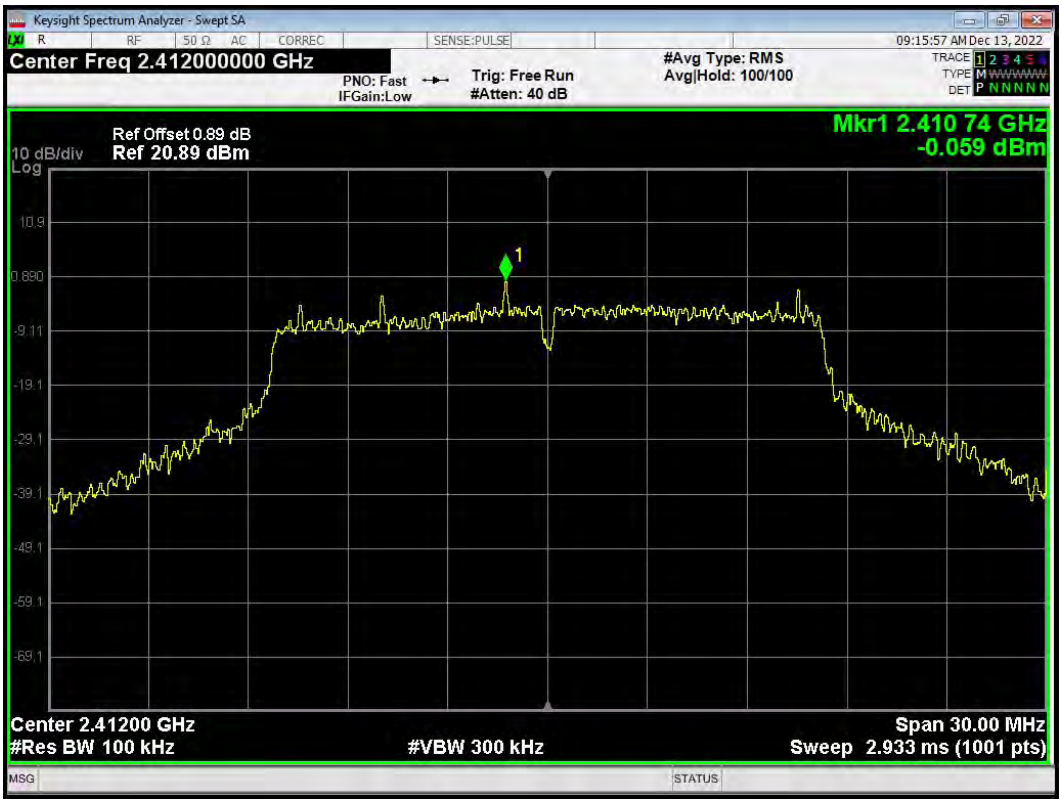
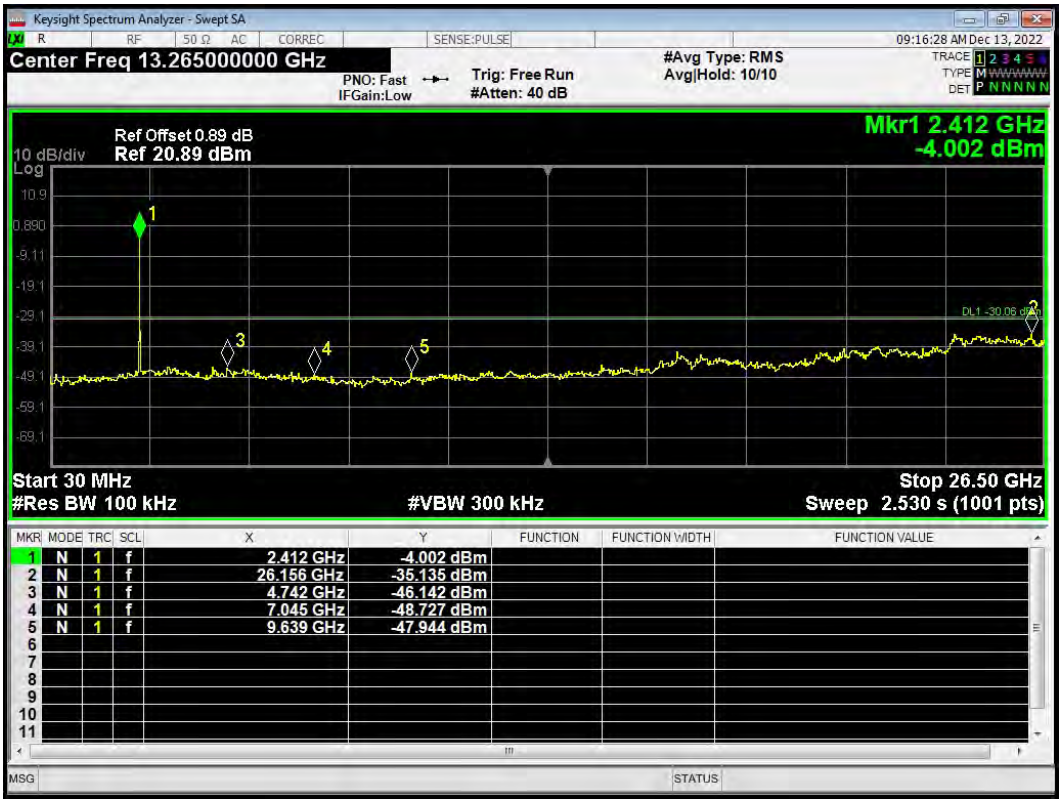
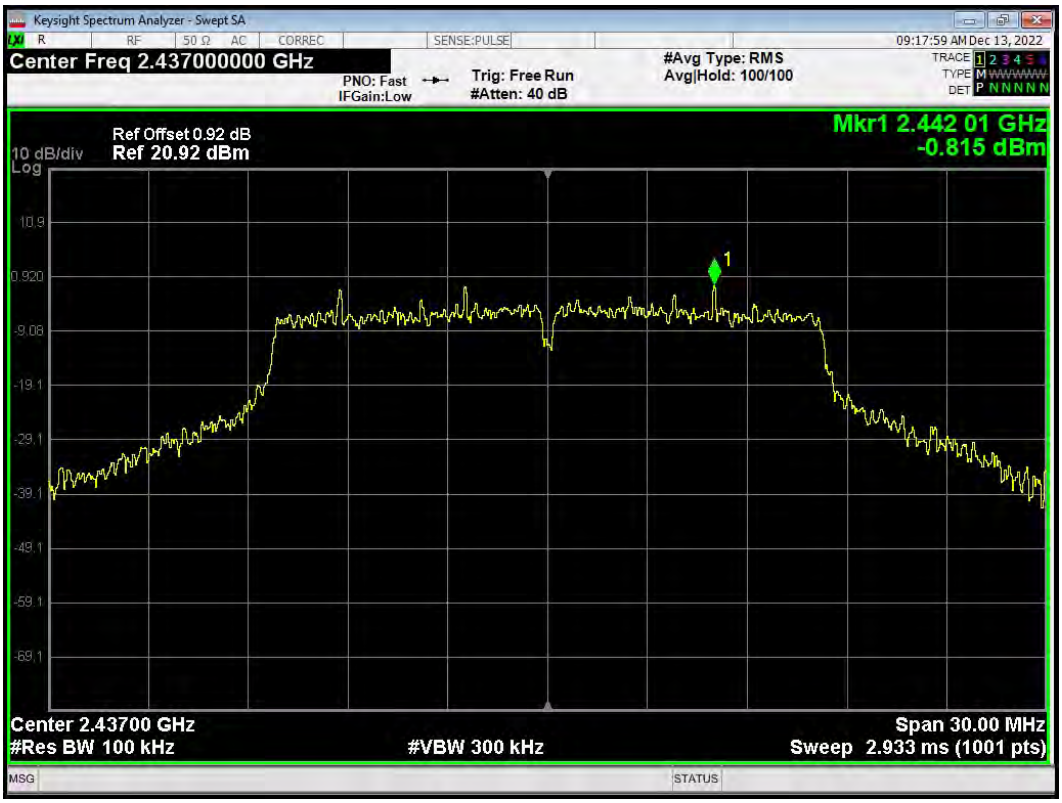
Tx. Spurious 802.11g 2412MHz Ref



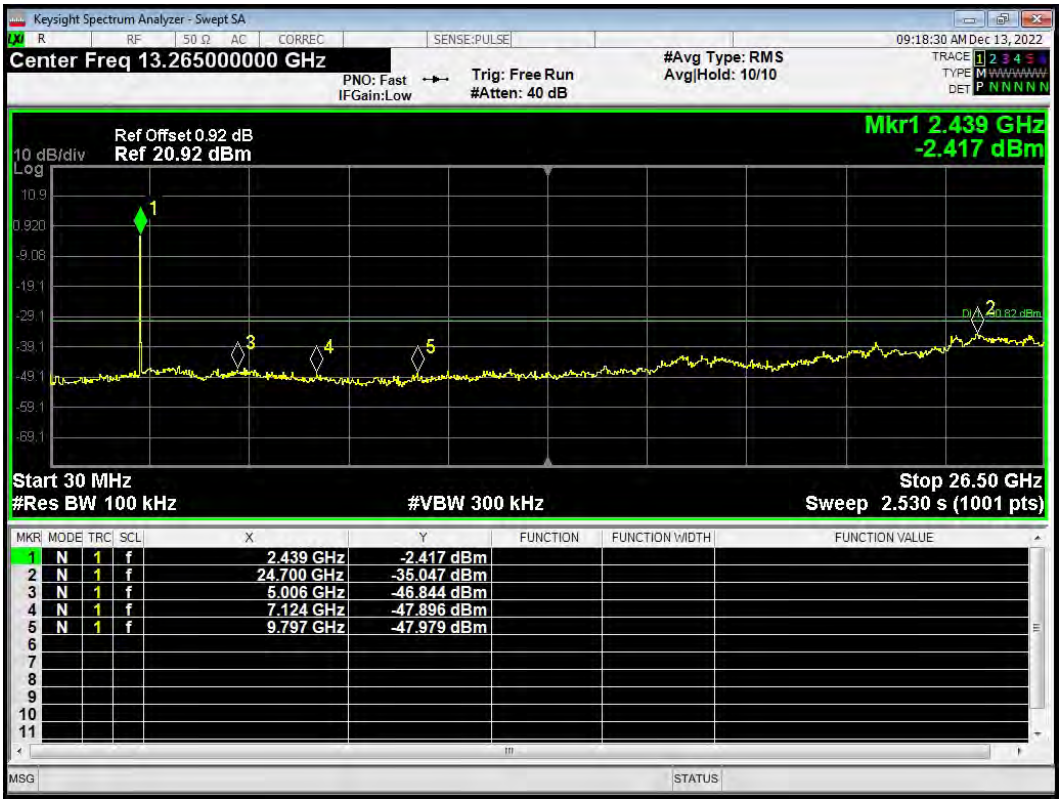

Tx. Spurious 802.11g 2412MHz Emission



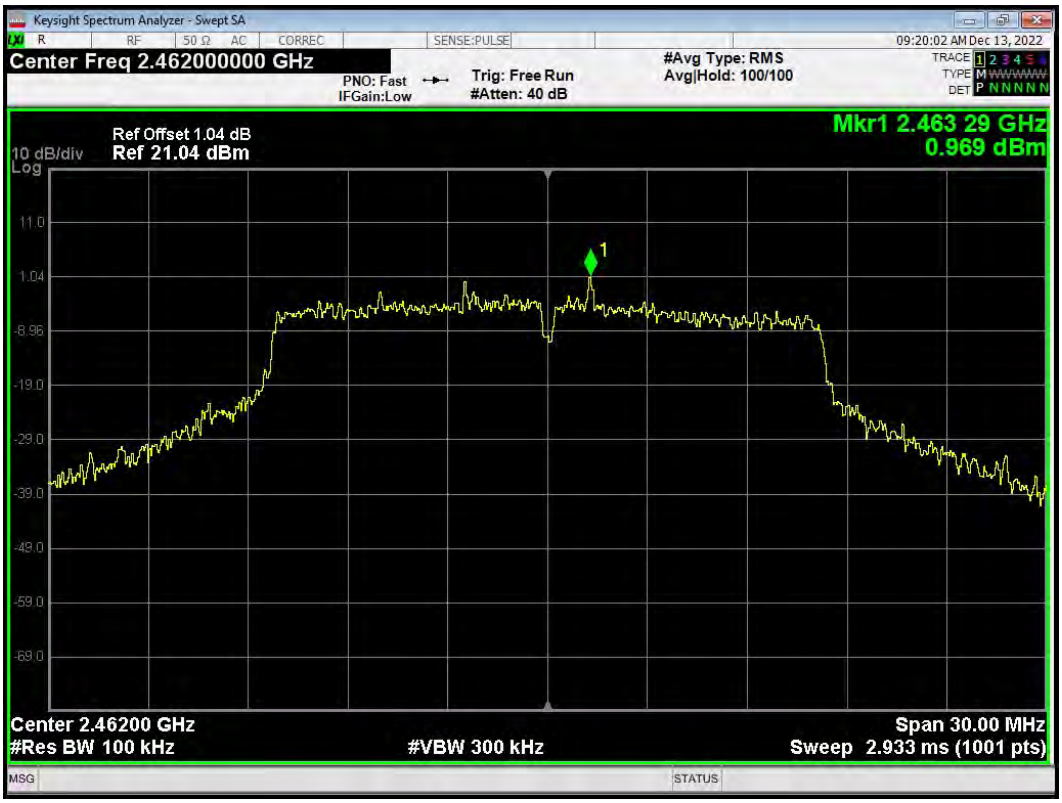
Tx. Spurious 802.11g 2437MHz Ref



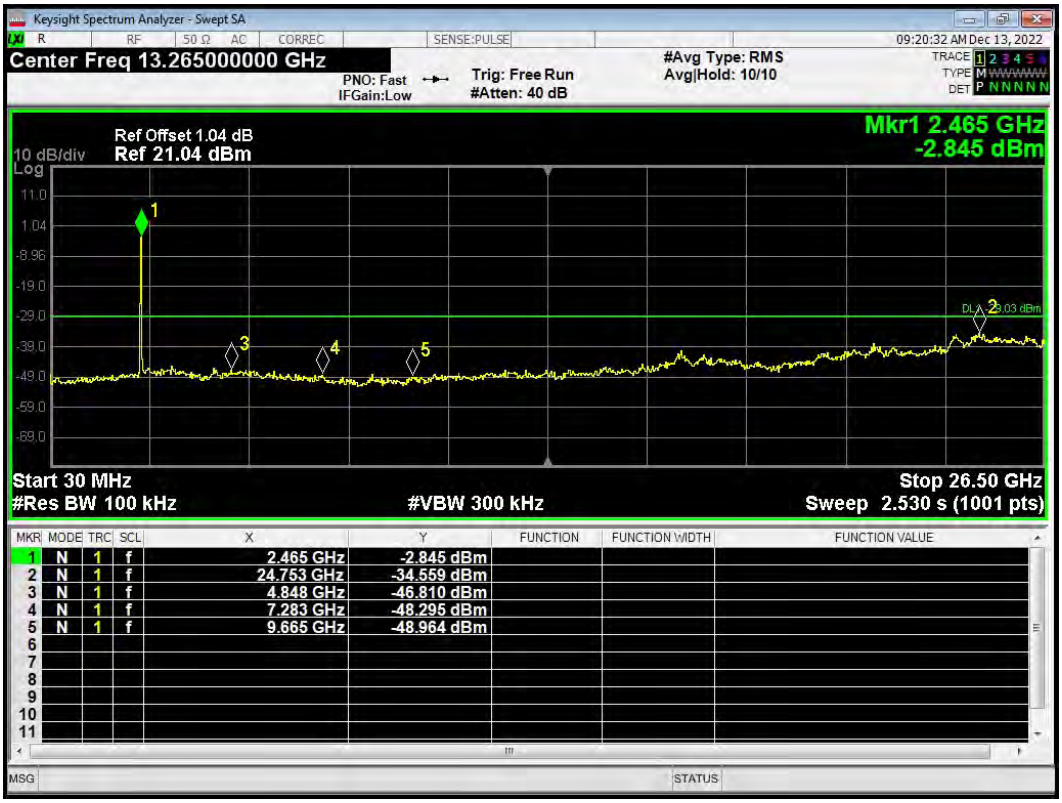

Tx. Spurious 802.11g 2437MHz Emission



Tx. Spurious 802.11g 2462MHz Ref

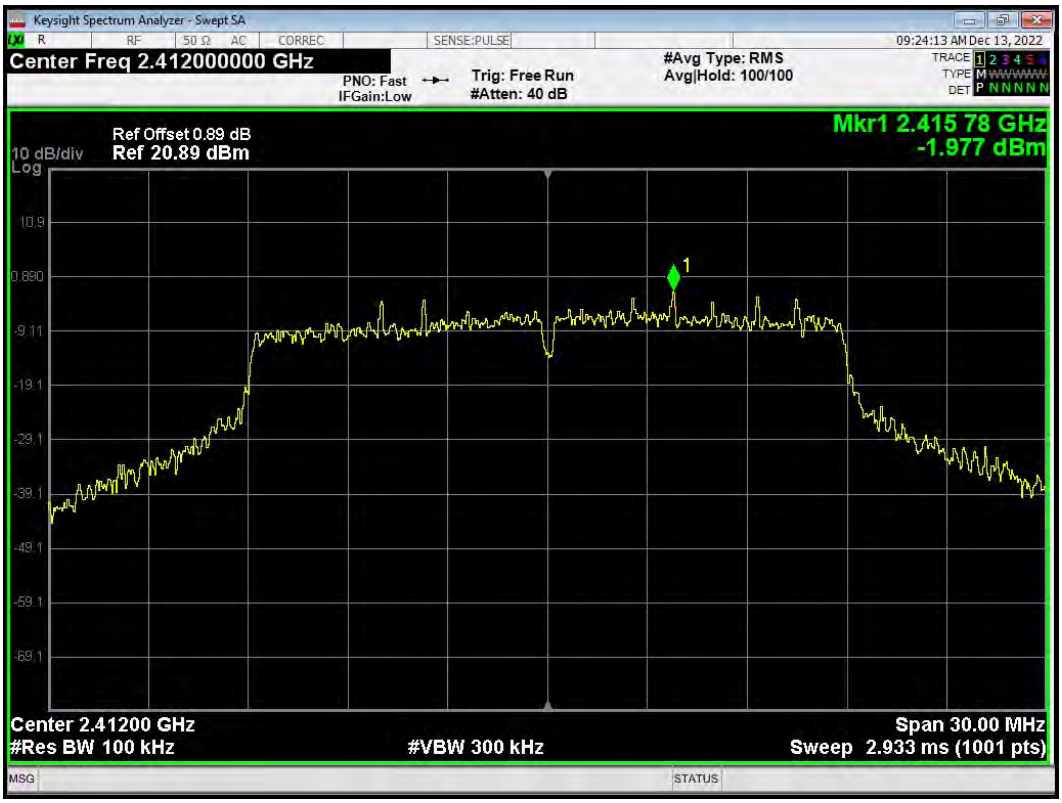



Tx. Spurious 802.11g 2462MHz Emission

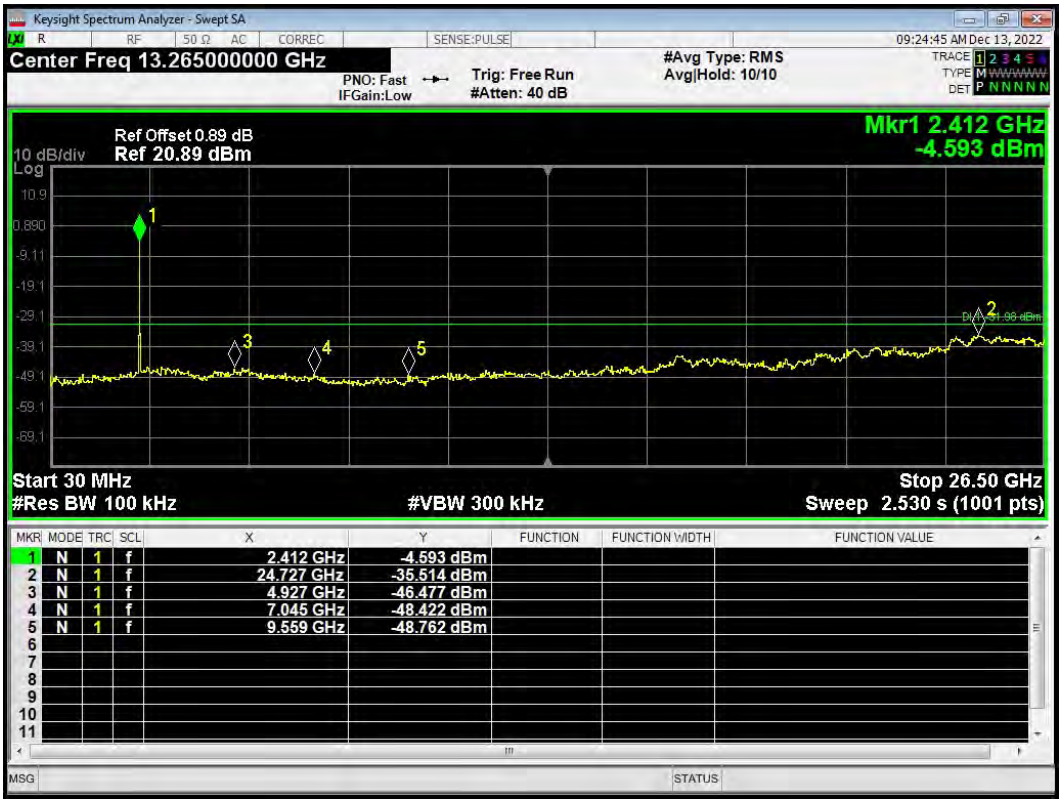



| MKR | MODE | TRC | SCL | X | Y | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE |
|---|---|---|---|---|---|---|---|---|
| 1 | N | 1 | f | 2.465 GHz | -2.845 dBm | | | |
| 2 | N | 1 | f | 24.753 GHz | -34.559 dBm | | | |
| 3 | N | 1 | f | 4.848 GHz | -46.810 dBm | | | |
| 4 | N | 1 | f | 7.283 GHz | -48.295 dBm | | | |
| 5 | N | 1 | f | 9.665 GHz | -48.964 dBm | | | |

