Wireless Router

Model Number: Q8

FCC ID: 2AKXUQ8

Prepared for : Net Simulasyon Cihazlari Tic. Ltd. Sti.
Address : Sevgi Sitesi, Lale Sokak, No.45,
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Report No. : 16KWE124892F
Date of Test : Dec. 15~29, 2016
Date of Report : Dec . 30, 2016

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# Keyway Testing Technology Co., Ltd.

| | | | |
|---|---|---|---|
| **Applicant:**<br>**Address:** | Net Simulasyon Cihazlari Tic. Ltd. Sti.<br>Sevgi Sitesi, Lale Sokak, No.45,<br>134457, Tarabya, Sariyer Istanbul Turkey | | |
| **Manufacturer:**<br>**Address:** | YICHEN (SHENZHEN) TECHNOLOGY CO., LTD<br>23/F, Block C1, Nanshan I Park, No. 1001, Xueyuan Road,<br>Taoyuan Street, Nanshan District, Shenzhen，China | | |
| **E.U.T:** | Wireless Router | | |
| **Model Number:** | Q8 | | |
| **Trade Name:** | JCG | **Serial No.:** | ------ |
| **Date of Receipt:** | Dec. 10, 2016 | **Date of Test:** | Dec. 15~29, 2016 |
| **Test Specification:** | FCC Part 15, Subpart 15.247: Oct. 1, 2016<br>ANSI C63.10:2013<br>KDB558074 D01 DTS Meas Guidance v03r05 | | |
| **Test Result:** | The equipment under test was found to be compliance with the requirements of the standards applied.<br><br>**Issue Date: Dec. 30, 2016** | | |

| Tested by: | Reviewed by: | Approved by: |
|---|---|---|
| Keven Wu / Engineer | Mark Li / Supervisor | Andy Gao / Supervisor |

**Other Aspects:**

None.

*Abbreviations: OK/P=passed fail/F=failed n.a/N=not applicable E.U.T=equipment under tested*

*This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of Keyway Testing Technology Co., Ltd.*

# 1.TEST SUMMARY

| Test Items | Test Requirement | Result |
|---|---|---|
| Conducted Emissions | 15.207 | PASS |
| Radiated Emissions | 15.205(a)/15.209/15.247(d) | PASS |
| 6dB&99% Bandwidth | 15.247(a)(2) | PASS |
| Power density | 15.247(e) | PASS |
| Maximum Peak Output Power | 15.247(b) | PASS |
| Duty Cycle | 15.207 | PASS |
| Emissions from out of band | 15.247(d) | PASS |
| Antenna Requirement | 15.203 | PASS |

# 2.GENERAL PRODUCT INFORMATION

## 2.1. Product Function

Refer to Technical Construction Form and User Manual.

## 2.2. Description of Device (EUT)

| | |
|---|---|
| Product Name: | Wireless Router |
| Model No.: | Q8 |
| Operation Frequency: | 2412MHz~2462MHz (802.11b/802.11g/802.11n(HT20));<br>2422MHz~2452MHz (802.11n(HT40)) |
| Channel numbers: | 11 for 802.11b/802.11g/802.11n(HT20);<br>9 for 802.11n(HT40) |
| Modulation technology: | Direct Sequence Spread Spectrum (DSSS) for (IEEE 802.11b)<br>Orthogonal Frequency Division Multiplexing(OFDM) for<br>(IEEE 802.11g/802.11n) |
| Data speed (IEEE 802.11b): | 1Mbps, 2Mbps, 5.5Mbps, 11Mbps |
| Data speed (IEEE 802.11g): | 6Mbps, 9Mbps, 12Mbps, 18Mbps, 24Mbps,<br>36Mbps, 48Mbps,54Mbps |
| Data speed (IEEE 802.11n): | Up to 300Mbps |
| Antenna Type: | External Antenna*4; 2T2R |
| Antenna gain: | 5.0dBi; |
| Power supply: | DC 5V from adapter |
| Adapter: | Manufacturer:YICHEN (SHENZHEN) TECHNOLOGY CO., LTD<br>Model:GQ05-050100<br>INPUT:AC 100-240V, 50/60Hz, 0.3A<br>OUTPUT:DC 5V/1A<br>DC Line:Unshielded, Undetachable 1.2m |

## 2.3. Independent Operation Modes

The basic operation modes are:

2.3.1. EUT work WFI TX mode, and frequency as below:

| | | Frequency |
|---|---|---|
| Mode 1 | 802.11b | 2412MHz |
| | | 2437MHz |
| | | 2462MHz |
| Mode 2 | 802.11g | 2412MHz |
| | | 2437MHz |
| | | 2462MHz |
| Mode 3 | 802.11n(HT20) | 2412MHz |
| | | 2437MHz |
| | | 2462MHz |
| Mode 4 | 802.11n(HT40) | 2422MHz |
| | | 2437MHz |
| | | 2452MHz |
| Mode 5 | LINK Mode | |

Remark: 802.11b mode:1Mbps ,802.11g mode:6Mbps , 802.11n HT20 mode:MCS0,802.11n HT40 mode:MCS0; MIMO fro 802.11n(20)/n(40).

## 2.4. Test Supporting System

None.

## 2.5. TEST SITES

### 2.5.1. Test Facilities

Lab Qualifications : Certificated by Industry Canada
Registration No.: 9868A
Date of registration: December 8, 2011

Certificated by FCC, USA
Registration No.: 370994
Date of registration: February 21, 2012

Certificated by CNAS China
Registration No.: CNAS L5783
Date of registration: August 8, 2012

## 2.6. List of Test and Measurement Instruments

### 2.6.1. For conducted emission at the mains terminals test

| Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Next Cal. |
|---|---|---|---|---|---|
| EMI Test Receiver | Rohde&Schwarz | ESCI | 101156 | Apr. 09,16 | Apr. 09,17 |
| Artificial Mains Network | Rohde&Schwarz | ENV216 | 101315 | Apr. 09,16 | Apr. 09,17 |
| RF Cable | FUJIKURA | 3D-2W | 944 Cable | Apr. 09,16 | Apr. 09,17 |

### 2.6.2. For radiated emission test

| Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Next Cal. |
|---|---|---|---|---|---|
| EMI Test Receiver | Rohde&Schwarz | ESCI | 101156 | Apr. 09,16 | Apr. 09,17 |
| Bilog Antenna | ETS-LINDGREEN | 3142D | 135452 | Apr. 09,16 | Apr. 09,17 |
| Spectrum Analyzer | Agilent | E4411B | MY4511304 | Apr. 09,16 | Apr. 09,17 |
| 3m Semi-anechoic Chamber | ETS-LINDGREEN | 966 | KW01 | Apr. 09,16 | Apr. 09,17 |
| Signal Amplifier | SONOMA | 310 | 187016 | Apr. 09,16 | Apr. 09,17 |
| Signal Amplifier | Agilent | 8449B | 3008A00251 | Apr. 09,16 | Apr. 09,17 |
| RF Cable | IMRO | IMRO-400 | 966 Cable 1# | N/A | N/A |
| MULTI-DEVICE Controller | ETS-LINDGREEN | 2090 | 126913 | N/A | N/A |
| Horn Antenna | SCHWARZBECK | BBHA9170 | 9170-068 | Apr. 09,16 | Apr. 09,17 |
| Spectrum Analyzer | Agilent | E4408B | MY44211125 | Apr. 09,16 | Apr. 09,17 |
| High Pass filter | Micro | HPM50111 | 324216 | Apr. 09,16 | Apr. 09,17 |
| Constant temperature and humidity box | GF | GTH-800-40-1P | MAA9906-005 | Apr. 09,16 | Apr. 09,17 |
| Attenuation | MCE | 24-10-34 | BN9258 | Apr. 02,16 | Apr. 02,17 |
| Loop Antenna | ARA | PLA-1030/B | 1029 | Apr. 02,16 | Apr. 02,17 |
| Power Meter | Anritsu | ML2495A | 1204003 | Apr. 24,16 | Apr. 24,17 |
| Power Sensor | Anritsu | MA2411B | 1126150 | Apr. 24,16 | Apr. 24,17 |

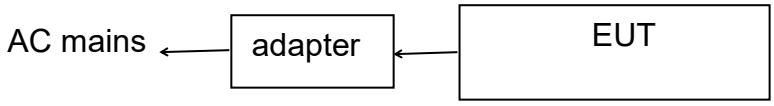
# 3. TEST SET-UP AND OPERATION MODES

## 3.1. Principle of Configuration Selection

**Emission:** The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

## 3.2. Block Diagram of Test Set-up

System Diagram of Connections between EUT and Simulators




*(EUT:Wireless Router)*

## 3.3. Test Software

| Final Test Mode | Description |
|---|---|
| Test Software | MP tool |

## 3.4. Special Accessories and Auxiliary Equipment

Notebook

Manufacturer: Lenovo
M/N: Lenovo G475
S/N: GB14477457

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## 3.5. Countermeasures to Achieve EMC Compliance

None.

# 4. EMISSION TEST RESULTS

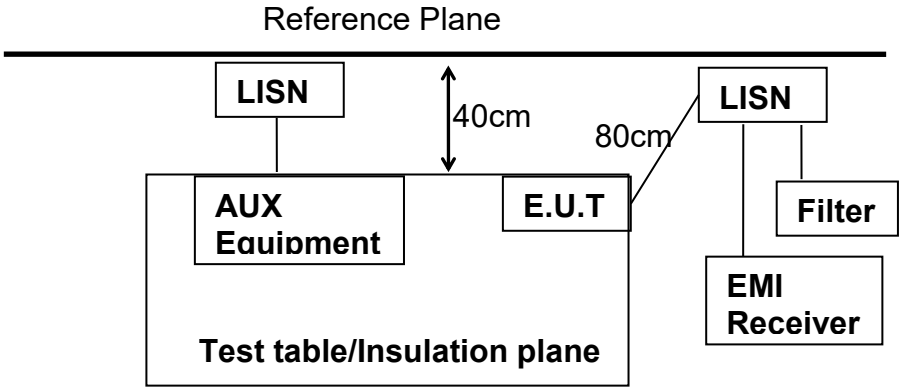
## 4.1. Conducted Emission at the Mains Terminals Test

### 4.1.1. Limit 15.209 limits

| Frequency | Limit (dBuV) | |
|---|---|---|
| MHz | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56 | 56 to 46 |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |
| NOTE: 1.The lower limit shall apply at the transition frequencies.<br>2.The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50 MHz. | | |

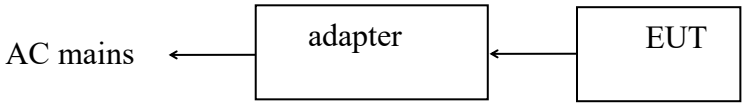
### 4.1.2. Test Setup

1.The EUT was put on a wooden table which was 0.8 m high above the ground and connected to the AC mains through the Artificial Mains Network (AMN). Where the mains cable supplied by the manufacture was longer than 0.8 m, the excess was folded back and forth parallel to the cable at the center so as to form a bundle no longer than 0.4 m.
2.The EUT was kept 0.4 m from any other earthed conducting surface. Both sides of AC line were checked to find out the maximum conducted emission levels according to the test procedure during the conducted emission test.
3.The frequency range from 150 kHz to 30 MHz was investigated.
4.The bandwidth of the test receiver was set at 9 kHz.
5.Pretest for all mode, The test data of the worst case condition(s) was reported on the following page.

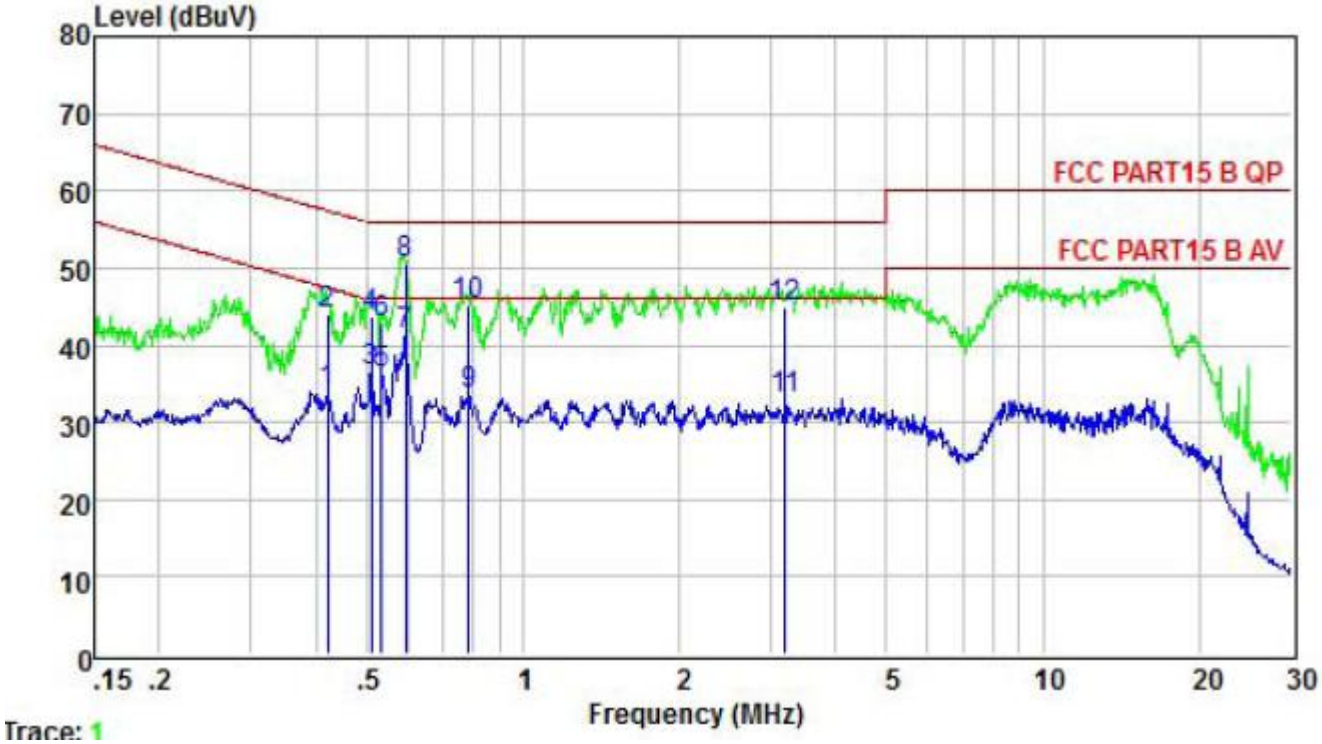



Remark: E.U.T. :Equipment Under Test
LISN: Line Impedance Stabilization Network
Test table height: 0.8m.

