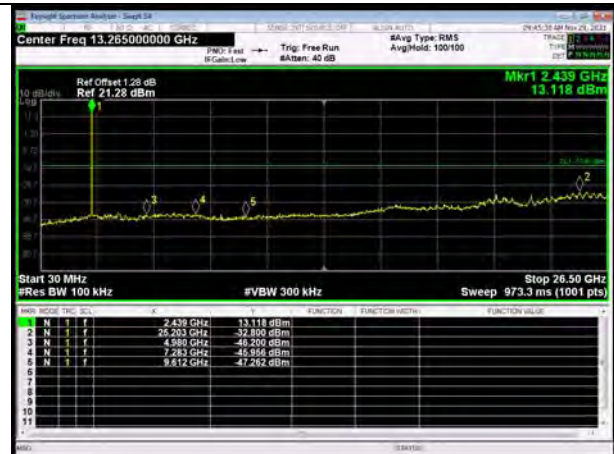
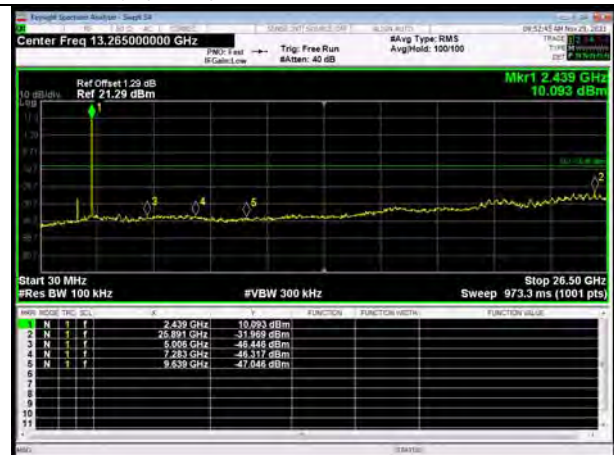


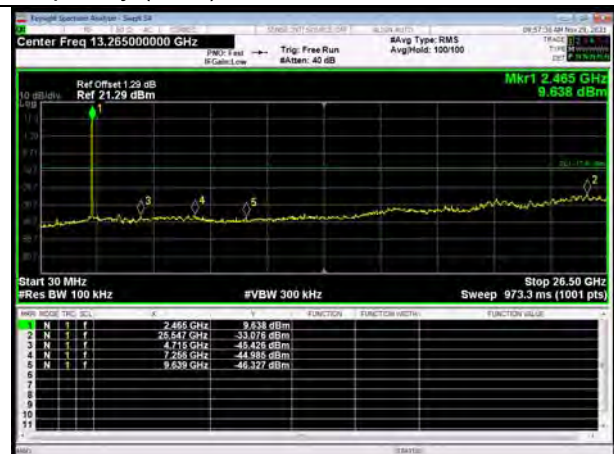
## 802.11ax(HE20), Carrier frequency (MHz): 2447



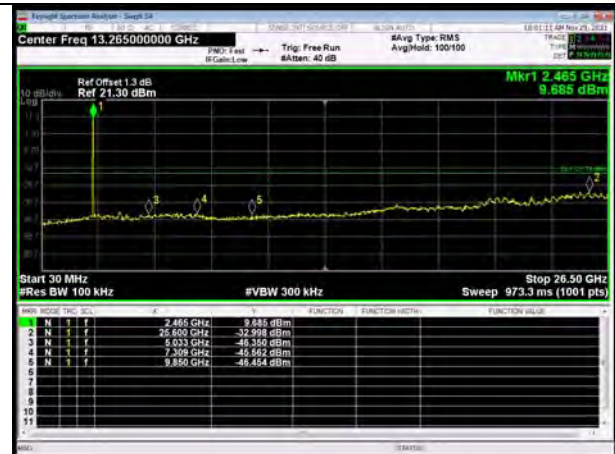
## 802.11ax(HE20), Carrier frequency (MHz): 2452



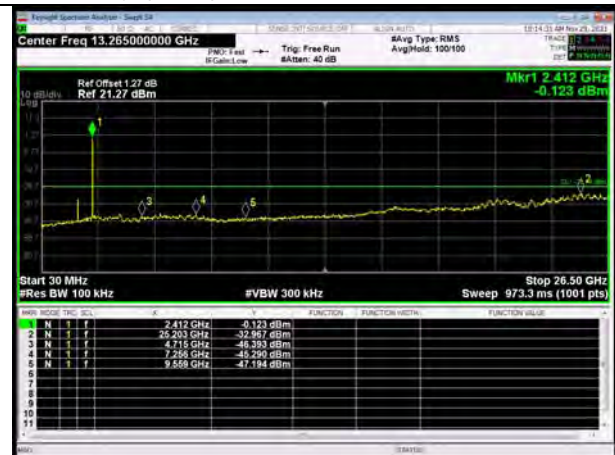
## 802.11ax(HE20), Carrier frequency (MHz): 2457



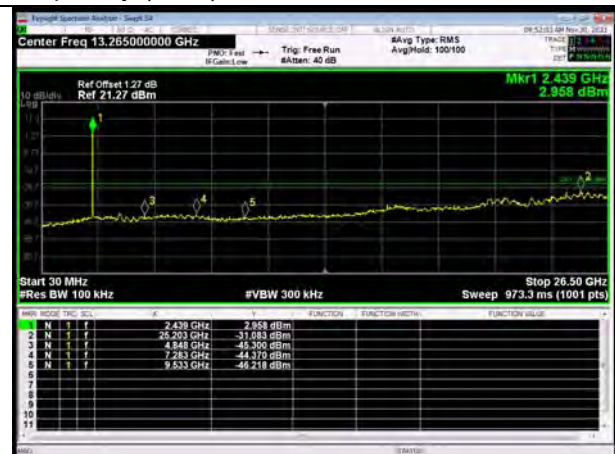
## 802.11ax(HE20), Carrier frequency (MHz): 2462



## 802.11ax(HE40), Carrier frequency (MHz): 2422



## 802.11ax(HE40), Carrier frequency (MHz): 2427



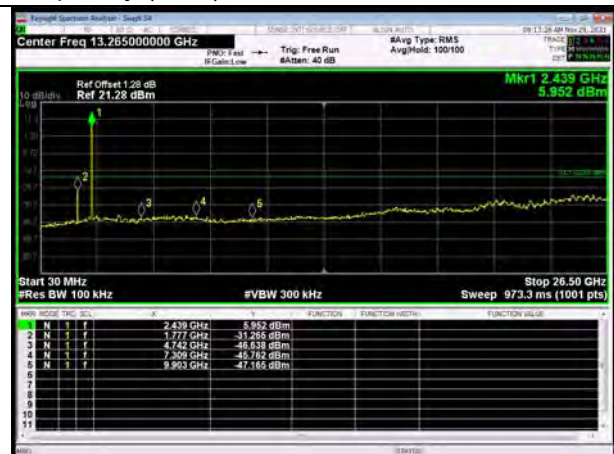
## 802.11ax(HE40), Carrier frequency (MHz): 2432



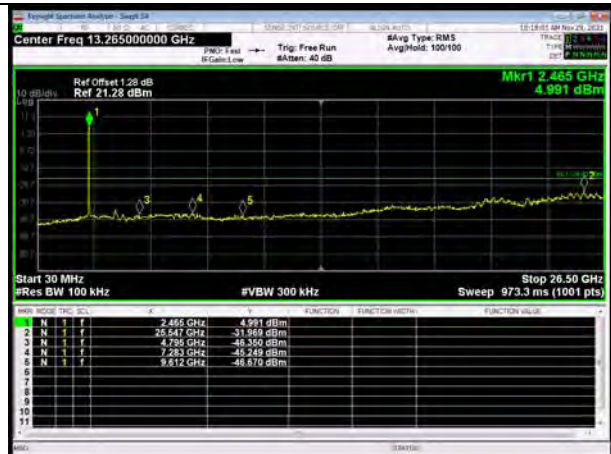
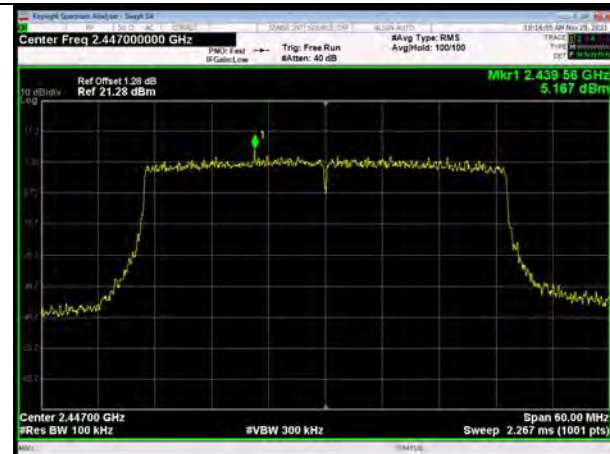
## 802.11ax(HE40), Carrier frequency (MHz): 2437



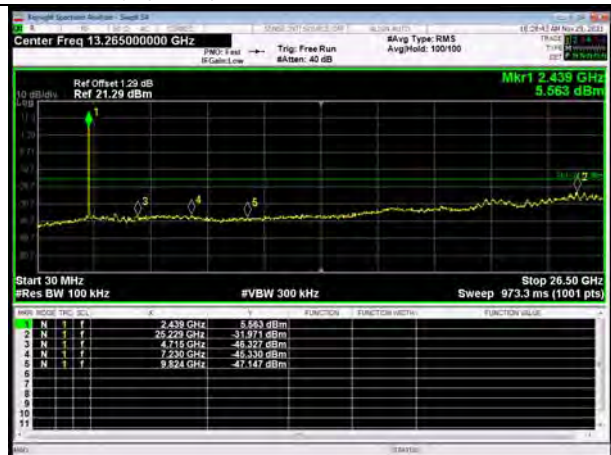
## 802.11ax(HE40), Carrier frequency (MHz):2442



