# RF TEST REPORT

| | |
|---|---|
| **Applicant** | Shanghai Smawave Technology Co. ,Ltd |
| **FCC ID** | 2AU8HSRG411-B |
| **Product** | LTE CPE |
| **Brand** | Smawave |
| **Model** | SRG411-b |
| **Report No.** | R2001A0012-R1V1 |
| **Issue Date** | May 7, 2020 |

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 15C (2019)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Peng Tao

*Performed by: Peng Tao*

Kai Xu

*Approved by: Kai Xu*


## TA Technology (Shanghai) Co., Ltd.

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# Summary of measurement results

| Number | Test Case | Clause in FCC rules | Verdict |
|---|---|---|---|
| 1 | Maximum conducted output power | 15.247(b)(3) | PASS |
| 2 | 6 dB bandwidth | 15.247(a)(2) | PASS |
| 3 | Power spectral density | 15.247(e) | PASS |
| 4 | Band Edge | 15.247(d) | PASS |
| 5 | Spurious RF Conducted Emissions | 15.247(d) | PASS |
| 6 | Unwanted Emissions | 15.247(d),15.205,15.209 | PASS |
| 7 | Conducted Emissions | 15.207 | PASS |
| Date of Testing: January 9, 2020~ March 31, 2020 | | | |
| Note: All indications of Pass/Fail in this report are opinions expressed by TAT echnology (Shanghai) Co., Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. | | | |

**Note: This revised report (Report No.: R2001A0012-R1V1) supersedes and replaces the previously issued report (Report No.: R2001A0012-R1). Please discard or destroy the previously issued report and dispose of it accordingly.**

# 1. Test Laboratory

## 1.1. Notes of the test report

This report shall not be reproduced in full or partial, without the written approval of **TA technology (shanghai) co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein .Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above.

## 1.2. Test facility

**FCC (Designation number: CN1179, Test Firm Registration Number: 446626)**

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

**A2LA (Certificate Number: 3857.01)**

TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

## 1.3. Testing Location

| | |
|---|---|
| Company: | TA Technology (Shanghai) Co., Ltd. |
| Address: | No.145, Jintang Rd, Tangzhen Industry Park, Pudong |
| City: | Shanghai |
| Post code: | 201201 |
| Country: | P. R. China |
| Contact: | Xu Kai |
| Telephone: | +86-021-50791141/2/3 |
| Fax: | +86-021-50791141/2/3-8000 |
| Website: | http://www.ta-shanghai.com |
| E-mail: | xukai@ta-shanghai.com |

# 2. General Description of Equipment under Test

## 2.1. Applicant and Manufacturer Information

| | |
|---|---|
| Applicant | Shanghai Smawave Technology Co. ,Ltd |
| Applicant address | 3/F, Building 8, 1001 North Qinzhou Road，Xuhui District, Shanghai, China |
| Manufacturer | Shanghai Smawave Technology Co. ,Ltd |
| Manufacturer address | 3/F, Building 8, 1001 North Qinzhou Road，Xuhui District, Shanghai, China |

## 2.2. General information

| EUT Description | |
|---|---|
| Model | SRG411-b |
| SN | 1# |
| Hardware Version | V1.0 |
| Software Version | SG625U |
| Power Supply | DC adapter |
| Antenna Type | External Antenna |
| Antenna Connector | SMA Female (meet with the standard FCC Part 15.203 requirement) |
| Antenna Gain | 5.0dBi |
| additional beamforming gain | NA |
| Test Mode | 802.11b<br>802.11g, 802.11n(HT20/HT40); |
| Modulation Type | 802.11b: DSSS;<br>802.11g/n(HT20/HT40): OFDM |
| Max. Conducted Power | 18.37dBm |
| Operating Frequency Range(s) | 802.11b/g/n(HT20): 2412 ~ 2462 MHz<br>802.11n(HT40): 2422 ~ 2452 MHz |
| Note: 1. The EUT is sent from the applicant to TA and the information of the EUT is declared by the applicant. | |

# 3. Applied Standards

According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**Test standards:**

**FCC CFR47 Part 15C (2019) Radio Frequency Devices**

**ANSI C63.10 (2013)**

**Reference standard:**

**KDB 558074 D01 15.247 Meas Guidance v05r02**

**KDB 662911 D01 Multiple Transmitter Output v02r01**

# 4. Test Configuration

## Test Mode

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in lie-down position (X axis) and the loop antenna is vertical, the others are vertical and horizontal. and the worst case was recorded.

In order to find the worst case condition, Pre-tests are needed at the presence of different data rate. Preliminary tests have been done on all the configuration for confirming worst case. Data rate below means worst-case rate of each test item.

Worst-case data rates are shown as following table.

| Band | Data Rate | | |
|---|---|---|---|
| | Antenna 1 | Antenna 2 | MIMO |
| 802.11b | 1 Mbps | 1 Mbps | MCS8 |
| 802.11g | 6 Mbps | 6 Mbps | MCS8 |
| 802.11n HT20 | MCS0 | MCS0 | MCS8 |
| 802.11n HT40 | MCS0 | MCS0 | MCS8 |

The worst case Antenna mode for each of the following tests for Wi-Fi:

| Test Cases | Antenna 1 | Antenna 2 | MIMO |
|---|---|---|---|
| Maximum conducted output power | O | O | O |
| 6dB Bandwidth | O | -- | -- |
| Band Edge | O | -- | -- |
| Power Spectral Density | O | O | O |
| Spurious RF Conducted Emissions | O | -- | -- |
| Unwanted Emissions | O | -- | -- |
| Conducted Emission | 802.11g | -- | -- |
| Note：“O”: test all bands | | | |

**According to RF Output power results in chapter 5.1, SISO Antenna 1 was selected as the worst antenna.**

# 5. Test Case Results

## 5.1. Maximum output power

### Ambient condition

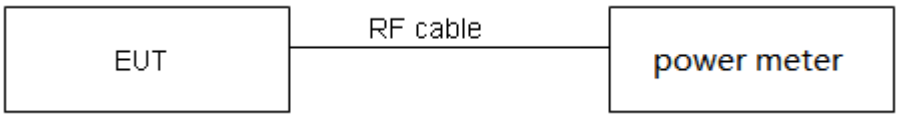
| Temperature | Relative humidity | Pressure |
|---|---|---|
| 23°C ~25°C | 45%~50% | 101.5kPa |

### Methods of Measurement

During the process of the testing, The EUT was connected to Power meter with a known loss. The EUT is max power transmission with proper modulation.

The conducted Power is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically.

### Test Setup




### Limits

Rule Part 15.247 (b) (3) specifies that " For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz: 1 Watt.”

| | |
|---|---|
| Average Output Power | ≤ 1W (30dBm) |

### Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k$ = 2, $U$= 0.44 dB.

## Test Results

| Single Antenna Power Index | | | | | | |
|---|---|---|---|---|---|---|
| Packet Type | Antenna 1 | | | Antenna 2 | | |
| | CH1 | CH6 | CH11 | CH1 | CH6 | CH11 |
| 802.11b | 43 | 46 | 44 | 44 | 53 | 56 |
| 802.11g | 50 | 54 | 51 | 55 | 58 | 56 |
| 802.11n HT20 | 50 | 54 | 51 | 56 | 59 | 55 |
| **Packet Type** | **CH3** | **CH6** | **CH9** | **CH3** | **CH6** | **CH9** |
| 802.11n HT40 | 53 | 54 | 53 | 53 | 58 | 60 |

| MIMO Antenna 1/2 Power Index | | | |
|---|---|---|---|
| **Packet Type** | **CH1** | **CH6** | **CH11** |
| 802.11b | 38 | 48 | 40 |
| 802.11g | 45 | 50 | 45 |
| 802.11n HT20 | 47 | 54 | 47 |
| **Packet Type** | **CH3** | **CH6** | **CH9** |
| 802.11n HT40 | 47 | 49 | 48 |

**SISO Antenna 1:**

| Band | $T_{on}$ (ms) | $T_{(on+off)}$ (ms) | Duty cycle | Duty cycle correction Factor(dB) |
|---|---|---|---|---|
| 802.11b | 1.30 | 1.41 | 0.92 | 0.35 |
| 802.11g | 0.25 | 0.41 | 0.61 | 2.16 |
| 802.11n HT20 | 0.23 | 0.40 | 0.57 | 2.42 |
| 802.11n HT40 | 0.13 | 0.26 | 0.49 | 3.11 |
| Note: when Duty cycle>0.98, Duty cycle correction Factor not required. | | | | |

**SISO Antenna 2:**

| Band | $T_{on}$ (ms) | $T_{(on+off)}$ (ms) | Duty cycle | Duty cycle correction Factor(dB) |
|---|---|---|---|---|
| 802.11b | 0.23 | 0.31 | 0.75 | 1.28 |
| 802.11g | 0.23 | 0.36 | 0.63 | 1.98 |
| 802.11n HT20 | 0.23 | 0.37 | 0.62 | 2.10 |
| 802.11n HT40 | 0.13 | 0.26 | 0.49 | 3.11 |
| Note: when Duty cycle>0.98, Duty cycle correction Factor not required. | | | | |

**MIMO:**

| Band | $T_{on}$ (ms) | $T_{(on+off)}$ (ms) | Duty cycle | Duty cycle correction Factor(dB) |
|---|---|---|---|---|
| 802.11b | 0.23 | 0.33 | 0.68 | 1.66 |
| 802.11g | 0.23 | 0.40 | 0.57 | 2.42 |
| 802.11n HT20 | 0.23 | 0.33 | 0.68 | 1.70 |
| 802.11n HT40 | 0.13 | 0.30 | 0.43 | 3.64 |
| Note: when Duty cycle>0.98, Duty cycle correction Factor not required. | | | | |

**SISO Antenna 1:**

| Network Standards | Carrier frequency (MHz) | Average Power Measured (dBm) | Average Power with duty factor (dBm) | Limit (dBm) | Conclusion |
|---|---|---|---|---|---|
| 802.11b | 2412 | 17.65 | 18.00 | 30 | PASS |
| | 2437 | 17.76 | 18.11 | 30 | PASS |
| | 2462 | 17.92 | 18.27 | 30 | PASS |
| 802.11g | 2412 | 15.48 | 17.64 | 30 | PASS |
| | 2437 | 16.11 | 18.27 | 30 | PASS |
| | 2462 | 15.53 | 17.69 | 30 | PASS |
| 802.11n HT20 | 2412 | 15.42 | 17.84 | 30 | PASS |
| | 2437 | 15.88 | 18.30 | 30 | PASS |
| | 2462 | 15.49 | 17.91 | 30 | PASS |
| 802.11n HT40 | 2422 | 14.86 | 17.97 | 30 | PASS |
| | 2437 | 15.26 | 18.37 | 30 | PASS |
| | 2452 | 14.53 | 17.64 | 30 | PASS |
| Note: Average Power with duty factor = Average Power Measured +Duty cycle correction factor | | | | | |

**SISO Antenna 2:**

| Network Standards | Carrier frequency (MHz) | Average Power Measured (dBm) | Average Power with duty factor (dBm) | Limit (dBm) | Conclusion |
|---|---|---|---|---|---|
| 802.11b | 2412 | 16.29 | 17.57 | 30 | PASS |
| | 2437 | 16.86 | 18.14 | 30 | PASS |
| | 2462 | 16.52 | 17.80 | 30 | PASS |
| 802.11g | 2412 | 16.07 | 18.05 | 30 | PASS |
| | 2437 | 15.52 | 17.50 | 30 | PASS |
| | 2462 | 16.14 | 18.12 | 30 | PASS |
| 802.11n HT20 | 2412 | 15.91 | 18.01 | 30 | PASS |
| | 2437 | 15.26 | 17.36 | 30 | PASS |
| | 2462 | 15.98 | 18.08 | 30 | PASS |
| 802.11n HT40 | 2422 | 14.06 | 17.17 | 30 | PASS |
| | 2437 | 14.30 | 17.41 | 30 | PASS |
| | 2452 | 14.77 | 17.88 | 30 | PASS |
| Note: Average Power with duty factor = Average Power Measured +Duty cycle correction factor | | | | | |

**MIMO:**

| Network Standards | Carrier frequency (MHz) | MIMO Antenna 1 | | MIMO Antenna 2 | | Total Power (dBm) | Limit (dBm) | Conclusion |
|---|---|---|---|---|---|---|---|---|
| | | Average Power Measured (dBm) | Average Power with duty factor (dBm) | Average Power Measured (dBm) | Average Power with duty factor (dBm) | | | |
| 802.11b HT20 | 2412 | 14.29 | 15.95 | 12.46 | 14.12 | 18.14 | 30 | PASS |
| | 2437 | 14.23 | 15.89 | 12.26 | 13.92 | 18.02 | 30 | PASS |
| | 2462 | 14.32 | 15.98 | 12.52 | 14.18 | 18.18 | 30 | PASS |
| 802.11g HT20 | 2412 | 13.38 | 15.80 | 11.09 | 13.51 | 17.81 | 30 | PASS |
| | 2437 | 13.51 | 15.93 | 10.86 | 13.28 | 17.81 | 30 | PASS |
| | 2462 | 13.53 | 15.95 | 11.74 | 14.16 | 18.16 | 30 | PASS |
| 802.11n HT20 | 2412 | 13.73 | 15.43 | 11.84 | 13.54 | 17.59 | 30 | PASS |
| | 2437 | 14.25 | 15.95 | 12.26 | 13.96 | 18.07 | 30 | PASS |
| | 2462 | 13.56 | 15.26 | 12.35 | 14.05 | 17.70 | 30 | PASS |
| 802.11n HT40 | 2422 | 12.24 | 15.88 | 10.09 | 13.73 | 17.95 | 30 | PASS |
| | 2437 | 12.41 | 16.05 | 10.32 | 13.96 | 18.14 | 30 | PASS |
| | 2452 | 12.16 | 15.80 | 10.13 | 13.77 | 17.91 | 30 | PASS |

Note: 1.Average Power with duty factor = Average Power Measured +Duty cycle correction factor

2. For Total Power, according to KDB 662911 D01 Multiple Transmitter Output v02r01 1),

The Total Power $=10\log(10^{(\text{Power antenna1 in dBm}/10)}+10^{(\text{Power antenna2 in dBm}/10)}$.

3. The manufacturer declared the transmitter output signals is CDD mode. And $N_{ss}=2$. According to KDB 662911 D01 Multiple Transmitter Output v02r01 2)f)(i): If all antennas have the same gain, Directional gain = $G_{ANT}$ + Array Gain,

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any $N_{ANT}$;

Array Gain = 5 log($N_{ANT}/N_{SS}$) dB or 3 dB, whichever is less, for 20-MHz channel widths with $N_{ANT} \geq 5$.

So directional gain = $G_{ANT}$ + Array Gain =5+0=5 dBi<6dBi. So the power limt is 30dBm

## 5.2. 99% Bandwidth and 6dB Bandwidth

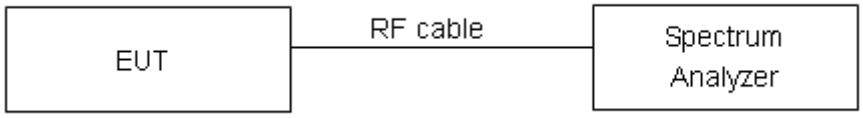
### Ambient condition

| Temperature | Relative humidity | Pressure |
|---|---|---|
| 23°C ~25°C | 45%~50% | 101.5kPa |

### Method of Measurement

The EUT was connected to the spectrum analyzer through an external attenuator (20dB) and a known loss cable. RBW is set to 100 kHz; VBW is set to 300 kHz on spectrum analyzer.
Dector=Peak, Trace mode=max hold.

### Test Setup




### Limits

Rule Part 15.247 (a) (2) specifies that “Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.”

| | |
|---|---|
| minimum 6 dB bandwidth | ≥ 500 kHz |

### Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k$ = 2, $U$= 936 Hz.

**Test Results:**

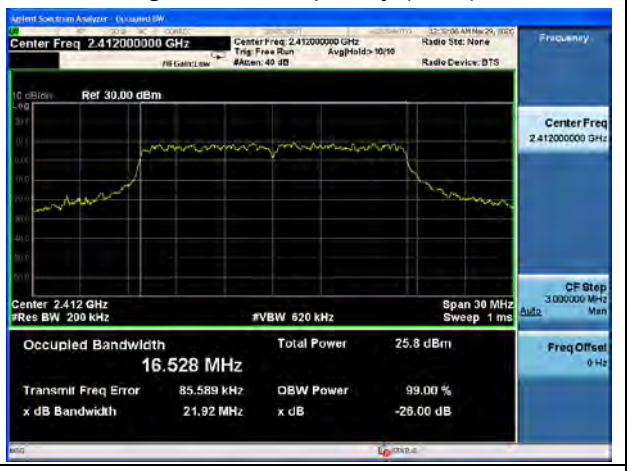
**SISO Antenna 1:**

| Network Standards | Carrier frequency (MHz) | 99% bandwidth (MHz) | Minimum 6 dB bandwidth (MHz) | Limit (kHz) | Conclusion |
|---|---|---|---|---|---|
| 802.11b | 2412 | 14.682 | 18.55 | 500 | PASS |
| | 2437 | 15.337 | 19.11 | 500 | PASS |
| | 2462 | 14.941 | 18.93 | 500 | PASS |
| 802.11g | 2412 | 16.528 | 21.92 | 500 | PASS |
| | 2437 | 16.796 | 29.53 | 500 | PASS |
| | 2462 | 16.559 | 24.34 | 500 | PASS |
| 802.11n HT20 | 2412 | 17.792 | 23.34 | 500 | PASS |
| | 2437 | 18.239 | 30.00 | 500 | PASS |
| | 2462 | 17.820 | 22.13 | 500 | PASS |
| 802.11n HT40 | 2422 | 36.127 | 43.39 | 500 | PASS |
| | 2437 | 36.516 | 49.45 | 500 | PASS |
| | 2452 | 36.779 | 59.47 | 500 | PASS |

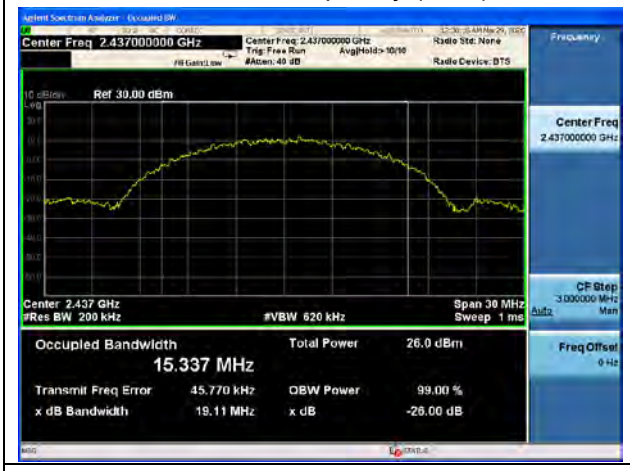
**99%bandwidth**

802.11b, Carrier frequency (MHz): 2412

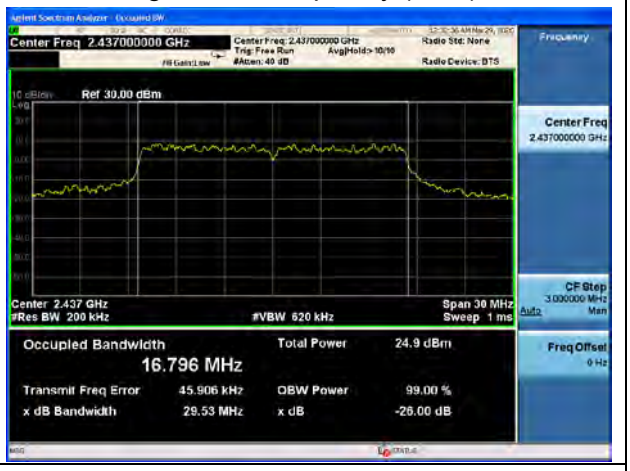

802.11g, Carrier frequency (MHz): 2412



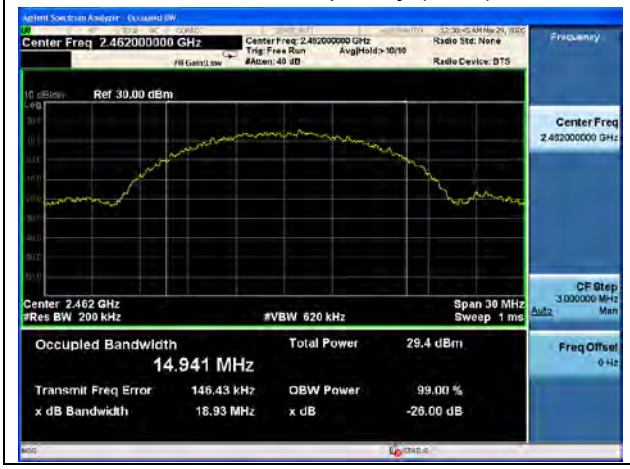

802.11b, Carrier frequency (MHz): 2437



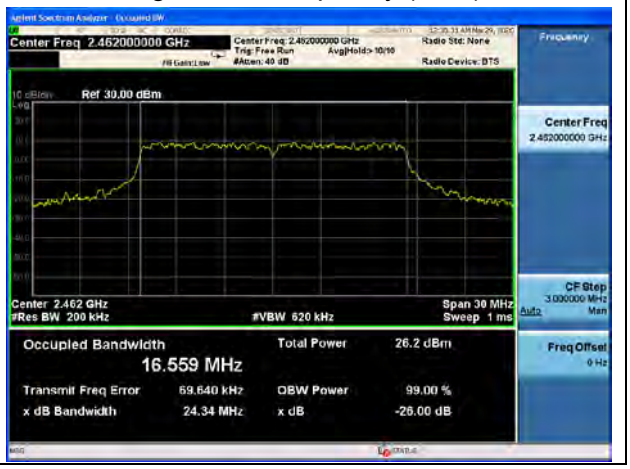

802.11g, Carrier frequency (MHz): 2437



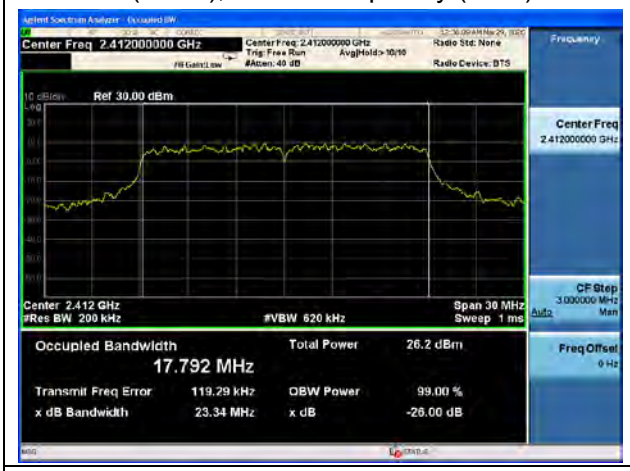

802.11b, Carrier frequency (MHz):2462



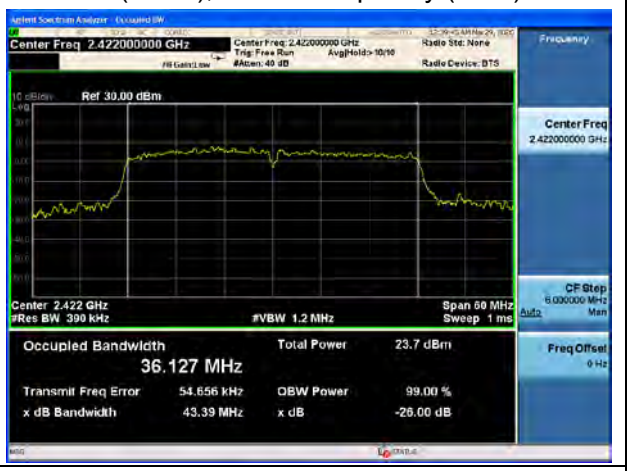

802.11g, Carrier frequency (MHz):2462



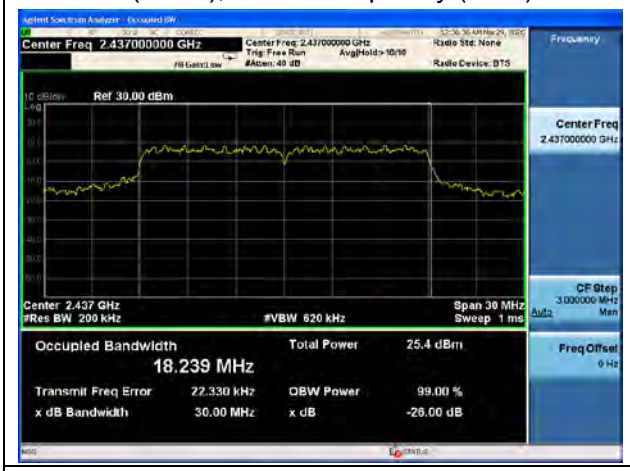
802.11n(HT20), Carrier frequency (MHz): 2412