Test block

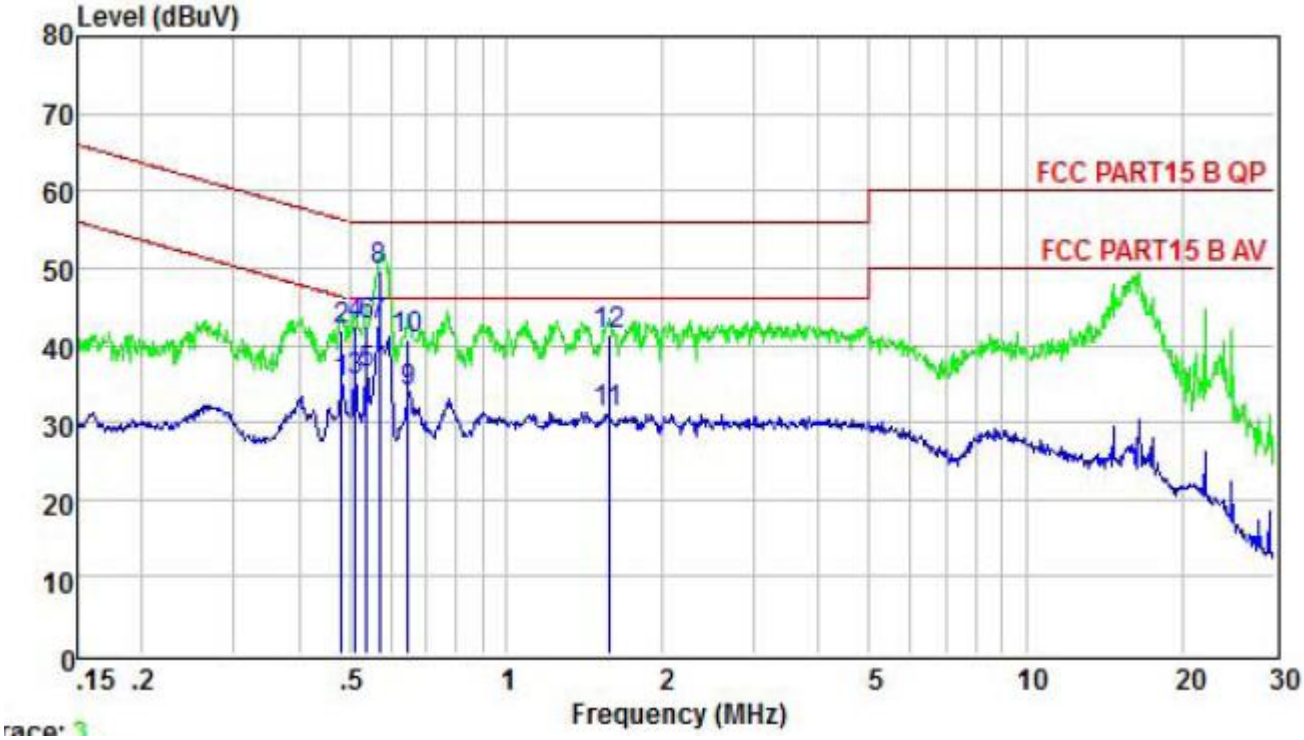


| | | | |
|---|---|---|---|
| EUT： | Wireless Router | Model Name ： | Q8 |
| Temperature： | 26 ℃ | Relative Humidity： | 54% |
| Pressure： | 1010hPa | Phase： | L |
| Test Voltage ： | DC 5.0V form Adapter<br>AC 120V/60Hz | Test Mode： | Mode 5 |



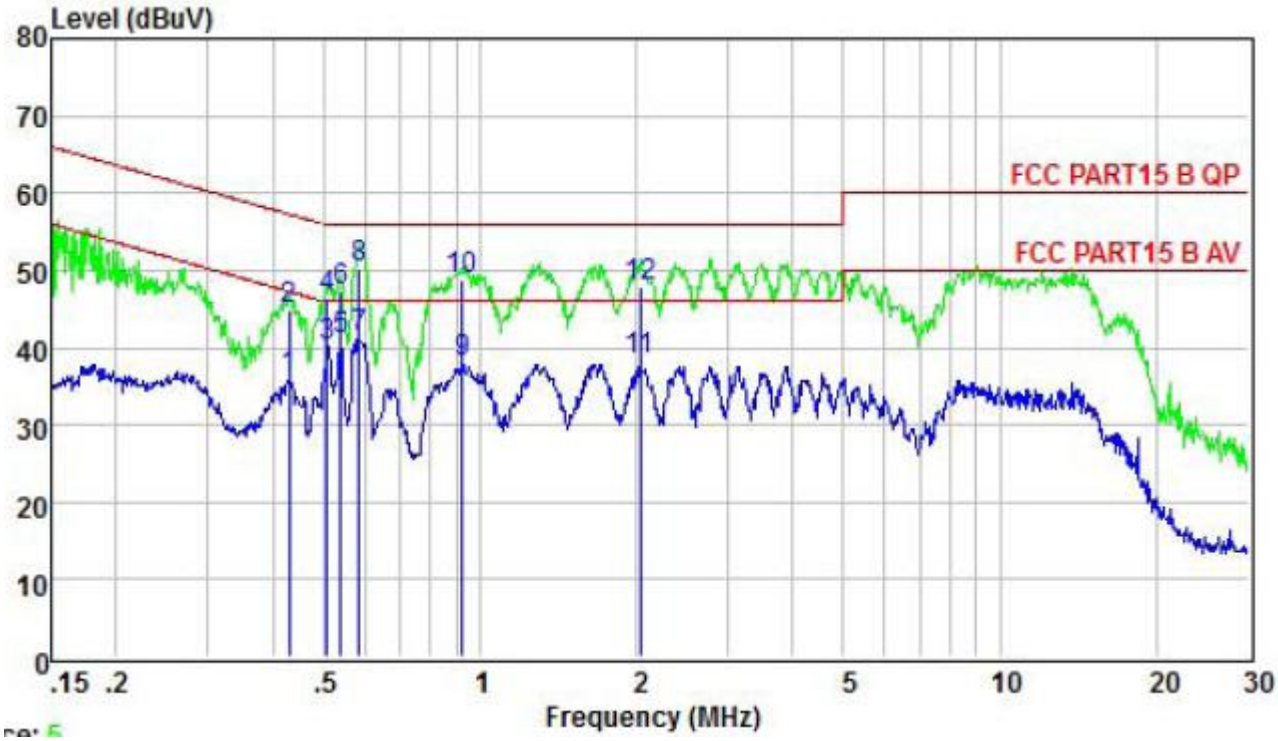

| | Freq | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|
| | MHz | dBuV | dBuV | dB | |
| 1 | 0.421 | 34.04 | 47.42 | -13.38 | Average |
| 2 | 0.421 | 43.90 | 57.42 | -13.52 | QP |
| 3 | 0.510 | 36.49 | 46.00 | -9.51 | Average |
| 4 | 0.510 | 43.60 | 56.00 | -12.40 | QP |
| 5 | 0.535 | 36.40 | 46.00 | -9.60 | Average |
| 6 | 0.535 | 42.90 | 56.00 | -13.10 | QP |
| 7 | 0.595 | 41.39 | 46.00 | -4.61 | Average |
| 8 | 0.595 | 50.60 | 56.00 | -5.40 | QP |
| 9 | 0.788 | 33.58 | 46.00 | -12.42 | Average |
| 10 | 0.788 | 45.20 | 56.00 | -10.80 | QP |
| 11 | 3.190 | 33.01 | 46.00 | -12.99 | Average |
| 12 | 3.190 | 44.80 | 56.00 | -11.20 | QP |

| | | | |
|---|---|---|---|
| EUT： | Wireless Router | Model Name ： | Q8 |
| Temperature： | 26 ℃ | Relative Humidity： | 54% |
| Pressure： | 1010hPa | Phase： | N |
| Test Voltage ： | DC 5.0V form Adapter<br>AC 120V/60Hz | Test Mode： | Mode 5 |



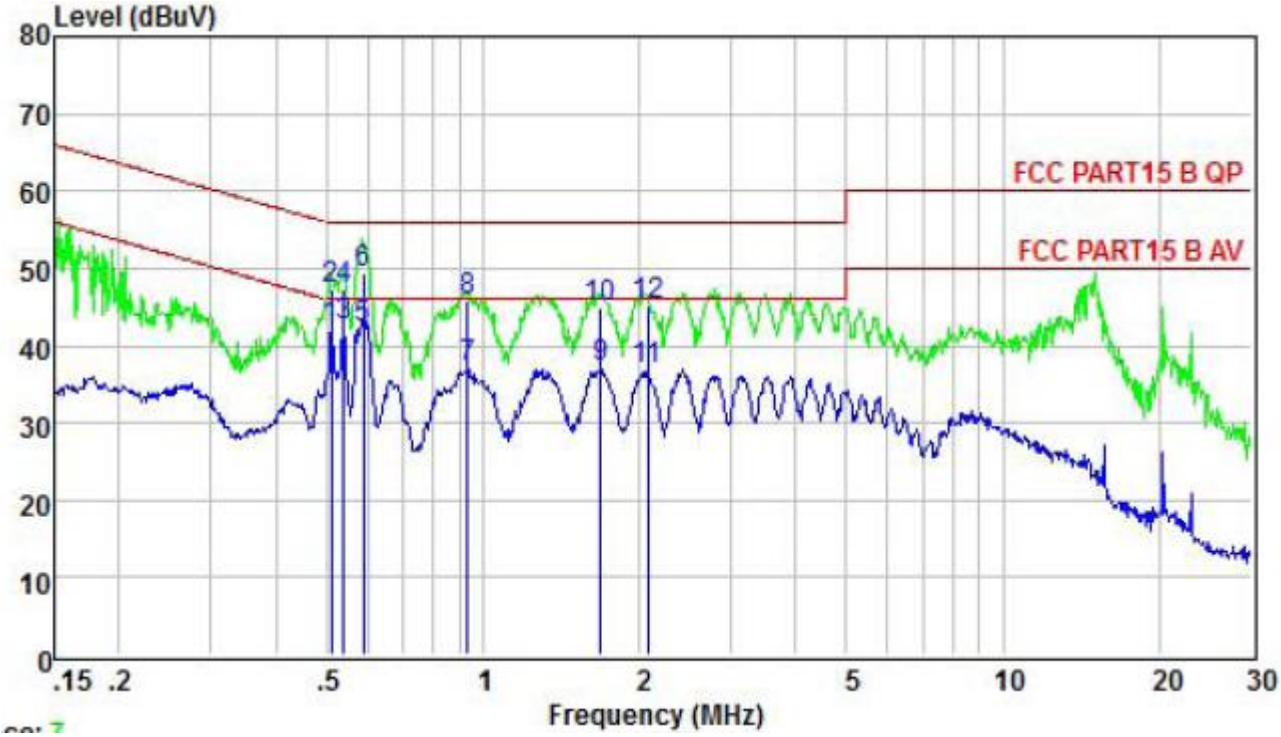

| | Freq | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|
| | MHz | dBuV | dBuV | dB | |
| 1 | 0.484 | 35.19 | 46.27 | -11.08 | Average |
| 2 | 0.484 | 41.80 | 56.27 | -14.47 | QP |
| 3 | 0.513 | 35.25 | 46.00 | -10.75 | Average |
| 4 | 0.513 | 42.60 | 56.00 | -13.40 | QP |
| 5 | 0.541 | 36.18 | 46.00 | -9.82 | Average |
| 6 | 0.541 | 42.40 | 56.00 | -13.60 | QP |
| 7 | 0.570 | 42.44 | 46.00 | -3.56 | Average |
| 8 | 0.570 | 49.59 | 56.00 | -6.41 | QP |
| 9 | 0.647 | 33.94 | 46.00 | -12.06 | Average |
| 10 | 0.647 | 40.70 | 56.00 | -15.30 | QP |
| 11 | 1.577 | 31.36 | 46.00 | -14.64 | Average |
| 12 | 1.577 | 41.30 | 56.00 | -14.70 | QP |

| | | | |
|---|---|---|---|
| EUT： | Wireless Router | Model Name ： | Q8 |
| Temperature： | 26 ℃ | Relative Humidity： | 54% |
| Pressure： | 1010hPa | Phase： | L |
| Test Voltage ： | DC 5.0V form Adapter<br>AC 240V/60Hz | Test Mode： | Mode 5 |




| | Freq | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|
| | MHz | dBuV | dBuV | dB | |
| 1 | 0.431 | 35.84 | 47.24 | -11.40 | Average |
| 2 | 0.431 | 44.80 | 57.24 | -12.44 | QP |
| 3 | 0.507 | 40.22 | 46.00 | -5.78 | Average |
| 4 | 0.507 | 46.30 | 56.00 | -9.70 | QP |
| 5 | 0.541 | 40.98 | 46.00 | -5.02 | Average |
| 6 | 0.541 | 47.30 | 56.00 | -8.70 | QP |
| 7 | 0.585 | 41.30 | 46.00 | -4.70 | Average |
| 8 | 0.585 | 50.30 | 56.00 | -5.70 | QP |
| 9 | 0.923 | 37.94 | 46.00 | -8.06 | Average |
| 10 | 0.923 | 48.90 | 56.00 | -7.10 | QP |
| 11 | 2.033 | 38.44 | 46.00 | -7.56 | Average |
| 12 | 2.033 | 47.80 | 56.00 | -8.20 | QP |

| | | | |
|---|---|---|---|
| EUT： | Wireless Router | Model Name ： | Q8 |
| Temperature： | 26 ℃ | Relative Humidity： | 54% |
| Pressure： | 1010hPa | Phase： | N |
| Test Voltage ： | DC 5.0V form Adapter<br>AC 240V/60Hz | Test Mode： | Mode 5 |




| | Freq | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|
| | MHz | dBuV | dBuV | dB | |
| 1 | 0.510 | 42.13 | 46.00 | -3.87 | Average |
| 2 | 0.510 | 47.30 | 56.00 | -8.70 | QP |
| 3 | 0.541 | 42.64 | 46.00 | -3.36 | Average |
| 4 | 0.541 | 47.30 | 56.00 | -8.70 | QP |
| 5 | 0.589 | 42.33 | 46.00 | -3.67 | Average |
| 6 | 0.589 | 49.40 | 56.00 | -6.60 | QP |
| 7 | 0.933 | 37.22 | 46.00 | -8.78 | Average |
| 8 | 0.933 | 45.80 | 56.00 | -10.20 | QP |
| 9 | 1.680 | 37.12 | 46.00 | -8.88 | Average |
| 10 | 1.680 | 44.90 | 56.00 | -11.10 | QP |
| 11 | 2.077 | 36.90 | 46.00 | -9.10 | Average |
| 12 | 2.077 | 45.30 | 56.00 | -10.70 | QP |

## 4.2. Radiated Emission Test

### 4.2.1. Limit 15.209 limits

| Frequency MHZ | Distance Meters | Filed Strengths Limit | |
|---|---|---|---|
| | | μV/m | dB(μV)/m |
| 30~88 | 3 | 100 | 40.0 |
| 88~216 | 3 | 150 | 43.5 |
| 216~960 | 3 | 200 | 46.0 |
| 960~1000 | 3 | 500 | 54.0 |
| Above 1000 | 3 | 74.0dB(μV)/m(Peak)<br>54.0dB(μV)/m(Average) | |

### 4.2.2. Restricted bands of operation

| MHz | MHz | MHz | GHz |
|---|---|---|---|
| 0.009-0.110 | 16.42-16.423 | 399.9-410 | 4.5-5.15 |
| 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 | |
| All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209,all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits. | | | |

### 4.2.3. Test setup

The EUT was placed on a turn table which was 0.8 m(above 1GHz, the high was 1.5m) above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was set 3 m away from the receiving antenna which was mounted on an antenna tower. The measuring antenna moved up and down to find out the maximum emission level. It moved from 1 m to 4 m for both horizontal and vertical polarizations.