802.11ax(HE40), Carrier frequency (MHz):2447



802.11ax(HE40), Carrier frequency (MHz):2452



## 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.

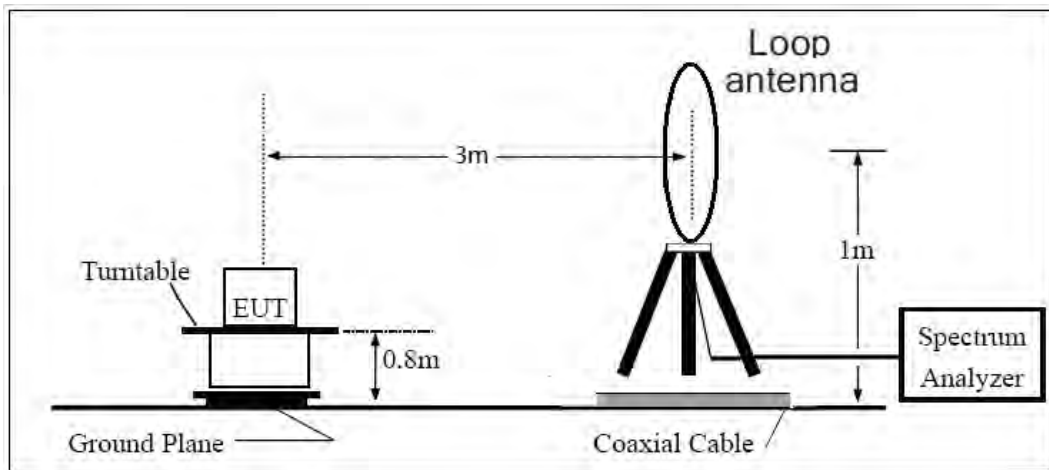
2) If linear voltage averaging mode was used in the preceding step e), then the correction factor is  $[20 \log (1 / D)]$ , where  $D$  is the duty cycle. For example, if the transmit duty cycle was 50%, then 6 dB shall be added to the measured emission levels.

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.

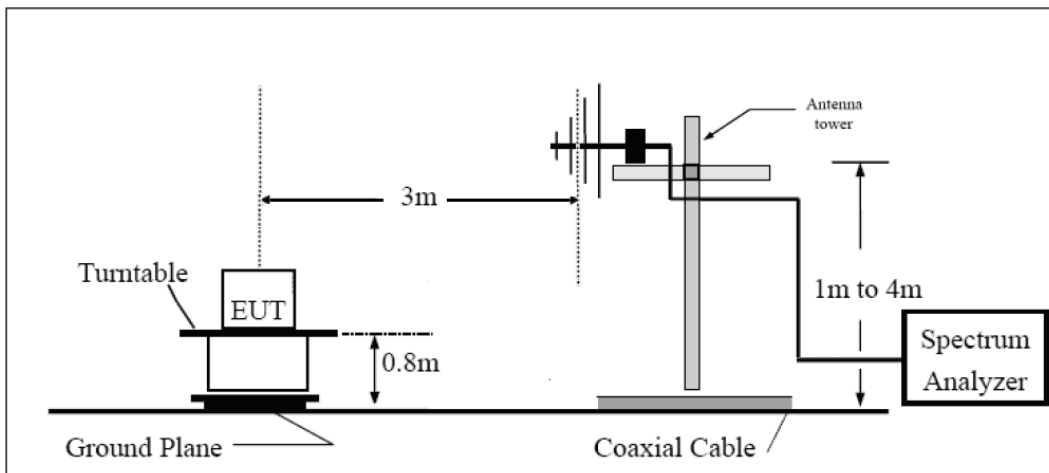
The test is in transmitting mode.

## Test setup

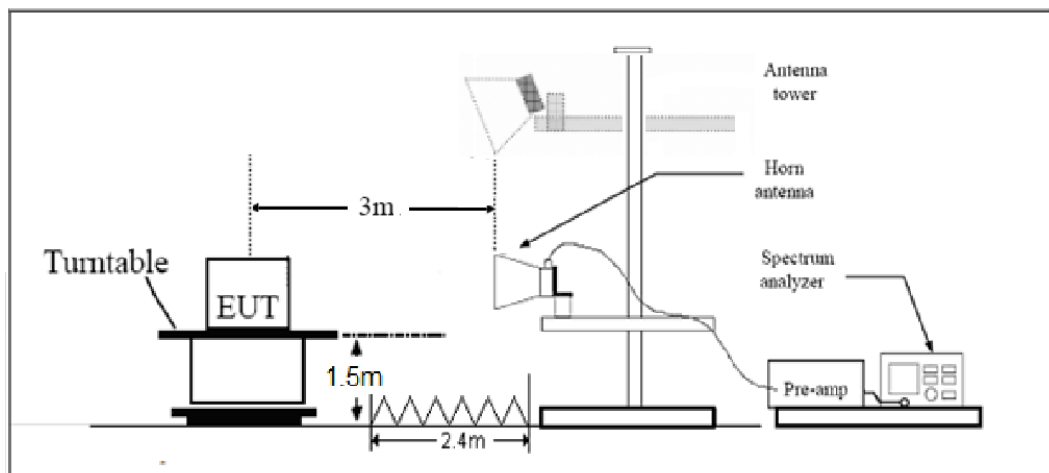
9KHz ~ 30MHz



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

## §15.35(b)

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

Peak Limit=74 dBuV/m

Average Limit=54 dBuV/m

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

| MHz                        | MHz                   | MHz             | GHz              |
|----------------------------|-----------------------|-----------------|------------------|
| 0.090 - 0.110              | 16.42 - 16.423        | 399.9 - 410     | 4.5 - 5.15       |
| <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**

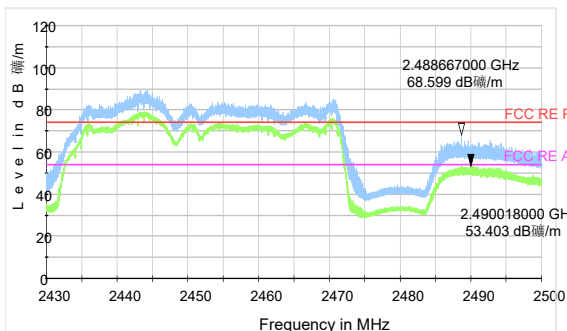
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 1.96$ .

| 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     |

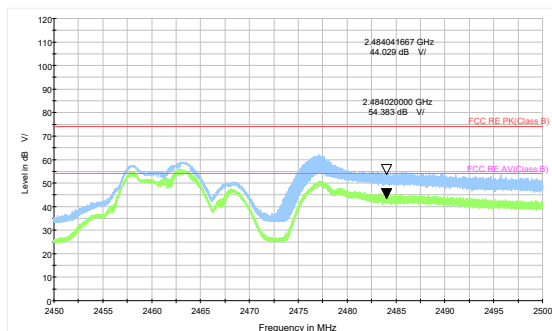
## Test Results:

A font ( dB 谱/m ) in the test plot =(level in dBμV/m)

