

## 5.4. Power Spectral Density

### Ambient Condition

| Temperature | Relative humidity |
|-------------|-------------------|
| 15°C ~ 35°C | 20% ~ 80%         |

### 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 AVGPS-1 was used for this test.

- Set instrument center frequency to DTS channel center frequency
- Set span to at least 1.5 times the OBW
- Set RBW to:  $3\text{kHz} \leq \text{RBW} \leq 100\text{kHz}$
- Set VBW  $\geq [3 \times \text{RBW}]$
- Detector=power averaging (rms) or sample detector (when rms not available)
- Ensure that the number of measurement points in the sweep  $\geq [2 \times \text{span}/\text{RBW}]$
- Sweep time auto couple
- Employ trace averaging (rms) mode over a minimum of 100 traces
- Use the peak marker function to determine the maximum amplitude level.
- If the measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat (note that this may require zooming in on the emission of interest and reducing the span to meet the minimum measurement point requirement as the RBW is reduced)

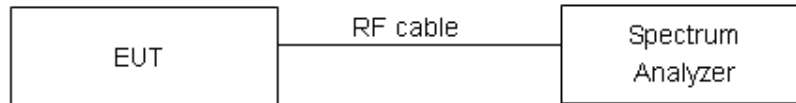
Method AVGPS-2 was used for this test.

- Measure the duty cycle (D) of the transmitter output signal as described in 11.6
- Set instrument center frequency to DTS channel center frequency
- Set span to at least 1.5 times the OBW
- Set RBW to:  $3\text{kHz} \leq \text{RBW} \leq 100\text{kHz}$
- Set VBW  $\geq [3 \times \text{RBW}]$
- Detector= power averaging (rms) or sample detector (when rms not available)
- Ensure that the number of measurement points in the sweep  $\geq [2 \times \text{span}/\text{RBW}]$
- Sweep time =auto couple
- Do not use sweep triggering; allow sweep to "free run"
- Employ trace averaging (rms) mode over a minimum of 100 traces
- Use the peak marker function to determine the maximum amplitude level

l) Add  $[10 \log(1/D)]$ , where D is the duty cycle measured in step a), to the measured PSD to compute the average PSD during the actual transmission time

m) If measured value exceeds requirement specified by regulatory agency then reduce RBW (but no less than 3 kHz) and repeat (note that this may require zooming in on the emission of interest and reducing the span to meet the minimum measurement point requirement as the RBW is reduced)

### 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 | $\leq 8 \text{ dBm} / 3\text{kHz}$ |
|--------|------------------------------------|

### Measurement Uncertainty

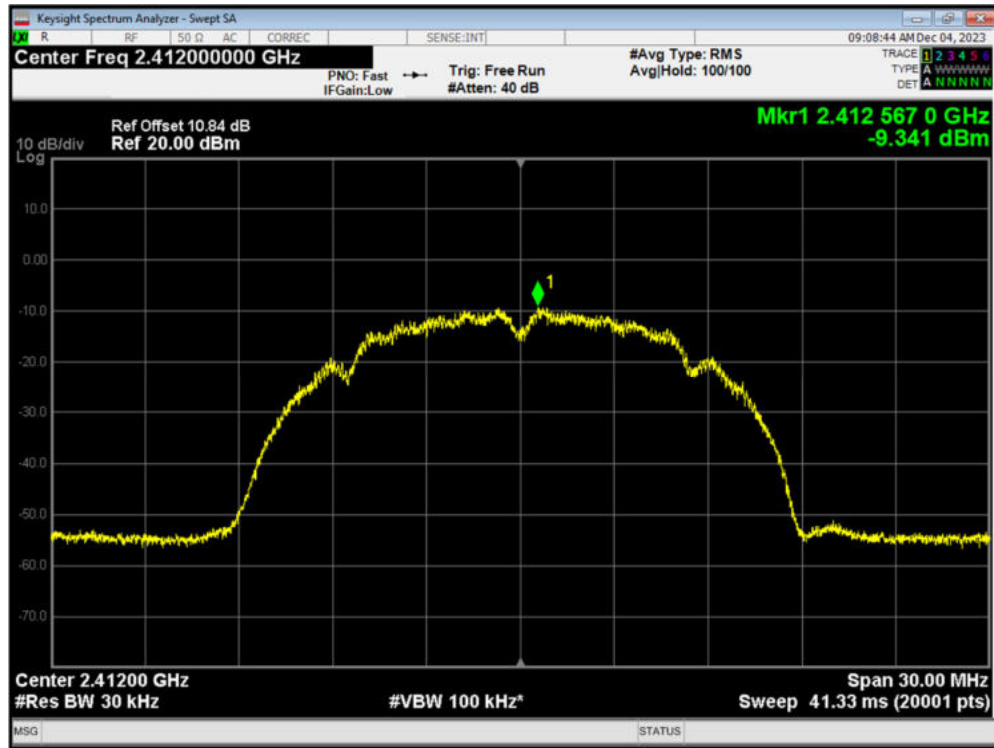
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 2$ ,  $U = 0.75\text{dB}$ .

**Test Results:**

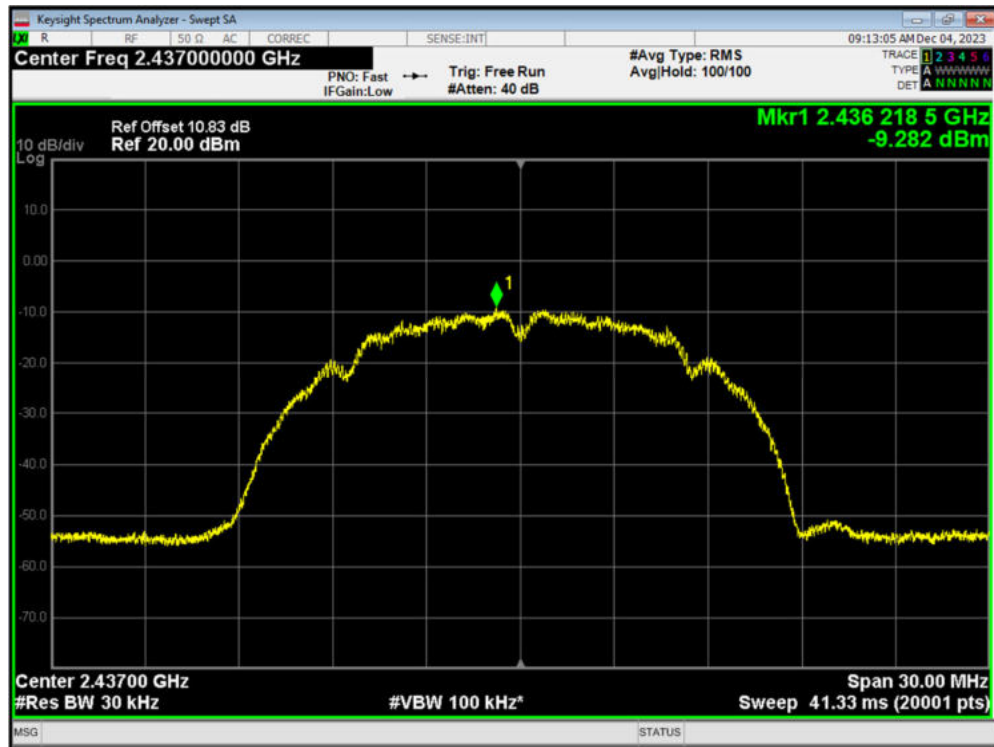
| Test Mode                                                                                         | Carrier frequency (MHz) )/ Channel | Read Value (dBm / 30kHz) | Power Spectral Density (dBm / 3kHz) | Limit (dBm / 3kHz) | Conclusion |
|---------------------------------------------------------------------------------------------------|------------------------------------|--------------------------|-------------------------------------|--------------------|------------|
| 802.11b                                                                                           | 2412/CH 1                          | -9.34                    | -19.34                              | 8                  | PASS       |
|                                                                                                   | 2437/CH 6                          | -9.28                    | -19.28                              | 8                  | PASS       |
|                                                                                                   | 2462/CH11                          | -8.51                    | -18.51                              | 8                  | PASS       |
| 802.11g                                                                                           | 2412/CH 1                          | -11.80                   | -21.80                              | 8                  | PASS       |
|                                                                                                   | 2437/CH 6                          | -11.84                   | -21.84                              | 8                  | PASS       |
|                                                                                                   | 2462/CH11                          | -11.42                   | -21.42                              | 8                  | PASS       |
| 802.11n<br>HT20                                                                                   | 2412/CH 1                          | -12.51                   | -22.51                              | 8                  | PASS       |
|                                                                                                   | 2437/CH 6                          | -12.00                   | -22.00                              | 8                  | PASS       |
|                                                                                                   | 2462/CH11                          | -11.89                   | -21.89                              | 8                  | PASS       |
| 802.11n<br>HT40                                                                                   | 2422/CH3                           | -15.00                   | -25.00                              | 8                  | PASS       |
|                                                                                                   | 2437/CH6                           | -14.96                   | -24.96                              | 8                  | PASS       |
|                                                                                                   | 2452/CH9                           | -14.70                   | -24.70                              | 8                  | PASS       |
| Note: Power Spectral Density (dBm/3kHz) =Read Value+Duty cycle correction factor + 10*log10(3/30) |                                    |                          |                                     |                    |            |

| Test Mode                                                             | Carrier frequency (MHz) )/ Channel | Read Value (dBm / 3kHz) | Power Spectral Density (dBm / 3kHz) | Limit (dBm / 3kHz) | Conclusion |
|-----------------------------------------------------------------------|------------------------------------|-------------------------|-------------------------------------|--------------------|------------|
| Bluetooth<br>(Low Energy)                                             | 2402/CH0                           | -17.51                  | -16.74                              | 8                  | PASS       |
|                                                                       | 2440/CH19                          | -16.67                  | -15.90                              | 8                  | PASS       |
|                                                                       | 2480/CH39                          | -16.10                  | -15.33                              | 8                  | PASS       |
| Note: Power Spectral Density =Read Value+Duty cycle correction factor |                                    |                         |                                     |                    |            |