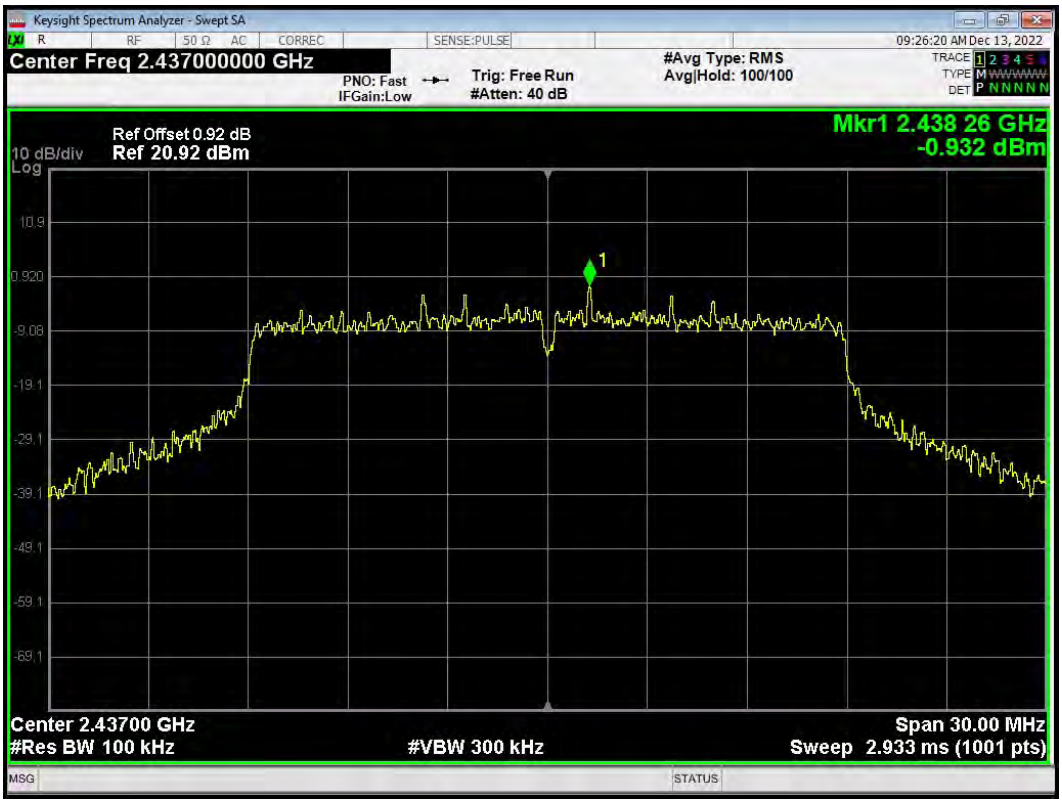
Tx. Spurious 802.11n(HT20) 2412MHz Ref



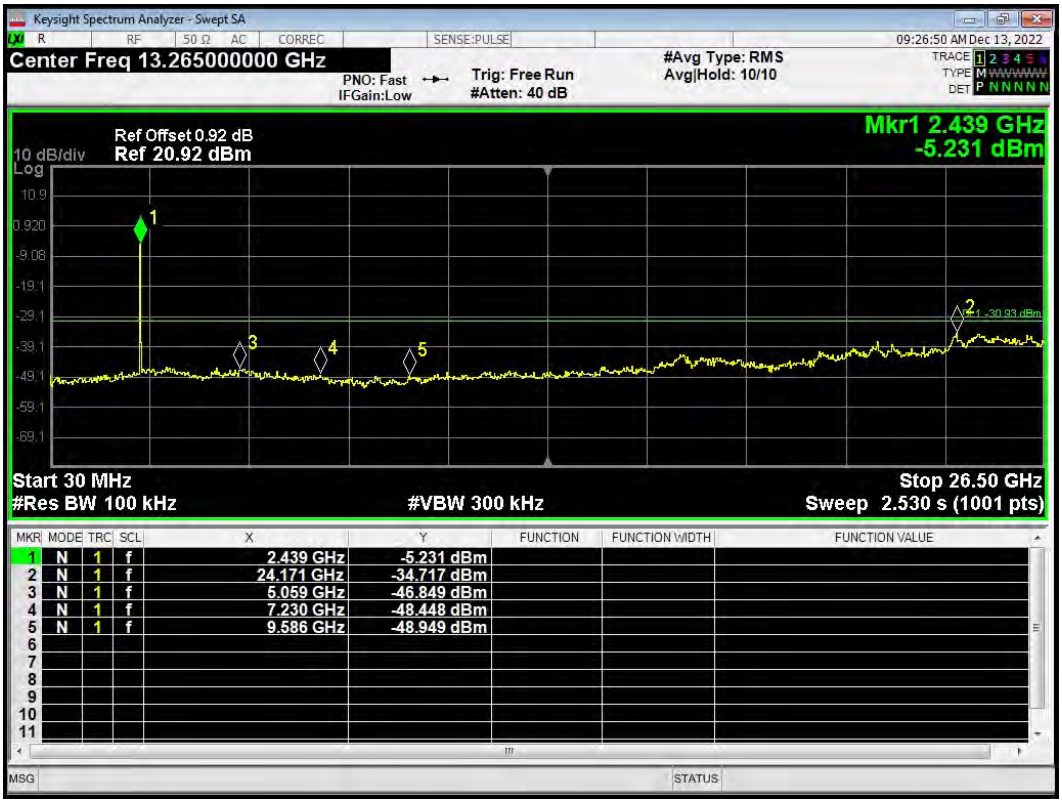

Tx. Spurious 802.11n(HT20) 2412MHz Emission



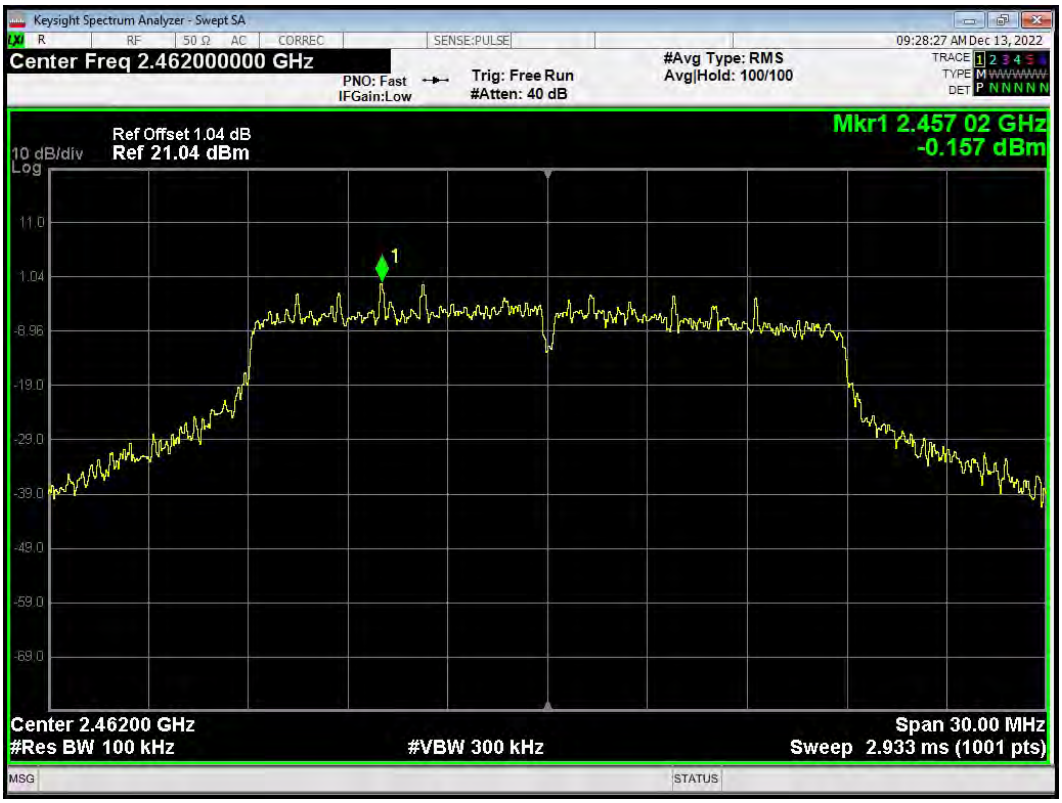
Tx. Spurious 802.11n(HT20) 2437MHz Ref



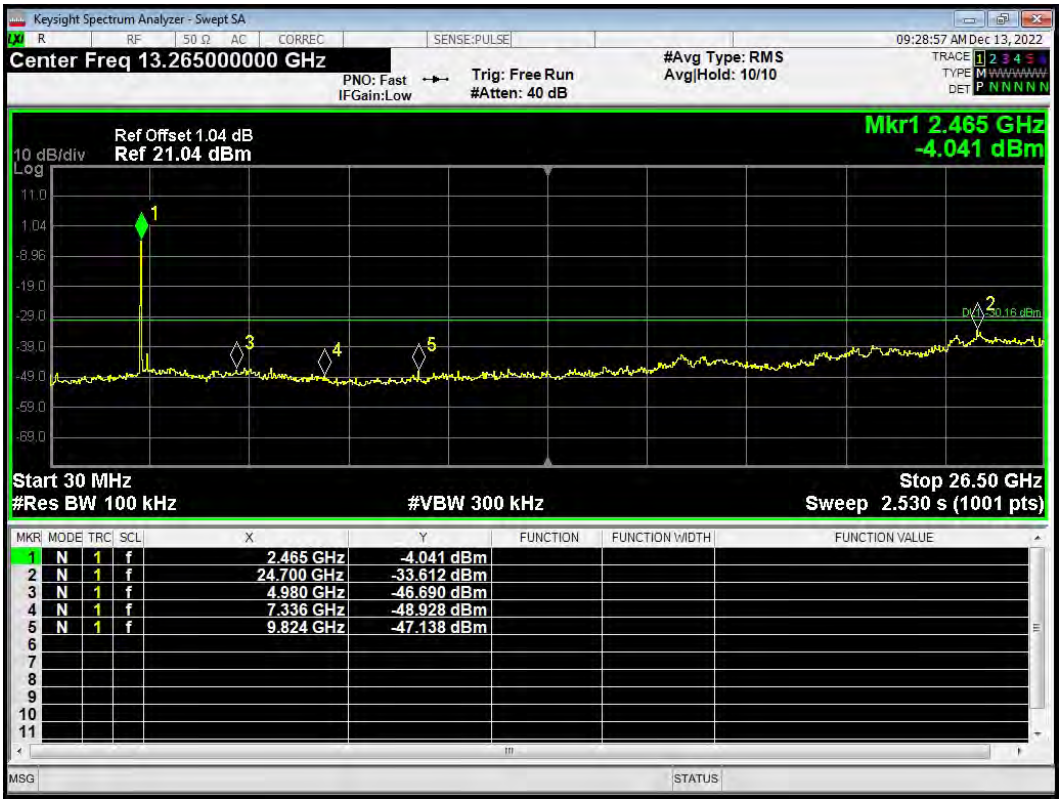

Tx. Spurious 802.11n(HT20) 2437MHz Emission



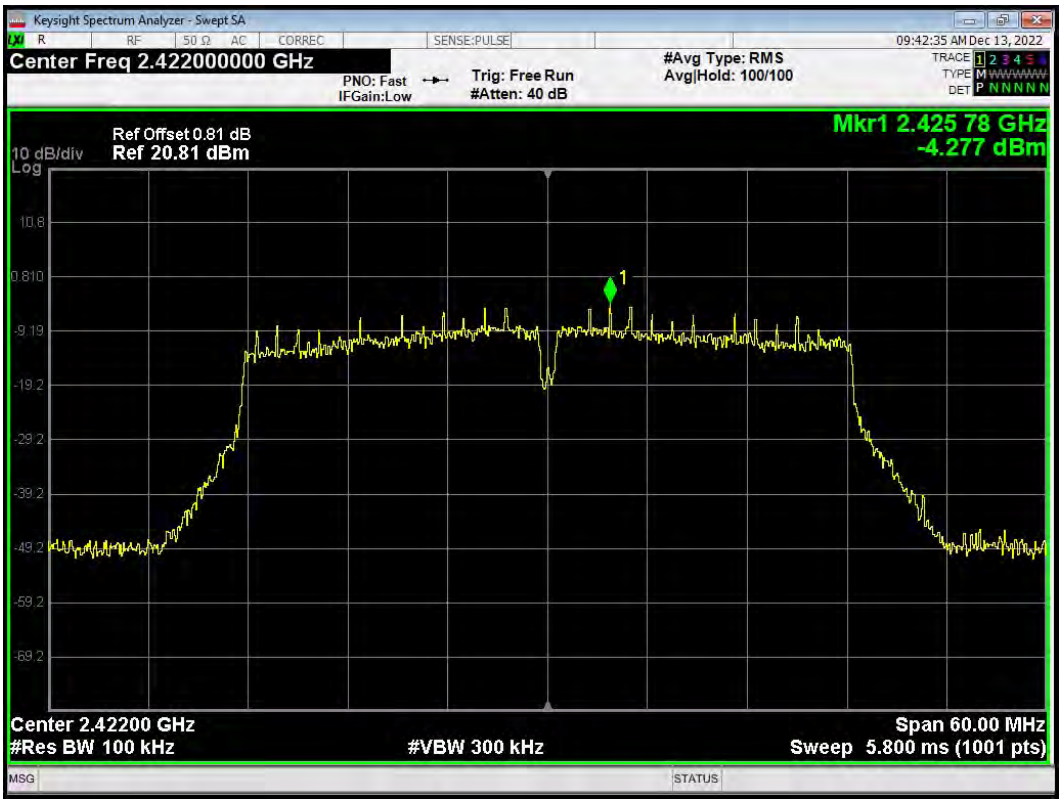
Tx. Spurious 802.11n(HT20) 2462MHz Ref



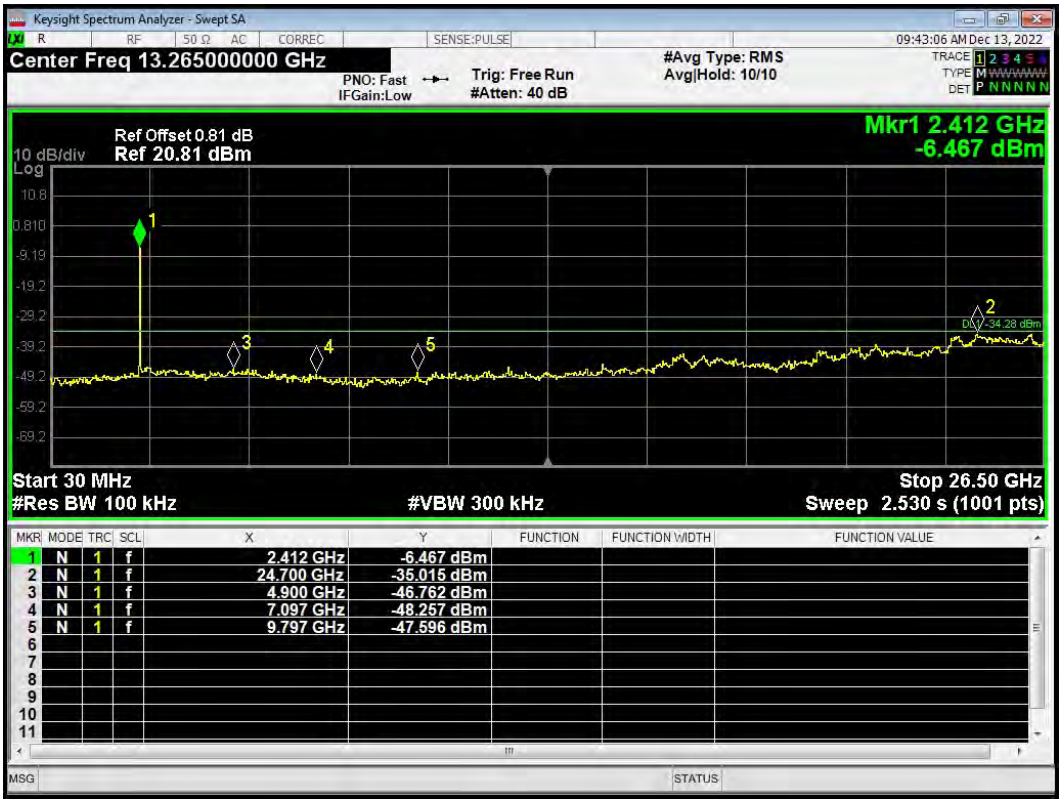

Tx. Spurious 802.11n(HT20) 2462MHz Emission



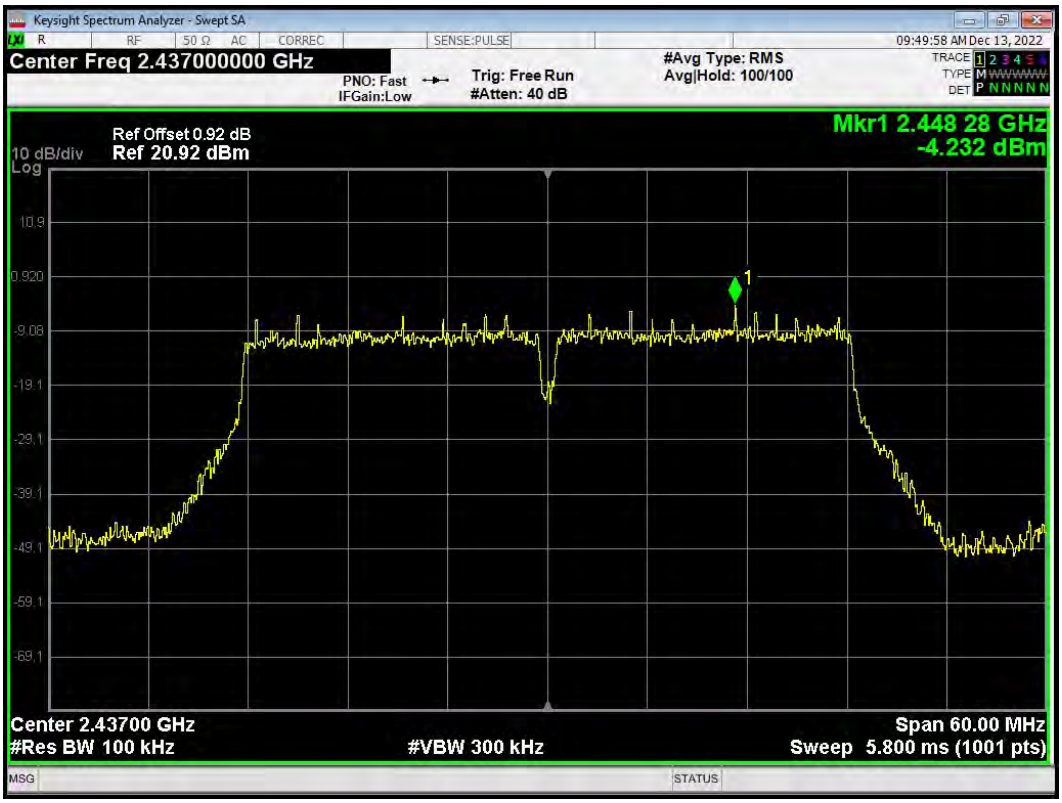
Tx. Spurious 802.11n(HT40) 2422MHz Ref



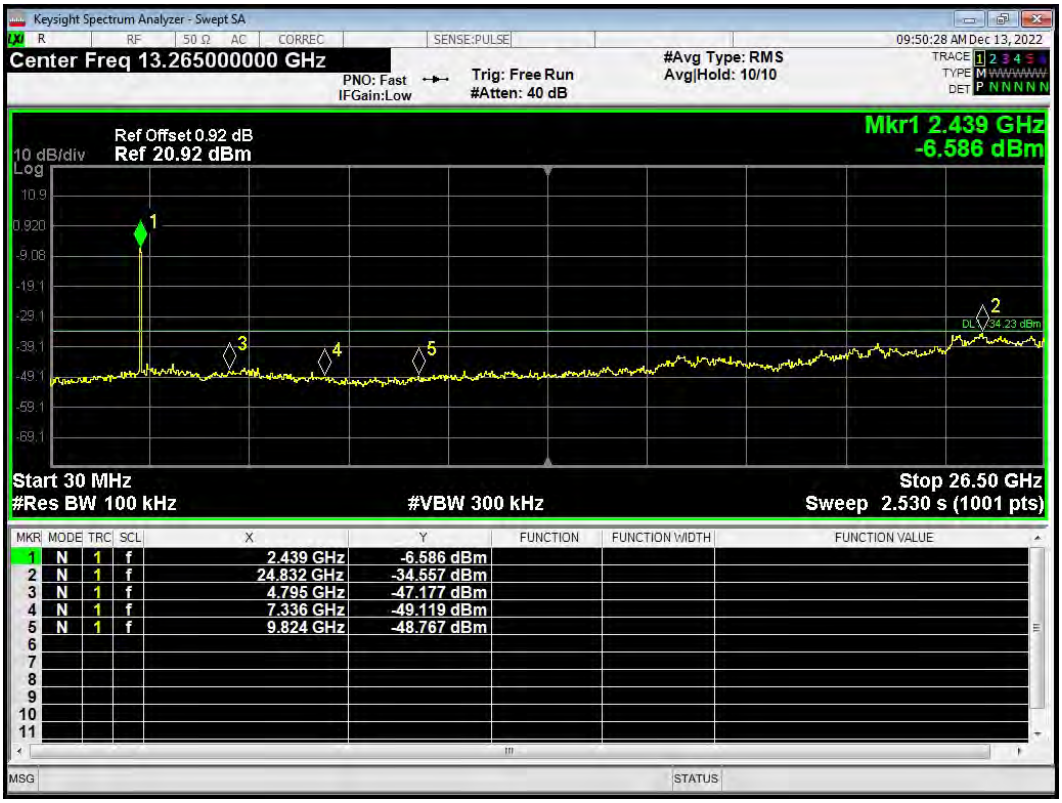

Tx. Spurious 802.11n(HT40) 2422MHz Emission



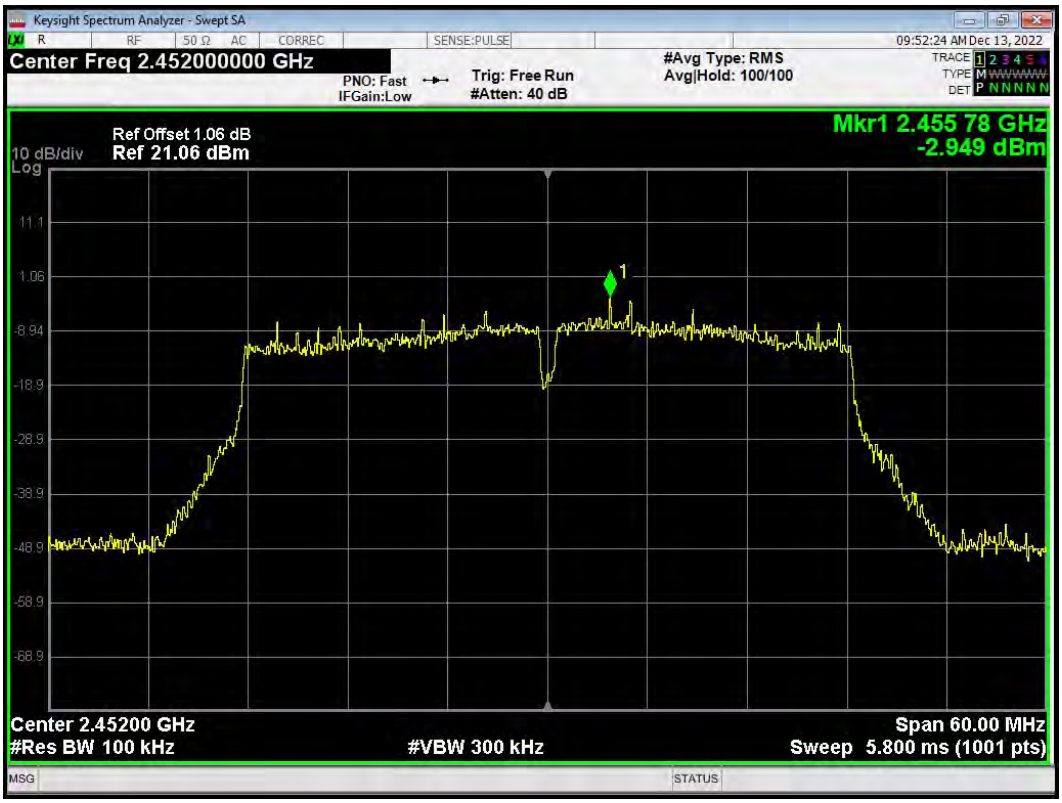
Tx. Spurious 802.11n(HT40) 2437MHz Ref



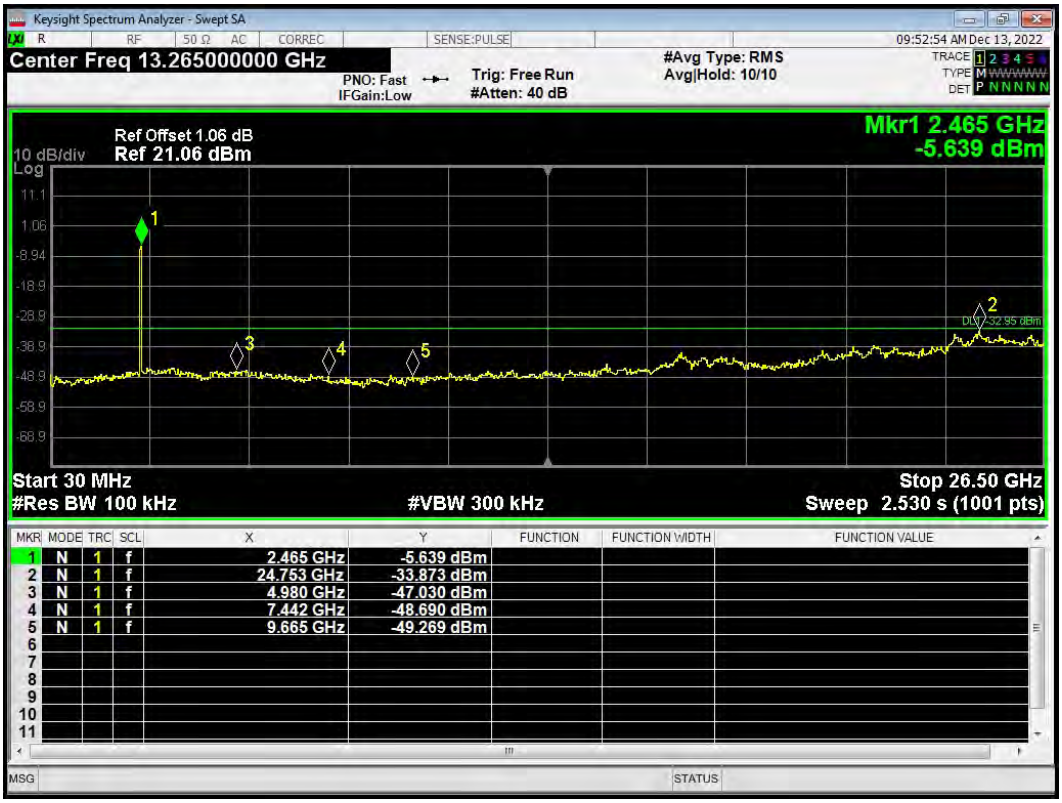

Tx. Spurious 802.11n(HT40) 2437MHz Emission



Tx. Spurious 802.11n(HT40) 2452MHz Ref

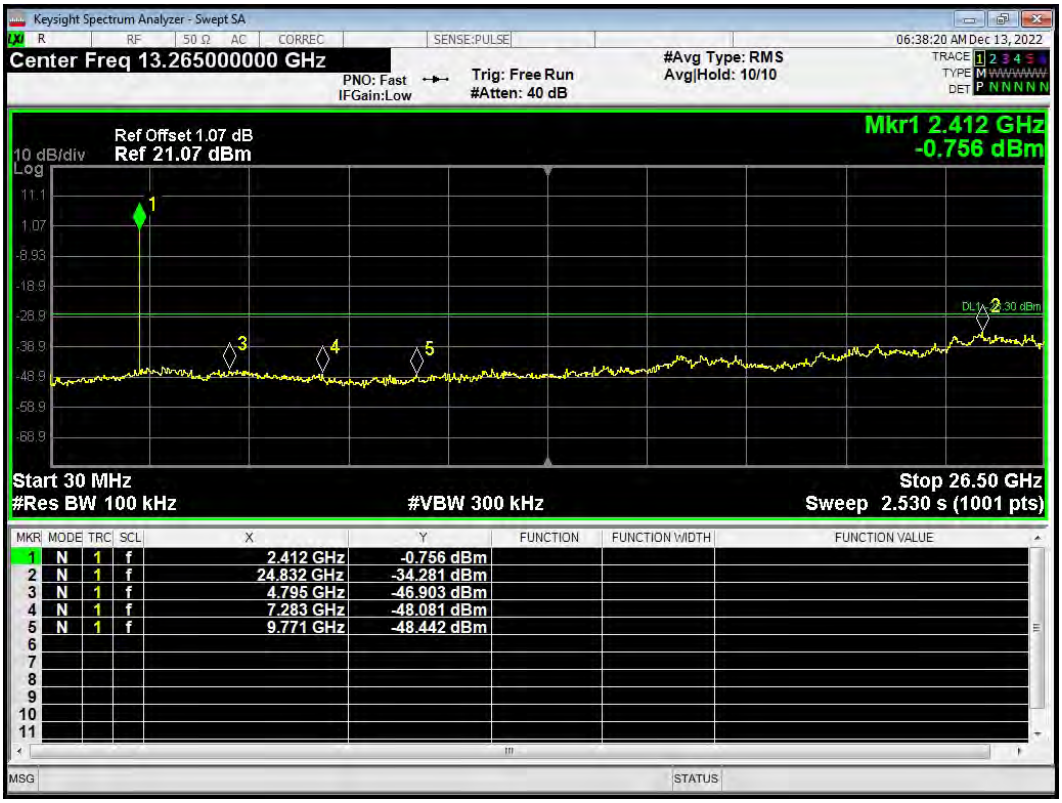



Tx. Spurious 802.11n(HT40) 2452MHz Emission



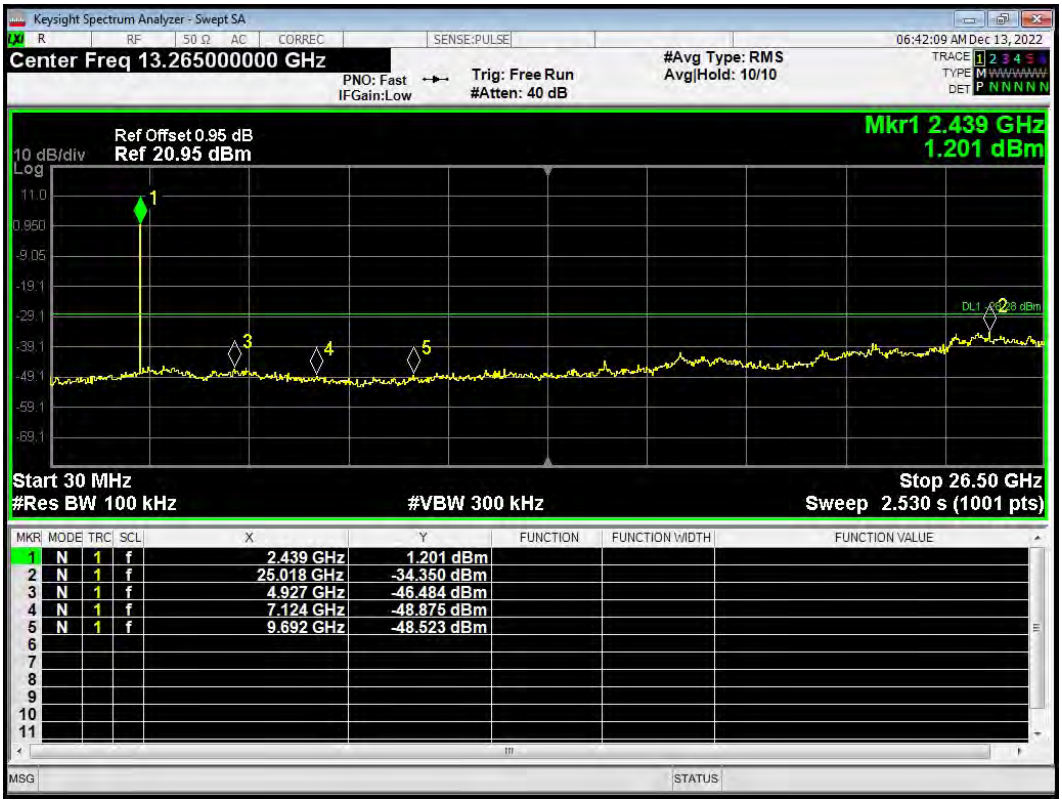
Tx. Spurious BLE (1M) 2402MHz Ref


Tx. Spurious BLE (1M) 2402MHz Emission



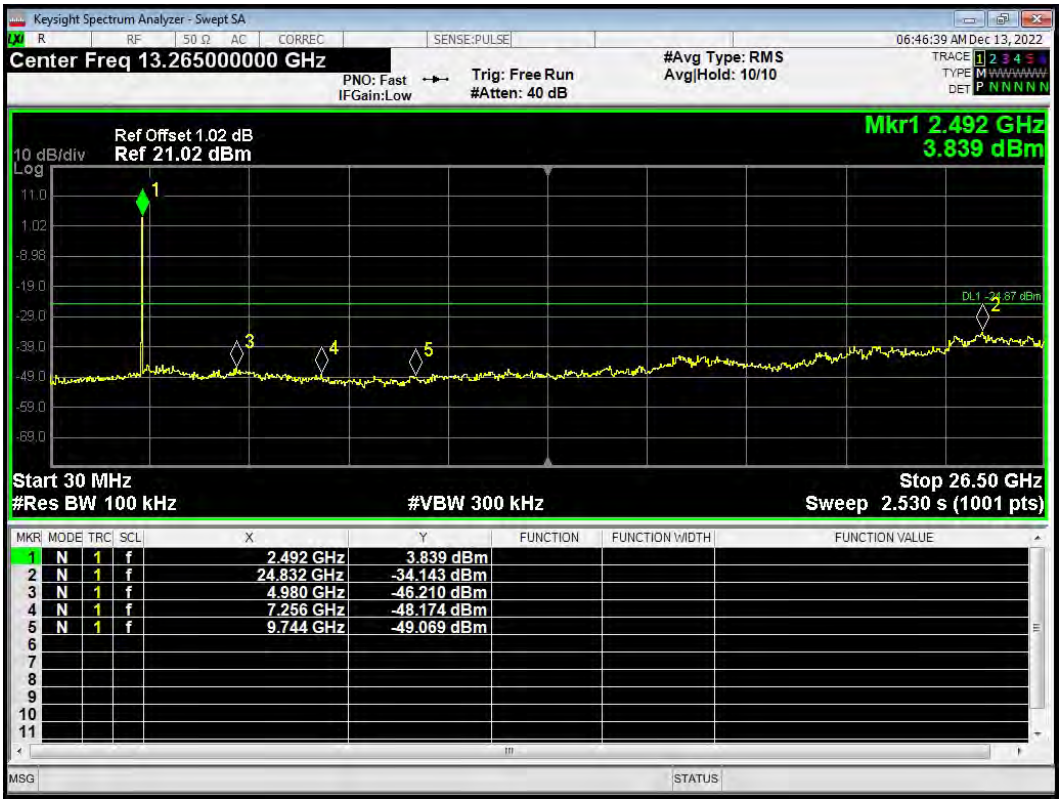
Tx. Spurious BLE (1M) 2440MHz Ref


Tx. Spurious BLE (1M) 2440MHz Emission



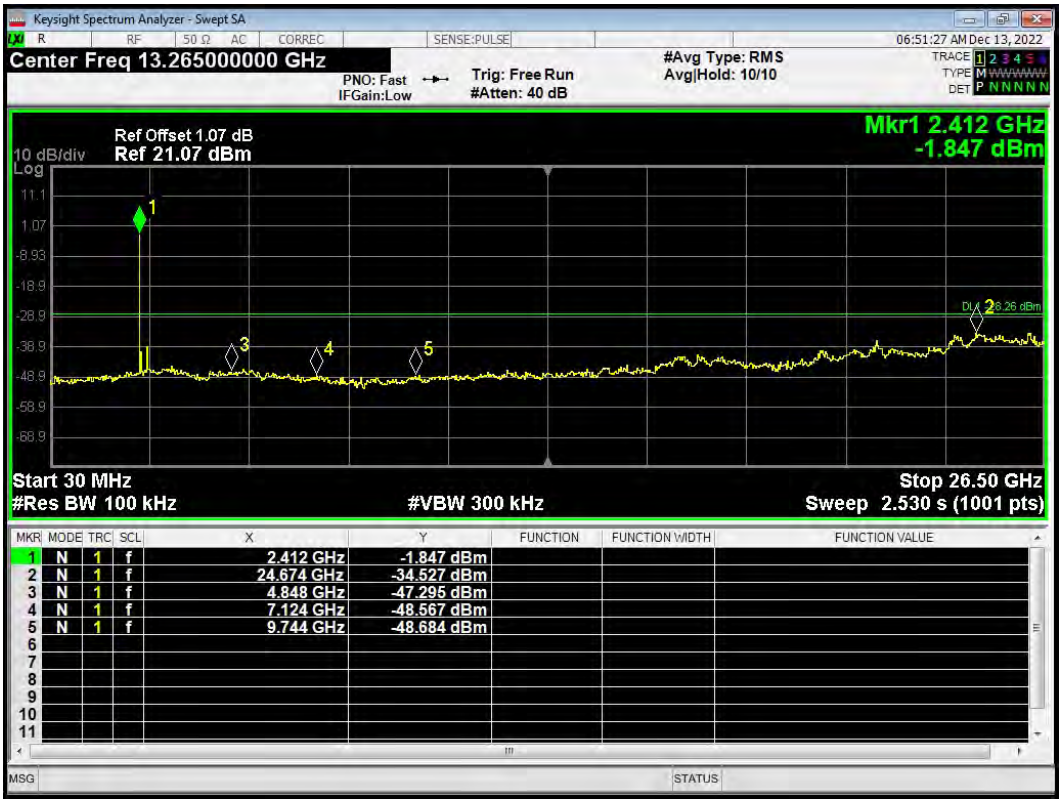
Tx. Spurious BLE (1M) 2480MHz Ref


Tx. Spurious BLE (1M) 2480MHz Emission



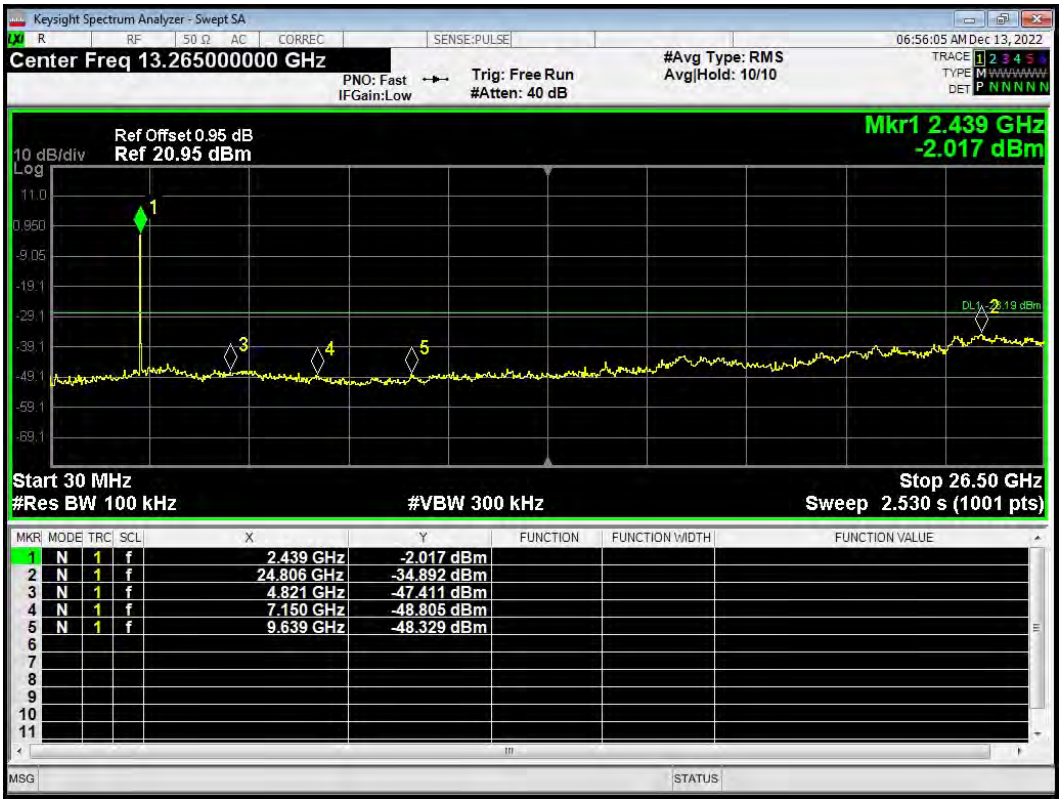
Tx. Spurious BLE (2M) 2402MHz Ref


Tx. Spurious BLE (2M) 2402MHz Emission



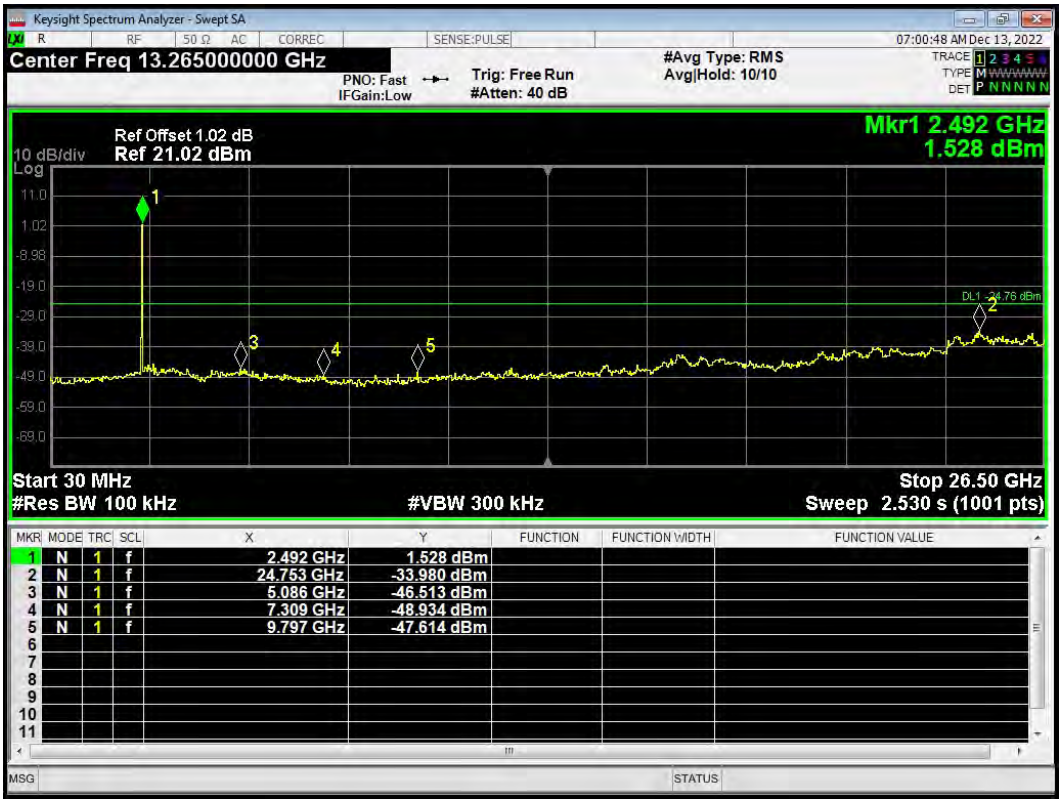