802.11n(HT40), Carrier frequency (MHz): 2422

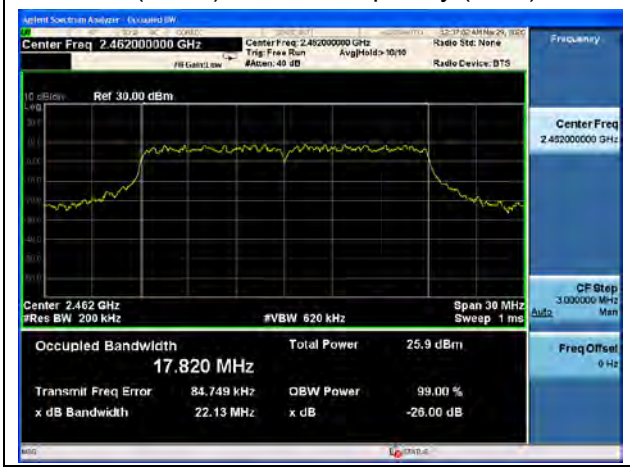



802.11n(HT20), Carrier frequency (MHz): 2437




802.11n(HT40), Carrier frequency (MHz): 2437

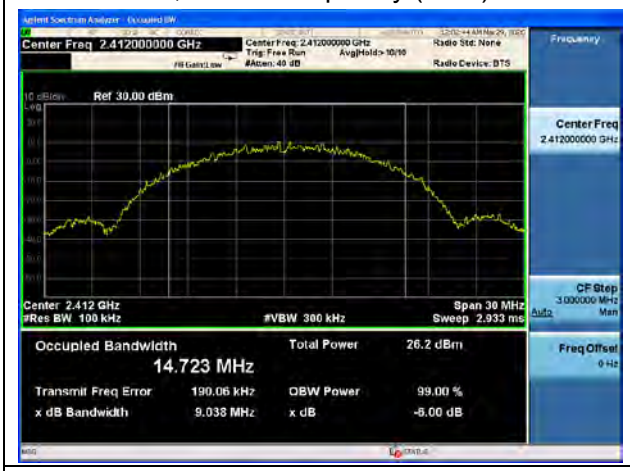

802.11n(HT20), Carrier frequency (MHz):2462



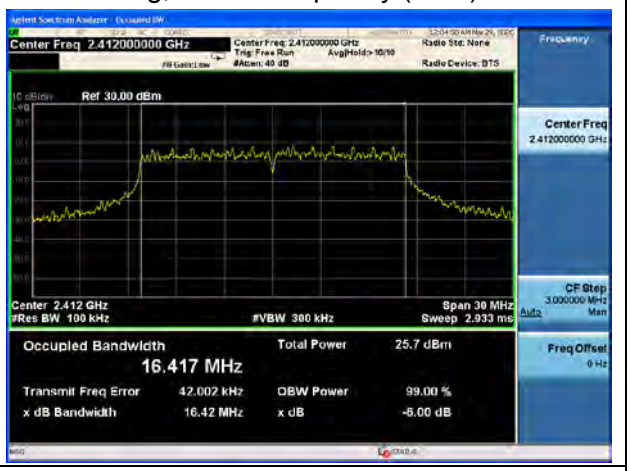

802.11n(HT40), Carrier frequency (MHz):2452

## 6 dB bandwidth

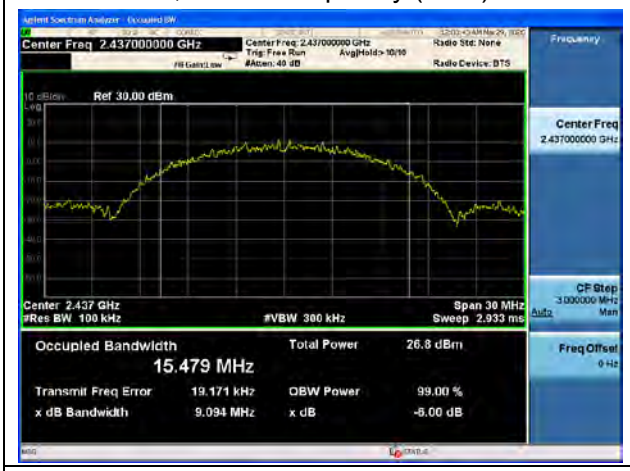
802.11b, Carrier frequency (MHz): 2412



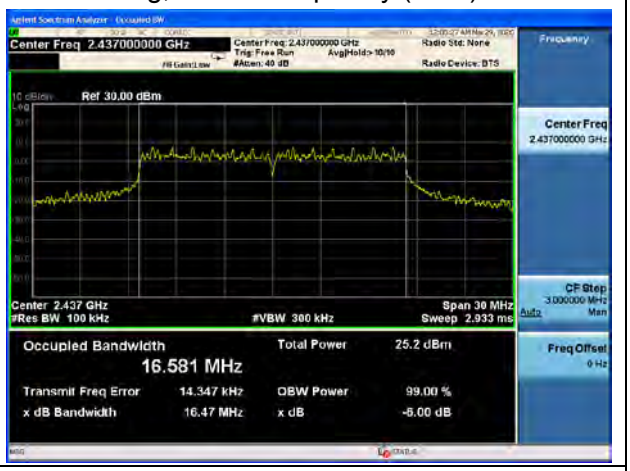

802.11g, Carrier frequency (MHz): 2412




802.11b, Carrier frequency (MHz): 2437

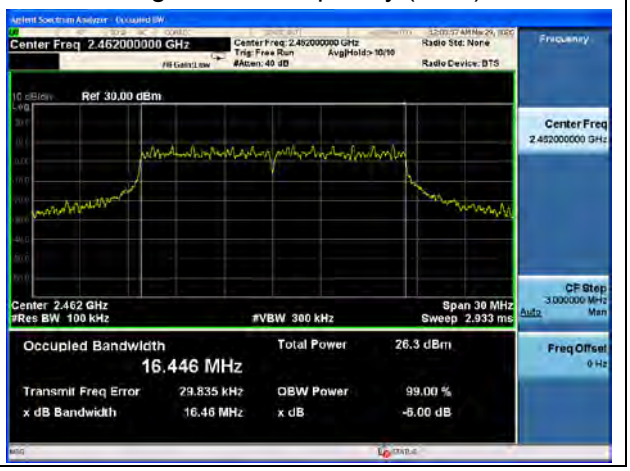



802.11g, Carrier frequency (MHz): 2437

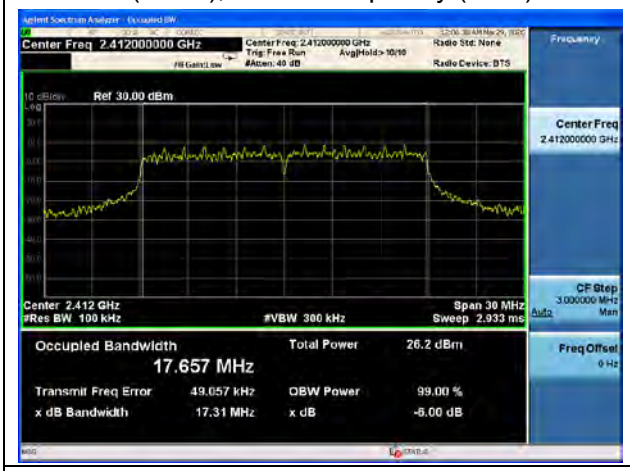



802.11b, Carrier frequency (MHz):2462

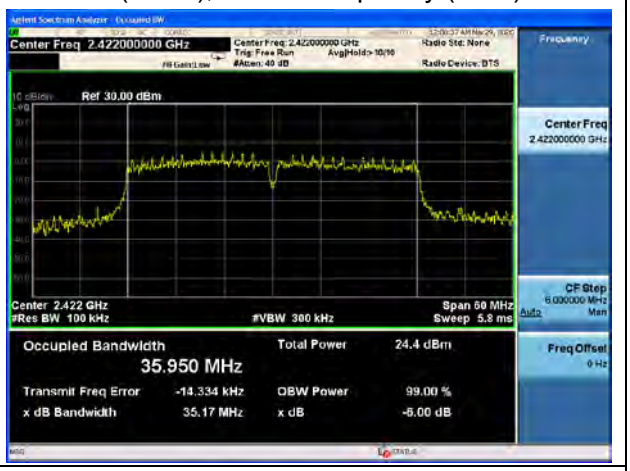

802.11g, Carrier frequency (MHz):2462



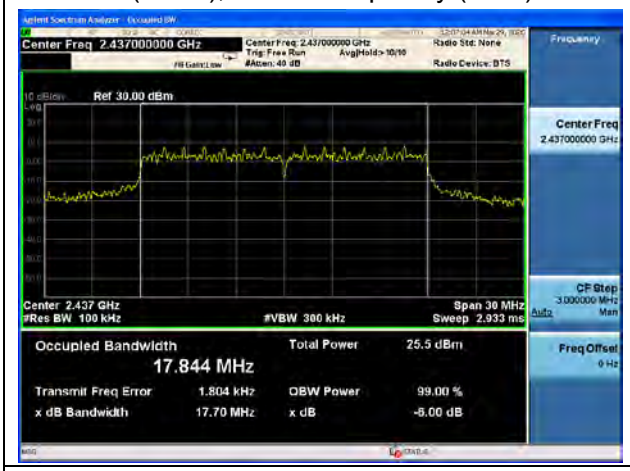
802.11n(HT20), Carrier frequency (MHz): 2412



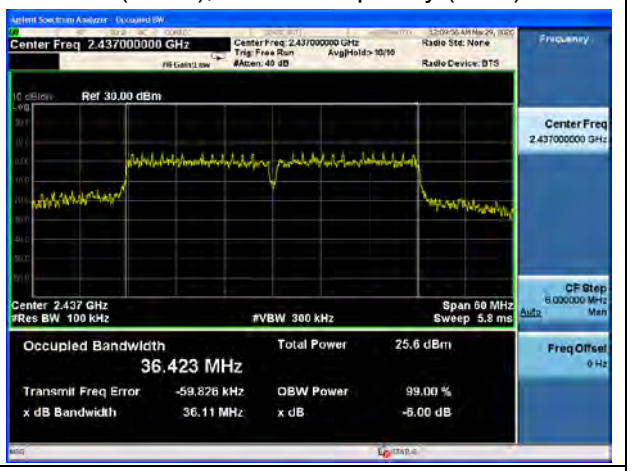

802.11n(HT40), Carrier frequency (MHz): 2422



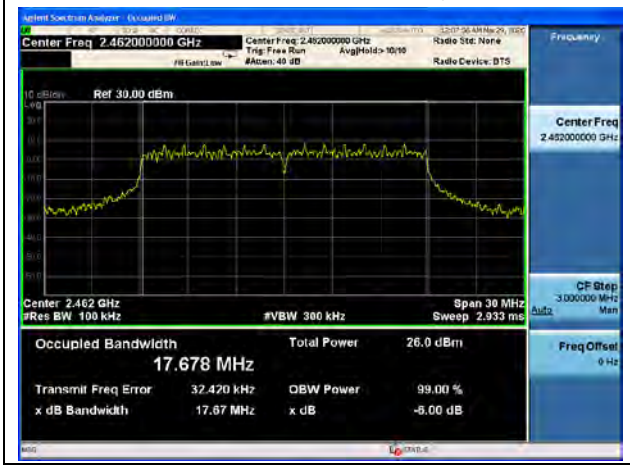

802.11n(HT20), Carrier frequency (MHz): 2437



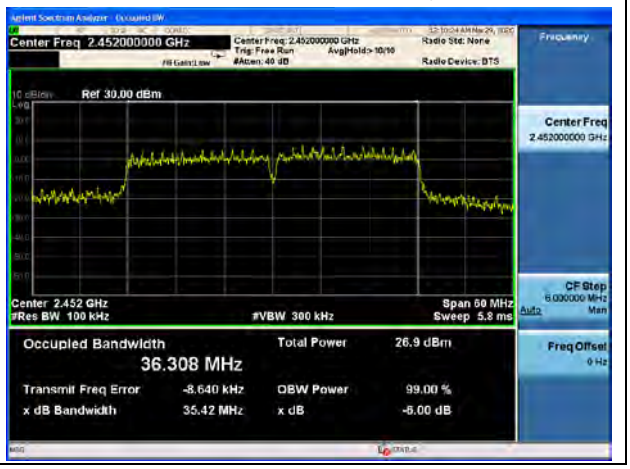

802.11n(HT40), Carrier frequency (MHz): 2437




802.11n(HT20), Carrier frequency (MHz):2462




802.11n(HT40), Carrier frequency (MHz):2452



## 5.3. Band Edge

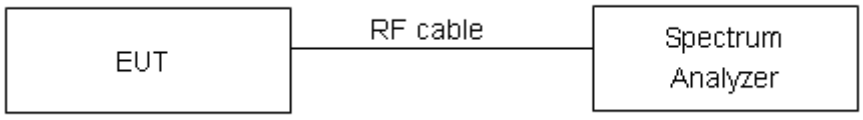
### Ambient condition

| Temperature | Relative humidity | Pressure |
|---|---|---|
| 23°C ~25°C | 45%~50% | 101.5kPa |

### Method of Measurement

The EUT was connected to the spectrum analyzer through an external attenuator (20dB) and a known loss cable the band edge of the lowest and highest channels were measured. The peak detector is used and RBW is set to 100 kHz and VBW is set to 300 kHz on spectrum analyzer. Spectrum analyzer plots are included on the following pages.

### Test Setup




### Limits

Rule Part 15.247(d) specifies that “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.”

### Measurement Uncertainty

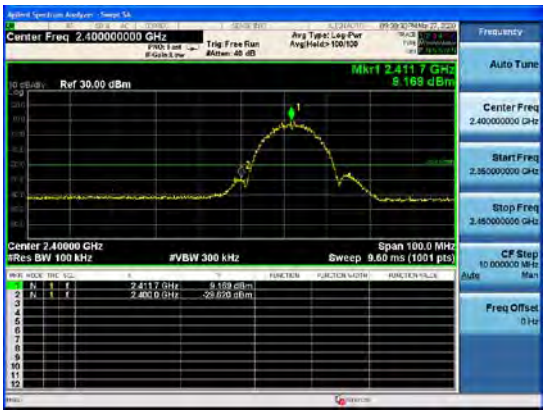
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k$ = 1.96.

| Frequency | Uncertainty |
|---|---|
| 2GHz-3GHz | 1.407 dB |

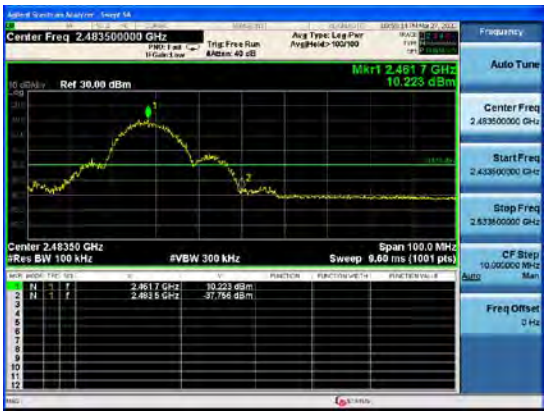
**Test Results: PASS**

**SISO Antenna 1:**

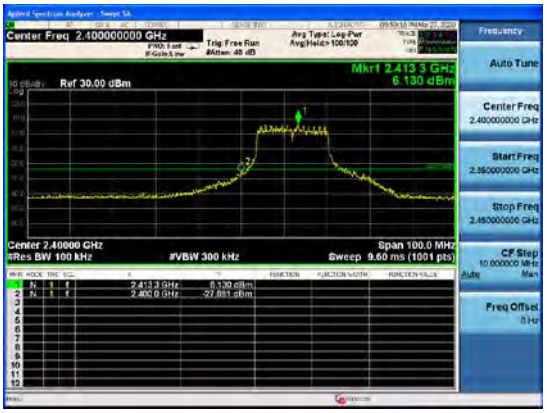
802.11b, Channel No.: 1




802.11b, Channel No.: 11




802.11g, Channel No.: 1




802.11g, Channel No.: 11


802.11n(HT20), Channel No.: 1


802.11n(HT20), Channel No.: 11

| 802.11n(HT40), Channel No.: 3 | 802.11n(HT40), Channel No.: 9 |
|---|---|
|  |  |

## 5.4. Power Spectral Density

### Ambient condition

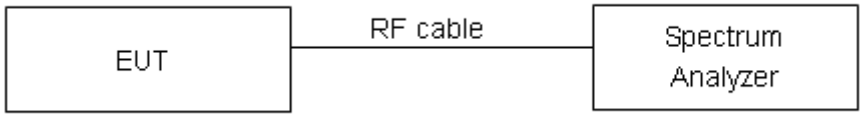
| Temperature | Relative humidity | Pressure |
|---|---|---|
| 23°C ~25°C | 45%~50% | 101.5kPa |

### Method of Measurement

During the process of the testing, The EUT was connected to Spectrum Analyzer with a known loss. The EUT is max power transmission with proper modulation. Method AVGPSD-2 in KDB558074 D01 was used for this test.

The conducted Power is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically.

### Test setup




### Limits

Rule Part 15.247(e) specifies that" For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. ''

| Limits | ≤ 8 dBm / 3kHz |
|---|---|

### Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k$ = 2, $U$= 0.75dB.

**Test Results:**

**SISO Antenna 1:**

| Network Standards | Channel Number | Read Value (dBm / 3kHz) | Power Spectral Density (dBm / 3kHz) | Limit (dBm / 3kHz) | Conclusion |
|---|---|---|---|---|---|
| 802.11b | 1 | -12.21 | -11.87 | 8.00 | PASS |
| | 6 | -12.76 | -12.41 | 8.00 | PASS |
| | 11 | -12.58 | -12.23 | 8.00 | PASS |
| 802.11g | 1 | -17.64 | -15.48 | 8.00 | PASS |
| | 6 | -16.06 | -13.89 | 8.00 | PASS |
| | 11 | -16.12 | -13.96 | 8.00 | PASS |
| 802.11n HT20 | 1 | -17.36 | -14.94 | 8.00 | PASS |
| | 6 | -15.99 | -13.57 | 8.00 | PASS |
| | 11 | -16.58 | -14.16 | 8.00 | PASS |
| 802.11n HT40 | 3 | -19.92 | -16.81 | 8.00 | PASS |
| | 6 | -19.30 | -16.19 | 8.00 | PASS |
| | 9 | -18.48 | -15.37 | 8.00 | PASS |
| Note: Power Spectral Density =Read Value+Duty cycle correction factor | | | | | |

**SISO Antenna 2:**

| Network Standards | Channel Number | Read Value (dBm / 3kHz) | Power Spectral Density (dBm / 3kHz) | Limit (dBm / 3kHz) | Conclusion |
|---|---|---|---|---|---|
| 802.11b | 1 | -11.19 | -9.92 | 8.00 | PASS |
| | 6 | -13.29 | -12.01 | 8.00 | PASS |
| | 11 | -11.32 | -10.04 | 8.00 | PASS |
| 802.11g | 1 | -17.25 | -15.27 | 8.00 | PASS |
| | 6 | -18.13 | -16.14 | 8.00 | PASS |
| | 11 | -16.26 | -14.27 | 8.00 | PASS |
| 802.11n HT20 | 1 | -16.67 | -14.56 | 8.00 | PASS |
| | 6 | -17.62 | -15.51 | 8.00 | PASS |
| | 11 | -17.15 | -15.05 | 8.00 | PASS |
| 802.11n HT40 | 3 | -20.08 | -16.97 | 8.00 | PASS |
| | 6 | -20.51 | -17.40 | 8.00 | PASS |
| | 9 | -18.56 | -15.45 | 8.00 | PASS |
| Note: Power Spectral Density =Read Value+Duty cycle correction factor | | | | | |

**MIMO**

| Network Standards | Channel Number | Power Spectral Density | | | | Total PSD | Limit (dBm / 3kHz) | Conclusion |
|---|---|---|---|---|---|---|---|---|
| | | Antenna 1 | | Antenna 2 | | | | |
| | | Read Value (dBm / 3kHz) | Power Spectral Density (dBm / 3kHz) | Read Value (dBm / 3kHz) | Power Spectral Density (dBm / 3kHz) | (dBm / 3kHz) | | |
| 802.11b | 1 | -18.26 | -16.60 | -18.82 | -17.16 | -13.86 | 8.00 | PASS |
| | 6 | -16.96 | -15.31 | -16.66 | -15.00 | -12.14 | 8.00 | PASS |
| | 11 | -16.59 | -14.93 | -16.12 | -14.46 | -11.68 | 8.00 | PASS |
| 802.11g | 1 | -21.14 | -18.72 | -20.53 | -18.11 | -15.39 | 8.00 | PASS |
| | 6 | -20.32 | -17.90 | -19.95 | -17.53 | -14.70 | 8.00 | PASS |
| | 11 | -20.97 | -18.55 | -19.45 | -17.03 | -14.71 | 8.00 | PASS |
| 802.11n HT20 | 1 | -19.25 | -17.55 | -20.49 | -18.79 | -15.12 | 8.00 | PASS |
| | 6 | -16.13 | -14.43 | -17.56 | -15.87 | -12.08 | 8.00 | PASS |
| | 11 | -18.14 | -16.44 | -19.80 | -18.11 | -14.18 | 8.00 | PASS |
| 802.11n HT40 | 3 | -25.34 | -21.70 | -25.43 | -21.79 | -18.73 | 8.00 | PASS |
| | 6 | -22.76 | -19.11 | -23.67 | -20.02 | -16.54 | 8.00 | PASS |
| | 9 | -22.07 | -18.43 | -22.87 | -19.23 | -15.80 | 8.00 | PASS |

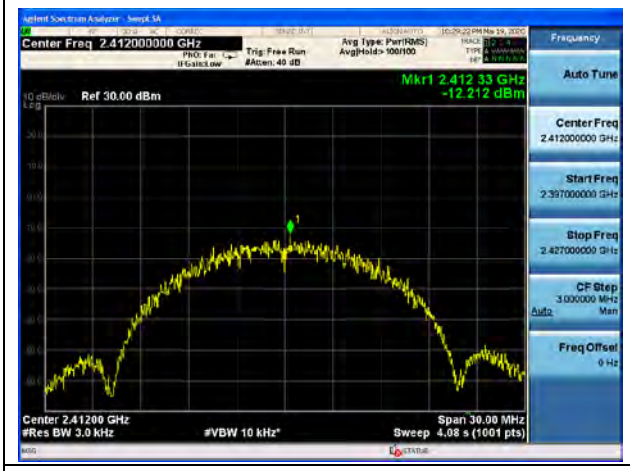
Note: 1.Power Spectral Density =Read Value+Duty cycle correction factor

2. For Total PSD, according to KDB 662911 D01 Multiple Transmitter Output v02r01 2)a),the power spectral density=$10\log(10^{(\text{PSD antenna1 in dBm/10})}+10^{(\text{PSD antenna2 in dBm/10})})$

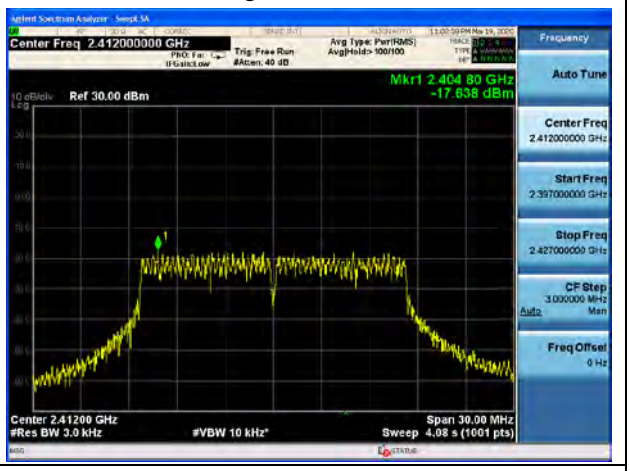
3. The manufacturer declared the transmitter output signals is CDD mode. And $N_{ss}$=2. According to KDB 662911 D01 Multiple Transmitter Output v02r01 2)f)(i): If all antennas have the same gain, Directional gain = $G_{ANT}$ + Array Gain, For PSD measurements on all devices, Array Gain=10log(Nant/Nss)dB,so directional gain=GANT+Array Gain=5+10log(2/2)=5 dBi <6dBi. So the power limt is 8.0 dBm