The EUT was tested in the Chamber Site. It was pre-scanned with a Peak detector from the spectrum, and all the final readings from the test receiver were measured with the Quasi-Peak detector.

The bandwidth of the EMI test receiver is set at 120kHz for frequency range from 30MHz to 1000 MHz.

The bandwidth of the Spectrum's VBW is set at 3MHz and RBW is set at 1MHz for peak emissions measurement above 1GHz and 1MHz RBW, 10Hz VBW for average emissions measure above 1GHz, Both PK and AV measure, PK detector is used.

The frequency range from 30MHz to 10$^{th}$ harmonic (25GHz) are checked. and no any emissions were found from 18GHz to 25 GHz, So the radiated emissions from 18GHz to 25GHz were not record.

Notes: 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading-Preamp Factor.

2. Measurement Uncertainty: ±3.2 dB at a level of confidence of 95%.

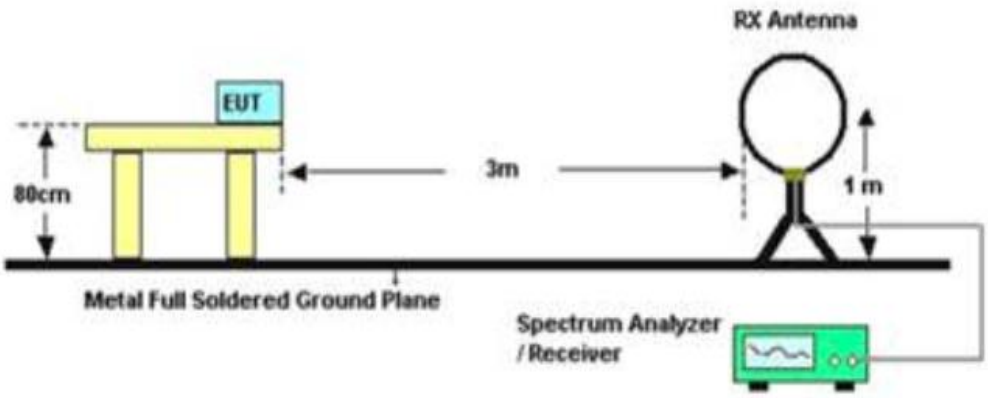
3. For emissions above 1GHz, if peak level comply with average limit, then the average level is deemed to comply with average limit.

4. For emissions below 1GHz, pretest for all mode, The test data of the worst case condition(s) was reported on the following pages.

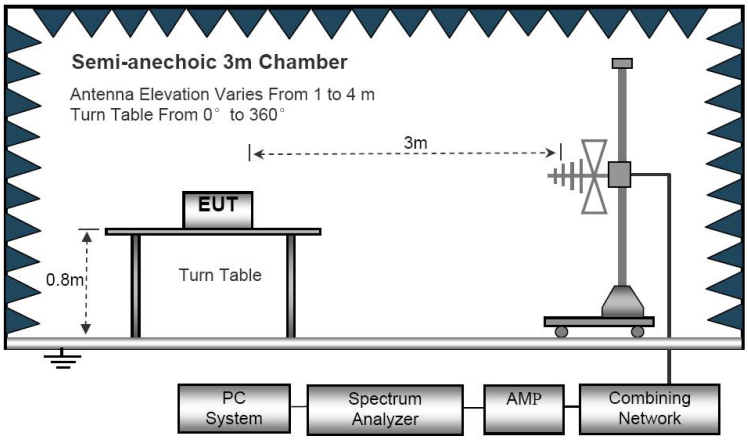
5. For Both PK and AV value above 1GHz, PK detector is used.

6.EUT Pre-scan X/Y/Z orientation, only worst case is presented in the report (Z orientation).

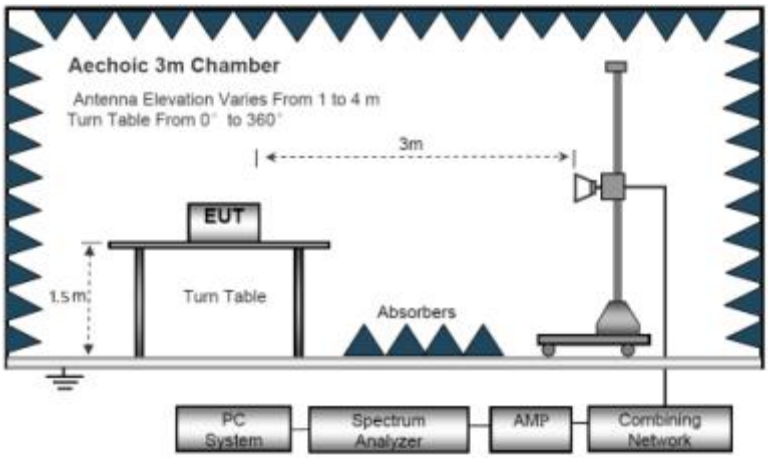
## Radiated Emission Test-Up Frequency Below 30MHz




## Radiated Emission Test-Up Frequency 30MHz- 1GHz




## Above 1GHz



| | | | |
|---|---|---|---|
| EUT： | Wireless Router | Model Name ： | Q8 |
| Temperature： | 20 ℃ | Relative Humidity： | 48% |
| Pressure： | 1010hPa | Test Mode： | TX |
| Test Voltage ： | DC 5.0V form Adapter | | |

**Below 30MHz**

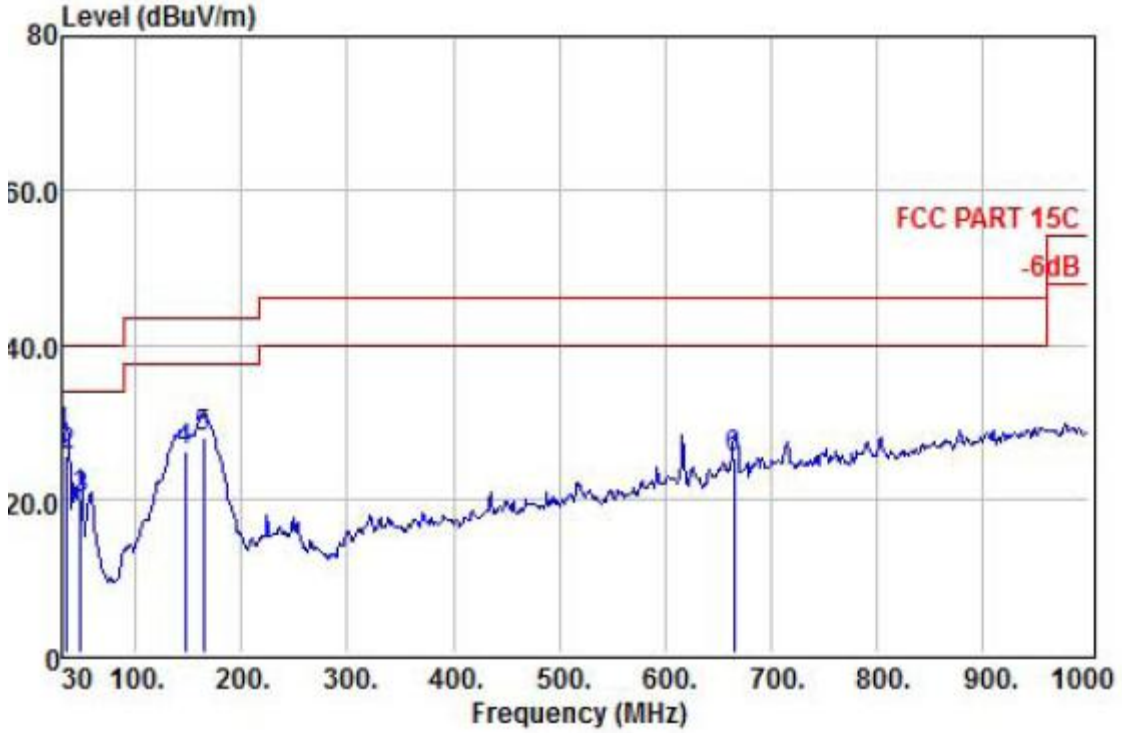
| Freq. | Reading | Limit | Margin | State |
|---|---|---|---|---|
| (MHz) | (dBuV/m) | (dBuV/m) | (dB) | P/F |
| -- | -- | -- | -- | P |
| -- | -- | -- | -- | P |

**Note:**

**The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.**
**Distance extrapolation factor =40 log (specific distance/test distance)(dB);**
**Limit line = specific limits(dBuv) + distance extrapolation factor.**

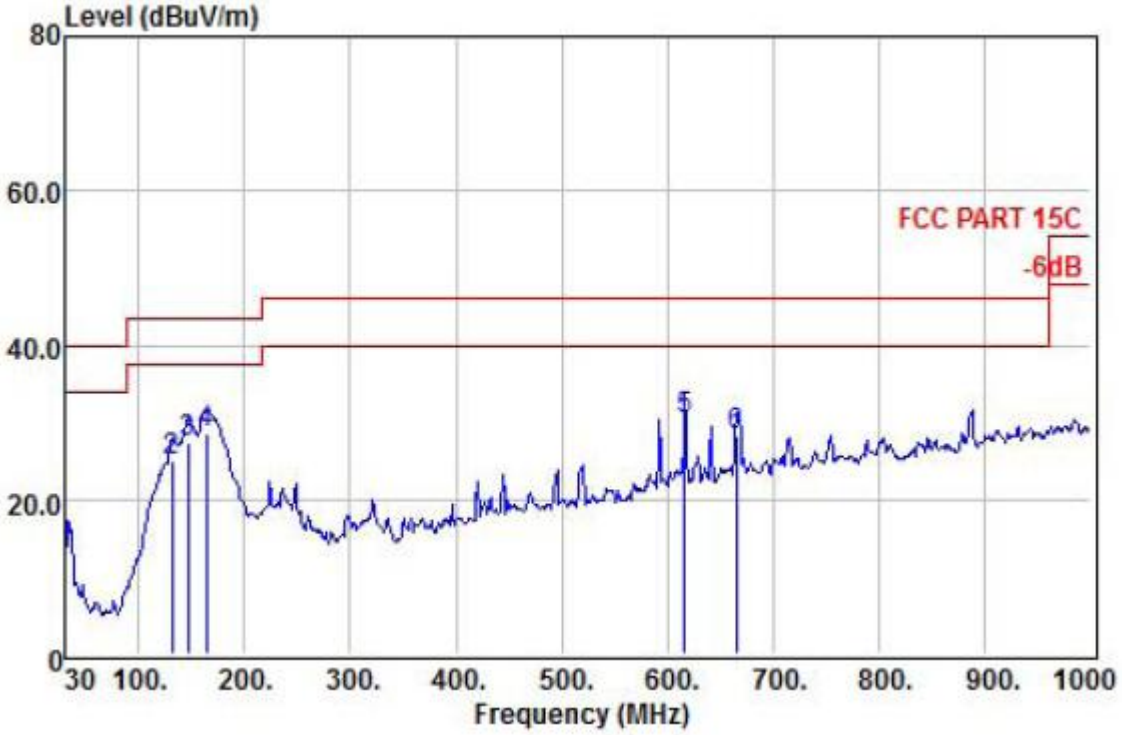
| Below 1GHz | | | |
|---|---|---|---|
| EUT： | Wireless Router | Model Name ： | Q8 |
| Temperature： | 20 ℃ | Relative Humidity： | 48% |
| Pressure： | 1010hPa | Test Mode： | Mode 5 |
| Test Voltage ： | DC 5.0V form Adapter | | |

**Vertical**




| | Freq | Preamp Factor | Read Level | Cable Loss | Antenna Factor | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dB | dBuV | dB | dB/m | dBuV/m | dBuV/m | dB | |
| 1 | 30.00 | 31.41 | 40.33 | 0.56 | 18.80 | 28.28 | 40.00 | -11.72 | QP |
| 2 | 34.85 | 31.38 | 40.48 | 0.56 | 15.94 | 25.60 | 40.00 | -14.40 | QP |
| 3 | 47.46 | 31.39 | 40.69 | 0.75 | 9.84 | 19.89 | 40.00 | -20.11 | QP |
| 4 | 146.40 | 31.23 | 47.28 | 1.22 | 8.78 | 26.05 | 43.50 | -17.45 | QP |
| 5 | 163.86 | 31.21 | 48.46 | 1.30 | 9.55 | 28.10 | 43.50 | -15.40 | QP |
| 6 | 665.35 | 30.80 | 30.67 | 3.69 | 21.77 | 25.33 | 46.00 | -20.67 | QP |

**Horizontal**




| | Freq | Preamp Factor | Read Level | Cable Loss | Antenna Factor | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dB | dBuV | dB | dB/m | dBuV/m | dBuV/m | dB | |
| 1 | 30.00 | 31.41 | 25.88 | 0.56 | 18.80 | 13.83 | 40.00 | -26.17 | QP |
| 2 | 131.85 | 31.20 | 46.74 | 1.12 | 8.32 | 24.98 | 43.50 | -18.52 | QP |
| 3 | 146.40 | 31.23 | 48.72 | 1.22 | 8.78 | 27.49 | 43.50 | -16.01 | QP |
| 4 | 163.86 | 31.21 | 48.94 | 1.30 | 9.55 | 28.58 | 43.50 | -14.92 | QP |
| 5 | 616.85 | 30.64 | 36.67 | 3.38 | 21.07 | 30.48 | 46.00 | -15.52 | QP |
| 6 | 665.35 | 30.80 | 33.64 | 3.69 | 21.77 | 28.30 | 46.00 | -17.70 | QP |

Note: 1.Absolute Level= Reading Level+antenna Factor+cable loss - Preamp factor,
2.Over Limit= Absolute Level – Limit;
3.Mode 1 is the worst mode. Only worst case is presented in the report .

| Above 1GHz | | | |
|---|---|---|---|
| EUT : | Wireless Router | Model Name : | Q8 |
| Temperature : | 20 ℃ | Relative Humidity : | 48% |
| Pressure : | 1010hPa | Test Voltage : | DC 5V |

| Polar (H/V) | Frequency (MHz) | Meter Reading (dBuV) | Antenna Factor (dB) | Cable loss (dB) | Preamp factor (dB) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| TX-2412 | | | | | | | | | |
| V | 4824 | 29.87 | 31.99 | 12.01 | 27.50 | 46.37 | 54 | -7.63 | Average |
| V | 4824 | 43.68 | 31.99 | 12.01 | 27.50 | 60.18 | 74 | -13.82 | Peak |
| V | 7236 | 35.98 | 25.31 | 16.61 | 27.95 | 49.95 | 74 | -24.05 | Peak |
| H | 4824 | 29.87 | 31.99 | 12.01 | 27.50 | 46.37 | 54 | -7.63 | Average |
| H | 4824 | 44.38 | 31.99 | 12.01 | 27.50 | 60.88 | 74 | -13.12 | Peak |
| H | 7236 | 36.59 | 25.31 | 16.61 | 27.95 | 50.56 | 74 | -23.44 | Peak |
| TX-2437 | | | | | | | | | |
| V | 4874 | 31.34 | 32.11 | 12.14 | 27.53 | 48.06 | 54 | -5.94 | Average |
| V | 4874 | 41.27 | 32.11 | 12.14 | 27.53 | 57.99 | 74 | -16.01 | Peak |
| V | 7311 | 37.53 | 24.32 | 16.62 | 27.96 | 50.51 | 74 | -23.49 | Peak |
| H | 4874 | 32.29 | 32.11 | 12.14 | 27.53 | 49.01 | 54 | -4.99 | Average |
| H | 4874 | 38.98 | 32.11 | 12.14 | 27.53 | 55.7 | 74 | -18.3 | Peak |
| H | 7311 | 35.23 | 24.32 | 16.62 | 27.96 | 48.21 | 74 | -25.79 | Peak |
| TX-2462 | | | | | | | | | |
| V | 4924 | 30.28 | 32.23 | 12.28 | 27.56 | 47.23 | 54 | -6.77 | Average |
| V | 4924 | 41.26 | 32.23 | 12.28 | 27.56 | 58.21 | 74 | -15.79 | Peak |
| V | 7386 | 34.57 | 24.36 | 16.62 | 27.98 | 47.57 | 74 | -26.43 | Peak |
| H | 4924 | 28.77 | 32.23 | 12.28 | 27.56 | 45.72 | 54 | -8.28 | Average |
| H | 4924 | 41.59 | 32.23 | 12.28 | 27.56 | 58.54 | 74 | -15.46 | Peak |
| H | 7386 | 35.86 | 24.36 | 16.62 | 27.98 | 48.86 | 74 | -25.14 | Peak |

Note: 1.”802.11b” mode is the worst mode.

