

- ☒ Undesirable radiated Spurious Emission in band edge

Antenna 1:

| | | | |
|------------|---------------|------------|------|
| Test mode: | 802.11n(HT20) | Frequency: | 5745 |
|------------|---------------|------------|------|

| Freq. (MHz) | Ant.Pol. H/V | Field Strength (RBW=100KHz) (dBuV/m) | E.I.R.P (dBm) | Limit (dBm) | Verdict |
|----------------|-----------------|--|------------------|-------------|---------|
| 5724.05 | H | 63.86 | -31.37 | 27 | PASS |
| 5724.96 | V | 64.27 | -30.96 | 27 | PASS |

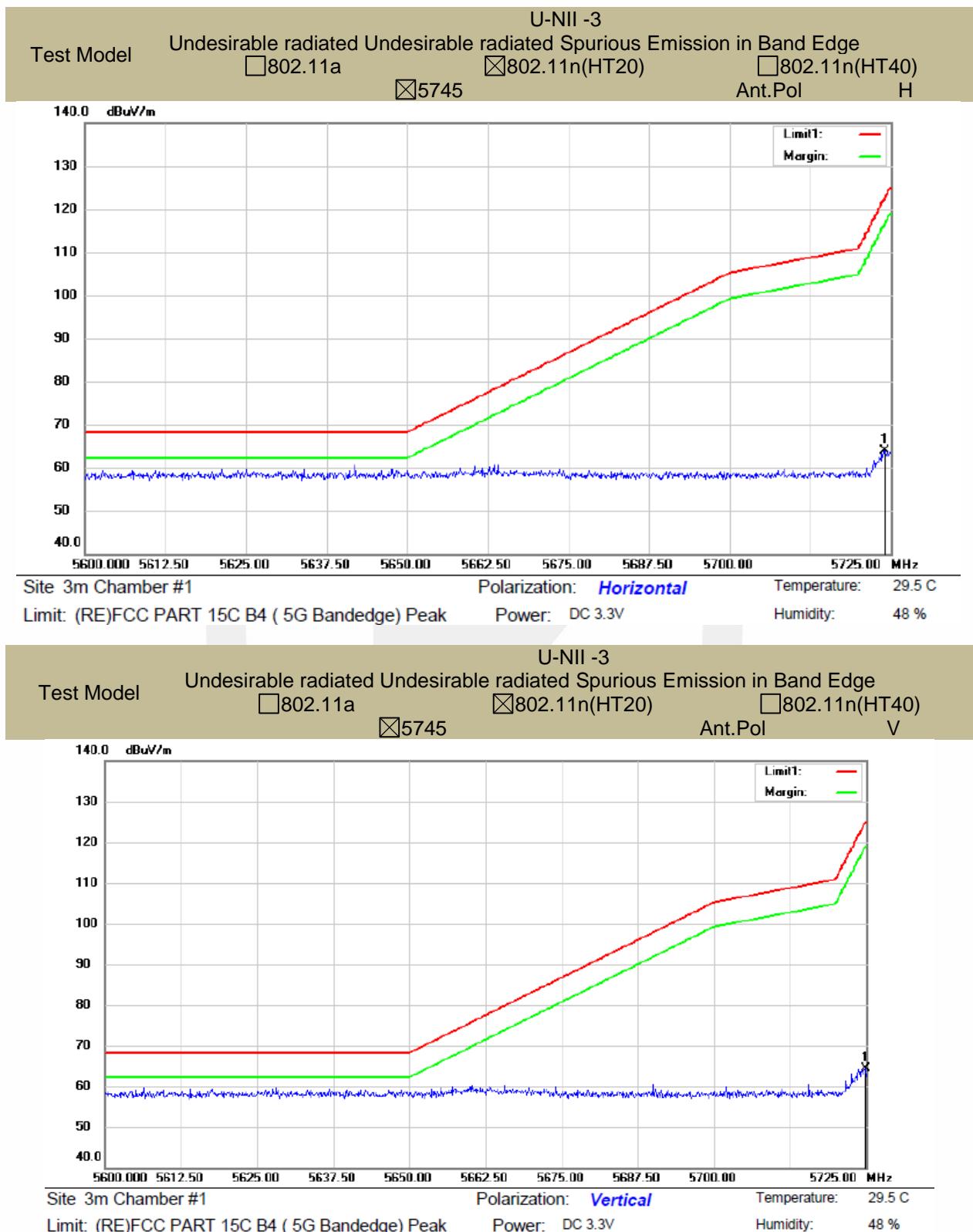
| | | | |
|------------|---------------|------------|------|
| Test mode: | 802.11n(HT20) | Frequency: | 5825 |
|------------|---------------|------------|------|

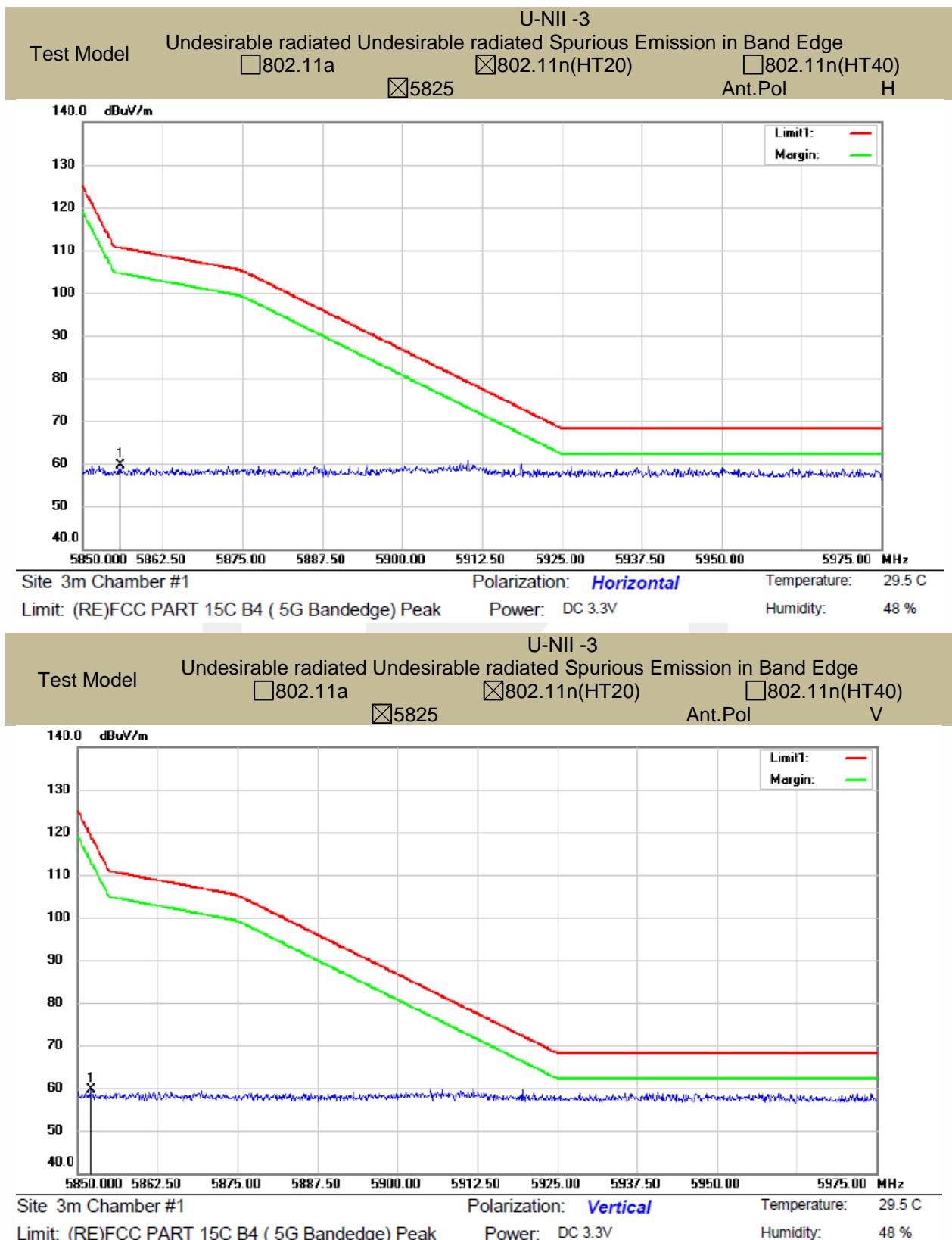
| Freq. (MHz) | Ant.Pol. H/V | Field Strength (RBW=100KHz) (dBuV/m) | E.I.R.P (dBm) | Limit (dBm) | Verdict |
|----------------|-----------------|--|------------------|-------------|---------|
| 5852.01 | V | 59.73 | -35.50 | 27 | PASS |
| 5855.97 | H | 59.67 | -35.56 | 27 | PASS |