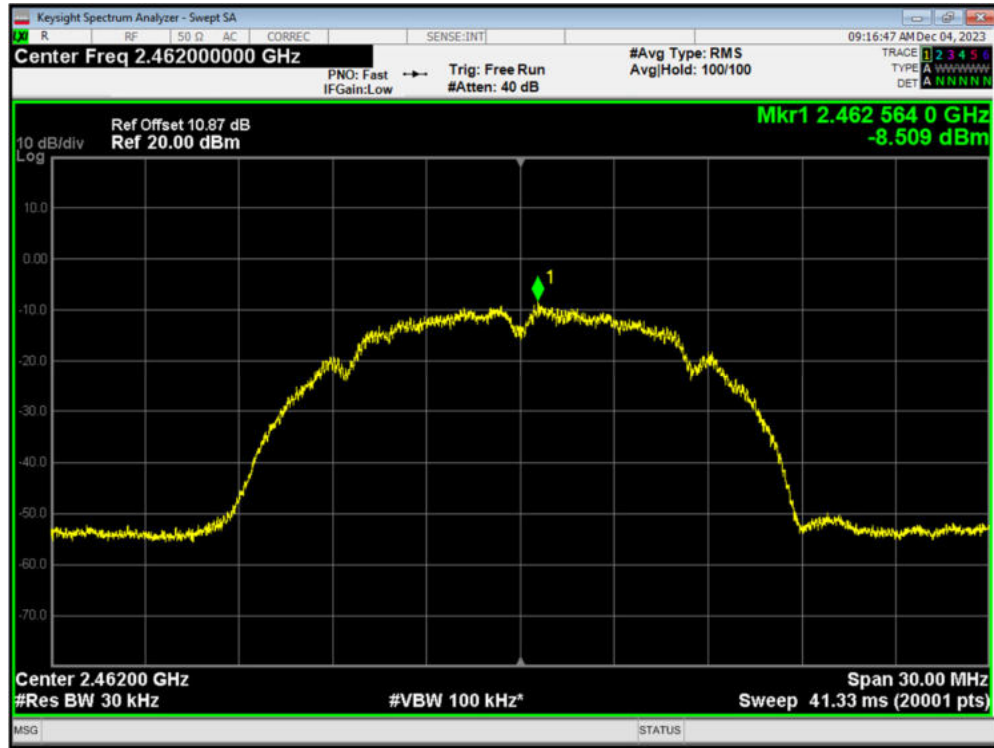
PSD 802.11b 2412MHz



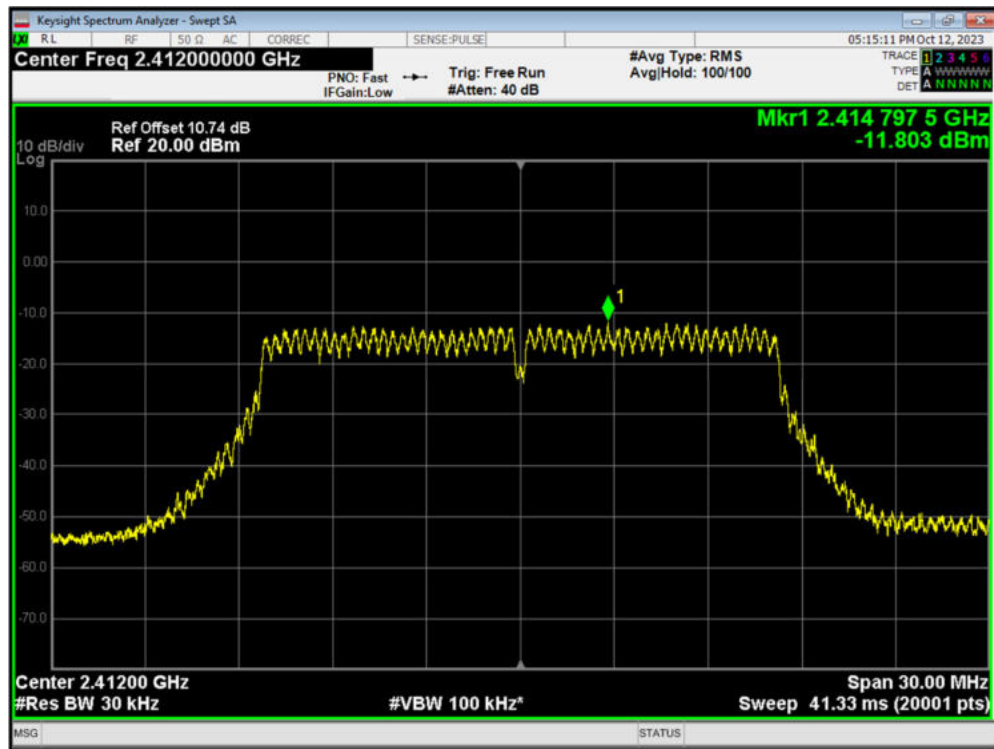
PSD 802.11b 2437MHz



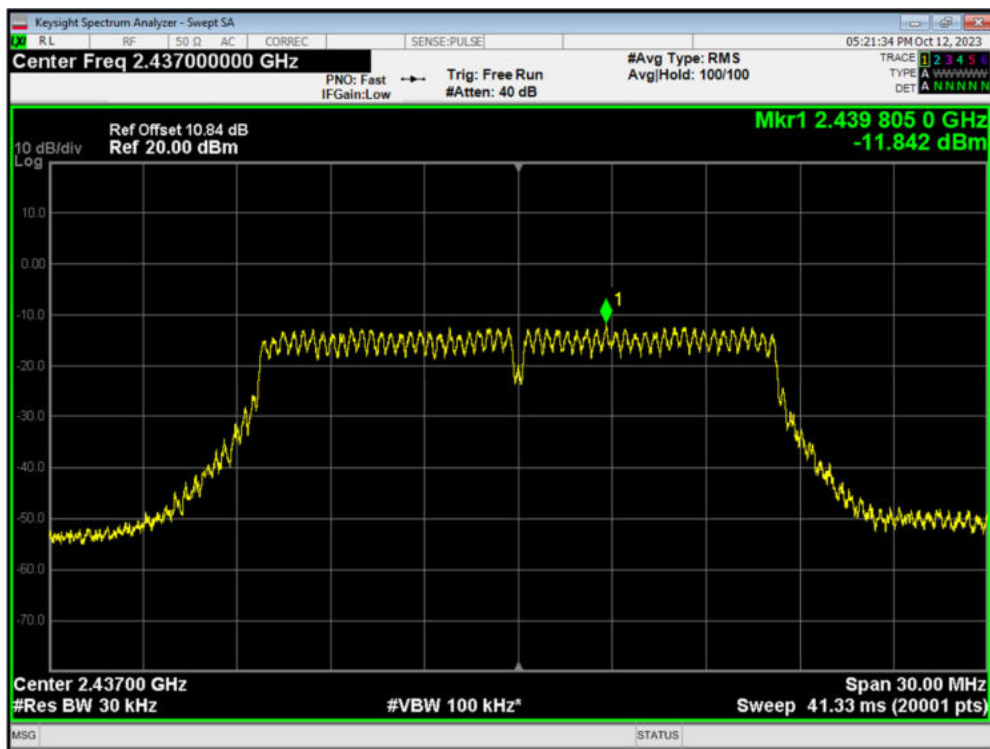
PSD 802.11b 2462MHz



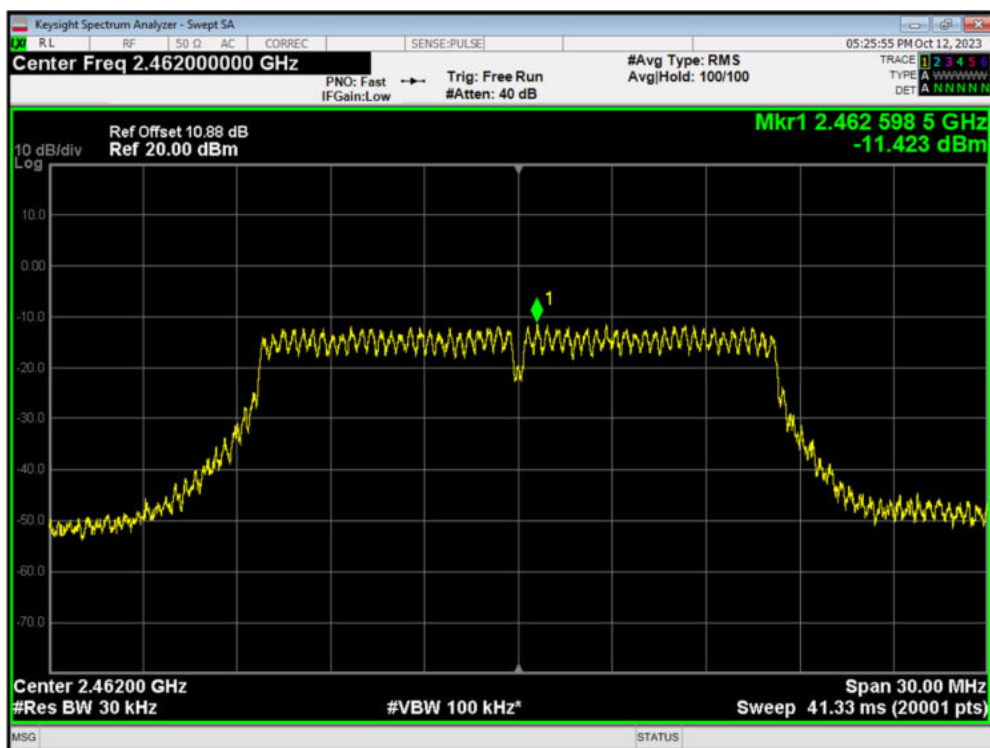
PSD 802.11g 2412MHz



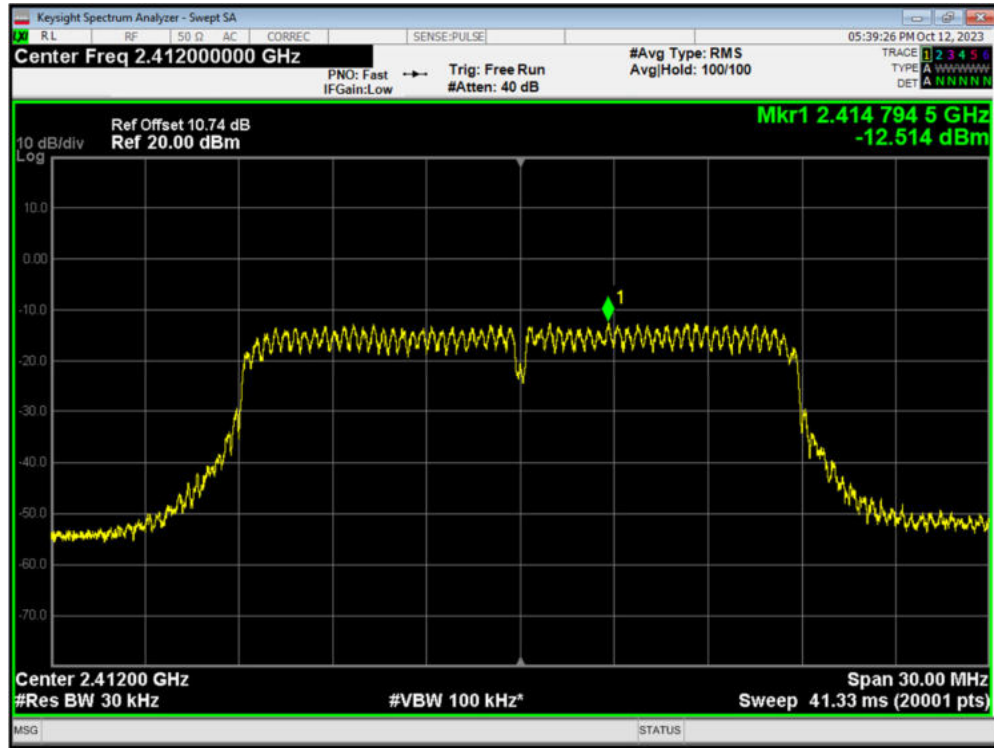
PSD 802.11g 2437MHz



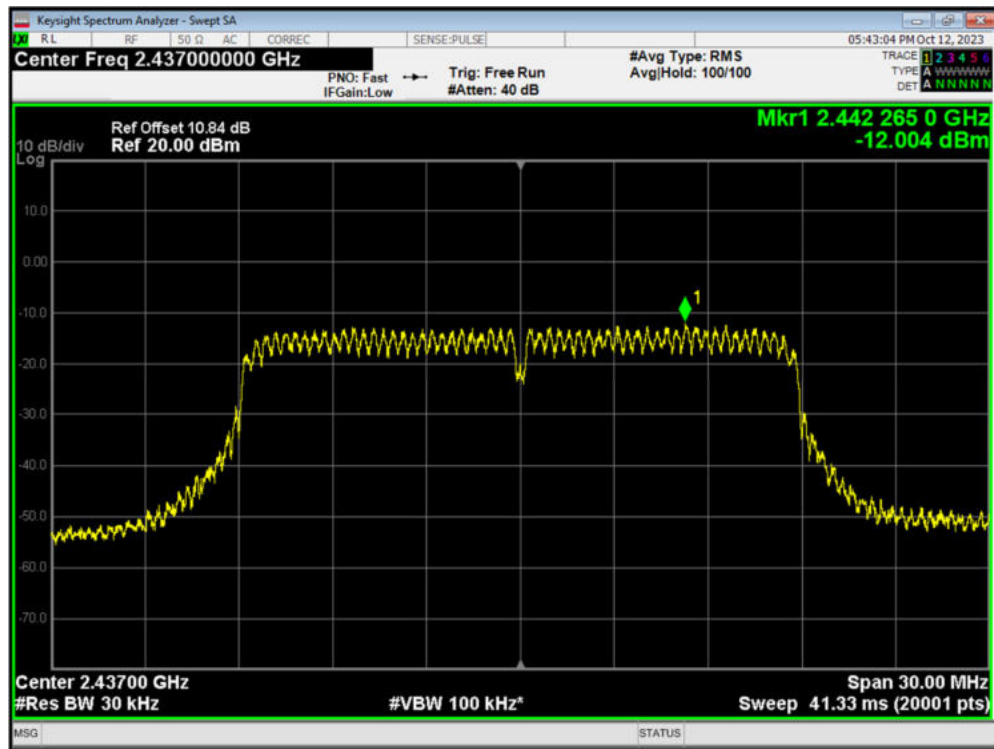
PSD 802.11g 2462MHz



PSD 802.11n(HT20) 2412MHz

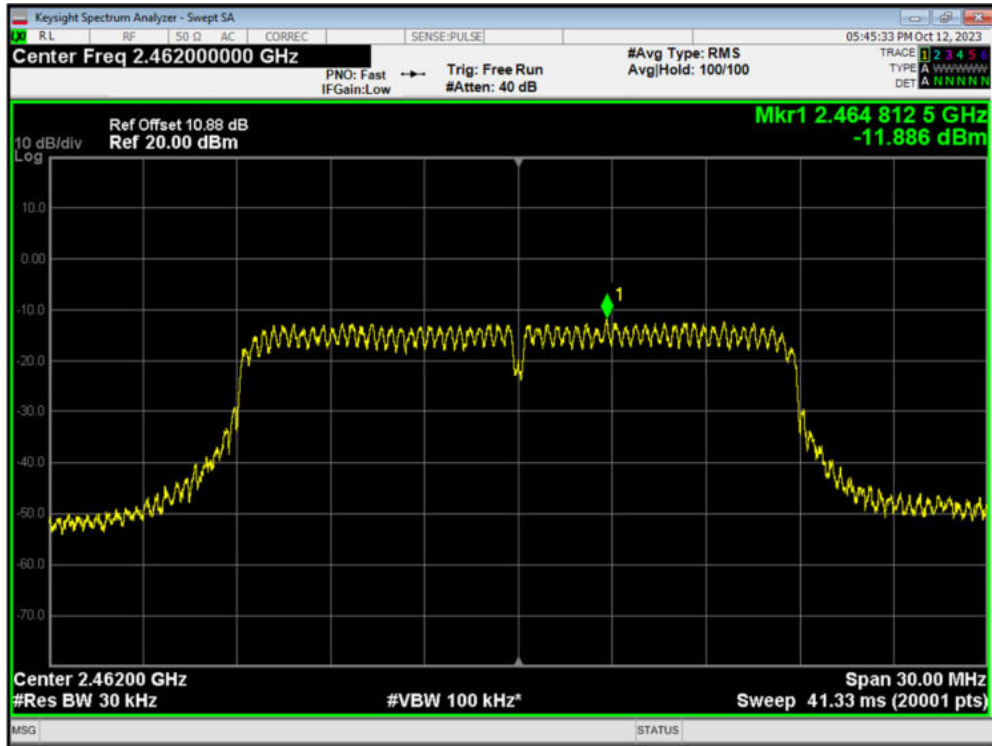


PSD 802.11n(HT20) 2437MHz

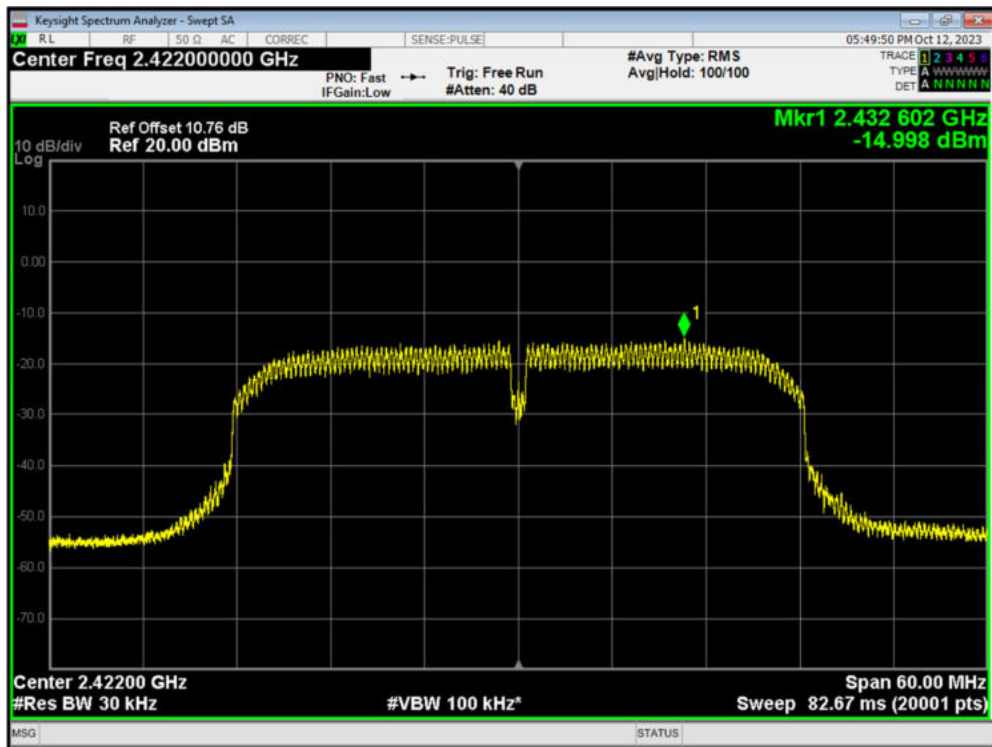




PSD 802.11n(HT20) 2462MHz

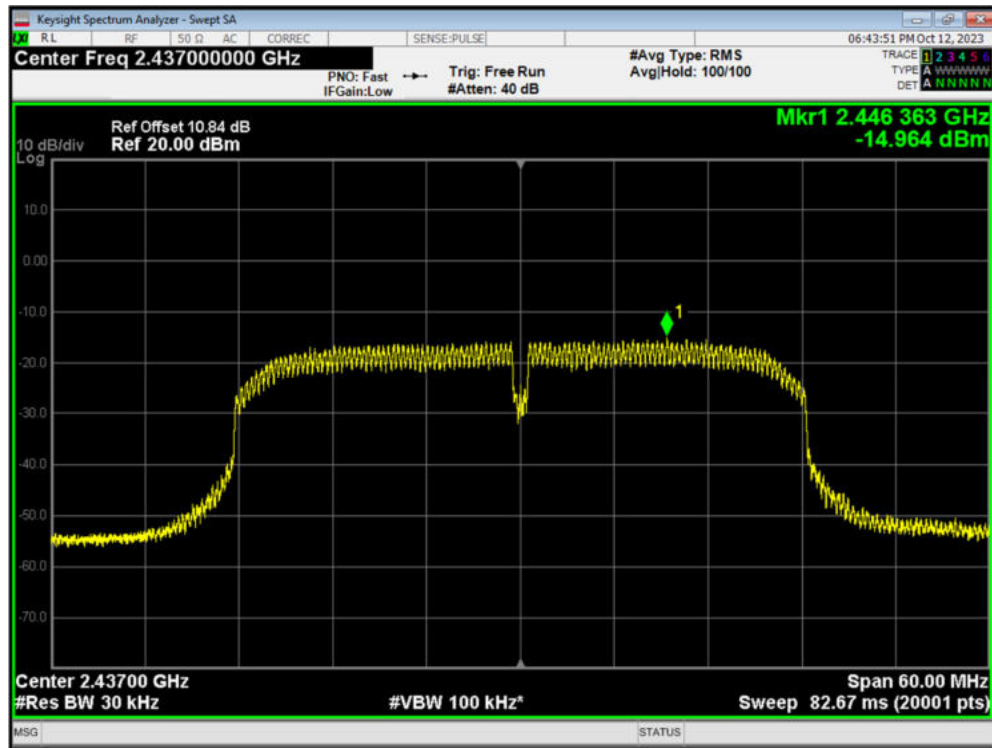


PSD 802.11n(HT40) 2422MHz

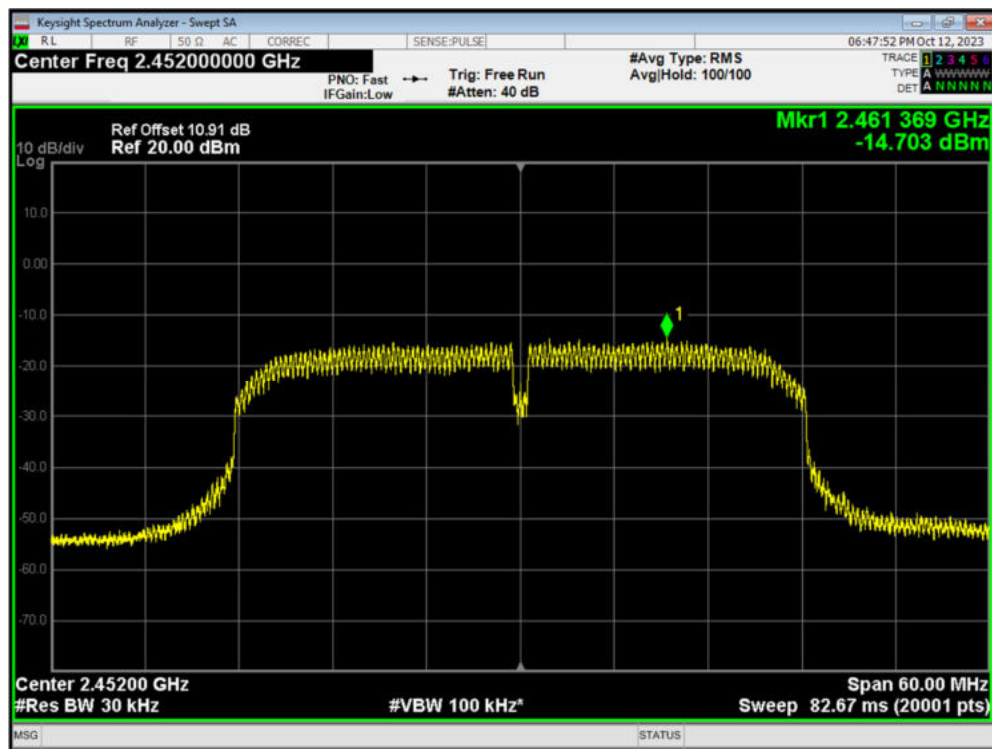




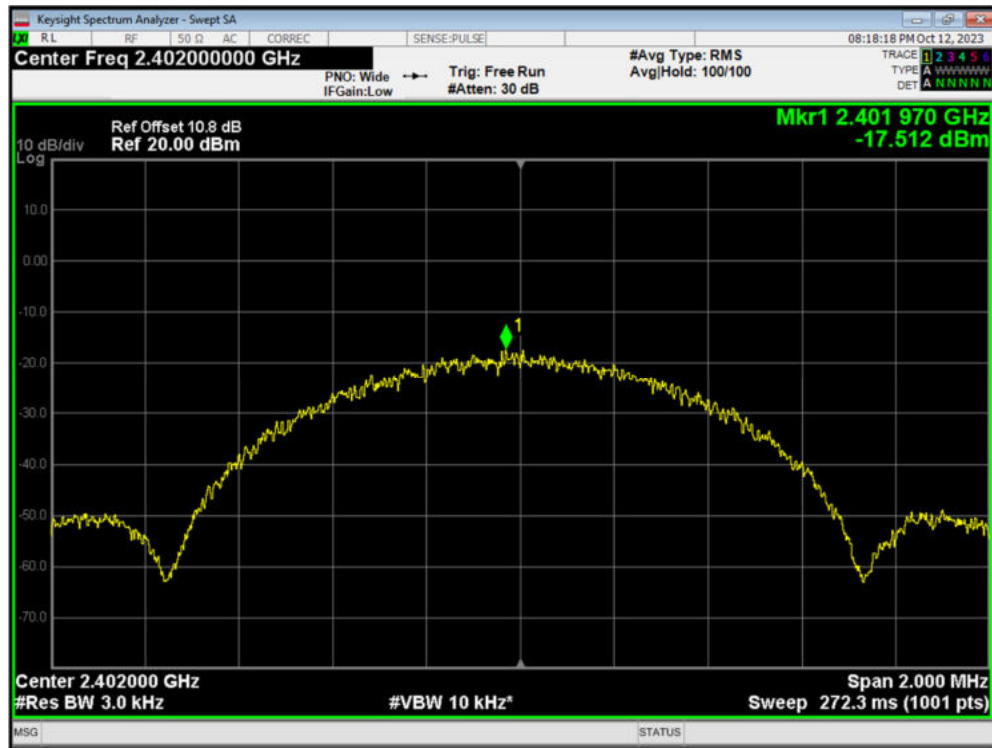
PSD 802.11n(HT40) 2437MHz



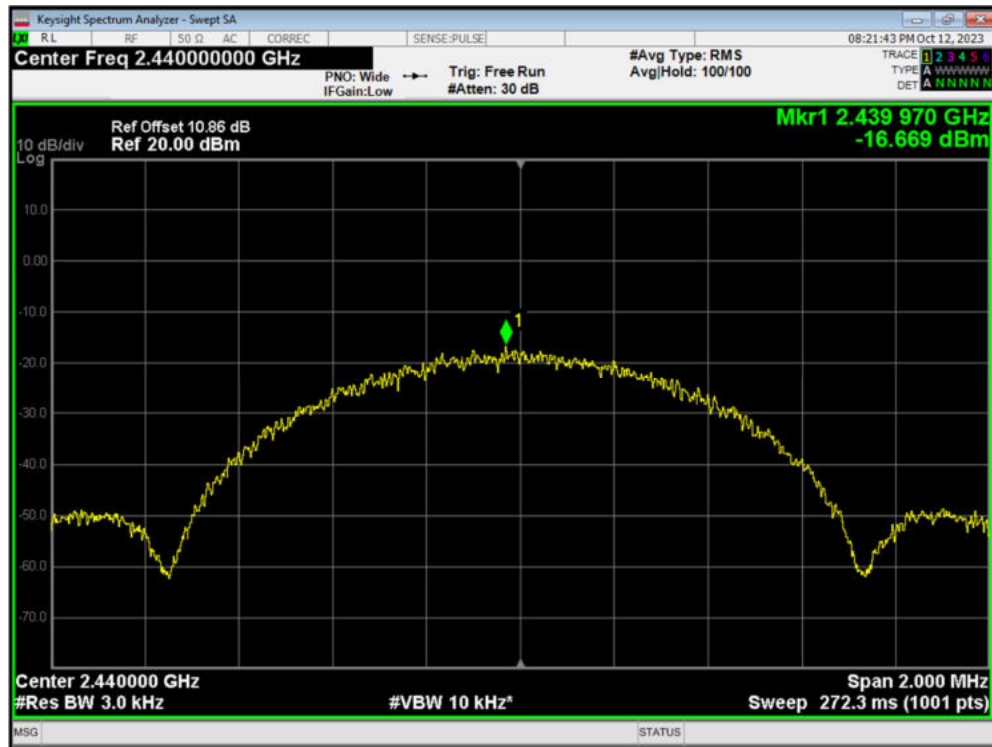
PSD 802.11n(HT40) 2452MHz



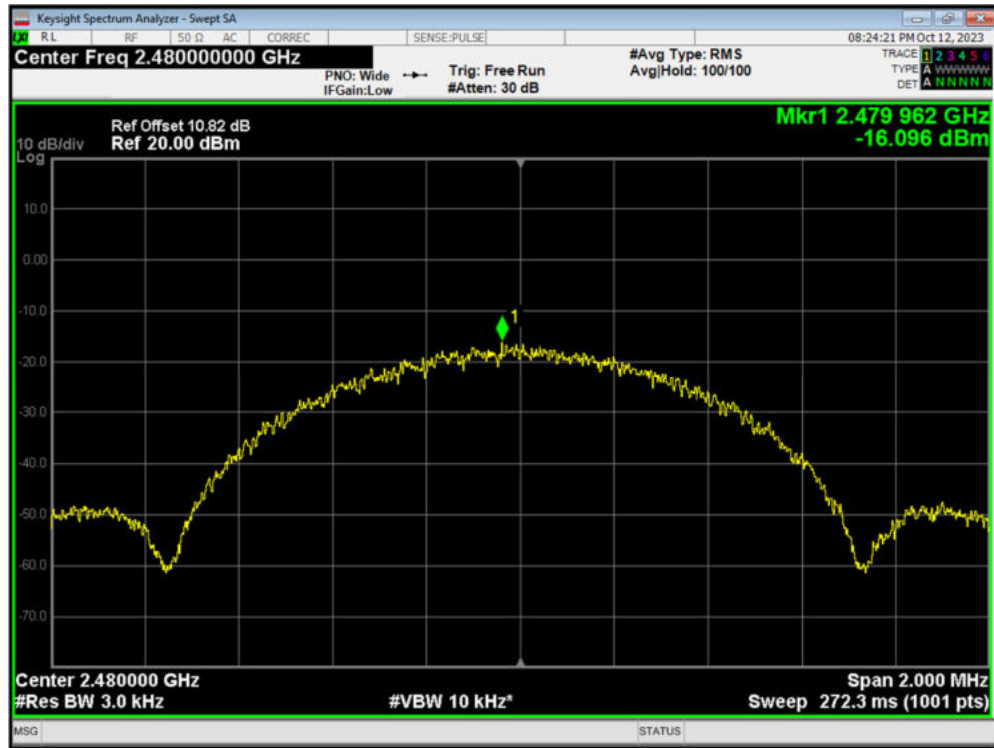
PSD Bluetooth LE 2402MHz



PSD Bluetooth LE 2440MHz



PSD Bluetooth LE 2480MHz



## 5.5. Spurious RF Conducted Emissions

### Ambient Condition

| Temperature | Relative humidity |
|-------------|-------------------|
| 15°C ~ 35°C | 20% ~ 80%         |

### 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 AUTO.

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.”

| Test Mode    | Carrier frequency (MHz) | Reference value (dBm) | Limit  |
|--------------|-------------------------|-----------------------|--------|
| 802.11b      | 2412                    | 4.13                  | -25.87 |
|              | 2437                    | 3.32                  | -26.68 |
|              | 2462                    | 4.43                  | -25.57 |
| 802.11g      | 2412                    | -0.68                 | -30.68 |
|              | 2437                    | -1.15                 | -31.15 |
|              | 2462                    | -0.16                 | -30.16 |
| 802.11n HT20 | 2412                    | -1.68                 | -31.68 |
|              | 2437                    | -1.23                 | -31.23 |
|              | 2462                    | -1.18                 | -31.18 |
| 802.11n HT40 | 2422                    | -4.67                 | -34.67 |
|              | 2437                    | -4.94                 | -34.94 |
|              | 2452                    | -4.02                 | -34.02 |

|                           |      |      |        |
|---------------------------|------|------|--------|
| Bluetooth<br>(Low Energy) | 2402 | 3.41 | -26.59 |
|                           | 2440 | 4.17 | -25.83 |
|                           | 2480 | 5.20 | -24.80 |

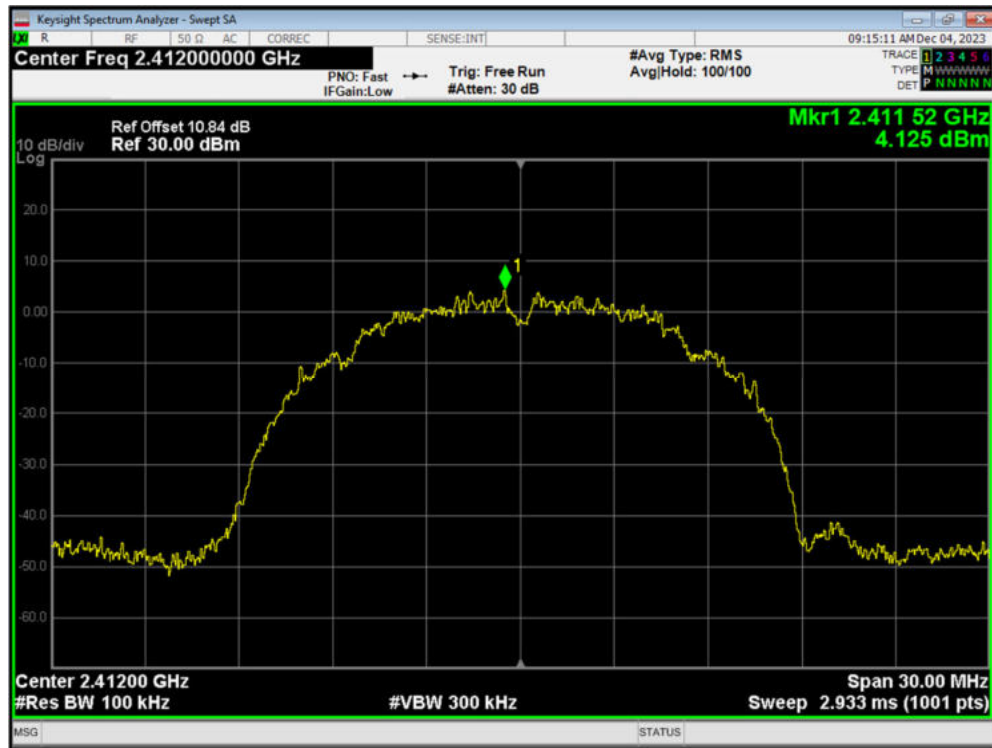
### Measurement Uncertainty

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

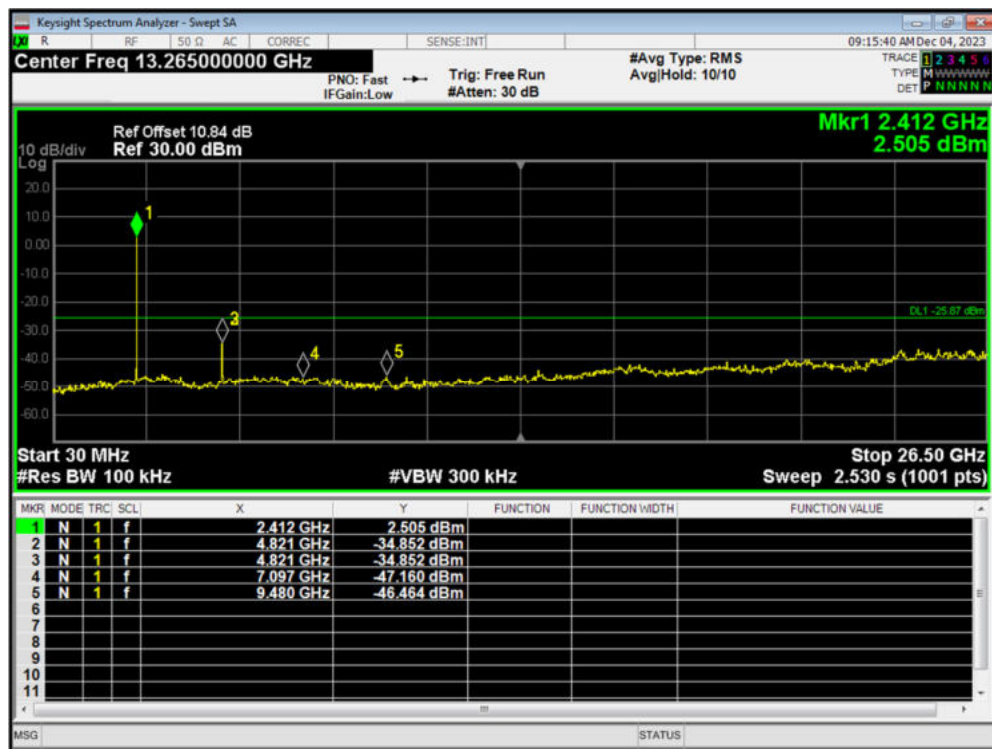
| Frequency   | Uncertainty |
|-------------|-------------|
| 100kHz-2GHz | 0.684 dB    |
| 2GHz-26GHz  | 1.407 dB    |