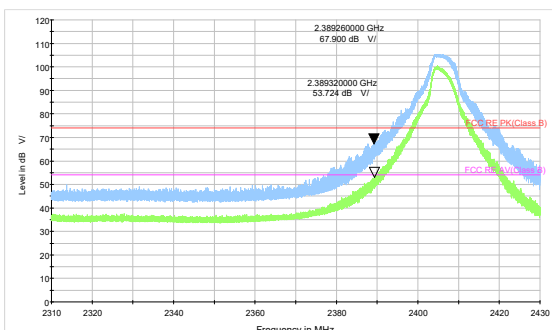
### Internal Antenna 1: HL



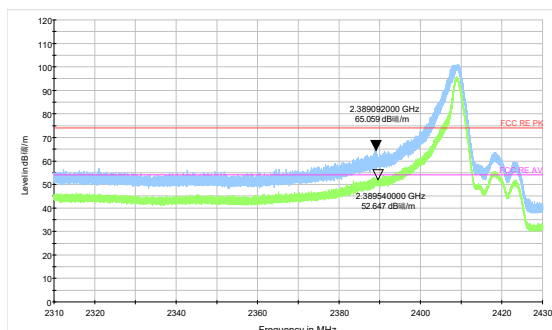
802.11b-Channel 1 Peak & Average



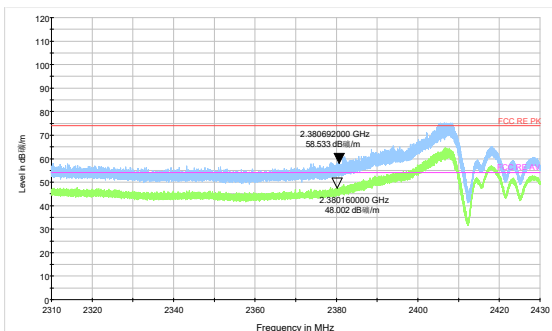
802.11b-Channel 11 Peak & Average



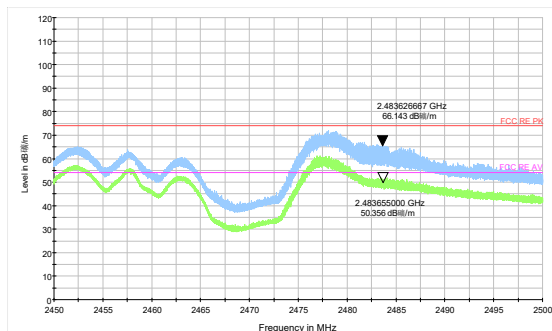
802.11g-Channel 1 Peak & Average



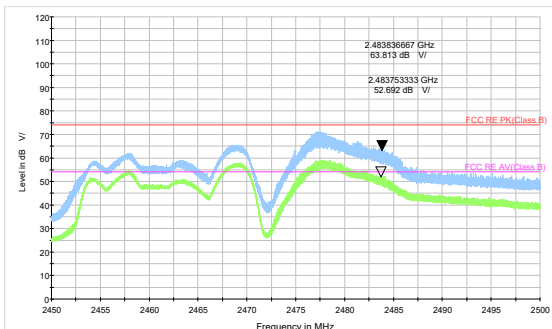
802.11g-Channel 2 Peak & Average



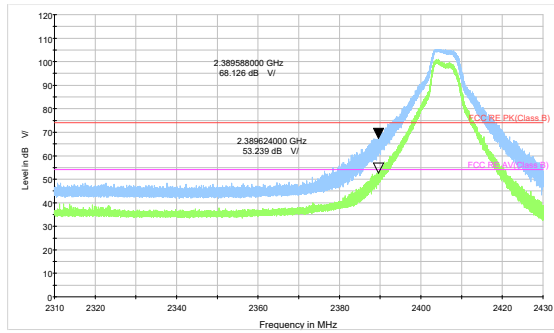
802.11g-Channel 3 Peak & Average



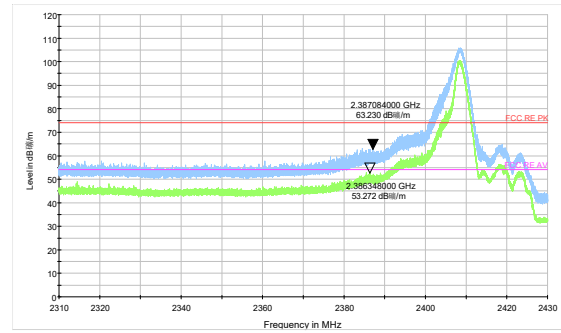
802.11g-Channel 10 Peak & Average



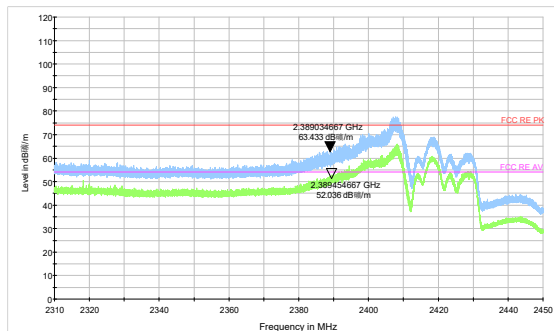
802.11g-Channel 11 Peak & Average



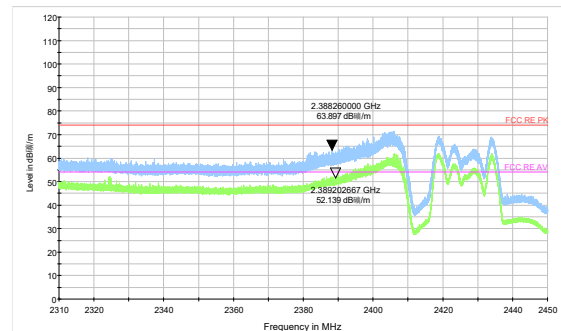
802.11n HT2-Channel 1 Peak & Average



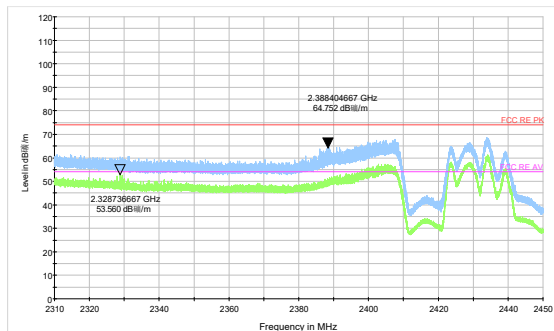
802.11n HT20-Channel 2 Peak & Average



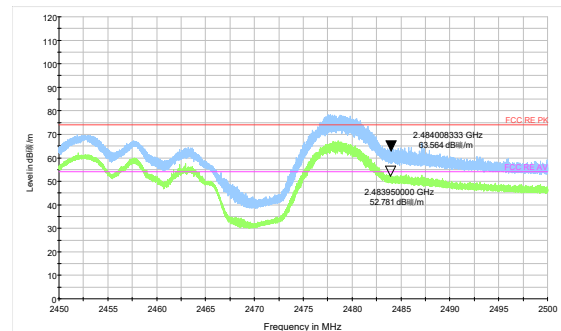
802.11n HT2-Channel 3 Peak & Average



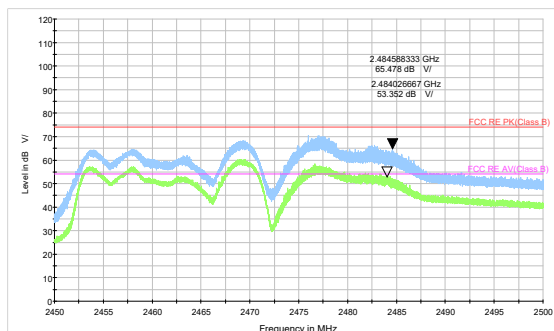
802.11n HT20-Channel 4 Peak & Average



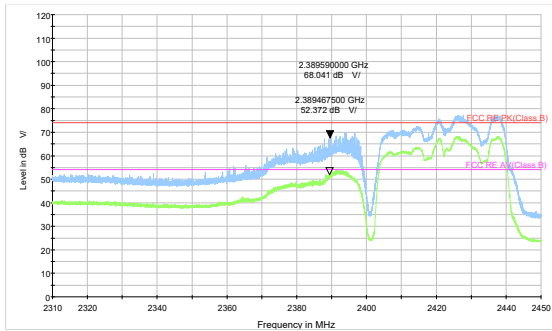
802.11n HT2-Channel 5 Peak & Average



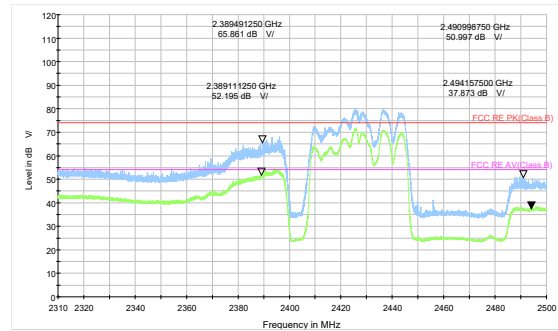
802.11n HT20-Channel 10 Peak & Average



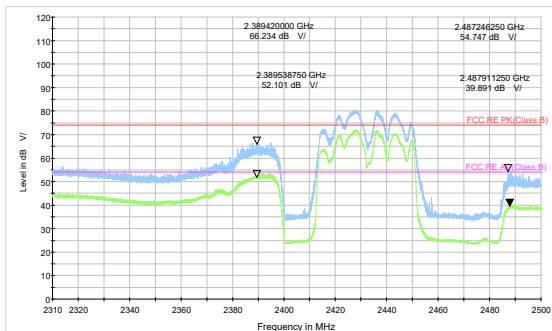
802.11n HT20-Channel 11 Peak & Average



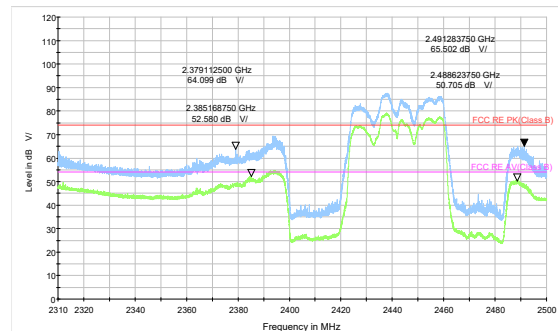
802.11n HT40-Channel 3 Peak &amp; Average



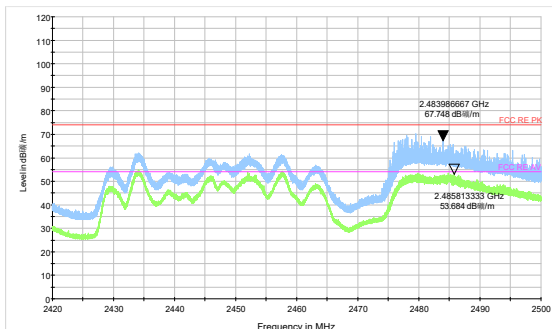
802.11n HT40-Channel 4 Peak &amp; Average



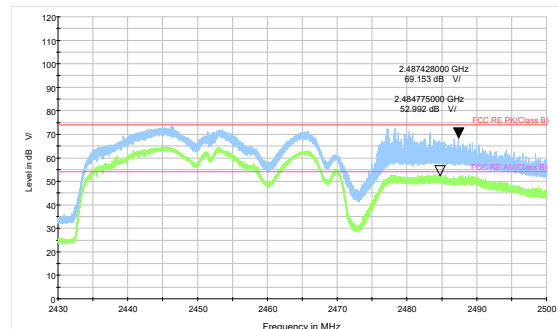
802.11n HT40-Channel 5 Peak &amp; Average