Tx. Spurious BLE (2M) 2440MHz Ref


Tx. Spurious BLE (2M) 2440MHz Emission



Tx. Spurious BLE (2M) 2480MHz Ref


Tx. Spurious BLE (2M) 2480MHz Emission



## 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.
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.

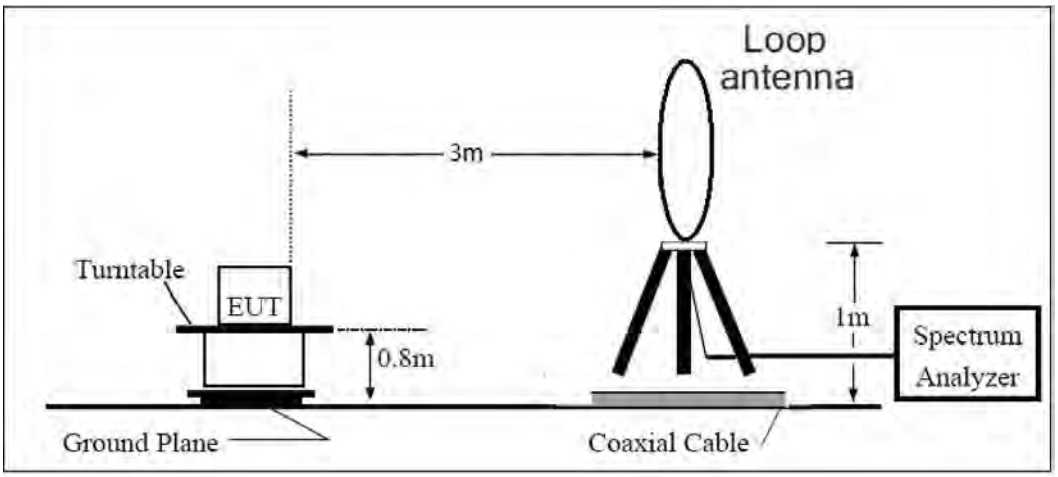
This method refer to ANSI C63.10.
The procedure for peak unwanted emissions measurements above 1000 MHz is as follows:
Set the spectrum analyzer in the following:
9kHz~150 kHz
RBW=200Hz, VBW=1kHz/ Sweep=AUTO
150 kHz~30MHz
RBW=9KHz, VBW=30KHz,/ Sweep=AUTO
Below 1GHz
RBW=100kHz / VBW=300kHz / Sweep=AUTO
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.

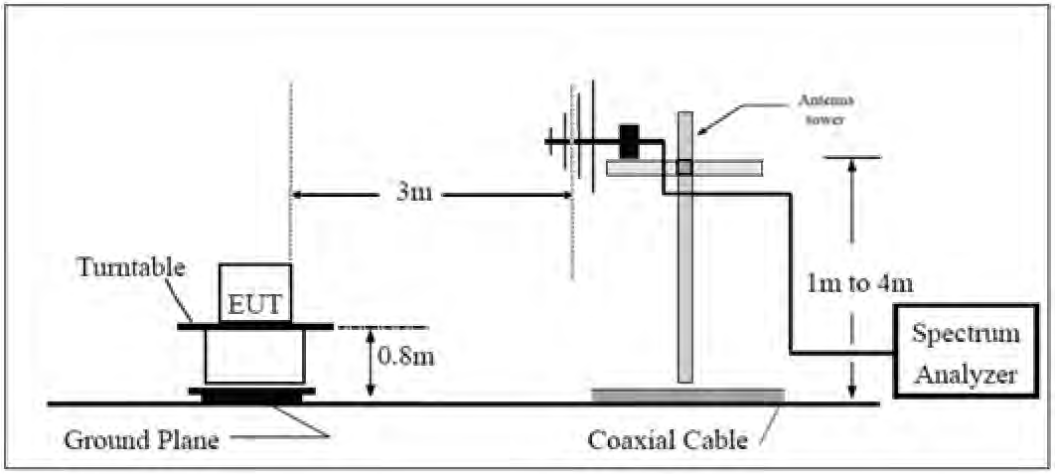
The test is in transmitting mode.

## Test Setup

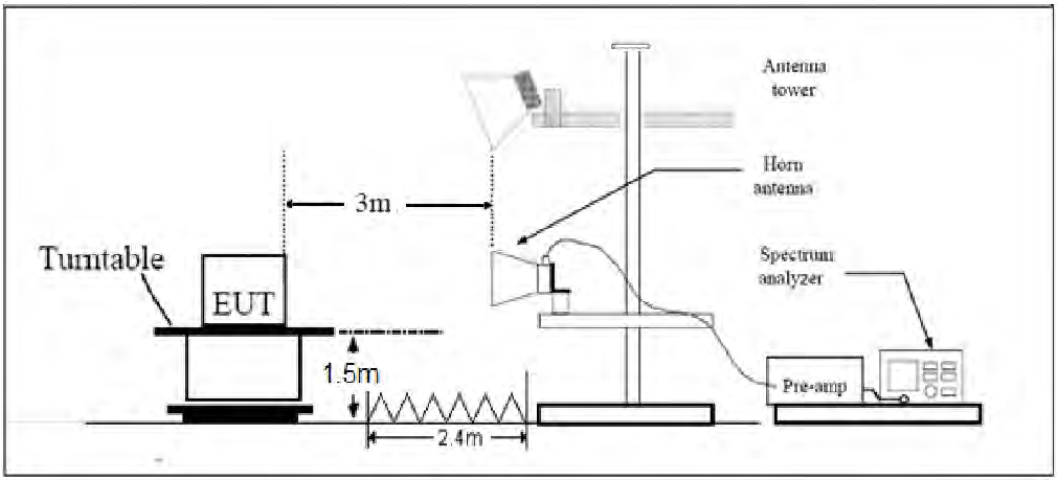
### 9KHz~ 30MHz




### 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(μV/m) | Field strength(dBμV/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 dBμV/m

Average Limit=54 dBμV/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 | | | |

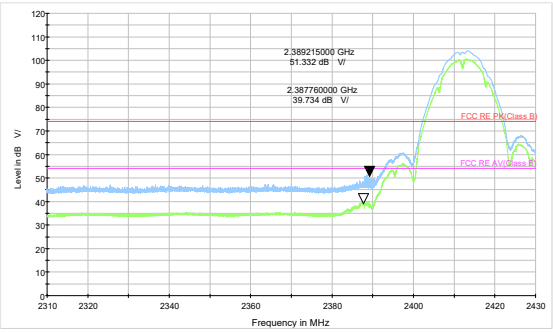
**Measurement Uncertainty**

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

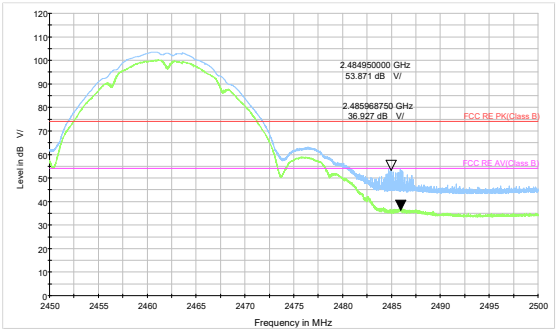
| Frequency | Uncertainty |
|---|---|
| 9KHz-30MHz | 3.55 dB |
| 30MHz-200MHz | 4.17 dB |
| 200MHz-1GHz | 4.84 dB |
| 1-18GHz | 4.35 dB |
| 18-26.5GHz | 5.90 dB |
| 26.5GHz~40GHz | 5.92 dB |

## Test Results:

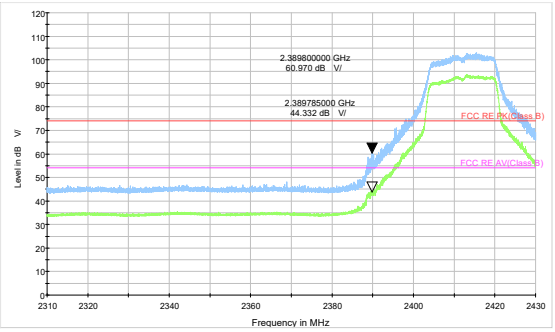
A symbol (dB V/) in the test plot below means (dBμV/m)