## Test Results:

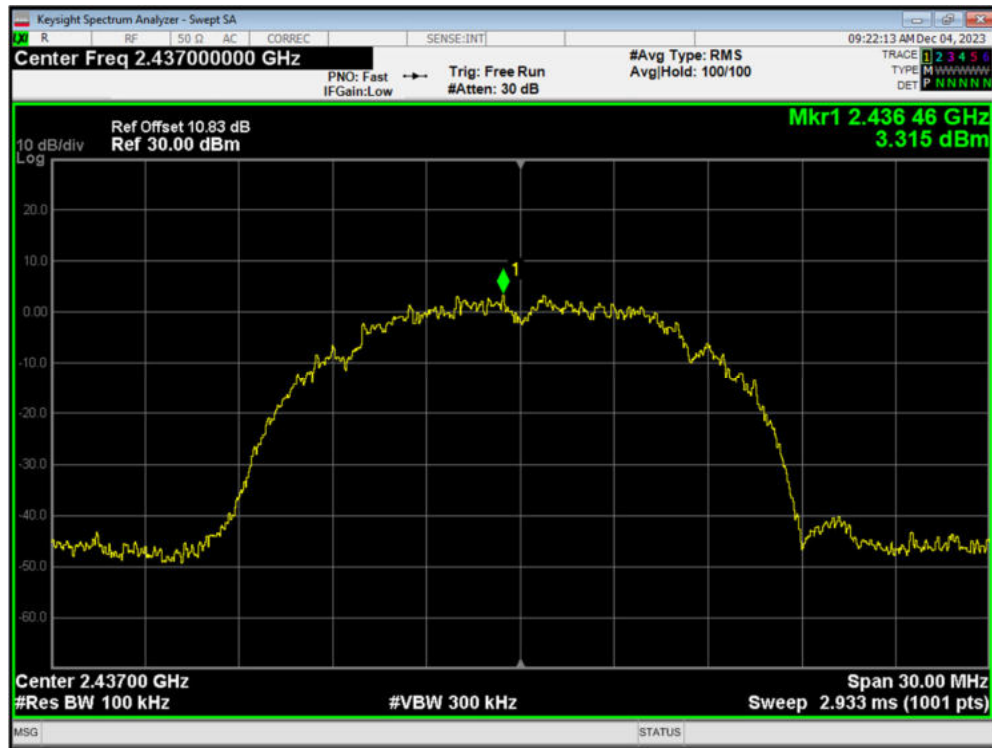
Tx. Spurious 802.11b 2412MHz Ref



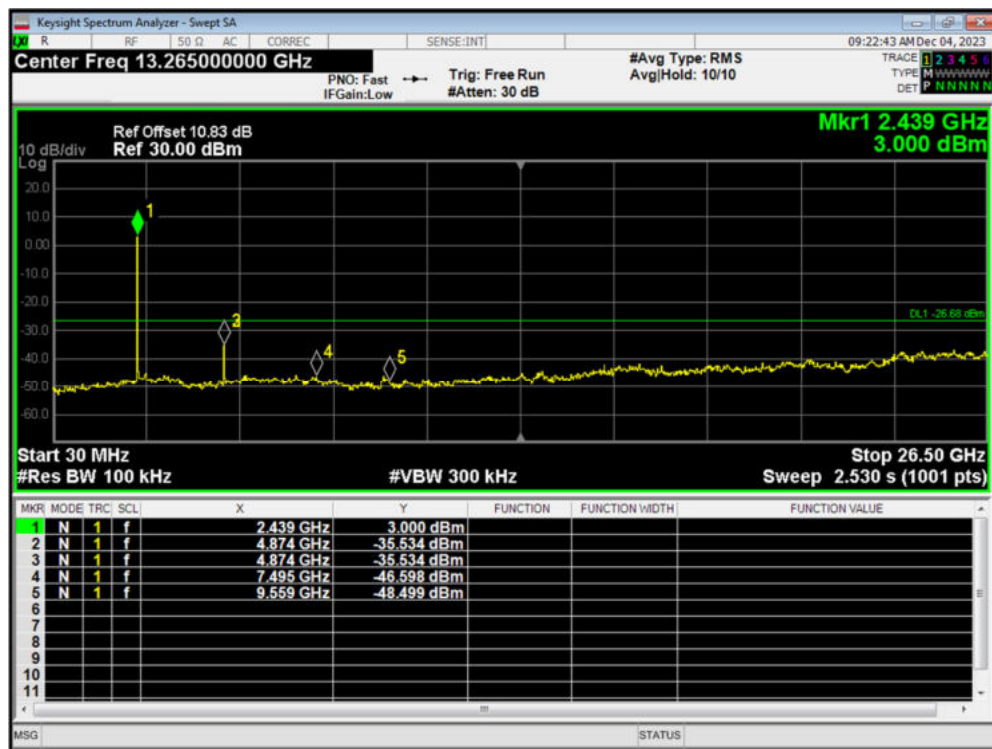
Tx. Spurious 802.11b 2412MHz Emission



Tx. Spurious 802.11b 2437MHz Ref

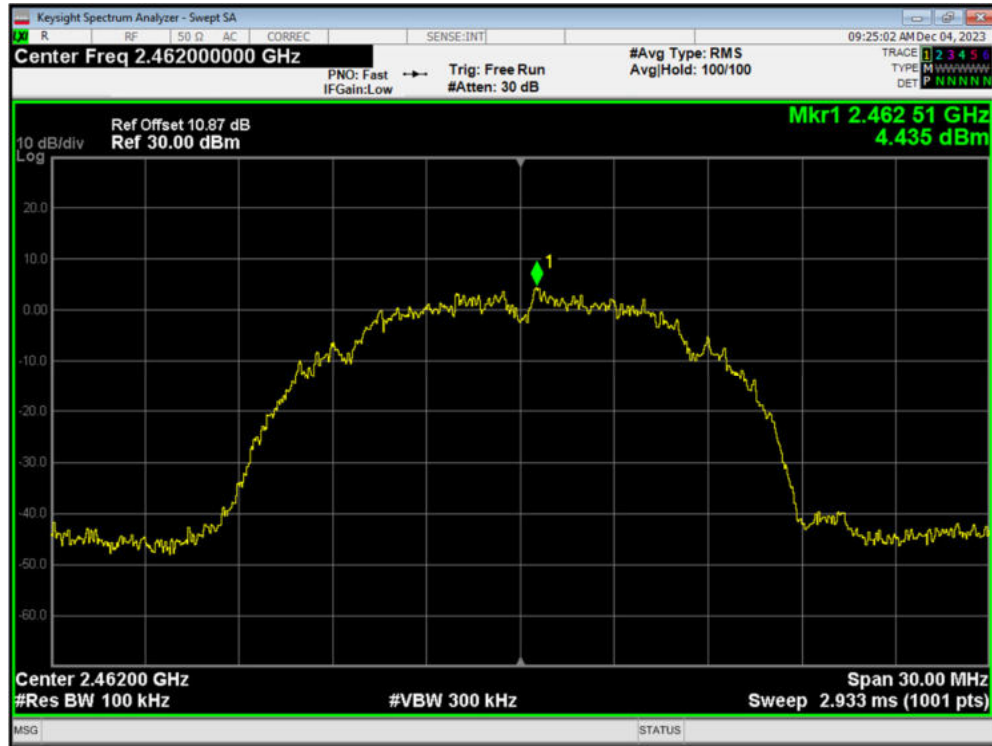


Tx. Spurious 802.11b 2437MHz Emission

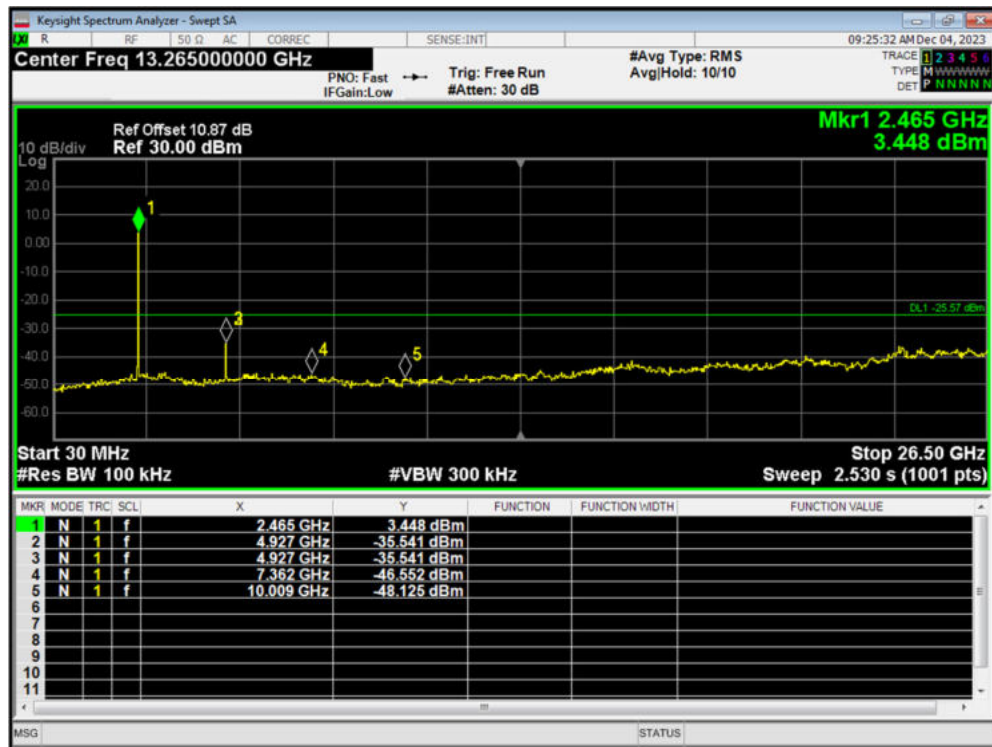




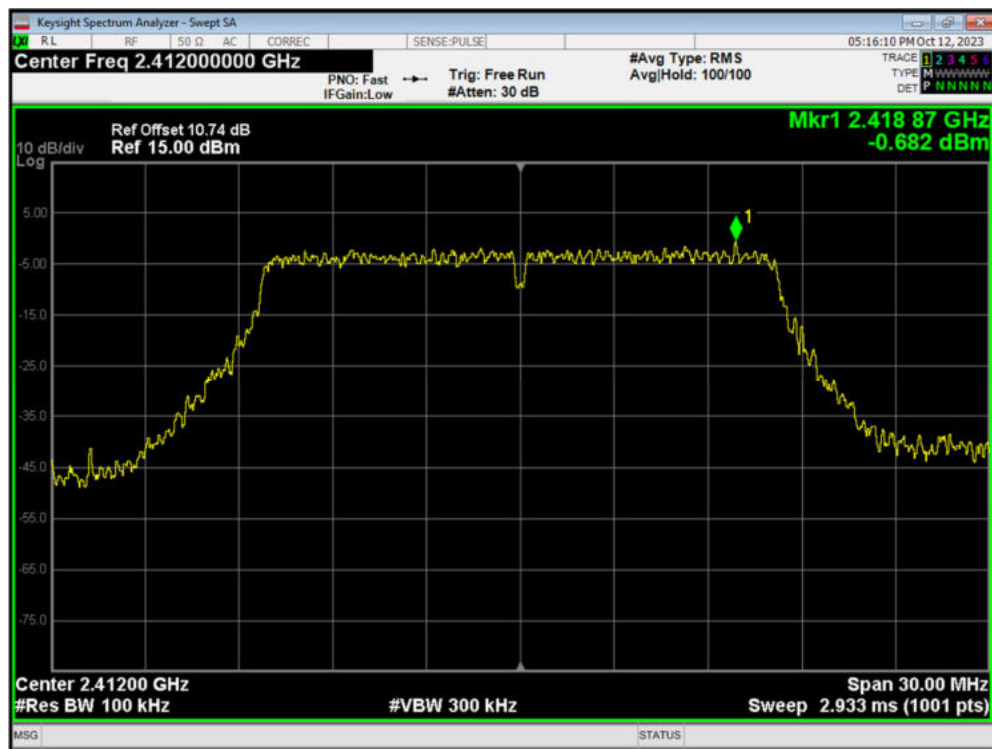
Tx. Spurious 802.11b 2462MHz Ref



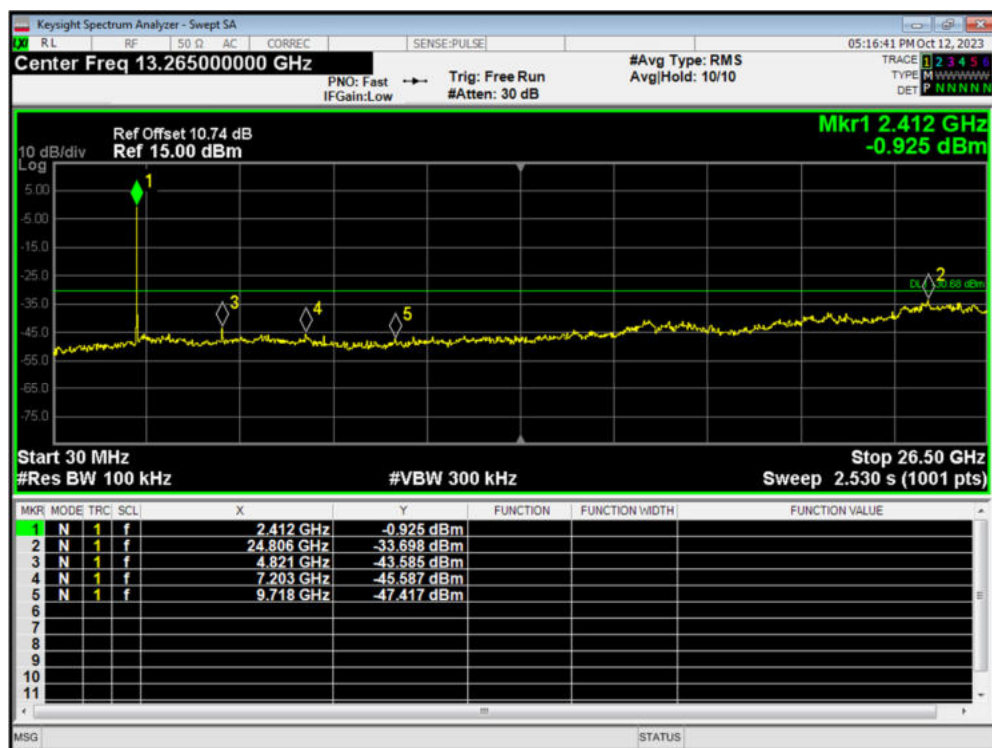
Tx. Spurious 802.11b 2462MHz Emission



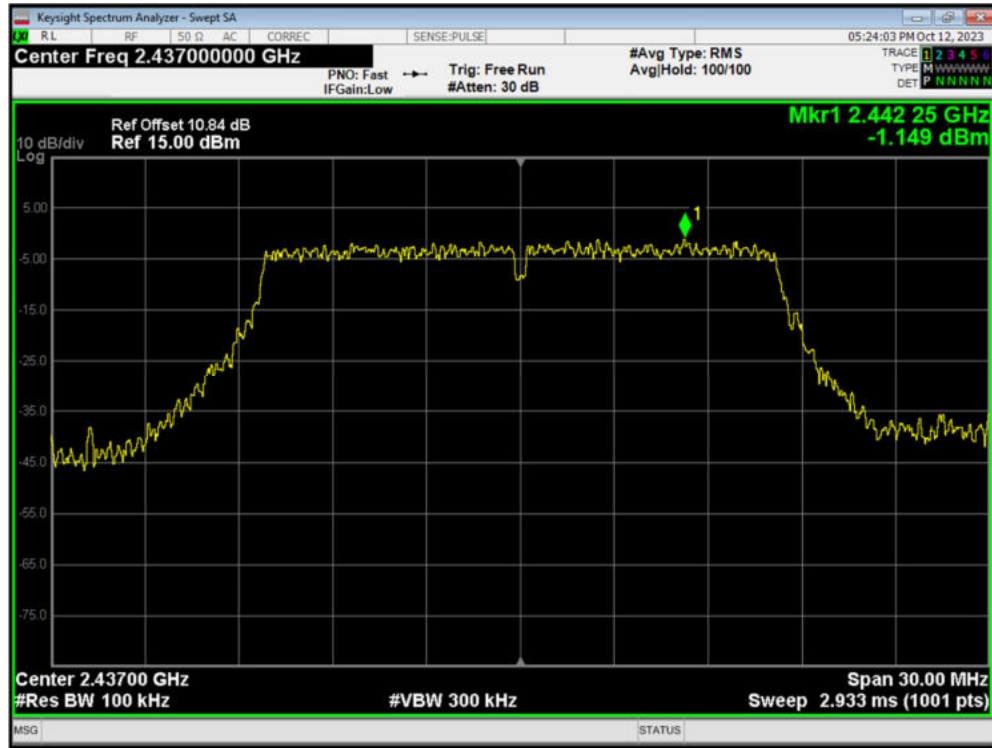
### Tx. Spurious 802.11g 2412MHz Ref



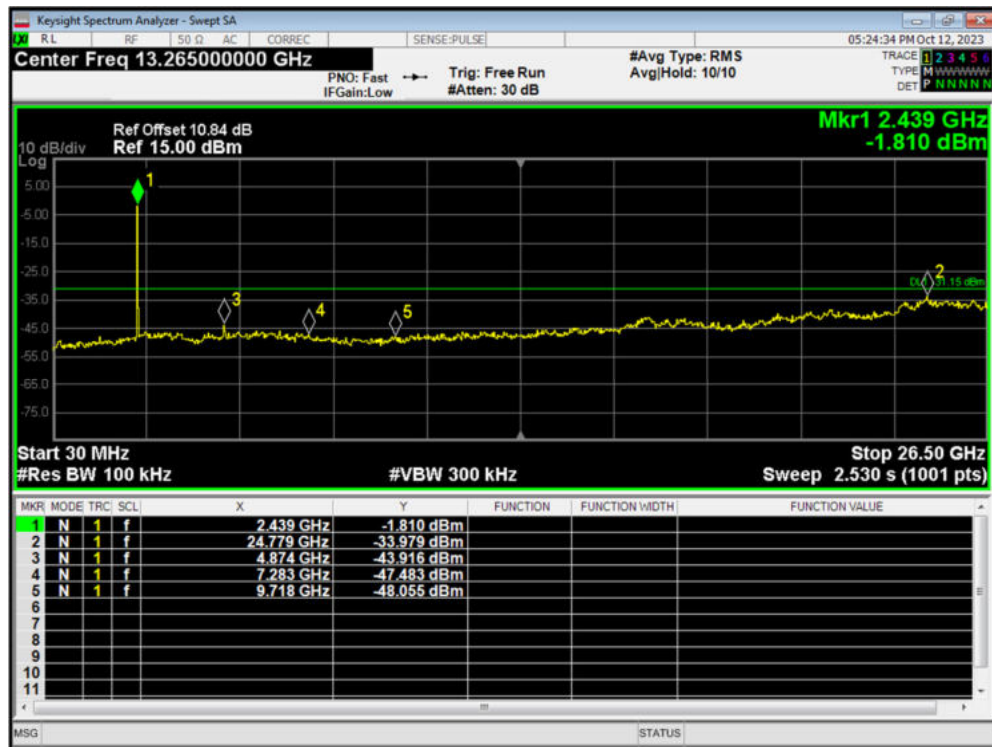
### Tx. Spurious 802.11g 2412MHz Emission



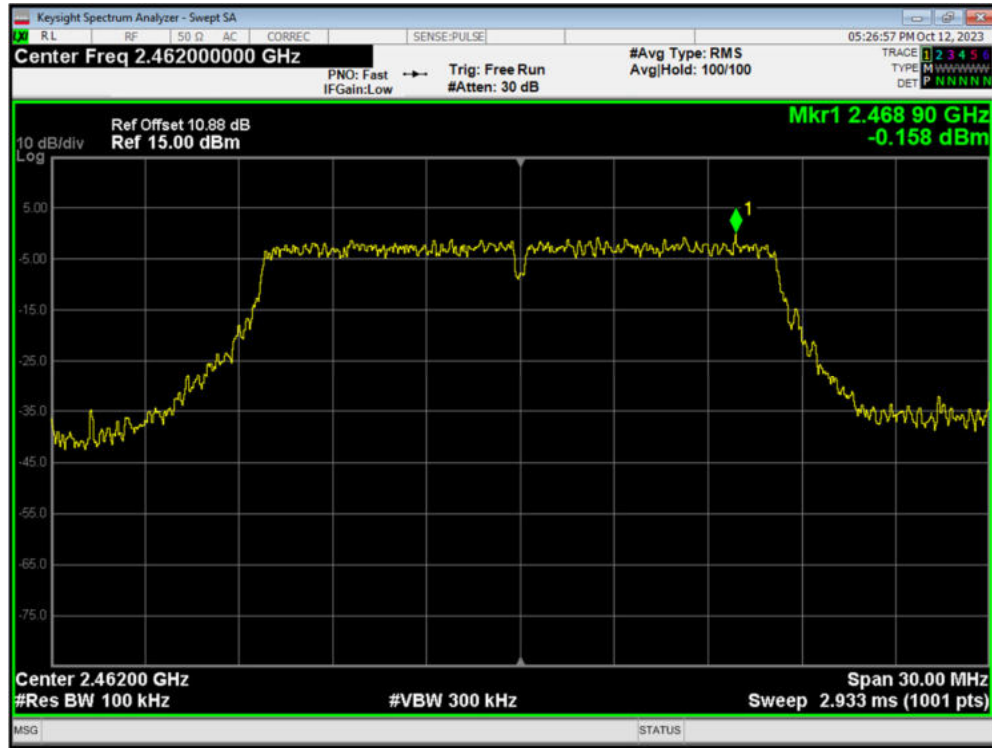
Tx. Spurious 802.11g 2437MHz Ref



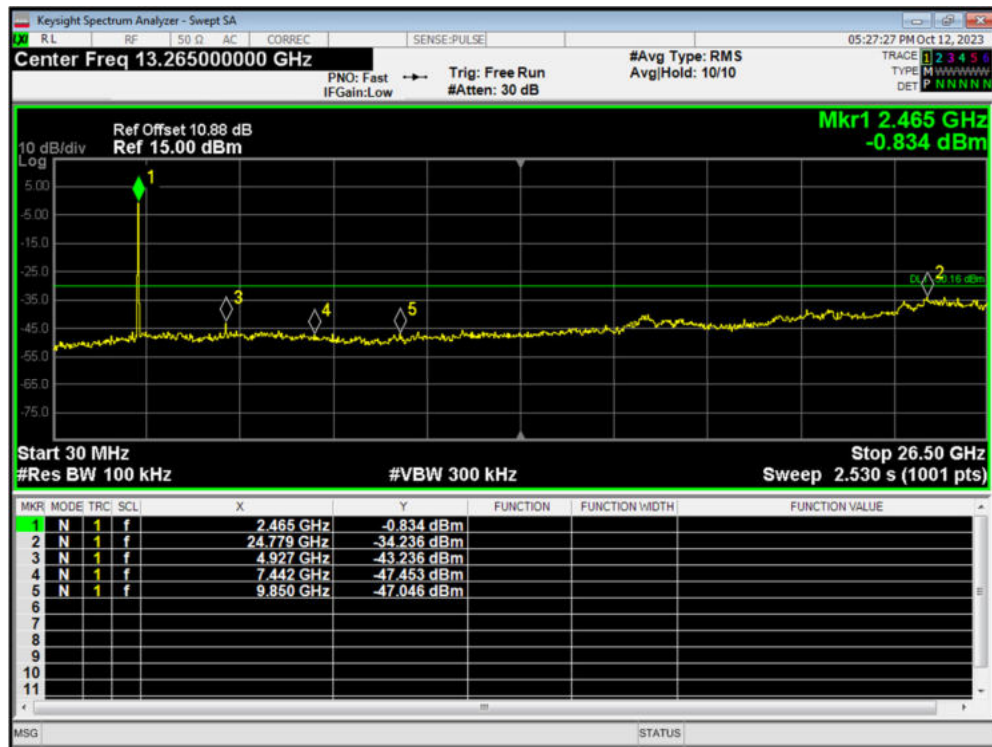
Tx. Spurious 802.11g 2437MHz Emission



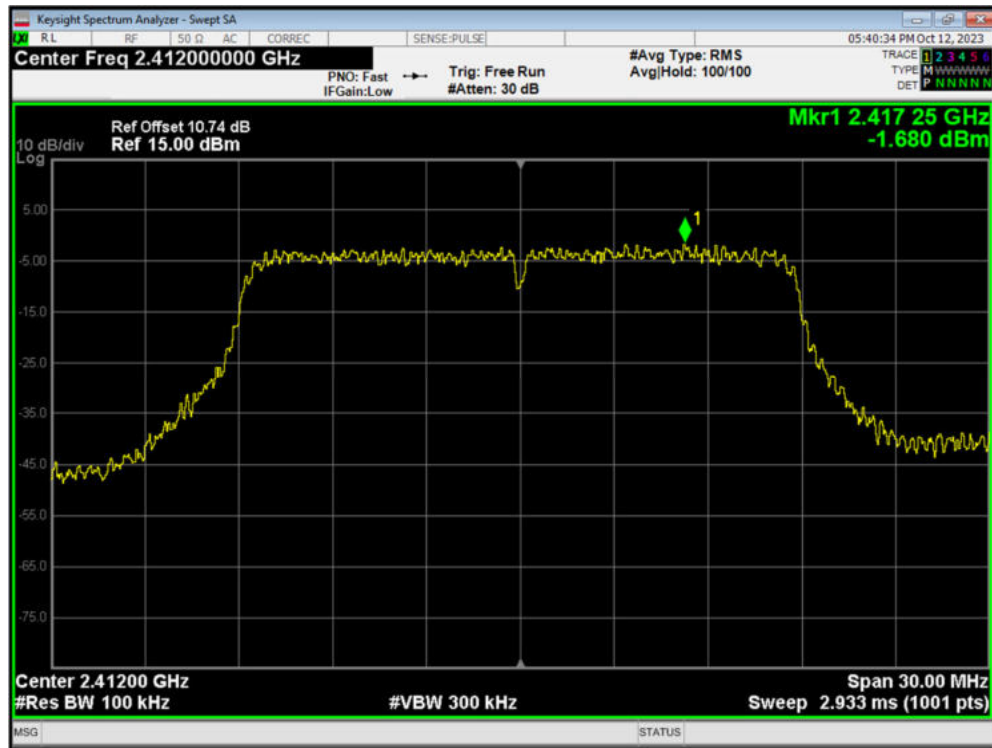
Tx. Spurious 802.11g 2462MHz Ref



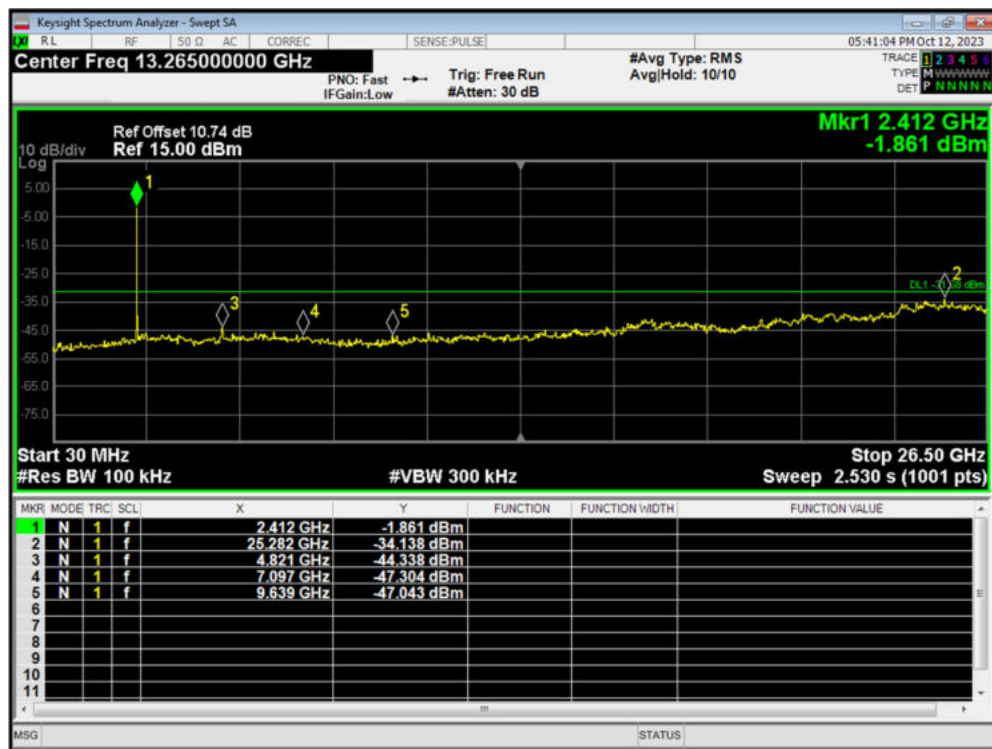
Tx. Spurious 802.11g 2462MHz Emission



Tx. Spurious 802.11n(HT20) 2412MHz Ref

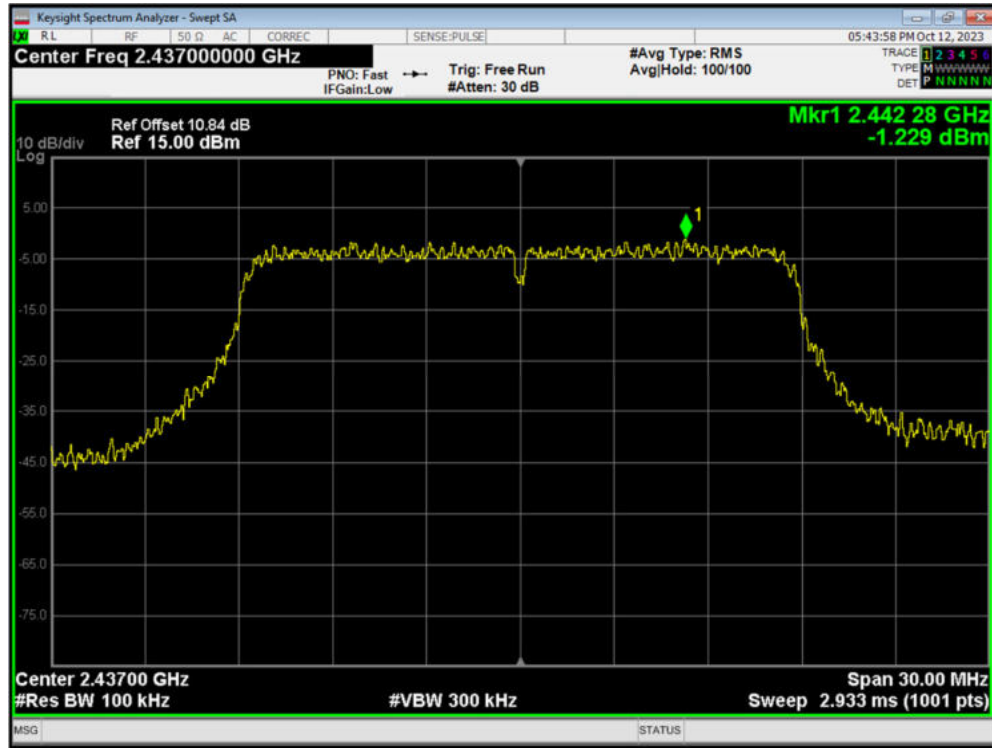


Tx. Spurious 802.11n(HT20) 2412MHz Emission

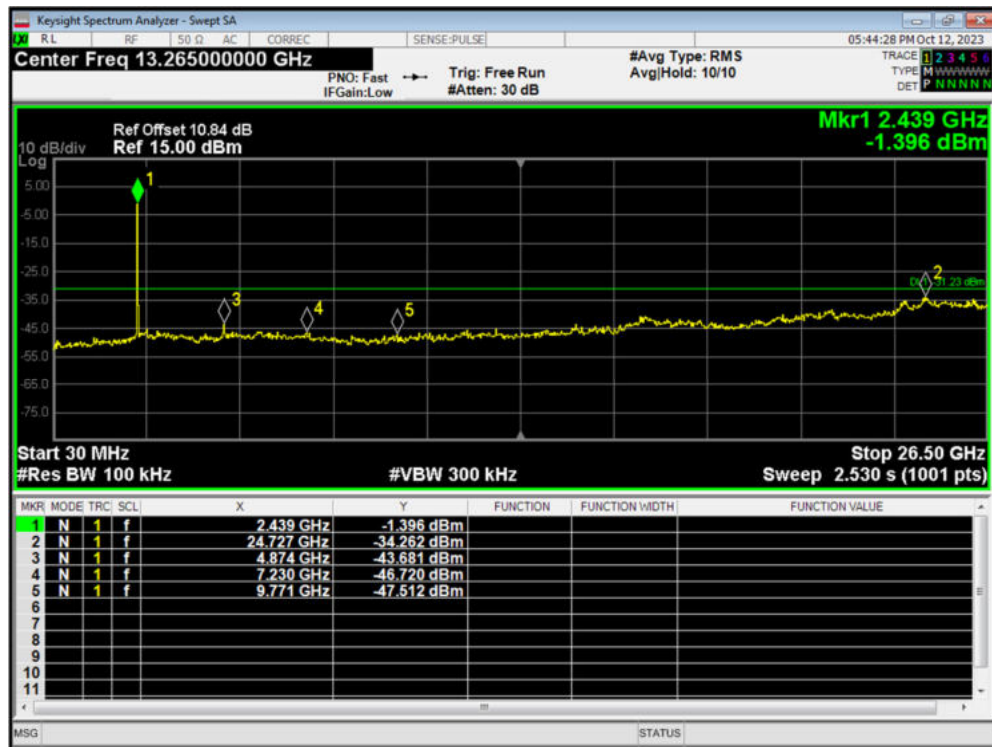




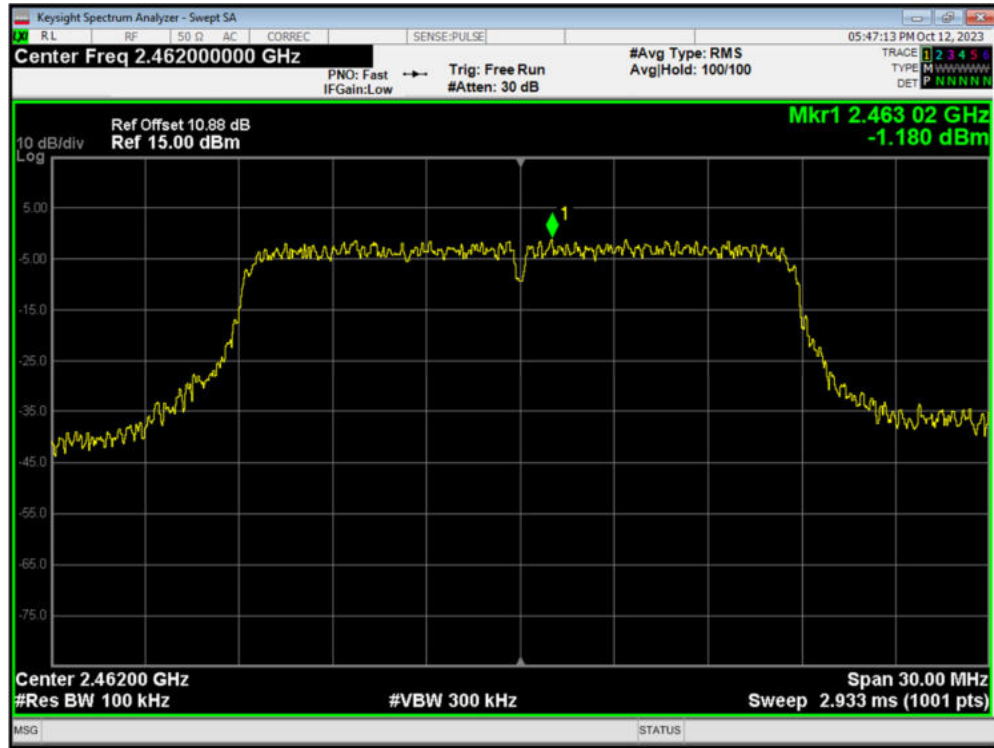
Tx. Spurious 802.11n(HT20) 2437MHz Ref



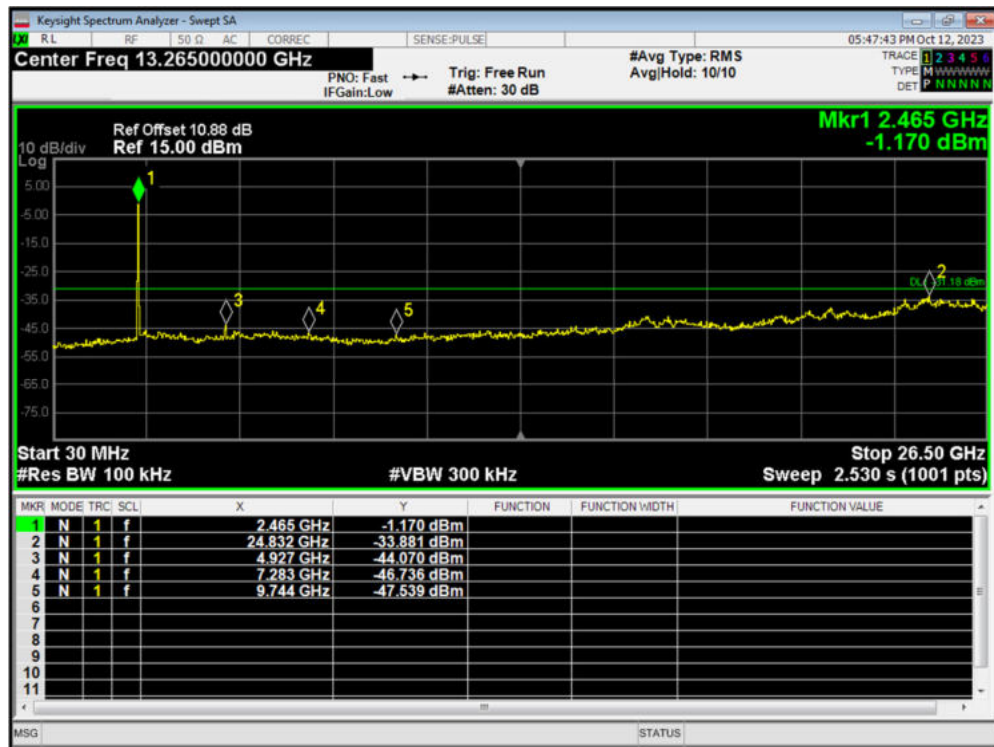
Tx. Spurious 802.11n(HT20) 2437MHz Emission