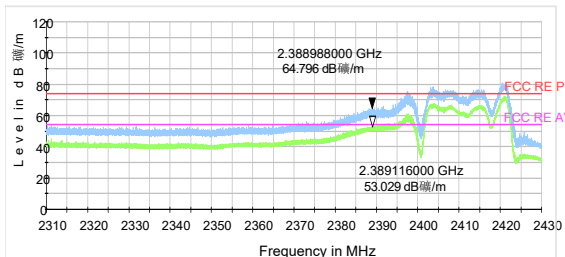
802.11n HT40-Channel 7 Peak &amp; Average



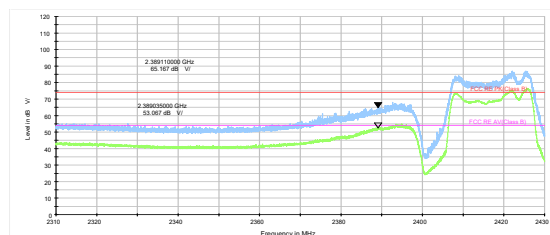
802.11n HT40-Channel 8 Peak &amp; Average



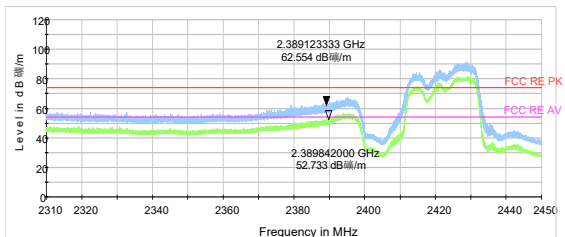
802.11n HT40-Channel 9 Peak &amp; Average



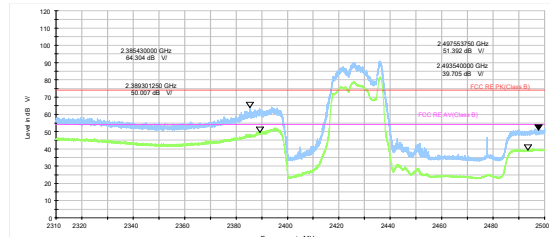
802.11ax HE20-Channel 1 Peak &amp; Average



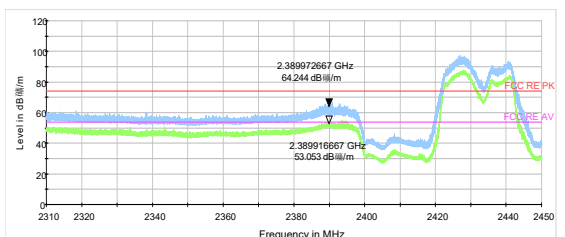
802.11ax HE20-Channel 2 Peak &amp; Average



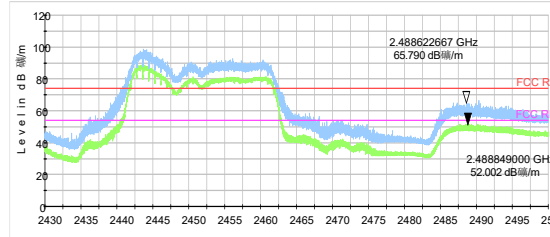
802.11ax HE20-Channel 3 Peak &amp; Average



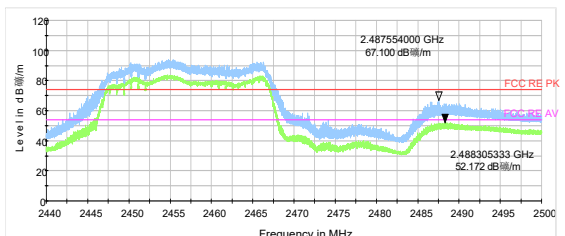
802.11ax HE20-Channel 4 Peak &amp; Average



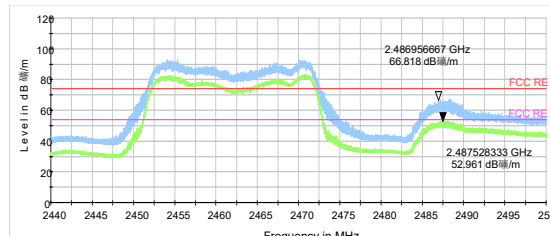
802.11ax HE20-Channel 5 Peak &amp; Average



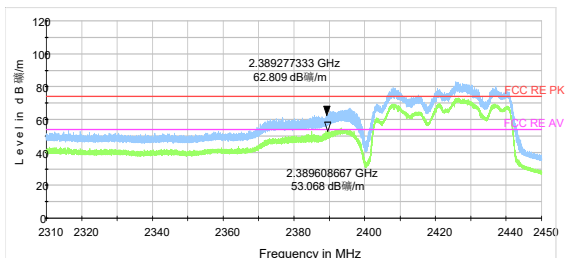
802.11ax HE20-Channel 9 Peak &amp; Average



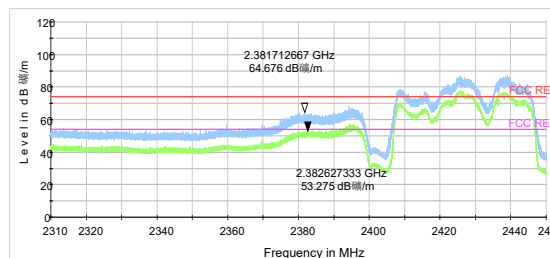
802.11ax HE20-Channel 10 Peak &amp; Average



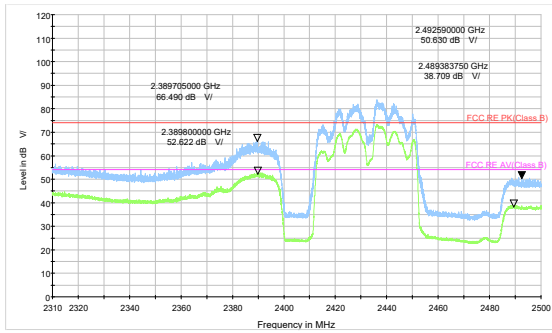
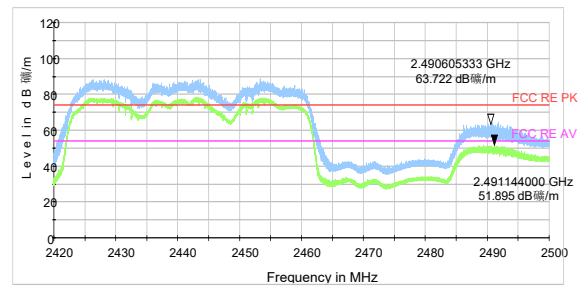
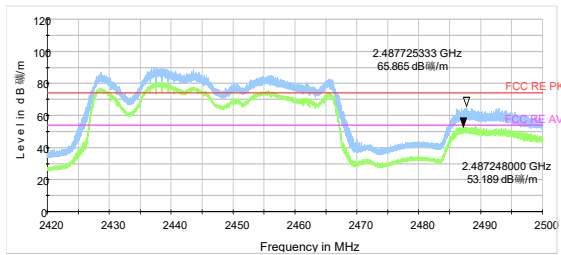
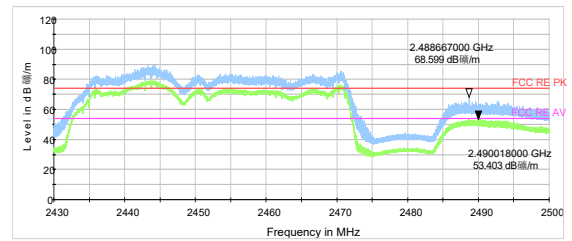
802.11ax HE20-Channel 11 Peak &amp; Average



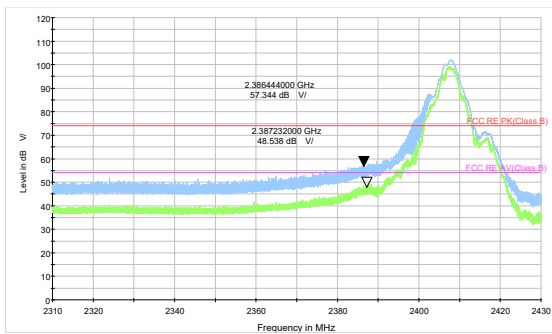
802.11ax HE40-Channel 3 Peak &amp; Average



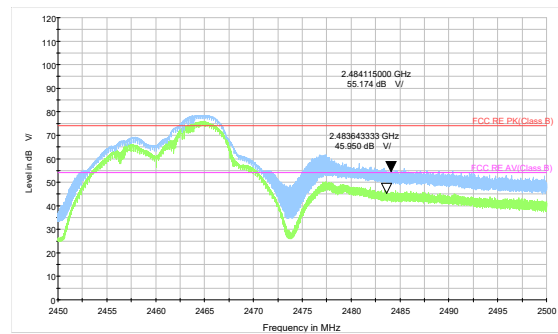
802.11ax HE40-Channel 4 Peak &amp; Average