**SISO Antenna 1:**

802.11b, Channel No.: 1

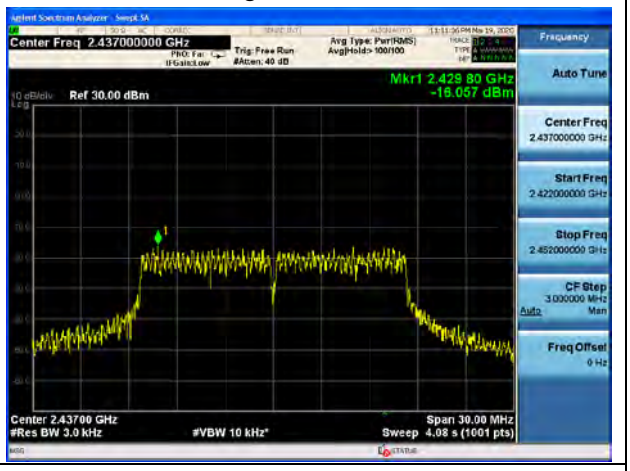



802.11g, Channel No.: 1



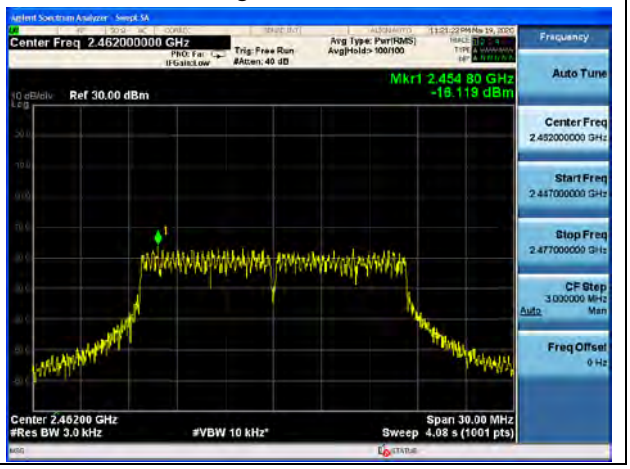

802.11b, Channel No.: 6


802.11g, Channel No.: 6

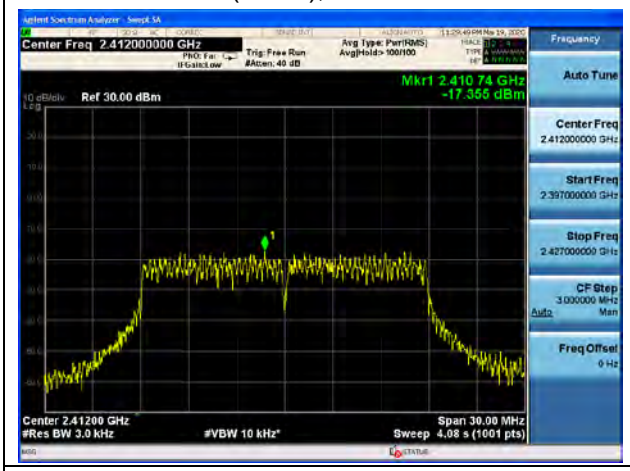



802.11b, Channel No.: 11

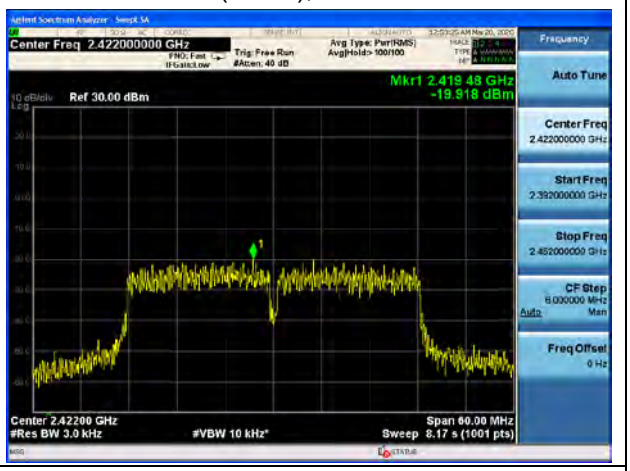

802.11g, Channel No.: 11



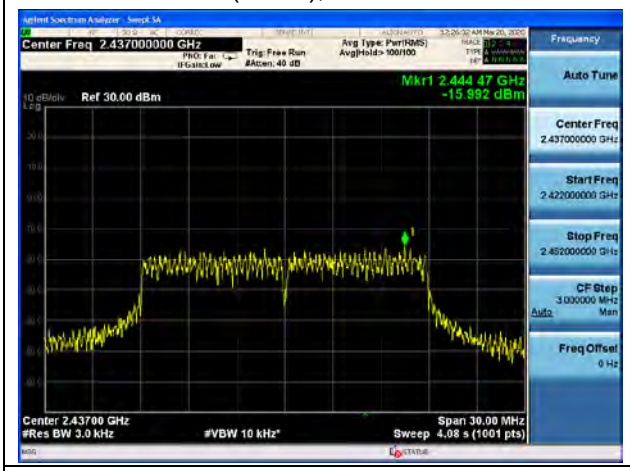
802.11n(HT20), Channel No. 1



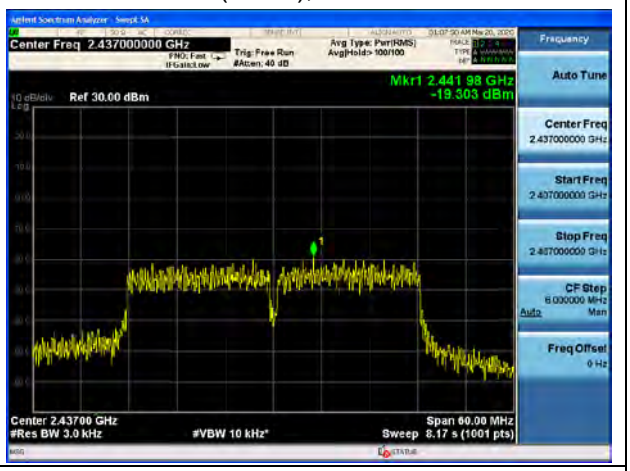

802.11n(HT40), Channel No. 3



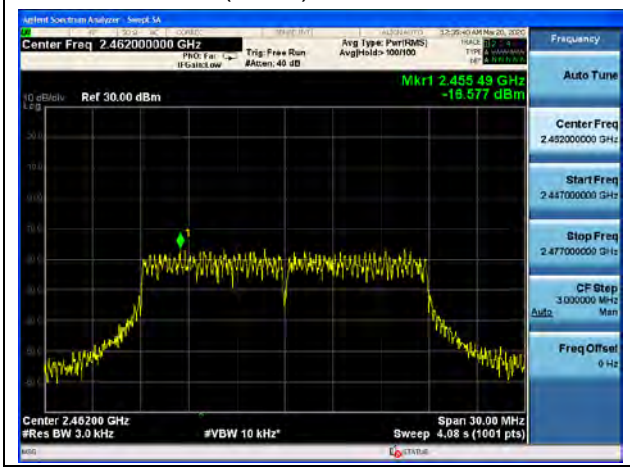

802.11n(HT20), Channel No. 6



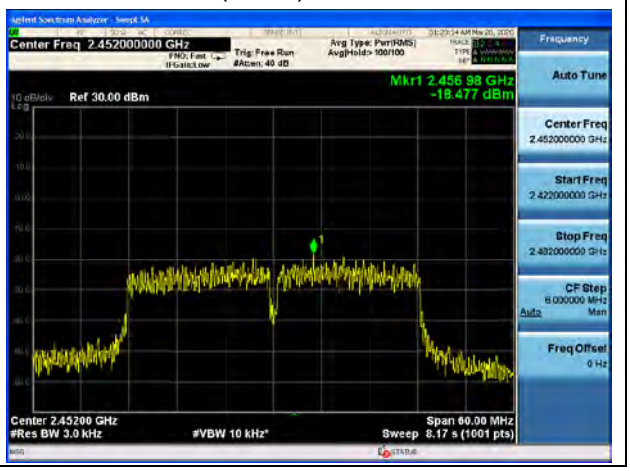

802.11n(HT40), Channel No. 6




802.11n(HT20), Channel No. 11

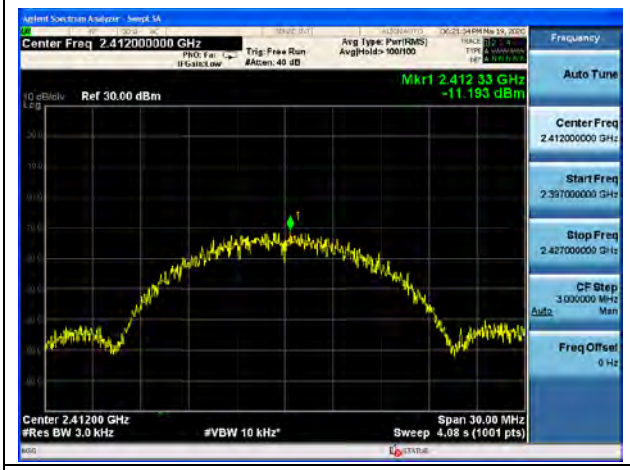



802.11n(HT40), Channel No. 9

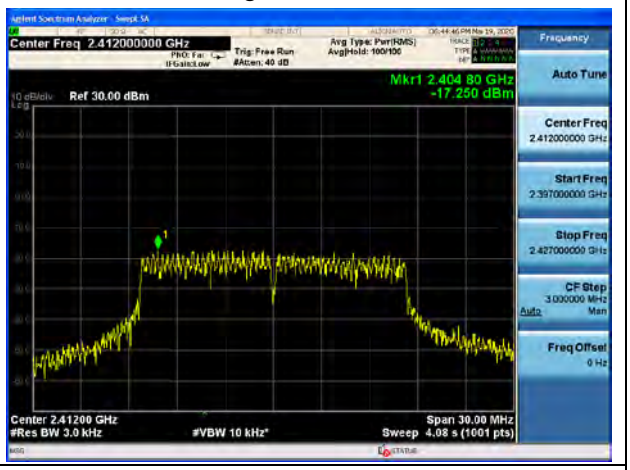


**SISO Antenna 2:**

802.11b, Channel No.: 1

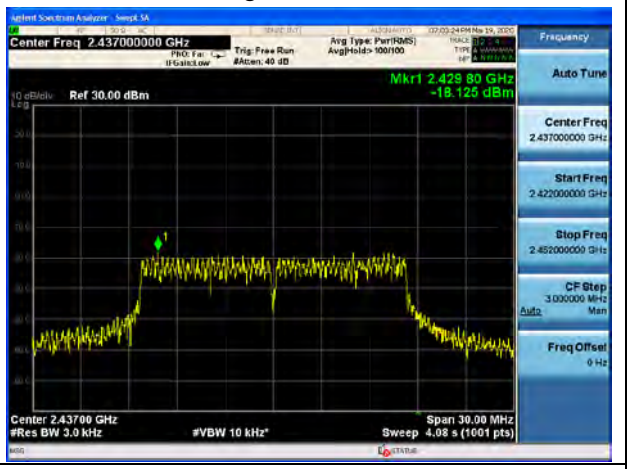



802.11g, Channel No.: 1

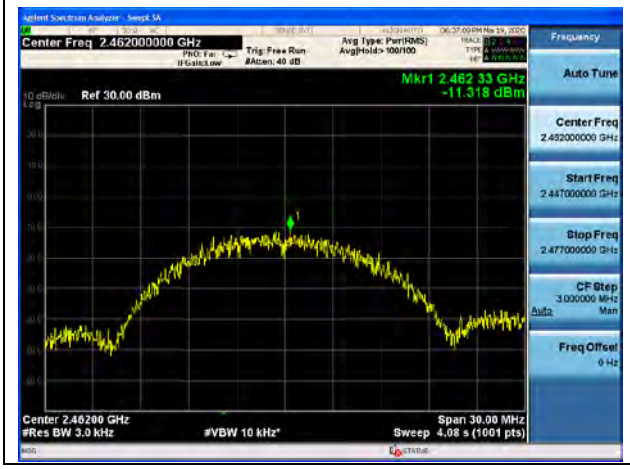



802.11b, Channel No.: 6


802.11g, Channel No.: 6

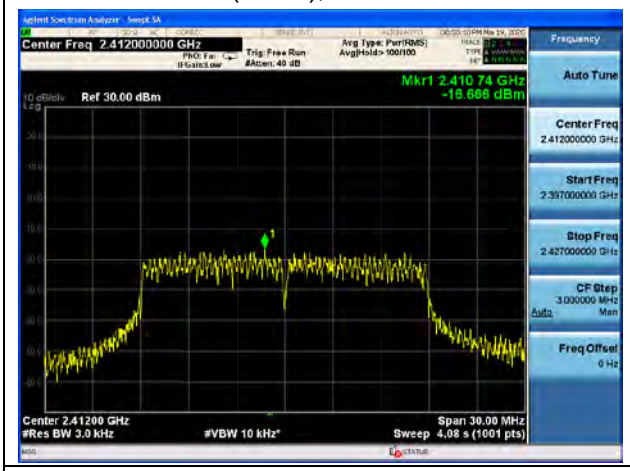



802.11b, Channel No.: 11

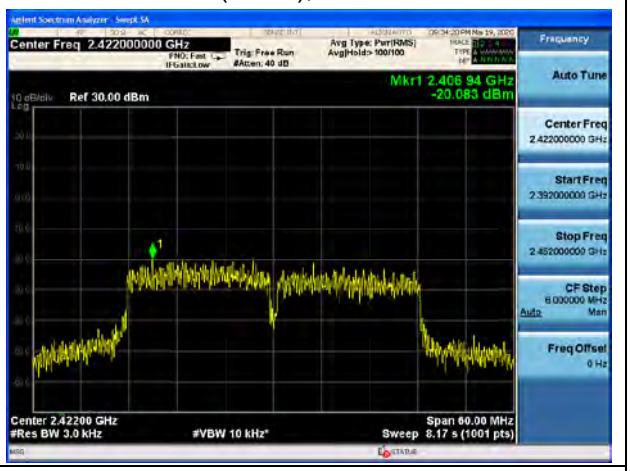



802.11g, Channel No.: 11

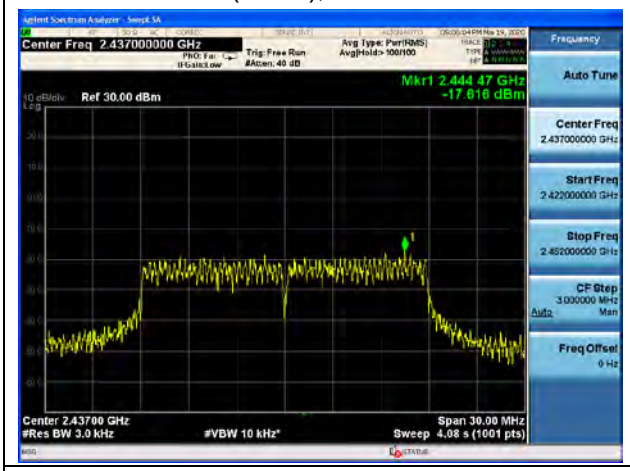
802.11n(HT20), Channel No. 1



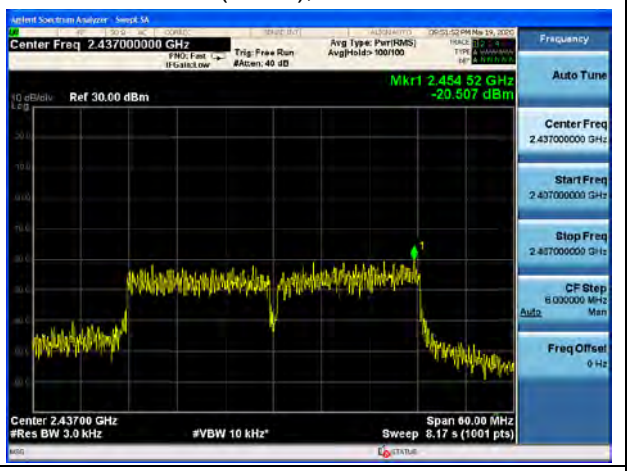

802.11n(HT40), Channel No. 3



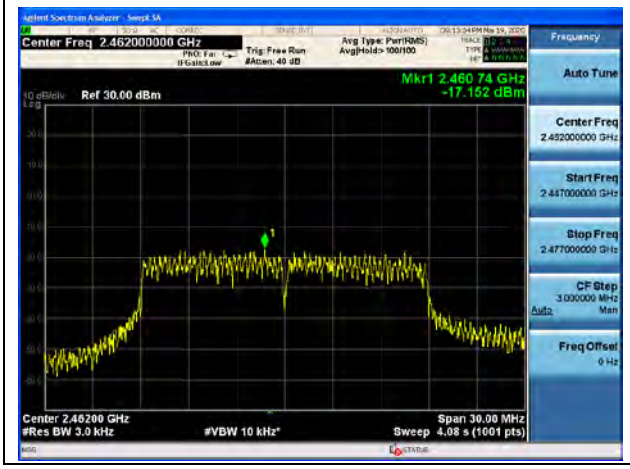

802.11n(HT20), Channel No. 6



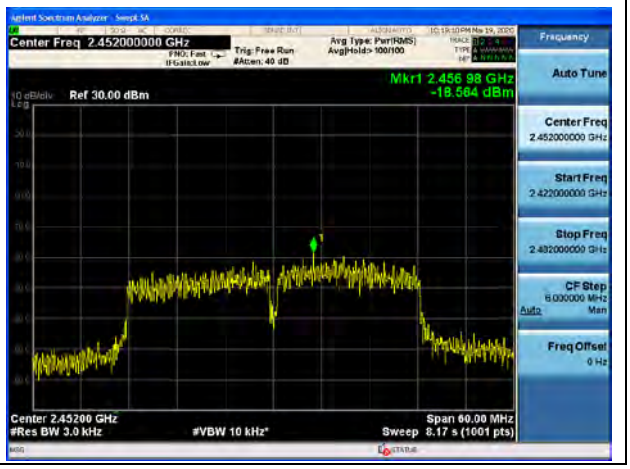

802.11n(HT40), Channel No. 6




802.11n(HT20), Channel No. 11

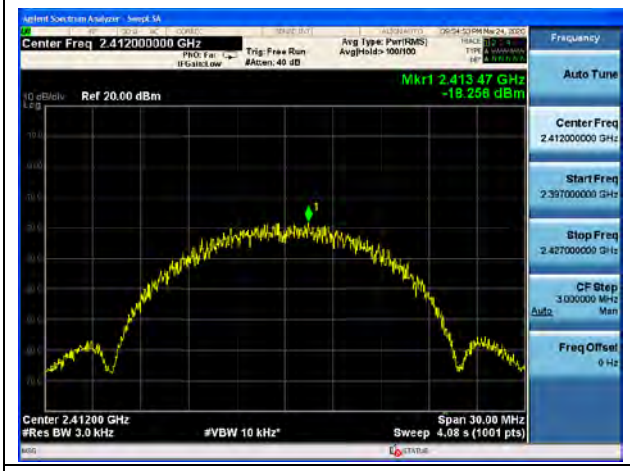



802.11n(HT40), Channel No. 9

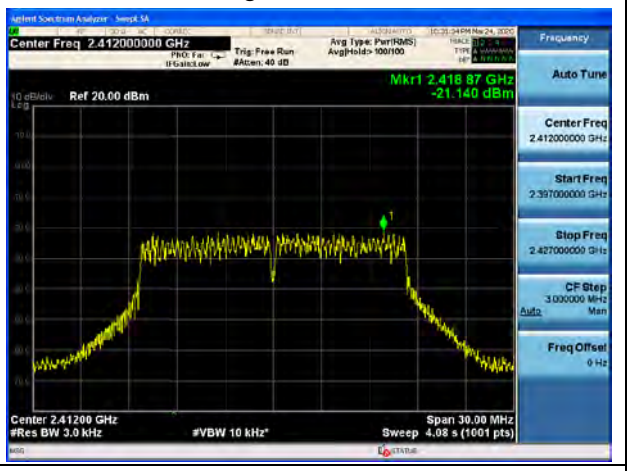


## MIMO Antenna 1:

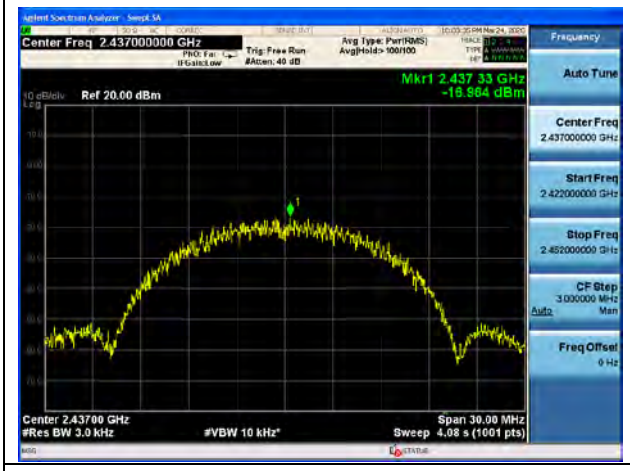
802.11b, Channel No.: 1



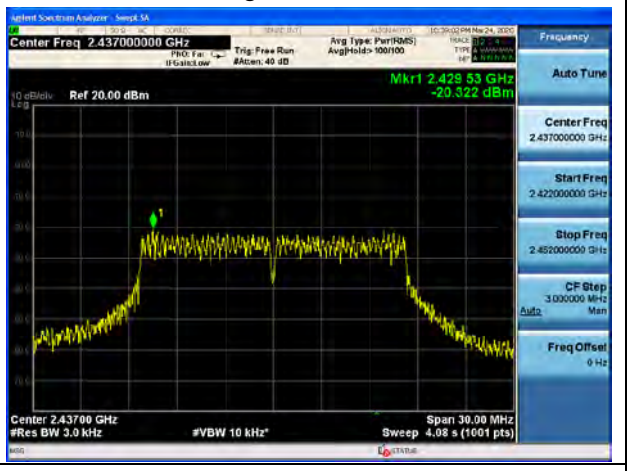

802.11g, Channel No.: 1



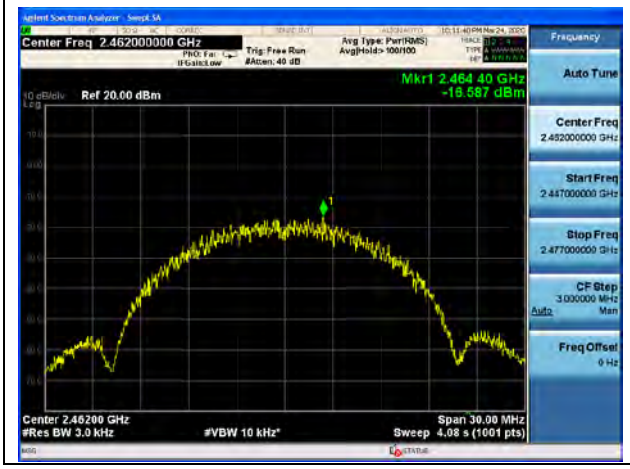

802.11b, Channel No.: 6



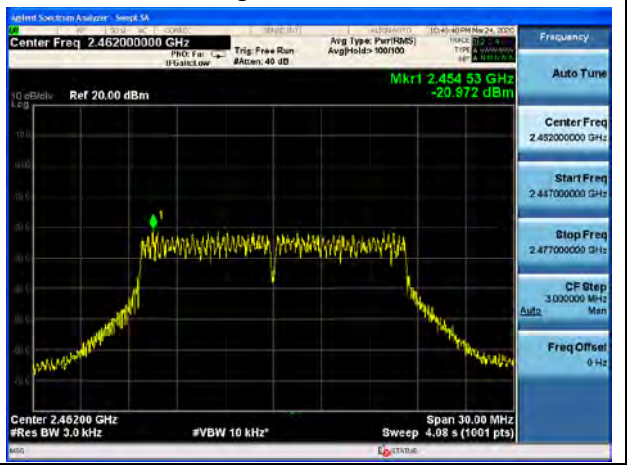

802.11g, Channel No.: 6



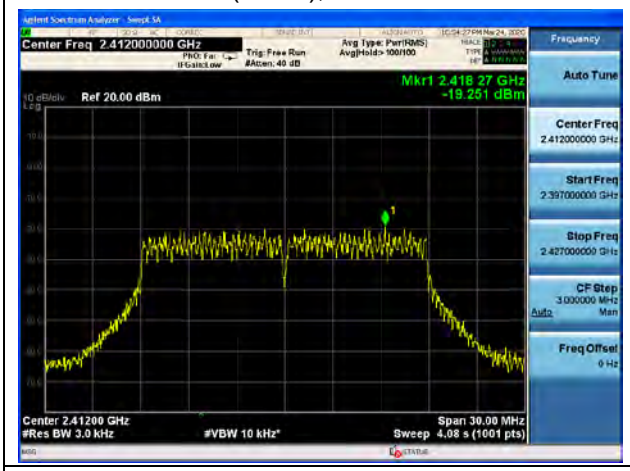

802.11b, Channel No.: 11



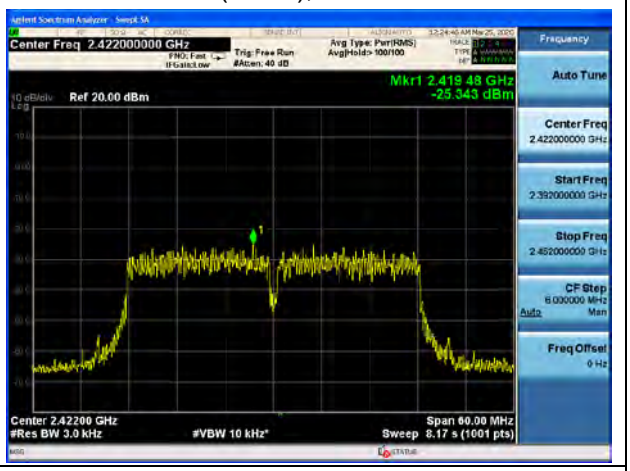

802.11g, Channel No.: 11



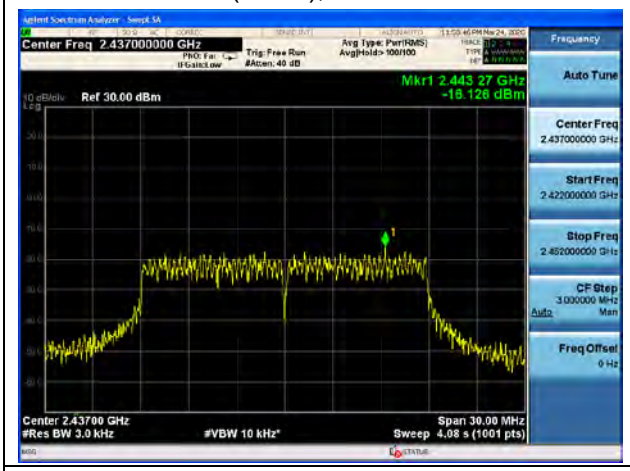
802.11n(HT20), Channel No. 1



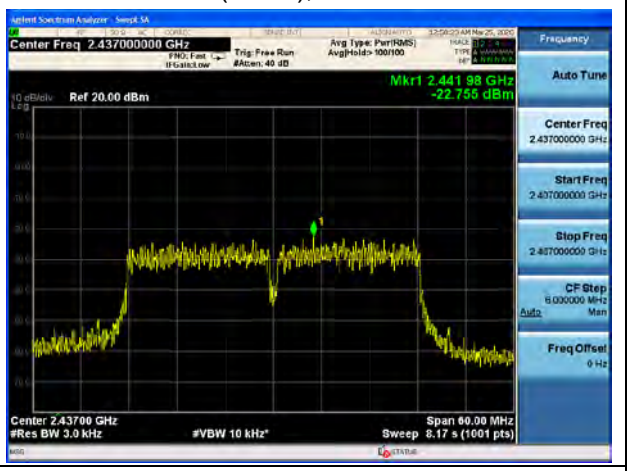

802.11n(HT40), Channel No. 3



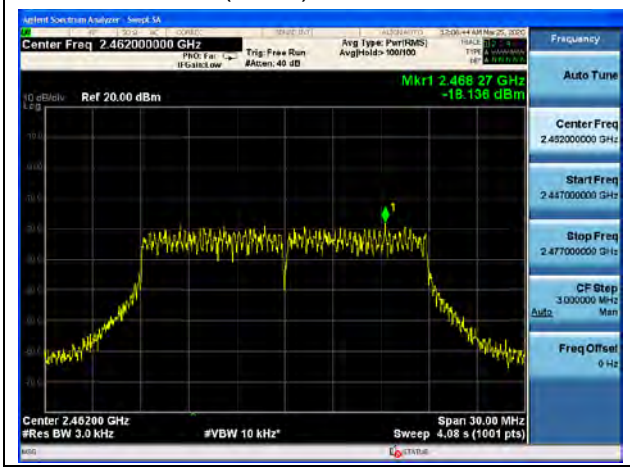

802.11n(HT20), Channel No. 6



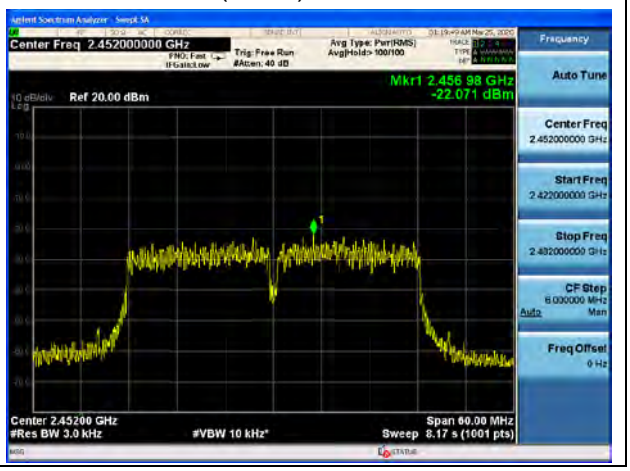

802.11n(HT40), Channel No. 6




802.11n(HT20), Channel No. 11

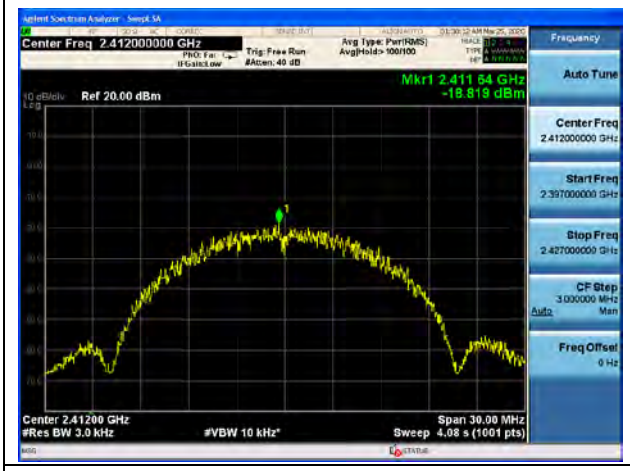



802.11n(HT40), Channel No. 9

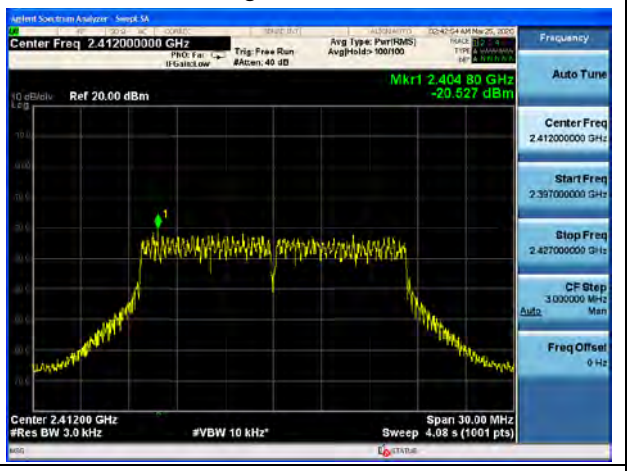


**MIMO Antenna 2:**

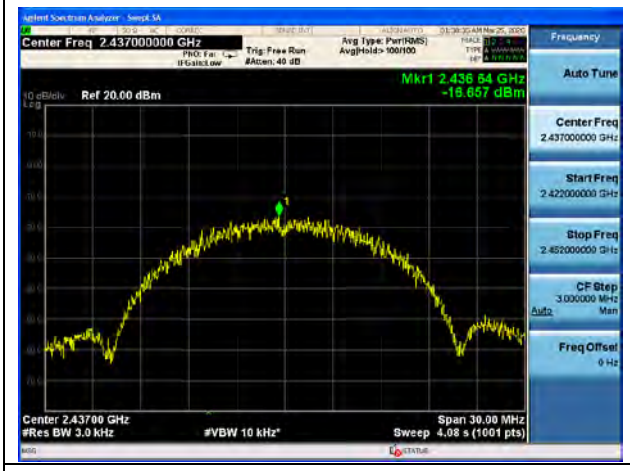
802.11b, Channel No.: 1



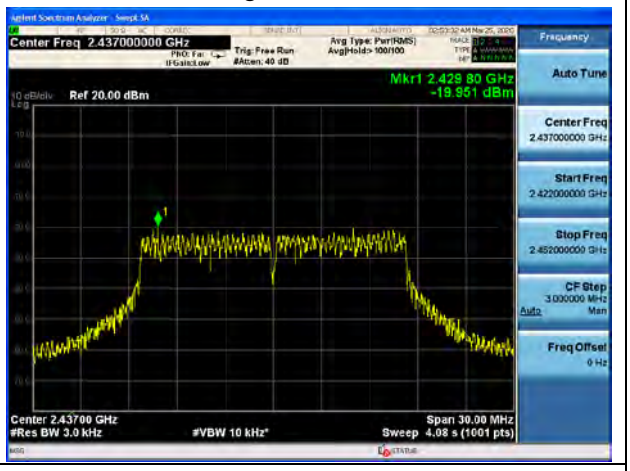

802.11g, Channel No.: 1



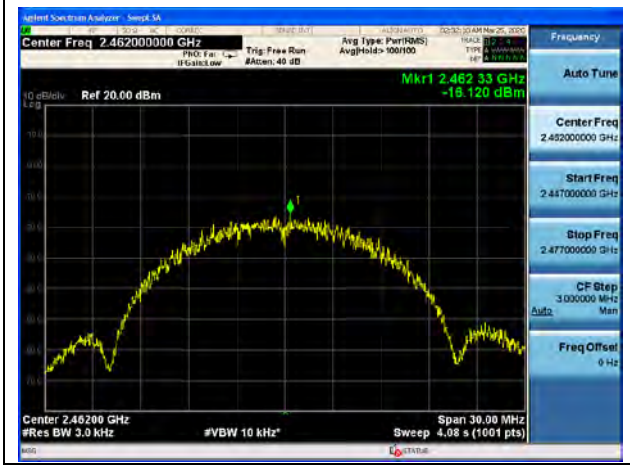

802.11b, Channel No.: 6



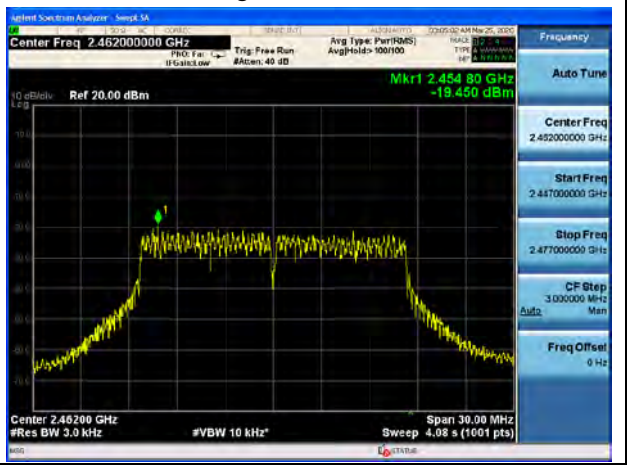

802.11g, Channel No.: 6



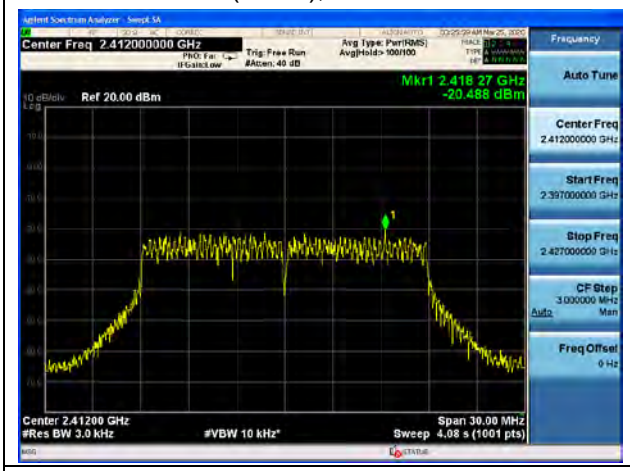