2.When PK value is lower than the Average value limit, average didn't record.

3.The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has not to be reported.

**Spurious Emission in Restricted Band (1-25G) :**

**All the modulation modes have been tested and all other emissions more than 20dB below the limit, the worst result was report as below:**

| Polar (H/V) | Frequency (MHz) | Meter Reading (dBuV) | Antenna Factor (dB) | Cable loss (dB) | Preamp factor (dB) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Detector Type |
|---|---|---|---|---|---|---|---|---|---|
| **802.11b-2412MHz** | | | | | | | | | |
| V | 3264 | 29.67 | 30.26 | 9.96 | 26.63 | 43.26 | 74 | -30.74 | Pk |
| H | 3264 | 31.25 | 30.26 | 9.96 | 26.63 | 44.84 | 74 | -29.16 | PK |
| V | 3336 | 31.34 | 30.33 | 9.96 | 26.66 | 44.97 | 74 | -29.03 | Pk |
| H | 3336 | 31.24 | 30.33 | 9.96 | 26.66 | 44.87 | 74 | -29.13 | PK |
| V | 4100 | 32.29 | 31.64 | 10.61 | 27.06 | 47.48 | 74 | -26.52 | Pk |
| H | 4100 | 32.54 | 31.64 | 10.61 | 27.06 | 47.73 | 74 | -26.27 | PK |
| V | 11764 | 32.73 | 26.64 | 17.32 | 28.98 | 47.71 | 74 | -26.29 | Pk |
| H | 11764 | 32.49 | 26.64 | 17.32 | 28.98 | 47.47 | 74 | -26.53 | PK |
| V | 17732 | 31.89 | 26.27 | 22.01 | 30.39 | 49.78 | 74 | -24.22 | Pk |
| H | 17732 | 31.82 | 26.27 | 22.01 | 30.39 | 49.71 | 74 | -24.29 | PK |
| **802.11g-2412MHz** | | | | | | | | | |
| V | 3264 | 33.01 | 30.26 | 9.96 | 26.63 | 46.6 | 74 | -27.4 | Pk |
| H | 3264 | 32.81 | 30.26 | 9.96 | 26.63 | 46.4 | 74 | -27.6 | PK |
| V | 3336 | 32.26 | 30.33 | 9.96 | 26.66 | 45.89 | 74 | -28.11 | Pk |
| H | 3336 | 32.36 | 30.33 | 9.96 | 26.66 | 45.99 | 74 | -28.01 | PK |
| V | 4100 | 32.48 | 31.64 | 10.61 | 27.06 | 47.67 | 74 | -26.33 | Pk |
| H | 4100 | 32.53 | 31.64 | 10.61 | 27.06 | 47.72 | 74 | -26.28 | PK |
| V | 11764 | 31.82 | 26.64 | 17.32 | 28.98 | 46.8 | 74 | -27.2 | Pk |
| H | 11764 | 31.59 | 26.64 | 17.32 | 28.98 | 46.57 | 74 | -27.43 | PK |
| V | 17732 | 32.38 | 26.27 | 22.01 | 30.39 | 50.27 | 74 | -23.73 | Pk |
| H | 17732 | 31.06 | 26.27 | 22.01 | 30.39 | 48.95 | 74 | -25.05 | PK |
| **802.11n(20)-2412MHz** | | | | | | | | | |
| V | 3264 | 31.91 | 30.26 | 9.96 | 26.63 | 45.5 | 74 | -28.5 | Pk |
| H | 3264 | 30.84 | 30.26 | 9.96 | 26.63 | 44.43 | 74 | -29.57 | PK |
| V | 3336 | 32.14 | 30.33 | 9.96 | 26.66 | 45.77 | 74 | -28.23 | Pk |
| H | 3336 | 31.79 | 30.33 | 9.96 | 26.66 | 45.42 | 74 | -28.58 | PK |
| V | 4100 | 32.85 | 31.64 | 10.61 | 27.06 | 48.04 | 74 | -25.96 | Pk |
| H | 4100 | 32.24 | 31.64 | 10.61 | 27.06 | 47.43 | 74 | -26.57 | PK |
| V | 11764 | 32.18 | 26.64 | 17.32 | 28.98 | 47.16 | 74 | -26.84 | Pk |
| H | 11764 | 32.74 | 26.64 | 17.32 | 28.98 | 47.72 | 74 | -26.28 | PK |
| V | 17732 | 32.16 | 26.27 | 22.01 | 30.39 | 50.05 | 74 | -23.95 | Pk |
| H | 17732 | 32.47 | 26.27 | 22.01 | 30.39 | 50.36 | 74 | -23.64 | PK |
| **802.11n(40)-2422MHz** | | | | | | | | | |
| V | 3264 | 30.23 | 30.26 | 9.96 | 26.63 | 43.82 | 74 | -30.18 | Pk |
| H | 3264 | 30.16 | 30.26 | 9.96 | 26.63 | 43.75 | 74 | -30.25 | PK |
| V | 3336 | 31.19 | 30.33 | 9.96 | 26.66 | 44.82 | 74 | -29.18 | Pk |
| H | 3336 | 31.48 | 30.33 | 9.96 | 26.66 | 45.11 | 74 | -28.89 | PK |
| V | 4100 | 32.45 | 31.64 | 10.61 | 27.06 | 47.64 | 74 | -26.36 | Pk |
| H | 4100 | 30.62 | 31.64 | 10.61 | 27.06 | 45.81 | 74 | -28.19 | PK |
| V | 11764 | 31.18 | 26.64 | 17.32 | 28.98 | 46.16 | 74 | -27.84 | Pk |
| H | 11764 | 31.42 | 26.64 | 17.32 | 28.98 | 46.4 | 74 | -27.6 | PK |
| V | 17732 | 29.23 | 26.27 | 22.01 | 30.39 | 47.12 | 74 | -26.88 | Pk |
| H | 17732 | 29.77 | 26.27 | 22.01 | 30.39 | 47.66 | 74 | -26.34 | PK |

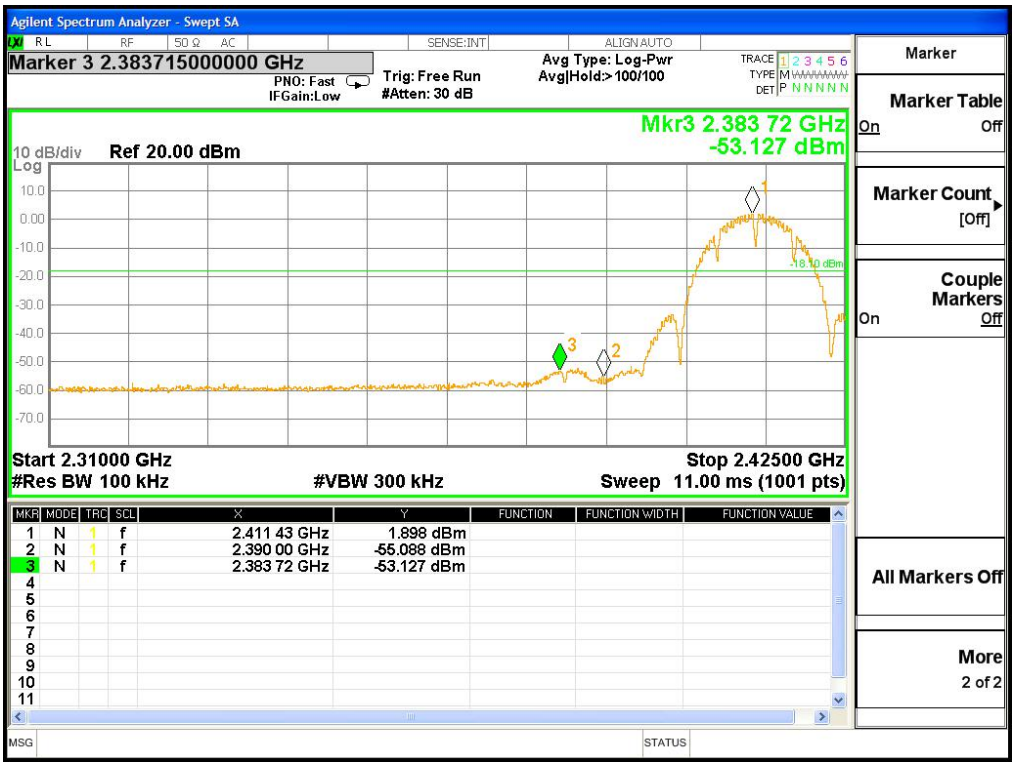
| Polar (H/V) | Frequency (MHz) | Meter Reading (dBuV) | Antenna Factor (dB) | Cable loss (dB) | Preamp factor (dB) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Detector Type |
|---|---|---|---|---|---|---|---|---|---|
| **802.11b-2437MHz** | | | | | | | | | |
| V | 3264 | 30.54 | 30.26 | 9.96 | 26.63 | 44.13 | 74 | -29.87 | Pk |
| H | 3264 | 31.18 | 30.26 | 9.96 | 26.63 | 44.77 | 74 | -29.23 | PK |
| V | 3336 | 31.69 | 30.33 | 9.96 | 26.66 | 45.32 | 74 | -28.68 | Pk |
| H | 3336 | 30.65 | 30.33 | 9.96 | 26.66 | 44.28 | 74 | -29.72 | PK |
| V | 4100 | 31.69 | 31.64 | 10.61 | 27.06 | 46.88 | 74 | -27.12 | Pk |
| H | 4100 | 31.64 | 31.64 | 10.61 | 27.06 | 46.83 | 74 | -27.17 | PK |
| V | 11764 | 31.82 | 26.64 | 17.32 | 28.98 | 46.8 | 74 | -27.2 | Pk |
| H | 11764 | 31.35 | 26.64 | 17.32 | 28.98 | 46.33 | 74 | -27.67 | PK |
| V | 17732 | 31.26 | 26.27 | 22.01 | 30.39 | 49.15 | 74 | -24.85 | Pk |
| H | 17732 | 31.75 | 26.27 | 22.01 | 30.39 | 49.64 | 74 | -24.36 | PK |
| **802.11g-2437MHz** | | | | | | | | | |
| V | 3264 | 32.75 | 30.26 | 9.96 | 26.63 | 46.34 | 74 | -27.66 | Pk |
| H | 3264 | 31.19 | 30.26 | 9.96 | 26.63 | 44.78 | 74 | -29.22 | PK |
| V | 3336 | 31.84 | 30.33 | 9.96 | 26.66 | 45.47 | 74 | -28.53 | Pk |
| H | 3336 | 31.79 | 30.33 | 9.96 | 26.66 | 45.42 | 74 | -28.58 | PK |
| V | 4100 | 31.75 | 31.64 | 10.61 | 27.06 | 46.94 | 74 | -27.06 | Pk |
| H | 4100 | 31.68 | 31.64 | 10.61 | 27.06 | 46.87 | 74 | -27.13 | PK |
| V | 11764 | 31.75 | 26.64 | 17.32 | 28.98 | 46.73 | 74 | -27.27 | Pk |
| H | 11764 | 31.87 | 26.64 | 17.32 | 28.98 | 46.85 | 74 | -27.15 | PK |
| V | 17732 | 31.65 | 26.27 | 22.01 | 30.39 | 49.54 | 74 | -24.46 | Pk |
| H | 17732 | 31.57 | 26.27 | 22.01 | 30.39 | 49.46 | 74 | -24.54 | PK |
| **802.11n(20)-2437MHz** | | | | | | | | | |
| V | 3264 | 31.57 | 30.26 | 9.96 | 26.63 | 45.16 | 74 | -28.84 | Pk |
| H | 3264 | 30.48 | 30.26 | 9.96 | 26.63 | 44.07 | 74 | -29.93 | PK |
| V | 3336 | 32.32 | 30.33 | 9.96 | 26.66 | 45.95 | 74 | -28.05 | Pk |
| H | 3336 | 31.43 | 30.33 | 9.96 | 26.66 | 45.06 | 74 | -28.94 | PK |
| V | 4100 | 31.79 | 31.64 | 10.61 | 27.06 | 46.98 | 74 | -27.02 | Pk |
| H | 4100 | 31.65 | 31.64 | 10.61 | 27.06 | 46.84 | 74 | -27.16 | PK |
| V | 11764 | 31.32 | 26.64 | 17.32 | 28.98 | 46.3 | 74 | -27.7 | Pk |
| H | 11764 | 31.79 | 26.64 | 17.32 | 28.98 | 46.77 | 74 | -27.23 | PK |
| V | 17732 | 31.37 | 26.27 | 22.01 | 30.39 | 49.26 | 74 | -24.74 | Pk |
| H | 17732 | 31.29 | 26.27 | 22.01 | 30.39 | 49.18 | 74 | -24.82 | PK |
| **802.11n(40)-2437MHz** | | | | | | | | | |
| V | 3264 | 31.65 | 30.26 | 9.96 | 26.63 | 45.24 | 74 | -28.76 | Pk |
| H | 3264 | 30.66 | 30.26 | 9.96 | 26.63 | 44.25 | 74 | -29.75 | PK |
| V | 3336 | 31.59 | 30.33 | 9.96 | 26.66 | 45.22 | 74 | -28.78 | Pk |
| H | 3336 | 31.61 | 30.33 | 9.96 | 26.66 | 45.24 | 74 | -28.76 | PK |
| V | 4100 | 31.32 | 31.64 | 10.61 | 27.06 | 46.51 | 74 | -27.49 | Pk |
| H | 4100 | 30.18 | 31.64 | 10.61 | 27.06 | 45.37 | 74 | -28.63 | PK |
| V | 11764 | 31.32 | 26.64 | 17.32 | 28.98 | 46.3 | 74 | -27.7 | Pk |
| H | 11764 | 31.57 | 26.64 | 17.32 | 28.98 | 46.55 | 74 | -27.45 | PK |
| V | 17732 | 29.72 | 26.27 | 22.01 | 30.39 | 47.61 | 74 | -26.39 | Pk |
| H | 17732 | 29.91 | 26.27 | 22.01 | 30.39 | 47.8 | 74 | -26.2 | PK |