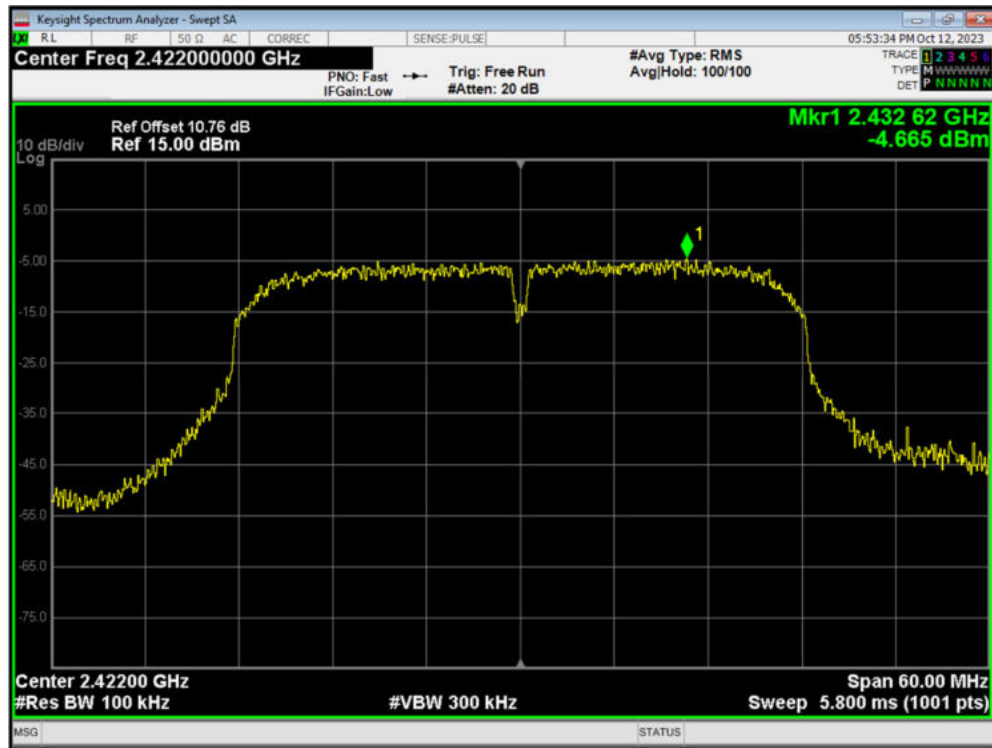
Tx. Spurious 802.11n(HT20) 2462MHz Ref



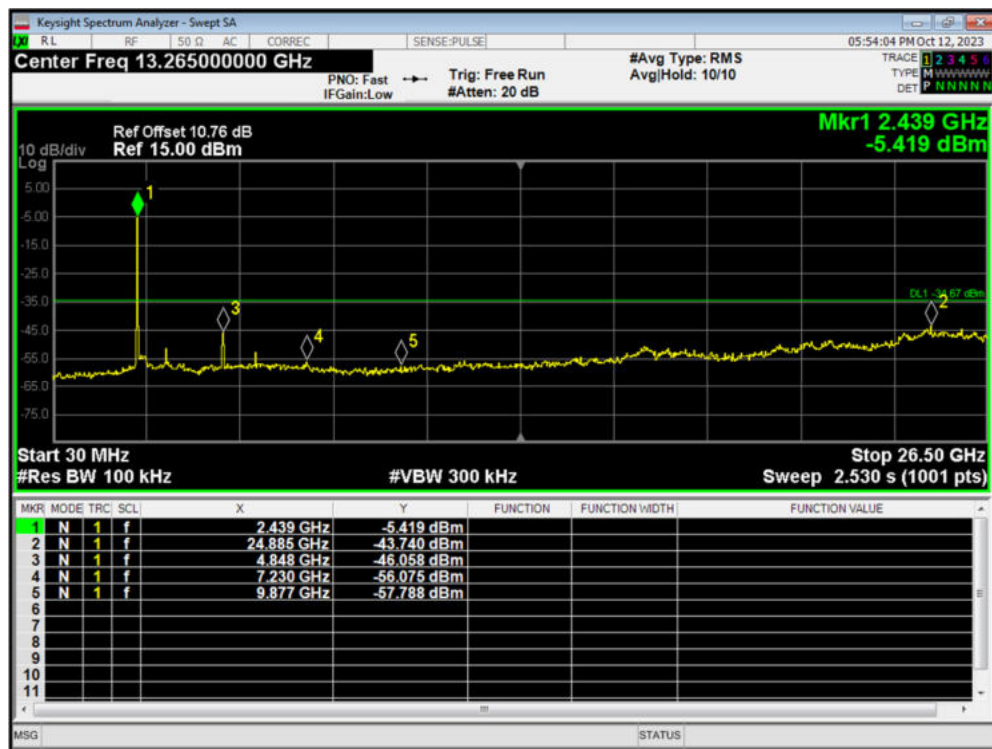
Tx. Spurious 802.11n(HT20) 2462MHz Emission



Tx. Spurious 802.11n(HT40) 2422MHz Ref

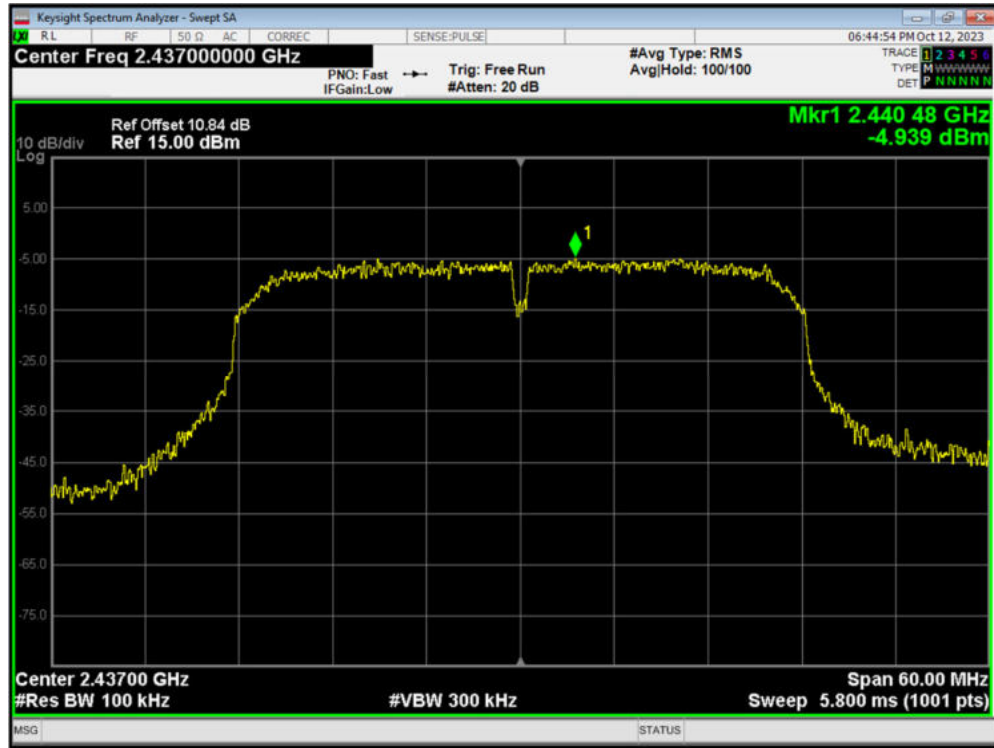


Tx. Spurious 802.11n(HT40) 2422MHz Emission

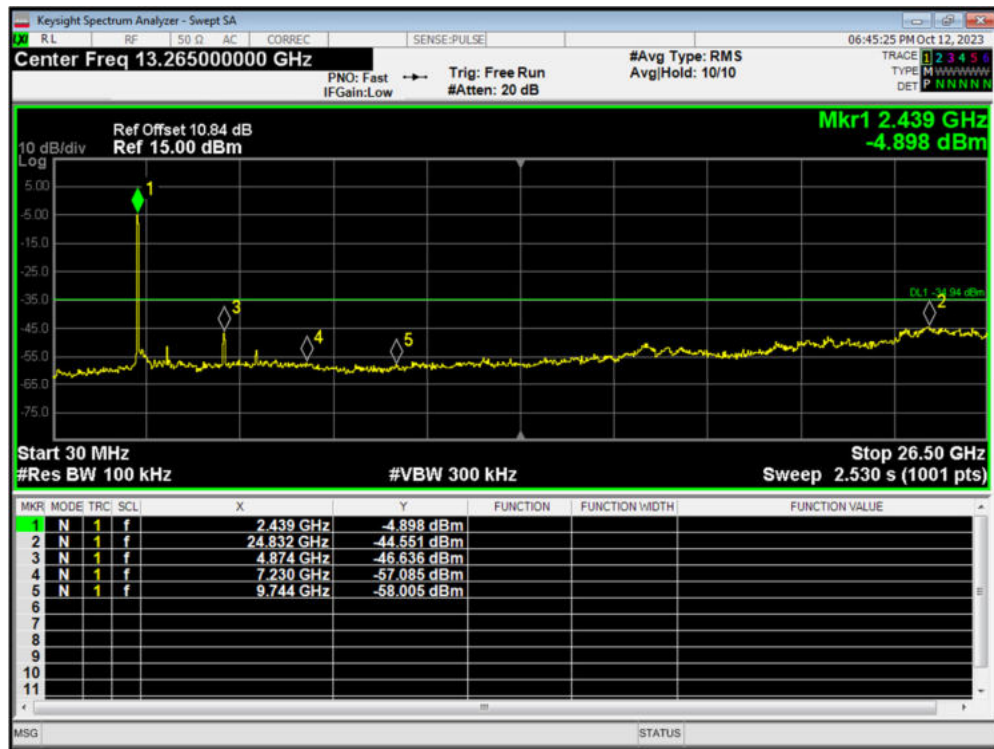




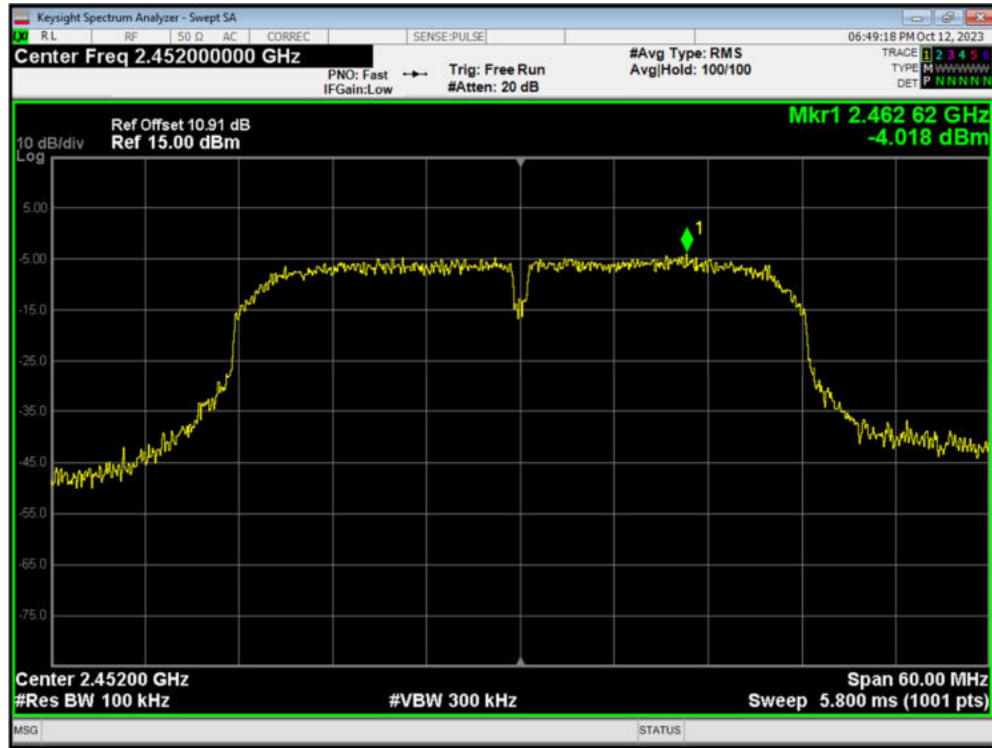
Tx. Spurious 802.11n(HT40) 2437MHz Ref



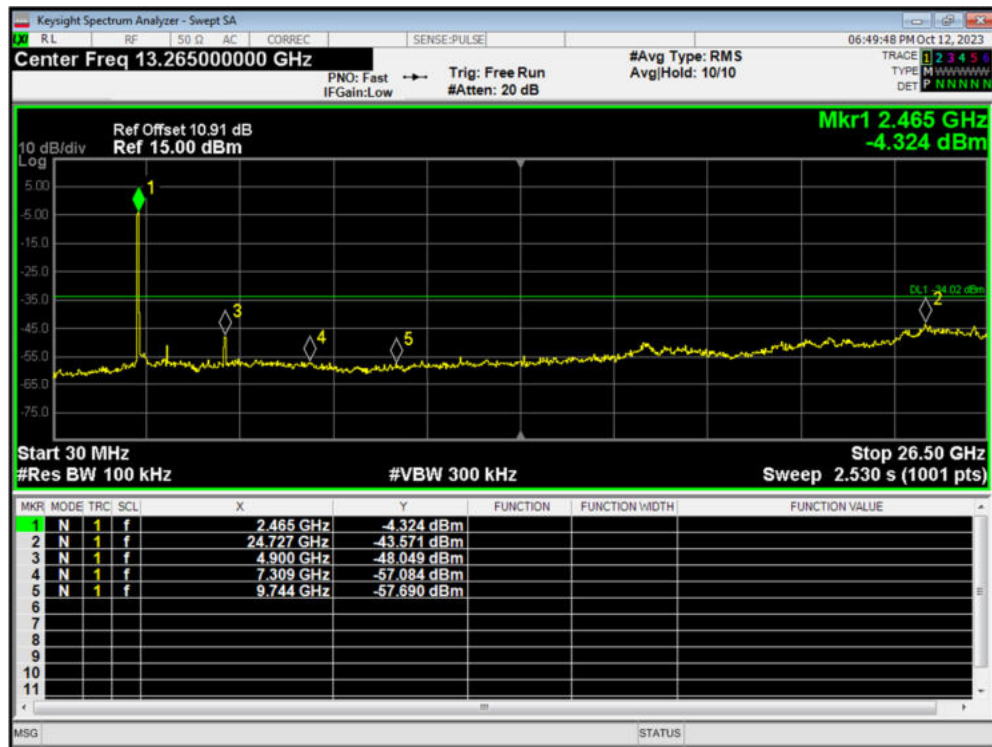
Tx. Spurious 802.11n(HT40) 2437MHz Emission



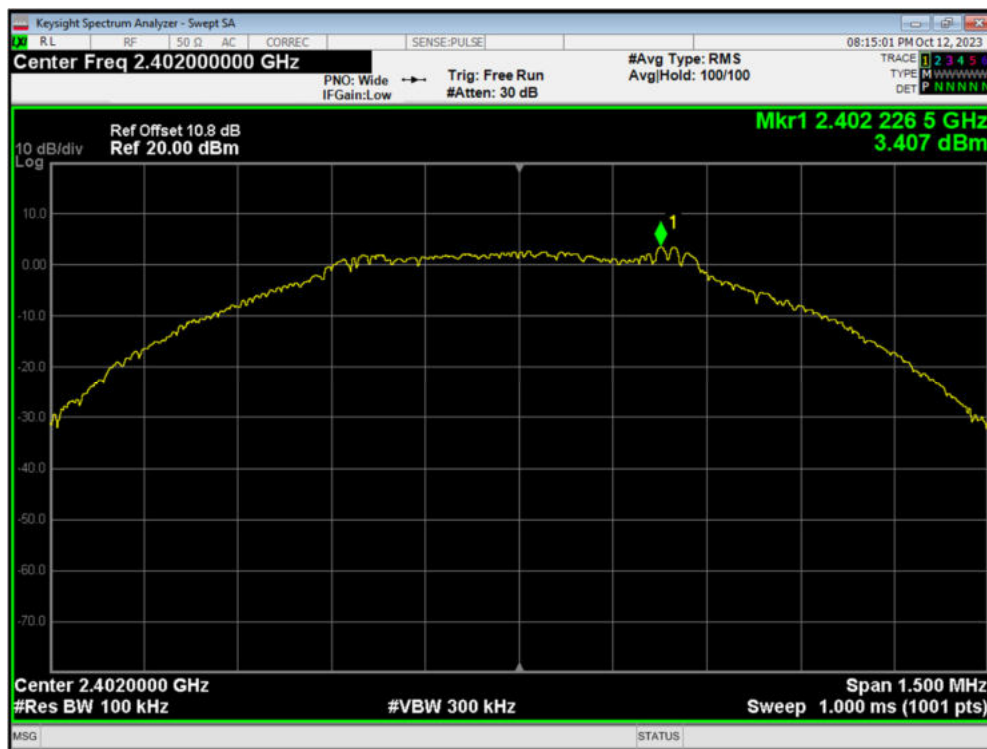
Tx. Spurious 802.11n(HT40) 2452MHz Ref



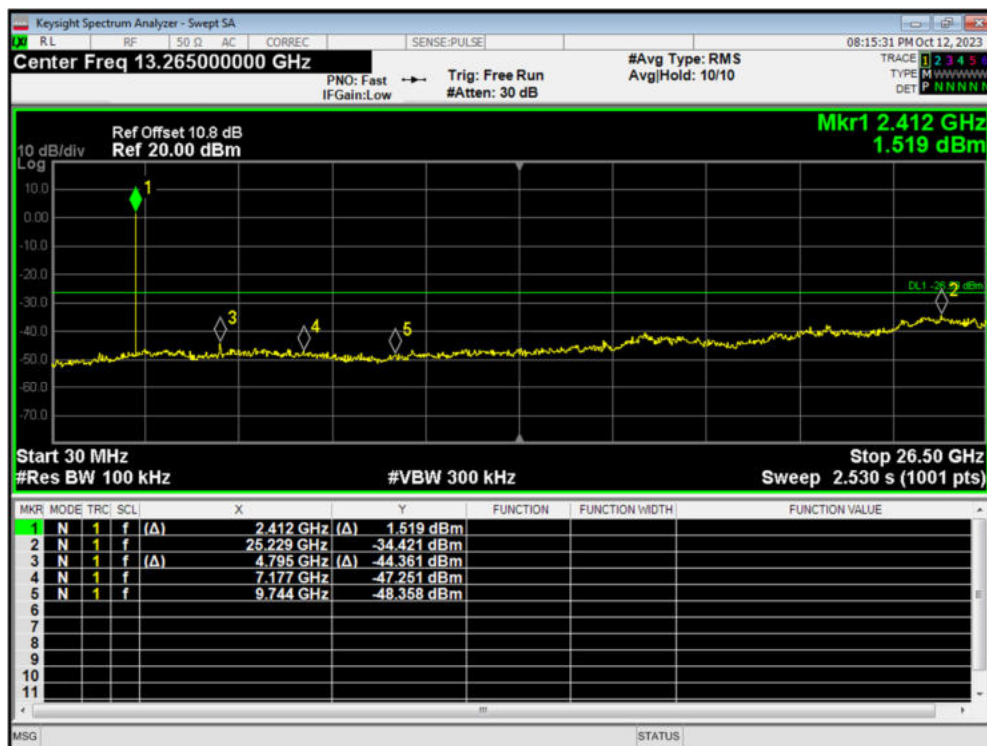
Tx. Spurious 802.11n(HT40) 2452MHz Emission



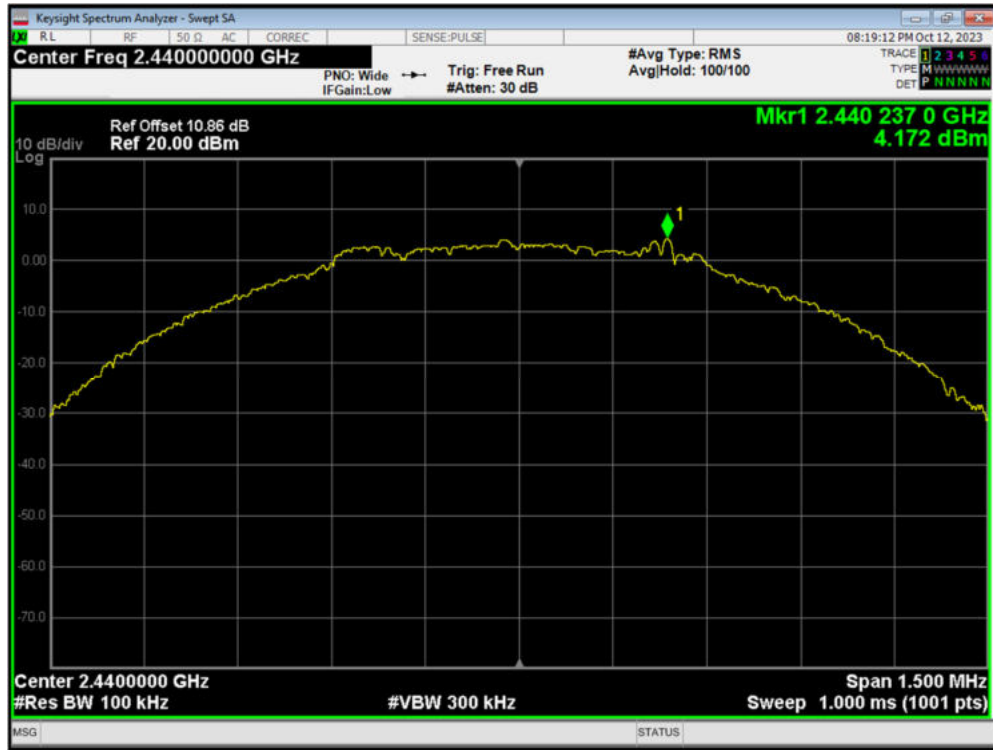
### Tx. Spurious Bluetooth LE 2402MHz Ref



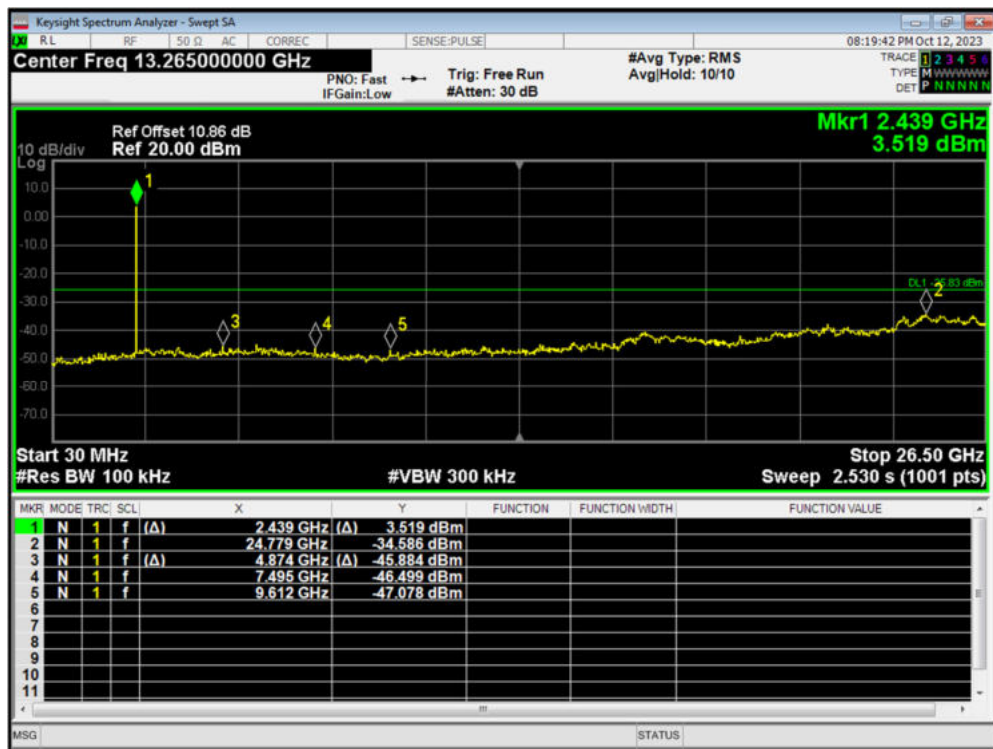
### Tx. Spurious Bluetooth LE 2402MHz Emission



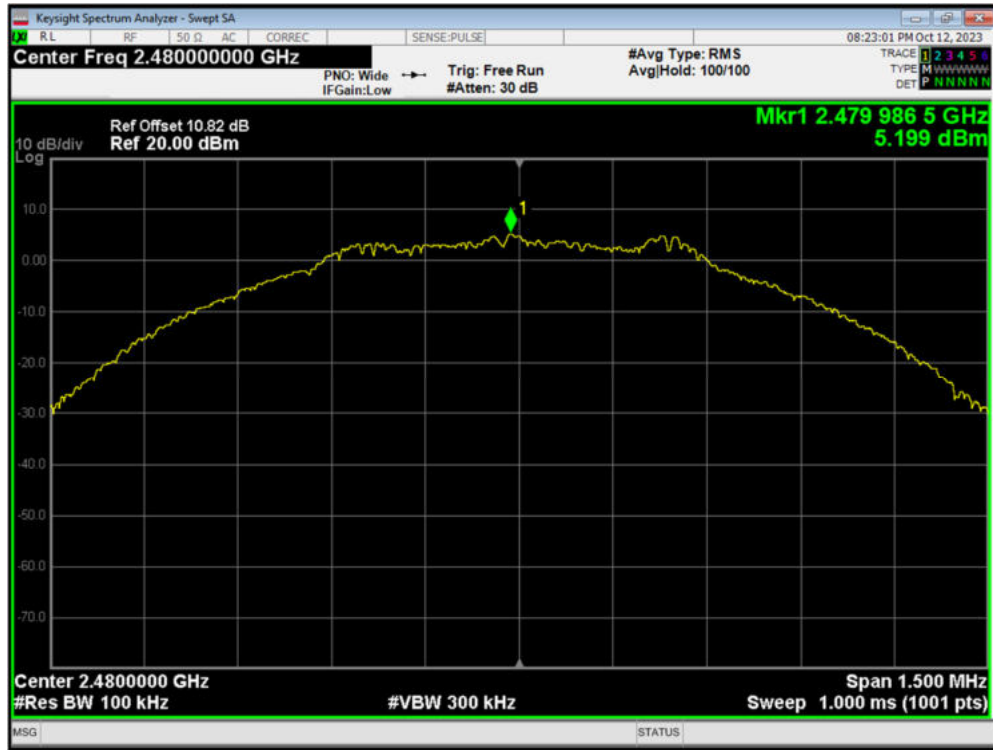
Tx. Spurious Bluetooth LE 2440MHz Ref



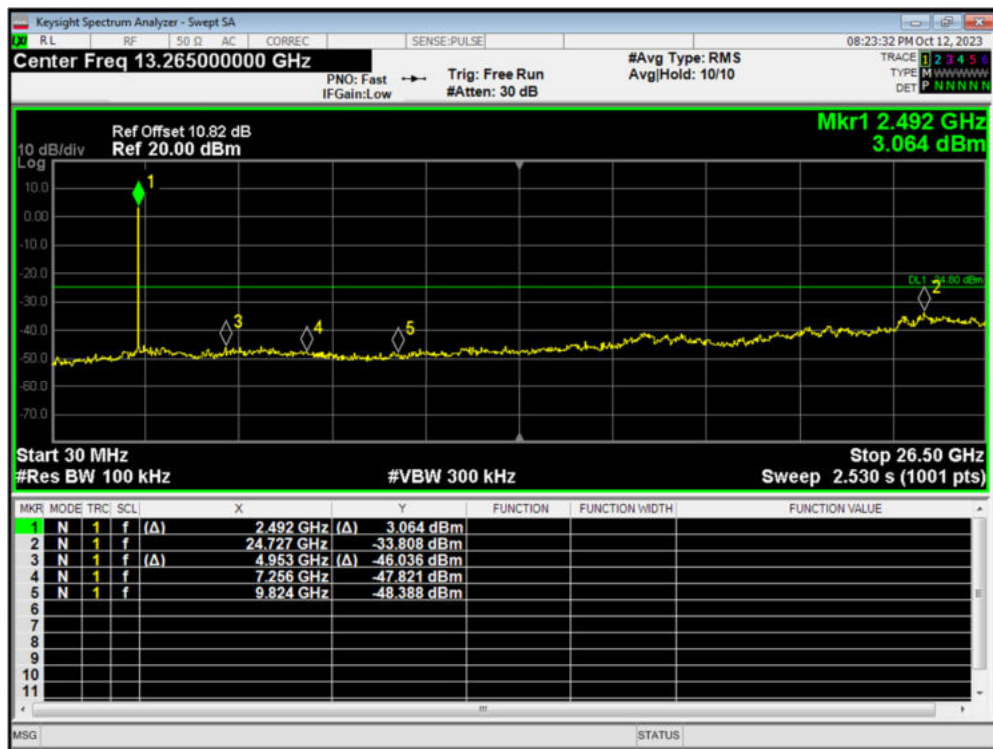
Tx. Spurious Bluetooth LE 2440MHz Emission



Tx. Spurious Bluetooth LE 2480MHz Ref



Tx. Spurious Bluetooth LE 2480MHz Emission



## 5.6. Unwanted Emission

### Ambient Condition

| Temperature | Relative humidity |
|-------------|-------------------|
| 15°C ~ 35°C | 20% ~ 80%         |

### Method of Measurement

The test set-up was made in accordance to the general provisions of ANSI C63.10.

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 level. The measurements shall be repeated with orthogonal polarization of the test 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.