802.11b, Channel No.: 11



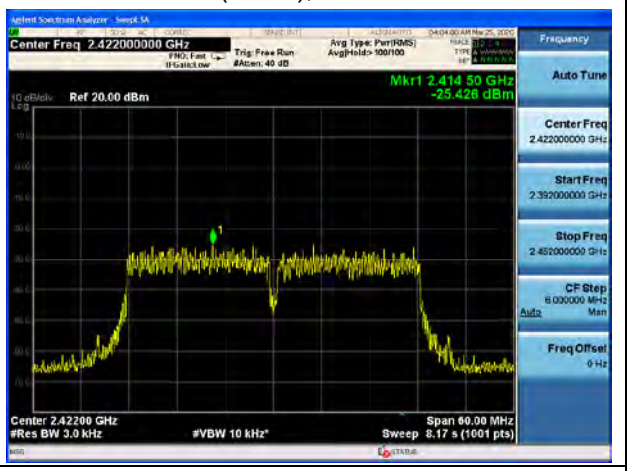

802.11g, Channel No.: 11



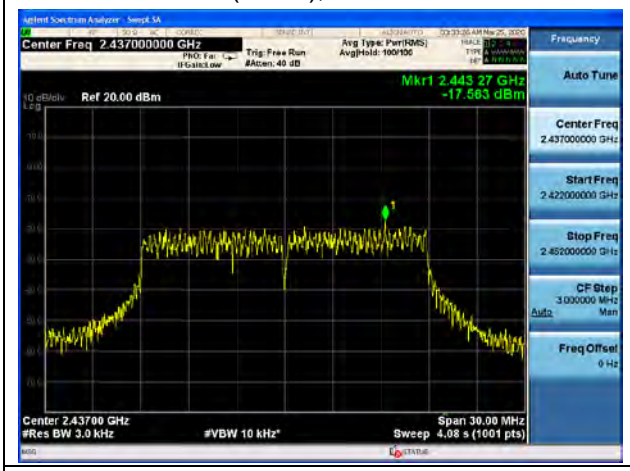
802.11n(HT20), Channel No. 1



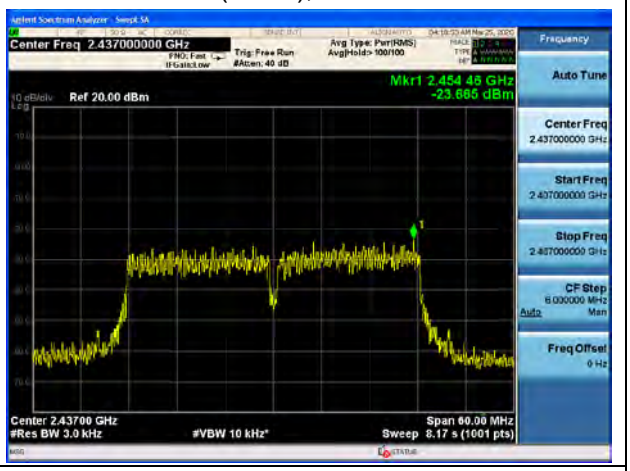

802.11n(HT40), Channel No. 3



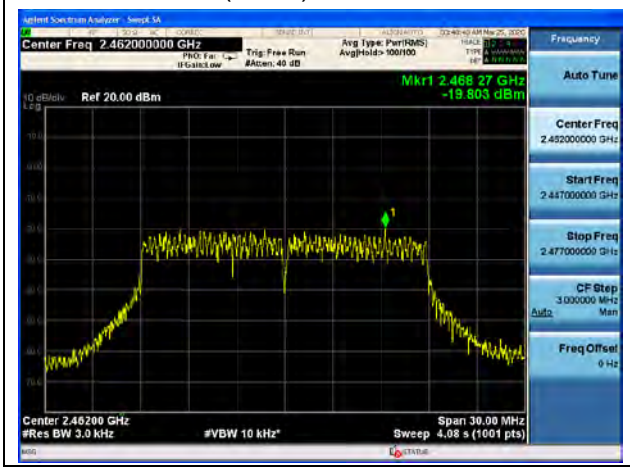

802.11n(HT20), Channel No. 6



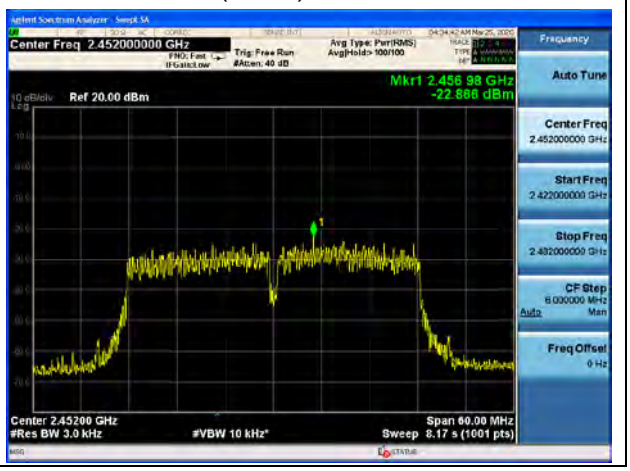

802.11n(HT40), Channel No. 6




802.11n(HT20), Channel No. 11




802.11n(HT40), Channel No. 9



## 5.5. Spurious RF Conducted Emissions

**Ambient condition**

| Temperature | Relative humidity | Pressure |
|---|---|---|
| 23°C ~25°C | 45%~50% | 101.5kPa |

**Method of Measurement**

The EUT was connected to the spectrum analyzer with a known loss. The spectrum analyzer scans from 30MHz to the 10th harmonic of the carrier. The peak detector is used. Set RBW to 100 kHz and VBW to 300 kHz, Sweep is set to ATUO.
The test is in transmitting mode.

**Test setup**


**Limits**

Rule Part 15.247(d) pacifies that “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. ”

**SISO Antenna 1:**

| Network Standards | Carrier frequency (MHz) | Reference value (dBm) | Limit |
|---|---|---|---|
| 802.11b | 2412 | 8.47 | -21.53 |
| | 2437 | 9.57 | -20.43 |
| | 2462 | 8.35 | -21.65 |
| 802.11g | 2412 | 4.41 | -25.59 |
| | 2437 | 4.62 | -25.38 |
| | 2462 | 4.30 | -25.70 |
| 802.11n HT20 | 2412 | 5.60 | -24.40 |
| | 2437 | 6.29 | -23.71 |
| | 2462 | 5.35 | -24.65 |
| 802.11n HT40 | 2422 | 2.14 | -27.86 |
| | 2437 | 1.55 | -28.45 |
| | 2452 | 2.12 | -27.88 |

**Measurement Uncertainty**

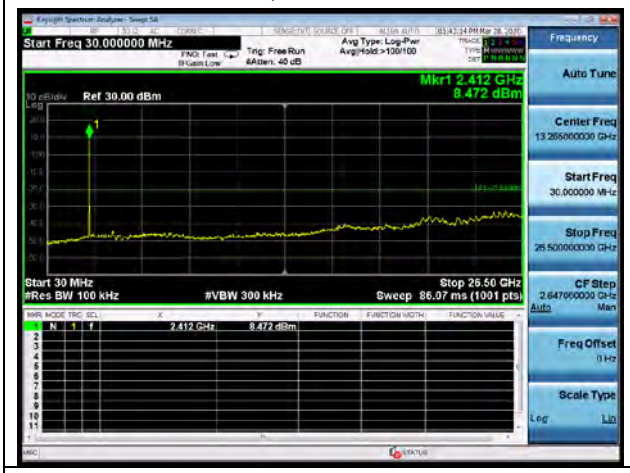
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k$ = 1.96.

| Frequency | Uncertainty |
|---|---|
| 100kHz-2GHz | 0.684 dB |
| 2GHz-26GHz | 1.407 dB |

## Test Results:

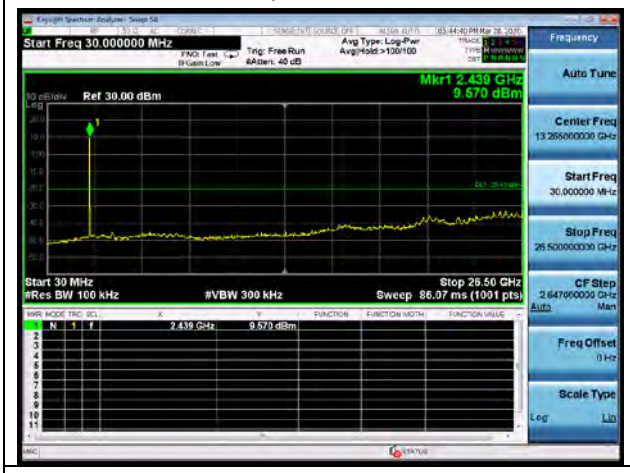
### SISO Antenna 1:

802.11b, Channel No.: 1



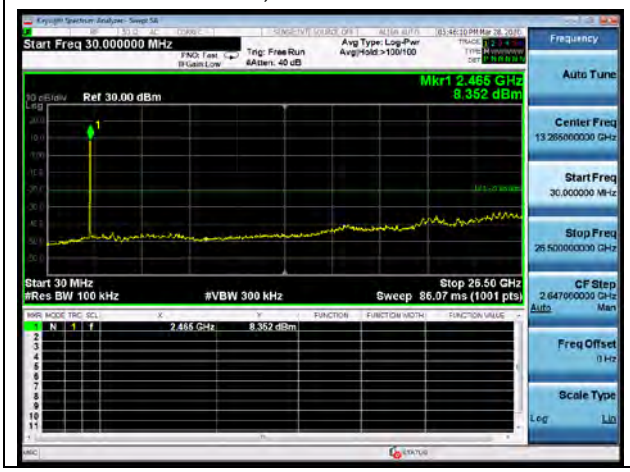

802.11g, Channel No.: 1


802.11b, Channel No.: 6



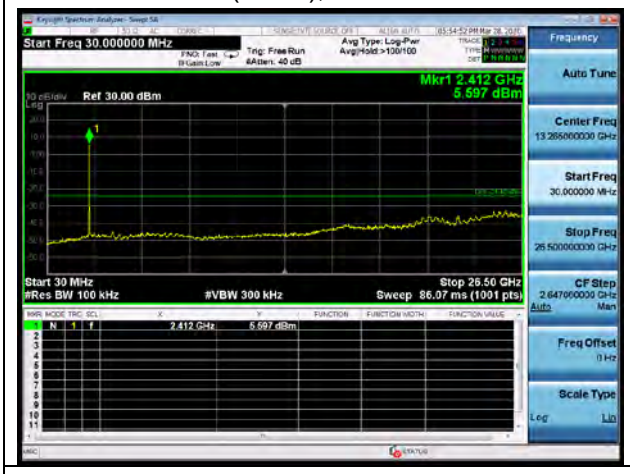

802.11g, Channel No.: 6


802.11b, Channel No.: 11



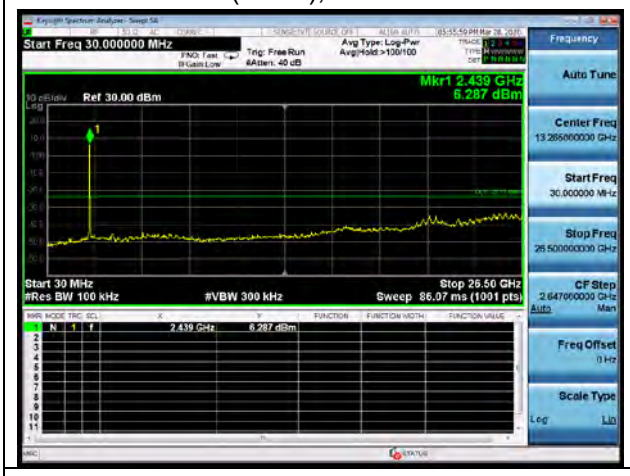

802.11g, Channel No.: 11

802.11n(HT20), Channel No. 1



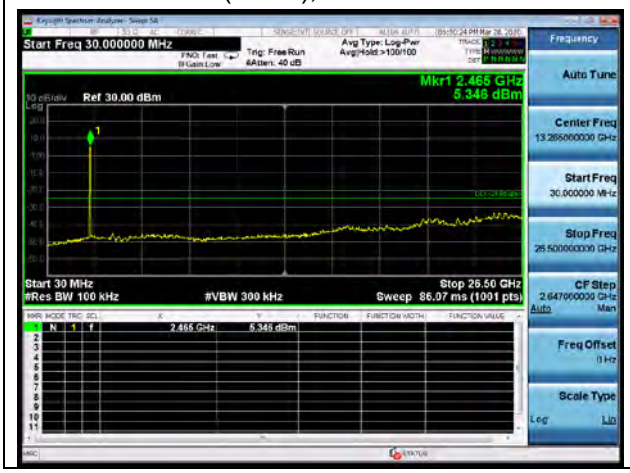

802.11n(HT40), Channel No. 3


802.11n(HT20), Channel No. 6




802.11n(HT40), Channel No. 6


802.11n(HT20), Channel No. 11




802.11n(HT40), Channel No. 9

## 5.6. Unwanted Emission

**Ambient condition**

| Temperature | Relative humidity | Pressure |
|---|---|---|
| 23°C ~25°C | 45%~50% | 102.5kPa |

**Method of Measurement**

The test set-up was made in accordance to the general provisions of ANSI C63.10-2013.
The Equipment Under Test (EUT) was set up on a non-conductive table in the semi-anechoic chamber. The test was performed at the distance of 3 m between the EUT and the receiving antenna.