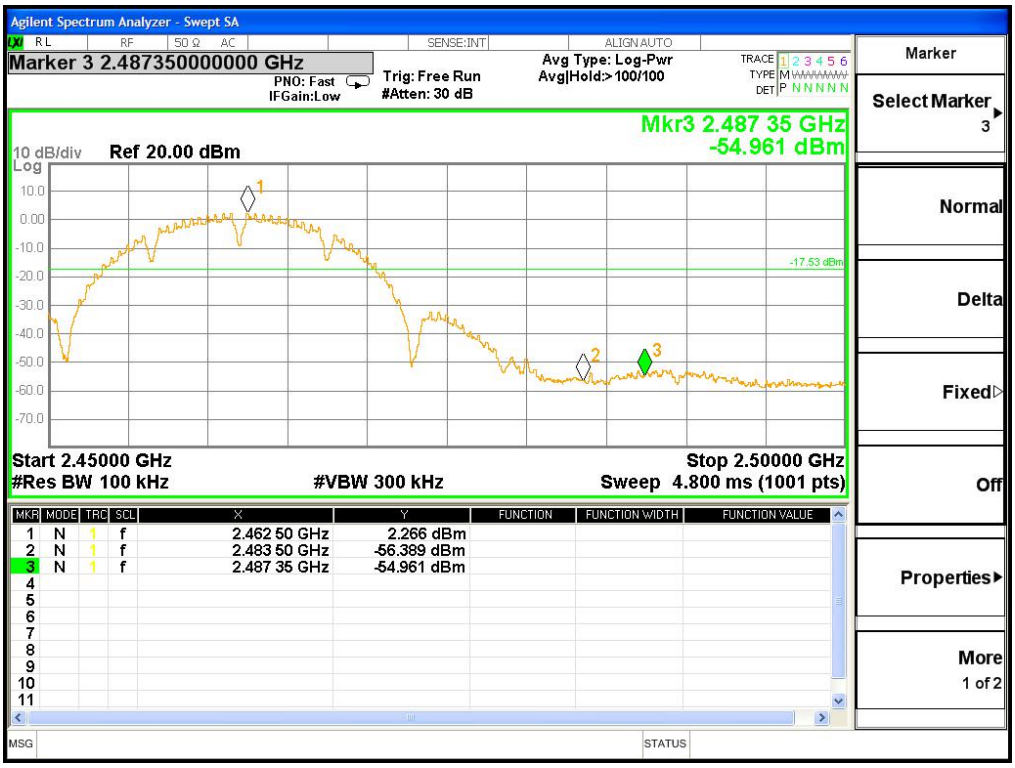
| Polar (H/V) | Frequency (MHz) | Meter Reading (dBuV) | Antenna Factor (dB) | Cable loss (dB) | Preamp factor (dB) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Detector Type |
|---|---|---|---|---|---|---|---|---|---|
| **802.11b-2462MHz** | | | | | | | | | |
| V | 3264 | 28.89 | 30.26 | 9.96 | 26.63 | 42.48 | 74 | -31.52 | Pk |
| H | 3264 | 30.08 | 30.26 | 9.96 | 26.63 | 43.67 | 74 | -30.33 | PK |
| V | 3336 | 30.94 | 30.33 | 9.96 | 26.66 | 44.57 | 74 | -29.43 | Pk |
| H | 3336 | 30.86 | 30.33 | 9.96 | 26.66 | 44.49 | 74 | -29.51 | PK |
| V | 4100 | 31.74 | 31.64 | 10.61 | 27.06 | 46.93 | 74 | -27.07 | Pk |
| H | 4100 | 31.69 | 31.64 | 10.61 | 27.06 | 46.88 | 74 | -27.12 | PK |
| V | 11764 | 31.26 | 26.64 | 17.32 | 28.98 | 46.24 | 74 | -27.76 | Pk |
| H | 11764 | 31.53 | 26.64 | 17.32 | 28.98 | 46.51 | 74 | -27.49 | PK |
| V | 17732 | 30.05 | 26.27 | 22.01 | 30.39 | 47.94 | 74 | -26.06 | Pk |
| H | 17732 | 30.25 | 26.27 | 22.01 | 30.39 | 48.14 | 74 | -25.86 | PK |
| **802.11g-2462MHz** | | | | | | | | | |
| V | 3264 | 32.97 | 30.26 | 9.96 | 26.63 | 46.56 | 74 | -27.44 | Pk |
| H | 3264 | 32.58 | 30.26 | 9.96 | 26.63 | 46.17 | 74 | -27.83 | PK |
| V | 3336 | 32.05 | 30.33 | 9.96 | 26.66 | 45.68 | 74 | -28.32 | Pk |
| H | 3336 | 31.29 | 30.33 | 9.96 | 26.66 | 44.92 | 74 | -29.08 | PK |
| V | 4100 | 30.46 | 31.64 | 10.61 | 27.06 | 45.65 | 74 | -28.35 | Pk |
| H | 4100 | 30.84 | 31.64 | 10.61 | 27.06 | 46.03 | 74 | -27.97 | PK |
| V | 11764 | 31.45 | 26.64 | 17.32 | 28.98 | 46.43 | 74 | -27.57 | Pk |
| H | 11764 | 31.06 | 26.64 | 17.32 | 28.98 | 46.04 | 74 | -27.96 | PK |
| V | 17732 | 32.27 | 26.27 | 22.01 | 30.39 | 50.16 | 74 | -23.84 | Pk |
| H | 17732 | 30.83 | 26.27 | 22.01 | 30.39 | 48.72 | 74 | -25.28 | PK |
| **802.11n(20)-2462MHz** | | | | | | | | | |
| V | 3264 | 31.38 | 30.26 | 9.96 | 26.63 | 44.97 | 74 | -29.03 | Pk |
| H | 3264 | 31.06 | 30.26 | 9.96 | 26.63 | 44.65 | 74 | -29.35 | PK |
| V | 3336 | 31.83 | 30.33 | 9.96 | 26.66 | 45.46 | 74 | -28.54 | Pk |
| H | 3336 | 31.19 | 30.33 | 9.96 | 26.66 | 44.82 | 74 | -29.18 | PK |
| V | 4100 | 31.67 | 31.64 | 10.61 | 27.06 | 46.86 | 74 | -27.14 | Pk |
| H | 4100 | 31.25 | 31.64 | 10.61 | 27.06 | 46.44 | 74 | -27.56 | PK |
| V | 11764 | 31.54 | 26.64 | 17.32 | 28.98 | 46.52 | 74 | -27.48 | Pk |
| H | 11764 | 31.52 | 26.64 | 17.32 | 28.98 | 46.5 | 74 | -27.5 | PK |
| V | 17732 | 31.79 | 26.27 | 22.01 | 30.39 | 49.68 | 74 | -24.32 | Pk |
| H | 17732 | 31.73 | 26.27 | 22.01 | 30.39 | 49.62 | 74 | -24.38 | PK |
| **802.11n(40)-2452MHz** | | | | | | | | | |
| V | 3264 | 31.82 | 30.26 | 9.96 | 26.63 | 45.41 | 74 | -28.59 | Pk |
| H | 3264 | 30.93 | 30.26 | 9.96 | 26.63 | 44.52 | 74 | -29.48 | PK |
| V | 3336 | 30.83 | 30.33 | 9.96 | 26.66 | 44.46 | 74 | -29.54 | Pk |
| H | 3336 | 31.71 | 30.33 | 9.96 | 26.66 | 45.34 | 74 | -28.66 | PK |
| V | 4100 | 31.06 | 31.64 | 10.61 | 27.06 | 46.25 | 74 | -27.75 | Pk |
| H | 4100 | 31.13 | 31.64 | 10.61 | 27.06 | 46.32 | 74 | -27.68 | PK |
| V | 11764 | 30.95 | 26.64 | 17.32 | 28.98 | 45.93 | 74 | -28.07 | Pk |
| H | 11764 | 31.15 | 26.64 | 17.32 | 28.98 | 46.13 | 74 | -27.87 | PK |
| V | 17732 | 30.09 | 26.27 | 22.01 | 30.39 | 47.98 | 74 | -26.02 | Pk |
| H | 17732 | 30.38 | 26.27 | 22.01 | 30.39 | 48.27 | 74 | -25.73 | PK |

**If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.**

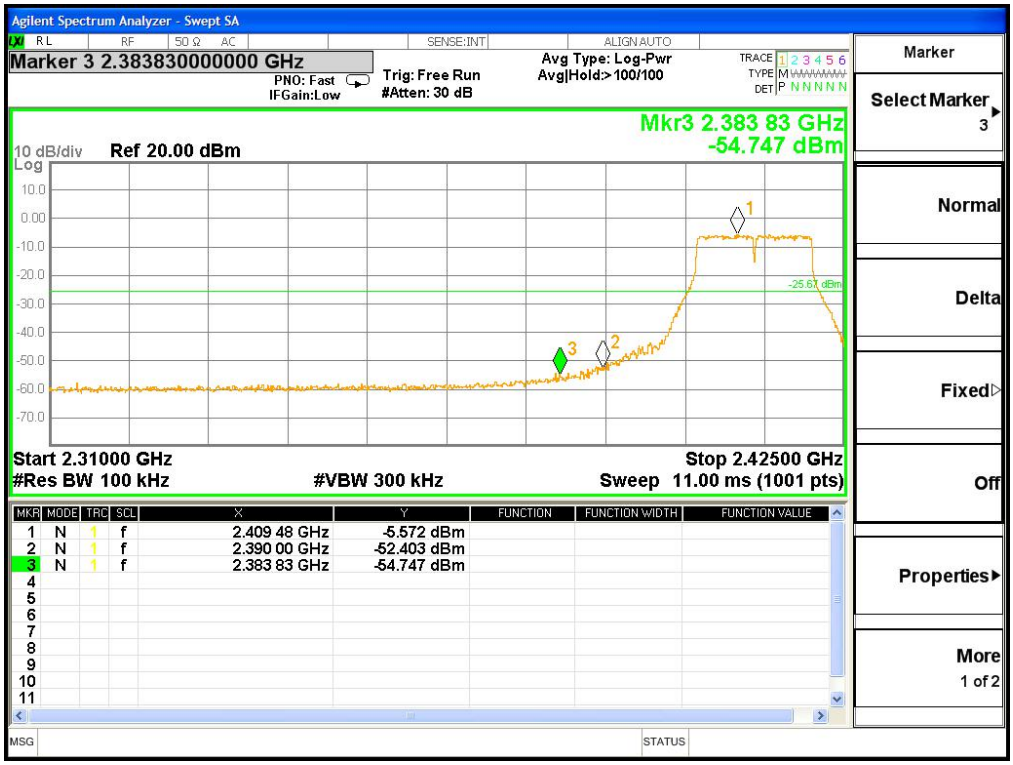
## Spurious Emission in Band Edge:

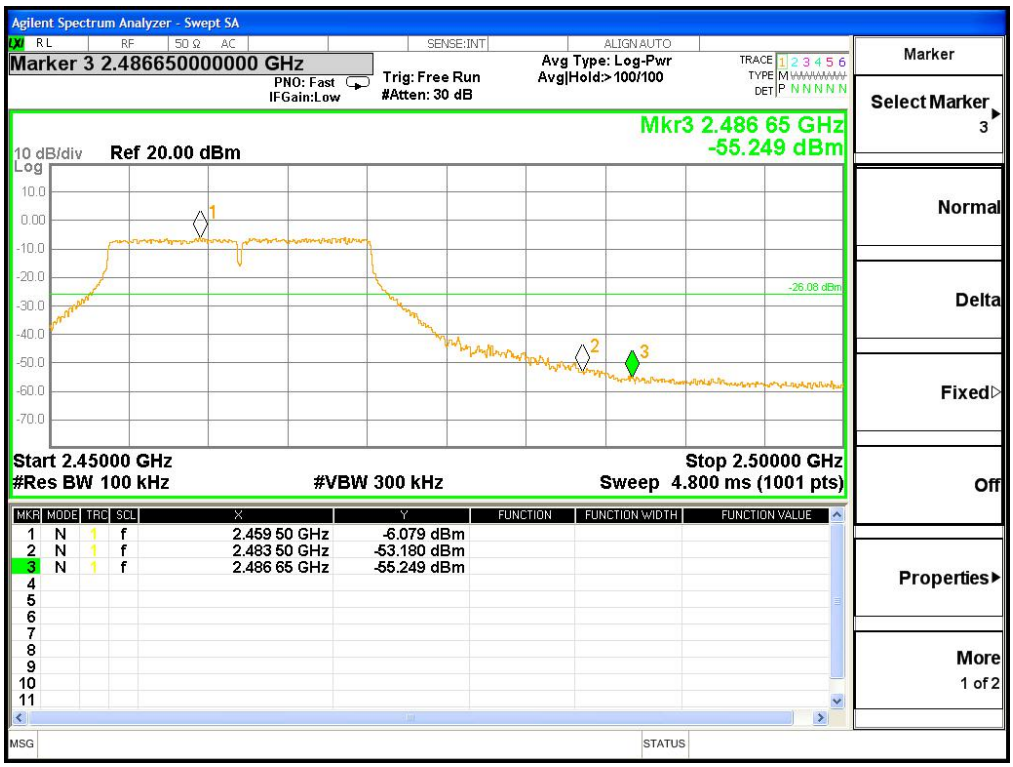
### 802.11b



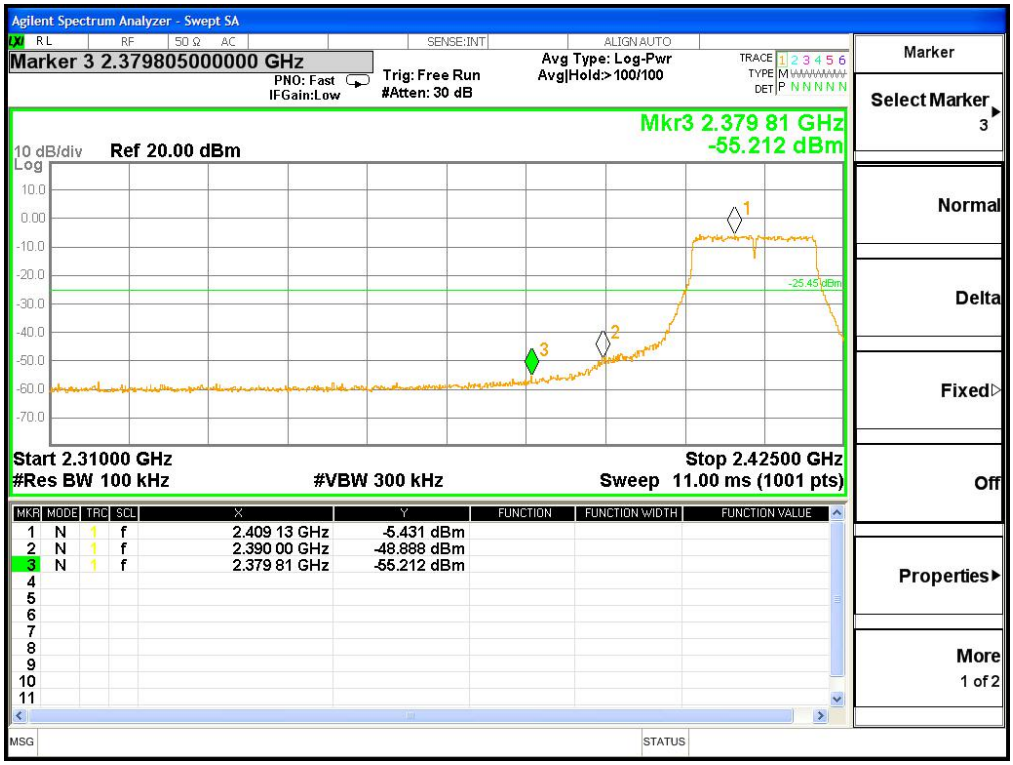



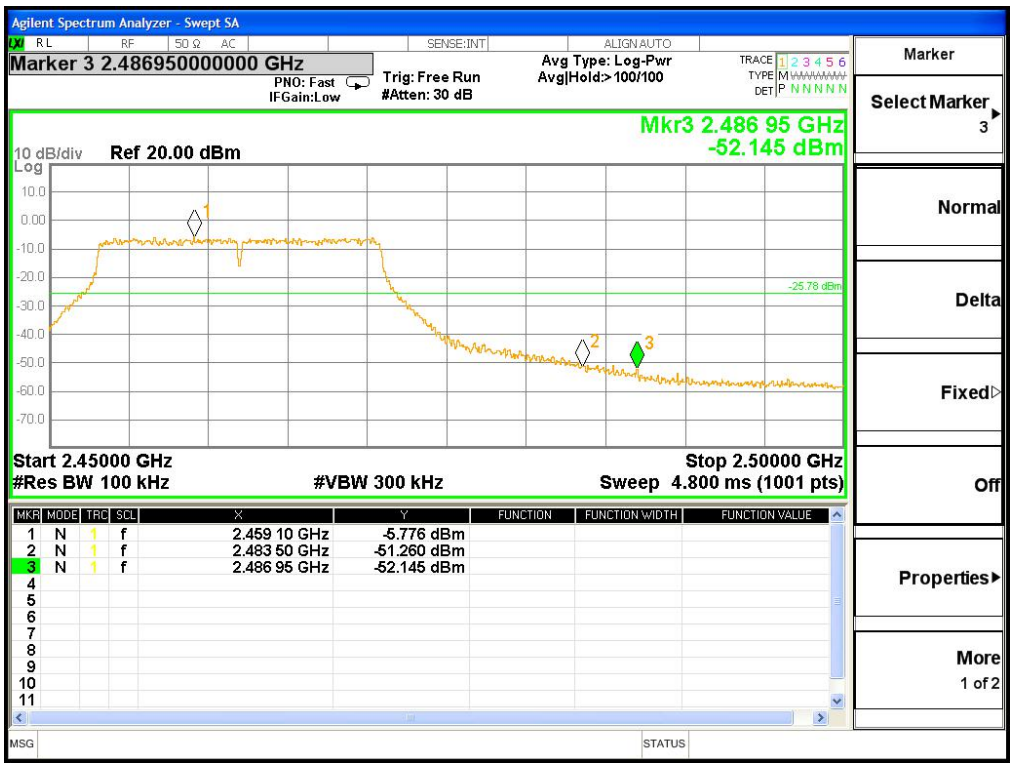
# 802.11g


Agilent Spectrum Analyzer - Swept SA
Marker 3 2.383830000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
Mkr3 2.383 83 GHz
-54.747 dBm
10 dB/div
Ref 20.00 dBm
-25.67 dBm
Start 2.31000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.42500 GHz
Sweep 11.00 ms (1001 pts)
1 N 1 f 2.409 48 GHz -5.572 dBm
2 N 1 f 2.390 00 GHz -52.403 dBm
3 N 1 f 2.383 83 GHz -54.747 dBm
Marker
Select Marker 3
Normal
Delta
Fixed
Off
Properties
More 1 of 2

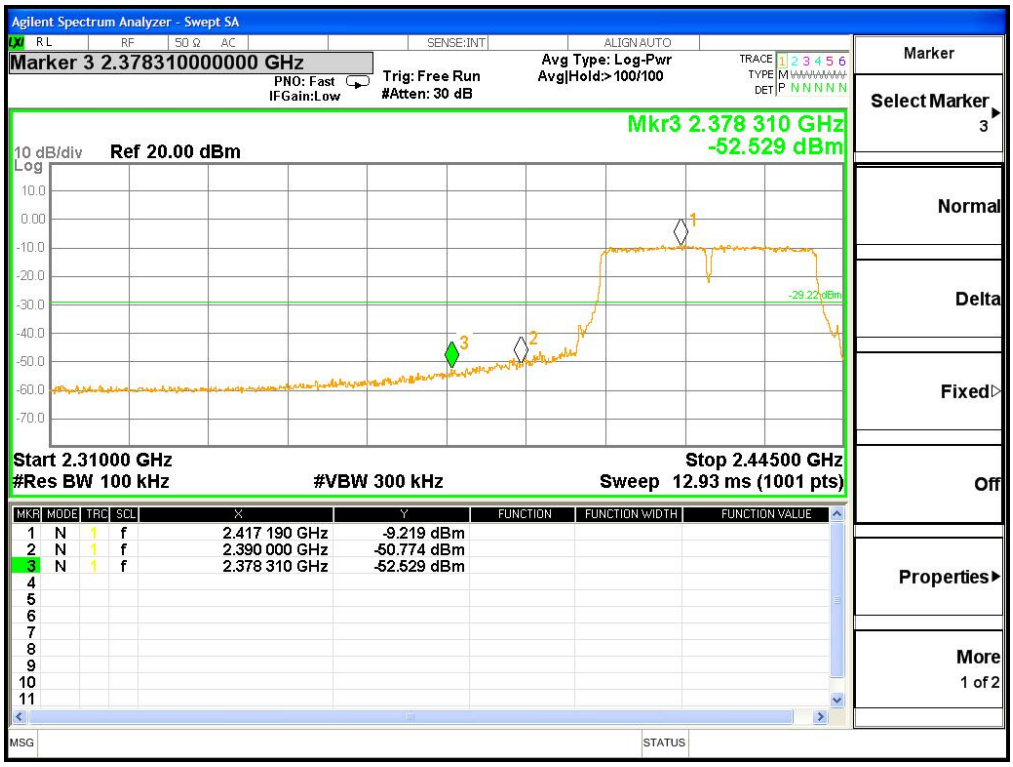

Agilent Spectrum Analyzer - Swept SA
Marker 3 2.486650000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
Mkr3 2.486 65 GHz
-55.249 dBm
10 dB/div
Ref 20.00 dBm
-26.08 dBm
Start 2.45000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.50000 GHz
Sweep 4.800 ms (1001 pts)
1 N 1 f 2.459 50 GHz -6.079 dBm
2 N 1 f 2.483 50 GHz -53.180 dBm
3 N 1 f 2.486 65 GHz -55.249 dBm
Marker
Select Marker 3
Normal
Delta
Fixed
Off
Properties
More 1 of 2

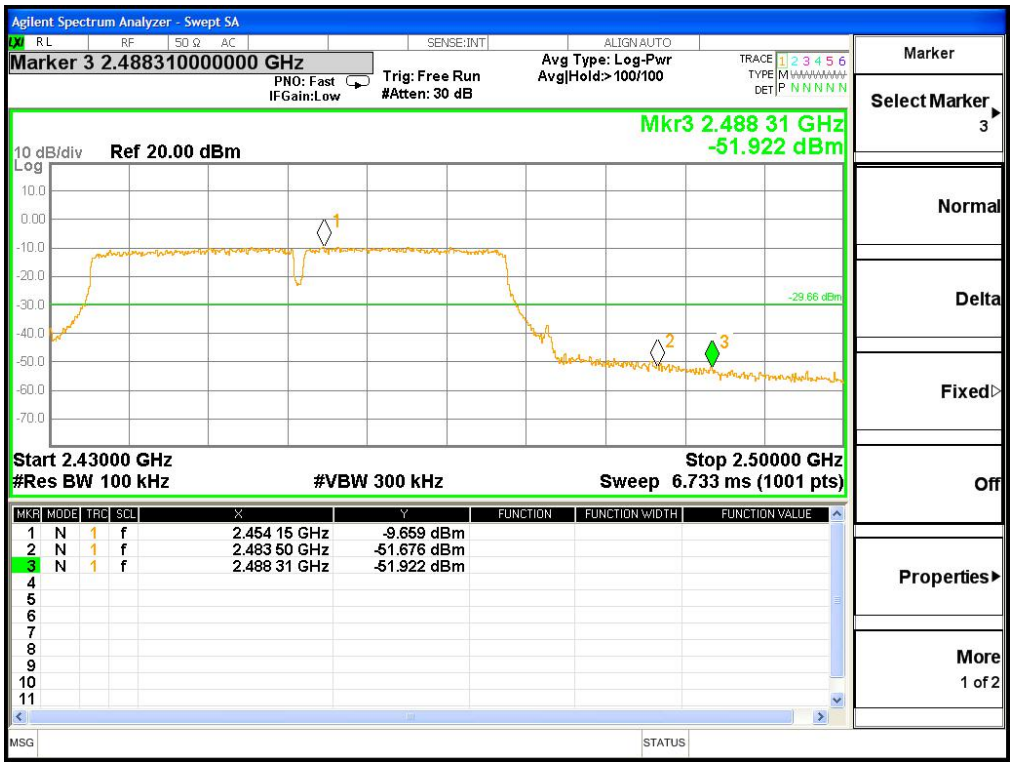
## 802.11n(20)


Agilent Spectrum Analyzer - Swept SA
Marker 3 2.379805000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
Mkr3 2.379 81 GHz
-55.212 dBm
10 dB/div
Ref 20.00 dBm
-25.45 dBm
Start 2.31000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.42500 GHz
Sweep 11.00 ms (1001 pts)
1 N 1 f 2.409 13 GHz -5.431 dBm
2 N 1 f 2.390 00 GHz -48.888 dBm
3 N 1 f 2.379 81 GHz -55.212 dBm
Marker
Select Marker 3
Normal
Delta
Fixed
Off
Properties
More 1 of 2


Agilent Spectrum Analyzer - Swept SA
Marker 3 2.486950000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
Mkr3 2.486 95 GHz
-52.145 dBm
10 dB/div
Ref 20.00 dBm
-25.78 dBm
Start 2.45000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.50000 GHz
Sweep 4.800 ms (1001 pts)
1 N 1 f 2.459 10 GHz -5.776 dBm
2 N 1 f 2.483 50 GHz -51.260 dBm
3 N 1 f 2.486 95 GHz -52.145 dBm
Marker
Select Marker 3
Normal
Delta
Fixed
Off
Properties
More 1 of 2

## 802.11n(40)


Agilent Spectrum Analyzer - Swept SA
Marker 3 2.378310000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
Mkr3 2.378 310 GHz
-52.529 dBm
10 dB/div
Ref 20.00 dBm
-29.22 dBm
Start 2.31000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.44500 GHz
Sweep 12.93 ms (1001 pts)
1 N 1 f 2.417 190 GHz -9.219 dBm
2 N 1 f 2.390 000 GHz -50.774 dBm
3 N 1 f 2.378 310 GHz -52.529 dBm
Marker
Select Marker 3
Normal
Delta
Fixed
Off
Properties
More 1 of 2


Agilent Spectrum Analyzer - Swept SA
Marker 3 2.488310000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
Mkr3 2.488 31 GHz
-51.922 dBm
10 dB/div
Ref 20.00 dBm
-29.66 dBm
Start 2.43000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.50000 GHz
Sweep 6.733 ms (1001 pts)
1 N 1 f 2.454 15 GHz -9.659 dBm
2 N 1 f 2.483 50 GHz -51.676 dBm
3 N 1 f 2.488 31 GHz -51.922 dBm
Marker
Select Marker 3
Normal
Delta
Fixed
Off
Properties
More 1 of 2

# 5. BAND EDGE COMPLIANCE TEST

## 5.1. Limits

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)).

## 5.2. Test setup

## 5.3. TEST Procedure

a) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

b) 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.

c) 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.

d) 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.

e) Repeat above procedures until all measured frequencies were complete.