**802.11ax HE40-Channel 5 Peak & Average**

**802.11ax HE40-Channel 7 Peak & Average**

**802.11ax HE40-Channel 8 Peak & Average**

**802.11ax HE40-Channel 9 Peak & Average**

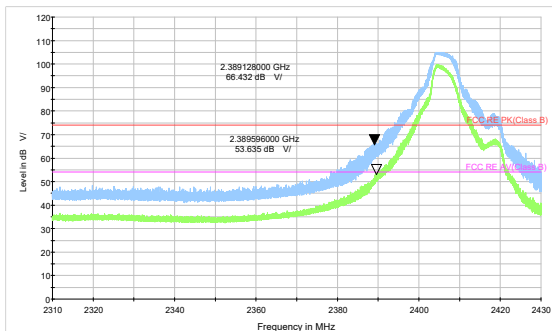
## Internal Antenna 2: DZZ



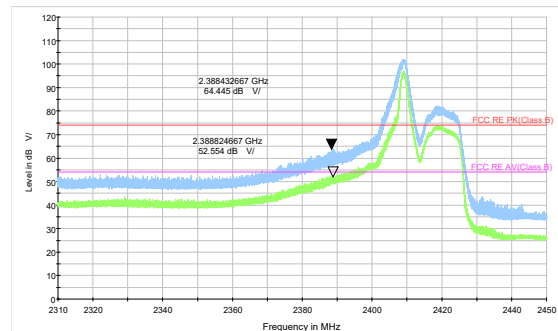
802.11b-Channel 1 Peak & Average



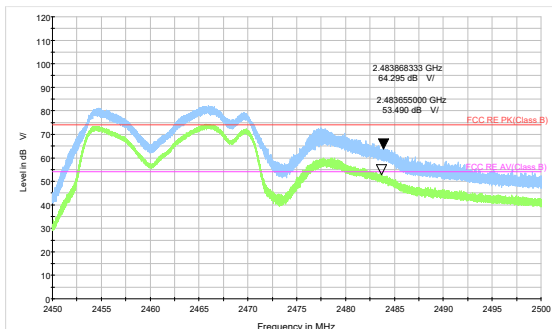
802.11b-Channel 11 Peak & Average



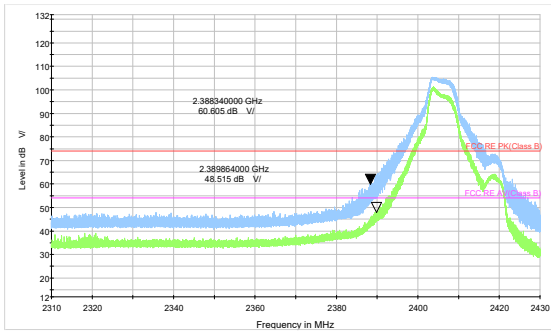
802.11g-Channel 1 Peak & Average



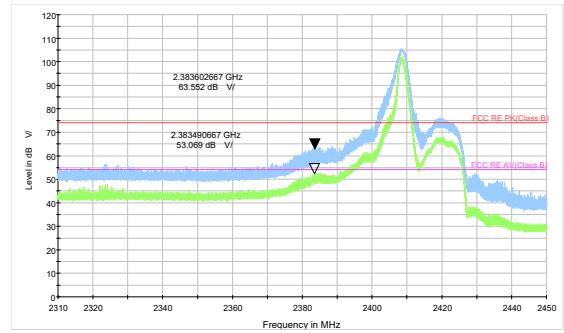
802.11g-Channel 2 Peak & Average



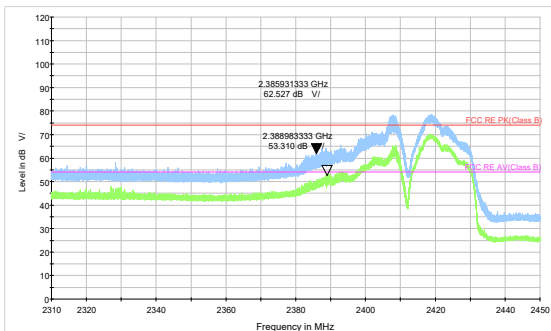
802.11g-Channel 11 Peak & Average



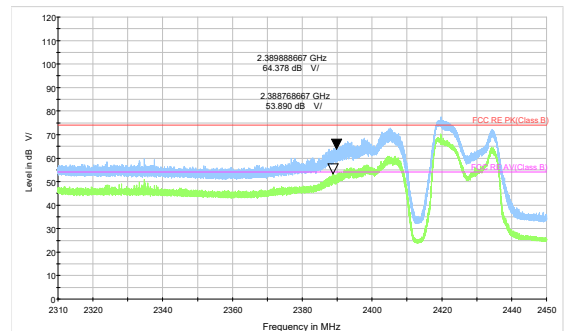
802.11n HT2-Channel 1 Peak &amp; Average



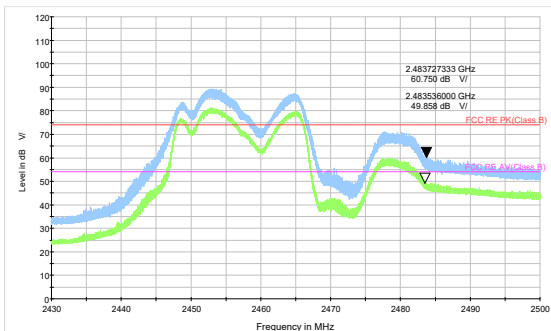
802.11n HT20-Channel 2 Peak &amp; Average



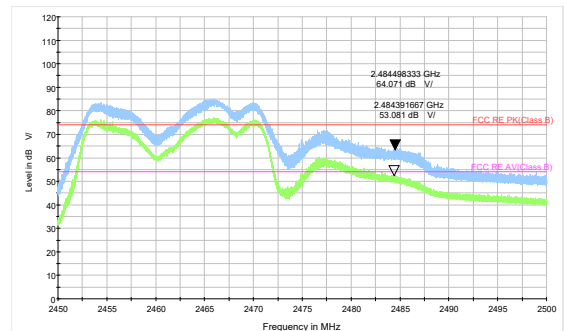
802.11n HT2-Channel 3 Peak &amp; Average



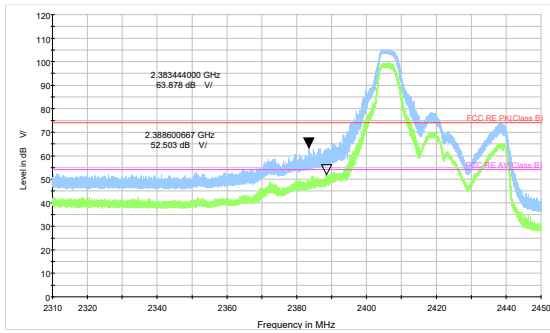
802.11n HT20-Channel 4 Peak &amp; Average



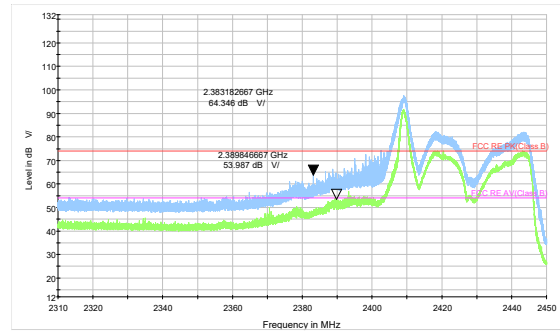
802.11n HT20-Channel 10 Peak &amp; Average



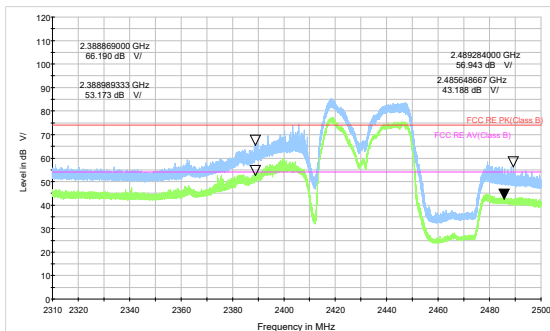
802.11n HT20-Channel 11 Peak &amp; Average



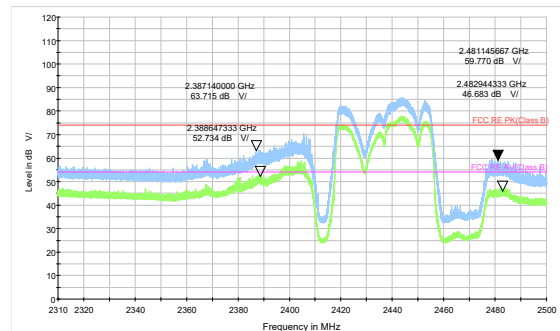
802.11n HT40-Channel 3 Peak &amp; Average



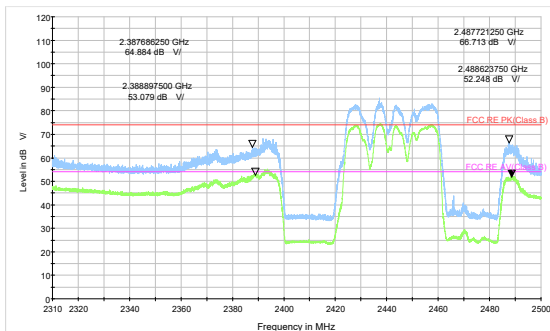
802.11n HT40-Channel 4 Peak &amp; Average



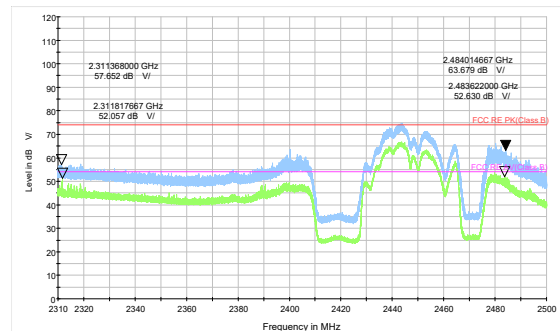
802.11n HT40-Channel 5 Peak &amp; Average