The turntable shall be rotated from 0 to 360 degrees for detecting the maximum of radiated spurious signal l evel. T he m easurements s hall be re peated wi th orthogonal polarization of t he t est antenna.The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing. Sweep the Restricted Band and the emissions less than 20 dB below the permissible value are reported.
The radiated emissions measurements were made in a typical installation configuration.
Sweep the whole frequency band through the range from 9 kHz to the 10th harmonic of the carrier, and the emissions less than 20 dB below the permissible value are reported.

This method refer to ANSI C63.10-2013.
The procedure for peak unwanted emissions measurements above 1000 MHz is as follows:
I) Peak emission levels are measured by setting the instrument as follows:
1) RBW = 1 MHz.
2) VBW ≥ [3 × RBW]
3) Detector = peak.
4) Sweep time = auto.
5) Trace mode = max hold.
6) Allow sweeps to continue until the trace stabilizes. Note that if the transmission is not continuous, then the time required for the trace to stabilize will increase by a factor of approximately 1 / D, where D is the duty cycle.

II) Average emission levels are measured by setting the instrument as follows:
a) RBW = 1 MHz.
b) VBW ≥ [3 × RBW].
c) Detector = RMS (power averaging), if [span / (# of points in sweep)]≤RBW / 2. Satisfying this condition c an req uire i ncreasing t he number of p oints i n t he s weep o r re ducing t he s pan. I f t he condition is not satisfied, then the detector mode shall be set to peak.
d) Averaging type = power (i.e., rms) (As an alternative, the detector and averaging type may be set for l inear v oltage av eraging. S ome i nstruments requi re l inear display m ode t o us e l inear voltage

averaging. Log or dB averaging shall not be used.)

e) Sweep time = auto.

f) Perform a trace average of at least 100 traces if the transmission is continuous. If the transmission is not continuous, then the number of traces shall be increased by a factor of 1 / D, where D is the duty cycle. For example, with 50% duty cycle, at least 200 traces shall be averaged. (If a specific emission is demonstrated to be continuous—i.e., 100% duty cycle—then rather than turning ON and OFF with the transmit cycle, at least 100 traces shall be averaged.)

g) If tests are performed with the EUT transmitting at a duty cycle less than 98%, then a correction factor shall be added to the measurement results prior to comparing with the emission limit, to compute the emission level that would have been measured had the test been performed at 100% duty cycle. The correction factor is computed as follows:

1) If power averaging (rms) mode was used in the preceding step e), then the correction factor is [10 log (1 / D)], where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 3 dB shall be added to the measured emission levels.

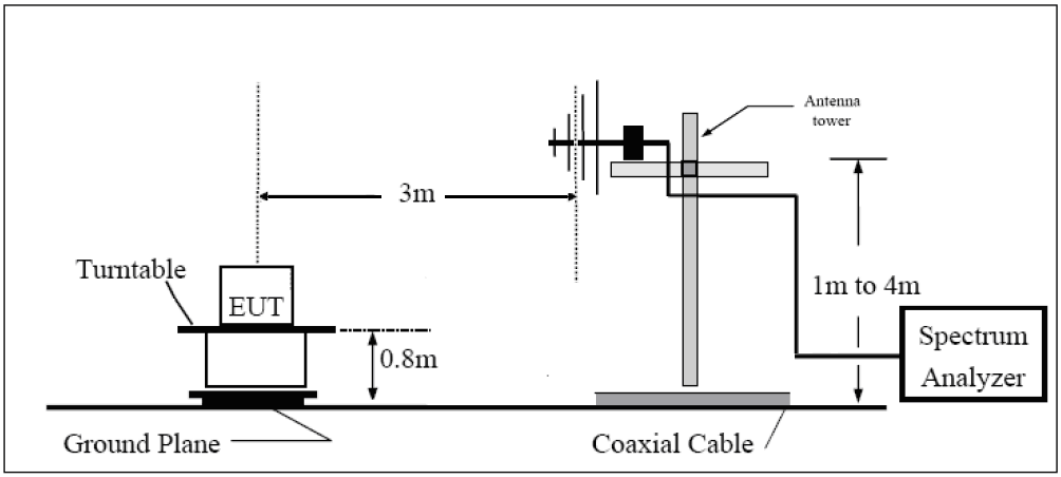
2) If linear voltage averaging mode was used in the preceding step e), then the correction factor is [20 log (1 / D)], where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 6 dB shall be added to the measured emission levels.

3) If a specific emission is demonstrated to be continuous (100% duty cycle) rather than turning ON and OFF with the transmit cycle, then no duty cycle correction is required for that emission.

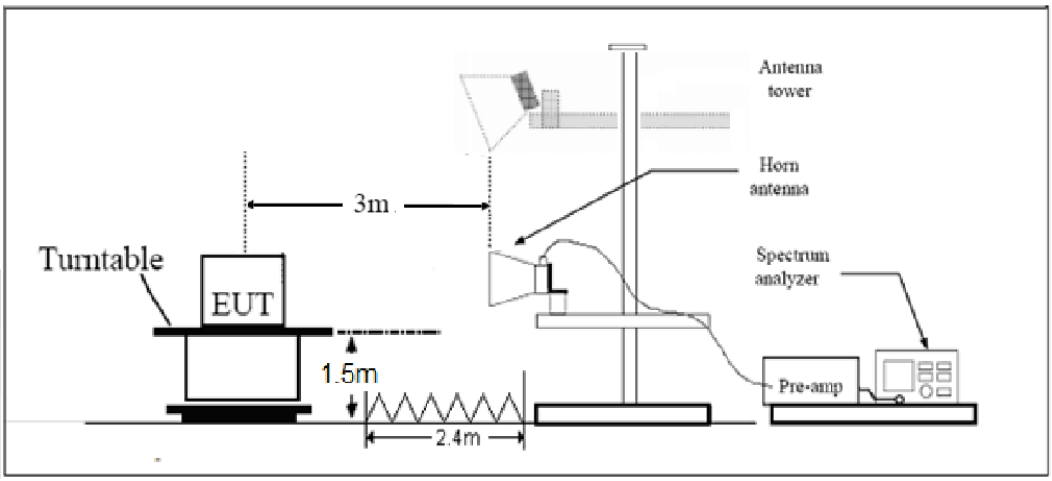
The test is in transmitting mode.

**Test setup**

**30MHz ~ 1GHz**




**Above 1GHz**




Note: Area side:2.4mX3.6m

**Limits**

Rule Part 15.247(d) specifies that “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)).”

Limit in restricted band

| Frequency of emission (MHz) | Field strength(uV/m) | Field strength(dBuV/m) |
|---|---|---|
| 0.009–0.490 | 2400/F(kHz) | / |
| 0.490–1.705 | 24000/F(kHz) | / |
| 1.705–30.0 | 30 | / |
| 30-88 | 100 | 40 |
| 88-216 | 150 | 43.5 |
| 216-960 | 200 | 46 |
| Above960 | 500 | 54 |

§15.35(b)

There is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.

Peak Limit=74 dBuV/m

Average Limit=54 dBuV/m

Spurious Radiated Emissions are permitted in any of the frequency bands listed below:

| MHz | MHz | MHz | GHz |
|---|---|---|---|
| 0.090 - 0.110 | 16.42 - 16.423 | 399.9 - 410 | 4.5 - 5.15 |
| [1]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 | ([2]) |
| 13.36 - 13.41 | | | |

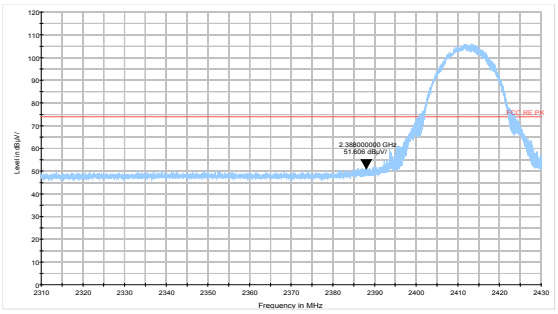
**Measurement Uncertainty**

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor *k* = 1.96.

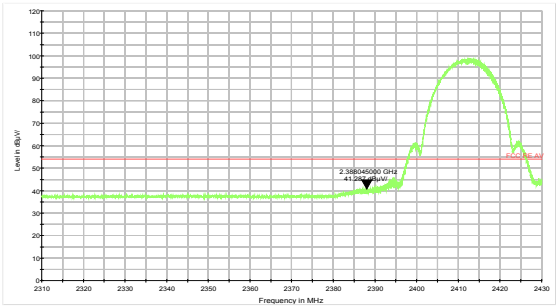
| Frequency | Uncertainty |
|---|---|
| 9KHz-30MHz | 3.55 dB |
| 30MHz-200MHz | 4.02 dB |
| 200MHz-1GHz | 3.28 dB |
| 1-18GHz | 3.70 dB |
| 18-26.5GHz | 5.78 dB |

## Test Results:

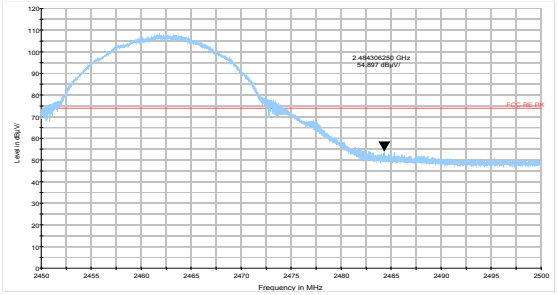
## SISO Antenna 1:



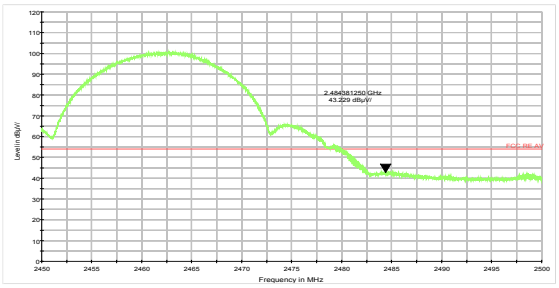

802.11b-Channel 1 Peak



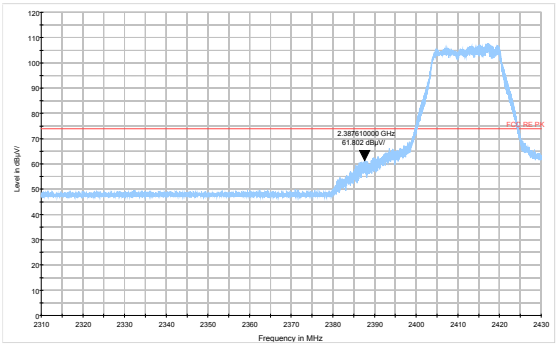

802.11b-Channel 1 Average



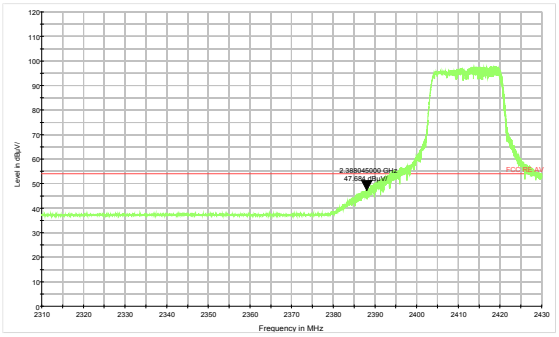

802.11b-Channel 11 Peak



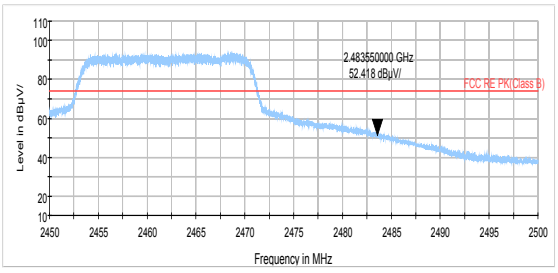

802.11b-Channel 11Average



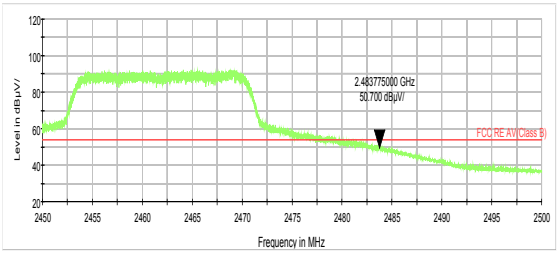

802.11g-Channel 1 Peak



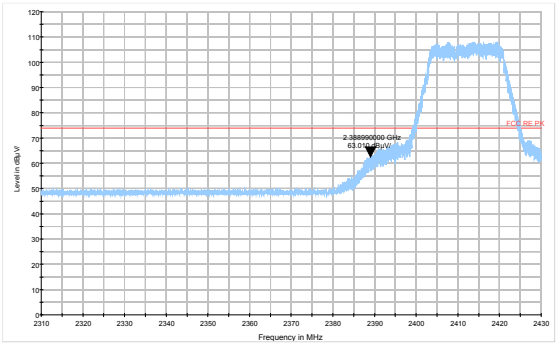

802.11g-Channel 1 Average



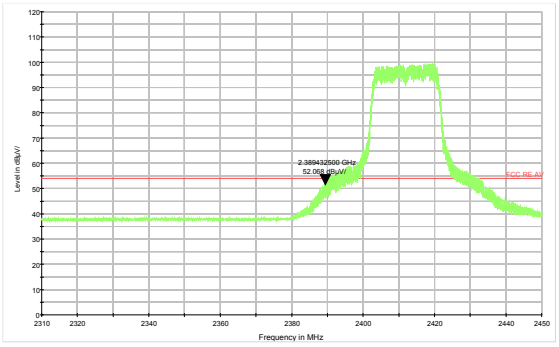

802.11g-Channel 11 Peak



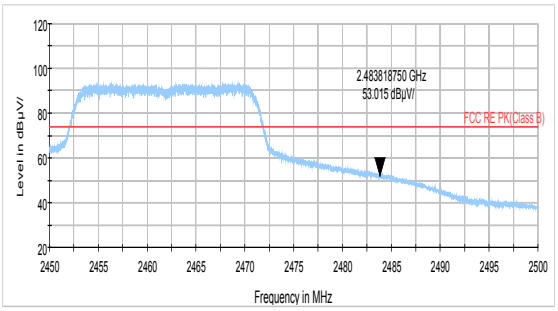

802.11g-Channel 11 Average



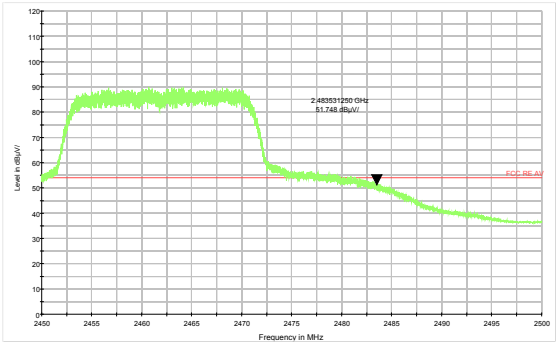

802.11n HT20 -Channel 1 Peak



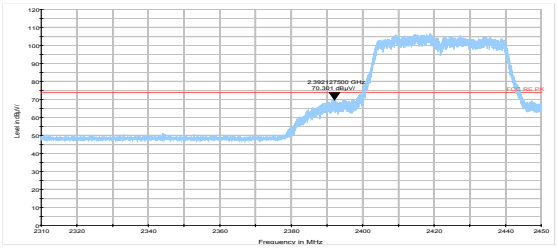

802.11n HT20 -Channel 1 Average



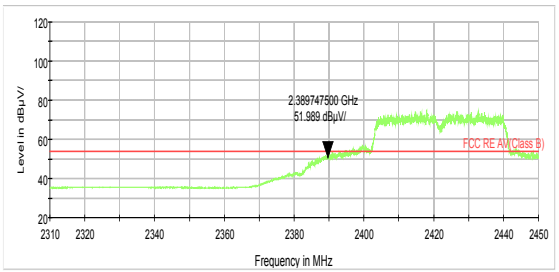

802.11n HT20 -Channel 11 Peak



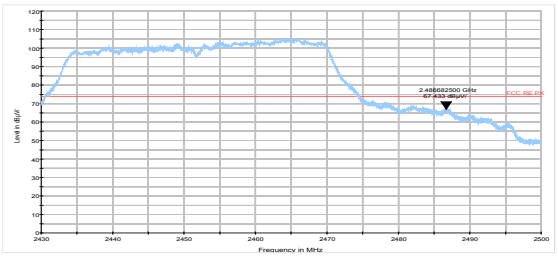

802.11n HT20 -Channel 11 Average



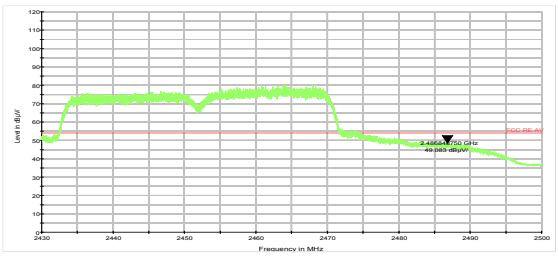

802.11n HT40 –Channel 3 Peak




802.11n HT40 -Channel 3 Average




802.11n HT40 -Channel 9 Peak




802.11n HT40 -Channel 9 Average

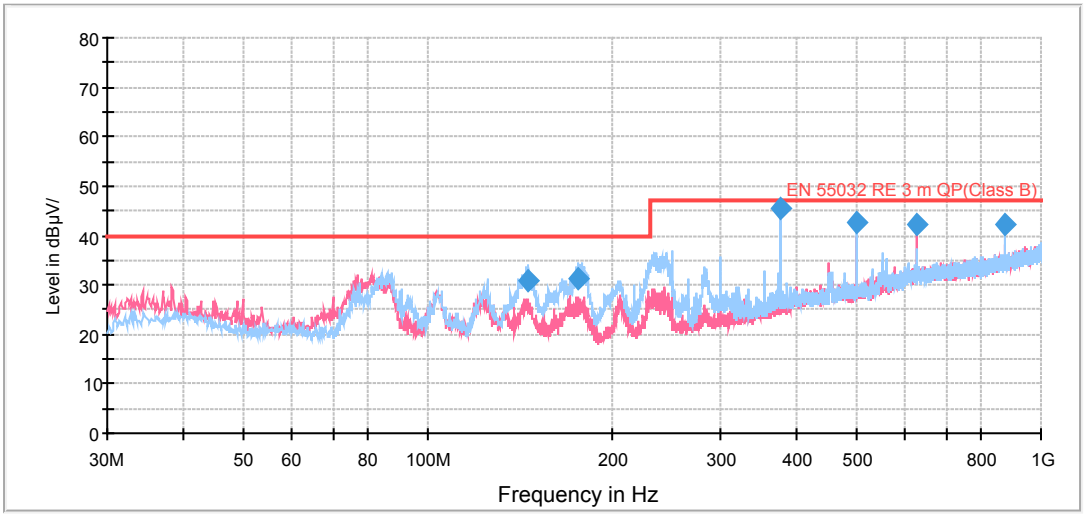
**Result of RE**

**Test result**

Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, the Emissions in the frequency band 9kHz-30MHz and 18GHz-26.5GHz are more than 20dB below the limit are not reported.