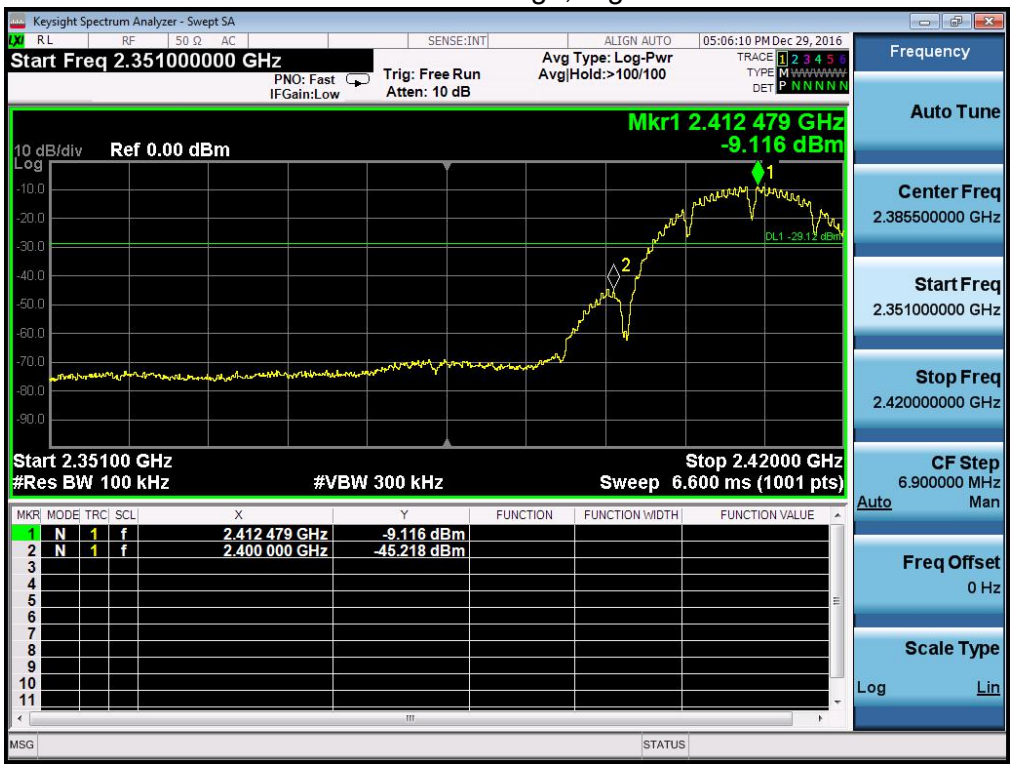
**Conduction band-edge**

| **A Antenna** | | | |
|---|---|---|---|
| Frequency Band MHz | Delta Peak to band emission (dBc) | > Limit (dBc) | Result |
| 802.11b mode | | | |
| 2400 | 36.10 | 20 | Pass |
| 2483.5 | 45.51 | 20 | Pass |
| 802.11g mode | | | |
| 2400 | 33.06 | 20 | Pass |
| 2483.5 | 45.49 | 20 | Pass |
| 802.11n-HT20 mode | | | |
| 2400 | 33.48 | 20 | Pass |
| 2483.5 | 42.77 | 20 | Pass |
| 802.11n-HT40 mode | | | |
| 2400 | 28.56 | 20 | Pass |
| 2483.5 | 37.52 | 20 | Pass |

| B Antenna | | | |
|---|---|---|---|
| Frequency Band MHz | Delta Peak to band emission (dBc) | > Limit (dBc) | Result |
| 802.11b mode | | | |
| 2400 | 36.00 | 20 | Pass |
| 2483.5 | 54.78 | 20 | Pass |
| 802.11g mode | | | |
| 2400 | 32.38 | 20 | Pass |
| 2483.5 | 46.26 | 20 | Pass |
| 802.11n-HT20 mode | | | |
| 2400 | 36.62 | 20 | Pass |
| 2483.5 | 45.85 | 20 | Pass |
| 802.11n-HT40 mode | | | |
| 2400 | 28.59 | 20 | Pass |
| 2483.5 | 37.61 | 20 | Pass |