Note: (1) All Readings are Peak Value (VBW=3MHz) and AV Value (VBW=10Hz).

(2) Emission Level= Reading Level+Probe Factor +Cable Loss.

(3)EIRP[dBm] = E[dB μ V/m] + 20 log(d[meters]) - 104.77
d is the measurement distance in 3 meters





Antenna 2:

| | | | |
|------------|---------------|------------|------|
| Test mode: | 802.11n(HT20) | Frequency: | 5745 |
|------------|---------------|------------|------|

| Freq. (MHz) | Ant.Pol. H/V | Field Strength (RBW=100KHz) (dBuV/m) | E.I.R.P (dBm) | Limit (dBm) | Verdict |
|----------------|-----------------|--|------------------|-------------|---------|
| 5723.73 | H | 65.46 | -29.77 | 27 | PASS |
| 5724.96 | V | 65.77 | -29.46 | 27 | PASS |

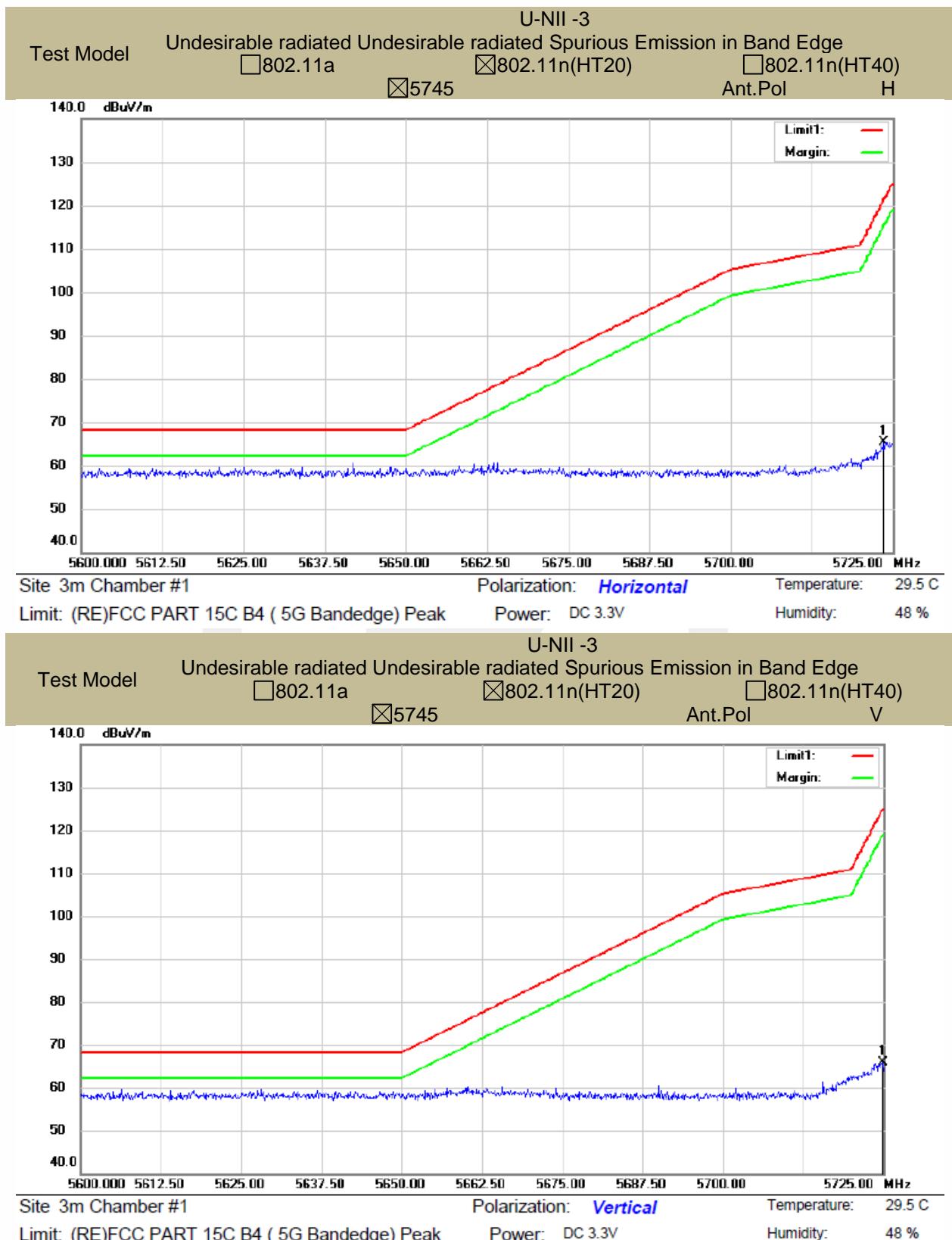
| | | | |
|------------|---------------|------------|------|
| Test mode: | 802.11n(HT20) | Frequency: | 5825 |
|------------|---------------|------------|------|