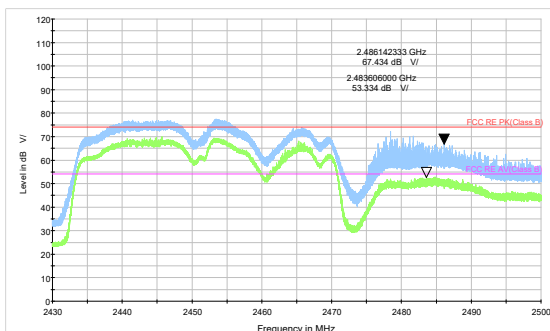
802.11n HT40-Channel 6 Peak &amp; Average



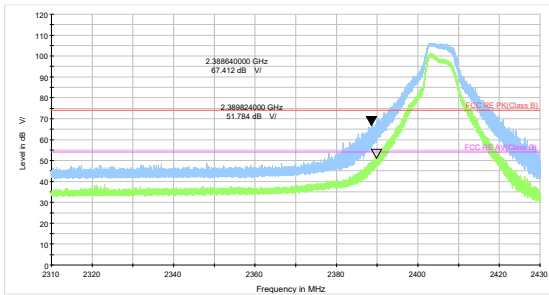
802.11n HT40-Channel 7 Peak &amp; Average



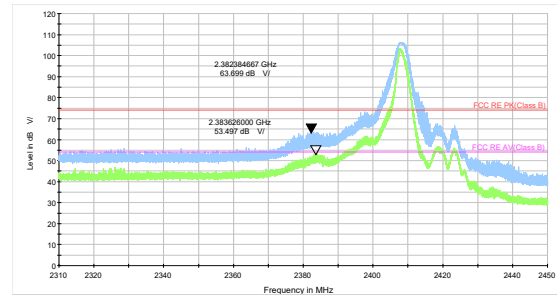
802.11n HT40-Channel 8 Peak &amp; Average



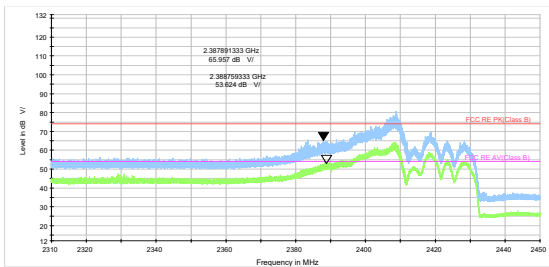
802.11n HT40-Channel 9 Peak &amp; Average



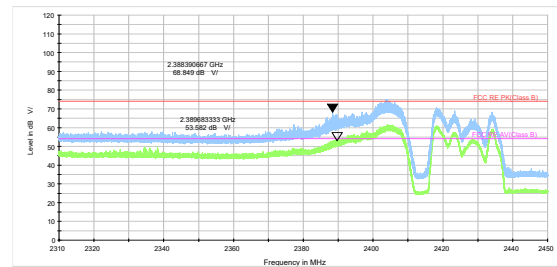
802.11ax HE20-Channel 1 Peak &amp; Average



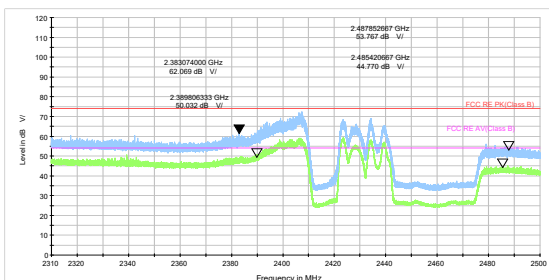
802.11ax HE20-Channel 2 Peak &amp; Average



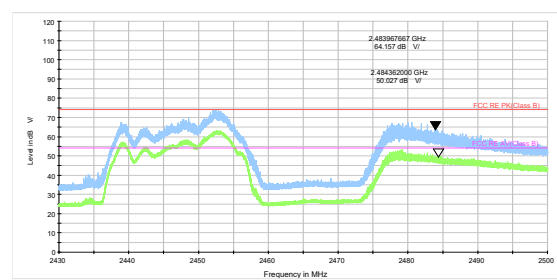
802.11ax HE20-Channel 3 Peak &amp; Average



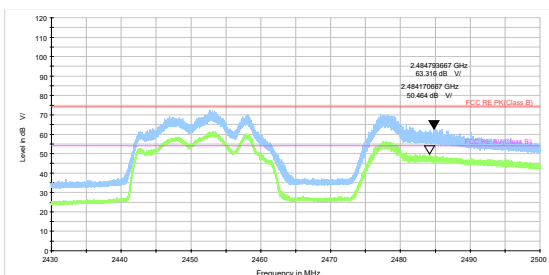
802.11ax HE20-Channel 4 Peak &amp; Average



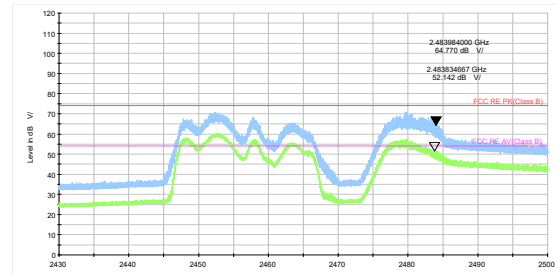
802.11ax HE20-Channel 5 Peak &amp; Average



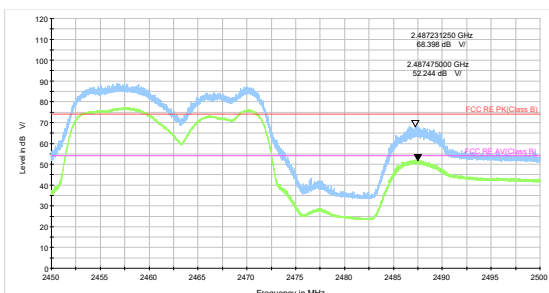
802.11ax HE20-Channel 8 Peak &amp; Average



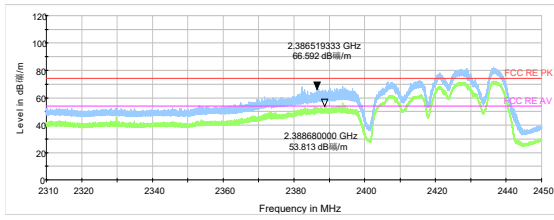
802.11ax HE20-Channel 9 Peak &amp; Average



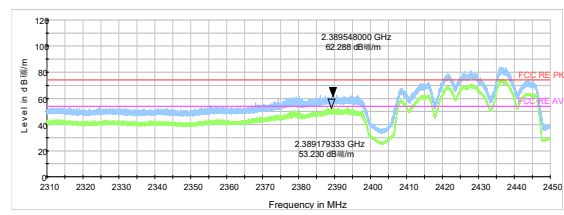
802.11ax HE20-Channel 10 Peak &amp; Average



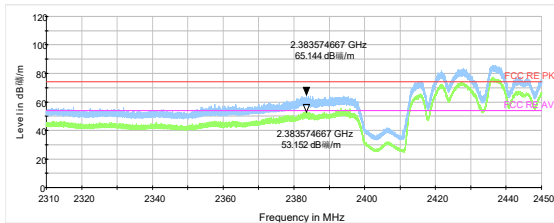
802.11ax HE20-Channel 11 Peak &amp; Average



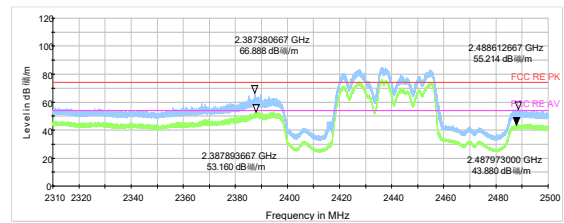
802.11ax HE40-Channel 3 Peak &amp; Average



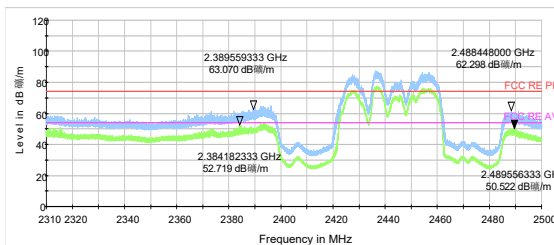
802.11ax HE40-Channel 4 Peak &amp; Average



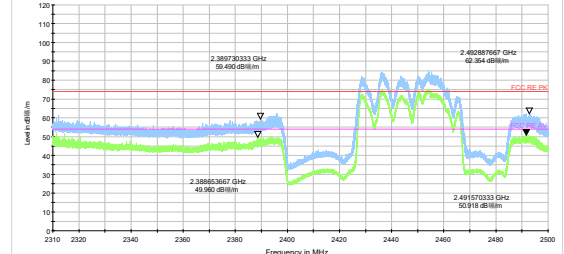
802.11ax HE40-Channel 5 Peak &amp; Average



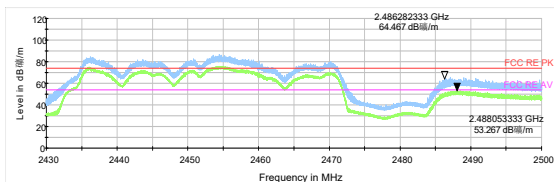
802.11ax HE40-Channel 6 Peak &amp; Average