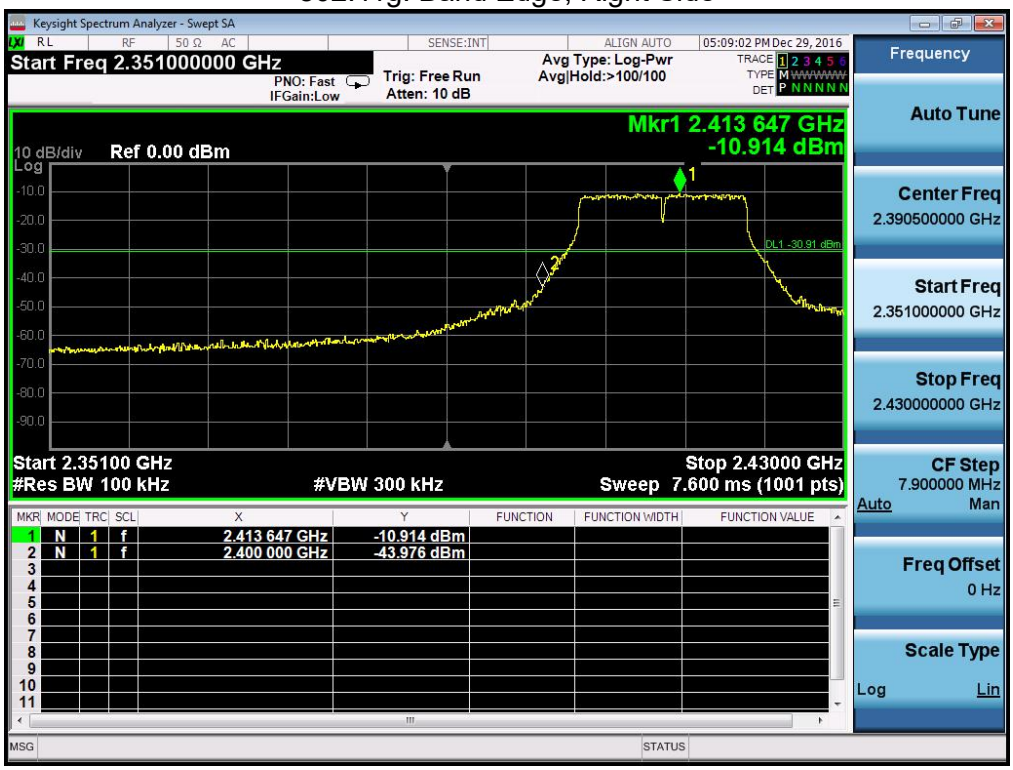
# A Antenna

802.11b: Band Edge, Right Side

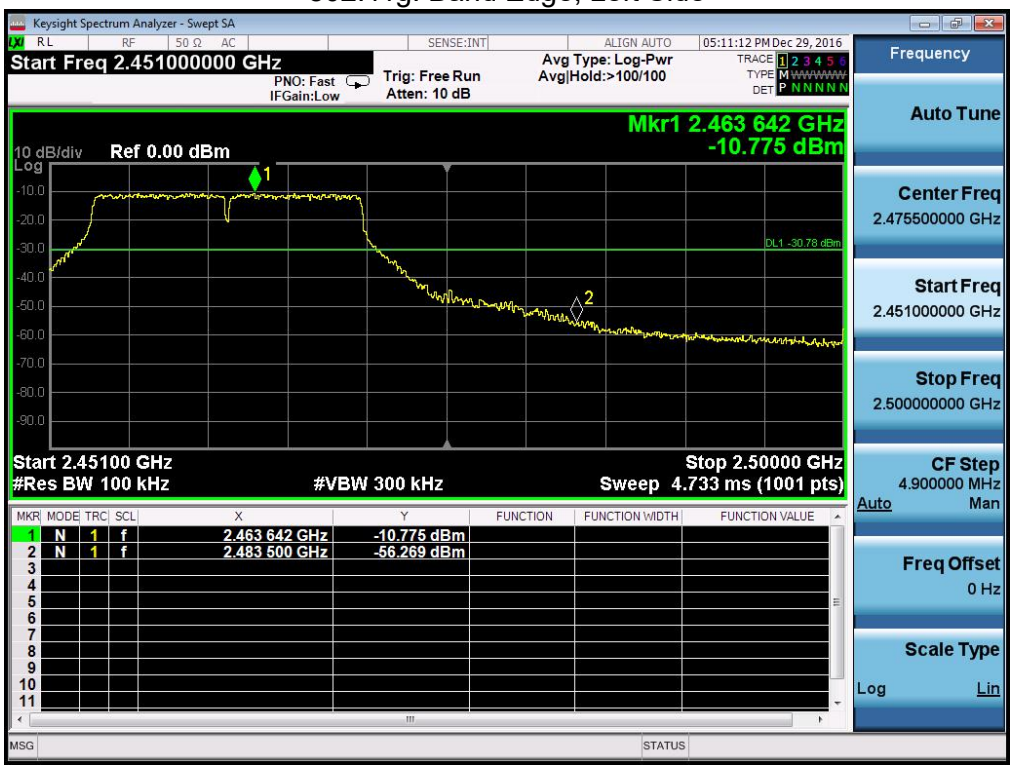



802.11b: Band Edge, Left Side

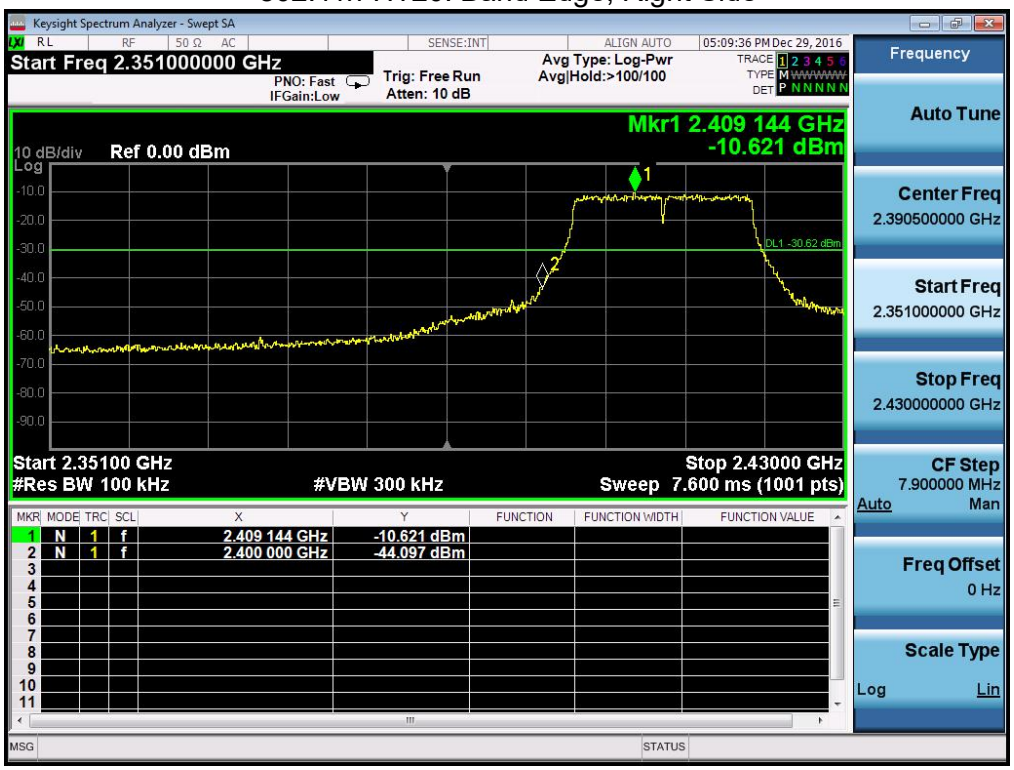
802.11g: Band Edge, Right Side



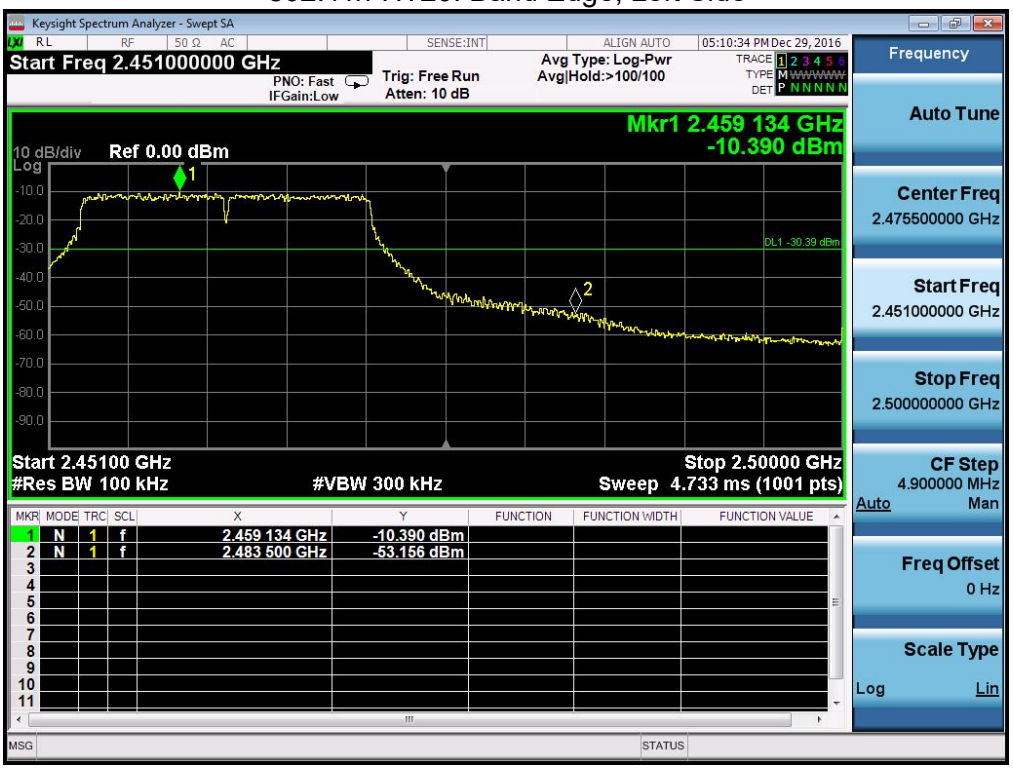

802.11g: Band Edge, Left Side



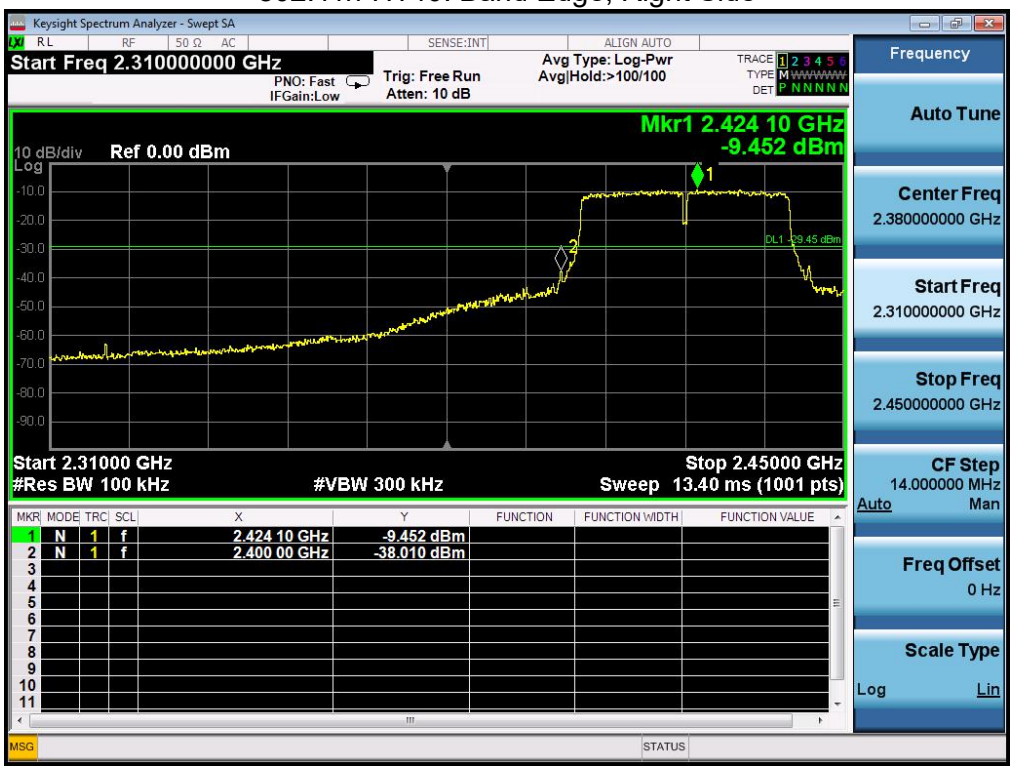
802.11n-HT20: Band Edge, Right Side



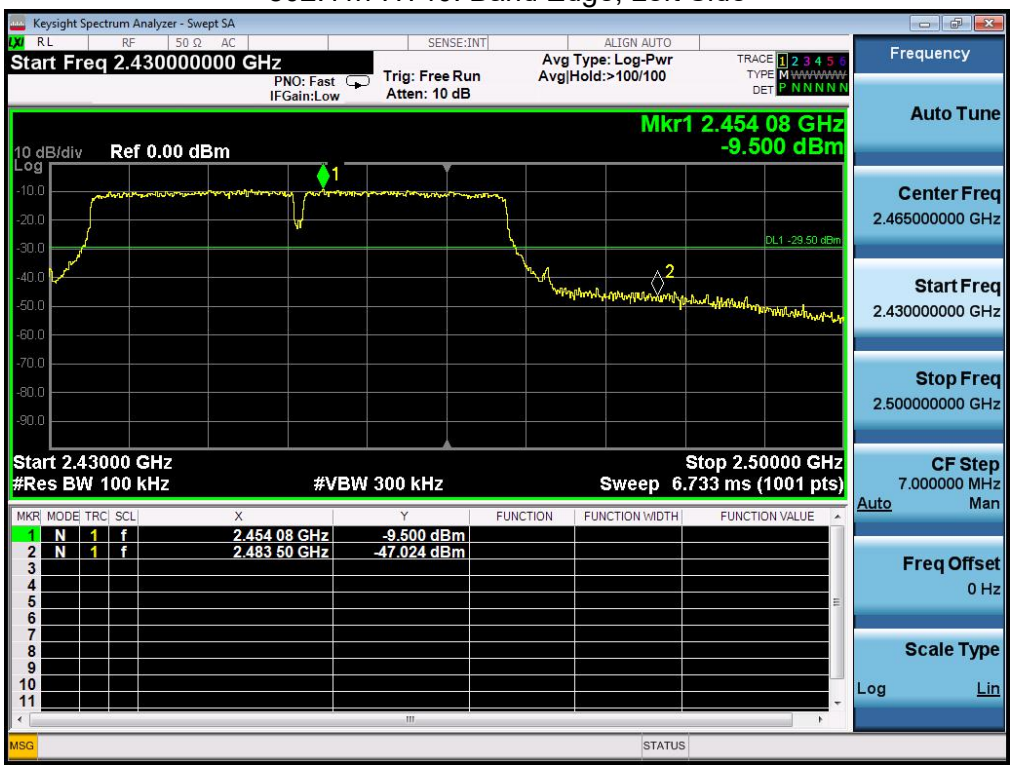

802.11n-HT20: Band Edge, Left Side



802.11n-HT40: Band Edge, Right Side

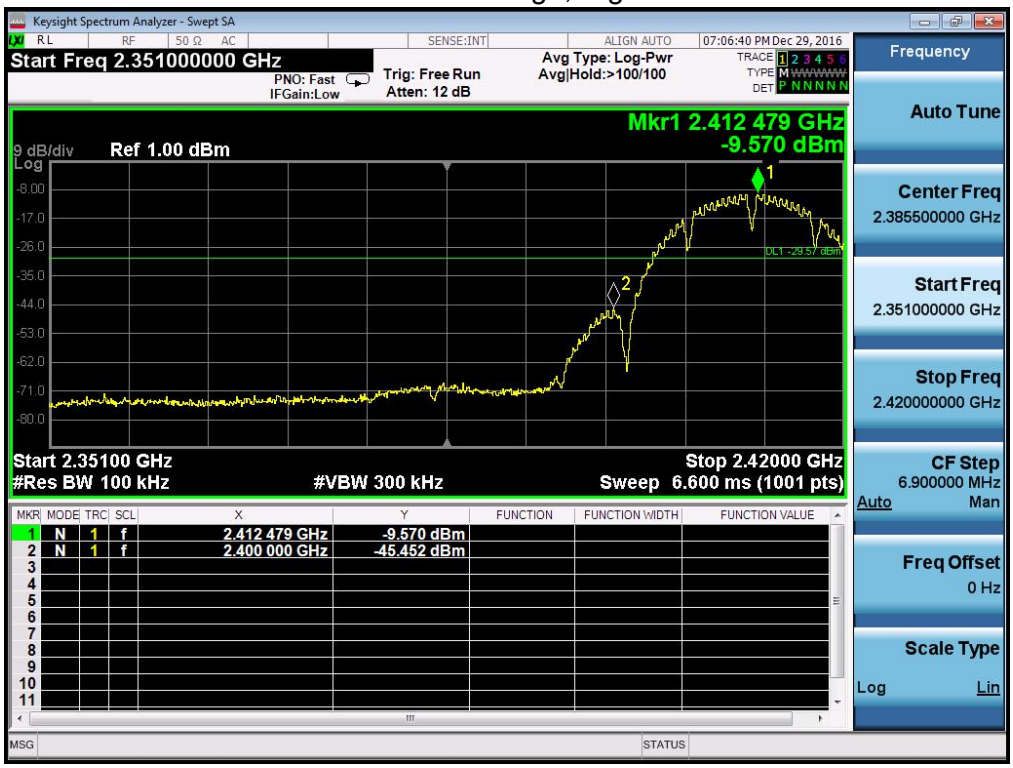



802.11n-HT40: Band Edge, Left Side



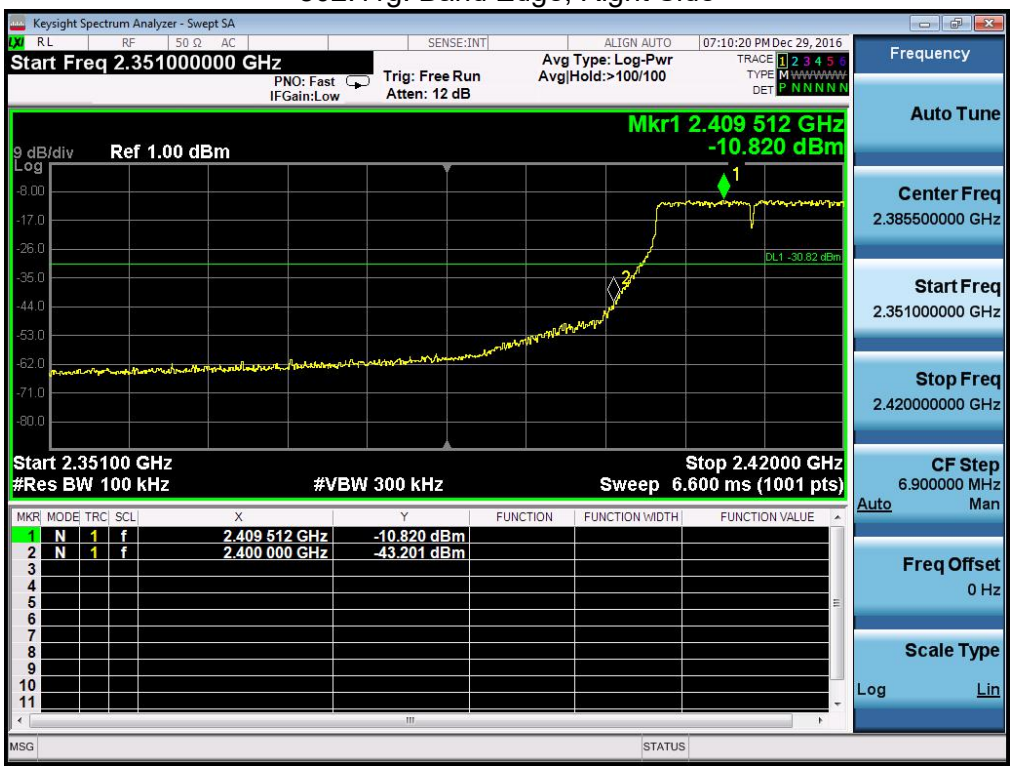
## B Antenna

802.11b: Band Edge, Right Side




802.11b: Band Edge, Left Side

802.11g: Band Edge, Right Side

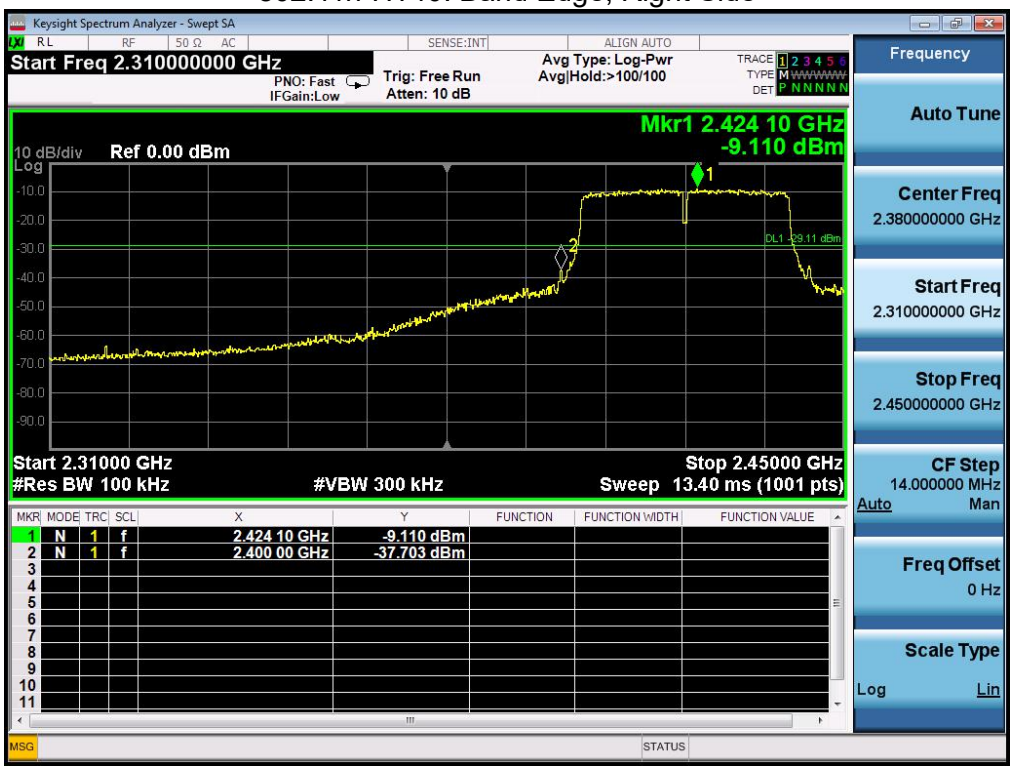



802.11g: Band Edge, Left Side

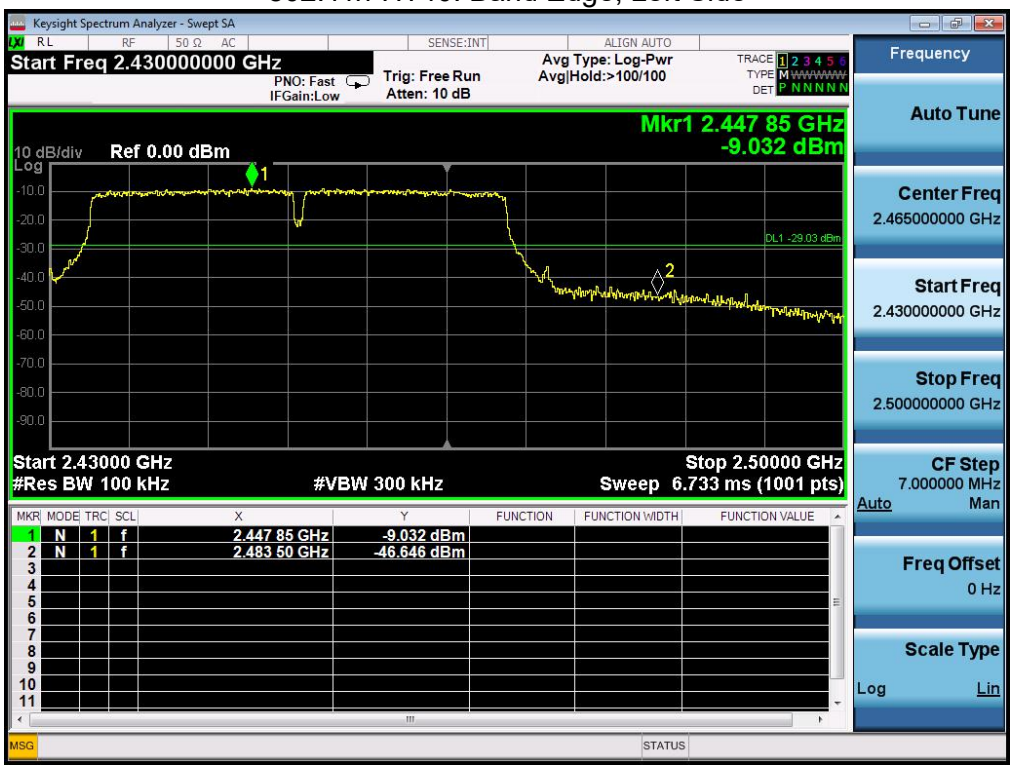
802.11n-HT20: Band Edge, Right Side

802.11n-HT20: Band Edge, Left Side

802.11n-HT40: Band Edge, Right Side




802.11n-HT40: Band Edge, Left Side



# 6. BANDWIDTH TEST

## 6.1. Limits

For direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz

## 6.2. TEST PROCEDURE

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 x 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) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Test data:

**A Antenna**

| | Frequency (MHz) | 6dB Bandwidth (MHz) | Limit (MHz) | Result |
|---|---|---|---|---|
| 802.11b | 2412 | 10.07 | >0.5 | Pass |
| | 2437 | 10.07 | >0.5 | Pass |
| | 2462 | 10.07 | >0.5 | Pass |
| 802.11g | 2412 | 16.57 | >0.5 | Pass |
| | 2437 | 16.58 | >0.5 | Pass |
| | 2462 | 16.57 | >0.5 | Pass |
| 802.11n (HT20) | 2412 | 17.80 | >0.5 | Pass |
| | 2437 | 17.79 | >0.5 | Pass |
| | 2462 | 17.78 | >0.5 | Pass |
| 802.11n (HT40) | 2422 | 36.45 | >0.5 | Pass |
| | 2437 | 36.45 | >0.5 | Pass |
| | 2452 | 36.46 | >0.5 | Pass |

## B Antenna

| | Frequency (MHz) | 6dB Bandwidth (MHz) | Limit (MHz) | Result |
|---|---|---|---|---|
| 802.11b | 2412 | 10.11 | >0.5 | Pass |
| | 2437 | 10.11 | >0.5 | Pass |
| | 2462 | 10.10 | >0.5 | Pass |
| 802.11g | 2412 | 16.63 | >0.5 | Pass |
| | 2437 | 16.62 | >0.5 | Pass |
| | 2462 | 16.62 | >0.5 | Pass |
| 802.11n (HT20) | 2412 | 17.85 | >0.5 | Pass |
| | 2437 | 17.85 | >0.5 | Pass |
| | 2462 | 17.85 | >0.5 | Pass |
| 802.11n (HT40) | 2422 | 36.45 | >0.5 | Pass |
| | 2437 | 36.44 | >0.5 | Pass |
| | 2452 | 36.46 | >0.5 | Pass |