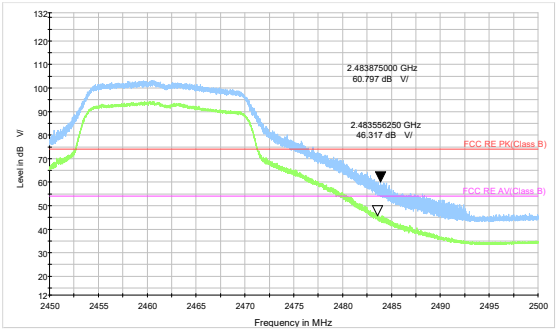

802.11b-Channel 1 Peak+ Average



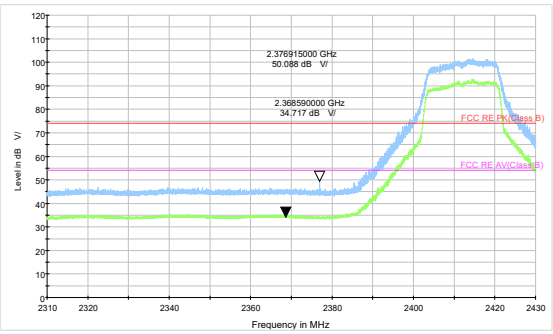

802.11b-Channel 11 Peak+ Average



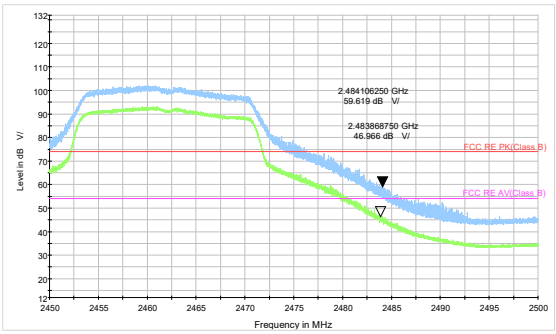

802.11g-Channel 1 Peak+ Average



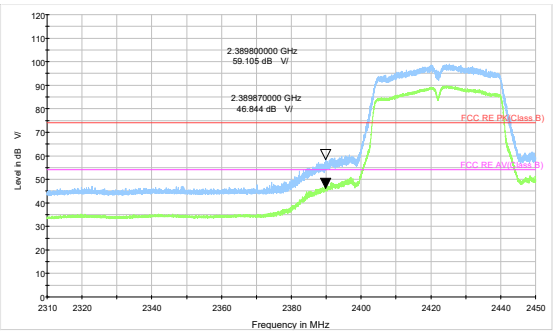

802.11g-Channel 11 Peak+ Average



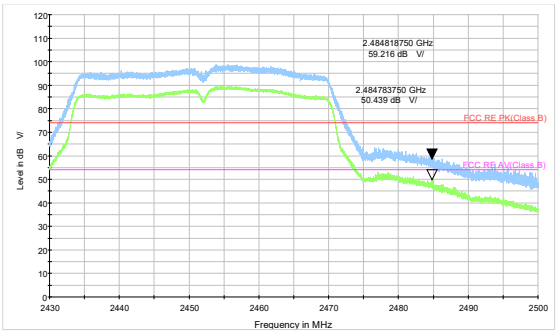

802.11n HT20 -Channel 1 Peak+ Average




802.11n HT20 -Channel 11 Peak+ Average

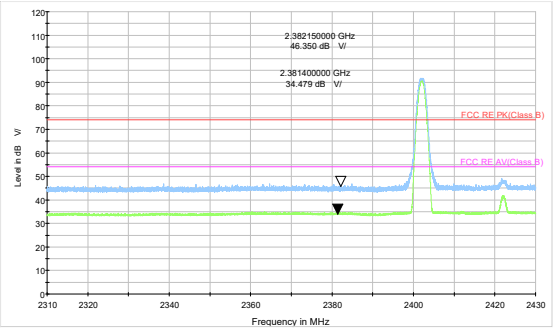



802.11n HT40 –Channel 3 Peak+ Average

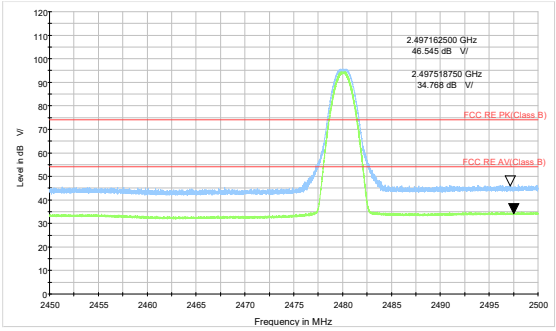



802.11n HT40 –Channel 9 Peak+ Average

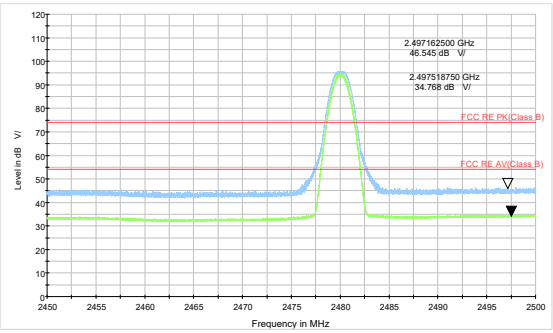
**After the pretest, Bluetooth LE (1M) was selected as the worst Mode for Bluetooth LE.**

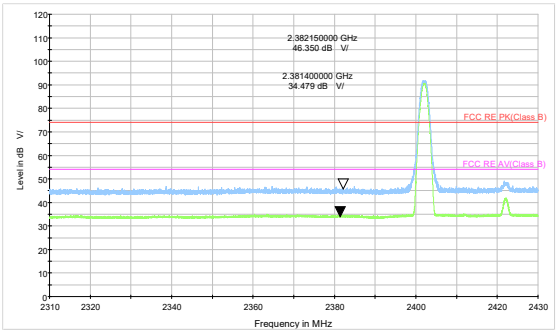



Bluetooth LE (1M) Channel 0 Peak+ Average




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 and 18GHz-26.5GHz are more than 20dB below the limit are not reported.

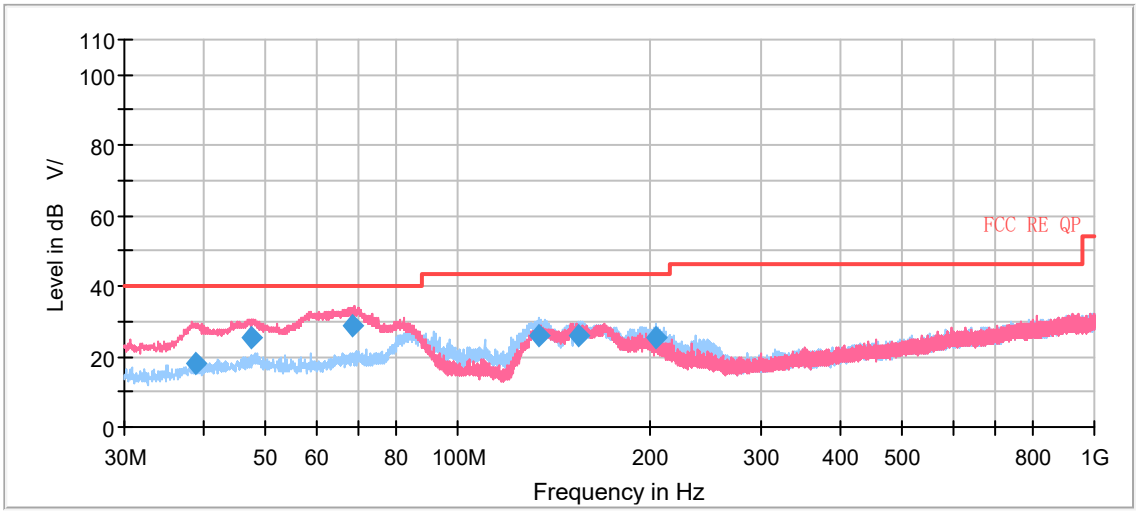
The following graphs display the maximum values of horizontal and vertical by software.
For above 1GHz, Blue trace uses the peak detection, Green trace uses the average detection.

**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, 802.11n (HT40) CH3 are selected as the worst condition. The test data of the worst-case condition was recorded in this report.

A symbol (dB V/) in the test plot below means (dBμV/m)



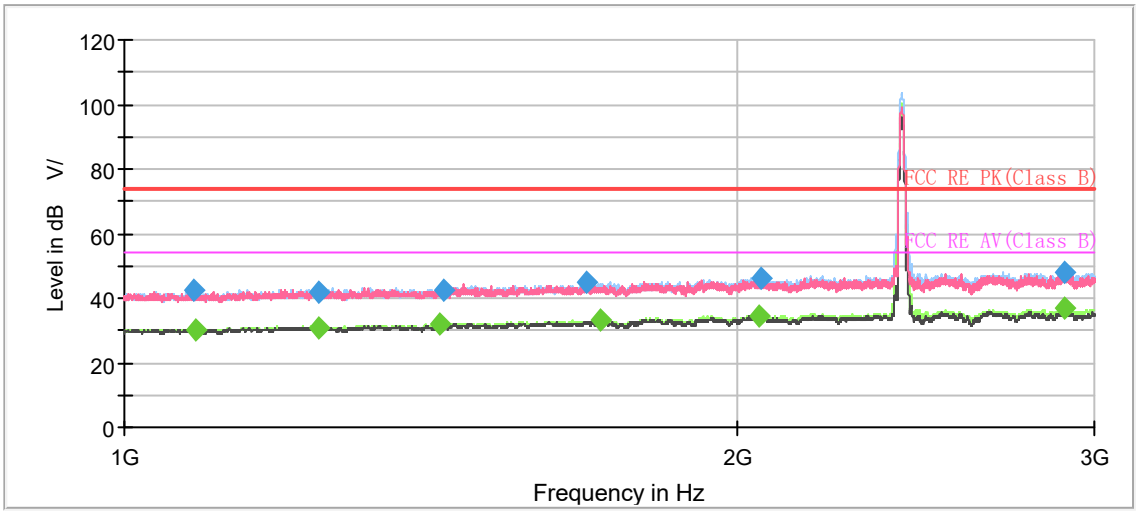

Radiates Emission from 30MHz to 1GHz

| Frequency (MHz) | Quasi-Peak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) |
|---|---|---|---|---|---|---|---|
| 38.845000 | 29.77 | 40.00 | 10.23 | 100.0 | V | 95.0 | 18.9 |
| 47.542667 | 30.65 | 40.00 | 9.35 | 100.0 | V | 28.0 | 20.4 |
| 68.649333 | 34.69 | 40.00 | 5.31 | 100.0 | V | 1.0 | 16.6 |
| 133.973667 | 30.91 | 43.50 | 12.59 | 225.0 | H | 119.0 | 14.9 |
| 155.435333 | 29.89 | 43.50 | 13.61 | 184.0 | H | 120.0 | 14.9 |
| 205.308000 | 29.32 | 43.50 | 14.18 | 125.0 | H | 96.0 | 17.7 |

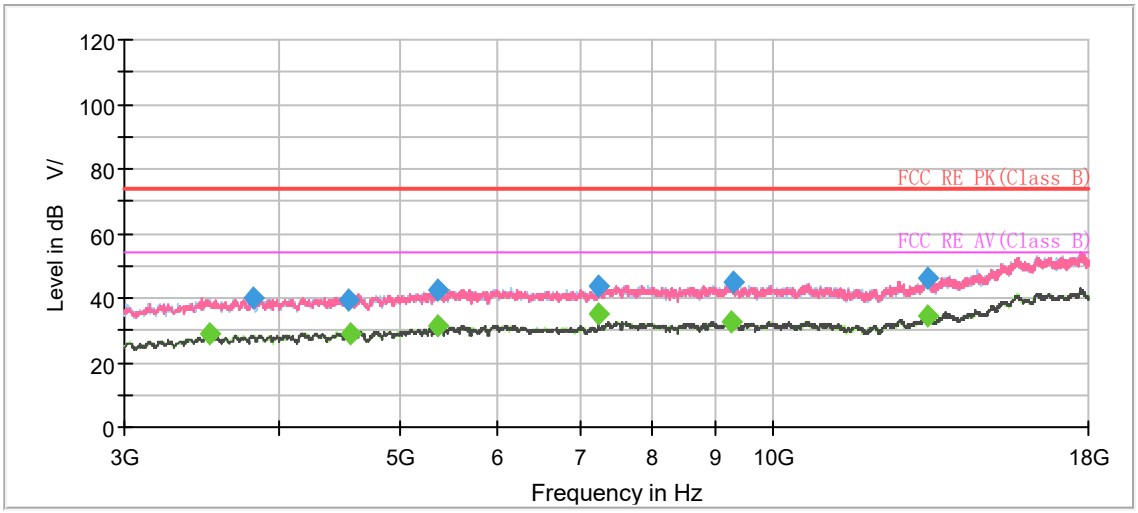
**Remark: 1. Correction Factor = Antenna factor + Insertion loss (cable loss + amplifier gain)**

**2. Margin = Limit – Quasi-Peak**

**802.11b CH1**




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



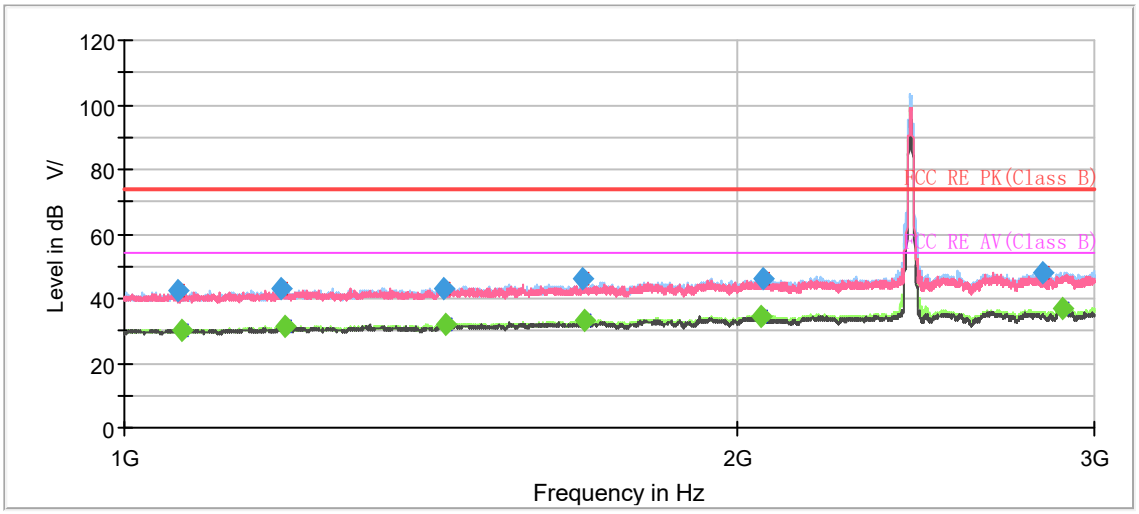

Radiates Emission from 3GHz to 18GHz

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|---|---|---|---|---|---|---|---|---|---|
| 1082.250000 | 42.41 | --- | 74.00 | 31.59 | 500.0 | 200.0 | H | 226.0 | -8.2 |
| 1083.500000 | --- | 30.07 | 54.00 | 23.93 | 500.0 | 200.0 | H | 203.0 | -8.2 |
| 1245.000000 | 41.84 | --- | 74.00 | 32.16 | 500.0 | 100.0 | V | 278.0 | -7.2 |
| 1247.500000 | --- | 30.65 | 54.00 | 23.35 | 500.0 | 200.0 | H | 180.0 | -7.2 |
| 1430.750000 | --- | 31.84 | 54.00 | 22.16 | 500.0 | 100.0 | H | 36.0 | -6.0 |
| 1435.500000 | 42.42 | --- | 74.00 | 31.58 | 500.0 | 200.0 | H | 266.0 | -6.0 |
| 1686.750000 | 44.95 | --- | 74.00 | 29.05 | 500.0 | 100.0 | H | 0.0 | -4.6 |
| 1715.250000 | --- | 33.22 | 54.00 | 20.78 | 500.0 | 200.0 | H | 330.0 | -4.4 |
| 2050.250000 | --- | 34.61 | 54.00 | 19.39 | 500.0 | 100.0 | H | 54.0 | -2.6 |
| 2056.250000 | 46.43 | --- | 74.00 | 27.57 | 500.0 | 100.0 | H | 77.0 | -2.6 |
| 2900.250000 | --- | 36.83 | 54.00 | 17.17 | 500.0 | 200.0 | H | 321.0 | 0.9 |
| 2903.500000 | 47.76 | --- | 74.00 | 26.24 | 500.0 | 200.0 | H | 212.0 | 0.9 |

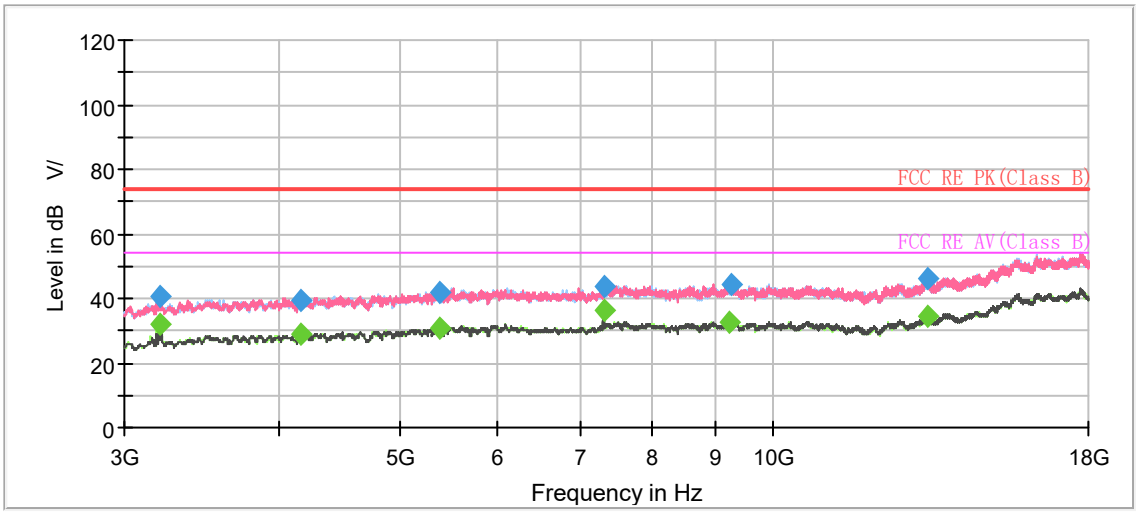
**Remark: 1. Correction Factor = Antenna factor + Insertion loss (cable loss + amplifier gain)**

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

**802.11b CH6**




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



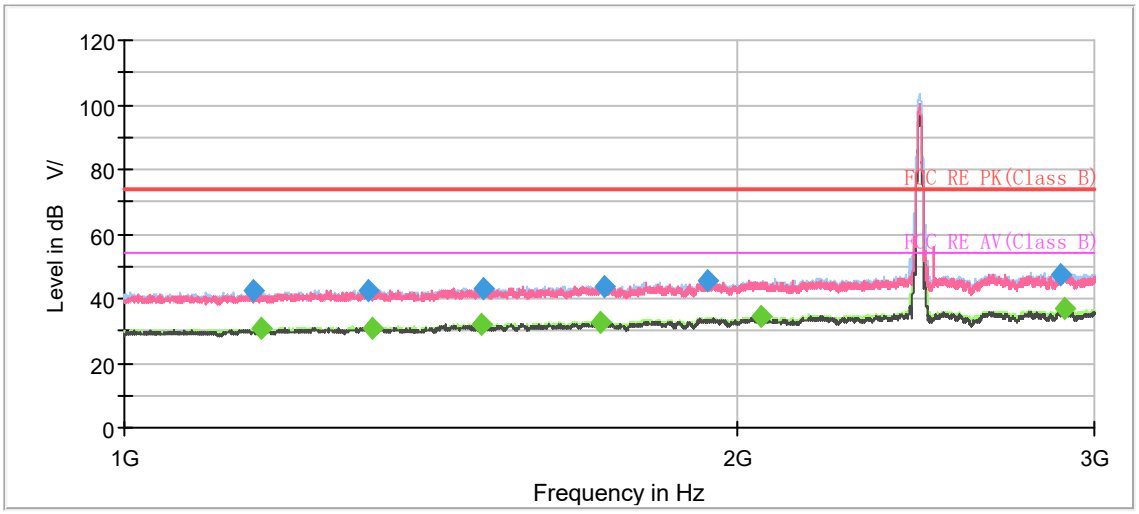

Radiates Emission from 3GHz to 18GHz

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|---|---|---|---|---|---|---|---|---|---|
| 1063.500000 | 42.37 | --- | 74.00 | 31.63 | 500.0 | 200.0 | H | 354.0 | -8.3 |
| 1068.000000 | --- | 30.34 | 54.00 | 23.66 | 500.0 | 100.0 | H | 75.0 | -8.3 |
| 1194.500000 | 42.87 | --- | 74.00 | 31.13 | 500.0 | 100.0 | V | 340.0 | -7.5 |
| 1200.250000 | --- | 31.64 | 54.00 | 22.36 | 500.0 | 200.0 | V | 0.0 | -7.4 |
| 1435.250000 | 43.01 | --- | 74.00 | 30.99 | 500.0 | 200.0 | H | 359.0 | -6.0 |
| 1440.250000 | --- | 32.12 | 54.00 | 21.88 | 500.0 | 200.0 | V | 233.0 | -5.9 |
| 1679.750000 | 46.36 | --- | 74.00 | 27.64 | 500.0 | 100.0 | V | 152.0 | -4.6 |
| 1685.500000 | --- | 33.25 | 54.00 | 20.75 | 500.0 | 100.0 | H | 70.0 | -4.6 |
| 2055.000000 | --- | 34.51 | 54.00 | 19.49 | 500.0 | 200.0 | H | 354.0 | -2.6 |
| 2059.500000 | 46.20 | --- | 74.00 | 27.80 | 500.0 | 100.0 | H | 66.0 | -2.6 |
| 2829.750000 | 47.86 | --- | 74.00 | 26.14 | 500.0 | 200.0 | H | 354.0 | 0.6 |
| 2897.250000 | --- | 36.91 | 54.00 | 17.09 | 500.0 | 100.0 | H | 21.0 | 0.8 |

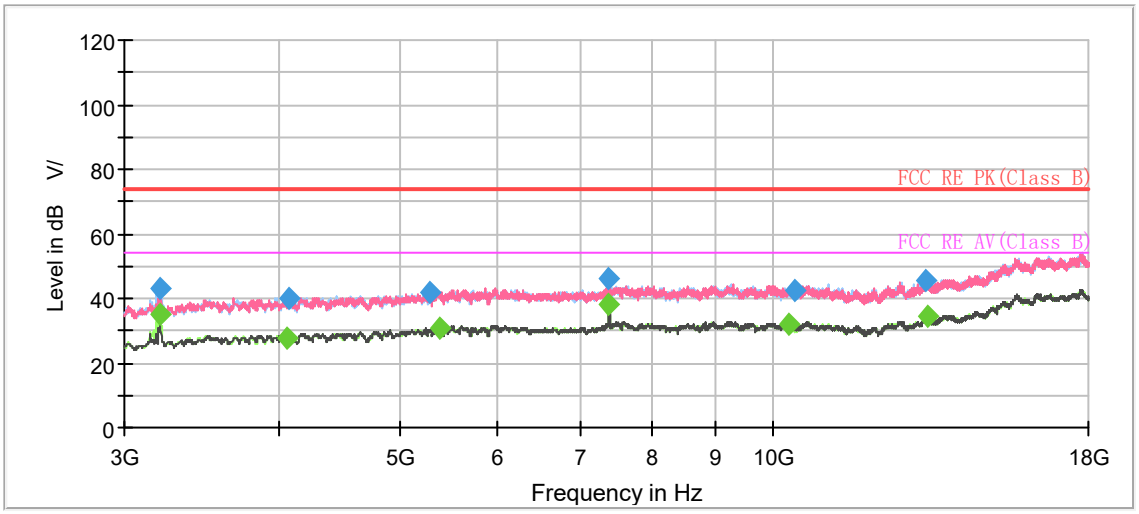
**Remark: 1. Correction Factor = Antenna factor + Insertion loss (cable loss + amplifier gain)**