802.11ax HE40-Channel 7 Peak &amp; Average



802.11ax HE40-Channel 8 Peak &amp; Average



802.11ax HE40-Channel 9 Peak &amp; Average

**Result of RE****Test result**

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

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

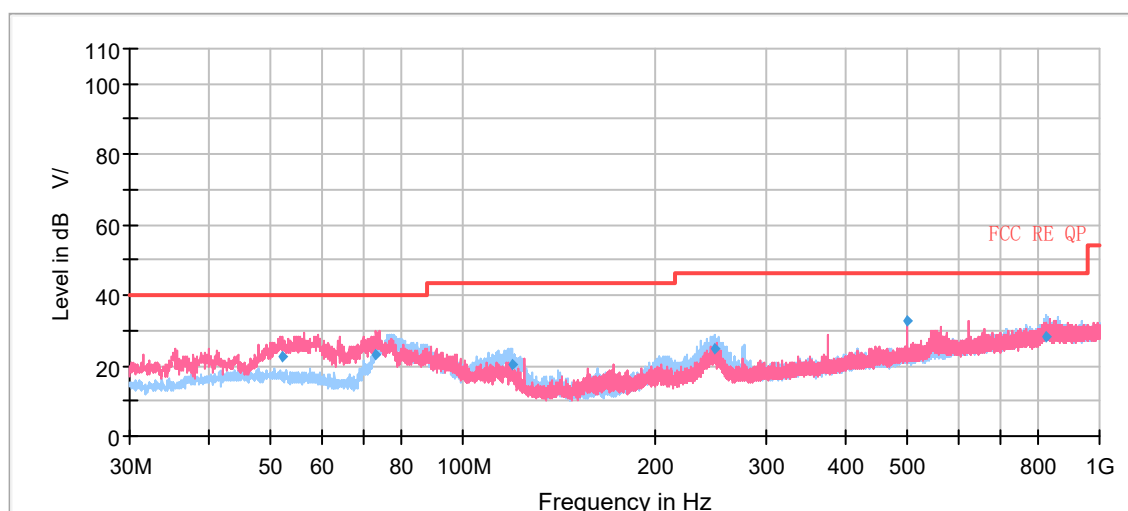
**After the pretest, MIMO was selected as the worst antenna.**

**Internal Antenna 1: HL**

During the test, the Radiates Emission from 30MHz to 1GHz was performed in all modes with all channels, 802.11ax HE40, Channel 6 are selected as the worst condition. The test data of the worst-case condition was recorded in this report.

A font (Level in dB $\mu$ V/) in the test plot =(level in dB  $\mu$  V/m)

A font (dB  $\mu$  V/m) in the test plot =(level in dB  $\mu$  V/m)

**Continuous TX mode:**

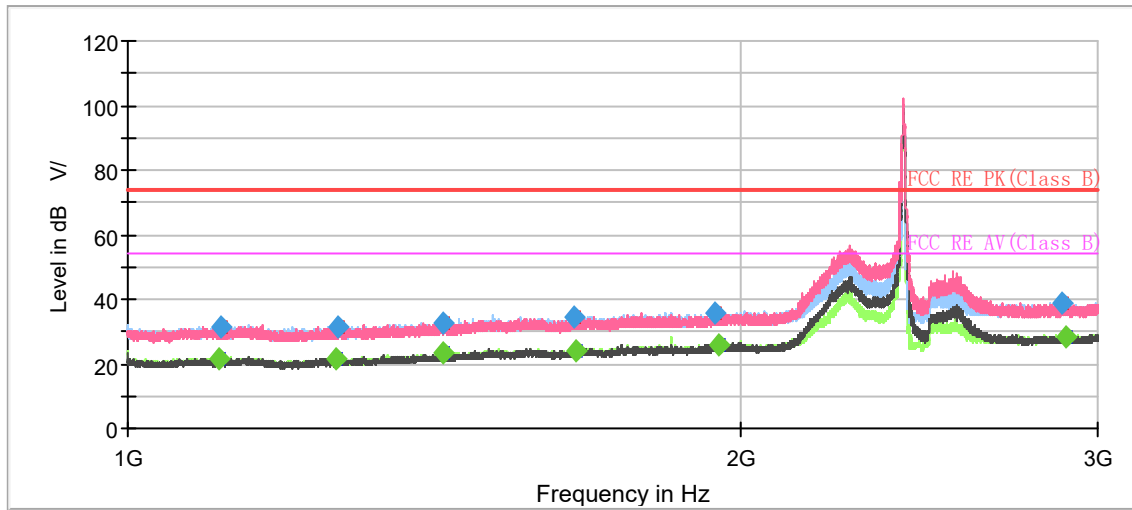
Radiates Emission from 30MHz to 1GHz

| Frequency (MHz) | Quasi-Peak (dB $\mu$ V/m) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) | Margin (dB) | Limit (dB $\mu$ V/m) |
|-----------------|---------------------------|-------------|--------------|---------------|---------------------|-------------|----------------------|
| 52.008000       | 22.41                     | 100.0       | V            | 35.0          | 20                  | 17.59       | 40.00                |
| 72.869667       | 23.06                     | 100.0       | V            | 17.0          | 15                  | 16.94       | 40.00                |
| 119.312333      | 20.56                     | 209.0       | H            | 229.0         | 17                  | 22.94       | 43.50                |
| 249.540000      | 24.99                     | 100.0       | H            | 164.0         | 20                  | 21.01       | 46.00                |
| 499.997333      | 32.48                     | 100.0       | V            | 184.0         | 25                  | 13.52       | 46.00                |
| 825.817667      | 28.19                     | 100.0       | H            | 168.0         | 29                  | 17.81       | 46.00                |

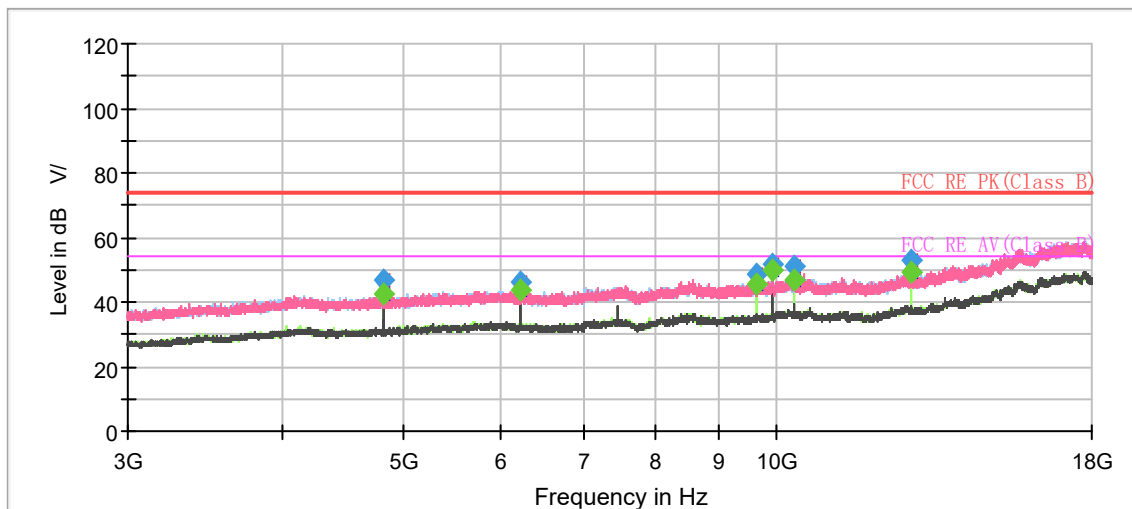
**Remark: 1. Correction Factor = Antenna factor+ Insertion loss(cable loss+amplifier gain)**