The procedure for peak unwanted emissions measurements above 1000 MHz is as follows:

Set the spectrum analyzer in the following:

9kHz~150 kHz

RBW=200Hz, VBW=1kHz/ Sweep=AUTO

150 kHz~30MHz

RBW=9KHz, VBW=30KHz,/ Sweep=AUTO

Below 1GHz

RBW=100kHz / VBW=300kHz / Sweep=AUTO

a) Peak emission levels are measured by setting the instrument as follows:

Above 1GHz

PEAK: RBW=1MHz VBW=3MHz/ Sweep=AUTO

b) Average emission levels are measured by setting the instrument as follows:

Above 1GHz

AVERAGE: RBW=1MHz / VBW=3MHz / Sweep=AUTO

c) Detector: The measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

d) Averaging type = power (i.e., rms) (As an alternative, the detector and averaging type may be set for linear voltage averaging. Some instruments require linear display mode to use linear 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.

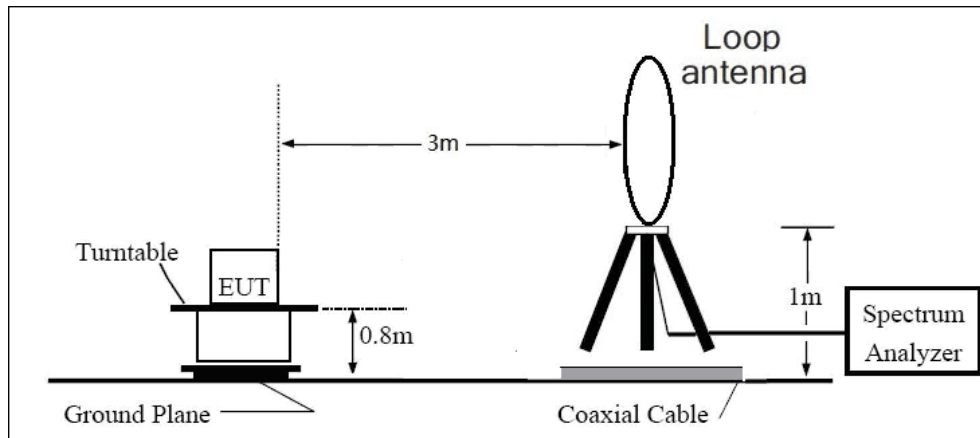
3) If a specific emission is demonstrated to be continuous (100% duty cycle) rather than turning ON and OFF with the transmit cycle, then no duty cycle correction is required for that emission.

The test is in transmitting mode.

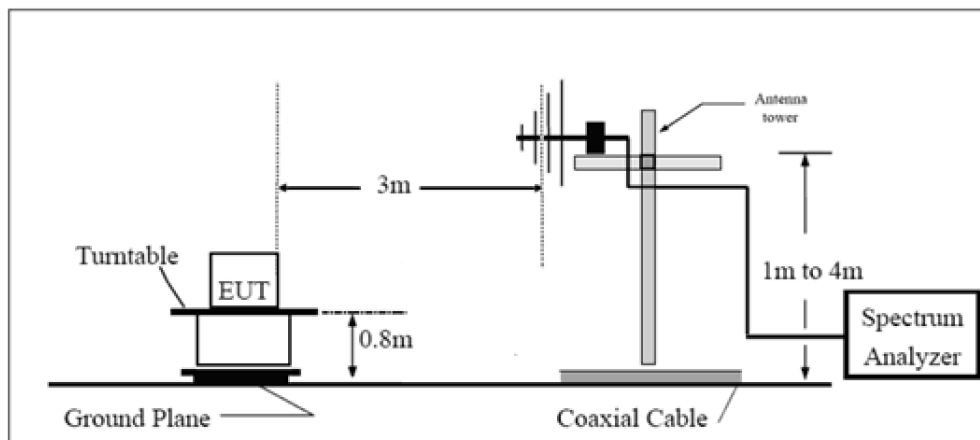


## Test Setup

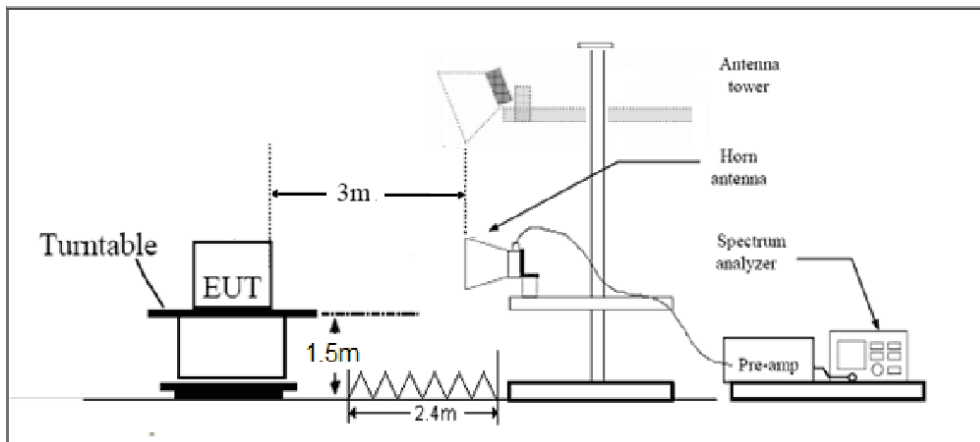
9KHz~ 30MHz



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( $\mu$ V/m) | Field strength(dB $\mu$ V/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 dB $\mu$ V/m

Average Limit=54 dB $\mu$ V/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         |
| <sup>1</sup> 0.495-0.505 | 16.69475-16.69525   | 608-614       | 5.35-5.46        |
| 2.1735-2.1905            | 16.80425-16.80475   | 960-1240      | 7.25-7.75        |
| 4.125-4.128              | 25.5-25.67          | 1300-1427     | 8.025-8.5        |
| 4.17725-4.17775          | 37.5-38.25          | 1435-1626.5   | 9.0-9.2          |
| 4.20725-4.20775          | 73-74.6             | 1645.5-1646.5 | 9.3-9.5          |
| 6.215-6.218              | 74.8-75.2           | 1660-1710     | 10.6-12.7        |
| 6.26775-6.26825          | 108-121.94          | 1718.8-1722.2 | 13.25-13.4       |
| 6.31175-6.31225          | 123-138             | 2200-2300     | 14.47-14.5       |
| 8.291-8.294              | 149.9-150.05        | 2310-2390     | 15.35-16.2       |
| 8.362-8.366              | 156.52475-156.52525 | 2483.5-2500   | 17.7-21.4        |
| 8.37625-8.38675          | 156.7-156.9         | 2690-2900     | 22.01-23.12      |
| 8.41425-8.41475          | 162.0125-167.17     | 3260-3267     | 23.6-24.0        |
| 12.29-12.293             | 167.72-173.2        | 3332-3339     | 31.2-31.8        |
| 12.51975-12.52025        | 240-285             | 3345.8-3358   | 36.43-36.5       |
| 12.57675-12.57725        | 322-335.4           | 3600-4400     | ( <sup>2</sup> ) |
| 13.36-13.41              |                     |               |                  |

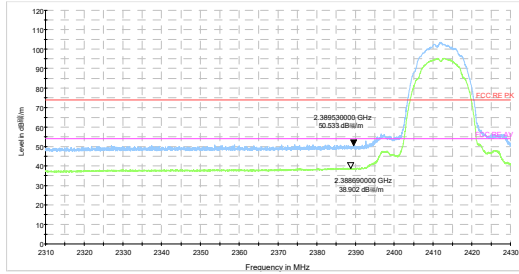
### Measurement Uncertainty

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

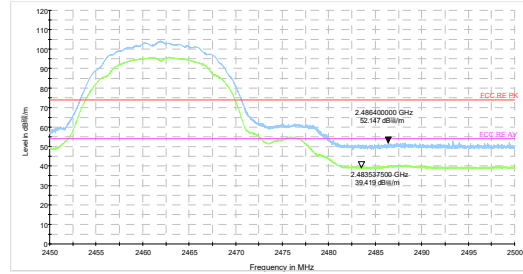
| Frequency     | Uncertainty |
|---------------|-------------|
| 9KHz-30MHz    | 3.55 dB     |
| 30MHz-200MHz  | 4.17 dB     |
| 200MHz-1GHz   | 4.84 dB     |
| 1-18GHz       | 4.35 dB     |
| 18-26.5GHz    | 5.90 dB     |
| 26.5GHz~40GHz | 5.92 dB     |

## Test Results:

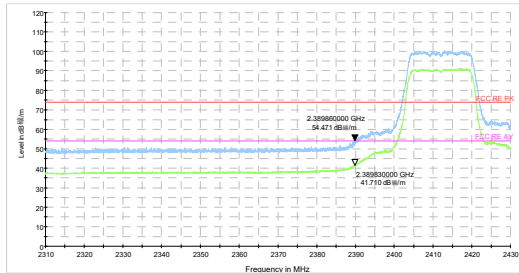
A symbol (  $\mu\text{V/m}$  ) in the test plot below means (dB $\mu\text{V/m}$ )



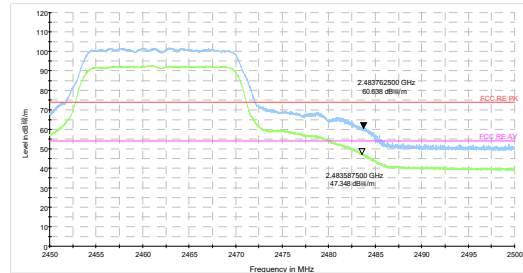
802.11b-Channel 1 Peak+ Average



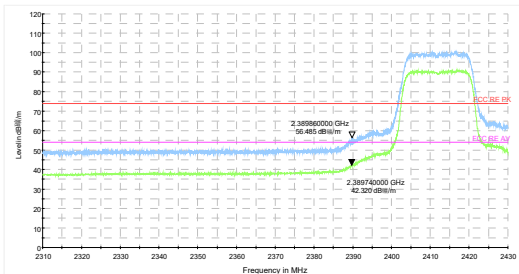
802.11b-Channel 11 Peak+ Average



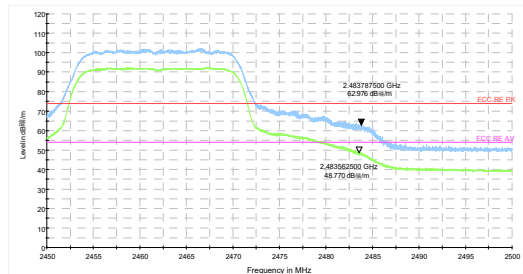
802.11g-Channel 1 Peak+ Average



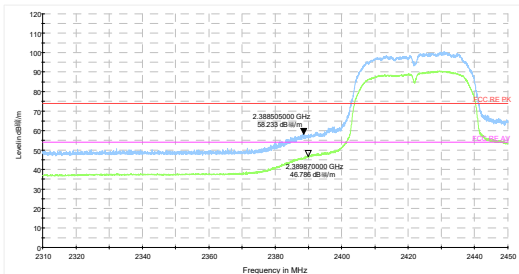
802.11g-Channel 11 Peak+ Average



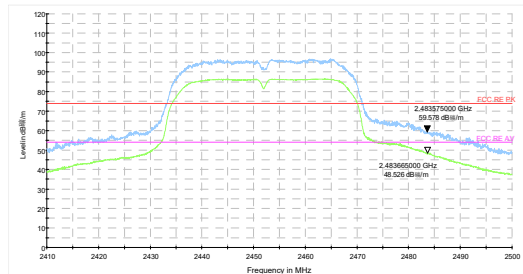
802.11n HT20-Channel 1 Peak+ Average



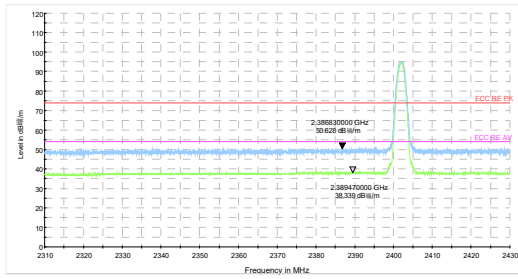
802.11n HT20-Channel 11 Peak+ Average



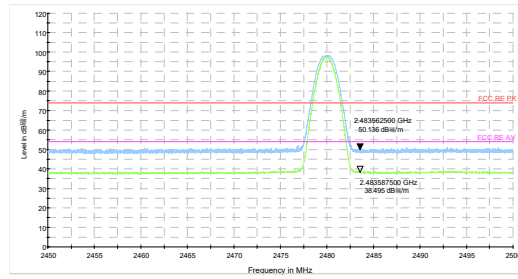
802.11n HT40-Channel 3 Peak+ Average



802.11n HT40-Channel 9 Peak+ Average



Bluetooth LE (1M) Channel 0 Peak+ Average



Bluetooth LE (1M) Channel 39 Peak+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 are more than 20dB below the limit are not reported.

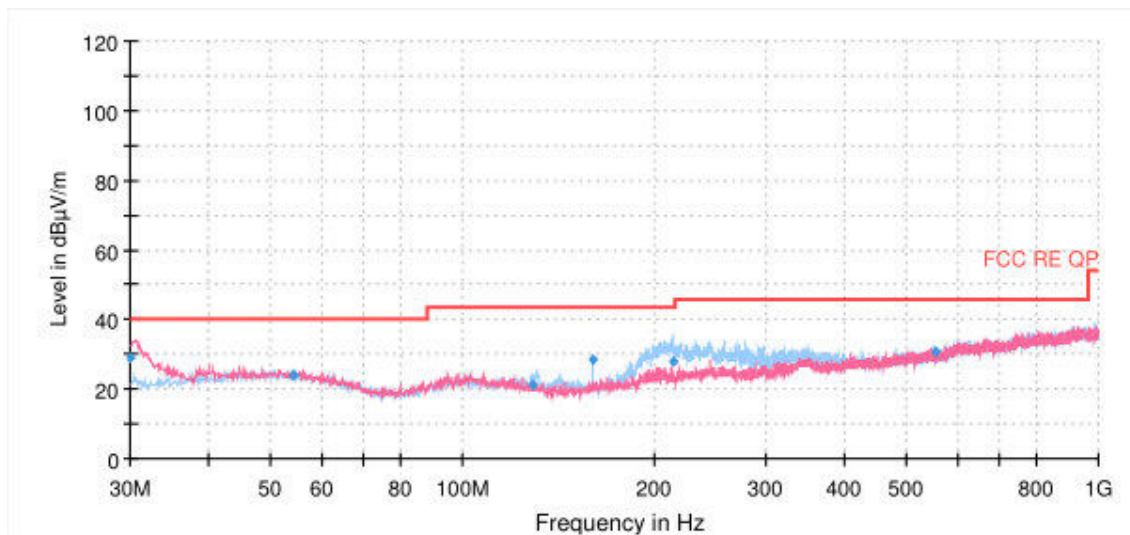
The following graphs display the maximum values of horizontal and vertical by software.

For above 1GHz, Blue trace uses the peak detection, Green trace uses the average detection.

### Continuous TX mode:

#### Wi-Fi 2.4G

During the test, the Radiates Emission from 30MHz to 1GHz was performed in all modes with all channels, 802.11b, Channel 6 are selected as the worst condition. The test data of the worst-case condition was recorded in this report.



Radiates Emission from 30MHz to 1GHz

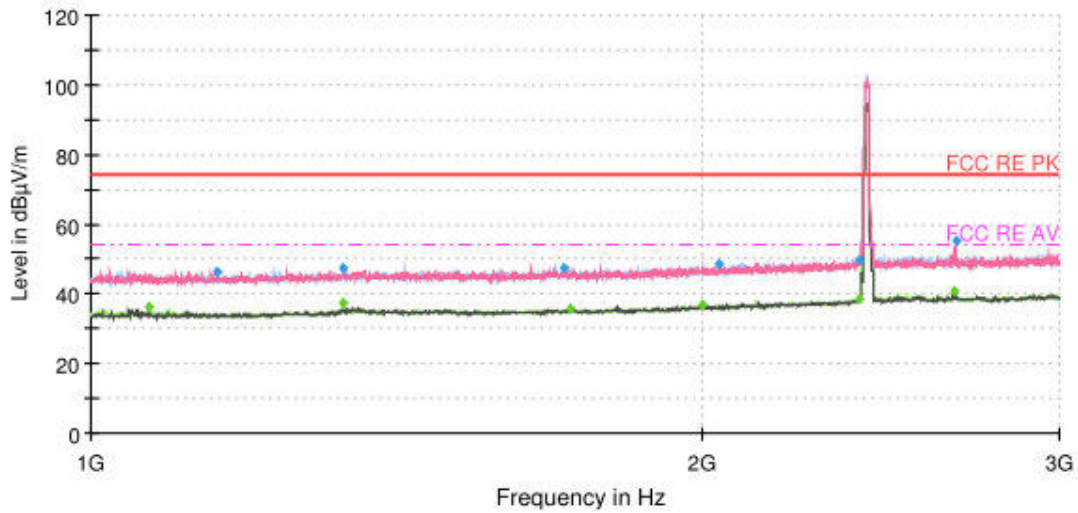
| Frequency (MHz) | Quasi-Peak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) |
|-----------------|---------------------|----------------|-------------|-------------|--------------|---------------|---------------------|
| 30.01           | 29.30               | 40.00          | 10.70       | 100.0       | V            | 214.00        | 17                  |
| 54.05           | 23.94               | 40.00          | 16.06       | 214.0       | H            | 202.00        | 20                  |
| 128.81          | 21.26               | 43.50          | 22.24       | 110.0       | H            | 316.00        | 16                  |
| 159.98          | 28.47               | 43.50          | 15.03       | 208.0       | H            | 0.00          | 16                  |
| 213.81          | 28.15               | 43.50          | 15.35       | 187.0       | H            | 0.00          | 18                  |
| 552.71          | 30.47               | 46.00          | 15.53       | 223.0       | H            | 186.00        | 27                  |

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

**2. Margin = Limit – Quasi-Peak**

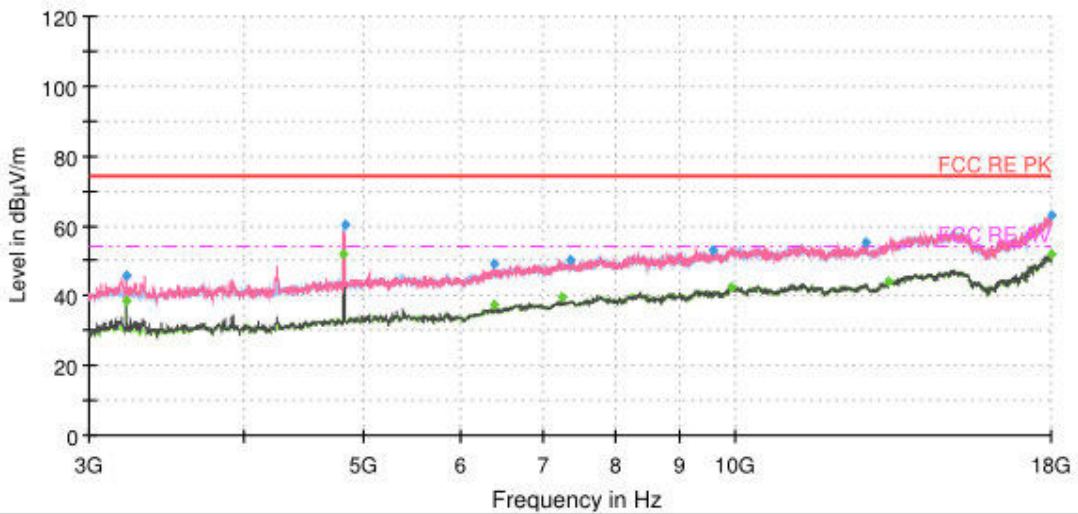


## 802.11b CH1



Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz



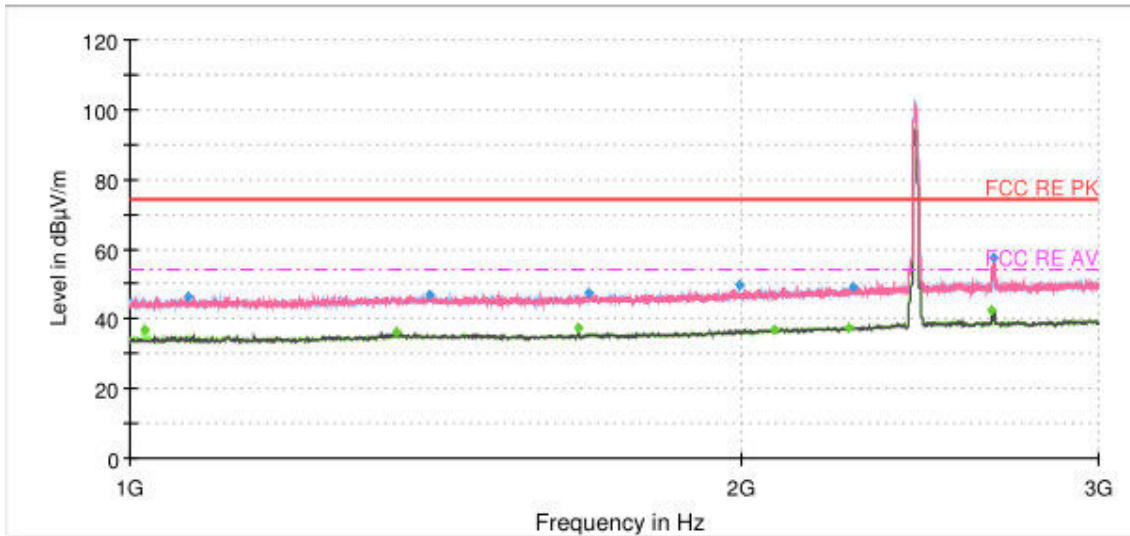
Radiates Emission from 3GHz to 18GHz

| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-------------|-----|---------------|--------------|
| 1067.00         | ---              | 36.12            | 54.00          | 17.88       | 500.00          | 200.0       | V   | 227.00        | -11          |
| 1153.50         | 46.31            | ---              | 74.00          | 27.69       | 500.00          | 100.0       | V   | 319.00        | -11          |
| 1330.25         | ---              | 37.25            | 54.00          | 16.75       | 500.00          | 200.0       | H   | 221.00        | -10          |
| 1330.50         | 47.64            | ---              | 74.00          | 26.36       | 500.00          | 200.0       | H   | 221.00        | -10          |
| 1710.50         | 47.62            | ---              | 74.00          | 26.38       | 500.00          | 100.0       | V   | 354.00        | -9           |
| 1722.00         | ---              | 35.90            | 54.00          | 18.10       | 500.00          | 200.0       | H   | 235.00        | -8           |
| 1998.50         | ---              | 36.98            | 54.00          | 17.02       | 500.00          | 100.0       | V   | 319.00        | -8           |
| 2039.25         | 48.57            | ---              | 74.00          | 25.43       | 500.00          | 100.0       | H   | 169.00        | -8           |
| 2387.50         | 49.89            | ---              | 74.00          | 24.11       | 500.00          | 200.0       | V   | 4.00          | -6           |
| 2387.75         | ---              | 38.51            | 54.00          | 15.49       | 500.00          | 200.0       | H   | 176.00        | -6           |
| 2662.50         | ---              | 40.89            | 54.00          | 13.11       | 500.00          | 200.0       | V   | 0.00          | -5           |
| 2665.75         | 55.19            | ---              | 74.00          | 18.81       | 500.00          | 200.0       | V   | 355.00        | -5           |
| 4822.50         | ---              | 52.18            | 54.00          | 1.82        | 500.00          | 100.0       | H   | 107.00        | -9           |
| 17977.50        | ---              | 51.83            | 54.00          | 2.17        | 500.00          | 200.0       | V   | 27.00         | 11           |

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

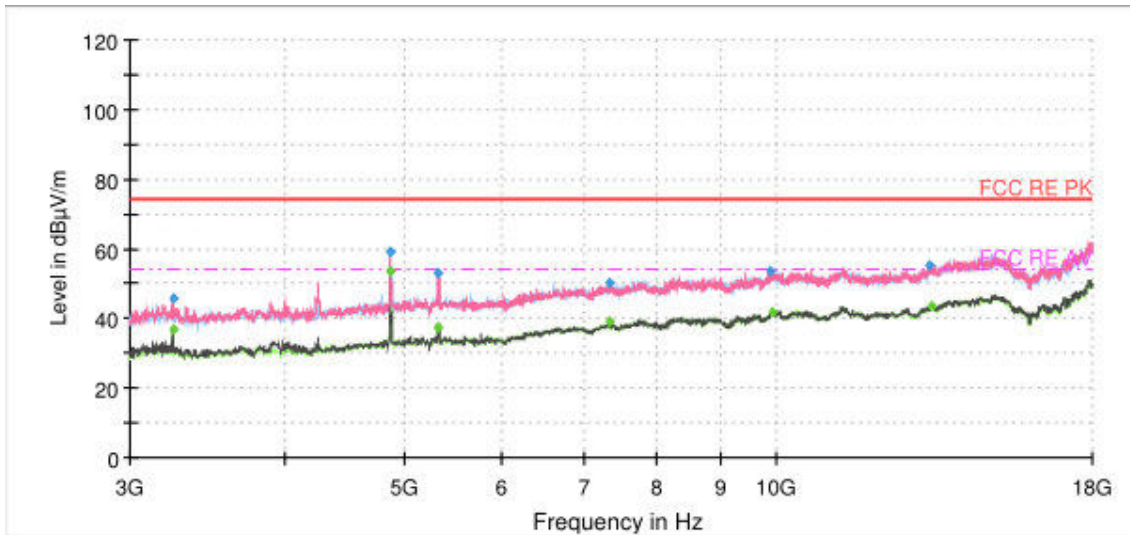
**2. Margin = Limit –MAX Peak/ Average**

802.11b CH6



Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz



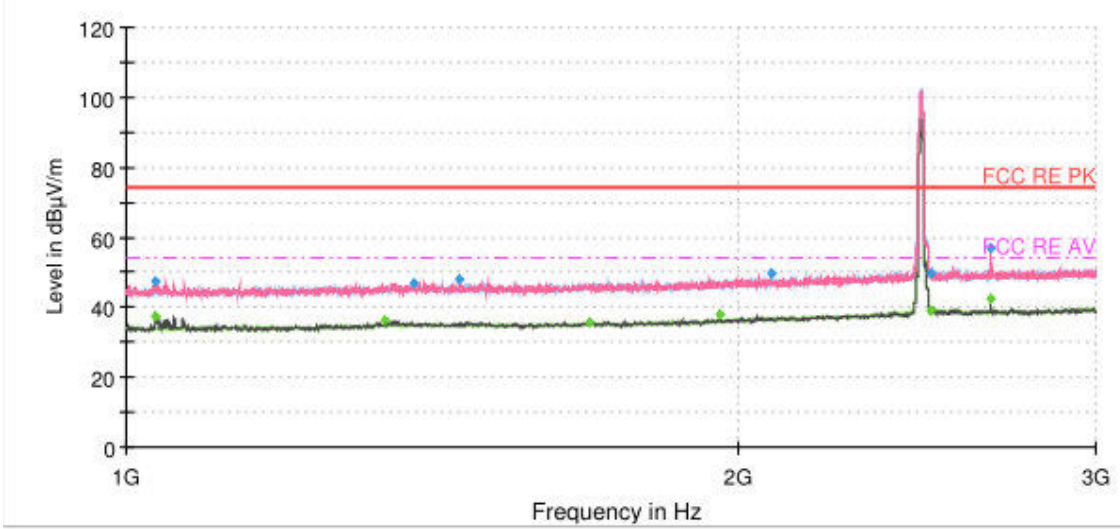
Radiates Emission from 3GHz to 18GHz

| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-------------|-----|---------------|--------------|
| 1017.50         | ---              | 36.73            | 54.00          | 17.27       | 500.00          | 200.0       | H   | 230.00        | -11          |
| 1068.25         | 46.43            | ---              | 74.00          | 27.57       | 500.00          | 200.0       | H   | 185.00        | -11          |
| 1352.25         | ---              | 36.22            | 54.00          | 17.78       | 500.00          | 100.0       | V   | 234.00        | -10          |
| 1405.75         | 47.11            | ---              | 74.00          | 26.89       | 500.00          | 200.0       | H   | 112.00        | -9           |
| 1661.00         | ---              | 37.13            | 54.00          | 16.87       | 500.00          | 200.0       | H   | 230.00        | -9           |
| 1681.25         | 47.42            | ---              | 74.00          | 26.58       | 500.00          | 100.0       | V   | 182.00        | -9           |
| 1997.25         | 49.78            | ---              | 74.00          | 24.22       | 500.00          | 200.0       | H   | 237.00        | -8           |
| 2074.50         | ---              | 37.08            | 54.00          | 16.92       | 500.00          | 200.0       | H   | 153.00        | -7           |
| 2260.50         | ---              | 37.46            | 54.00          | 16.54       | 500.00          | 100.0       | H   | 160.00        | -7           |
| 2268.25         | 48.95            | ---              | 74.00          | 25.05       | 500.00          | 200.0       | H   | 307.00        | -7           |
| 2658.75         | ---              | 42.69            | 54.00          | 11.31       | 500.00          | 200.0       | V   | 92.00         | -5           |
| 2663.00         | 57.71            | ---              | 74.00          | 16.29       | 500.00          | 200.0       | V   | 92.00         | -5           |
| 4873.13         | ---              | 53.42            | 54.00          | 0.58        | 500.00          | 100.0       | H   | 106.00        | -9           |