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

**802.11b CH11**




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



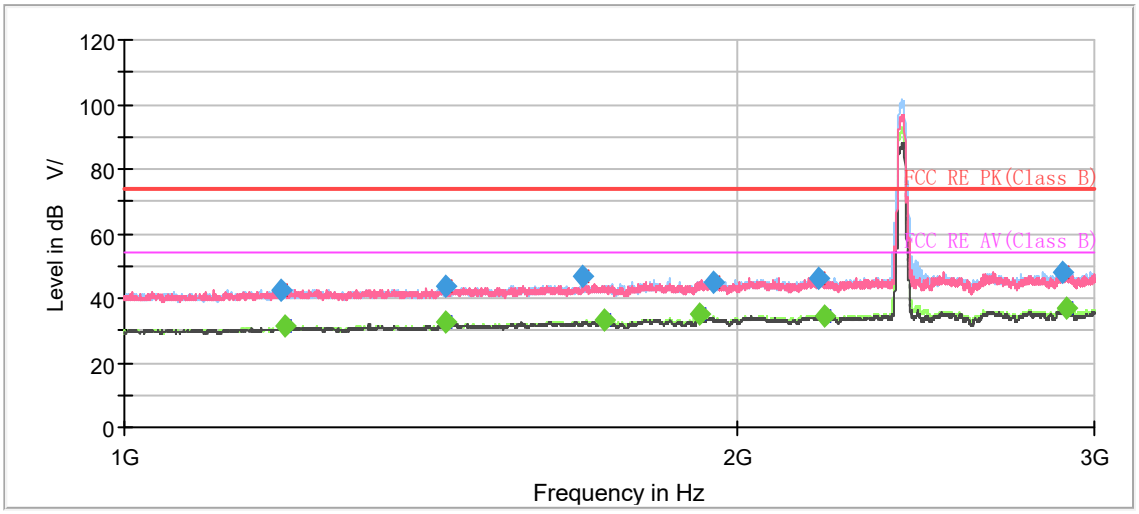

Radiates Emission from 3GHz to 18GHz

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|---|---|---|---|---|---|---|---|---|---|
| 1157.250000 | 42.32 | --- | 74.00 | 31.68 | 500.0 | 100.0 | H | 24.0 | -7.7 |
| 1167.000000 | --- | 30.74 | 54.00 | 23.26 | 500.0 | 200.0 | H | 232.0 | -7.7 |
| 1319.750000 | 42.72 | --- | 74.00 | 31.28 | 500.0 | 100.0 | H | 199.0 | -6.7 |
| 1324.500000 | --- | 31.04 | 54.00 | 22.96 | 500.0 | 200.0 | H | 273.0 | -6.7 |
| 1499.500000 | --- | 31.71 | 54.00 | 22.29 | 500.0 | 200.0 | H | 319.0 | -5.5 |
| 1502.750000 | 43.12 | --- | 74.00 | 30.88 | 500.0 | 100.0 | V | 193.0 | -5.5 |
| 1714.750000 | --- | 32.75 | 54.00 | 21.25 | 500.0 | 200.0 | H | 227.0 | -4.4 |
| 1721.250000 | 43.93 | --- | 74.00 | 30.07 | 500.0 | 100.0 | H | 1.0 | -4.4 |
| 1937.000000 | 45.40 | --- | 74.00 | 28.60 | 500.0 | 100.0 | V | 313.0 | -3.2 |
| 2055.750000 | --- | 34.53 | 54.00 | 19.47 | 500.0 | 200.0 | H | 241.0 | -2.6 |
| 2885.000000 | 47.66 | --- | 74.00 | 26.34 | 500.0 | 200.0 | H | 190.0 | 0.8 |
| 2902.000000 | --- | 36.70 | 54.00 | 17.30 | 500.0 | 100.0 | H | 69.0 | 0.9 |

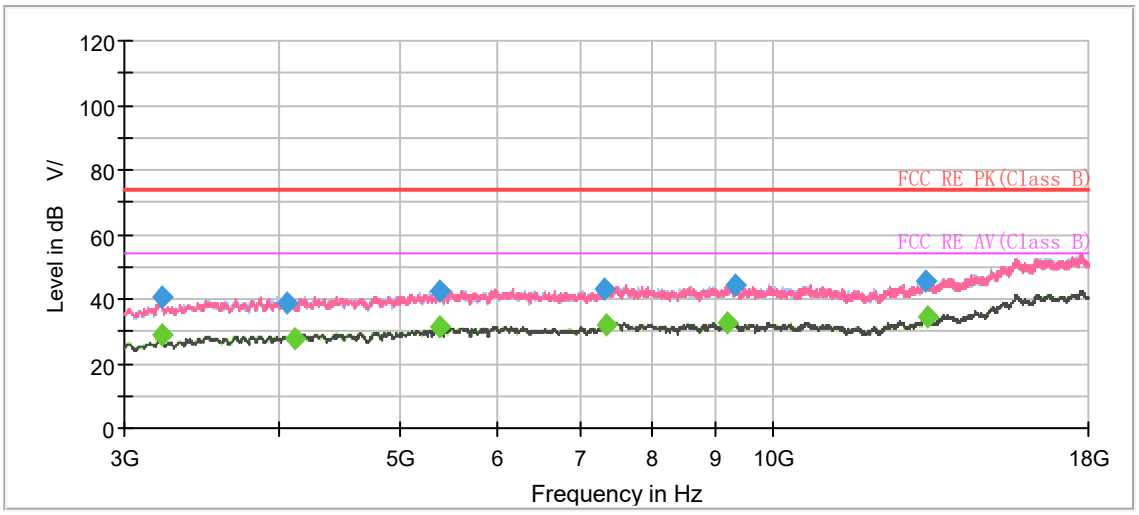
**Remark: 1. Correction Factor = Antenna factor + Insertion loss (cable loss + amplifier gain)**

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

**802.11g CH1**




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



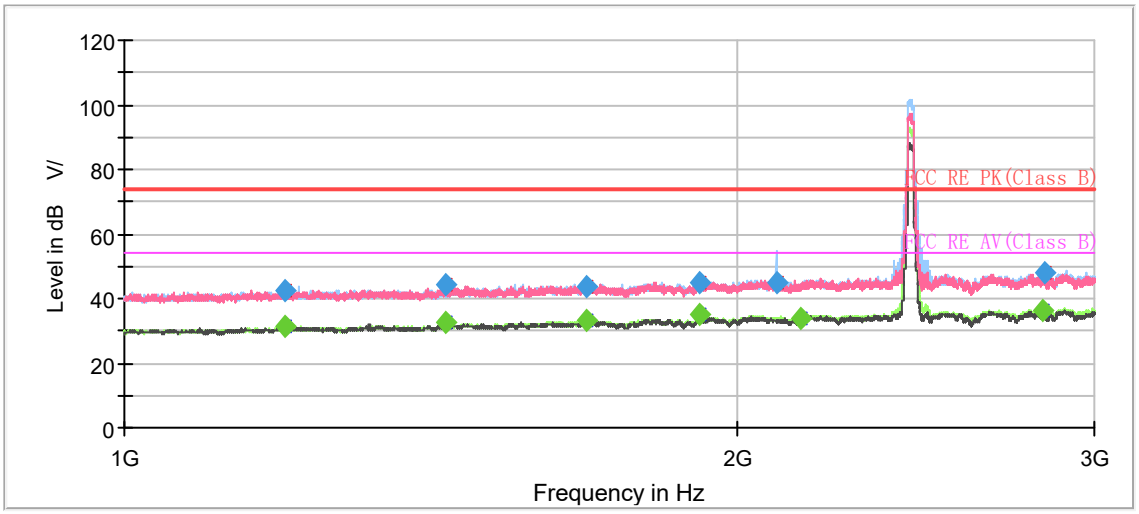

Radiates Emission from 3GHz to 18GHz

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|---|---|---|---|---|---|---|---|---|---|
| 1195.000000 | 42.53 | --- | 74.00 | 31.47 | 500.0 | 100.0 | V | 349.0 | -7.5 |
| 1200.000000 | --- | 31.11 | 54.00 | 22.89 | 500.0 | 200.0 | V | 328.0 | -7.4 |
| 1439.750000 | 43.93 | --- | 74.00 | 30.07 | 500.0 | 200.0 | V | 94.0 | -5.9 |
| 1440.000000 | --- | 32.76 | 54.00 | 21.24 | 500.0 | 200.0 | V | 90.0 | -5.9 |
| 1680.500000 | 46.78 | --- | 74.00 | 27.22 | 500.0 | 200.0 | V | 67.0 | -4.6 |
| 1723.250000 | --- | 33.00 | 54.00 | 21.00 | 500.0 | 100.0 | H | 49.0 | -4.4 |
| 1919.000000 | --- | 34.88 | 54.00 | 19.12 | 500.0 | 200.0 | H | 72.0 | -3.4 |
| 1946.750000 | 44.76 | --- | 74.00 | 29.24 | 500.0 | 100.0 | H | 4.0 | -3.2 |
| 2195.750000 | 46.06 | --- | 74.00 | 27.94 | 500.0 | 100.0 | H | 150.0 | -2.0 |
| 2209.750000 | --- | 34.30 | 54.00 | 19.70 | 500.0 | 100.0 | H | 72.0 | -2.0 |
| 2891.750000 | 48.10 | --- | 74.00 | 25.90 | 500.0 | 200.0 | H | 144.0 | 0.8 |
| 2905.750000 | --- | 36.70 | 54.00 | 17.30 | 500.0 | 100.0 | H | 150.0 | 0.9 |

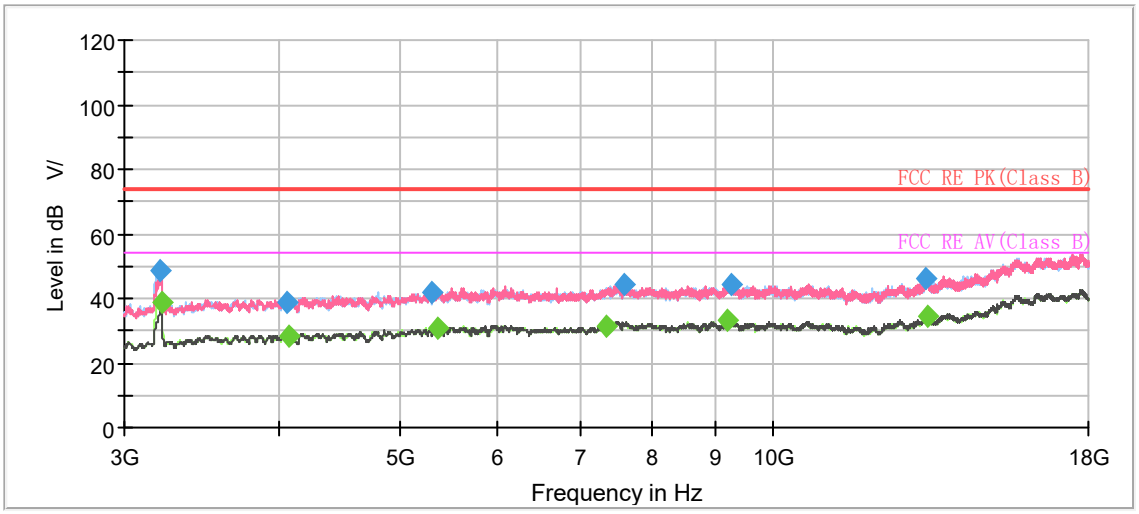
**Remark: 1. Correction Factor = Antenna factor + Insertion loss (cable loss + amplifier gain)**

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

**802.11g CH6**




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



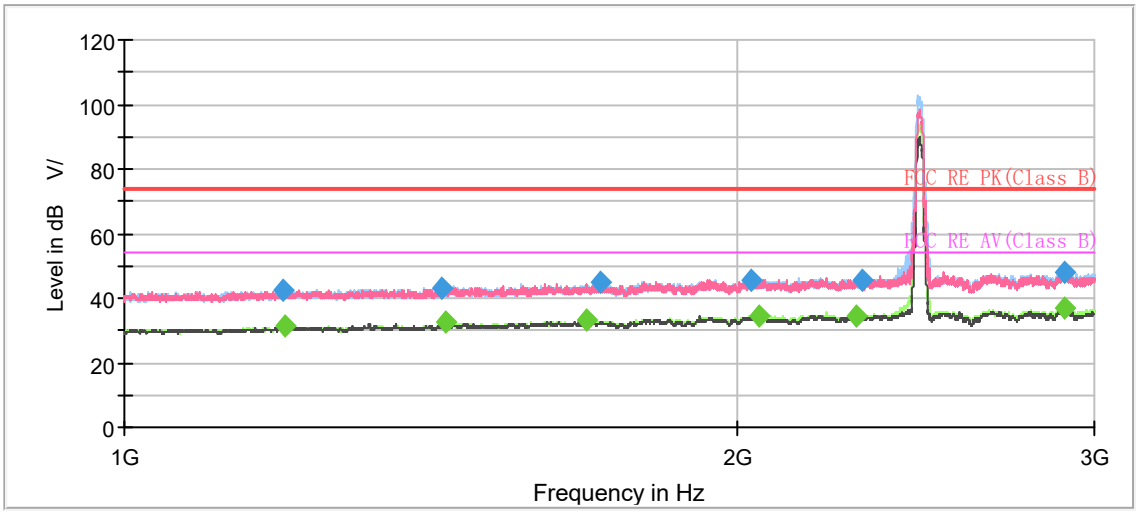

Radiates Emission from 3GHz to 18GHz

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|---|---|---|---|---|---|---|---|---|---|
| 1200.250000 | --- | 31.19 | 54.00 | 22.81 | 500.0 | 200.0 | V | 341.0 | -7.4 |
| 1200.500000 | 42.54 | --- | 74.00 | 31.46 | 500.0 | 200.0 | V | 12.0 | -7.4 |
| 1440.000000 | 44.08 | --- | 74.00 | 29.92 | 500.0 | 200.0 | V | 86.0 | -5.9 |
| 1440.250000 | --- | 32.80 | 54.00 | 21.20 | 500.0 | 200.0 | V | 146.0 | -5.9 |
| 1688.500000 | 43.48 | --- | 74.00 | 30.52 | 500.0 | 200.0 | V | 181.0 | -4.6 |
| 1688.500000 | --- | 33.28 | 54.00 | 20.72 | 500.0 | 100.0 | H | 6.0 | -4.6 |
| 1919.000000 | 44.86 | --- | 74.00 | 29.14 | 500.0 | 100.0 | V | 159.0 | -3.4 |
| 1920.250000 | --- | 34.81 | 54.00 | 19.19 | 500.0 | 100.0 | V | 226.0 | -3.3 |
| 2092.500000 | 44.62 | --- | 74.00 | 29.38 | 500.0 | 100.0 | V | 359.0 | -2.5 |
| 2153.000000 | --- | 33.92 | 54.00 | 20.08 | 500.0 | 100.0 | H | 20.0 | -2.2 |
| 2831.750000 | --- | 36.02 | 54.00 | 17.98 | 500.0 | 100.0 | H | 38.0 | 0.6 |
| 2834.500000 | 47.83 | --- | 74.00 | 26.17 | 500.0 | 100.0 | H | 38.0 | 0.6 |

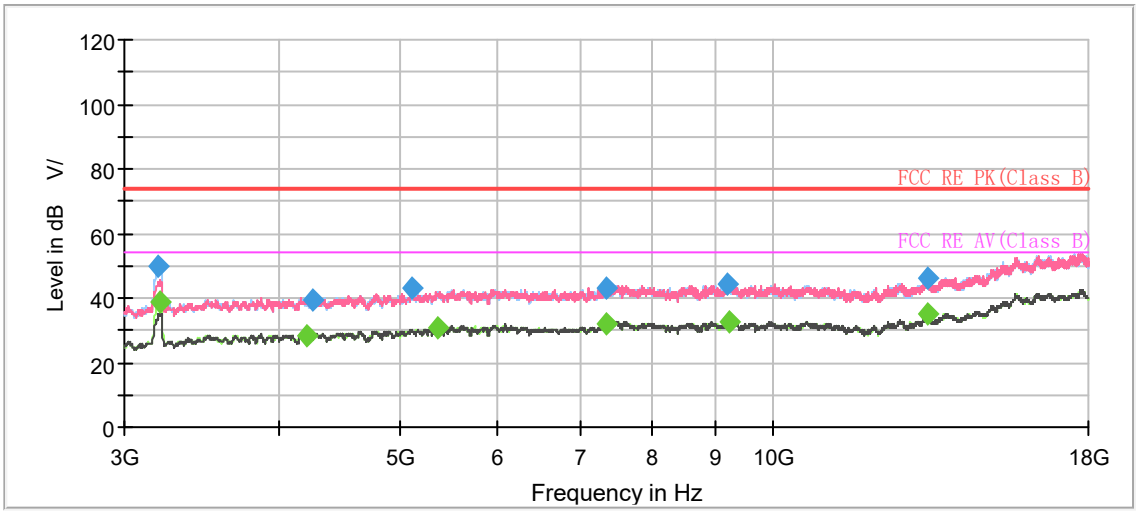
**Remark: 1. Correction Factor = Antenna factor + Insertion loss (cable loss + amplifier gain)**

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

**802.11g CH11**




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



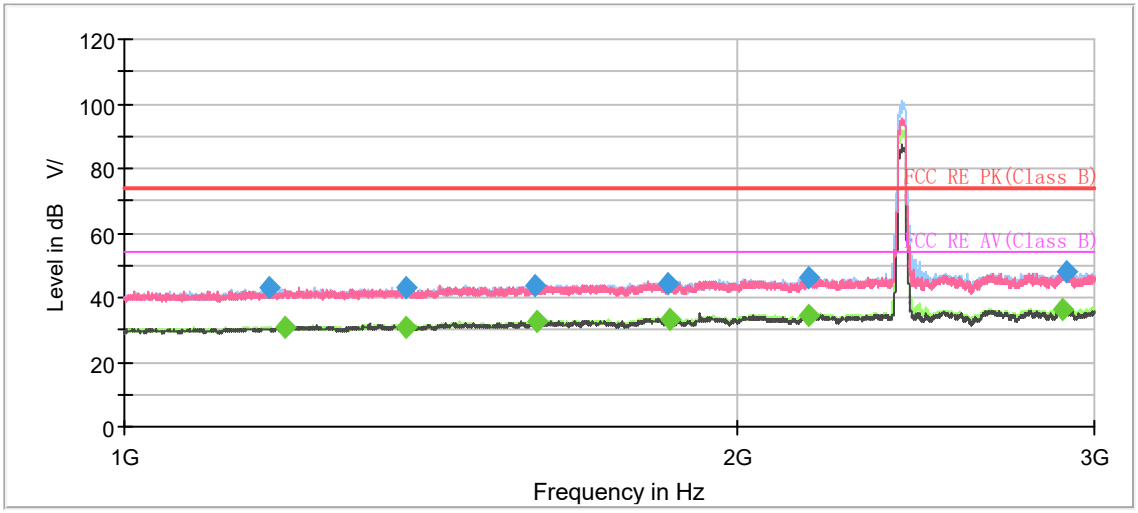

Radiates Emission from 3GHz to 18GHz

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|---|---|---|---|---|---|---|---|---|---|
| 1196.250000 | 42.22 | --- | 74.00 | 31.78 | 500.0 | 100.0 | V | 125.0 | -7.5 |
| 1200.000000 | --- | 31.22 | 54.00 | 22.78 | 500.0 | 200.0 | V | 78.0 | -7.4 |
| 1432.000000 | 43.33 | --- | 74.00 | 30.67 | 500.0 | 100.0 | V | 203.0 | -6.0 |
| 1440.000000 | --- | 32.43 | 54.00 | 21.57 | 500.0 | 200.0 | V | 83.0 | -5.9 |
| 1688.750000 | --- | 33.39 | 54.00 | 20.61 | 500.0 | 100.0 | H | 77.0 | -4.6 |
| 1716.000000 | 44.76 | --- | 74.00 | 29.24 | 500.0 | 200.0 | V | 173.0 | -4.4 |
| 2032.750000 | 45.84 | --- | 74.00 | 28.16 | 500.0 | 100.0 | H | 72.0 | -2.7 |
| 2054.250000 | --- | 34.56 | 54.00 | 19.44 | 500.0 | 100.0 | H | 0.0 | -2.6 |
| 2291.500000 | --- | 34.45 | 54.00 | 19.55 | 500.0 | 100.0 | H | 4.0 | -1.7 |
| 2308.500000 | 45.45 | --- | 74.00 | 28.55 | 500.0 | 200.0 | H | 84.0 | -1.6 |
| 2902.250000 | 48.06 | --- | 74.00 | 25.94 | 500.0 | 200.0 | H | 181.0 | 0.9 |
| 2902.250000 | --- | 36.81 | 54.00 | 17.19 | 500.0 | 100.0 | H | 18.0 | 0.9 |

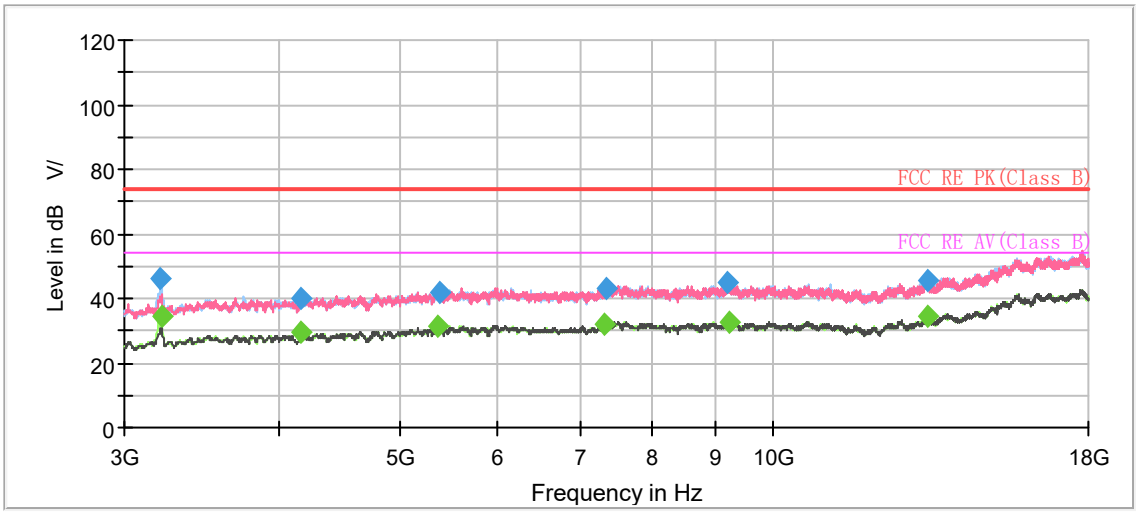
**Remark: 1. Correction Factor = Antenna factor + Insertion loss (cable loss + amplifier gain)**

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

**802.11n (HT20) CH1**




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



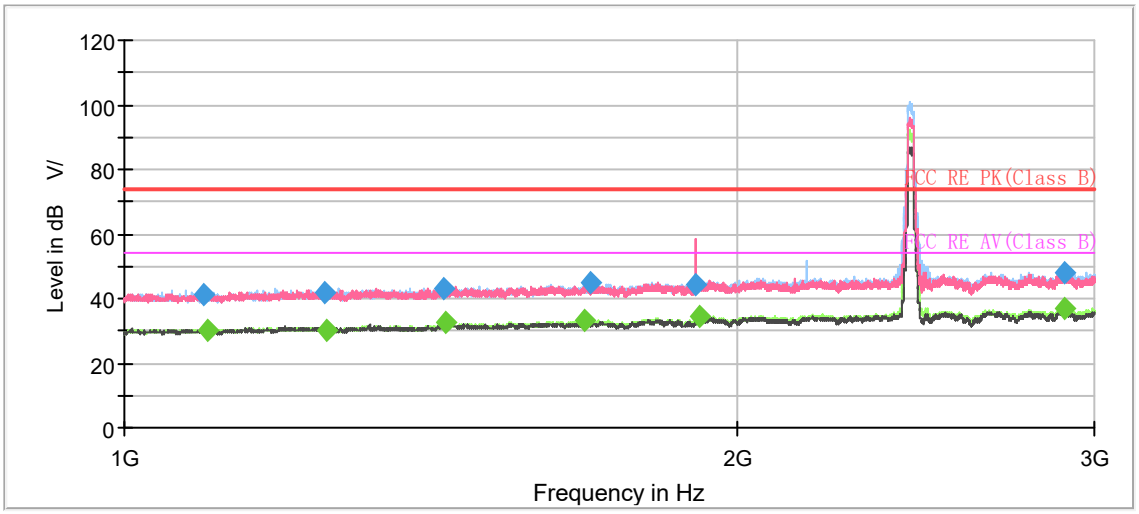

Radiates Emission from 3GHz to 18GHz

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|---|---|---|---|---|---|---|---|---|---|
| 1178.750000 | 42.79 | --- | 74.00 | 31.21 | 500.0 | 100.0 | H | 333.0 | -7.6 |
| 1200.500000 | --- | 31.06 | 54.00 | 22.94 | 500.0 | 200.0 | V | 347.0 | -7.4 |
| 1376.250000 | 42.99 | --- | 74.00 | 31.01 | 500.0 | 100.0 | H | 185.0 | -6.4 |
| 1377.000000 | --- | 30.99 | 54.00 | 23.01 | 500.0 | 100.0 | H | 0.0 | -6.4 |
| 1591.250000 | 43.48 | --- | 74.00 | 30.52 | 500.0 | 100.0 | V | 13.0 | -5.1 |
| 1596.750000 | --- | 32.42 | 54.00 | 21.58 | 500.0 | 100.0 | H | 306.0 | -5.0 |
| 1848.750000 | 44.09 | --- | 74.00 | 29.91 | 500.0 | 100.0 | H | 198.0 | -3.7 |
| 1856.250000 | --- | 33.13 | 54.00 | 20.87 | 500.0 | 100.0 | H | 229.0 | -3.7 |
| 2171.000000 | --- | 34.40 | 54.00 | 19.60 | 500.0 | 100.0 | H | 140.0 | -2.1 |
| 2171.250000 | 46.33 | --- | 74.00 | 27.67 | 500.0 | 100.0 | V | 162.0 | -2.1 |
| 2897.250000 | --- | 36.29 | 54.00 | 17.71 | 500.0 | 100.0 | H | 338.0 | 0.8 |
| 2907.750000 | 47.90 | --- | 74.00 | 26.10 | 500.0 | 100.0 | H | 343.0 | 0.9 |