The following graphs display the maximum values of horizontal and vertical by software.
For above 1GHz, Blue trace uses the peak detection, Green trace uses the average detection.
**After the pretest, SISO Antenna 1 was selected as the worst antenna.**

During the test, the Radiates Emission from 30MHz to 1GHz was performed in all modes with all channels, 802.11b, Channel 11 are selected as the worst condition. The test data of the worst-case condition was recorded in this report.
**Continuous TX mode:**

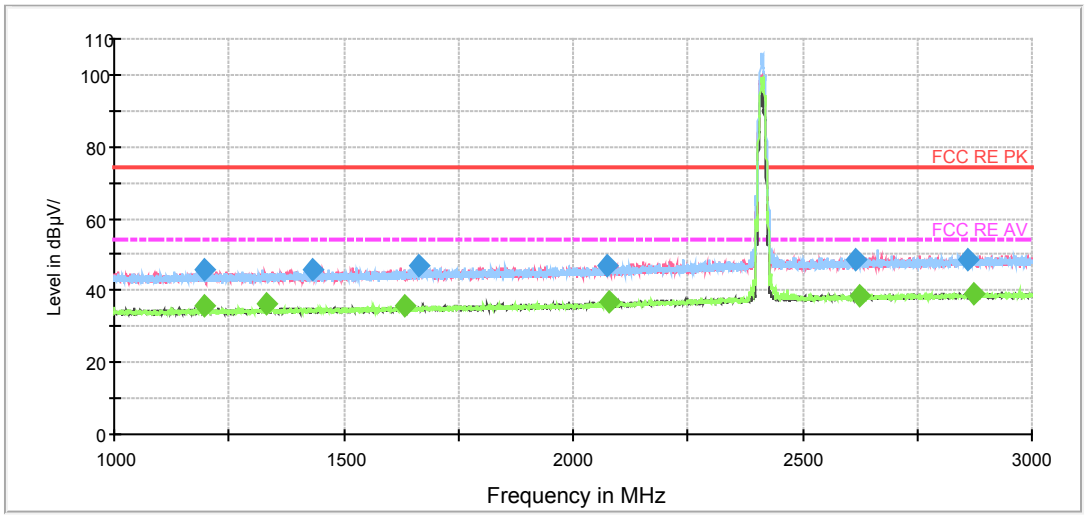



Radiates Emission from 30MHz to 1GHz

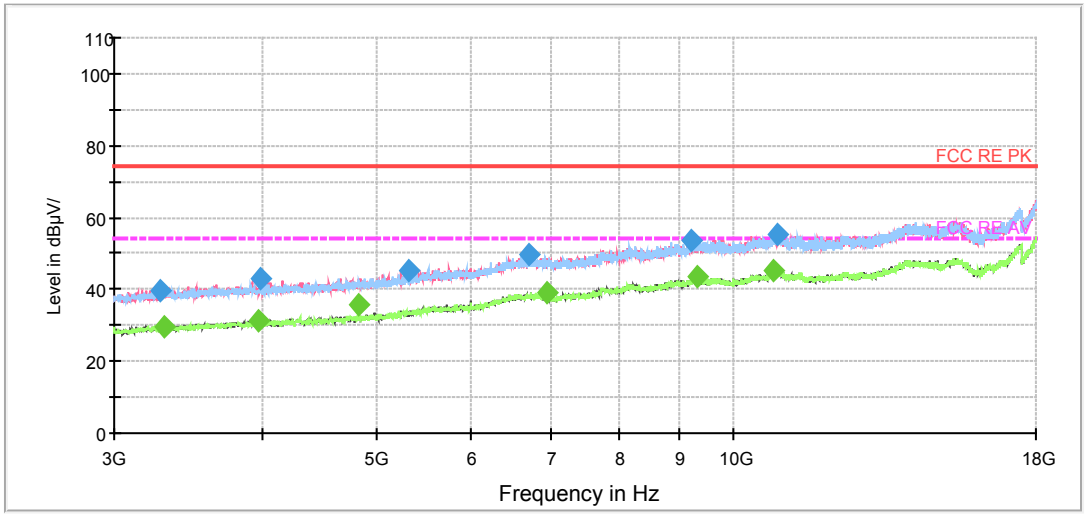
| Frequency (MHz) | Quasi-Peak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|---|---|---|---|---|---|---|---|
| 145.556250 | 30.9 | 175.0 | H | 235.0 | 9.6 | 9.1 | 40.0 |
| 176.463750 | 31.4 | 125.0 | H | 25.0 | 10.9 | 8.6 | 40.0 |
| 374.996250 | 45.4 | 100.0 | H | 162.0 | 18.5 | 1.6 | 47.0 |
| 500.006250 | 42.6 | 200.0 | H | 22.0 | 21.1 | 4.4 | 47.0 |
| 625.015000 | 42.3 | 100.0 | V | 0.0 | 23.3 | 4.7 | 47.0 |
| 875.032500 | 42.3 | 100.0 | H | 243.0 | 26.0 | 4.7 | 47.0 |

**Remark: 1. Correction Factor = Antenna factor+ Insertion loss(cable loss+amplifier gain)**
**2. Margin = Limit – Quasi-Peak**

**802.11b CH1**




Note: The signal beyond the limit is carrier.
Radiates Emission from 1GHz to 3GHz




Radiates Emission from 3GHz to 18GHz

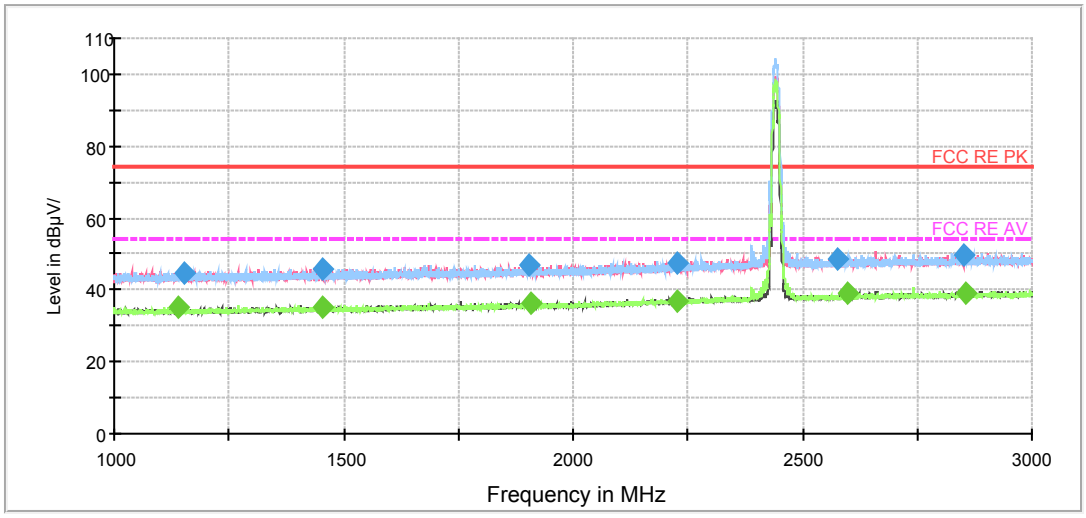
| Frequency (MHz) | Peak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|---|---|---|---|---|---|---|---|
| 1198.250000 | 46.0 | 200.0 | V | 9.0 | -1.2 | 28.0 | 74.0 |
| 1432.500000 | 45.8 | 200.0 | V | 0.0 | -0.6 | 28.2 | 74.0 |
| 1665.750000 | 46.9 | 100.0 | H | 76.0 | 0.2 | 27.1 | 74.0 |
| 2074.250000 | 47.1 | 200.0 | V | 0.0 | 1.5 | 26.9 | 74.0 |
| 2616.500000 | 48.8 | 100.0 | H | 141.0 | 3.8 | 25.2 | 74.0 |
| 2861.750000 | 48.8 | 200.0 | V | 6.0 | 4.4 | 25.2 | 74.0 |

**Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)**

| Frequency (MHz) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|---|---|---|---|---|---|---|---|
| 1198.250000 | 35.7 | 200.0 | V | 9.0 | -1.2 | 18.3 | 54.0 |
| 1331.500000 | 36.1 | 100.0 | H | 108.0 | -0.9 | 17.9 | 54.0 |
| 1633.250000 | 35.9 | 100.0 | H | 0.0 | 0.1 | 18.1 | 54.0 |
| 2078.750000 | 36.8 | 100.0 | H | 0.0 | 1.5 | 17.2 | 54.0 |
| 2625.750000 | 38.8 | 100.0 | V | 340.0 | 3.8 | 15.2 | 54.0 |
| 2874.250000 | 38.9 | 100.0 | V | 0.0 | 4.5 | 15.1 | 54.0 |

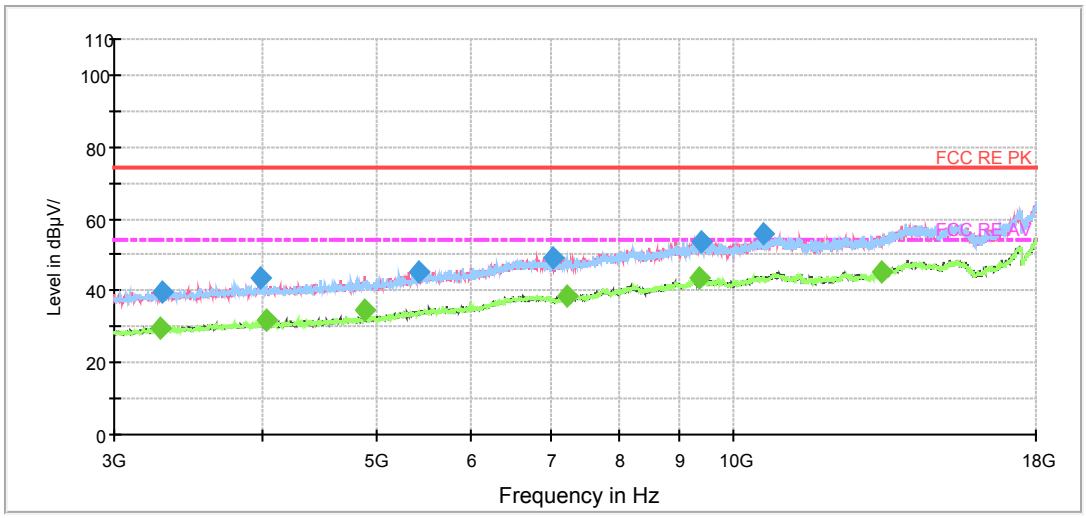
**Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)**

**802.11b CH6**




Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz




Radiates Emission from 3GHz to 18GHz

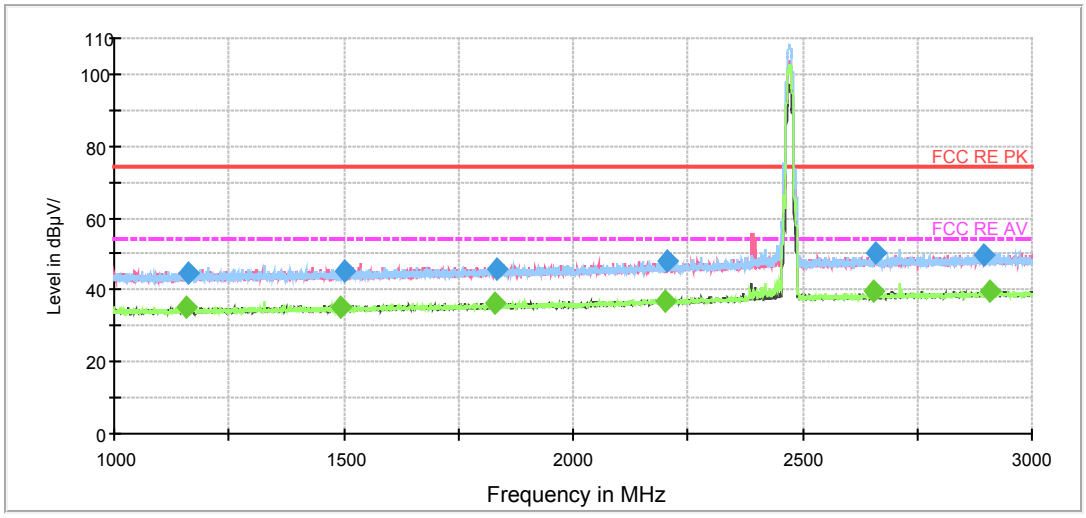
| Frequency (MHz) | Peak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|---|---|---|---|---|---|---|---|
| 1151.000000 | 44.7 | 200.0 | H | 233.0 | -1.3 | 29.3 | 74.0 |
| 1455.000000 | 45.5 | 200.0 | V | 0.0 | -0.5 | 28.5 | 74.0 |
| 1904.500000 | 47.0 | 100.0 | V | 78.0 | 0.9 | 27.0 | 74.0 |
| 2227.000000 | 47.2 | 200.0 | H | 0.0 | 2.3 | 26.8 | 74.0 |
| 2576.000000 | 48.8 | 200.0 | H | 358.0 | 3.8 | 25.2 | 74.0 |
| 2850.000000 | 49.6 | 100.0 | H | 1.0 | 4.4 | 24.4 | 74.0 |

**Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)**

| Frequency (MHz) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|---|---|---|---|---|---|---|---|
| 1138.500000 | 35.0 | 200.0 | V | 2.0 | -1.3 | 19.0 | 54.0 |
| 1454.000000 | 35.3 | 200.0 | V | 11.0 | -0.5 | 18.7 | 54.0 |
| 1910.000000 | 36.5 | 100.0 | V | 0.0 | 0.9 | 17.5 | 54.0 |
| 2226.750000 | 37.1 | 200.0 | V | 30.0 | 2.3 | 16.9 | 54.0 |
| 2596.500000 | 39.2 | 200.0 | V | 3.0 | 3.8 | 14.8 | 54.0 |
| 2855.000000 | 39.1 | 100.0 | H | 39.0 | 4.4 | 14.9 | 54.0 |

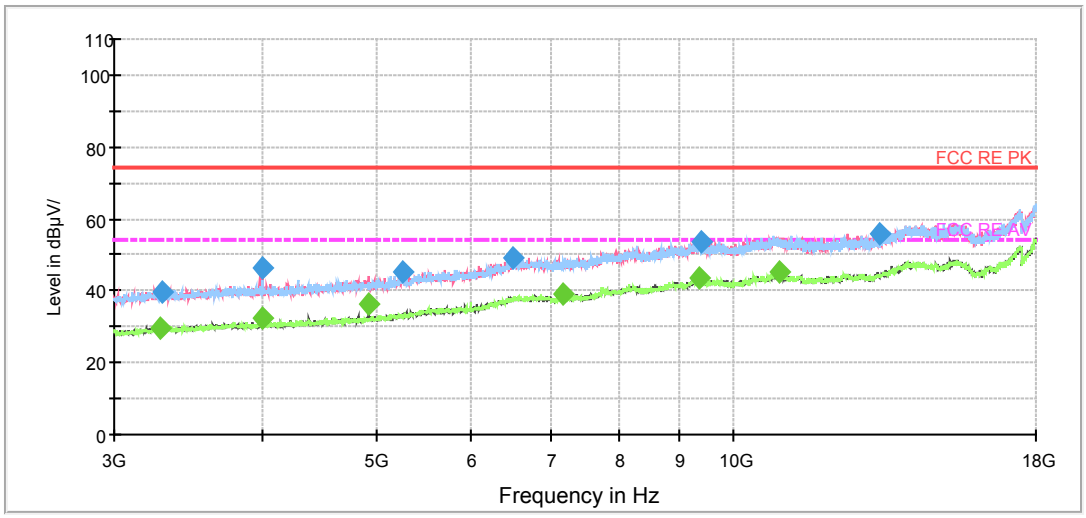
**Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)**

**802.11b CH11**




Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz




Radiates Emission from 3GHz to 18GHz

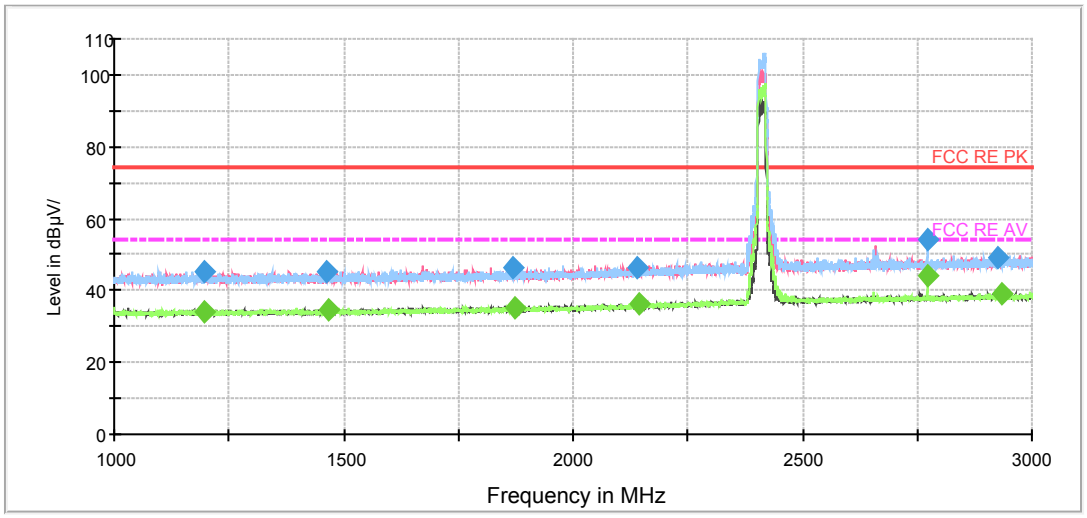
| Frequency (MHz) | Peak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|---|---|---|---|---|---|---|---|
| 1160.250000 | 44.9 | 100.0 | H | 0.0 | -1.3 | 29.1 | 74.0 |
| 1502.000000 | 45.3 | 200.0 | V | 141.0 | -0.4 | 28.7 | 74.0 |
| 1836.000000 | 46.0 | 100.0 | H | 158.0 | 0.7 | 28.0 | 74.0 |
| 2205.250000 | 47.8 | 100.0 | H | 125.0 | 2.2 | 26.2 | 74.0 |
| 2661.250000 | 50.4 | 100.0 | V | 350.0 | 3.9 | 23.6 | 74.0 |
| 2895.500000 | 49.6 | 200.0 | H | 86.0 | 4.5 | 24.4 | 74.0 |

**Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)**

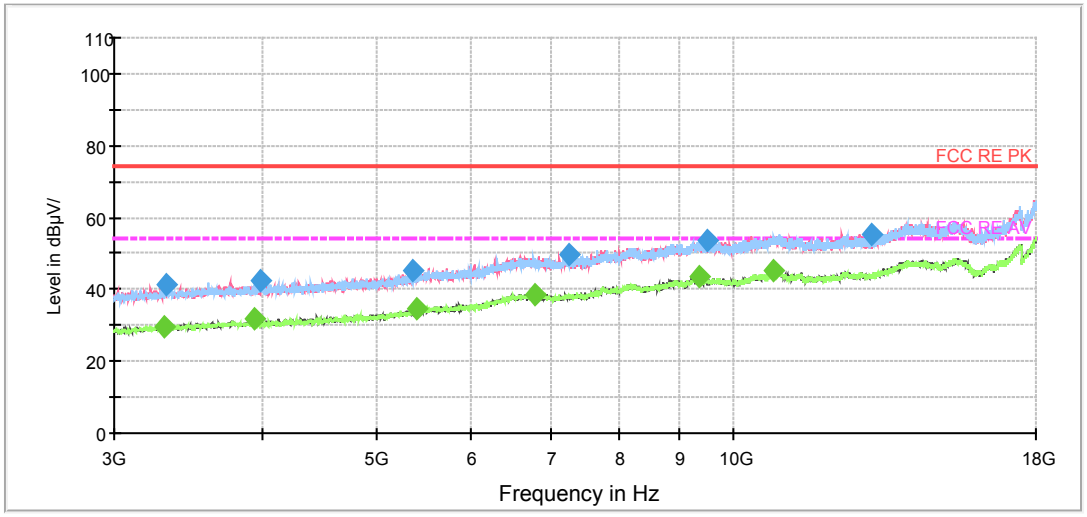
| Frequency (MHz) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|---|---|---|---|---|---|---|---|
| 1155.750000 | 35.0 | 200.0 | V | 110.0 | -1.3 | 19.0 | 54.0 |
| 1495.000000 | 35.1 | 100.0 | H | 192.0 | -0.4 | 18.9 | 54.0 |
| 1830.500000 | 36.3 | 200.0 | V | 141.0 | 0.7 | 17.7 | 54.0 |
| 2201.750000 | 37.0 | 200.0 | H | 304.0 | 2.2 | 17.0 | 54.0 |
| 2656.500000 | 39.7 | 100.0 | H | 3.0 | 3.9 | 14.3 | 54.0 |
| 2906.500000 | 39.6 | 100.0 | V | 358.0 | 4.5 | 14.4 | 54.0 |

**Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)**

**802.11g CH1**




Note: The signal beyond the limit is carrier.
Radiates Emission from 1GHz to 3GHz




Radiates Emission from 3GHz to 18GHz

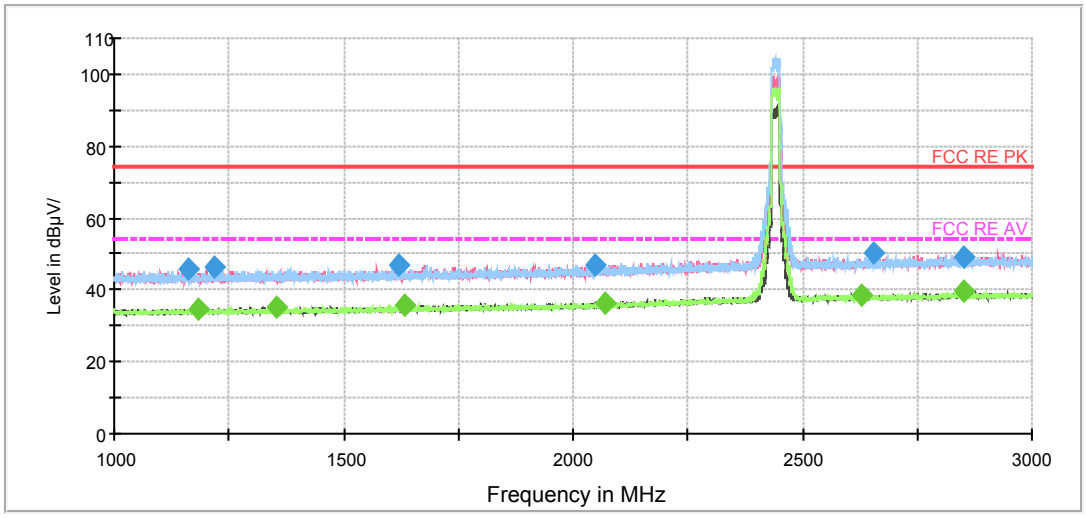
| Frequency (MHz) | Peak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|---|---|---|---|---|---|---|---|
| 1196.000000 | 45.5 | 100.0 | H | 0.0 | -1.2 | 28.5 | 74.0 |
| 1461.500000 | 45.4 | 200.0 | V | 3.0 | -0.5 | 28.6 | 74.0 |
| 1869.250000 | 46.1 | 100.0 | H | 58.0 | 0.8 | 27.9 | 74.0 |
| 2140.500000 | 46.3 | 200.0 | H | 0.0 | 1.9 | 27.7 | 74.0 |
| 2771.750000 | 54.0 | 100.0 | H | 264.0 | 4.2 | 20.0 | 74.0 |
| 2924.250000 | 48.9 | 100.0 | V | 359.0 | 4.6 | 25.1 | 74.0 |

**Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)**

| Frequency (MHz) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|---|---|---|---|---|---|---|---|
| 1196.000000 | 34.3 | 200.0 | V | 145.0 | -1.2 | 19.7 | 54.0 |
| 1468.750000 | 34.7 | 100.0 | V | 342.0 | -0.5 | 19.3 | 54.0 |
| 1874.250000 | 35.4 | 200.0 | H | 359.0 | 0.8 | 18.6 | 54.0 |
| 2144.250000 | 36.3 | 200.0 | H | 358.0 | 1.9 | 17.7 | 54.0 |
| 2772.000000 | 43.9 | 100.0 | H | 264.0 | 4.2 | 10.1 | 54.0 |
| 2936.250000 | 39.1 | 200.0 | V | 65.0 | 4.7 | 14.9 | 54.0 |

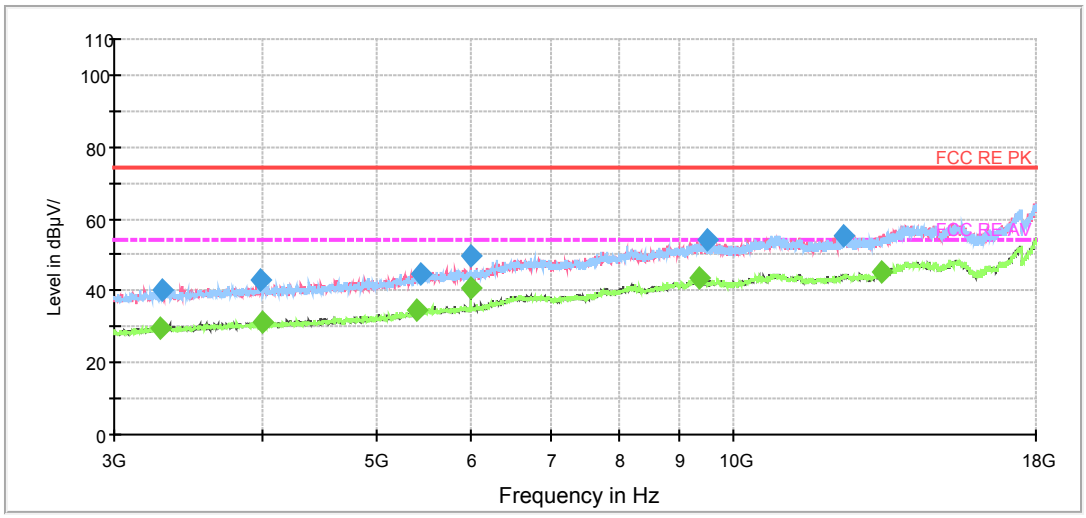
**Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)**