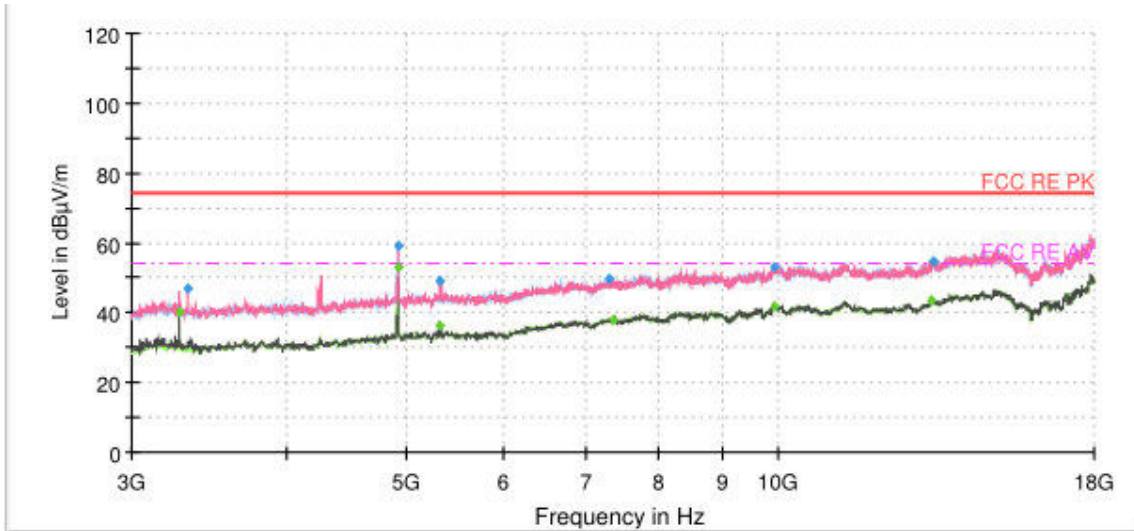
**Remark: 1. Correction Factor = Antenna factor + Insertion loss (cable loss + amplifier gain)**

**2. Margin = Limit –MAX Peak/ Average**

802.11b CH11



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



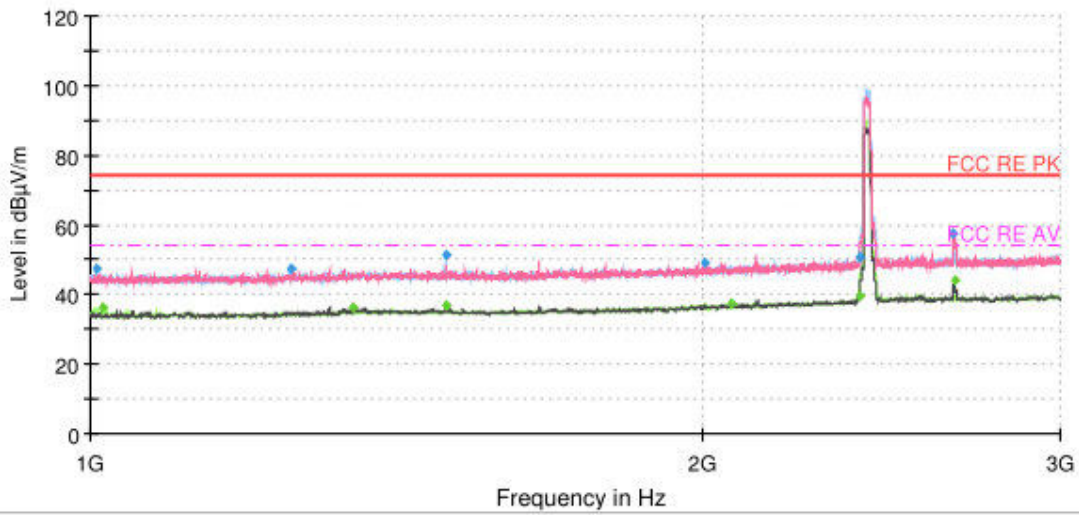
Radiates Emission from 3GHz to 18GHz

| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-------------|-----|---------------|--------------|
| 1032.25         | 47.38            | ---              | 74.00          | 26.62       | 500.00          | 200.0       | V   | 212.00        | -11          |
| 1034.50         | ---              | 37.39            | 54.00          | 16.61       | 500.00          | 200.0       | V   | 212.00        | -11          |
| 1341.75         | ---              | 36.18            | 54.00          | 17.82       | 500.00          | 100.0       | V   | 260.00        | -10          |
| 1383.50         | 47.11            | ---              | 74.00          | 26.89       | 500.00          | 200.0       | H   | 314.00        | -10          |
| 1459.50         | 47.85            | ---              | 74.00          | 26.15       | 500.00          | 100.0       | V   | 335.00        | -9           |
| 1689.00         | ---              | 35.96            | 54.00          | 18.04       | 500.00          | 200.0       | V   | 186.00        | -8           |
| 1959.50         | ---              | 38.20            | 54.00          | 15.80       | 500.00          | 200.0       | V   | 102.00        | -8           |
| 2076.75         | 49.58            | ---              | 74.00          | 24.42       | 500.00          | 100.0       | H   | 15.00         | -7           |
| 2485.50         | ---              | 39.27            | 54.00          | 14.73       | 500.00          | 100.0       | V   | 227.00        | -6           |
| 2485.75         | 49.91            | ---              | 74.00          | 24.09       | 500.00          | 100.0       | H   | 200.00        | -6           |
| 2660.50         | 57.09            | ---              | 74.00          | 16.91       | 500.00          | 200.0       | V   | 89.00         | -5           |
| 2660.75         | ---              | 42.68            | 54.00          | 11.32       | 500.00          | 200.0       | V   | 89.00         | -5           |
| 4923.75         | ---              | 52.93            | 54.00          | 1.07        | 500.00          | 100.0       | H   | 107.00        | -9           |

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

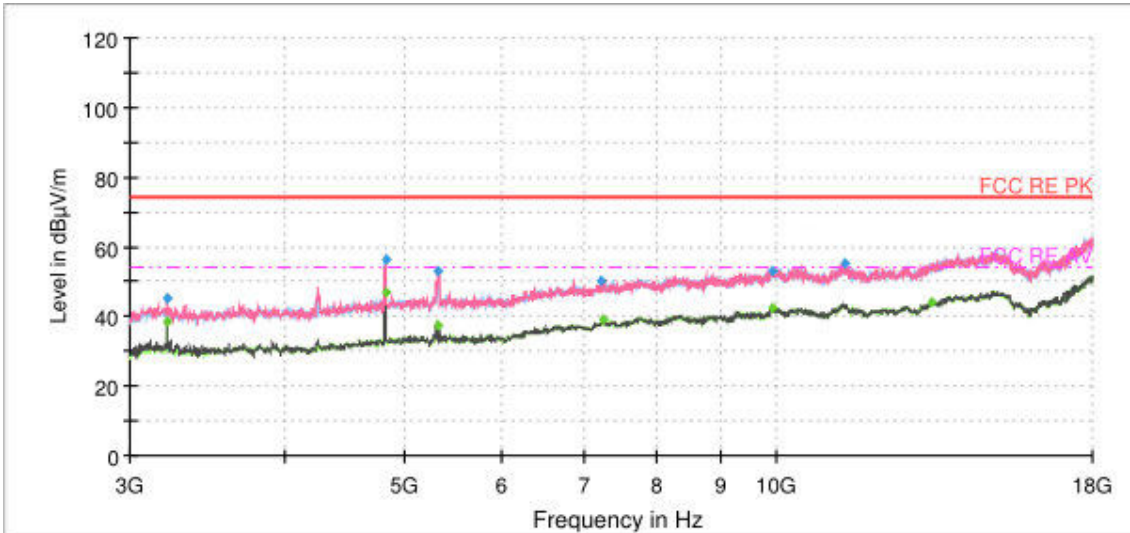
2. Margin = Limit –MAX Peak/ Average

## 802.11g CH1



Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz



Radiates Emission from 3GHz to 18GHz

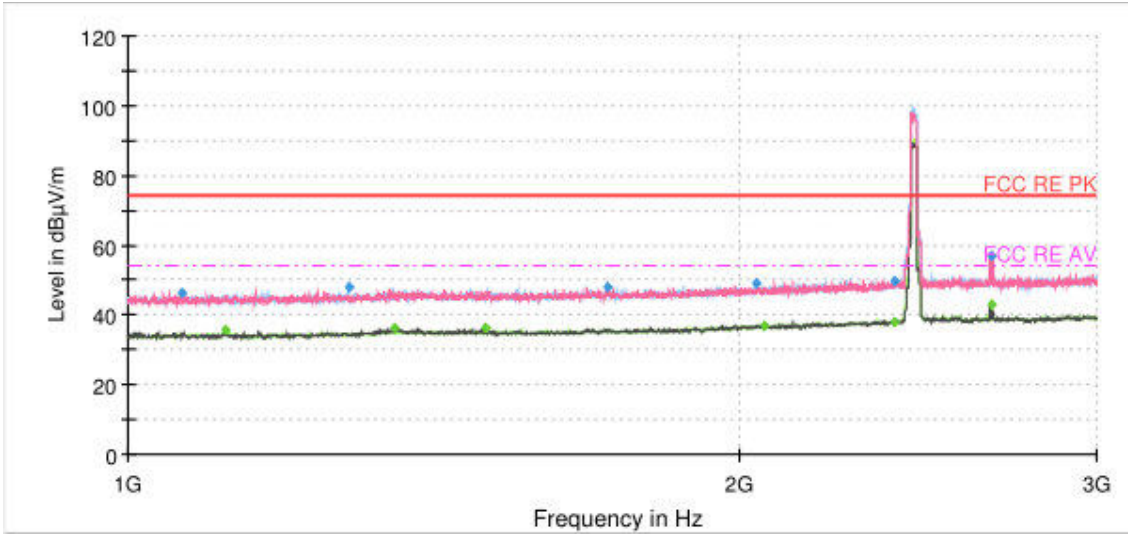


| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-------------|-----|---------------|--------------|
| 1007.00         | 47.29            | ---              | 74.00          | 26.71       | 500.00          | 200.0       | H   | 197.00        | -11          |
| 1014.75         | ---              | 36.54            | 54.00          | 17.46       | 500.00          | 200.0       | H   | 197.00        | -11          |
| 1255.50         | 47.38            | ---              | 74.00          | 26.62       | 500.00          | 200.0       | H   | 147.00        | -10          |
| 1346.00         | ---              | 36.48            | 54.00          | 17.52       | 500.00          | 100.0       | V   | 241.00        | -10          |
| 1494.75         | 51.29            | ---              | 74.00          | 22.71       | 500.00          | 200.0       | H   | 134.00        | -9           |
| 1496.00         | ---              | 36.71            | 54.00          | 17.29       | 500.00          | 200.0       | V   | 96.00         | -9           |
| 2004.25         | 48.85            | ---              | 74.00          | 25.15       | 500.00          | 100.0       | H   | 254.00        | -8           |
| 2069.25         | ---              | 37.31            | 54.00          | 16.69       | 500.00          | 200.0       | V   | 302.00        | -8           |
| 2388.00         | ---              | 39.54            | 54.00          | 14.46       | 500.00          | 200.0       | H   | 352.00        | -6           |
| 2388.50         | 50.52            | ---              | 74.00          | 23.48       | 500.00          | 100.0       | V   | 312.00        | -6           |
| 2657.75         | 57.57            | ---              | 74.00          | 16.43       | 500.00          | 100.0       | V   | 45.00         | -5           |
| 2664.25         | ---              | 43.89            | 54.00          | 10.11       | 500.00          | 200.0       | V   | 242.00        | -5           |

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

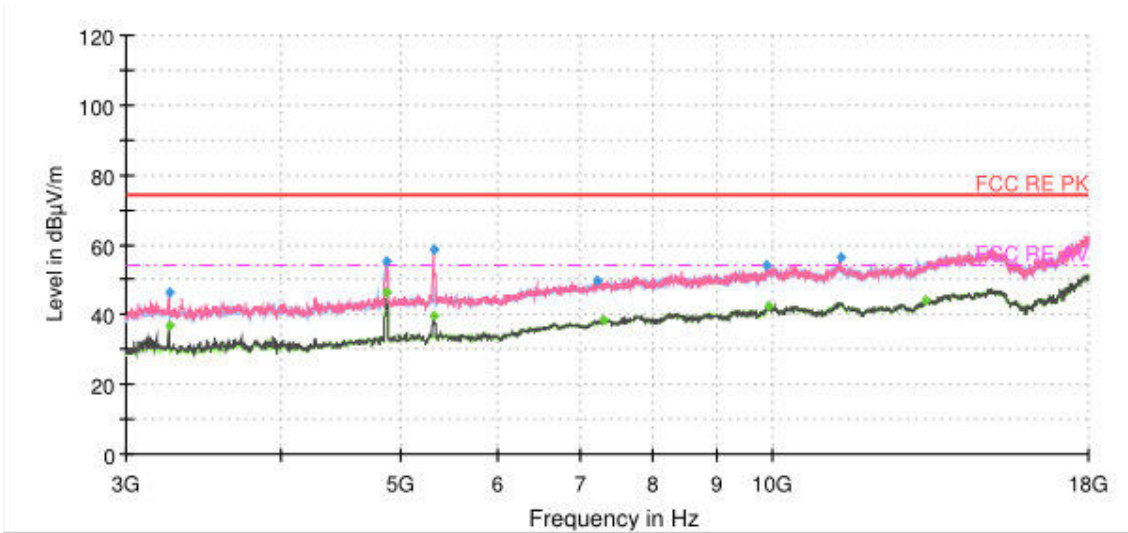
**2. Margin = Limit –MAX Peak/ Average**

802.11g CH6



Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz



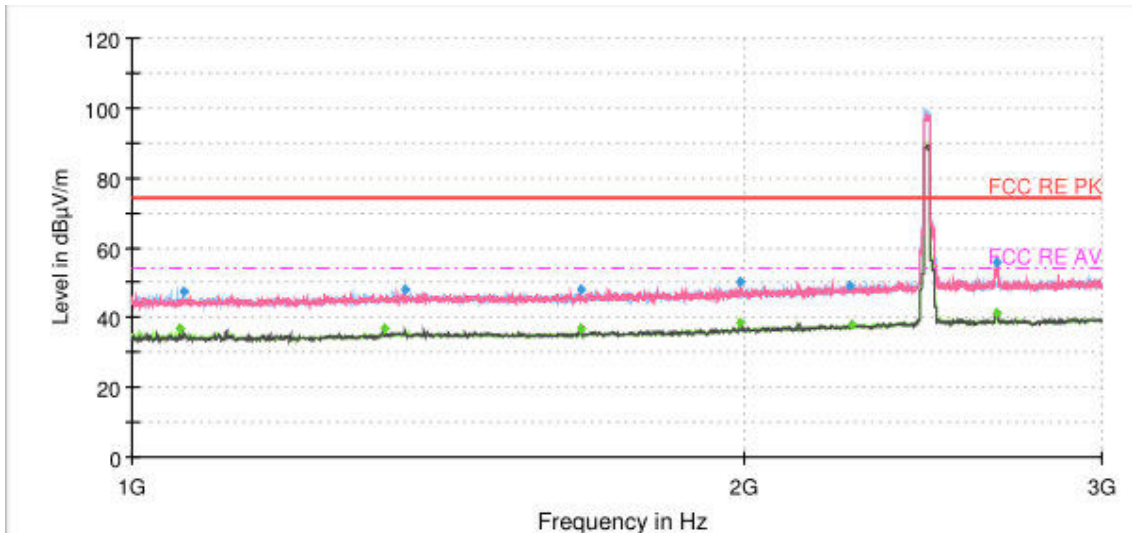
Radiates Emission from 3GHz to 18GHz

| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-------------|-----|---------------|--------------|
| 1062.50         | 46.58            | ---              | 74.00          | 27.42       | 500.00          | 200.0       | V   | 358.00        | -11          |
| 1115.50         | ---              | 35.89            | 54.00          | 18.11       | 500.00          | 200.0       | H   | 278.00        | -11          |
| 1283.50         | 48.16            | ---              | 74.00          | 25.84       | 500.00          | 200.0       | H   | 357.00        | -10          |
| 1352.25         | ---              | 36.51            | 54.00          | 17.49       | 500.00          | 100.0       | V   | 234.00        | -10          |
| 1499.50         | ---              | 36.33            | 54.00          | 17.67       | 500.00          | 200.0       | V   | 137.00        | -9           |
| 1722.25         | 48.11            | ---              | 74.00          | 25.89       | 500.00          | 100.0       | H   | 112.00        | -8           |
| 2037.75         | 49.16            | ---              | 74.00          | 24.84       | 500.00          | 200.0       | H   | 272.00        | -8           |
| 2058.50         | ---              | 37.07            | 54.00          | 16.93       | 500.00          | 100.0       | V   | 266.00        | -8           |
| 2384.75         | 49.79            | ---              | 74.00          | 24.21       | 500.00          | 200.0       | H   | 0.00          | -6           |
| 2384.75         | ---              | 38.03            | 54.00          | 15.97       | 500.00          | 100.0       | H   | 29.00         | -6           |
| 2660.25         | ---              | 43.20            | 54.00          | 10.80       | 500.00          | 200.0       | V   | 92.00         | -5           |
| 2660.25         | 57.20            | ---              | 74.00          | 16.80       | 500.00          | 200.0       | V   | 92.00         | -5           |

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

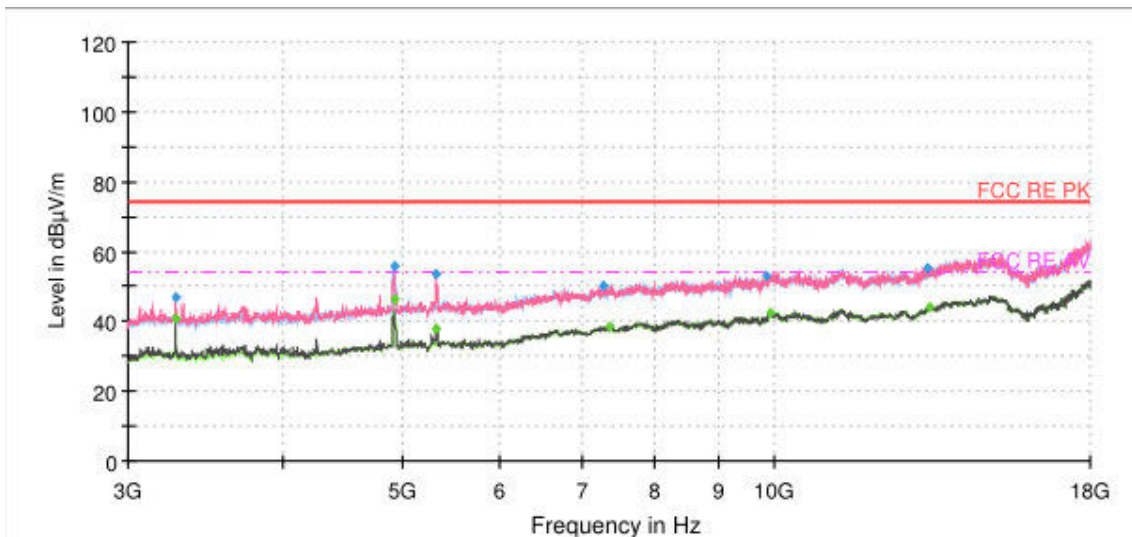
**2. Margin = Limit –MAX Peak/ Average**

802.11g CH11



Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz



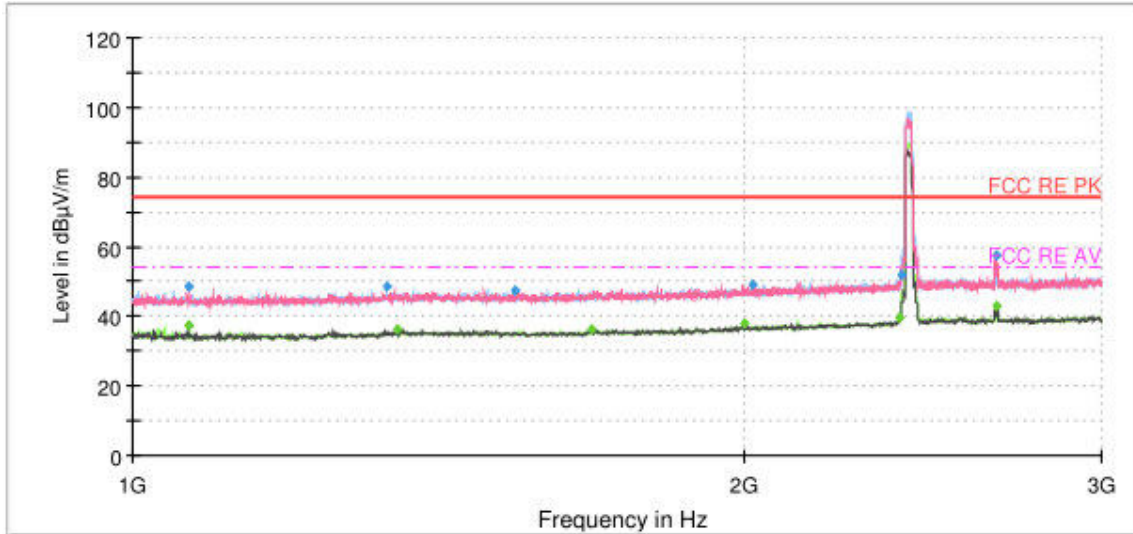
Radiates Emission from 3GHz to 18GHz

| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-------------|-----|---------------|--------------|
| 1056.50         | ---              | 37.05            | 54.00          | 16.95       | 500.00          | 200.0       | H   | 227.00        | -11          |
| 1060.25         | 47.57            | ---              | 74.00          | 26.43       | 500.00          | 200.0       | H   | 227.00        | -11          |
| 1329.25         | ---              | 36.56            | 54.00          | 17.44       | 500.00          | 100.0       | H   | 244.00        | -10          |
| 1363.50         | 47.75            | ---              | 74.00          | 26.25       | 500.00          | 100.0       | V   | 244.00        | -10          |
| 1661.25         | 48.07            | ---              | 74.00          | 25.93       | 500.00          | 200.0       | V   | 235.00        | -9           |
| 1662.00         | ---              | 36.69            | 54.00          | 17.31       | 500.00          | 200.0       | V   | 235.00        | -9           |
| 1992.50         | 50.19            | ---              | 74.00          | 23.81       | 500.00          | 100.0       | V   | 351.00        | -8           |
| 1993.25         | ---              | 38.43            | 54.00          | 15.57       | 500.00          | 100.0       | V   | 351.00        | -8           |
| 2256.75         | 49.28            | ---              | 74.00          | 24.72       | 500.00          | 200.0       | V   | 28.00         | -7           |
| 2260.00         | ---              | 37.70            | 54.00          | 16.30       | 500.00          | 200.0       | H   | 330.00        | -7           |
| 2662.25         | ---              | 41.54            | 54.00          | 12.46       | 500.00          | 100.0       | V   | 251.00        | -5           |
| 2665.25         | 55.96            | ---              | 74.00          | 18.04       | 500.00          | 100.0       | V   | 339.00        | -5           |

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

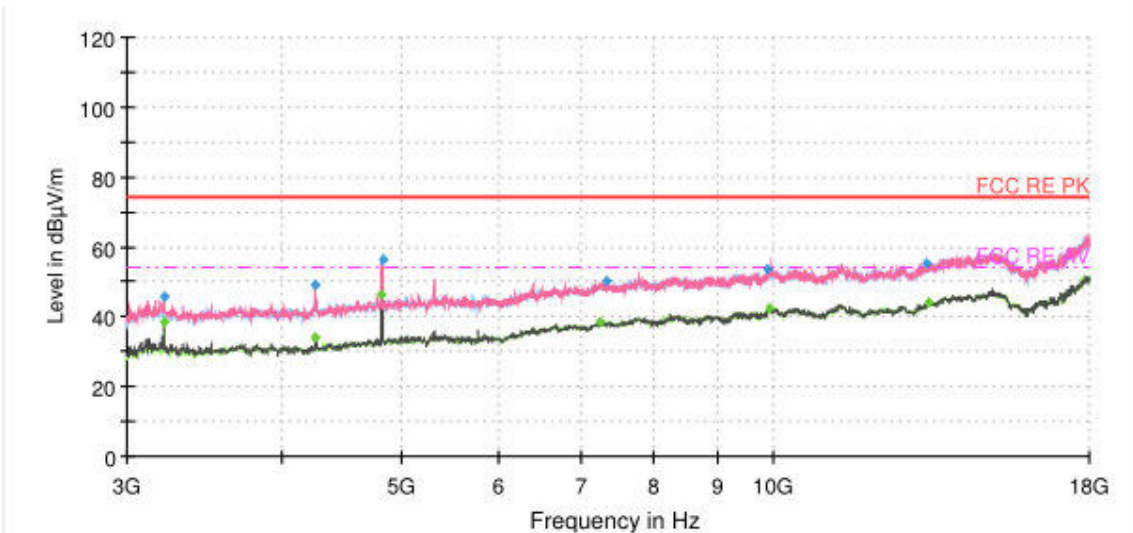
**2. Margin = Limit –MAX Peak/ Average**

802.11n (HT20) CH1



Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz



Radiates Emission from 3GHz to 18GHz

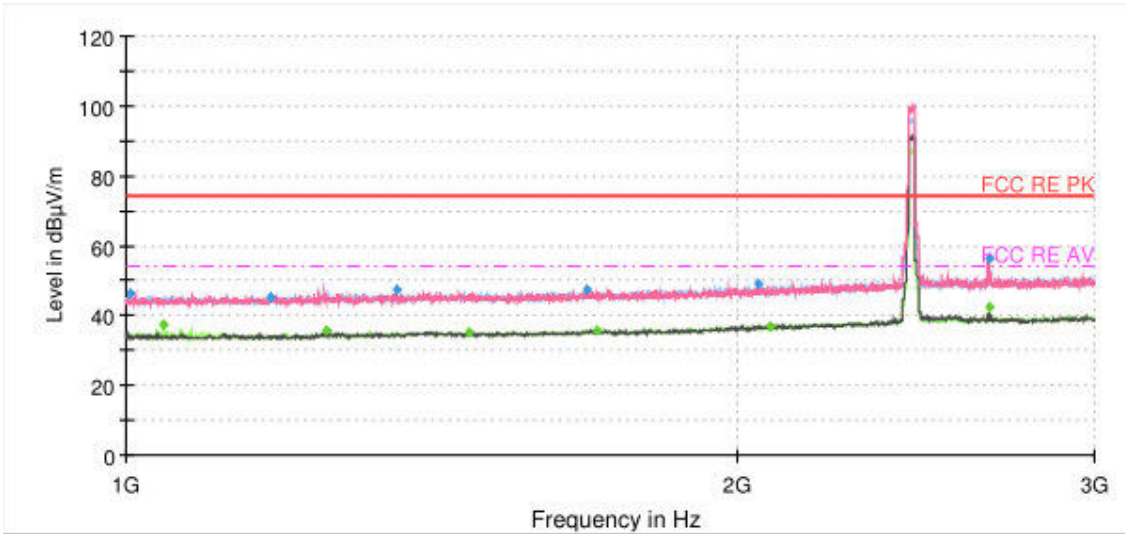
| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-------------|-----|---------------|--------------|
| 1065.25         | ---              | 37.17            | 54.00          | 16.83       | 500.00          | 200.0       | V   | 210.00        | -11          |
| 1065.25         | 48.39            | ---              | 74.00          | 25.61       | 500.00          | 200.0       | V   | 210.00        | -11          |
| 1333.25         | 48.39            | ---              | 74.00          | 25.61       | 500.00          | 200.0       | H   | 321.00        | -10          |
| 1349.25         | ---              | 36.19            | 54.00          | 17.81       | 500.00          | 100.0       | V   | 246.00        | -10          |
| 1542.75         | 47.71            | ---              | 74.00          | 26.29       | 500.00          | 100.0       | H   | 193.00        | -9           |
| 1681.75         | ---              | 36.13            | 54.00          | 17.87       | 500.00          | 100.0       | V   | 176.00        | -9           |
| 1999.25         | ---              | 37.90            | 54.00          | 16.10       | 500.00          | 200.0       | V   | 3.00          | -8           |
| 2019.00         | 48.99            | ---              | 74.00          | 25.01       | 500.00          | 200.0       | V   | 159.00        | -8           |
| 2385.75         | ---              | 39.42            | 54.00          | 14.58       | 500.00          | 200.0       | H   | 0.00          | -6           |
| 2387.50         | 51.64            | ---              | 74.00          | 22.36       | 500.00          | 100.0       | H   | 347.00        | -6           |
| 2662.75         | 57.43            | ---              | 74.00          | 16.57       | 500.00          | 200.0       | V   | 359.00        | -5           |
| 2664.00         | ---              | 42.75            | 54.00          | 11.25       | 500.00          | 200.0       | V   | 359.00        | -5           |