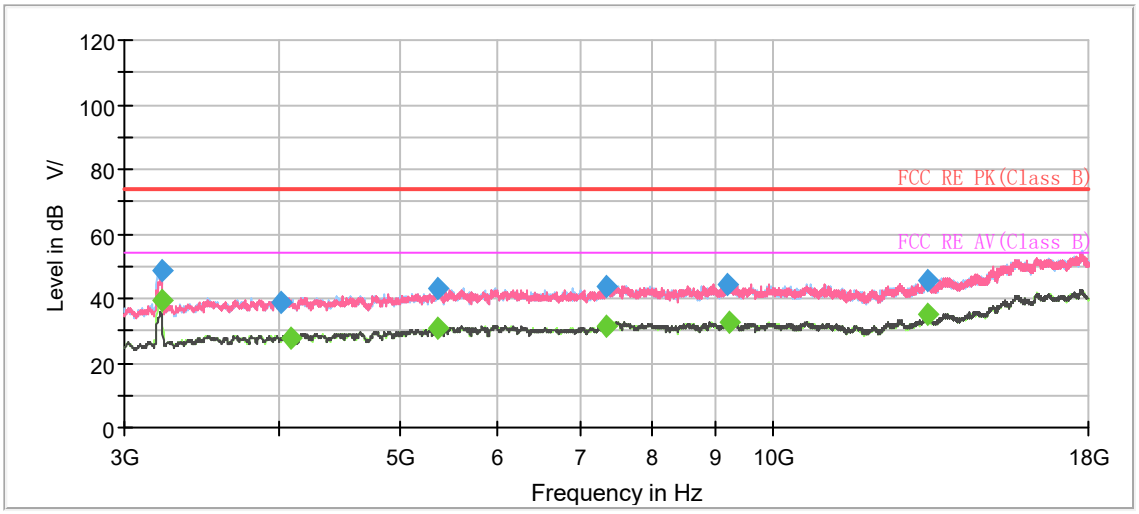
**Remark: 1. Correction Factor = Antenna factor + Insertion loss (cable loss + amplifier gain)**

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

**802.11n (HT20) CH6**




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



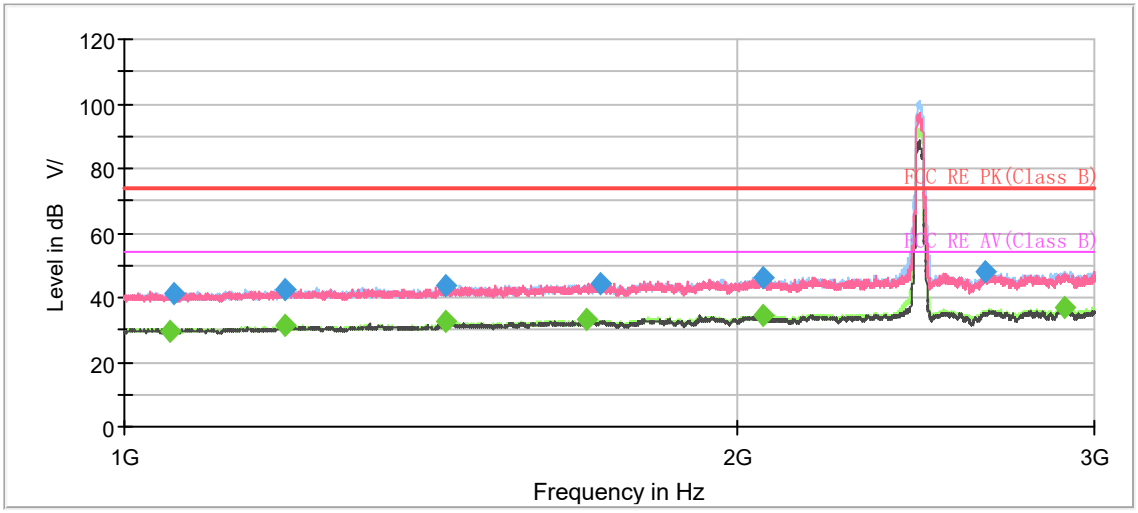

Radiates Emission from 3GHz to 18GHz

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|---|---|---|---|---|---|---|---|---|---|
| 1094.750000 | 40.99 | --- | 74.00 | 33.01 | 500.0 | 100.0 | V | 44.0 | -8.1 |
| 1099.750000 | --- | 30.37 | 54.00 | 23.63 | 500.0 | 100.0 | H | 289.0 | -8.1 |
| 1254.750000 | 41.57 | --- | 74.00 | 32.43 | 500.0 | 200.0 | H | 77.0 | -7.1 |
| 1256.250000 | --- | 30.41 | 54.00 | 23.59 | 500.0 | 100.0 | H | 270.0 | -7.1 |
| 1437.250000 | 43.23 | --- | 74.00 | 30.77 | 500.0 | 100.0 | H | 211.0 | -6.0 |
| 1440.000000 | --- | 32.46 | 54.00 | 21.54 | 500.0 | 200.0 | V | 90.0 | -5.9 |
| 1683.500000 | --- | 33.28 | 54.00 | 20.72 | 500.0 | 100.0 | H | 321.0 | -4.6 |
| 1693.750000 | 44.89 | --- | 74.00 | 29.11 | 500.0 | 100.0 | H | 248.0 | -4.6 |
| 1911.750000 | 44.39 | --- | 74.00 | 29.61 | 500.0 | 100.0 | H | 279.0 | -3.4 |
| 1920.000000 | --- | 34.57 | 54.00 | 19.43 | 500.0 | 100.0 | V | 173.0 | -3.3 |
| 2900.500000 | --- | 36.68 | 54.00 | 17.32 | 500.0 | 100.0 | H | 257.0 | 0.9 |
| 2901.000000 | 48.00 | --- | 74.00 | 26.00 | 500.0 | 100.0 | H | 298.0 | 0.9 |

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

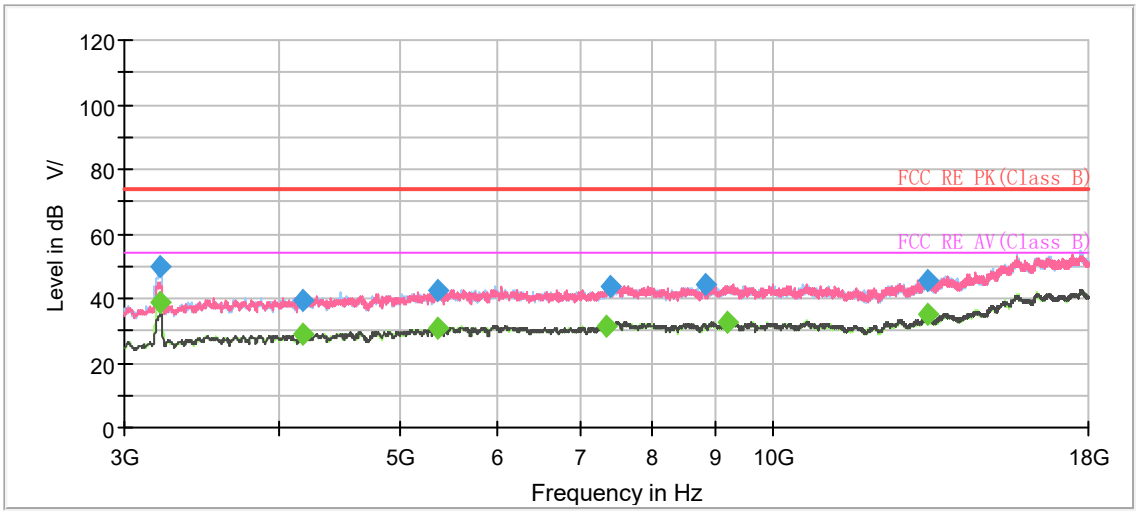
**2. Margin = Limit –MAX Peak/ Average**

**802.11n (HT20) CH11**




Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz



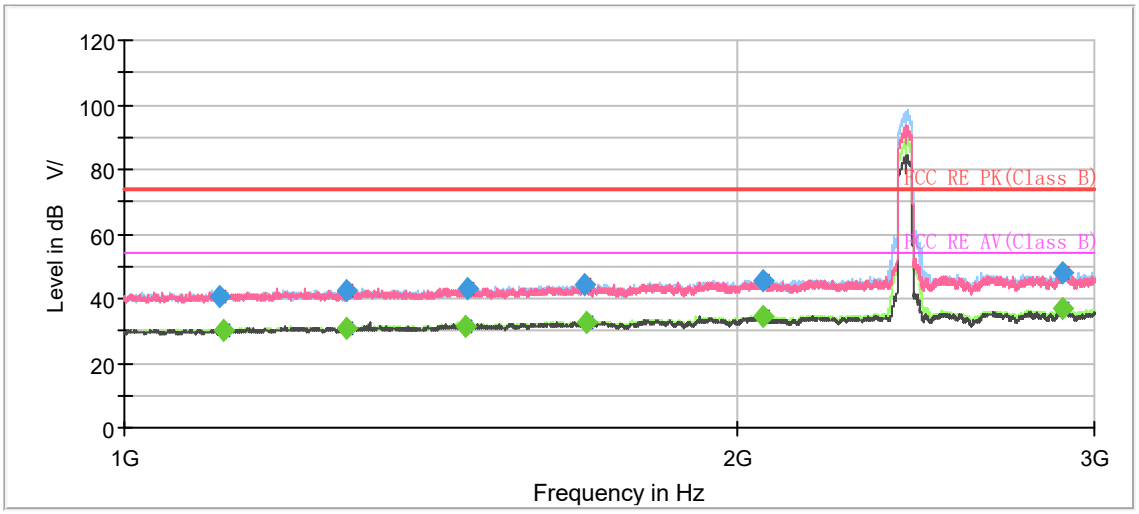

Radiates Emission from 3GHz to 18GHz

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|---|---|---|---|---|---|---|---|---|---|
| 1053.000000 | --- | 29.81 | 54.00 | 24.19 | 500.0 | 100.0 | H | 0.0 | -8.4 |
| 1056.750000 | 41.48 | --- | 74.00 | 32.52 | 500.0 | 100.0 | V | 9.0 | -8.4 |
| 1200.000000 | --- | 31.30 | 54.00 | 22.70 | 500.0 | 200.0 | V | 96.0 | -7.4 |
| 1200.250000 | 42.52 | --- | 74.00 | 31.48 | 500.0 | 200.0 | V | 265.0 | -7.4 |
| 1440.000000 | --- | 32.64 | 54.00 | 21.36 | 500.0 | 200.0 | V | 242.0 | -5.9 |
| 1440.500000 | 43.68 | --- | 74.00 | 30.32 | 500.0 | 200.0 | V | 96.0 | -5.9 |
| 1689.250000 | --- | 33.02 | 54.00 | 20.98 | 500.0 | 100.0 | H | 317.0 | -4.6 |
| 1714.000000 | 44.47 | --- | 74.00 | 29.53 | 500.0 | 100.0 | H | 254.0 | -4.4 |
| 2060.250000 | 46.22 | --- | 74.00 | 27.78 | 500.0 | 100.0 | H | 262.0 | -2.6 |
| 2063.750000 | --- | 34.38 | 54.00 | 19.62 | 500.0 | 100.0 | H | 240.0 | -2.6 |
| 2653.750000 | 48.13 | --- | 74.00 | 25.87 | 500.0 | 200.0 | H | 56.0 | -0.1 |
| 2898.750000 | --- | 36.68 | 54.00 | 17.32 | 500.0 | 100.0 | H | 340.0 | 0.8 |

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

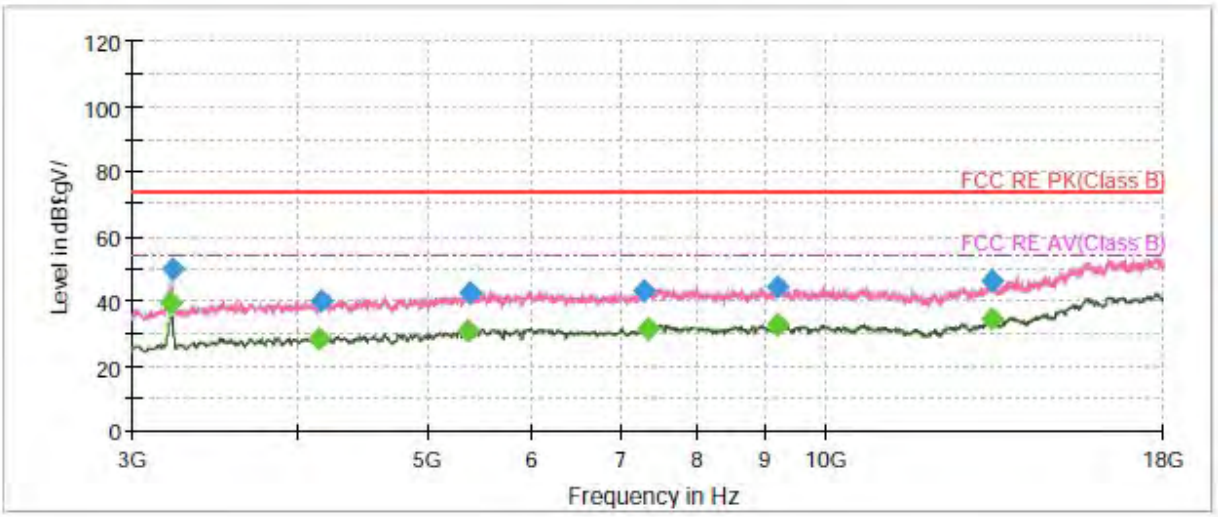
**2. Margin = Limit –MAX Peak/ Average**

**802.11n (HT40) CH3**




Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz



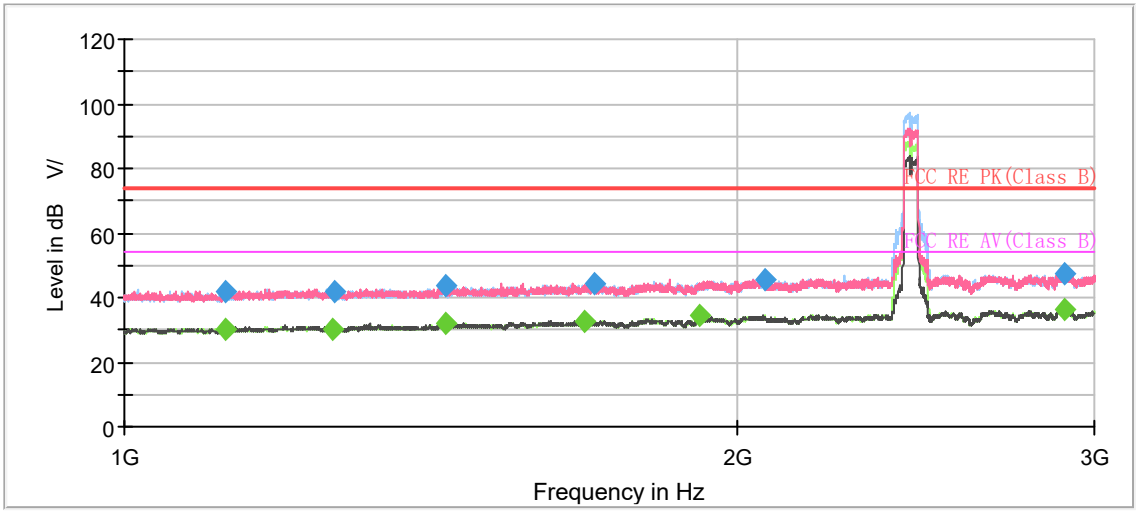

Radiates Emission from 3GHz to 18GHz

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|---|---|---|---|---|---|---|---|---|---|
| 1114.500000 | 40.86 | --- | 74.00 | 33.14 | 500.0 | 200.0 | H | 189.0 | -8.0 |
| 1118.250000 | --- | 29.90 | 54.00 | 24.10 | 500.0 | 100.0 | H | 190.0 | -8.0 |
| 1286.000000 | 42.50 | --- | 74.00 | 31.50 | 500.0 | 100.0 | H | 331.0 | -7.0 |
| 1286.250000 | --- | 30.56 | 54.00 | 23.44 | 500.0 | 100.0 | H | 177.0 | -7.0 |
| 1473.000000 | --- | 31.66 | 54.00 | 22.34 | 500.0 | 100.0 | H | 331.0 | -5.7 |
| 1475.500000 | 42.92 | --- | 74.00 | 31.08 | 500.0 | 100.0 | H | 350.0 | -5.7 |
| 1685.000000 | 44.42 | --- | 74.00 | 29.58 | 500.0 | 100.0 | H | 327.0 | -4.6 |
| 1689.000000 | --- | 32.78 | 54.00 | 21.22 | 500.0 | 100.0 | H | 309.0 | -4.6 |
| 2060.250000 | --- | 34.54 | 54.00 | 19.46 | 500.0 | 100.0 | H | 260.0 | -2.6 |
| 2061.750000 | 45.75 | --- | 74.00 | 28.25 | 500.0 | 100.0 | V | 6.0 | -2.6 |
| 2893.250000 | 47.93 | --- | 74.00 | 26.07 | 500.0 | 100.0 | H | 0.0 | 0.8 |
| 2896.250000 | --- | 36.98 | 54.00 | 17.02 | 500.0 | 100.0 | H | 282.0 | 0.8 |

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

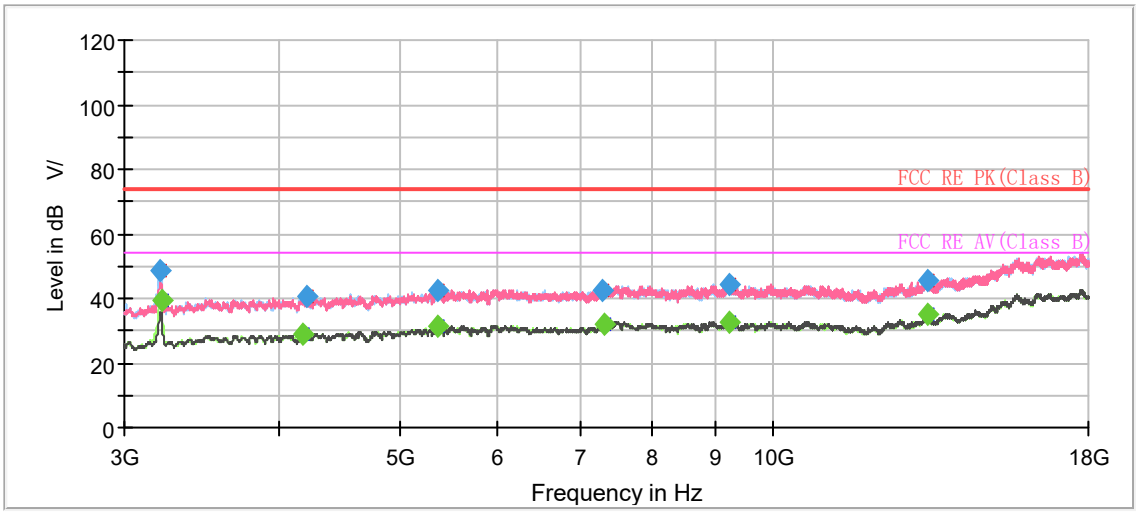
**2. Margin = Limit –MAX Peak/ Average**

**802.11n (HT40) CH6**




Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz



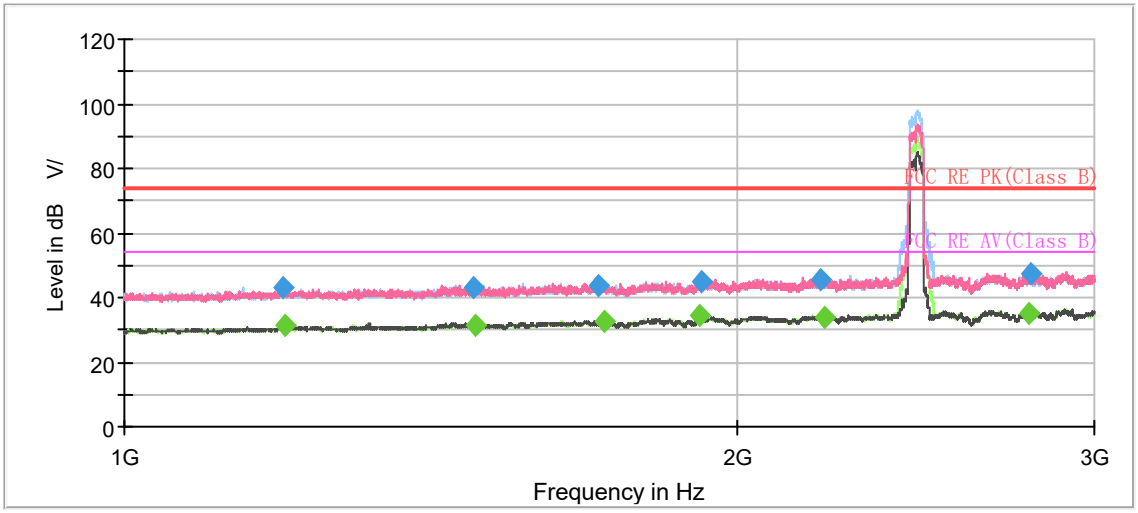

Radiates Emission from 3GHz to 18GHz

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|---|---|---|---|---|---|---|---|---|---|
| 1121.500000 | --- | 30.16 | 54.00 | 23.84 | 500.0 | 200.0 | H | 26.0 | -8.0 |
| 1122.250000 | 41.60 | --- | 74.00 | 32.40 | 500.0 | 200.0 | H | 13.0 | -8.0 |
| 1266.250000 | --- | 30.35 | 54.00 | 23.65 | 500.0 | 100.0 | H | 260.0 | -7.1 |
| 1270.250000 | 41.77 | --- | 74.00 | 32.23 | 500.0 | 200.0 | V | 179.0 | -7.1 |
| 1439.500000 | 43.51 | --- | 74.00 | 30.49 | 500.0 | 200.0 | V | 143.0 | -5.9 |
| 1440.000000 | --- | 32.18 | 54.00 | 21.82 | 500.0 | 200.0 | V | 88.0 | -5.9 |
| 1684.750000 | --- | 32.61 | 54.00 | 21.39 | 500.0 | 200.0 | V | 277.0 | -4.6 |
| 1702.250000 | 44.54 | --- | 74.00 | 29.46 | 500.0 | 100.0 | V | 335.0 | -4.5 |
| 1920.500000 | --- | 34.61 | 54.00 | 19.39 | 500.0 | 100.0 | V | 162.0 | -3.3 |
| 2065.750000 | 45.55 | --- | 74.00 | 28.45 | 500.0 | 100.0 | H | 251.0 | -2.6 |
| 2897.750000 | 47.39 | --- | 74.00 | 26.61 | 500.0 | 100.0 | H | 192.0 | 0.8 |
| 2898.500000 | --- | 36.15 | 54.00 | 17.85 | 500.0 | 100.0 | V | 158.0 | 0.8 |