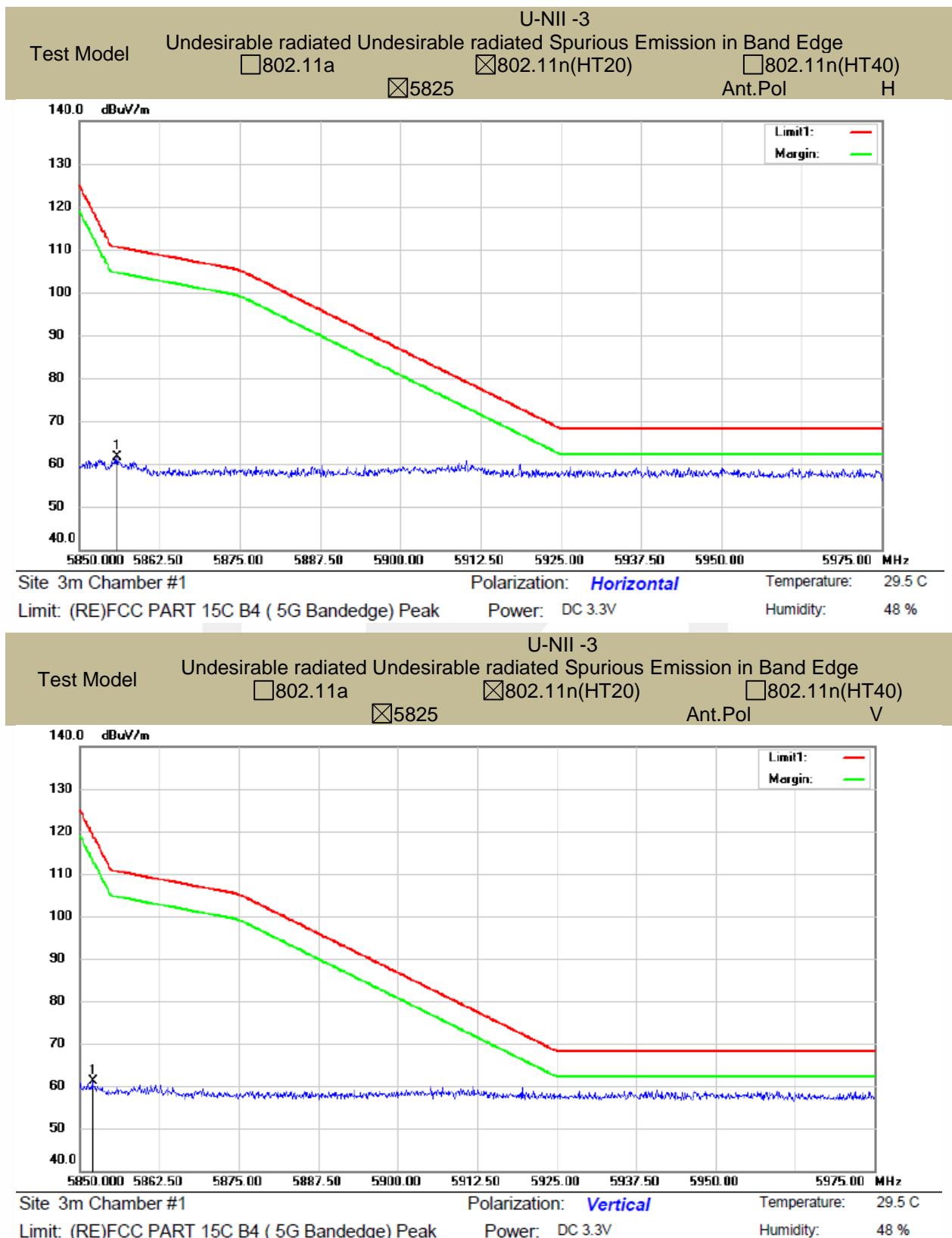
| Freq. (MHz) | Ant.Pol. H/V | Field Strength (RBW=100KHz) (dBuV/m) | E.I.R.P (dBm) | Limit (dBm) | Verdict |
|----------------|-----------------|--|------------------|-------------|---------|
| 5852.01 | V | 61.23 | -34.00 | 27 | PASS |
| 5855.97 | H | 61.67 | -33.56 | 27 | PASS |

Note: (1) All Readings are Peak Value (VBW=3MHz) and AV Value (VBW=10Hz).

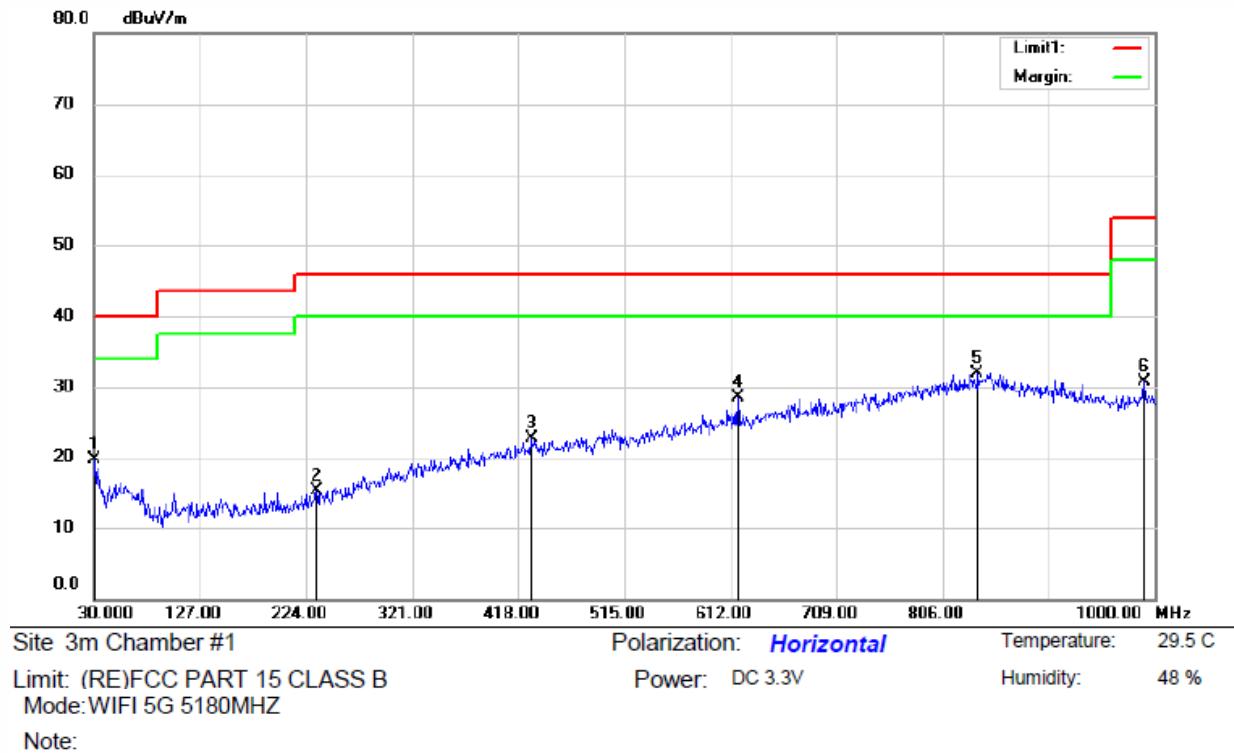
(2) Emission Level= Reading Level+Probe Factor +Cable Loss.