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

**2. Margin = Limit –MAX Peak/ Average**

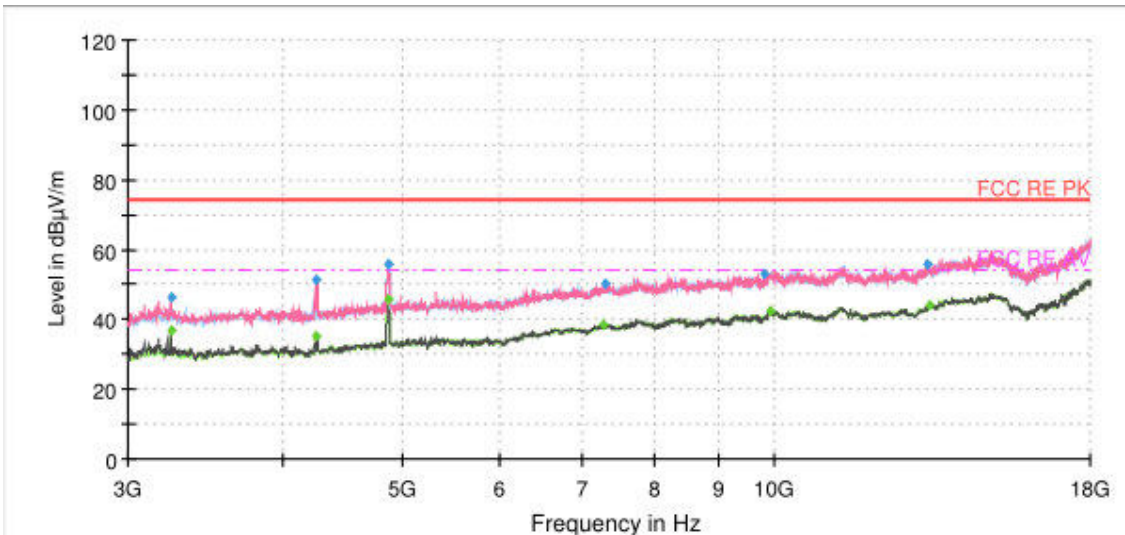


802.11n (HT20) CH6



Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz



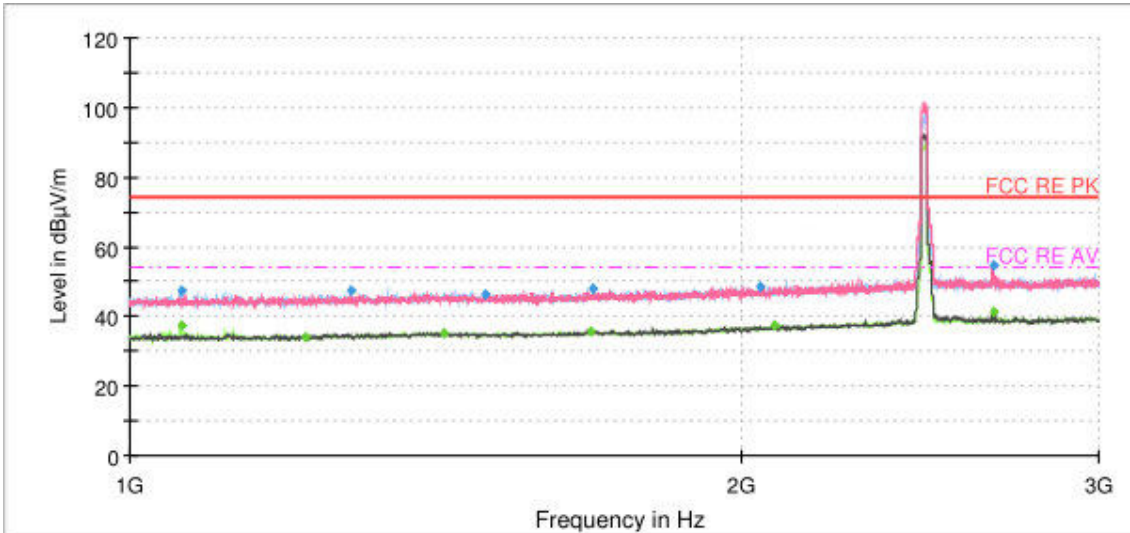
Radiates Emission from 3GHz to 18GHz

| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-------------|-----|---------------|--------------|
| 1005.25         | 46.56            | ---              | 74.00          | 27.44       | 500.00          | 100.0       | H   | 313.00        | -11          |
| 1044.00         | ---              | 37.20            | 54.00          | 16.80       | 500.00          | 100.0       | H   | 261.00        | -11          |
| 1178.50         | 45.05            | ---              | 74.00          | 28.95       | 500.00          | 100.0       | V   | 108.00        | -11          |
| 1256.00         | ---              | 35.88            | 54.00          | 18.12       | 500.00          | 200.0       | H   | 358.00        | -10          |
| 1360.25         | 47.55            | ---              | 74.00          | 26.45       | 500.00          | 100.0       | H   | 56.00         | -10          |
| 1475.25         | ---              | 35.06            | 54.00          | 18.94       | 500.00          | 100.0       | H   | 20.00         | -9           |
| 1686.75         | 47.32            | ---              | 74.00          | 26.68       | 500.00          | 100.0       | V   | 322.00        | -8           |
| 1707.00         | ---              | 35.90            | 54.00          | 18.10       | 500.00          | 200.0       | H   | 0.00          | -9           |
| 2049.00         | 49.25            | ---              | 74.00          | 24.75       | 500.00          | 200.0       | V   | 9.00          | -8           |
| 2077.25         | ---              | 37.10            | 54.00          | 16.90       | 500.00          | 200.0       | H   | 217.00        | -7           |
| 2664.50         | 56.26            | ---              | 74.00          | 17.74       | 500.00          | 100.0       | V   | 6.00          | -5           |
| 2664.75         | ---              | 42.36            | 54.00          | 11.64       | 500.00          | 100.0       | V   | 6.00          | -5           |

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

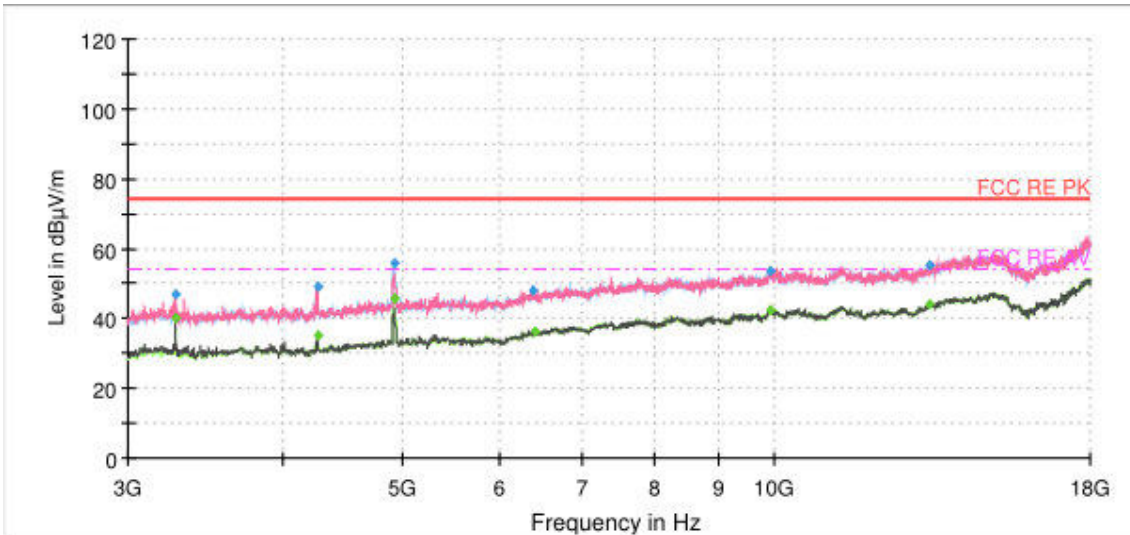
**2. Margin = Limit –MAX Peak/ Average**

802.11n (HT20) CH11



Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz



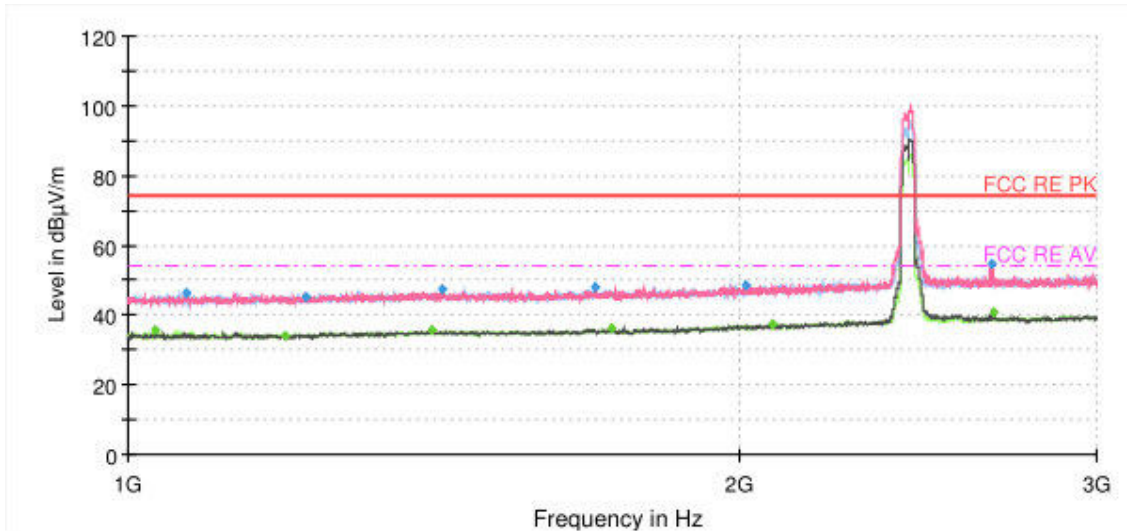
Radiates Emission from 3GHz to 18GHz

| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-------------|-----|---------------|--------------|
| 1059.25         | ---              | 37.45            | 54.00          | 16.55       | 500.00          | 200.0       | H   | 19.00         | -11          |
| 1059.25         | 47.48            | ---              | 74.00          | 26.52       | 500.00          | 200.0       | H   | 19.00         | -11          |
| 1219.00         | ---              | 34.26            | 54.00          | 19.74       | 500.00          | 200.0       | H   | 157.00        | -11          |
| 1284.75         | 47.30            | ---              | 74.00          | 26.70       | 500.00          | 100.0       | V   | 207.00        | -10          |
| 1429.00         | ---              | 35.43            | 54.00          | 18.57       | 500.00          | 100.0       | H   | 104.00        | -9           |
| 1494.50         | 46.12            | ---              | 74.00          | 27.88       | 500.00          | 200.0       | V   | 203.00        | -9           |
| 1687.50         | ---              | 35.90            | 54.00          | 18.10       | 500.00          | 100.0       | V   | 335.00        | -8           |
| 1690.50         | 47.95            | ---              | 74.00          | 26.05       | 500.00          | 200.0       | H   | 241.00        | -8           |
| 2041.00         | 48.60            | ---              | 74.00          | 25.40       | 500.00          | 100.0       | H   | 9.00          | -8           |
| 2074.75         | ---              | 37.29            | 54.00          | 16.71       | 500.00          | 200.0       | H   | 261.00        | -7           |
| 2663.25         | ---              | 41.17            | 54.00          | 12.83       | 500.00          | 200.0       | V   | 22.00         | -5           |
| 2663.75         | 54.83            | ---              | 74.00          | 19.17       | 500.00          | 200.0       | V   | 35.00         | -5           |

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

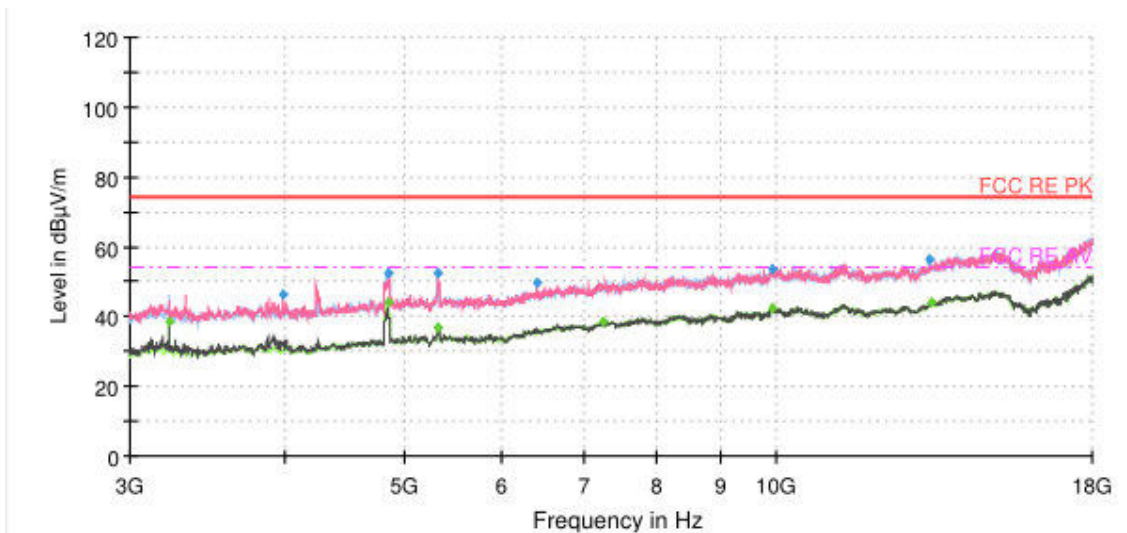
**2. Margin = Limit –MAX Peak/ Average**

802.11n (HT40) CH3



Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz



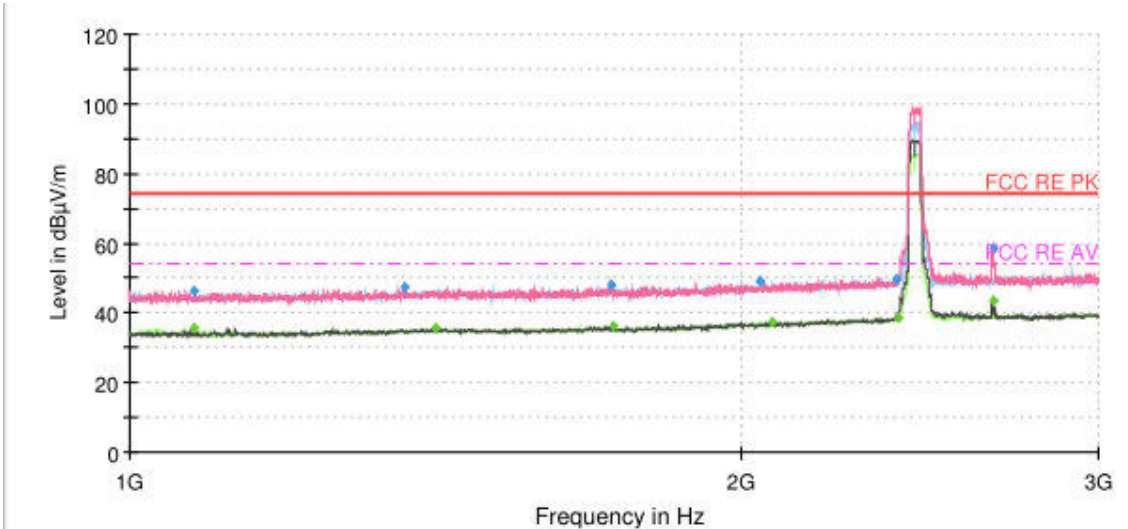
Radiates Emission from 3GHz to 18GHz

| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-------------|-----|---------------|--------------|
| 1030.25         | ---              | 35.66            | 54.00          | 18.34       | 500.00          | 200.0       | H   | 7.00          | -11          |
| 1067.50         | 46.49            | ---              | 74.00          | 27.51       | 500.00          | 100.0       | H   | 323.00        | -11          |
| 1194.75         | ---              | 34.29            | 54.00          | 19.71       | 500.00          | 100.0       | V   | 41.00         | -11          |
| 1222.75         | 45.34            | ---              | 74.00          | 28.66       | 500.00          | 200.0       | H   | 204.00        | -11          |
| 1409.50         | ---              | 35.78            | 54.00          | 18.22       | 500.00          | 200.0       | V   | 337.00        | -9           |
| 1429.00         | 47.28            | ---              | 74.00          | 26.72       | 500.00          | 200.0       | V   | 337.00        | -9           |
| 1697.25         | 48.23            | ---              | 74.00          | 25.77       | 500.00          | 100.0       | V   | 131.00        | -9           |
| 1730.00         | ---              | 36.10            | 54.00          | 17.90       | 500.00          | 200.0       | V   | 313.00        | -9           |
| 2013.50         | 48.82            | ---              | 74.00          | 25.18       | 500.00          | 100.0       | H   | 350.00        | -8           |
| 2076.25         | ---              | 37.15            | 54.00          | 16.85       | 500.00          | 100.0       | V   | 60.00         | -7           |
| 2665.25         | 54.77            | ---              | 74.00          | 19.23       | 500.00          | 200.0       | V   | 137.00        | -5           |
| 2666.50         | ---              | 40.91            | 54.00          | 13.09       | 500.00          | 200.0       | V   | 137.00        | -5           |

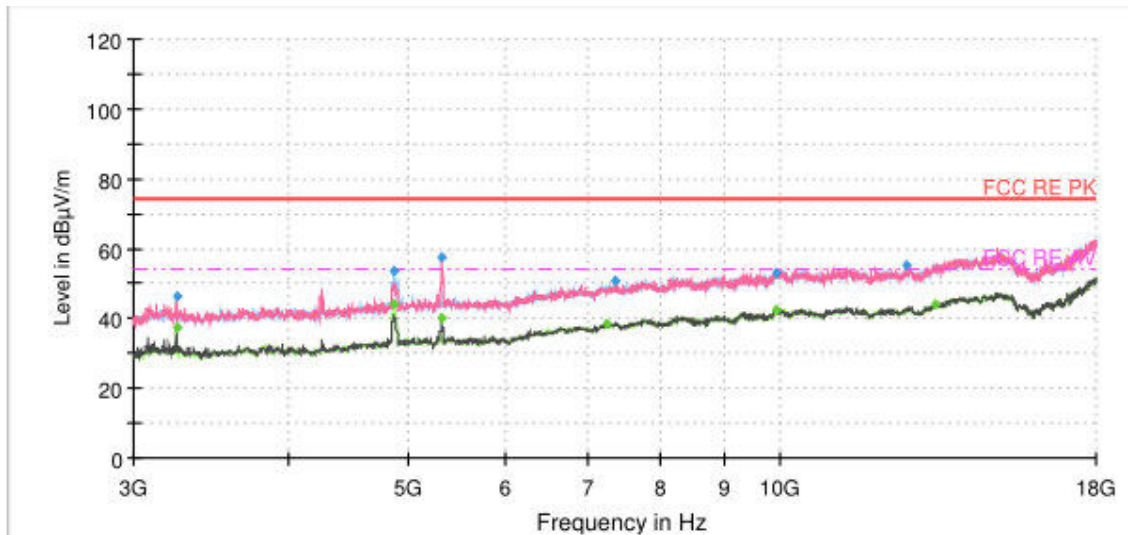
**Remark: 1. Correction Factor = Antenna factor + Insertion loss (cable loss + amplifier gain)**

**2. Margin = Limit –MAX Peak/ Average**

802.11n (HT40) CH6



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



Radiates Emission from 3GHz to 18GHz

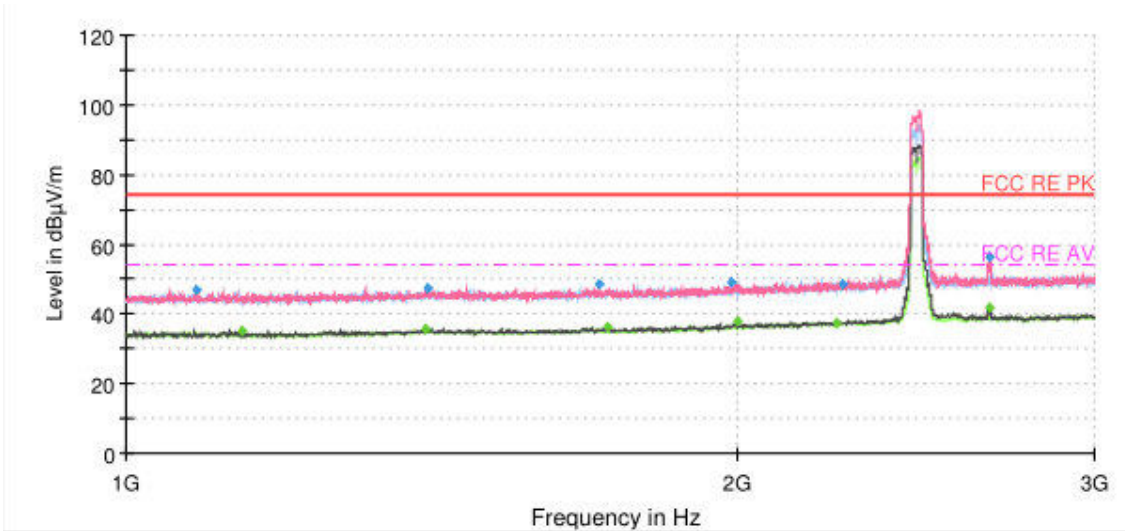


| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-------------|-----|---------------|--------------|
| 1075.75         | ---              | 35.98            | 54.00          | 18.02       | 500.00          | 200.0       | H   | 21.00         | -11          |
| 1075.75         | 46.48            | ---              | 74.00          | 27.52       | 500.00          | 200.0       | H   | 21.00         | -11          |
| 1364.00         | 47.20            | ---              | 74.00          | 26.80       | 500.00          | 200.0       | V   | 209.00        | -10          |
| 1415.50         | ---              | 35.51            | 54.00          | 18.49       | 500.00          | 100.0       | H   | 124.00        | -9           |
| 1727.75         | 47.77            | ---              | 74.00          | 26.23       | 500.00          | 200.0       | V   | 0.00          | -9           |
| 1729.25         | ---              | 36.12            | 54.00          | 17.88       | 500.00          | 200.0       | V   | 325.00        | -9           |
| 2041.75         | 49.14            | ---              | 74.00          | 24.86       | 500.00          | 200.0       | H   | 261.00        | -8           |
| 2074.25         | ---              | 37.35            | 54.00          | 16.65       | 500.00          | 100.0       | H   | 332.00        | -7           |
| 2387.25         | 49.95            | ---              | 74.00          | 24.05       | 500.00          | 100.0       | V   | 42.00         | -6           |
| 2388.25         | ---              | 38.70            | 54.00          | 15.30       | 500.00          | 200.0       | V   | 118.00        | -6           |
| 2659.50         | 58.44            | ---              | 74.00          | 15.56       | 500.00          | 200.0       | V   | 5.00          | -5           |
| 2664.50         | ---              | 43.42            | 54.00          | 10.58       | 500.00          | 200.0       | V   | 5.00          | -5           |

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

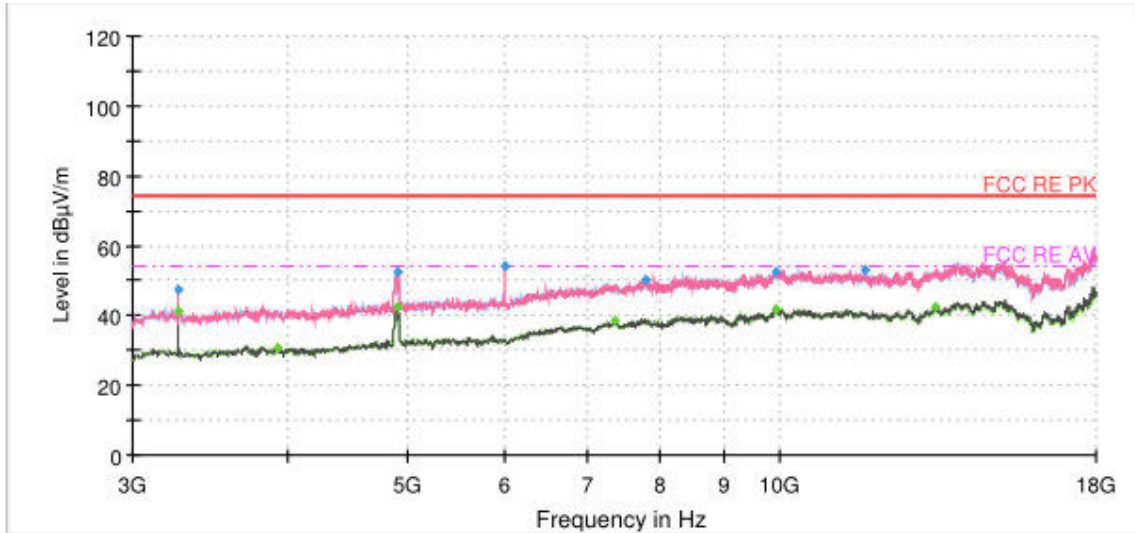
**2. Margin = Limit –MAX Peak/ Average**

802.11n (HT40) CH9



Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz



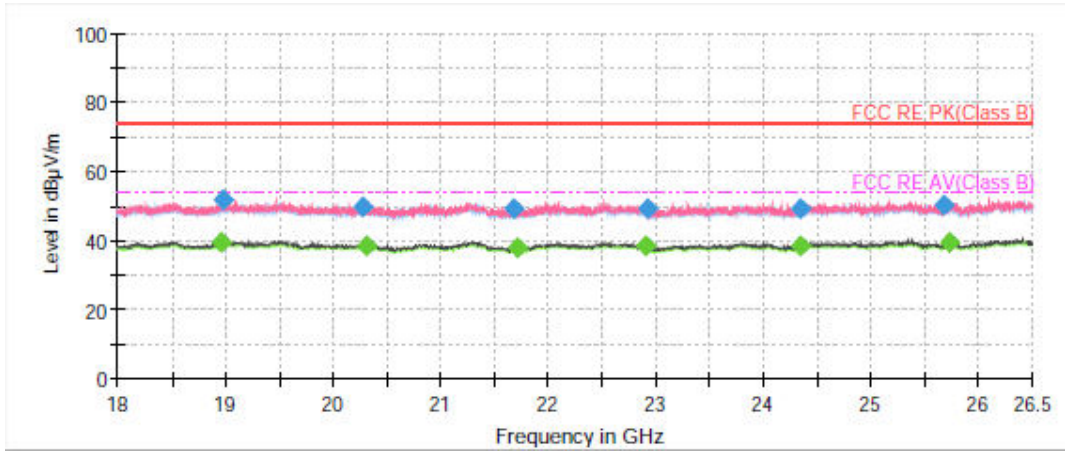
Radiates Emission from 3GHz to 18GHz

| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-------------|-----|---------------|--------------|
| 1082.75         | 46.63            | ---              | 74.00          | 27.37       | 500.00          | 100.0       | V   | 4.00          | -11          |
| 1140.00         | ---              | 35.42            | 54.00          | 18.58       | 500.00          | 100.0       | V   | 4.00          | -11          |
| 1404.50         | ---              | 35.63            | 54.00          | 18.37       | 500.00          | 100.0       | H   | 347.00        | -9           |
| 1409.25         | 47.38            | ---              | 74.00          | 26.62       | 500.00          | 100.0       | V   | 92.00         | -9           |
| 1709.25         | 48.43            | ---              | 74.00          | 25.57       | 500.00          | 200.0       | V   | 358.00        | -9           |
| 1726.00         | ---              | 36.09            | 54.00          | 17.91       | 500.00          | 200.0       | H   | 9.00          | -9           |
| 1988.00         | 49.33            | ---              | 74.00          | 24.67       | 500.00          | 200.0       | H   | 48.00         | -8           |
| 1998.25         | ---              | 38.14            | 54.00          | 15.86       | 500.00          | 200.0       | V   | 0.00          | -8           |
| 2239.25         | ---              | 37.44            | 54.00          | 16.56       | 500.00          | 200.0       | V   | 329.00        | -7           |
| 2255.75         | 48.45            | ---              | 74.00          | 25.55       | 500.00          | 100.0       | H   | 214.00        | -7           |
| 2663.75         | 56.47            | ---              | 74.00          | 17.53       | 500.00          | 100.0       | V   | 42.00         | -5           |
| 2665.00         | ---              | 42.12            | 54.00          | 11.88       | 500.00          | 100.0       | V   | 42.00         | -5           |

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

2. Margin = Limit –MAX Peak/ Average

During the test, the Radiates Emission from 18GHz to 26.5GHz was performed in all modes with all channels, 802.11b CH6 are selected as the worst condition. The test data of the worst-case condition was recorded in this report.