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

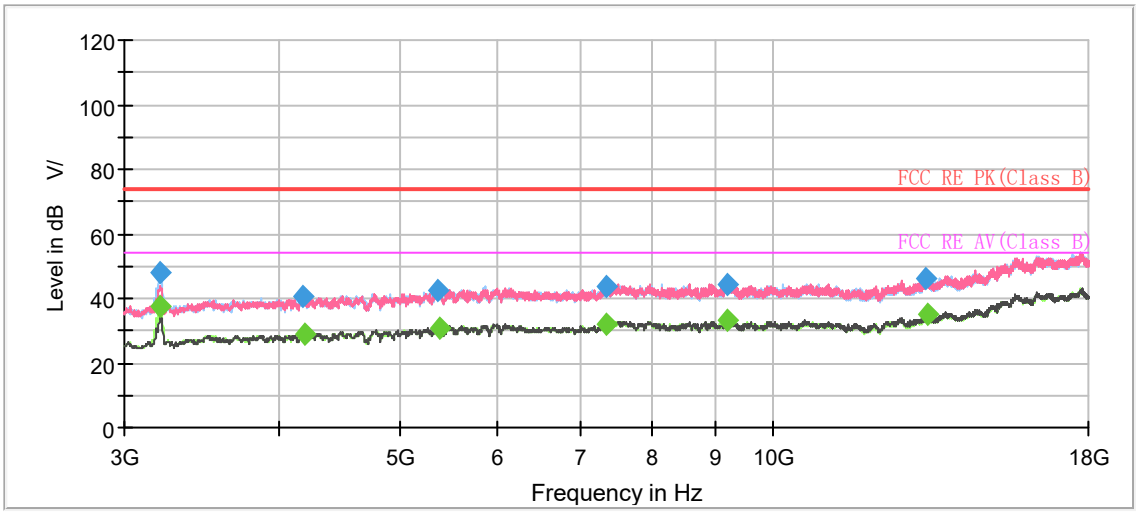
**2. Margin = Limit –MAX Peak/ Average**

**802.11n (HT40) CH9**




Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz



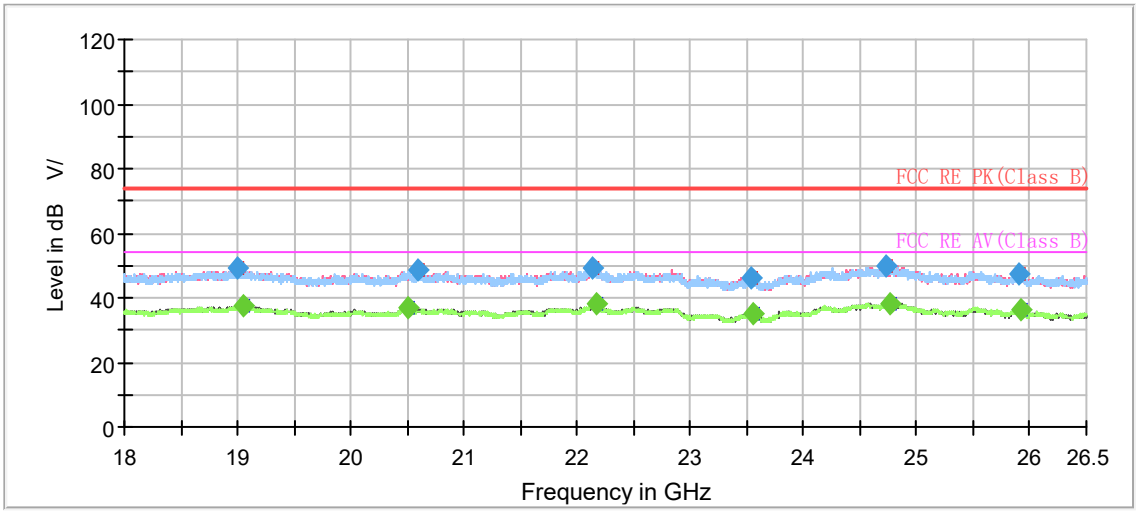

Radiates Emission from 3GHz to 18GHz

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|---|---|---|---|---|---|---|---|---|---|
| 1196.250000 | 42.90 | --- | 74.00 | 31.10 | 500.0 | 100.0 | V | 149.0 | -7.5 |
| 1200.500000 | --- | 31.09 | 54.00 | 22.91 | 500.0 | 200.0 | V | 80.0 | -7.4 |
| 1484.000000 | 43.05 | --- | 74.00 | 30.95 | 500.0 | 100.0 | V | 0.0 | -5.6 |
| 1488.500000 | --- | 31.18 | 54.00 | 22.82 | 500.0 | 200.0 | H | 72.0 | -5.6 |
| 1712.500000 | 43.39 | --- | 74.00 | 30.61 | 500.0 | 100.0 | V | 123.0 | -4.5 |
| 1721.500000 | --- | 32.75 | 54.00 | 21.25 | 500.0 | 100.0 | H | 276.0 | -4.4 |
| 1920.000000 | --- | 34.61 | 54.00 | 19.39 | 500.0 | 100.0 | V | 172.0 | -3.3 |
| 1924.250000 | 45.02 | --- | 74.00 | 28.98 | 500.0 | 200.0 | V | 85.0 | -3.3 |
| 2200.000000 | 45.40 | --- | 74.00 | 28.60 | 500.0 | 100.0 | V | 229.0 | -2.0 |
| 2208.250000 | --- | 33.73 | 54.00 | 20.27 | 500.0 | 200.0 | H | 87.0 | -2.0 |
| 2788.500000 | --- | 34.91 | 54.00 | 19.09 | 500.0 | 100.0 | H | 56.0 | 0.4 |
| 2789.500000 | 47.34 | --- | 74.00 | 26.66 | 500.0 | 100.0 | H | 304.0 | 0.4 |

**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, 802.11n (HT40) CH3 are selected as the worst condition. The test data of the worst-case condition was recorded in this report.



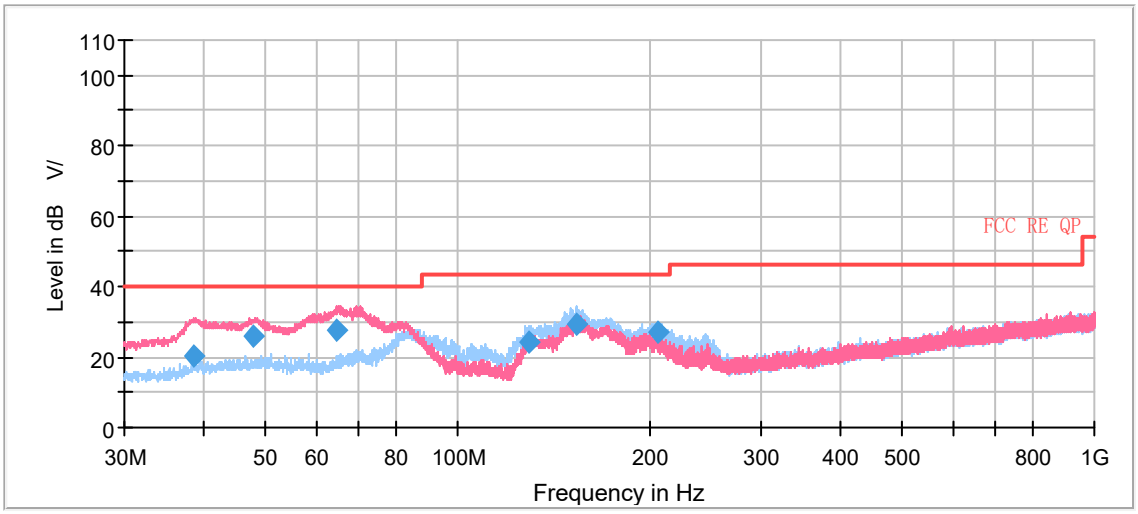

Radiates Emission from 18GHz to 26.5GHz

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|---|---|---|---|---|---|---|---|---|---|
| 19007.250000 | 49.36 | --- | 74.00 | 24.64 | 500.0 | 100.0 | V | 103.0 | -6.5 |
| 19050.812500 | --- | 37.51 | 54.00 | 16.49 | 500.0 | 100.0 | V | 221.0 | -6.4 |
| 20499.000000 | --- | 36.77 | 54.00 | 17.23 | 500.0 | 100.0 | V | 108.0 | -6.2 |
| 20590.375000 | 48.49 | --- | 74.00 | 25.51 | 500.0 | 200.0 | V | 314.0 | -6.2 |
| 22139.500000 | 48.97 | --- | 74.00 | 25.03 | 500.0 | 200.0 | H | 56.0 | -4.5 |
| 22162.875000 | --- | 37.90 | 54.00 | 16.10 | 500.0 | 100.0 | V | 181.0 | -4.5 |
| 23535.625000 | 46.06 | --- | 74.00 | 27.94 | 500.0 | 200.0 | H | 148.0 | -5.8 |
| 23548.375000 | --- | 34.84 | 54.00 | 19.16 | 500.0 | 100.0 | H | 100.0 | -5.8 |
| 24736.250000 | 49.72 | --- | 74.00 | 24.28 | 500.0 | 100.0 | V | 236.0 | -1.4 |
| 24769.187500 | --- | 38.36 | 54.00 | 15.64 | 500.0 | 200.0 | H | 167.0 | -1.5 |
| 25897.562500 | 47.33 | --- | 74.00 | 26.67 | 500.0 | 100.0 | V | 138.0 | -2.9 |
| 25918.812500 | --- | 36.09 | 54.00 | 17.91 | 500.0 | 200.0 | H | 239.0 | -3.0 |

**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 0 are selected as the worst condition. The test data of the worst-case condition was recorded in this report.



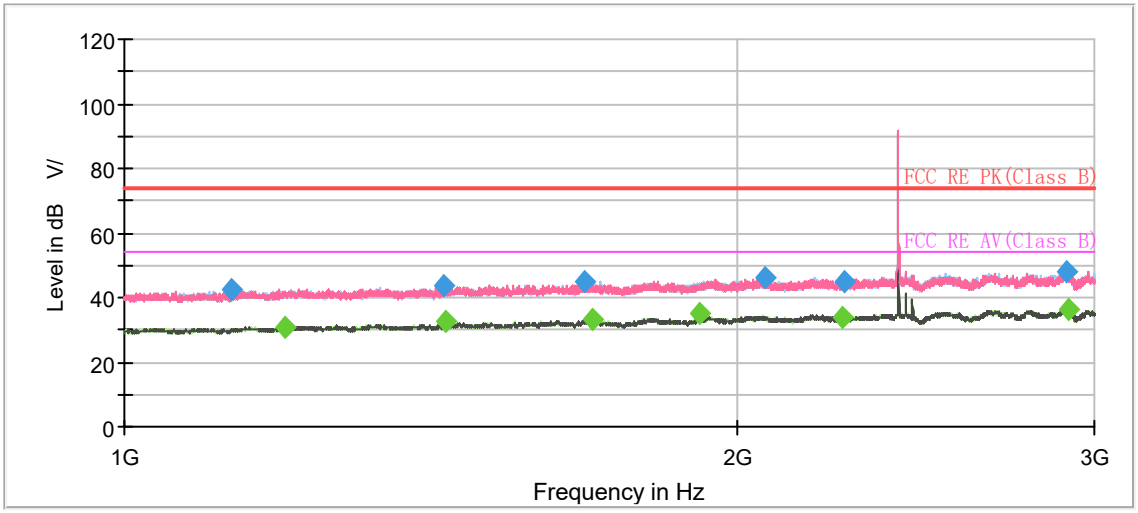

Radiates Emission from 30MHz to 1GHz

| Frequency (MHz) | Quasi-Peak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) |
|---|---|---|---|---|---|---|---|
| 38.610000 | 20.15 | 40.00 | 19.85 | 100.0 | V | 349.0 | 19.0 |
| 47.843667 | 26.09 | 40.00 | 13.91 | 100.0 | V | 15.0 | 20.5 |
| 64.714000 | 27.81 | 40.00 | 12.19 | 100.0 | V | 0.0 | 18.0 |
| 129.952667 | 24.23 | 43.50 | 19.27 | 175.0 | H | 307.0 | 15.3 |
| 154.115000 | 29.16 | 43.50 | 14.34 | 185.0 | H | 117.0 | 14.8 |
| 206.045667 | 27.14 | 43.50 | 16.36 | 125.0 | H | 94.0 | 17.7 |

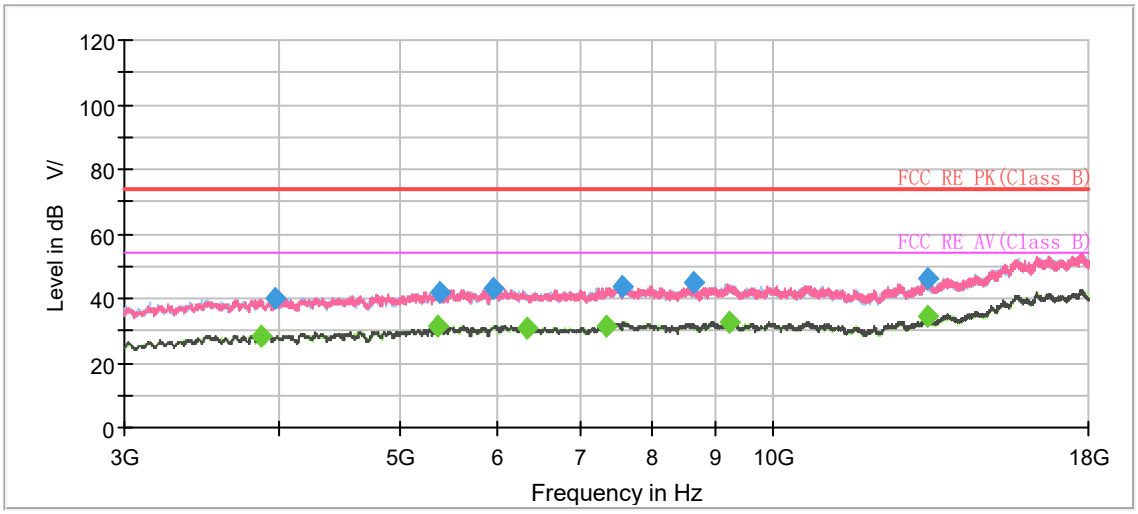
**Remark: 1. Correction Factor = Antenna factor + Insertion loss (cable loss + amplifier gain)**

**2. Margin = Limit – Quasi-Peak**

**Bluetooth LE-Channel 0**




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



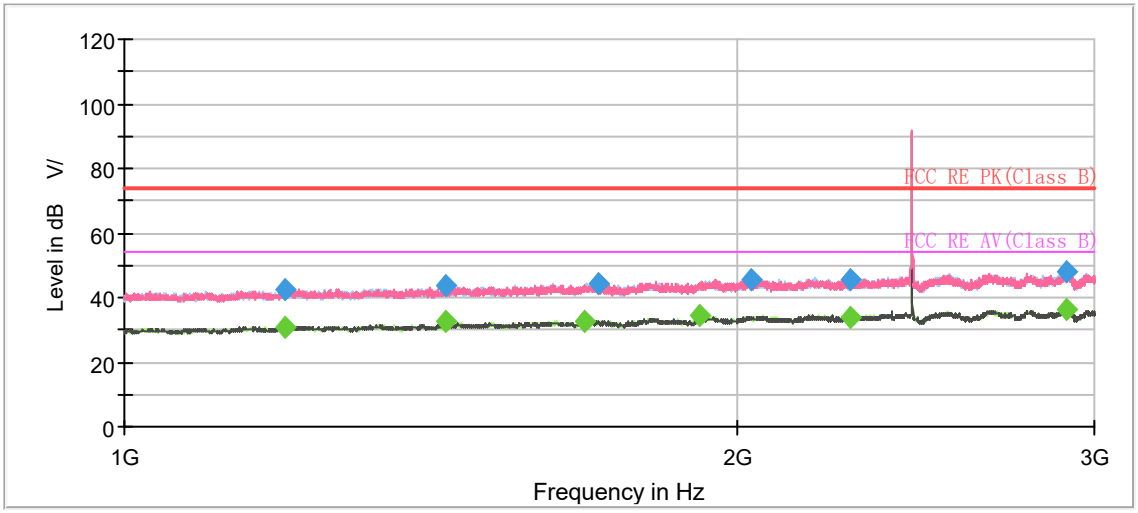

Radiates Emission from 3GHz to 18GHz

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|---|---|---|---|---|---|---|---|---|---|
| 1129.750000 | 42.47 | --- | 74.00 | 31.53 | 500.0 | 100.0 | H | 0.0 | -7.9 |
| 1199.750000 | --- | 30.90 | 54.00 | 23.10 | 500.0 | 200.0 | V | 14.0 | -7.4 |
| 1434.500000 | 43.87 | --- | 74.00 | 30.13 | 500.0 | 200.0 | H | 95.0 | -6.0 |
| 1440.000000 | --- | 32.73 | 54.00 | 21.27 | 500.0 | 200.0 | V | 84.0 | -5.9 |
| 1684.500000 | 44.87 | --- | 74.00 | 29.13 | 500.0 | 200.0 | H | 31.0 | -4.6 |
| 1699.500000 | --- | 33.06 | 54.00 | 20.94 | 500.0 | 200.0 | H | 265.0 | -4.5 |
| 1920.500000 | --- | 34.79 | 54.00 | 19.21 | 500.0 | 100.0 | V | 260.0 | -3.3 |
| 2065.750000 | 45.91 | --- | 74.00 | 28.09 | 500.0 | 100.0 | V | 156.0 | -2.6 |
| 2257.250000 | --- | 33.71 | 54.00 | 20.29 | 500.0 | 200.0 | V | 187.0 | -1.9 |
| 2259.000000 | 45.12 | --- | 74.00 | 28.88 | 500.0 | 200.0 | V | 103.0 | -1.8 |
| 2904.000000 | 47.78 | --- | 74.00 | 26.22 | 500.0 | 200.0 | H | 86.0 | 0.9 |
| 2910.750000 | --- | 36.32 | 54.00 | 17.68 | 500.0 | 100.0 | H | 27.0 | 0.9 |

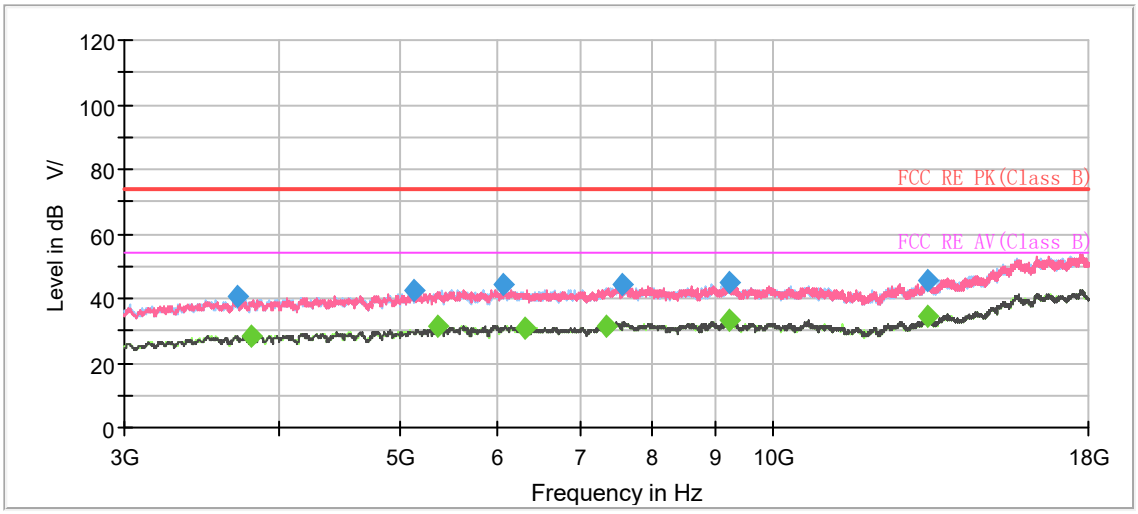
**Remark: 1. Correction Factor = Antenna factor + Insertion loss (cable loss + amplifier gain)**

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

**Bluetooth LE-Channel 19**




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



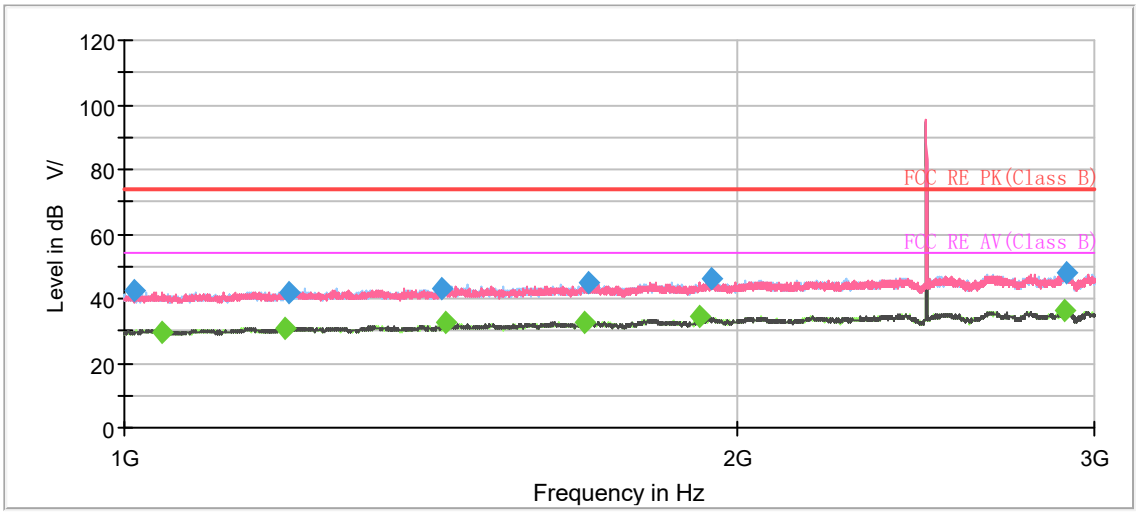

Radiates Emission from 3GHz to 18GHz

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|---|---|---|---|---|---|---|---|---|---|
| 1199.750000 | 42.25 | --- | 74.00 | 31.75 | 500.0 | 200.0 | V | 44.0 | -7.4 |
| 1200.250000 | --- | 30.96 | 54.00 | 23.04 | 500.0 | 200.0 | H | 0.0 | -7.4 |
| 1440.000000 | --- | 32.53 | 54.00 | 21.47 | 500.0 | 200.0 | V | 85.0 | -5.9 |
| 1440.000000 | 43.47 | --- | 74.00 | 30.53 | 500.0 | 200.0 | H | 320.0 | -5.9 |
| 1684.250000 | --- | 32.84 | 54.00 | 21.16 | 500.0 | 200.0 | V | 109.0 | -4.6 |
| 1711.750000 | 44.29 | --- | 74.00 | 29.71 | 500.0 | 100.0 | H | 140.0 | -4.5 |
| 1920.250000 | --- | 34.66 | 54.00 | 19.34 | 500.0 | 100.0 | V | 261.0 | -3.3 |
| 2032.750000 | 45.64 | --- | 74.00 | 28.36 | 500.0 | 200.0 | H | 192.0 | -2.7 |
| 2276.750000 | --- | 33.73 | 54.00 | 20.27 | 500.0 | 200.0 | H | 0.0 | -1.7 |
| 2278.000000 | 45.34 | --- | 74.00 | 28.66 | 500.0 | 100.0 | V | 351.0 | -1.7 |
| 2908.500000 | --- | 36.28 | 54.00 | 17.72 | 500.0 | 200.0 | V | 127.0 | 0.9 |
| 2910.000000 | 47.99 | --- | 74.00 | 26.01 | 500.0 | 100.0 | H | 169.0 | 0.9 |

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

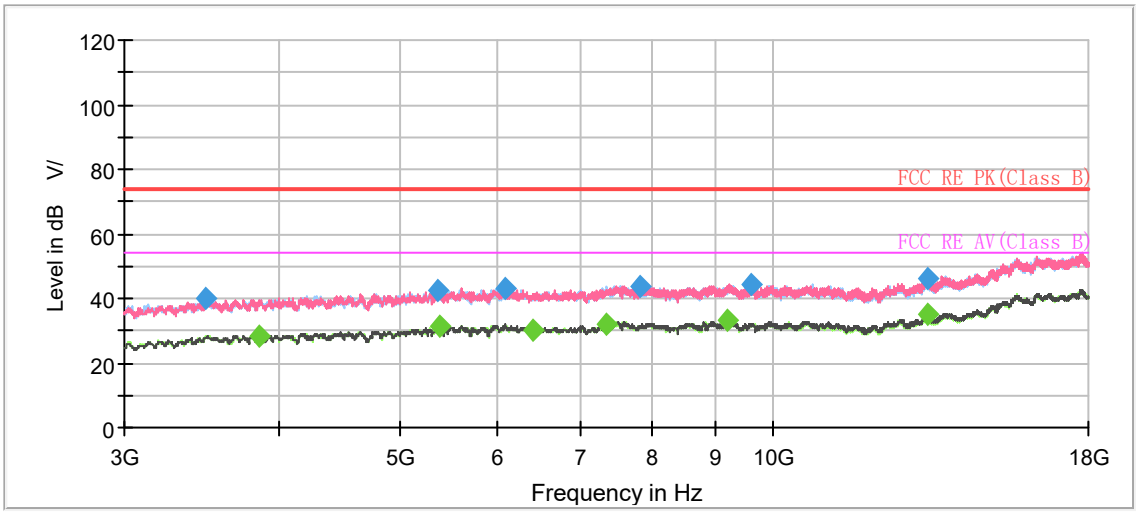
**2. Margin = Limit –MAX Peak/ Average**