(3)EIRP[dBm] = E[dB μ V/m] + 20 log(d[meters]) - 104.77
d is the measurement distance in 3 meters

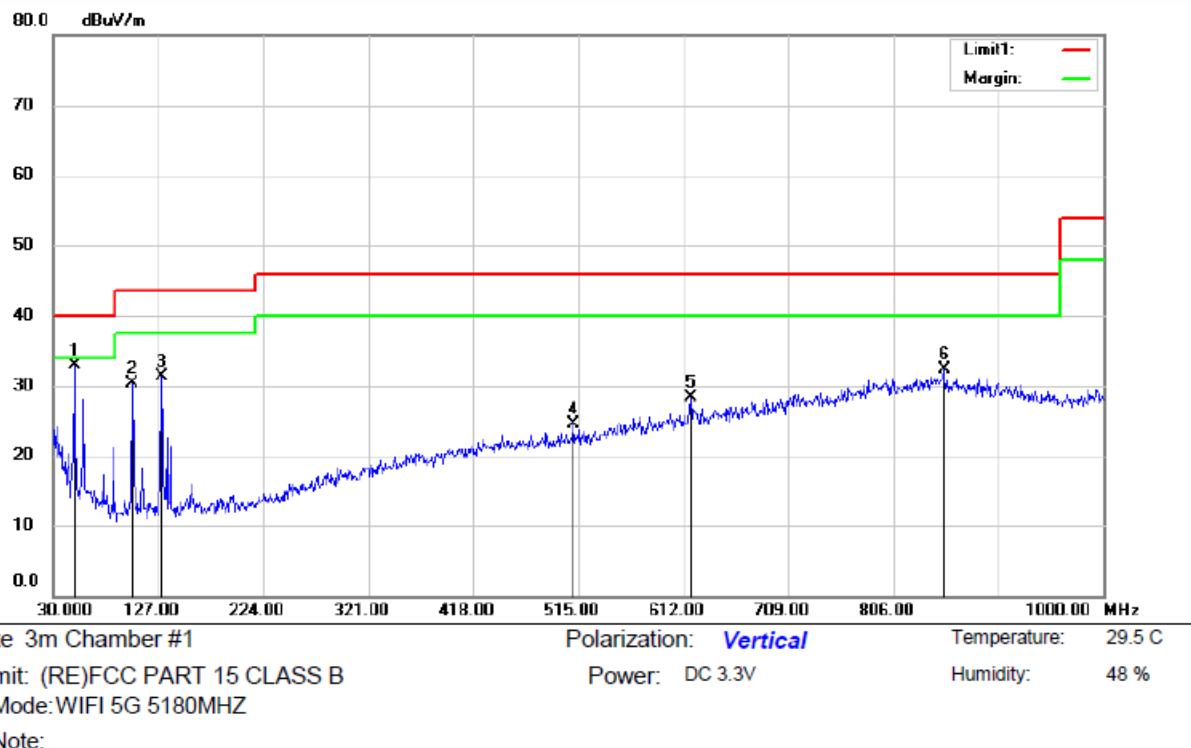




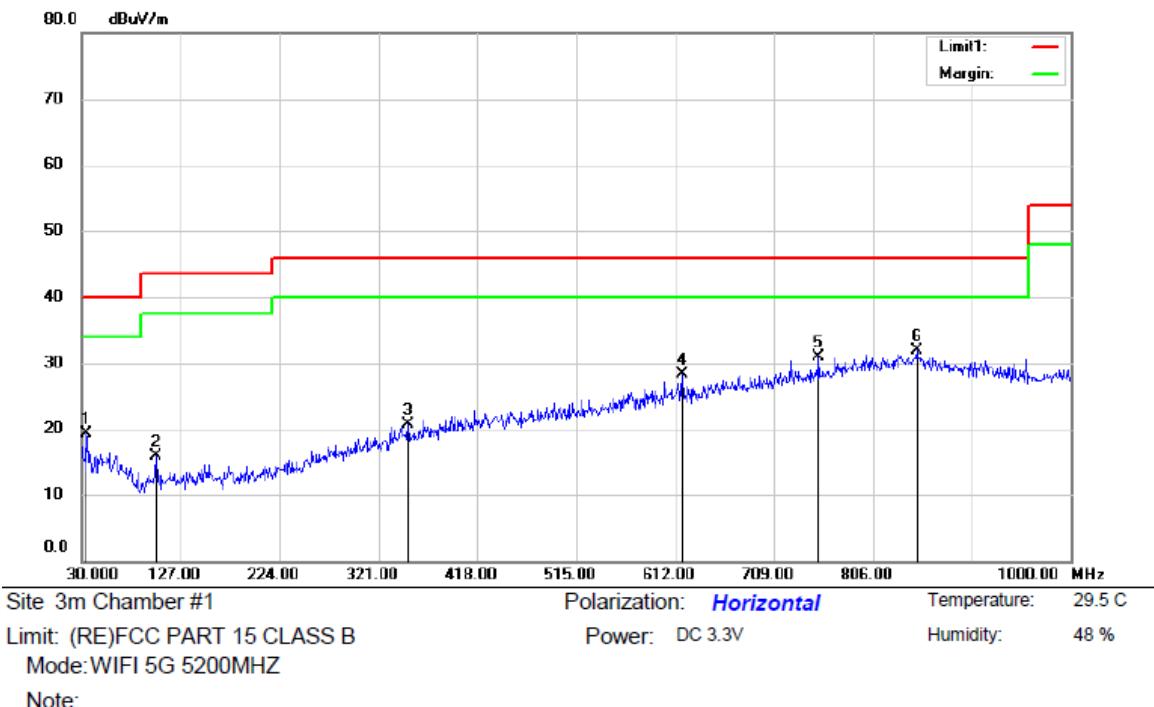
- Undesirable radiated Spurious Emission below 1GHz (30MHz to 1GHz)
All the modes 802.11a/n has been tested and the worst result 802.11n (HT20) recorded as below:

Antenna 1:


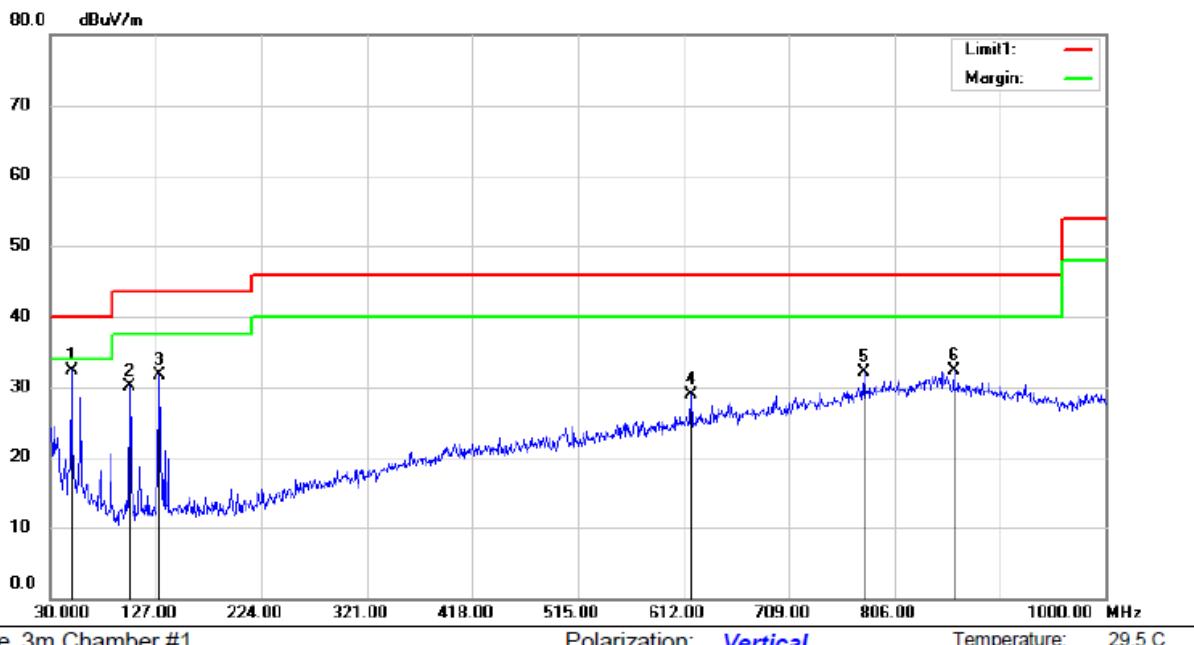
| No. | Mk. | Freq. | Reading | Correct | Measure- | Limit | Over | Antenna | Table | | |
|-----|----------|-------|---------|---------|----------|--------|------|----------|-------|--------|---------|
| | | | Level | Factor | ment | | | | | | |
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | 31.2123 | 34.13 | -14.51 | 19.62 | 40.00 | -20.38 | QP | | | | |
| 2 | 234.4275 | 27.67 | -12.36 | 15.31 | 46.00 | -30.69 | QP | | | | |
| 3 | 430.0036 | 28.28 | -5.64 | 22.64 | 46.00 | -23.36 | QP | | | | |
| 4 | 619.5175 | 31.07 | -2.50 | 28.57 | 46.00 | -17.43 | QP | | | | |
| 5 * | 838.8585 | 29.05 | 2.81 | 31.86 | 46.00 | -14.14 | QP | | | | |
| 6 | 990.7850 | 30.42 | 0.31 | 30.73 | 54.00 | -23.27 | QP | | | | |



| No. | Mk. | Freq. | Reading | Correct | Measure- | Limit | Over | Antenna | Table | |
|-----|-----|----------|---------|---------|----------|-------|----------|---------|--------|---------|
| | | | Level | Factor | ment | | | | | |
| | | MHz | dBuV | dB | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | * | 49.5212 | 45.06 | -12.12 | 32.94 | 40.00 | -7.06 | QP | | |
| 2 | | 103.4775 | 44.72 | -14.45 | 30.27 | 43.50 | -13.23 | QP | | |
| 3 | | 130.5161 | 45.52 | -14.24 | 31.28 | 43.50 | -12.22 | QP | | |
| 4 | | 510.1500 | 29.53 | -5.08 | 24.45 | 46.00 | -21.55 | QP | | |
| 5 | | 619.5175 | 30.79 | -2.50 | 28.29 | 46.00 | -17.71 | QP | | |
| 6 | | 853.2875 | 29.53 | 2.68 | 32.21 | 46.00 | -13.79 | QP | | |



| No. | Mk. | Freq. | Reading | Correct | Measure- | Limit | Over | Antenna | Table | | |
|-----|-----|----------|---------|---------|----------|--------|--------|----------|-------|--------|---------|
| | | | Level | | | | | | | Degree | |
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 34.1225 | 33.31 | -14.10 | 19.21 | 40.00 | -20.79 | QP | | | |
| 2 | | 103.5986 | 30.27 | -14.44 | 15.83 | 43.50 | -27.67 | QP | | | |
| 3 | | 350.9486 | 28.37 | -7.64 | 20.73 | 46.00 | -25.27 | QP | | | |
| 4 | | 619.5175 | 30.88 | -2.50 | 28.38 | 46.00 | -17.62 | QP | | | |
| 5 | | 752.8925 | 30.62 | 0.20 | 30.82 | 46.00 | -15.18 | QP | | | |
| 6 | * | 849.1650 | 29.03 | 2.92 | 31.95 | 46.00 | -14.05 | QP | | | |