**2. Margin = Limit – Quasi-Peak**

# 802.11b CH1



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

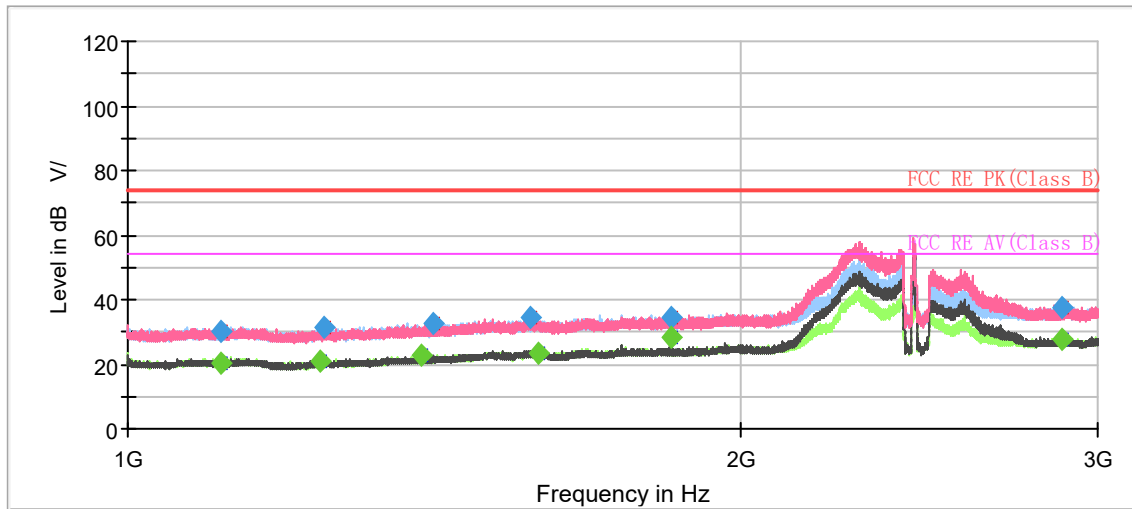


Radiates Emission from 3GHz to 18GHz

| Frequency (MHz) | Peak (dBuV/m) | Average (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|-----------------|---------------|------------------|----------------|-------------|-------------|-----|---------------|------------|
| 1108.666667     | ---           | 21.27            | 54.00          | 32.73       | 200.0       | V   | 27.0          | -18        |
| 1110.133333     | 31.32         | ---              | 74.00          | 42.68       | 200.0       | H   | 312.0         | -18        |
| 1266.533333     | ---           | 21.37            | 54.00          | 32.63       | 200.0       | H   | 292.0         | -17        |
| 1268.000000     | 31.45         | ---              | 74.00          | 42.55       | 200.0       | H   | 130.0         | -17        |
| 1428.666667     | ---           | 23.42            | 54.00          | 30.58       | 100.0       | V   | 256.0         | -16        |
| 1428.866667     | 32.40         | ---              | 74.00          | 41.60       | 100.0       | H   | 4.0           | -16        |
| 1658.800000     | 34.50         | ---              | 74.00          | 39.50       | 100.0       | H   | 206.0         | -15        |
| 1661.000000     | ---           | 24.25            | 54.00          | 29.75       | 100.0       | H   | 206.0         | -15        |
| 1944.666667     | 35.69         | ---              | 74.00          | 38.31       | 200.0       | H   | 172.0         | -13        |
| 1952.266667     | ---           | 25.94            | 54.00          | 28.06       | 200.0       | H   | 25.0          | -13        |
| 2881.866667     | 38.57         | ---              | 74.00          | 35.43       | 200.0       | H   | 326.0         | -9         |
| 2891.266667     | ---           | 28.42            | 54.00          | 25.58       | 200.0       | H   | 157.0         | -9         |
| 9953.000000     | ---           | 49.66            | 54.00          | 4.34        | 200.0       | H   | 307.0         | 5          |
| 12864.000000    | ---           | 49.19            | 54.00          | 4.81        | 200.0       | H   | 358.0         | 8          |

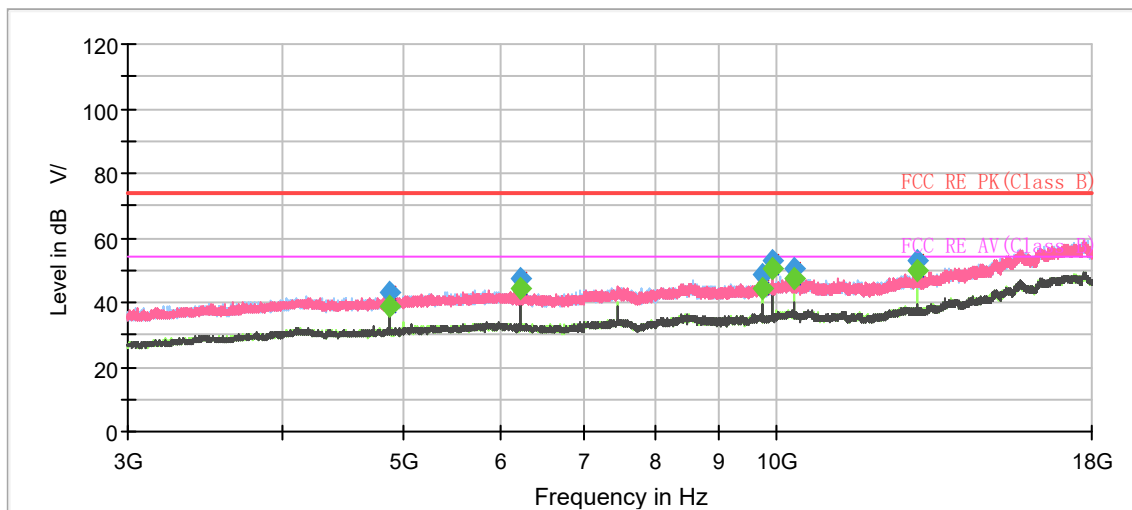
**Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)**

# 802.11b CH6



Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz

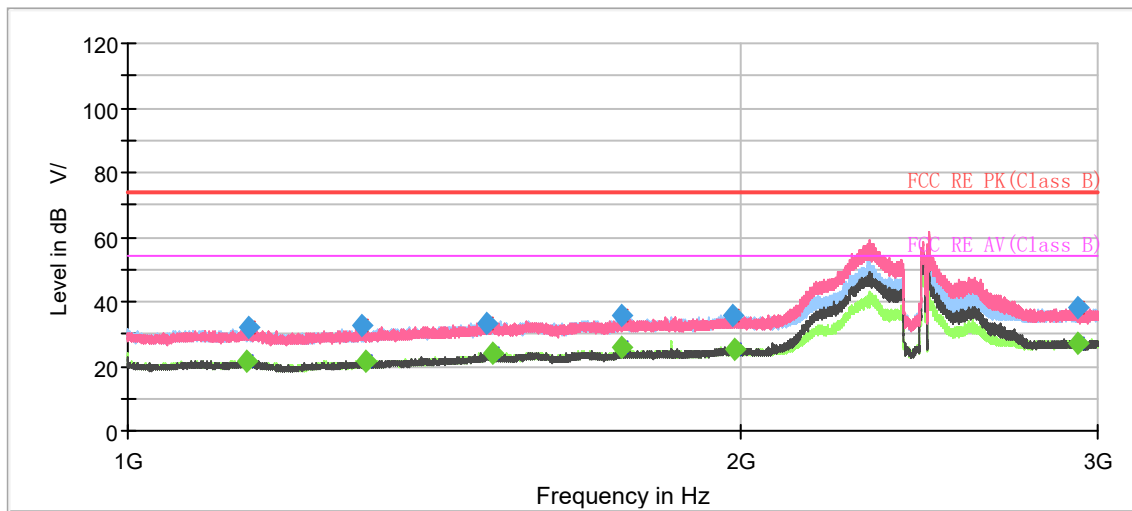


Radiates Emission from 3GHz to 18GHz

| Frequency (MHz) | Peak (dBuV/m) | Average (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|-----------------|---------------|------------------|----------------|-------------|-------------|-----|---------------|------------|
| 1111.800000     | 30.33         | ---              | 74.00          | 43.67       | 200.0       | H   | 0.0           | -18        |
| 1112.200000     | ---           | 20.17            | 54.00          | 33.83       | 100.0       | H   | 304.0         | -18        |
| 1244.400000     | ---           | 20.68            | 54.00          | 33.32       | 100.0       | H   | 0.0           | -17        |
| 1247.733333     | 31.09         | ---              | 74.00          | 42.91       | 200.0       | H   | 338.0         | -17        |
| 1395.400000     | ---           | 22.84            | 54.00          | 31.16       | 100.0       | V   | 23.0          | -16        |
| 1413.733333     | 32.41         | ---              | 74.00          | 41.59       | 200.0       | V   | 112.0         | -16        |
| 1579.333333     | 34.19         | ---              | 74.00          | 39.81       | 200.0       | V   | 31.0          | -15        |
| 1592.000000     | ---           | 23.60            | 54.00          | 30.40       | 100.0       | H   | 4.0           | -15        |
| 1849.333333     | 34.61         | ---              | 74.00          | 39.39       | 200.0       | V   | 125.0         | -14        |
| 1850.000000     | ---           | 28.32            | 54.00          | 25.68       | 100.0       | H   | 52.0          | -14        |
| 2878.333333     | ---           | 27.67            | 54.00          | 26.33       | 200.0       | V   | 198.0         | -9         |
| 2880.000000     | 37.25         | ---              | 74.00          | 36.75       | 100.0       | V   | 165.0         | -9         |
| 9953.000000     | ---           | 50.74            | 54.00          | 3.26        | 200.0       | H   | 312.0         | 5          |
| 12997.500000    | ---           | 49.74            | 54.00          | 4.26        | 200.0       | H   | 7.0           | 9          |

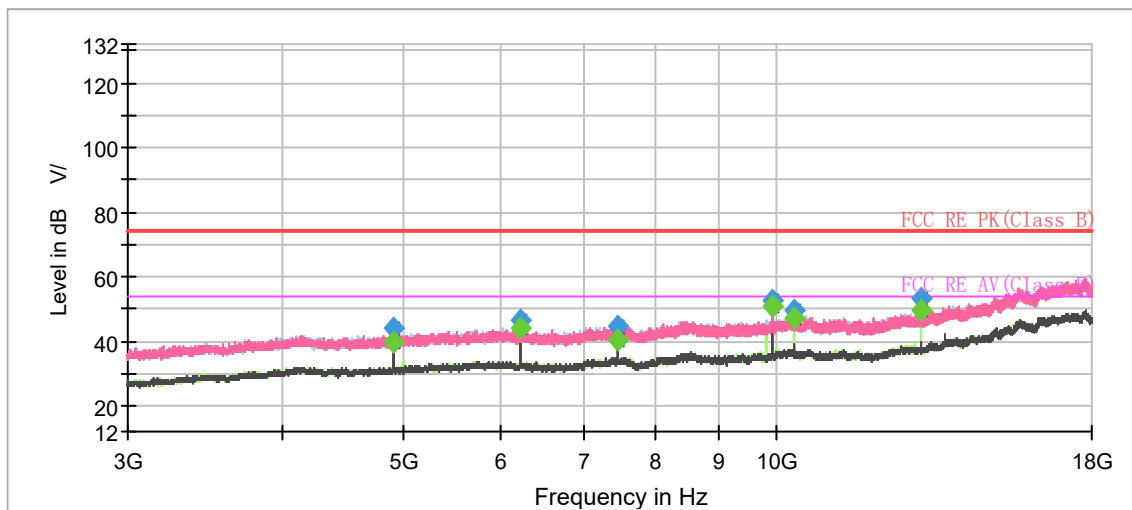
**Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)**

# 802.11b CH11



Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz



Radiates Emission from 3GHz to 18GHz