**Bluetooth LE-Channel 39**




Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz



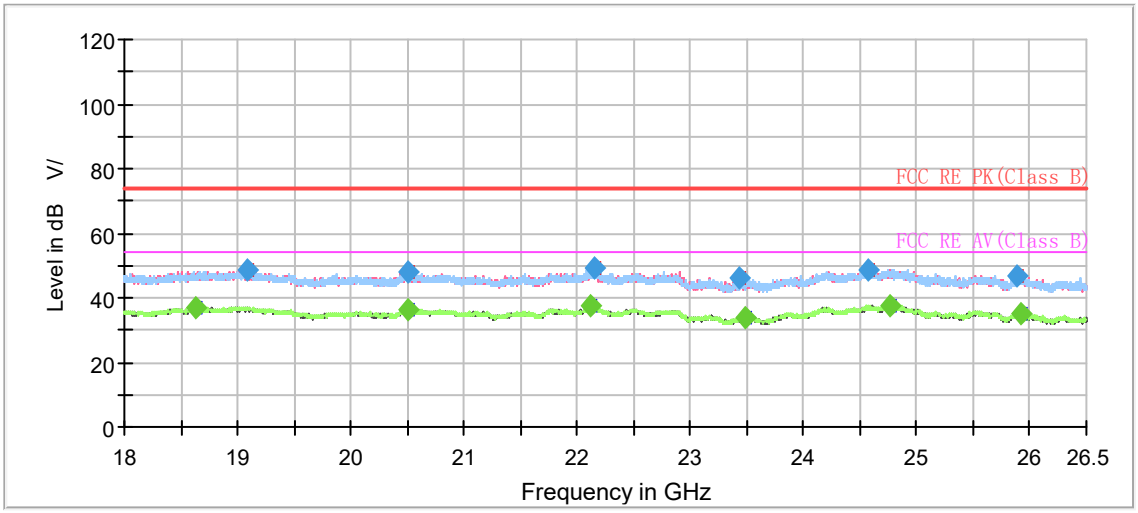

Radiates Emission from 3GHz to 18GHz

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|---|---|---|---|---|---|---|---|---|---|
| 1012.000000 | 42.24 | --- | 74.00 | 31.76 | 500.0 | 200.0 | V | 3.0 | -8.7 |
| 1043.250000 | --- | 29.73 | 54.00 | 24.27 | 500.0 | 100.0 | H | 80.0 | -8.5 |
| 1199.750000 | --- | 30.89 | 54.00 | 23.11 | 500.0 | 100.0 | V | 0.0 | -7.4 |
| 1204.750000 | 41.74 | --- | 74.00 | 32.26 | 500.0 | 100.0 | H | 315.0 | -7.4 |
| 1433.000000 | 43.21 | --- | 74.00 | 30.79 | 500.0 | 200.0 | V | 129.0 | -6.0 |
| 1440.250000 | --- | 32.34 | 54.00 | 21.66 | 500.0 | 200.0 | V | 88.0 | -5.9 |
| 1684.500000 | --- | 32.72 | 54.00 | 21.28 | 500.0 | 200.0 | H | 286.0 | -4.6 |
| 1692.000000 | 44.68 | --- | 74.00 | 29.32 | 500.0 | 100.0 | V | 27.0 | -4.6 |
| 1920.250000 | --- | 34.52 | 54.00 | 19.48 | 500.0 | 100.0 | V | 272.0 | -3.3 |
| 1943.750000 | 46.09 | --- | 74.00 | 27.91 | 500.0 | 200.0 | H | 254.0 | -3.2 |
| 2899.250000 | --- | 36.21 | 54.00 | 17.79 | 500.0 | 100.0 | H | 191.0 | 0.8 |
| 2906.500000 | 47.96 | --- | 74.00 | 26.04 | 500.0 | 200.0 | V | 133.0 | 0.9 |

**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 0 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) |
|---|---|---|---|---|---|---|---|---|---|
| 18625.812500 | --- | 36.94 | 54.00 | 17.06 | 500.0 | 200.0 | V | 241.0 | -7.0 |
| 19084.812500 | 48.82 | --- | 74.00 | 25.18 | 500.0 | 200.0 | H | 2.0 | -6.4 |
| 20508.562500 | --- | 36.29 | 54.00 | 17.71 | 500.0 | 200.0 | V | 140.0 | -6.2 |
| 20514.937500 | 47.98 | --- | 74.00 | 26.02 | 500.0 | 200.0 | V | 338.0 | -6.2 |
| 22126.750000 | --- | 37.27 | 54.00 | 16.73 | 500.0 | 200.0 | H | 104.0 | -4.5 |
| 22158.625000 | 48.99 | --- | 74.00 | 25.01 | 500.0 | 200.0 | H | 171.0 | -4.5 |
| 23440.000000 | 46.44 | --- | 74.00 | 27.56 | 500.0 | 100.0 | V | 173.0 | -5.9 |
| 23494.187500 | --- | 33.84 | 54.00 | 20.16 | 500.0 | 100.0 | V | 258.0 | -5.9 |
| 24580.062500 | 48.79 | --- | 74.00 | 25.21 | 500.0 | 200.0 | V | 352.0 | -1.7 |
| 24767.062500 | --- | 37.42 | 54.00 | 16.58 | 500.0 | 200.0 | H | 128.0 | -1.5 |
| 25888.000000 | 46.89 | --- | 74.00 | 27.11 | 500.0 | 200.0 | V | 347.0 | -2.8 |
| 25922.000000 | --- | 35.26 | 54.00 | 18.74 | 500.0 | 200.0 | H | 0.0 | -3.0 |

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

## 5.7. Conducted Emission

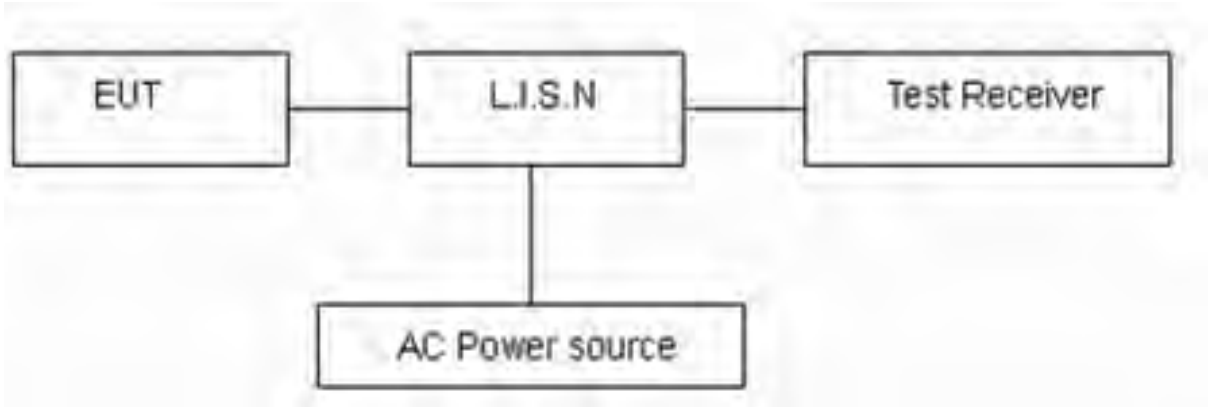
### Ambient Condition

| Temperature | Relative humidity | 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. 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

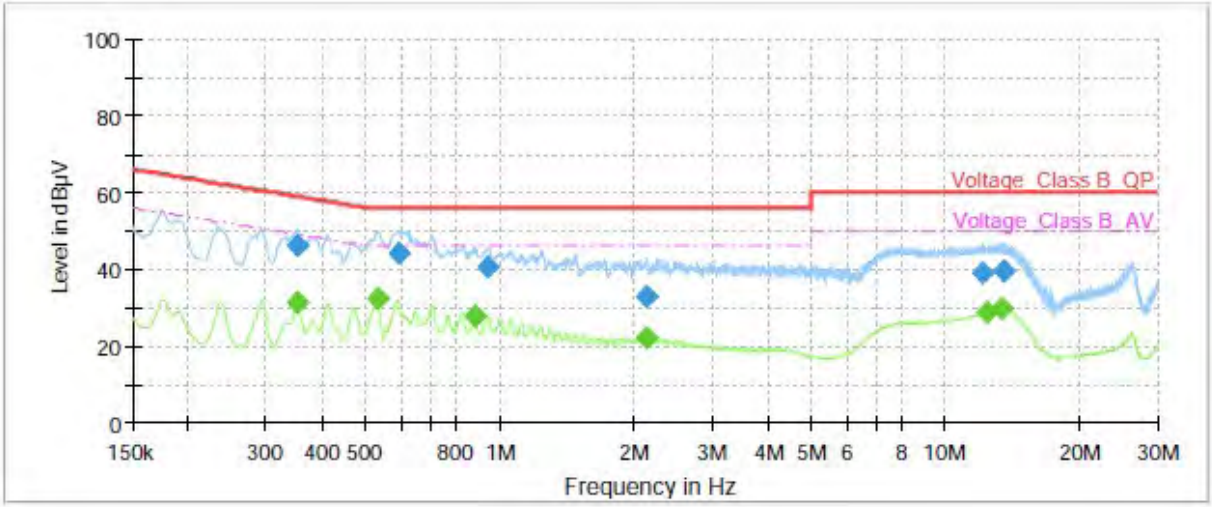
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k$ = 1.96, $U$= 2.69 dB.

**Test Results:**

Following plots, Blue trace uses the peak detection and Green trace uses the average detection.

**Wi-Fi 2.4G**

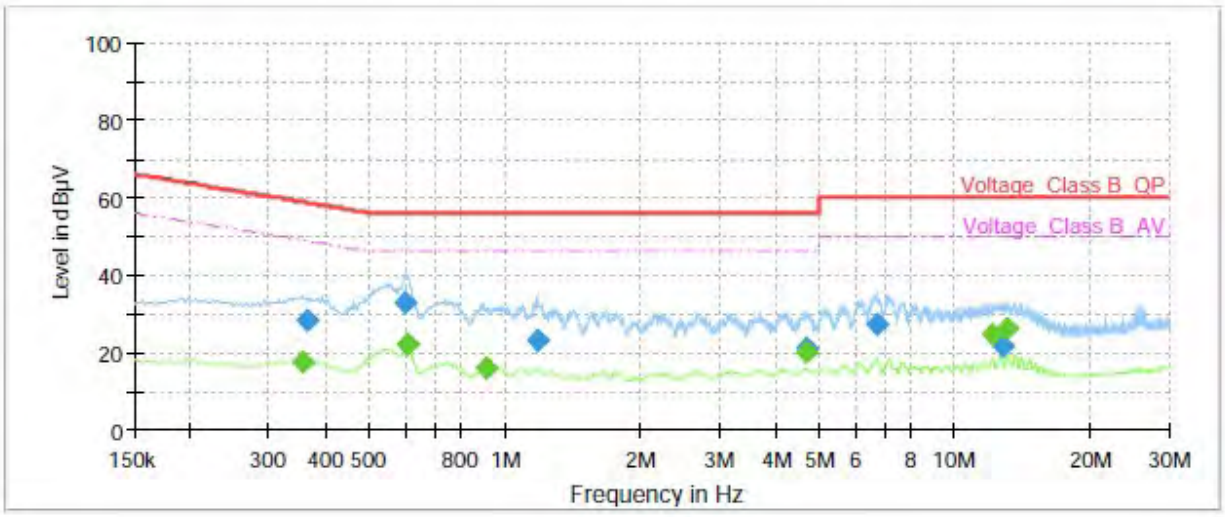
During the test, the Conducted Emission was performed in all modes with all channels, 802.11n (HT40) CH3 are selected as the worst condition. The test data of the worst-case condition was recorded in this report.




| Frequency (MHz) | QuasiPeak (dBµV) | Average (dBµV) | Limit (dBµV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Filter | Corr. (dB) |
|---|---|---|---|---|---|---|---|---|---|
| 0.35 | 46.06 | --- | 58.96 | 12.90 | 1000.0 | 9.000 | L1 | ON | 20.8 |
| 0.35 | --- | 31.47 | 48.90 | 17.43 | 1000.0 | 9.000 | L1 | ON | 20.8 |
| 0.53 | --- | 32.45 | 46.00 | 13.55 | 1000.0 | 9.000 | L1 | ON | 20.6 |
| 0.60 | 44.25 | --- | 56.00 | 11.75 | 1000.0 | 9.000 | L1 | ON | 20.5 |
| 0.88 | --- | 27.63 | 46.00 | 18.37 | 1000.0 | 9.000 | L1 | ON | 20.1 |
| 0.94 | 40.33 | --- | 56.00 | 15.67 | 1000.0 | 9.000 | L1 | ON | 20.0 |
| 2.12 | --- | 21.97 | 46.00 | 24.03 | 1000.0 | 9.000 | L1 | ON | 19.4 |
| 2.13 | 32.71 | --- | 56.00 | 23.29 | 1000.0 | 9.000 | L1 | ON | 19.4 |
| 12.12 | 39.16 | --- | 60.00 | 20.84 | 1000.0 | 9.000 | L1 | ON | 19.3 |
| 12.38 | --- | 28.94 | 50.00 | 21.06 | 1000.0 | 9.000 | L1 | ON | 19.3 |
| 13.38 | --- | 29.52 | 50.00 | 20.48 | 1000.0 | 9.000 | L1 | ON | 19.4 |
| 13.46 | 39.54 | --- | 60.00 | 20.46 | 1000.0 | 9.000 | L1 | ON | 19.4 |

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

L line Conducted Emission from 150 KHz to 30 MHz



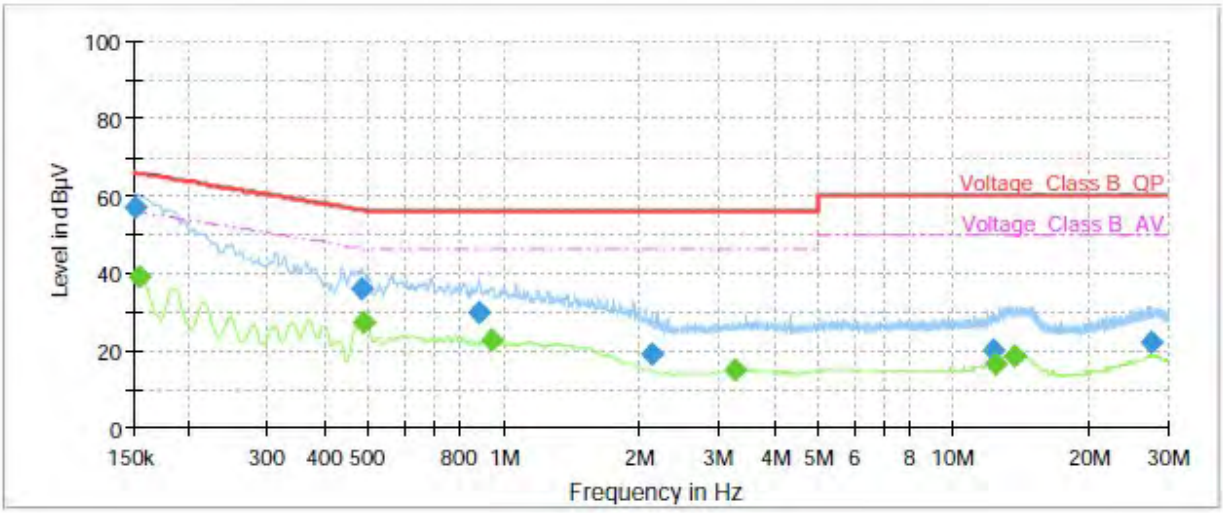

| Frequency (MHz) | QuasiPeak (dBµV) | Average (dBµV) | Limit (dBµV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Filter | Corr. (dB) |
|---|---|---|---|---|---|---|---|---|---|
| 0.36 | --- | 17.66 | 48.80 | 31.14 | 1000.0 | 9.000 | N | ON | 20.9 |
| 0.36 | 28.34 | --- | 58.69 | 30.35 | 1000.0 | 9.000 | N | ON | 20.9 |
| 0.60 | 32.92 | --- | 56.00 | 23.08 | 1000.0 | 9.000 | N | ON | 20.5 |
| 0.60 | --- | 22.31 | 46.00 | 23.69 | 1000.0 | 9.000 | N | ON | 20.5 |
| 0.91 | --- | 15.83 | 46.00 | 30.17 | 1000.0 | 9.000 | N | ON | 20.1 |
| 1.18 | 22.96 | --- | 56.00 | 33.04 | 1000.0 | 9.000 | N | ON | 19.9 |
| 4.67 | --- | 19.82 | 46.00 | 26.18 | 1000.0 | 9.000 | N | ON | 19.2 |
| 4.67 | 20.92 | --- | 56.00 | 35.08 | 1000.0 | 9.000 | N | ON | 19.2 |
| 6.71 | 27.37 | --- | 60.00 | 32.63 | 1000.0 | 9.000 | N | ON | 19.3 |
| 12.12 | --- | 24.68 | 50.00 | 25.32 | 1000.0 | 9.000 | N | ON | 19.4 |
| 12.73 | 21.50 | --- | 60.00 | 38.50 | 1000.0 | 9.000 | N | ON | 19.4 |
| 13.15 | --- | 26.11 | 50.00 | 23.89 | 1000.0 | 9.000 | N | ON | 19.4 |

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

N line Conducted Emission from 150 KHz to 30 MHz

**Bluetooth LE**

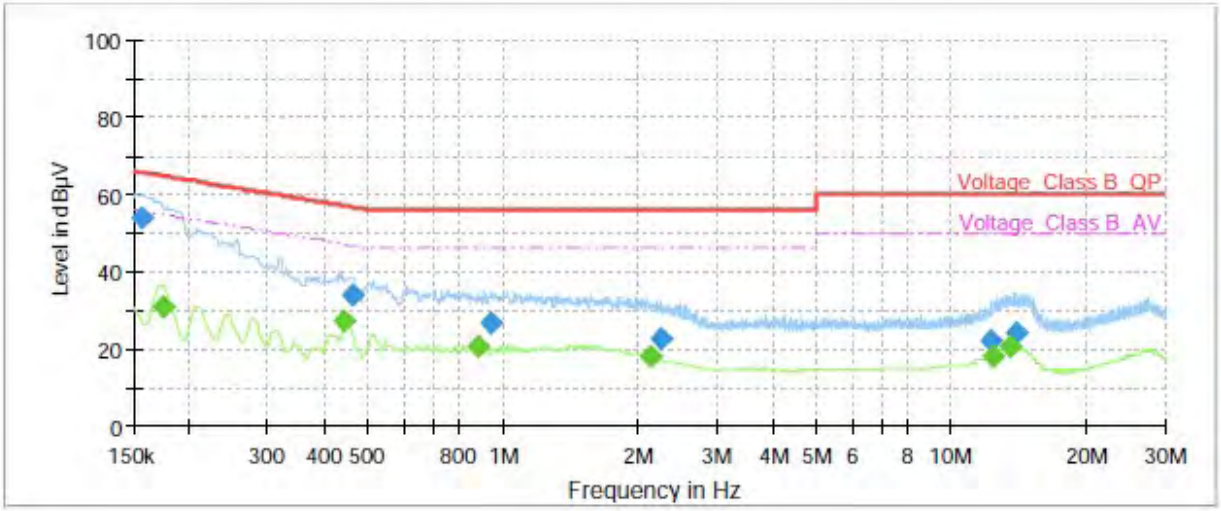
During the test, the Conducted Emission was performed in all modes with all channels, Bluetooth LE-Channel 0 are selected as the worst condition. The test data of the worst-case condition was recorded in this report.




| Frequency (MHz) | QuasiPeak (dBµV) | Average (dBµV) | Limit (dBµV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Filter | Corr. (dB) |
|---|---|---|---|---|---|---|---|---|---|
| 0.15 | 56.93 | --- | 65.88 | 8.95 | 1000.0 | 9.000 | L1 | ON | 20.9 |
| 0.15 | --- | 38.82 | 55.75 | 16.93 | 1000.0 | 9.000 | L1 | ON | 20.9 |
| 0.49 | 36.05 | --- | 56.25 | 20.20 | 1000.0 | 9.000 | L1 | ON | 20.6 |
| 0.49 | --- | 27.26 | 46.17 | 18.91 | 1000.0 | 9.000 | L1 | ON | 20.6 |
| 0.88 | 29.70 | --- | 56.00 | 26.30 | 1000.0 | 9.000 | L1 | ON | 20.1 |
| 0.94 | --- | 22.57 | 46.00 | 23.43 | 1000.0 | 9.000 | L1 | ON | 20.0 |
| 2.13 | 19.19 | --- | 56.00 | 36.81 | 1000.0 | 9.000 | L1 | ON | 19.4 |
| 3.28 | --- | 14.73 | 46.00 | 31.27 | 1000.0 | 9.000 | L1 | ON | 19.2 |
| 12.22 | 19.87 | --- | 60.00 | 40.13 | 1000.0 | 9.000 | L1 | ON | 19.3 |
| 12.40 | --- | 16.42 | 50.00 | 33.58 | 1000.0 | 9.000 | L1 | ON | 19.3 |
| 13.61 | --- | 18.71 | 50.00 | 31.29 | 1000.0 | 9.000 | L1 | ON | 19.4 |
| 27.39 | 21.84 | --- | 60.00 | 38.16 | 1000.0 | 9.000 | L1 | ON | 20.0 |

**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) |
|---|---|---|---|---|---|---|---|---|---|
| 0.16 | 53.84 | --- | 65.63 | 11.79 | 1000.0 | 9.000 | N | ON | 20.9 |
| 0.17 | --- | 30.53 | 54.73 | 24.20 | 1000.0 | 9.000 | N | ON | 21.1 |
| 0.44 | --- | 27.25 | 46.97 | 19.72 | 1000.0 | 9.000 | N | ON | 20.8 |
| 0.46 | 33.79 | --- | 56.64 | 22.85 | 1000.0 | 9.000 | N | ON | 20.7 |
| 0.88 | --- | 20.40 | 46.00 | 25.60 | 1000.0 | 9.000 | N | ON | 20.1 |
| 0.94 | 26.77 | --- | 56.00 | 29.23 | 1000.0 | 9.000 | N | ON | 20.0 |
| 2.14 | --- | 17.83 | 46.00 | 28.17 | 1000.0 | 9.000 | N | ON | 19.4 |
| 2.25 | 22.58 | --- | 56.00 | 33.42 | 1000.0 | 9.000 | N | ON | 19.4 |
| 12.20 | 21.99 | --- | 60.00 | 38.01 | 1000.0 | 9.000 | N | ON | 19.4 |
| 12.40 | --- | 17.98 | 50.00 | 32.02 | 1000.0 | 9.000 | N | ON | 19.4 |
| 13.55 | --- | 20.76 | 50.00 | 29.24 | 1000.0 | 9.000 | N | ON | 19.5 |
| 13.91 | 24.18 | --- | 60.00 | 35.82 | 1000.0 | 9.000 | N | ON | 19.5 |

**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 |
|---|---|---|---|---|---|
| Power sensor | R&S | NRP18S | 101954 | 2022-05-14 | 2023-05-13 |
| Spectrum Analyzer | KEYSIGHT | N9020A | MY51330870 | 2022-05-14 | 2023-05-13 |
| Radiated Emission | | | | | |
| EMI Test Receiver | R&S | ESR | 102389 | 2022-05-25 | 2023-05-24 |
| Signal Analyzer | R&S | FSV40 | 101186 | 2022-05-14 | 2023-05-13 |
| Loop Antenna | SCHWARZBECK | FMZB1519 | 1519-047 | 2020-04-02 | 2023-04-01 |
| TRILOG Broadband Antenna | SCHWARZBECK | VULB 9163 | 1023 | 2020-05-05 | 2023-05-04 |
| Horn Antenna | R&S | HF907 | 102723 | 2020-08-11 | 2023-08-10 |
| Horn Antenna | ETS-Lindgren | 3160-09 | 00102643 | 2021-10-10 | 2024-10-09 |
| Software | R&S | EMC32 | 9.26.0 | / | / |
| Conducted Emission | | | | | |
| EMI Test Receiver | R&S | ESR | 101667 | 2022-05-25 | 2023-05-24 |
| LISN | R&S | ENV216 | 102191 | 2018-12-15 | 2021-12-14 |
| | | | | 2022-12-13 | 2024-12-09 |
| Software | R&S | EMC32 | 10.35.10 | / | / |

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

# ANNEX A: The EUT Appearance

**The EUT Appearance are submitted separately.**

# ANNEX B: Test Setup Photos

**The Test Setup Photos are submitted separately.**