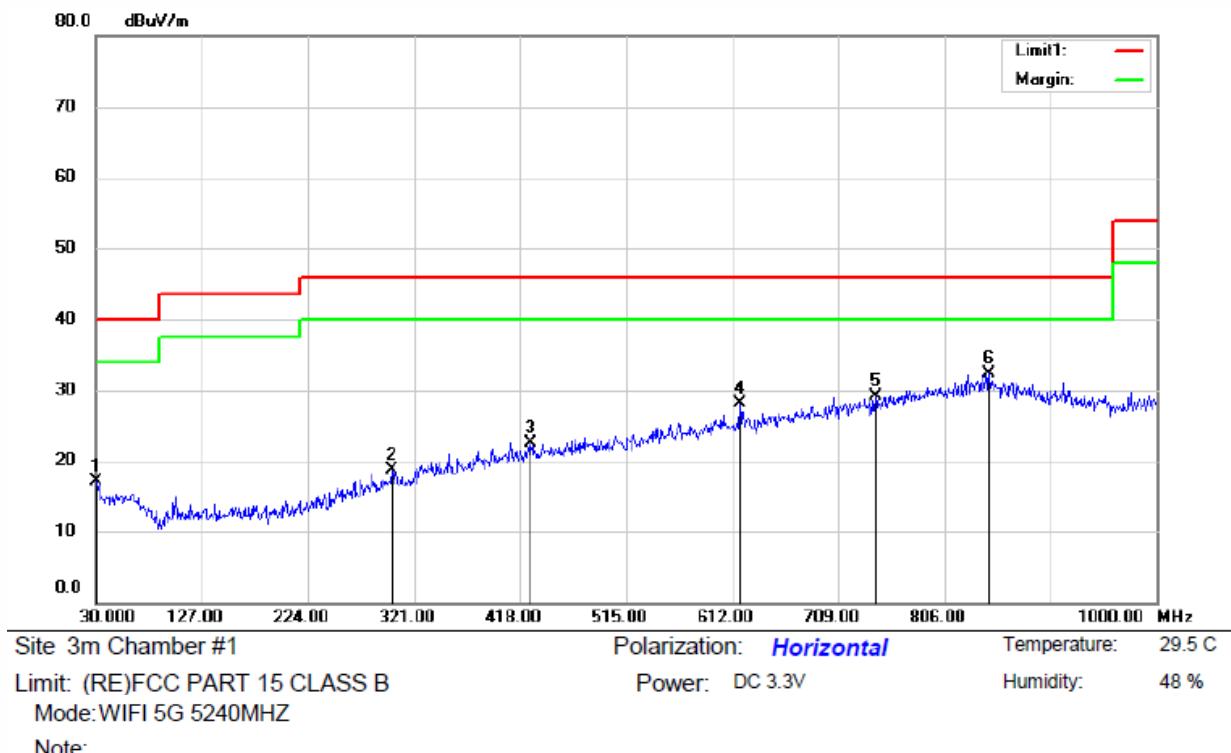


Site: 3m Chamber #1 Polarization: **Vertical** Temperature: 29.5 C

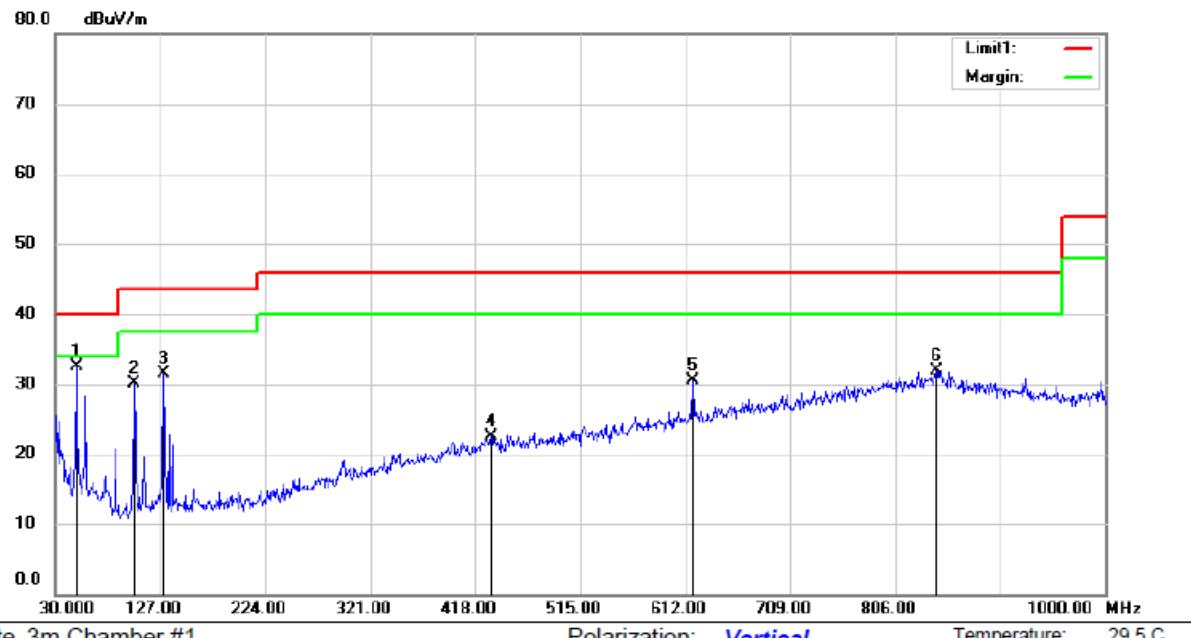
Limit: (RE)FCC PART 15 CLASS B Power: DC 3.3V Humidity: 48 %
Mode: WIFI 5G 5200MHZ

Note:

| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV/m | Limit dBuV/m | Over dB | Antenna Height cm | | Table Degree | Comment |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|------------|-------------------------|--------|-----------------|---------|
| | | | | | | | | Detector | degree | | |
| 1 | * | 49.5212 | 44.44 | -12.12 | 32.32 | 40.00 | -7.68 | QP | | | |
| 2 | | 103.4775 | 44.57 | -14.45 | 30.12 | 43.50 | -13.38 | QP | | | |
| 3 | | 130.5161 | 45.90 | -14.24 | 31.66 | 43.50 | -11.84 | QP | | | |
| 4 | | 619.5175 | 31.47 | -2.50 | 28.97 | 46.00 | -17.03 | QP | | | |
| 5 | | 778.1123 | 30.82 | 1.22 | 32.04 | 46.00 | -13.96 | QP | | | |
| 6 | | 861.0475 | 30.15 | 2.16 | 32.31 | 46.00 | -13.69 | QP | | | |



| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV/m | Limit dBuV/m | Over dB | Antenna Height cm | | Table Degree | Comment |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|------------|-------------------------|-----------------|-----------------|---------|
| | | | | | | | | Detector | Table Degree | | |
| 1 | | 30.9700 | 31.72 | -14.52 | 17.20 | 40.00 | -22.80 | QP | | | |
| 2 | | 300.9936 | 27.63 | -8.99 | 18.64 | 46.00 | -27.36 | QP | | | |
| 3 | | 427.8211 | 28.25 | -5.74 | 22.51 | 46.00 | -23.49 | QP | | | |
| 4 | | 619.5175 | 30.57 | -2.50 | 28.07 | 46.00 | -17.93 | QP | | | |
| 5 | | 743.3137 | 29.08 | 0.01 | 29.09 | 46.00 | -16.91 | QP | | | |
| 6 | * | 847.2250 | 29.44 | 2.91 | 32.35 | 46.00 | -13.65 | QP | | | |