Radiates Emission from 18GHz to 26.5GHz

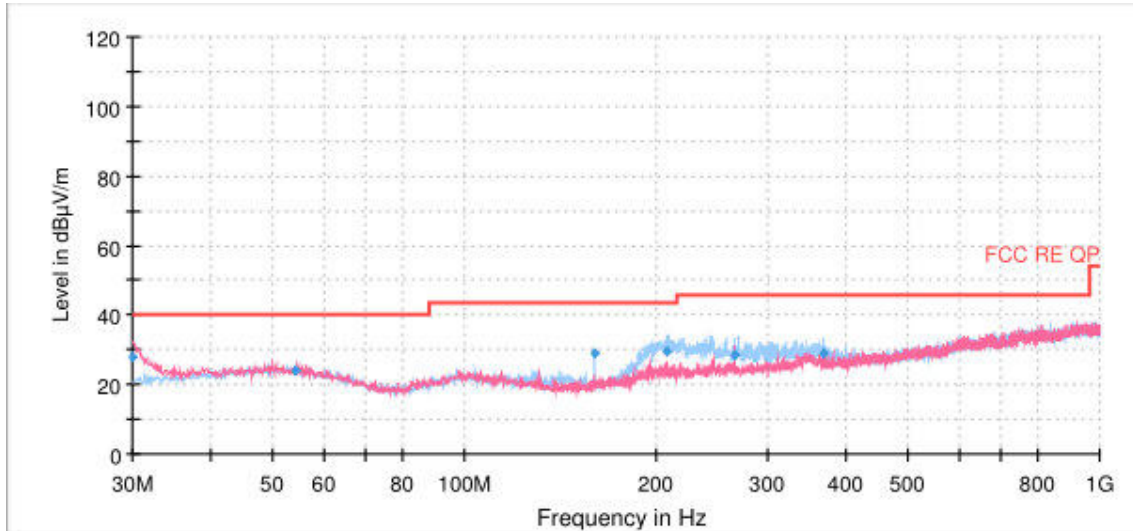
| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-------------|-----|---------------|--------------|
| 18956.250000    | ---              | 39.30            | 54.00          | 14.70       | 500.0           | 200.0       | V   | 132.0         | -3.1         |
| 18973.250000    | 51.84            | ---              | 74.00          | 22.16       | 500.0           | 200.0       | V   | 8.0           | -3.0         |
| 20285.437500    | 49.71            | ---              | 74.00          | 24.29       | 500.0           | 200.0       | H   | 243.0         | -3.1         |
| 20321.562500    | ---              | 38.25            | 54.00          | 15.75       | 500.0           | 200.0       | V   | 29.0          | -3.0         |
| 21677.312500    | 48.98            | ---              | 74.00          | 25.02       | 500.0           | 200.0       | V   | 197.0         | -2.5         |
| 21707.062500    | ---              | 37.79            | 54.00          | 16.21       | 500.0           | 200.0       | V   | 38.0          | -2.5         |
| 22913.000000    | ---              | 38.27            | 54.00          | 15.73       | 500.0           | 200.0       | V   | 0.0           | -1.7         |
| 22933.187500    | 49.19            | ---              | 74.00          | 24.81       | 500.0           | 200.0       | V   | 284.0         | -1.8         |
| 24337.812500    | ---              | 38.21            | 54.00          | 15.79       | 500.0           | 200.0       | V   | 49.0          | -1.5         |
| 24342.062500    | 49.14            | ---              | 74.00          | 24.86       | 500.0           | 200.0       | V   | 150.0         | -1.5         |
| 25682.937500    | 50.39            | ---              | 74.00          | 23.61       | 500.0           | 200.0       | V   | 191.0         | -0.7         |
| 25728.625000    | ---              | 39.25            | 54.00          | 14.75       | 500.0           | 200.0       | V   | 191.0         | -0.7         |

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

2. Margin = Limit –MAX Peak/ Average

## Bluetooth LE

During the test, the Radiates Emission from 30MHz to 1GHz was performed in all modes with all channels, Bluetooth LE-Channel 19 are selected as the worst condition. The test data of the worst-case condition was recorded in this report.



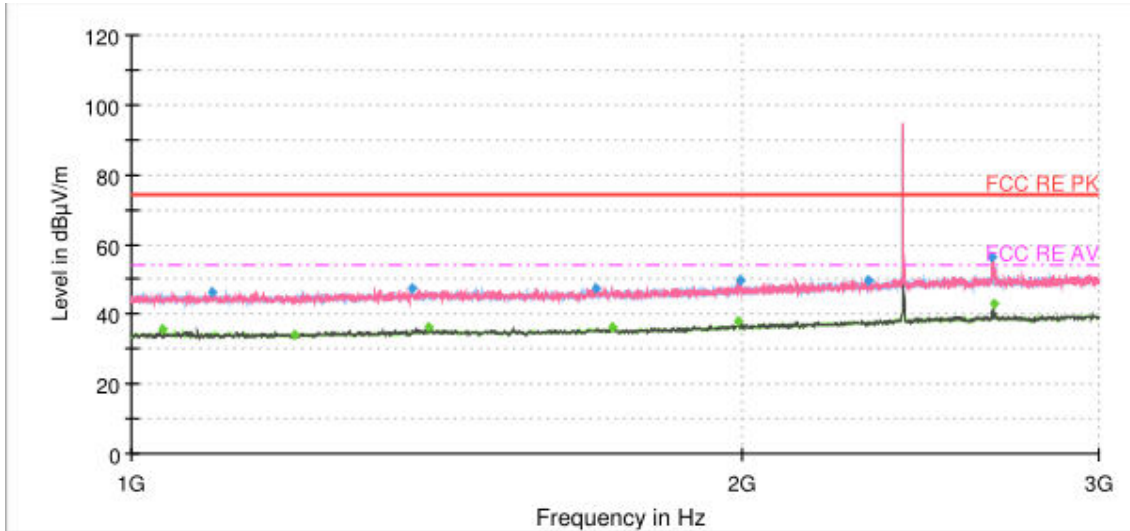
Radiates Emission from 30MHz to 1GHz

| Frequency (MHz) | Quasi-Peak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) |
|-----------------|---------------------|----------------|-------------|-------------|--------------|---------------|---------------------|
| 30.00           | 27.67               | 40.00          | 12.33       | 100.0       | V            | 242.00        | 17                  |
| 54.18           | 23.94               | 40.00          | 16.06       | 181.0       | V            | 324.00        | 20                  |
| 159.98          | 29.14               | 43.50          | 14.36       | 205.0       | H            | 182.00        | 16                  |
| 208.61          | 29.47               | 43.50          | 14.03       | 175.0       | H            | 0.00          | 18                  |
| 266.24          | 28.68               | 46.00          | 17.32       | 111.0       | H            | 33.00         | 20                  |
| 367.24          | 28.89               | 46.00          | 17.11       | 100.0       | H            | 327.00        | 23                  |

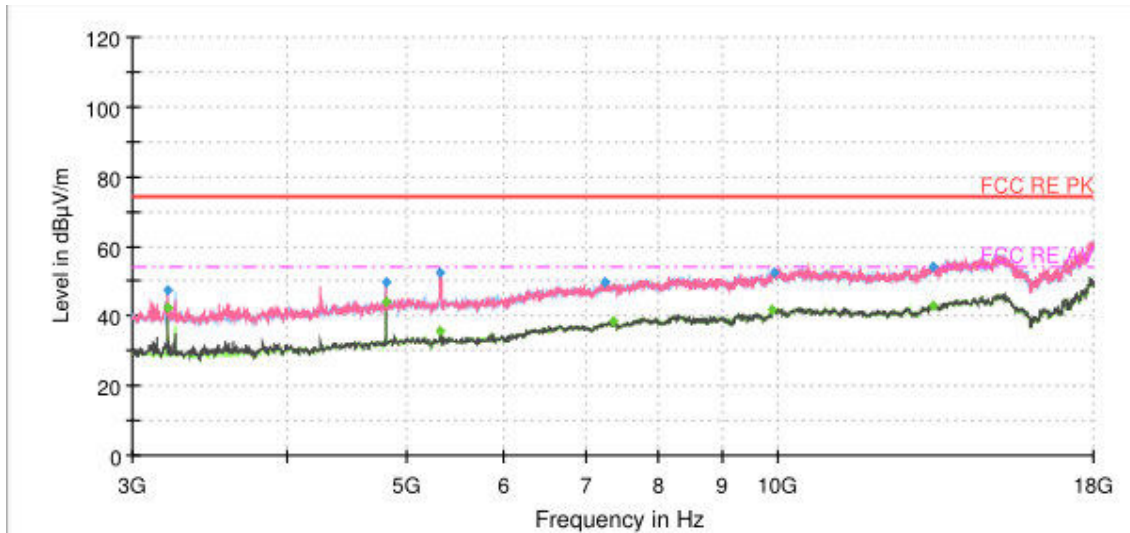
**Remark: 1. Correction Factor = Antenna factor + Insertion loss (cable loss + amplifier gain)**

**2. Margin = Limit – Quasi-Peak**

Bluetooth LE-Channel 0



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



Radiates Emission from 3GHz to 18GHz

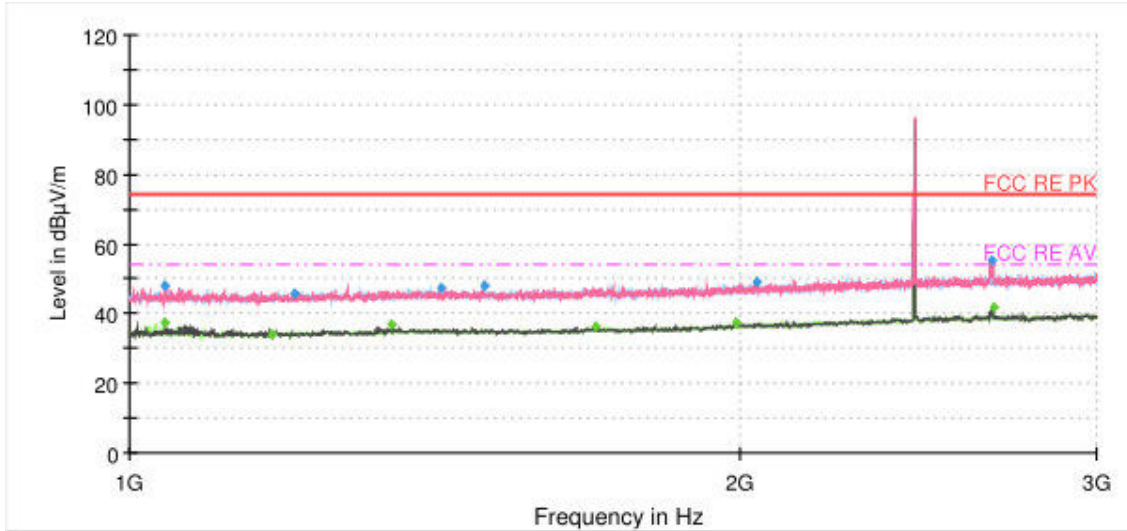
| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-------------|-----|---------------|--------------|
| 1036.25         | ---              | 35.68            | 54.00          | 18.32       | 500.00          | 200.0       | H   | 290.00        | -11          |
| 1096.75         | 46.44            | ---              | 74.00          | 27.56       | 500.00          | 200.0       | H   | 290.00        | -11          |
| 1204.00         | ---              | 33.84            | 54.00          | 20.16       | 500.00          | 100.0       | H   | 7.00          | -11          |
| 1375.75         | 47.17            | ---              | 74.00          | 26.83       | 500.00          | 200.0       | V   | 108.00        | -10          |
| 1400.00         | ---              | 36.06            | 54.00          | 17.94       | 500.00          | 200.0       | V   | 1.00          | -9           |
| 1695.75         | 47.71            | ---              | 74.00          | 26.29       | 500.00          | 200.0       | H   | 109.00        | -9           |
| 1724.50         | ---              | 36.09            | 54.00          | 17.91       | 500.00          | 200.0       | V   | 277.00        | -8           |
| 1992.25         | ---              | 38.22            | 54.00          | 15.78       | 500.00          | 100.0       | V   | 305.00        | -8           |
| 1993.75         | 49.76            | ---              | 74.00          | 24.24       | 500.00          | 100.0       | V   | 353.00        | -8           |
| 2309.00         | 49.51            | ---              | 74.00          | 24.49       | 500.00          | 200.0       | H   | 252.00        | -7           |
| 2657.25         | 56.46            | ---              | 74.00          | 17.54       | 500.00          | 100.0       | V   | 0.00          | -5           |
| 2664.00         | ---              | 42.70            | 54.00          | 11.30       | 500.00          | 100.0       | V   | 0.00          | -5           |

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

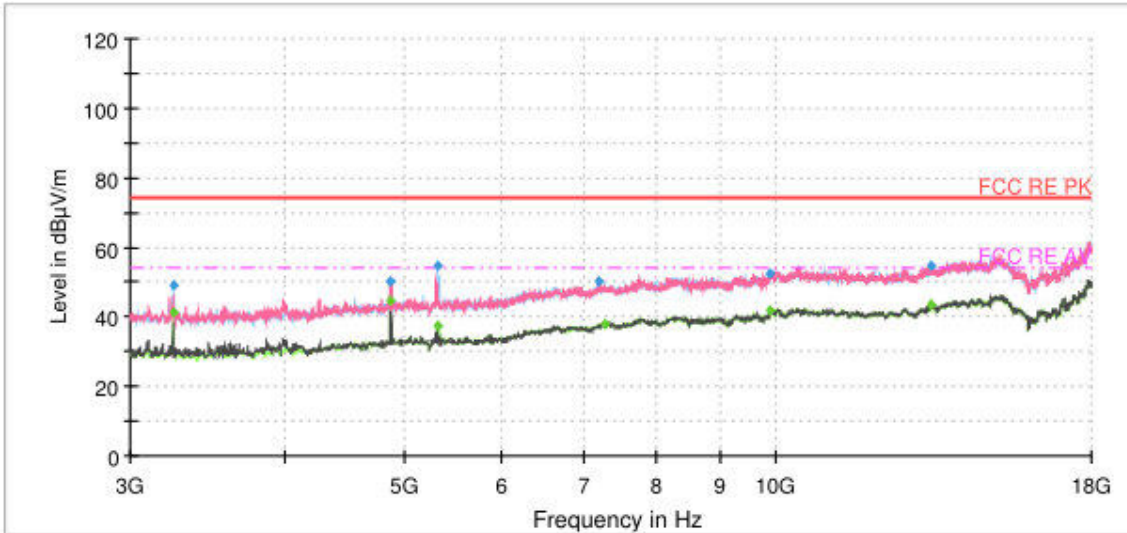
**2. Margin = Limit –MAX Peak/ Average**



Bluetooth LE-Channel 19



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



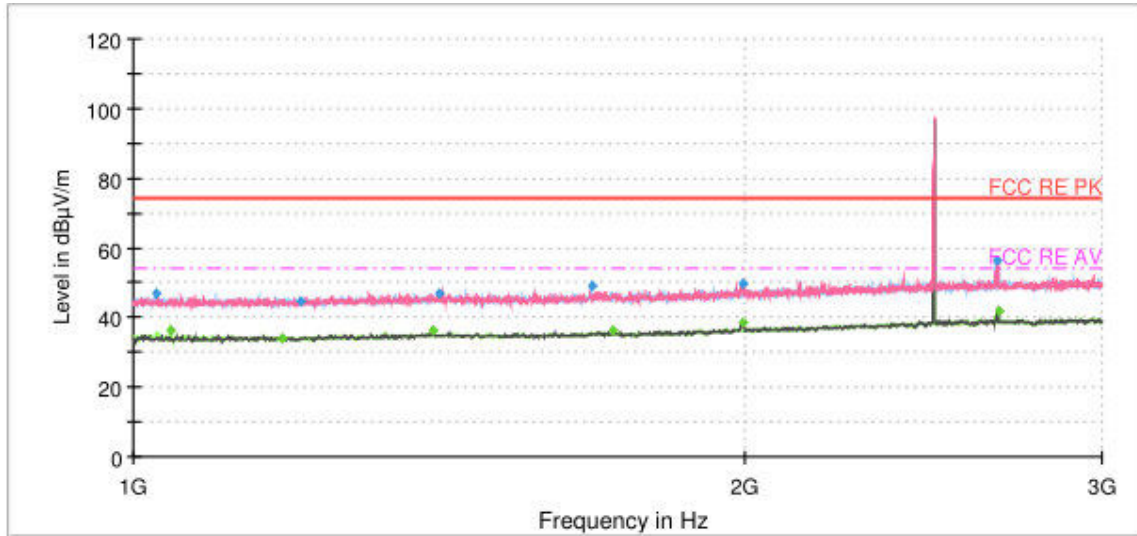
Radiates Emission from 3GHz to 18GHz

| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-------------|-----|---------------|--------------|
| 1040.25         | ---              | 37.67            | 54.00          | 16.33       | 500.00          | 100.0       | V   | 222.00        | -11          |
| 1040.25         | 48.14            | ---              | 74.00          | 25.86       | 500.00          | 100.0       | V   | 222.00        | -11          |
| 1174.75         | ---              | 34.09            | 54.00          | 19.91       | 500.00          | 200.0       | H   | 303.00        | -11          |
| 1207.25         | 45.90            | ---              | 74.00          | 28.10       | 500.00          | 100.0       | H   | 5.00          | -11          |
| 1347.50         | ---              | 36.90            | 54.00          | 17.10       | 500.00          | 100.0       | V   | 357.00        | -10          |
| 1425.50         | 47.33            | ---              | 74.00          | 26.67       | 500.00          | 200.0       | V   | 48.00         | -9           |
| 1496.50         | 47.75            | ---              | 74.00          | 26.25       | 500.00          | 200.0       | H   | 245.00        | -9           |
| 1698.00         | ---              | 36.08            | 54.00          | 17.92       | 500.00          | 100.0       | H   | 205.00        | -9           |
| 1991.00         | ---              | 37.30            | 54.00          | 16.70       | 500.00          | 100.0       | H   | 0.00          | -8           |
| 2038.75         | 49.13            | ---              | 74.00          | 24.87       | 500.00          | 200.0       | H   | 0.00          | -8           |
| 2664.00         | 55.48            | ---              | 74.00          | 18.52       | 500.00          | 200.0       | V   | 2.00          | -5           |
| 2665.50         | ---              | 41.70            | 54.00          | 12.30       | 500.00          | 100.0       | V   | 0.00          | -5           |
| 4878.75         | ---              | 44.44            | 54.00          | 9.56        | 500.00          | 200.0       | V   | 270.00        | -9           |

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

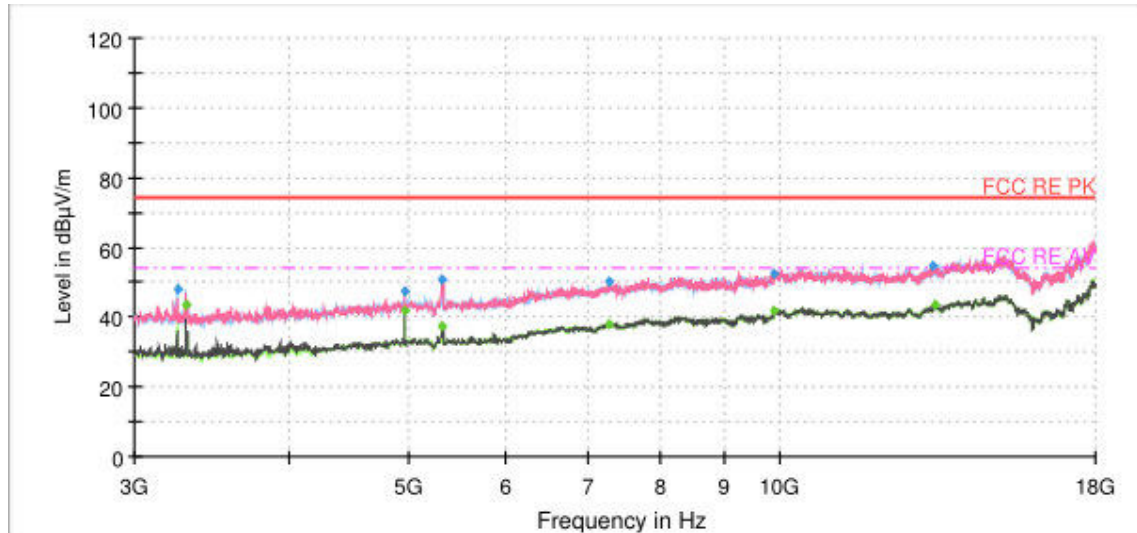
2. Margin = Limit –MAX Peak/ Average

Bluetooth LE-Channel 39



Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz



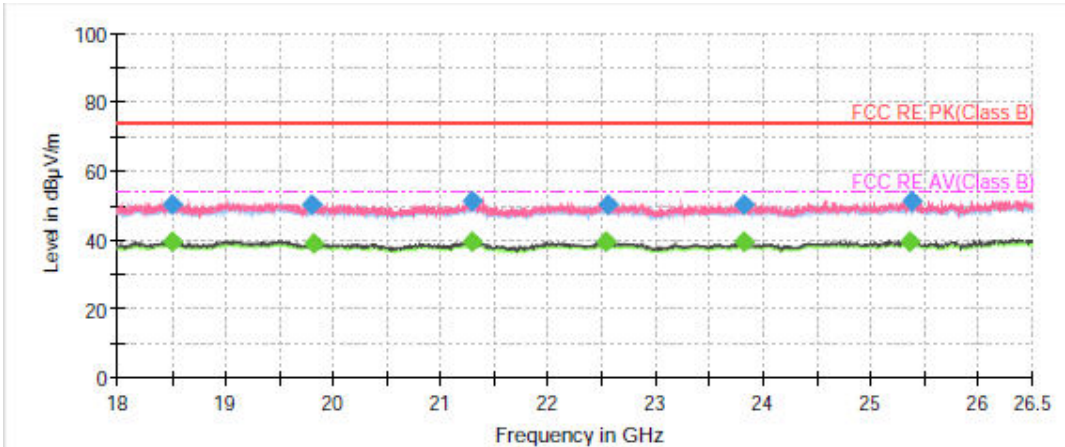
Radiates Emission from 3GHz to 18GHz

| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-------------|-----|---------------|--------------|
| 1027.25         | 47.00            | ---              | 74.00          | 27.00       | 500.00          | 100.0       | H   | 290.00        | -11          |
| 1044.25         | ---              | 36.03            | 54.00          | 17.97       | 500.00          | 100.0       | H   | 297.00        | -11          |
| 1184.75         | ---              | 34.12            | 54.00          | 19.88       | 500.00          | 200.0       | H   | 322.00        | -11          |
| 1208.25         | 44.82            | ---              | 74.00          | 29.18       | 500.00          | 100.0       | V   | 279.00        | -11          |
| 1404.00         | ---              | 36.01            | 54.00          | 17.99       | 500.00          | 100.0       | V   | 241.00        | -9           |
| 1414.25         | 47.10            | ---              | 74.00          | 26.90       | 500.00          | 200.0       | V   | 44.00         | -9           |
| 1680.75         | 48.86            | ---              | 74.00          | 25.14       | 500.00          | 100.0       | H   | 109.00        | -9           |
| 1723.25         | ---              | 36.06            | 54.00          | 17.94       | 500.00          | 100.0       | V   | 0.00          | -8           |
| 1994.25         | ---              | 38.38            | 54.00          | 15.62       | 500.00          | 100.0       | V   | 305.00        | -8           |
| 1996.00         | 49.94            | ---              | 74.00          | 24.06       | 500.00          | 100.0       | V   | 305.00        | -8           |
| 2660.00         | 56.29            | ---              | 74.00          | 17.71       | 500.00          | 200.0       | V   | 0.00          | -5           |
| 2666.00         | ---              | 41.61            | 54.00          | 12.39       | 500.00          | 100.0       | V   | 0.00          | -5           |

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

**2. Margin = Limit –MAX Peak/ Average**

During the test, the Radiates Emission from 18GHz to 26.5GHz was performed in all modes with all channels, Bluetooth LE-Channel 19 are selected as the worst condition. The test data of the worst-case condition was recorded in this report.



Radiates Emission from 18GHz to 26.5GHz

| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-------------|-----|---------------|--------------|
| 18505.750000    | 50.51            | ---              | 74.00          | 23.49       | 500.0           | 200.0       | V   | 356.0         | -3.0         |
| 18507.875000    | ---              | 39.38            | 54.00          | 14.62       | 500.0           | 200.0       | V   | 198.0         | -3.0         |
| 19812.625000    | 50.33            | ---              | 74.00          | 23.67       | 500.0           | 200.0       | H   | 320.0         | -3.2         |
| 19828.562500    | ---              | 38.92            | 54.00          | 15.08       | 500.0           | 200.0       | V   | 65.0          | -3.2         |
| 21288.437500    | 51.35            | ---              | 74.00          | 22.65       | 500.0           | 200.0       | V   | 127.0         | -1.9         |
| 21303.312500    | ---              | 39.37            | 54.00          | 14.63       | 500.0           | 200.0       | V   | 188.0         | -1.8         |
| 22534.750000    | ---              | 39.24            | 54.00          | 14.76       | 500.0           | 200.0       | V   | 235.0         | -1.8         |
| 22554.937500    | 50.19            | ---              | 74.00          | 23.81       | 500.0           | 200.0       | V   | 111.0         | -1.8         |
| 23815.062500    | 50.39            | ---              | 74.00          | 23.61       | 500.0           | 200.0       | V   | 163.0         | -1.0         |
| 23823.562500    | ---              | 39.32            | 54.00          | 14.68       | 500.0           | 200.0       | V   | 34.0          | -1.0         |
| 25366.312500    | ---              | 39.55            | 54.00          | 14.45       | 500.0           | 200.0       | V   | 65.0          | -0.2         |
| 25383.312500    | 51.09            | ---              | 74.00          | 22.91       | 500.0           | 200.0       | V   | 308.0         | -0.3         |

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

2. Margin = Limit –MAX Peak/ Average

## 5.7. Conducted Emission

### Ambient Condition

| Temperature | Relative humidity |
|-------------|-------------------|
| 15°C ~ 35°C | 20% ~ 80%         |

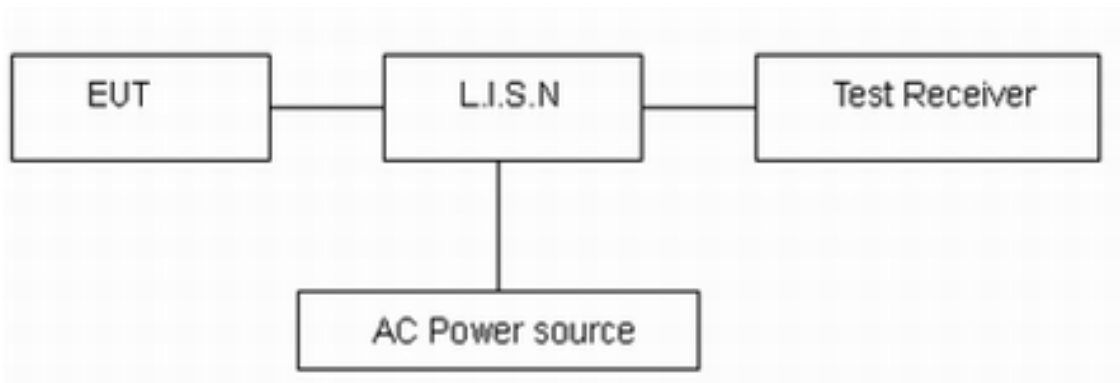
### Methods of Measurement

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. 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<br>(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:**

The equipment doesn't connected to public network, therefore this requirement do not apply.



## 6. Main Test Instruments

| Name                     | Manufacturer | Type            | Serial Number | Calibration Date | Expiration Date |
|--------------------------|--------------|-----------------|---------------|------------------|-----------------|
| Power sensor             | R&S          | NRP18S          | 101954        | 2023-05-12       | 2024-05-11      |
| Spectrum Analyzer        | KEYSIGHT     | N9020A          | MY51330870    | 2023-05-12       | 2024-05-11      |
| Unwanted Emission        |              |                 |               |                  |                 |
| EMI Test Receiver        | R&S          | ESCI3           | 100948        | 2023-05-12       | 2024-05-11      |
| Signal Analyzer          | R&S          | FSV40           | 101298        | 2023-05-12       | 2024-05-11      |
| Loop Antenna             | SCHWARZBECK  | FMZB1519        | 1519-047      | 2023-04-16       | 2026-04-15      |
| TRILOG Broadband Antenna | SCHWARZBECK  | VULB 9163       | 01111         | 2022-10-25       | 2025-10-24      |
| Horn Antenna             | SCHWARZBECK  | BBHA 9120D      | 430           | 2021-07-26       | 2024-07-25      |
| Amplifier                | MWPA.CN      | MWLA-0102 00G40 | YQ2103039 B01 | 2023-05-12       | 2024-05-11      |
| Horn Antenna             | ETS-Lindgren | 3160-09         | 00102643      | 2021-10-10       | 2024-10-09      |
| Amplifier                | MicroWave    | KLNA-18040 050  | 220826001     | 2023-05-12       | 2024-05-11      |
| Software                 | R&S          | EMC32           | 9.26.01       | /                | /               |

## ANNEX A: The EUT Appearance

The EUT Appearance are submitted separately.

## ANNEX B: Test Setup Photos

The Test Setup Photos are submitted separately.

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