**802.11g CH6**




Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz




Radiates Emission from 3GHz to 18GHz

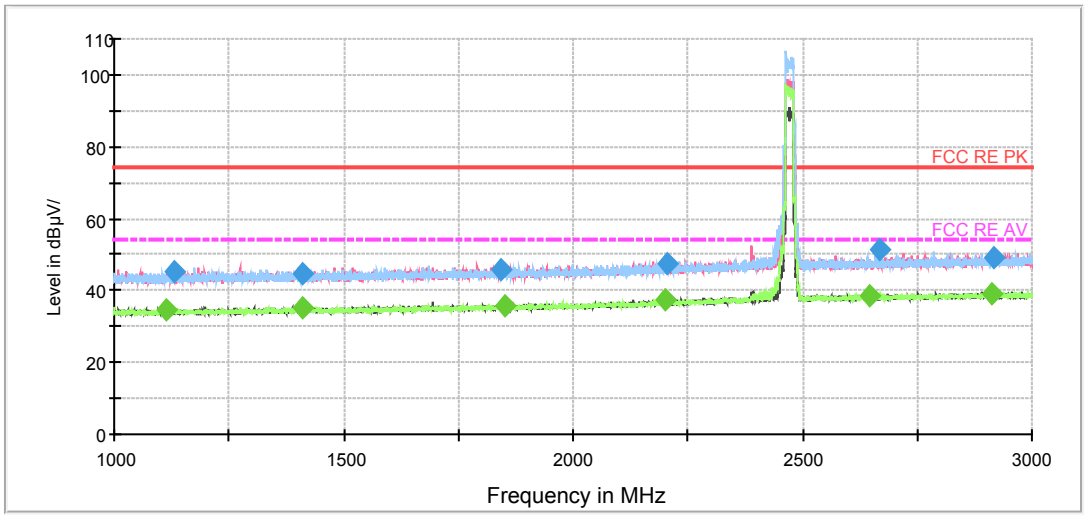
| Frequency (MHz) | Peak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|---|---|---|---|---|---|---|---|
| 1160.000000 | 45.7 | 200.0 | H | 348.0 | -1.3 | 28.3 | 74.0 |
| 1216.750000 | 46.3 | 100.0 | H | 7.0 | -1.2 | 27.7 | 74.0 |
| 1619.500000 | 46.8 | 200.0 | H | 96.0 | 0.1 | 27.2 | 74.0 |
| 2049.250000 | 47.2 | 100.0 | H | 0.0 | 1.4 | 26.8 | 74.0 |
| 2655.000000 | 50.4 | 100.0 | V | 148.0 | 3.9 | 23.6 | 74.0 |
| 2850.750000 | 49.0 | 200.0 | H | 265.0 | 4.4 | 25.0 | 74.0 |

**Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)**

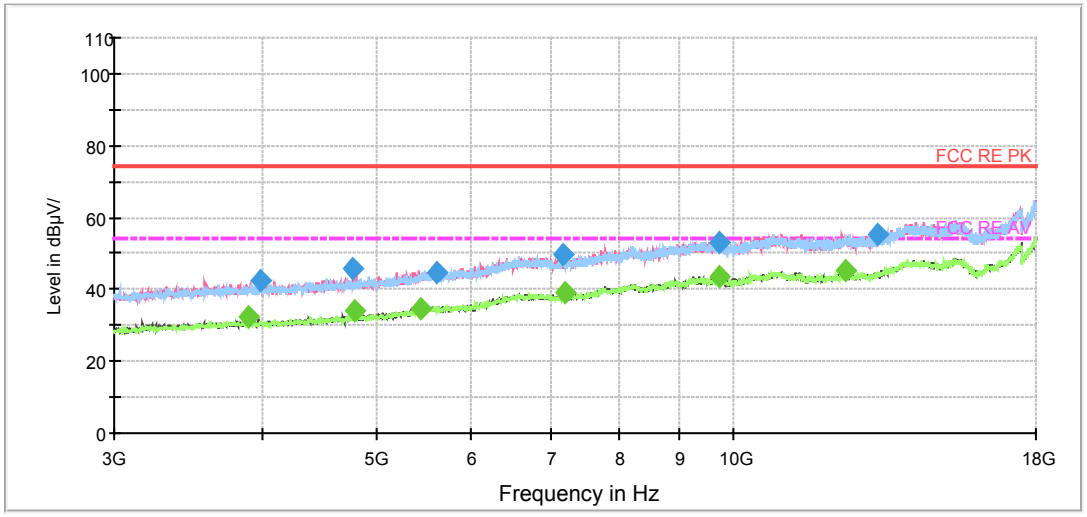
| Frequency (MHz) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|---|---|---|---|---|---|---|---|
| 1184.500000 | 34.9 | 200.0 | H | 248.0 | -1.3 | 19.1 | 54.0 |
| 1355.750000 | 35.1 | 100.0 | H | 12.0 | -0.9 | 18.9 | 54.0 |
| 1634.250000 | 36.0 | 100.0 | H | 112.0 | 0.1 | 18.0 | 54.0 |
| 2072.000000 | 36.5 | 100.0 | H | 112.0 | 1.5 | 17.5 | 54.0 |
| 2628.250000 | 38.7 | 200.0 | H | 319.0 | 3.9 | 15.3 | 54.0 |
| 2853.500000 | 39.4 | 100.0 | H | 262.0 | 4.4 | 14.6 | 54.0 |

**Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)**

**802.11g CH11**




Note: The signal beyond the limit is carrier.
Radiates Emission from 1GHz to 3GHz




Radiates Emission from 3GHz to 18GHz

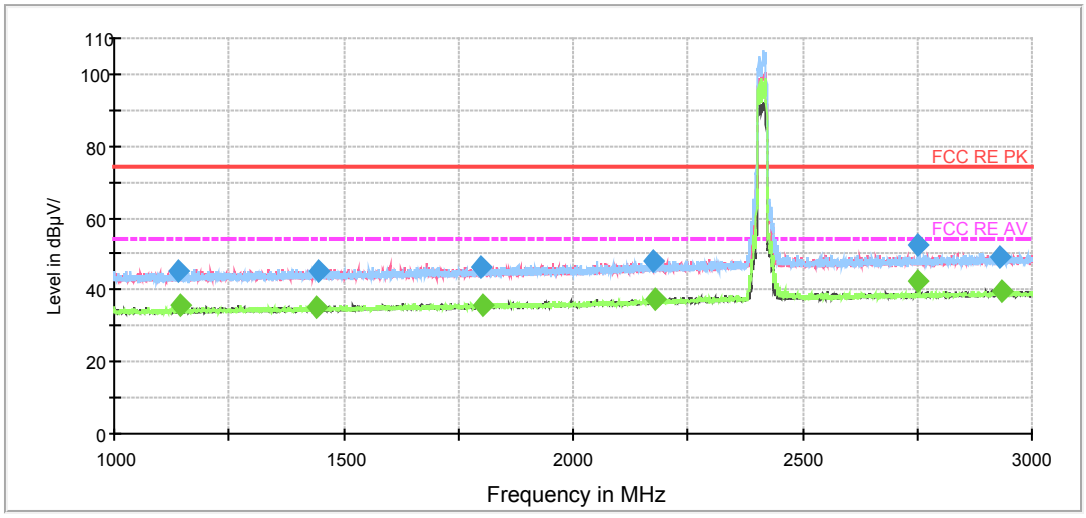
| Frequency (MHz) | Peak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|---|---|---|---|---|---|---|---|
| 1129.250000 | 45.4 | 100.0 | H | 3.0 | -1.3 | 28.6 | 74.0 |
| 1409.250000 | 44.8 | 200.0 | H | 190.0 | -0.7 | 29.2 | 74.0 |
| 1841.750000 | 45.5 | 200.0 | V | 194.0 | 0.7 | 28.5 | 74.0 |
| 2206.000000 | 47.6 | 200.0 | V | 27.0 | 2.2 | 26.4 | 74.0 |
| 2666.000000 | 51.5 | 100.0 | H | 64.0 | 3.9 | 22.5 | 74.0 |
| 2917.000000 | 49.3 | 200.0 | V | 9.0 | 4.5 | 24.7 | 74.0 |

**Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)**

| Frequency (MHz) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|---|---|---|---|---|---|---|---|
| 1115.500000 | 34.6 | 100.0 | H | 3.0 | -1.4 | 19.4 | 54.0 |
| 1410.750000 | 35.3 | 200.0 | H | 340.0 | -0.7 | 18.7 | 54.0 |
| 1853.250000 | 35.9 | 100.0 | H | 228.0 | 0.8 | 18.1 | 54.0 |
| 2201.500000 | 37.3 | 100.0 | V | 356.0 | 2.2 | 16.7 | 54.0 |
| 2646.500000 | 38.7 | 100.0 | H | 2.0 | 3.9 | 15.3 | 54.0 |
| 2911.750000 | 39.2 | 100.0 | V | 232.0 | 4.5 | 14.8 | 54.0 |

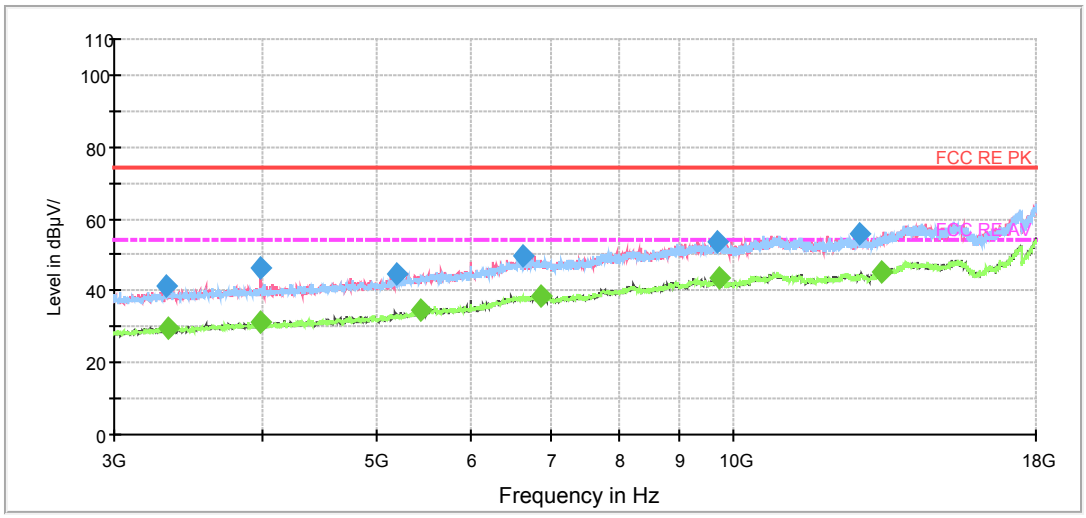
**Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)**

## 802.11n (HT20) CH1




Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz




Radiates Emission from 3GHz to 18GHz

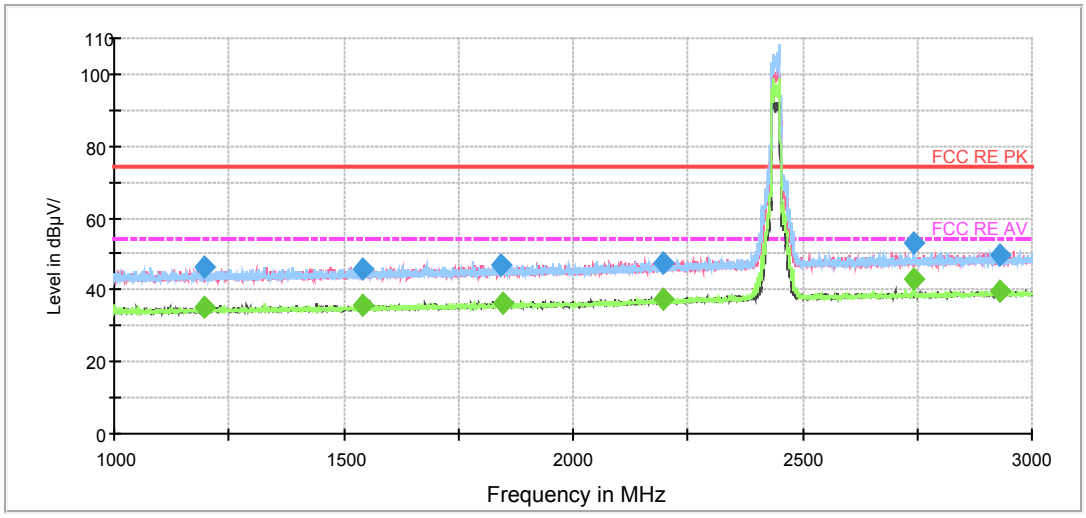
| Frequency (MHz) | Peak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|---|---|---|---|---|---|---|---|
| 1139.000000 | 45.3 | 100.0 | H | 25.0 | -1.3 | 28.7 | 74.0 |
| 1445.000000 | 45.4 | 100.0 | H | 4.0 | -0.6 | 28.6 | 74.0 |
| 1798.000000 | 46.4 | 100.0 | H | 4.0 | 0.6 | 27.6 | 74.0 |
| 2172.500000 | 47.8 | 100.0 | H | 0.0 | 2.1 | 26.2 | 74.0 |
| 2753.250000 | 52.6 | 100.0 | H | 261.0 | 4.2 | 21.4 | 74.0 |
| 2928.000000 | 49.2 | 200.0 | V | 22.0 | 4.6 | 24.8 | 74.0 |

**Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)**

| Frequency (MHz) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|---|---|---|---|---|---|---|---|
| 1142.250000 | 35.7 | 200.0 | V | 2.0 | -1.3 | 18.3 | 54.0 |
| 1439.500000 | 35.4 | 100.0 | H | 1.0 | -0.6 | 18.6 | 54.0 |
| 1802.000000 | 35.9 | 200.0 | V | 280.0 | 0.6 | 18.1 | 54.0 |
| 2177.000000 | 37.5 | 100.0 | V | 0.0 | 2.1 | 16.5 | 54.0 |
| 2753.250000 | 42.2 | 100.0 | H | 261.0 | 4.2 | 11.8 | 54.0 |
| 2932.500000 | 39.5 | 200.0 | V | 300.0 | 4.6 | 14.5 | 54.0 |

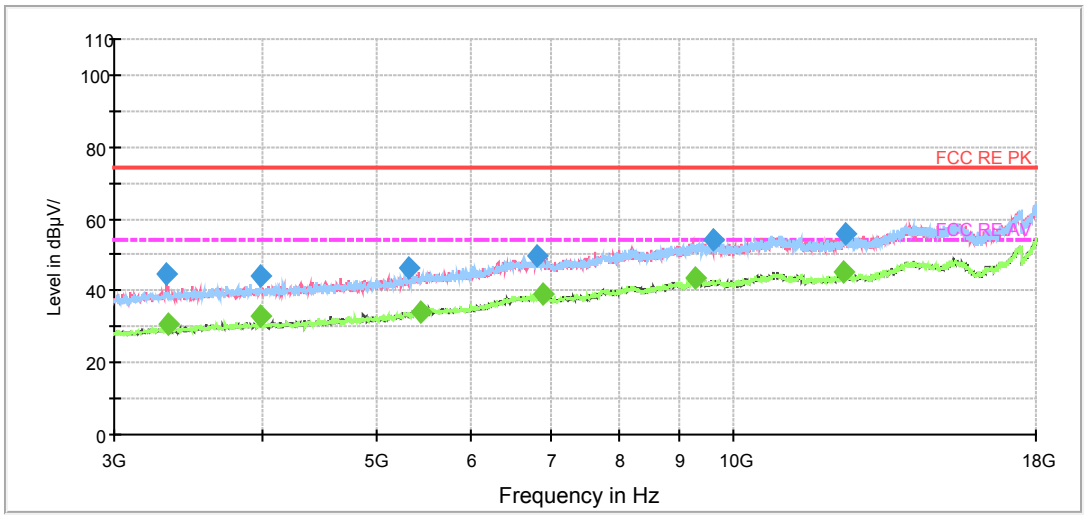
**Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)**

**802.11n (HT20) CH6**




Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz




Radiates Emission from 3GHz to 18GHz

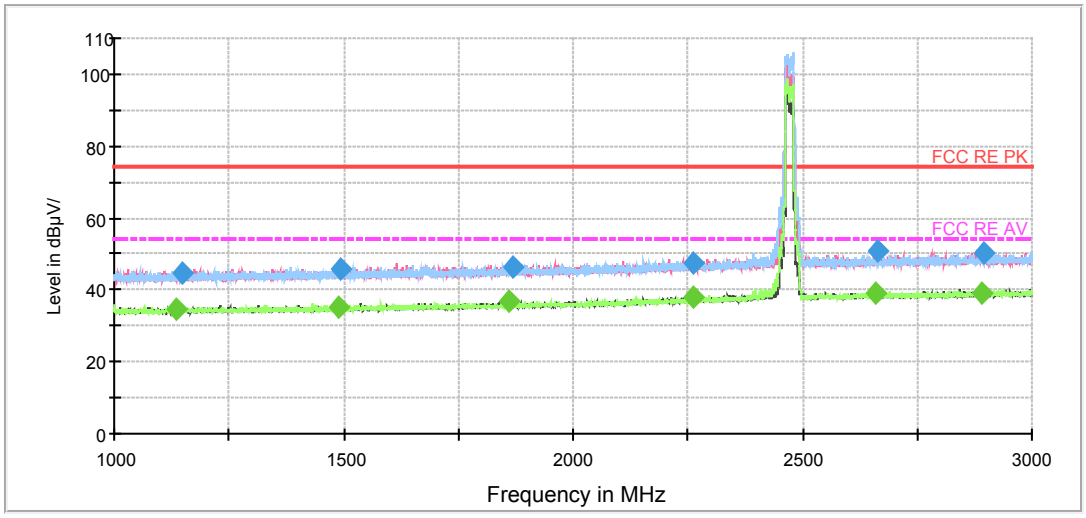
| Frequency (MHz) | Peak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|---|---|---|---|---|---|---|---|
| 1195.000000 | 46.2 | 200.0 | H | 179.0 | -1.2 | 27.8 | 74.0 |
| 1541.500000 | 45.6 | 100.0 | V | 345.0 | -0.3 | 28.4 | 74.0 |
| 1844.000000 | 46.8 | 100.0 | H | 0.0 | 0.7 | 27.2 | 74.0 |
| 2197.750000 | 47.3 | 100.0 | H | 284.0 | 2.2 | 26.7 | 74.0 |
| 2742.000000 | 52.8 | 100.0 | H | 31.0 | 4.1 | 21.2 | 74.0 |
| 2928.000000 | 49.7 | 100.0 | V | 312.0 | 4.6 | 24.3 | 74.0 |

**Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)**

| Frequency (MHz) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|---|---|---|---|---|---|---|---|
| 1196.000000 | 35.2 | 200.0 | H | 15.0 | -1.2 | 18.8 | 54.0 |
| 1543.000000 | 35.5 | 200.0 | V | 4.0 | -0.3 | 18.5 | 54.0 |
| 1847.250000 | 36.1 | 100.0 | V | 331.0 | 0.7 | 17.9 | 54.0 |
| 2198.500000 | 37.2 | 100.0 | V | 353.0 | 2.2 | 16.8 | 54.0 |
| 2742.000000 | 42.8 | 100.0 | H | 31.0 | 4.1 | 11.2 | 54.0 |
| 2931.000000 | 39.9 | 200.0 | H | 128.0 | 4.6 | 14.1 | 54.0 |

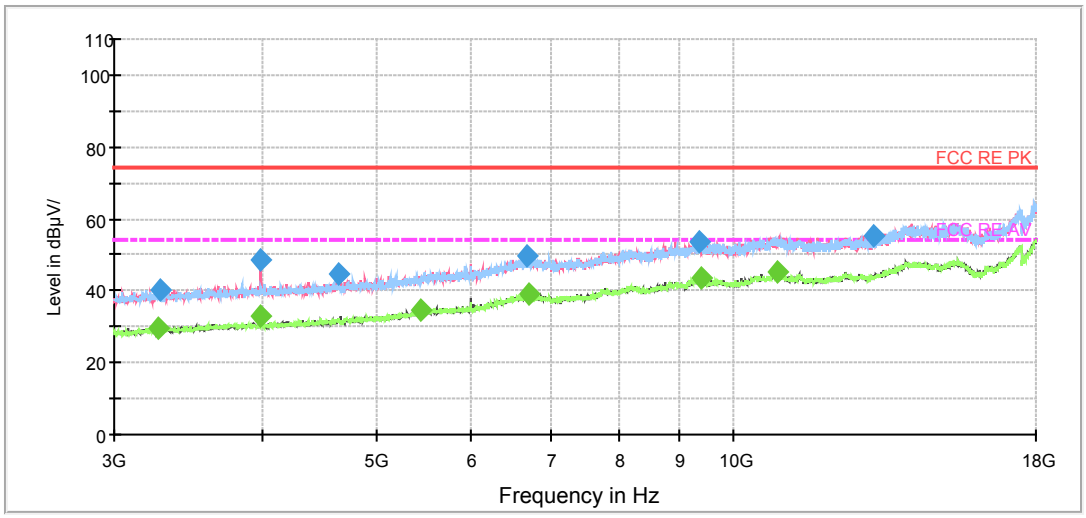
**Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)**

## 802.11n (HT20) CH11




Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz




Radiates Emission from 3GHz to 18GHz

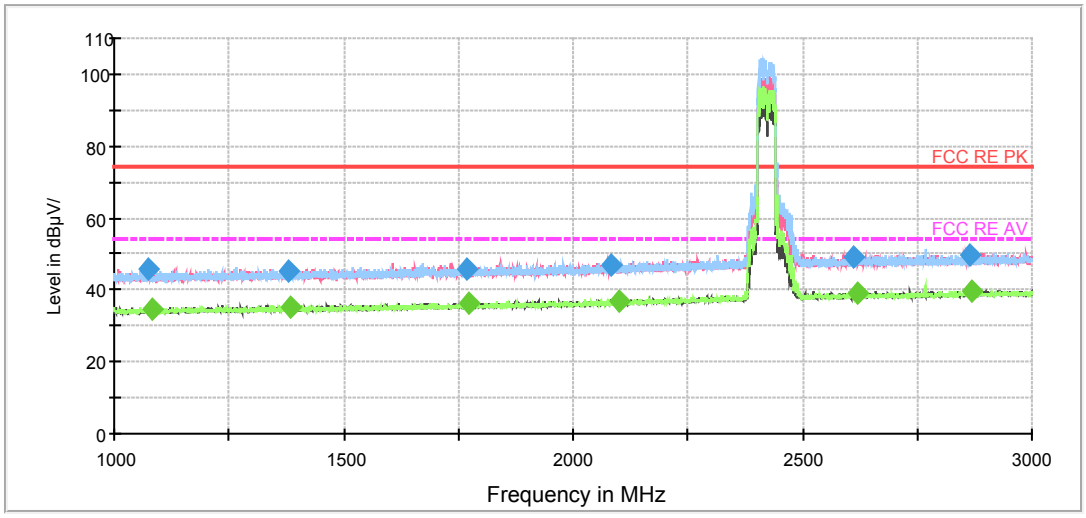
| Frequency (MHz) | Peak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|---|---|---|---|---|---|---|---|
| 1146.750000 | 44.7 | 100.0 | V | 37.0 | -1.3 | 29.3 | 74.0 |
| 1492.500000 | 45.7 | 200.0 | H | 279.0 | -0.4 | 28.3 | 74.0 |
| 1871.000000 | 46.5 | 100.0 | H | 94.0 | 0.8 | 27.5 | 74.0 |
| 2260.750000 | 47.6 | 200.0 | H | 357.0 | 2.5 | 26.4 | 74.0 |
| 2662.250000 | 51.0 | 200.0 | V | 66.0 | 3.9 | 23.0 | 74.0 |
| 2894.750000 | 50.4 | 200.0 | H | 180.0 | 4.5 | 23.6 | 74.0 |

**Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)**

| Frequency (MHz) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|---|---|---|---|---|---|---|---|
| 1134.000000 | 34.6 | 100.0 | V | 354.0 | -1.3 | 19.4 | 54.0 |
| 1491.000000 | 35.4 | 100.0 | V | 358.0 | -0.4 | 18.6 | 54.0 |
| 1860.750000 | 36.6 | 200.0 | H | 352.0 | 0.8 | 17.4 | 54.0 |
| 2262.500000 | 37.8 | 100.0 | V | 162.0 | 2.6 | 16.2 | 54.0 |
| 2660.250000 | 39.2 | 100.0 | V | 292.0 | 3.9 | 14.8 | 54.0 |
| 2893.000000 | 39.1 | 100.0 | V | 335.0 | 4.5 | 14.9 | 54.0 |

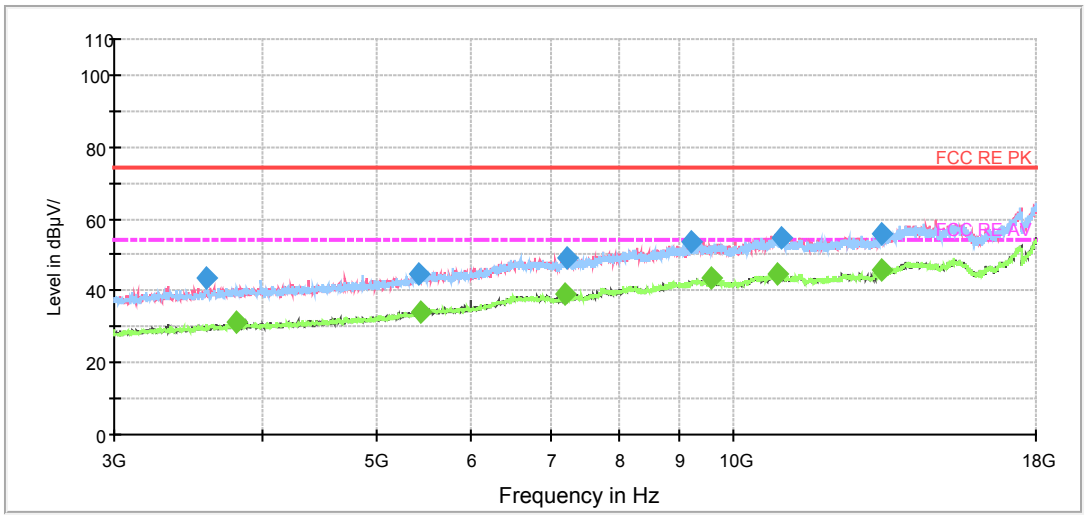
**Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)**

## 802.11n (HT40) CH3




Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz




Radiates Emission from 3GHz to 18GHz

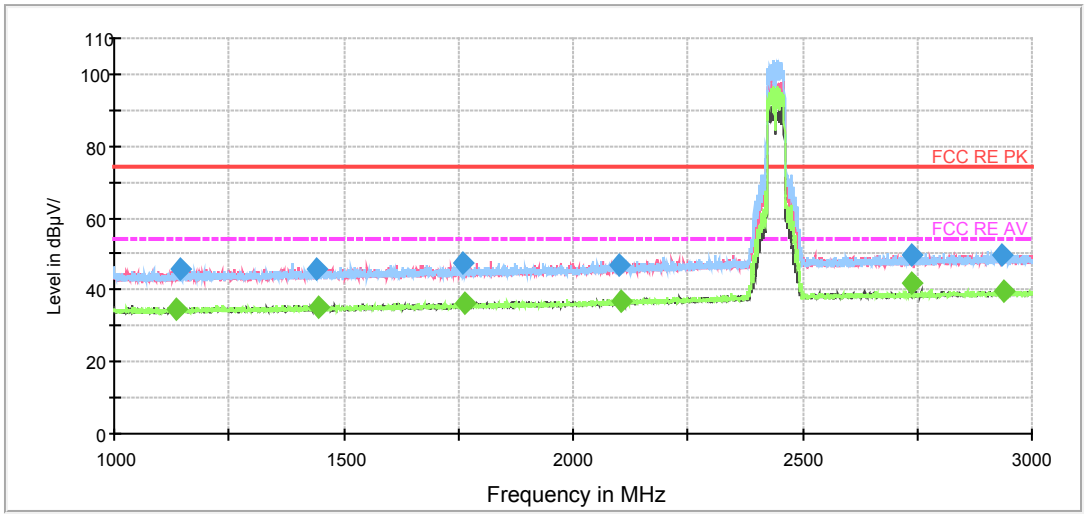
| Frequency (MHz) | Peak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|---|---|---|---|---|---|---|---|
| 1076.000000 | 45.8 | 200.0 | H | 319.0 | -1.5 | 28.2 | 74.0 |
| 1379.250000 | 45.1 | 200.0 | V | 12.0 | -0.7 | 28.9 | 74.0 |
| 1767.500000 | 45.9 | 200.0 | H | 230.0 | 0.5 | 28.1 | 74.0 |
| 2081.000000 | 47.1 | 200.0 | V | 12.0 | 1.5 | 26.9 | 74.0 |
| 2611.750000 | 49.1 | 200.0 | H | 182.0 | 3.8 | 24.9 | 74.0 |
| 2866.750000 | 49.8 | 200.0 | V | 6.0 | 4.4 | 24.2 | 74.0 |

**Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)**

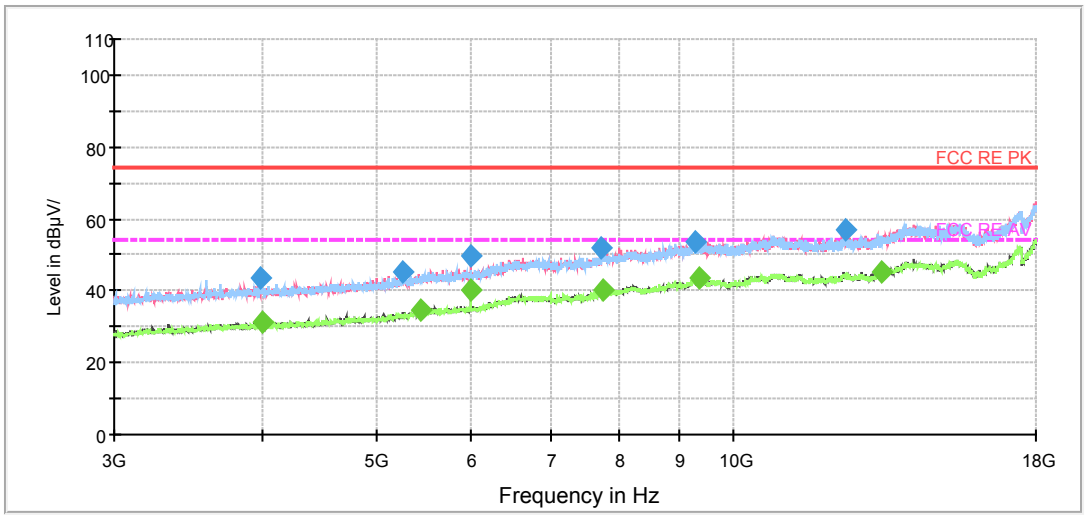
| Frequency (MHz) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|---|---|---|---|---|---|---|---|
| 1082.500000 | 34.7 | 100.0 | H | 127.0 | -1.5 | 19.3 | 54.0 |
| 1385.500000 | 35.1 | 100.0 | H | 51.0 | -0.7 | 18.9 | 54.0 |
| 1770.750000 | 36.3 | 100.0 | H | 1.0 | 0.6 | 17.7 | 54.0 |
| 2100.500000 | 37.0 | 200.0 | H | 355.0 | 1.7 | 17.0 | 54.0 |
| 2621.000000 | 39.1 | 100.0 | V | 271.0 | 3.8 | 14.9 | 54.0 |
| 2869.000000 | 39.6 | 100.0 | H | 127.0 | 4.4 | 14.4 | 54.0 |

**Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)**

**802.11n (HT40) CH6**




Note: The signal beyond the limit is carrier.
Radiates Emission from 1GHz to 3GHz




Radiates Emission from 3GHz to 18GHz

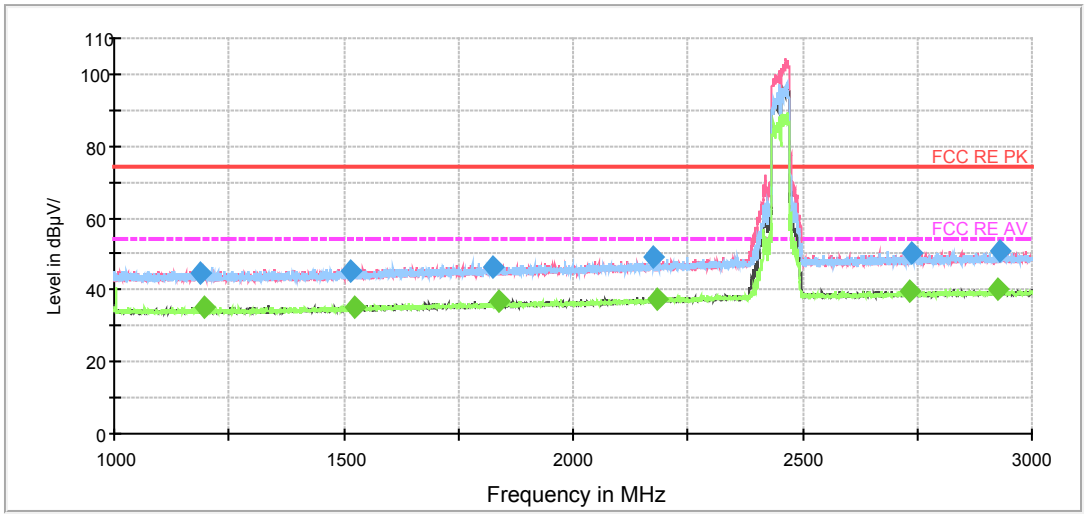
| Frequency (MHz) | Peak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|---|---|---|---|---|---|---|---|
| 1145.750000 | 45.6 | 200.0 | V | 5.0 | -1.3 | 28.4 | 74.0 |
| 1441.500000 | 46.0 | 200.0 | V | 1.0 | -0.6 | 28.0 | 74.0 |
| 1761.750000 | 47.4 | 200.0 | H | 336.0 | 0.5 | 26.6 | 74.0 |
| 2101.500000 | 47.1 | 100.0 | V | 348.0 | 1.7 | 26.9 | 74.0 |
| 2737.250000 | 49.7 | 200.0 | H | 348.0 | 4.1 | 24.3 | 74.0 |
| 2933.250000 | 49.6 | 200.0 | V | 0.0 | 4.6 | 24.4 | 74.0 |

**Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)**

| Frequency (MHz) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|---|---|---|---|---|---|---|---|
| 1137.000000 | 34.6 | 100.0 | H | 0.0 | -1.3 | 19.4 | 54.0 |
| 1443.250000 | 35.0 | 100.0 | V | 231.0 | -0.6 | 19.0 | 54.0 |
| 1762.750000 | 36.4 | 200.0 | H | 215.0 | 0.5 | 17.6 | 54.0 |
| 2104.750000 | 36.8 | 200.0 | V | 214.0 | 1.7 | 17.2 | 54.0 |
| 2736.750000 | 41.7 | 200.0 | V | 178.0 | 4.1 | 12.3 | 54.0 |
| 2937.250000 | 39.5 | 100.0 | H | 0.0 | 4.7 | 14.5 | 54.0 |

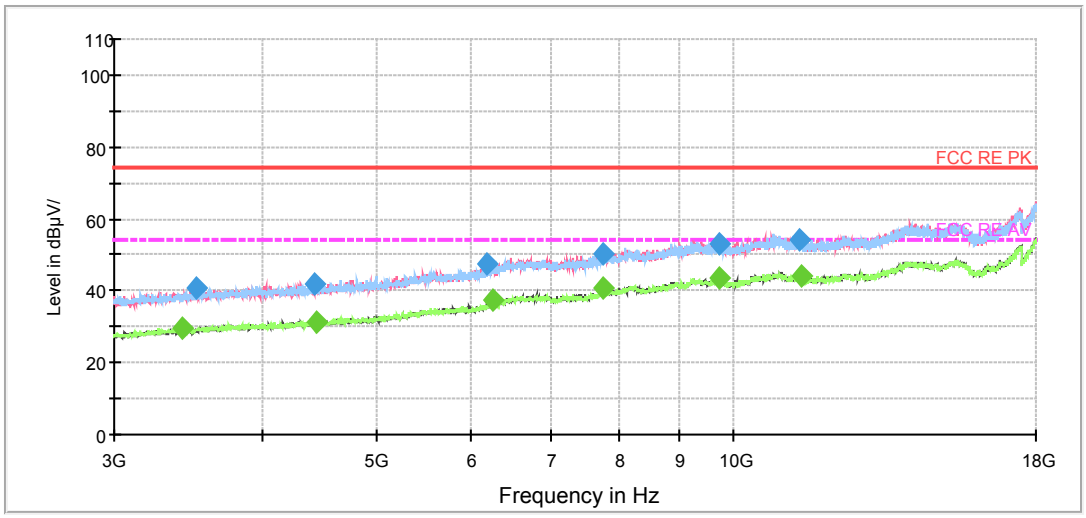
**Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)**

## 802.11n (HT40) CH9




Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz




Radiates Emission from 3GHz to 18GHz

| Frequency (MHz) | Peak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|---|---|---|---|---|---|---|---|
| 1186.500000 | 44.8 | 200.0 | V | 7.0 | -1.3 | 29.2 | 74.0 |
| 1516.000000 | 45.4 | 200.0 | V | 0.0 | -0.4 | 28.6 | 74.0 |
| 1826.750000 | 46.2 | 200.0 | H | 52.0 | 0.7 | 27.8 | 74.0 |
| 2175.000000 | 49.0 | 200.0 | V | 23.0 | 2.1 | 25.0 | 74.0 |
| 2736.750000 | 50.0 | 100.0 | H | 74.0 | 4.1 | 24.0 | 74.0 |
| 2931.750000 | 50.8 | 100.0 | V | 335.0 | 4.6 | 23.2 | 74.0 |

**Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)**

| Frequency (MHz) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|---|---|---|---|---|---|---|---|
| 1195.500000 | 35.4 | 200.0 | V | 230.0 | -1.2 | 18.6 | 54.0 |
| 1525.500000 | 35.3 | 200.0 | V | 7.0 | -0.3 | 18.7 | 54.0 |
| 1836.500000 | 36.8 | 200.0 | V | 2.0 | 0.7 | 17.2 | 54.0 |
| 2182.500000 | 37.4 | 100.0 | V | 348.0 | 2.1 | 16.6 | 54.0 |
| 2734.500000 | 39.7 | 200.0 | H | 0.0 | 4.1 | 14.3 | 54.0 |
| 2926.250000 | 40.2 | 100.0 | H | 0.0 | 4.6 | 13.8 | 54.0 |

**Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)**

## 5.7. Conducted Emission

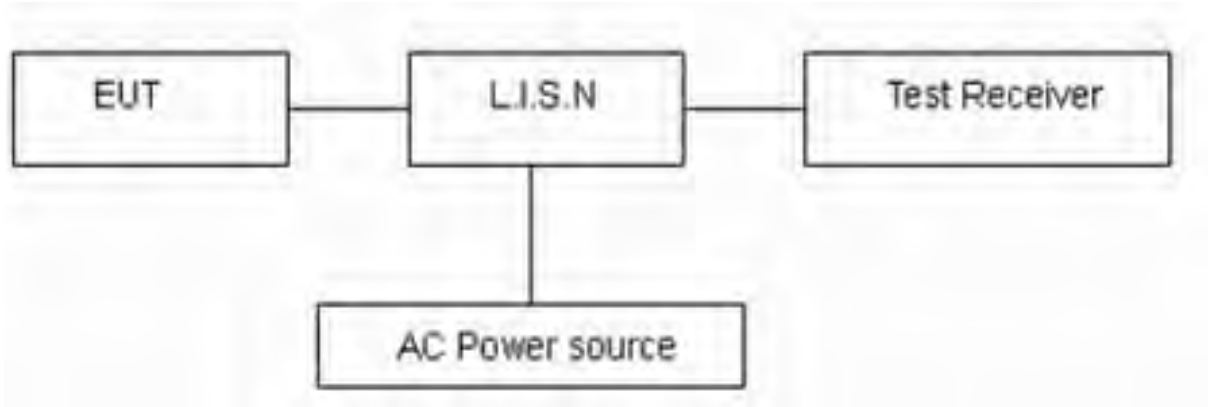
### Ambient condition

| Temperature | Relative humidity | Pressure |
|---|---|---|
| 23°C ~25°C | 45%~50% | 101.5kPa |

### Methods of Measurement

The EUT is placed on a non-metallic table of 80cm height above the horizontal metal reference ground plane. During the test, the EUT was operating in its typical mode. The test method is according to ANSI C63.10-2013. Connect the AC power line of the EUT to the L.I.S.N. Use EMI receiver to detect the average and Quasi-peak value. RBW is set to 9 kHz, VBW is set to 30kHz. The measurement result should include both L line and N line.
The test is in transmitting mode.

### Test Setup




Note: AC Power source is used to change the voltage 110V/60Hz.

### Limits

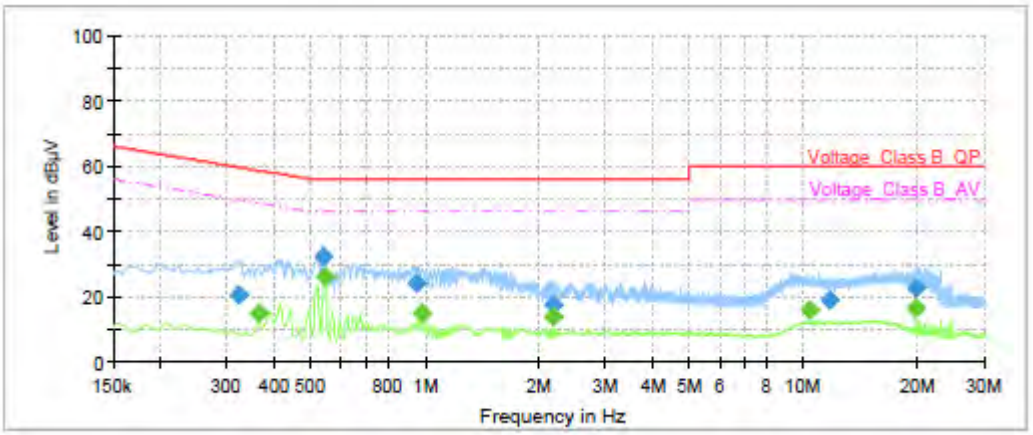
| Frequency (MHz) | Conducted Limits(dBμV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15 - 0.5 | 66 to 56 * | 56 to 46* |
| 0.5 - 5 | 56 | 46 |
| 5 - 30 | 60 | 50 |
| *: Decreases with the logarithm of the frequency. | | |

### Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k$ = 1.96, $U$= 2.69 dB.

**Test Results:**

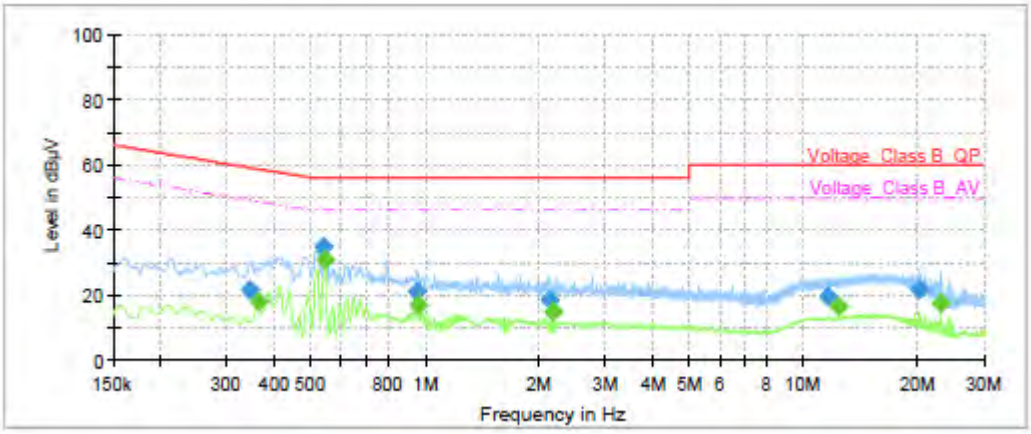
Following plots, Blue trace uses the peak detection and Green trace uses the average detection. During the test, the Conducted Emission was performed in all modes (WIFI 2.4G) with all channels, 802.11g CH1 are selected as the worst condition. The test data of the worst-case condition was recorded in this report.




| Frequency (MHz) | QuasiPeak (dBµV) | Average (dBµV) | Limit (dBµV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Filter | Corr. (dB) |
|---|---|---|---|---|---|---|---|---|---|
| 0.32 | 20.53 | --- | 59.62 | 39.09 | 1000.0 | 9.000 | L1 | ON | 19 |
| 0.36 | --- | 14.75 | 48.69 | 33.94 | 1000.0 | 9.000 | L1 | ON | 19 |
| 0.54 | 32.52 | --- | 56.00 | 23.48 | 1000.0 | 9.000 | L1 | ON | 19 |
| 0.54 | --- | 26.25 | 46.00 | 19.75 | 1000.0 | 9.000 | L1 | ON | 19 |
| 0.96 | 23.97 | --- | 56.00 | 32.03 | 1000.0 | 9.000 | L1 | ON | 19 |
| 0.98 | --- | 14.86 | 46.00 | 31.14 | 1000.0 | 9.000 | L1 | ON | 19 |
| 2.18 | 17.50 | --- | 56.00 | 38.50 | 1000.0 | 9.000 | L1 | ON | 19 |
| 2.18 | --- | 13.65 | 46.00 | 32.35 | 1000.0 | 9.000 | L1 | ON | 19 |
| 10.39 | --- | 15.95 | 50.00 | 34.05 | 1000.0 | 9.000 | L1 | ON | 19 |
| 11.69 | 18.82 | --- | 60.00 | 41.18 | 1000.0 | 9.000 | L1 | ON | 19 |
| 19.71 | --- | 16.34 | 50.00 | 33.66 | 1000.0 | 9.000 | L1 | ON | 20 |
| 19.71 | 22.79 | --- | 60.00 | 37.21 | 1000.0 | 9.000 | L1 | ON | 20 |

**Remark: Correct factor=cable loss + LISN factor**

L line Conducted Emission from 150 KHz to 30 MHz




| Frequency (MHz) | QuasiPeak (dBµV) | Average (dBµV) | Limit (dBµV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Filter | Corr. (dB) |
|---|---|---|---|---|---|---|---|---|---|
| 0.35 | 21.56 | --- | 59.06 | 37.50 | 1000.0 | 9.000 | N | ON | 19 |
| 0.36 | --- | 18.11 | 48.69 | 30.58 | 1000.0 | 9.000 | N | ON | 19 |
| 0.54 | 34.84 | --- | 56.00 | 21.16 | 1000.0 | 9.000 | N | ON | 19 |
| 0.54 | --- | 30.53 | 46.00 | 15.47 | 1000.0 | 9.000 | N | ON | 19 |
| 0.96 | 21.02 | --- | 56.00 | 34.98 | 1000.0 | 9.000 | N | ON | 19 |
| 0.96 | --- | 16.97 | 46.00 | 29.03 | 1000.0 | 9.000 | N | ON | 19 |
| 2.13 | 18.45 | --- | 56.00 | 37.55 | 1000.0 | 9.000 | N | ON | 19 |
| 2.18 | --- | 15.01 | 46.00 | 30.99 | 1000.0 | 9.000 | N | ON | 19 |
| 11.65 | 19.25 | --- | 60.00 | 40.75 | 1000.0 | 9.000 | N | ON | 19 |
| 12.32 | --- | 16.19 | 50.00 | 33.81 | 1000.0 | 9.000 | N | ON | 19 |
| 20.26 | 21.59 | --- | 60.00 | 38.41 | 1000.0 | 9.000 | N | ON | 19 |
| 23.13 | --- | 17.52 | 50.00 | 32.48 | 1000.0 | 9.000 | N | ON | 20 |

**Remark: Correct factor=cable loss + LISN factor**

N line Conducted Emission from 150 KHz to 30 MHz

# 6. Main Test Instruments

| Name | Manufacturer | Type | Serial Number | Calibration Date | Expiration Date |
|---|---|---|---|---|---|
| Spectrum Analyzer | R&S | FSV30 | 100815 | 2019-12-15 | 2020-12-14 |
| EMI Test Receiver | R&S | ESCI | 100948 | 2019-05-19 | 2020-05-18 |
| Loop Antenna | SCHWARZBECK | FMZB1519 | 1519-047 | 2017-09-26 | 2020-09-25 |
| TRILOG Broadband Antenna | Schwarzbeck | VULB 9163 | 9163-201 | 2017-11-18 | 2020-11-17 |
| Double Ridged Waveguide Horn Antenna | R&S | HF907 | 100126 | 2018-07-07 | 2020-07-06 |
| Standard Gain Horn | ETS-Lindgren | 3160-09 | 00102643 | 2018-06-20 | 2020-06-19 |
| EMI Test Receiver | R&S | ESR | 101667 | 2019-05-19 | 2020-05-18 |
| LISN | R&S | ENV216 | 101171 | 2018-12-15 | 2021-12-14 |
| Spectrum Analyzer | Agilent | N9010A | MY47191109 | 2019-05-19 | 2020-05-18 |
| Power Meter | R&S | NRP | 104306 | 2019-05-19 | 2020-05-18 |
| Power Sensor | R&S | NRP-Z21 | 104799 | 2019-05-19 | 2020-05-18 |
| 20dB Attenuator | Star River Highlight | UCL-TS2S-20 | 18013001 | 2019-12-15 | 2020-12-14 |
| RF Cable | Agilent | SMA 15cm | 0001 | 2019-12-13 | 2020-06-12 |
| Software | R&S | EMC32 | 9.26.0 | / | / |

********END OF REPORT ********