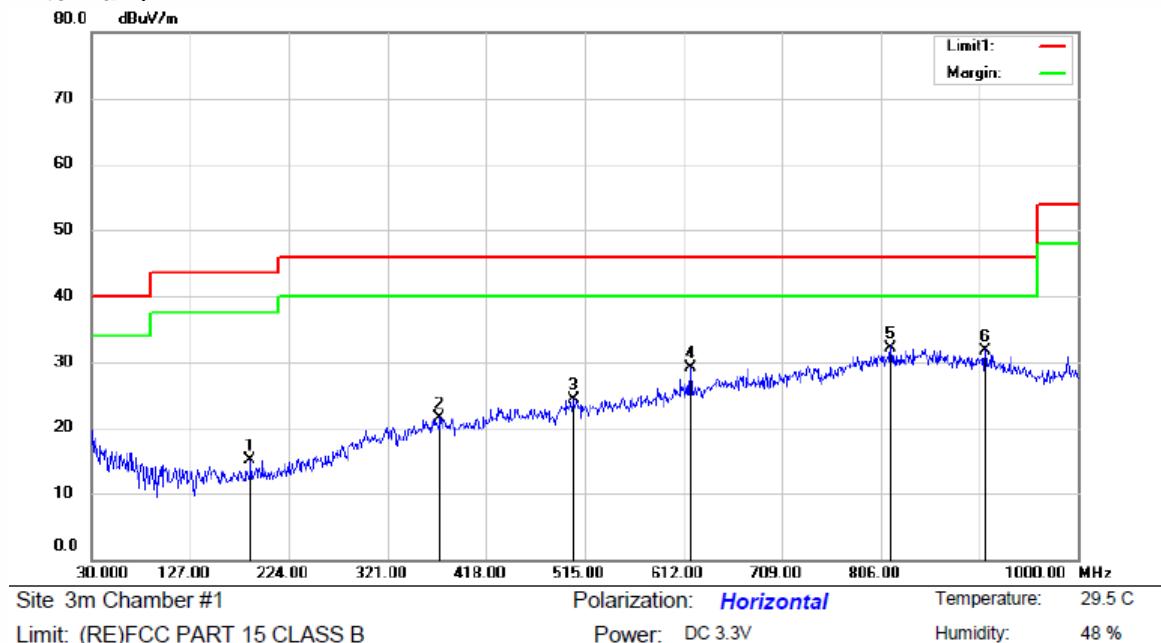


Site 3m Chamber #1 Polarization: *Vertical* Temperature: 29.5 C

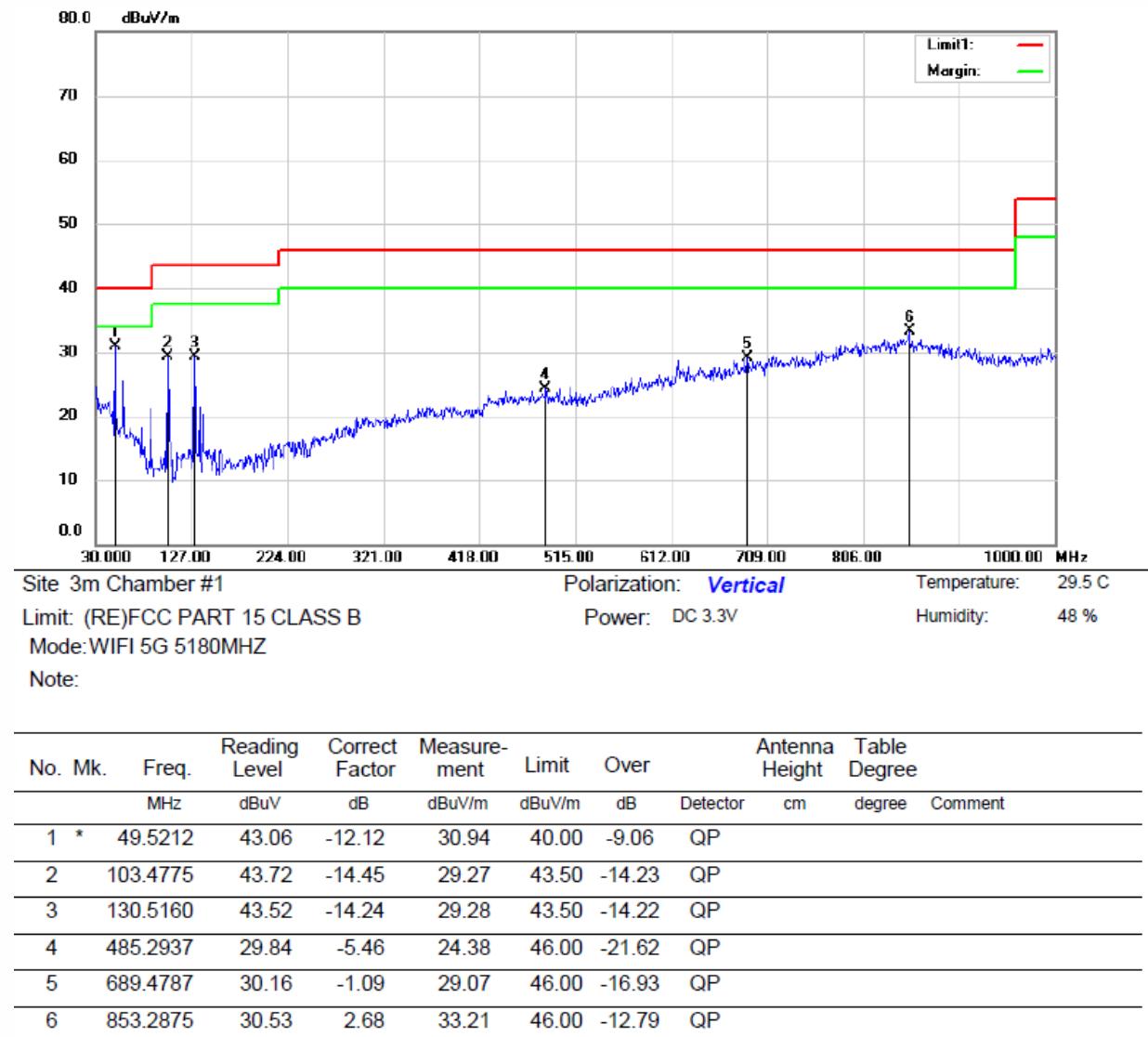
Limit: (RE)FCC PART 15 CLASS B Power: DC 3.3V Humidity: 48 %
Mode: WIFI 5G 5240MHZ

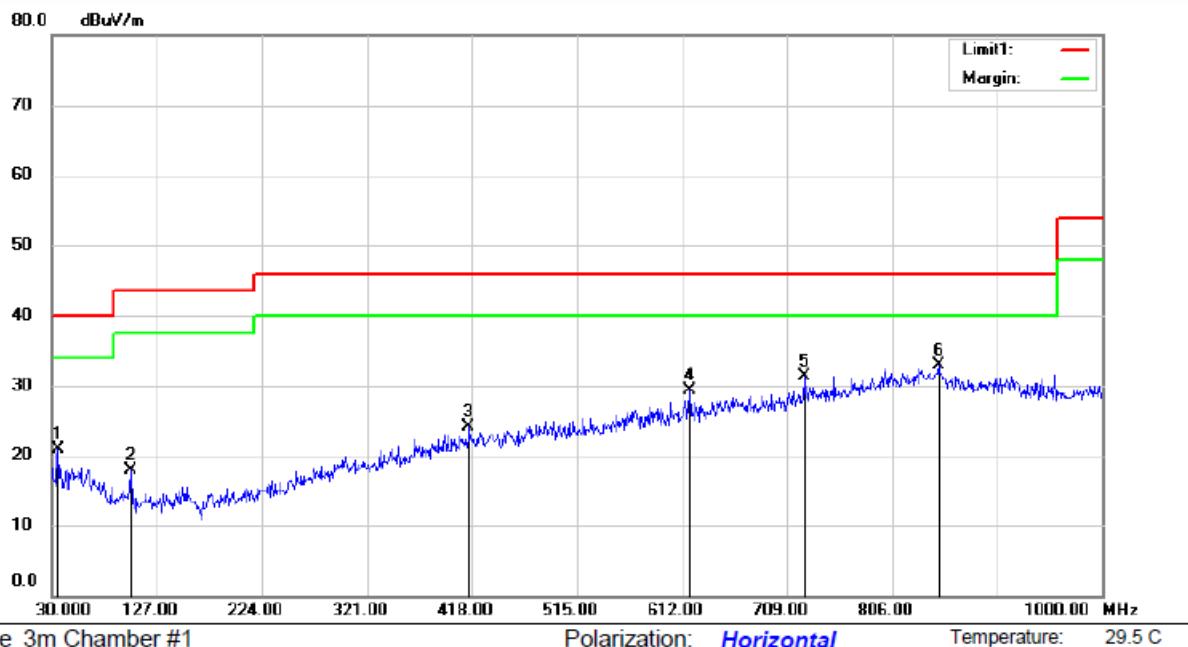
Note:

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure- ment | Limit | Over | Antenna Height | Table Degree | | |
|-----|-----|----------|---------------|----------------|------------------|--------|--------|----------------|--------------|--------|---------|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | * | 49.5212 | 44.71 | -12.12 | 32.59 | 40.00 | -7.41 | QP | | | |
| 2 | | 103.4775 | 44.61 | -14.45 | 30.16 | 43.50 | -13.34 | QP | | | |
| 3 | | 130.5161 | 45.74 | -14.24 | 31.50 | 43.50 | -12.00 | QP | | | |
| 4 | | 432.7925 | 28.31 | -5.71 | 22.60 | 46.00 | -23.40 | QP | | | |
| 5 | | 619.5175 | 33.01 | -2.50 | 30.51 | 46.00 | -15.49 | QP | | | |
| 6 | | 844.0724 | 29.07 | 2.89 | 31.96 | 46.00 | -14.04 | QP | | | |

Antenna 2:


| No. Mk. | Freq. MHz | Reading Level | Correct Factor | Measure- ment | Limit | Over | Antenna Height | Table Degree | Comment |
|---------|--------------|------------------|-------------------|------------------|--------|--------|-------------------|-----------------|---------|
| | | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | |
| 1 | 186.8975 | 28.86 | -13.74 | 15.12 | 43.50 | -28.38 | QP | | |
| 2 | 372.6524 | 28.81 | -7.21 | 21.60 | 46.00 | -24.40 | QP | | |
| 3 | 504.3300 | 29.33 | -5.00 | 24.33 | 46.00 | -21.67 | QP | | |
| 4 | 619.5175 | 31.57 | -2.50 | 29.07 | 46.00 | -16.93 | QP | | |
| 5 * | 815.9424 | 30.31 | 1.89 | 32.20 | 46.00 | -13.80 | QP | | |
| 6 | 909.3050 | 30.70 | 1.10 | 31.80 | 46.00 | -14.20 | QP | | |





Site 3m Chamber #1

 Polarization: **Horizontal**

Temperature: 29.5 C

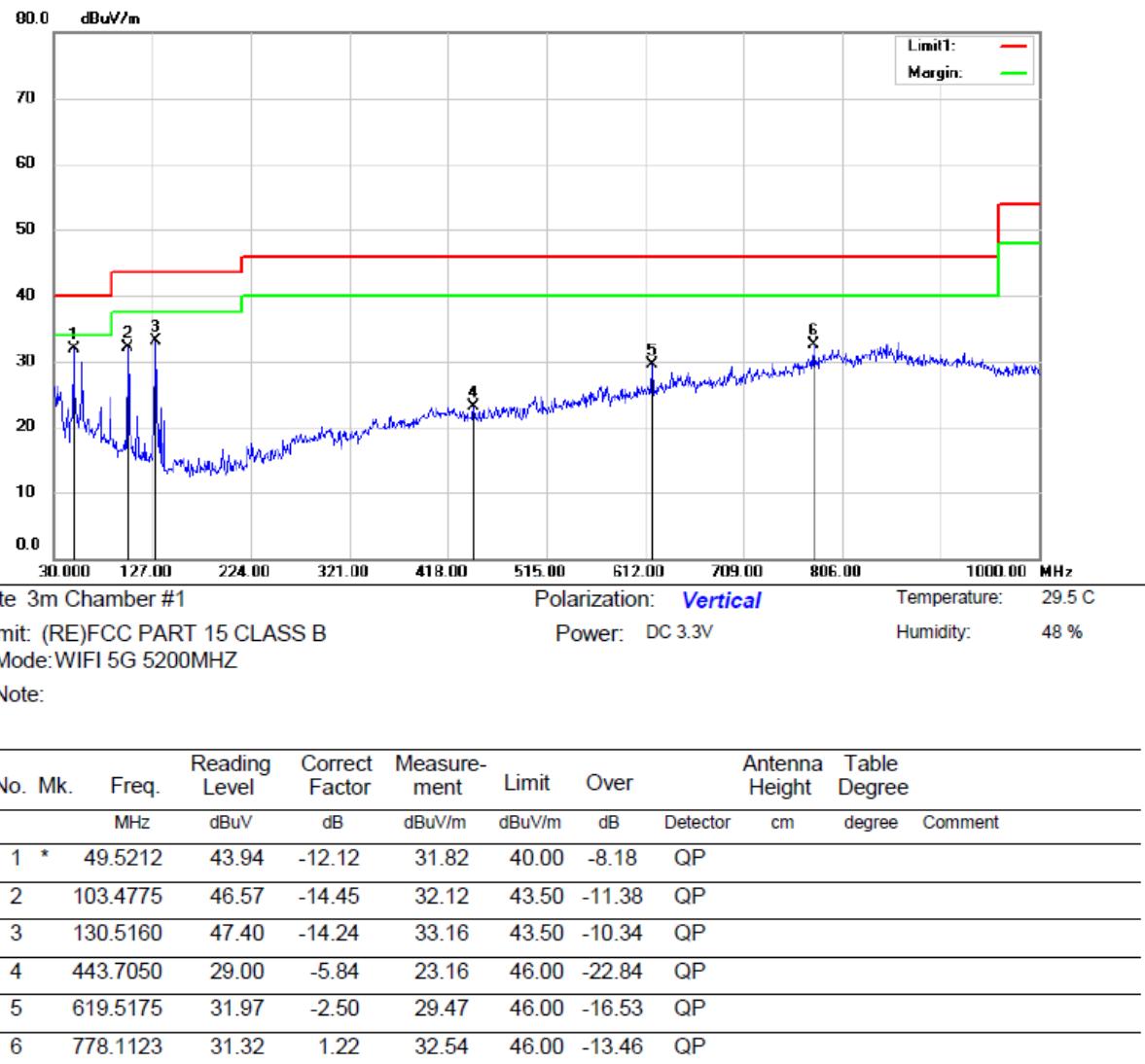
 Limit: (RE)FCC PART 15 CLASS B
 Mode: WIFI 5G 5200MHZ

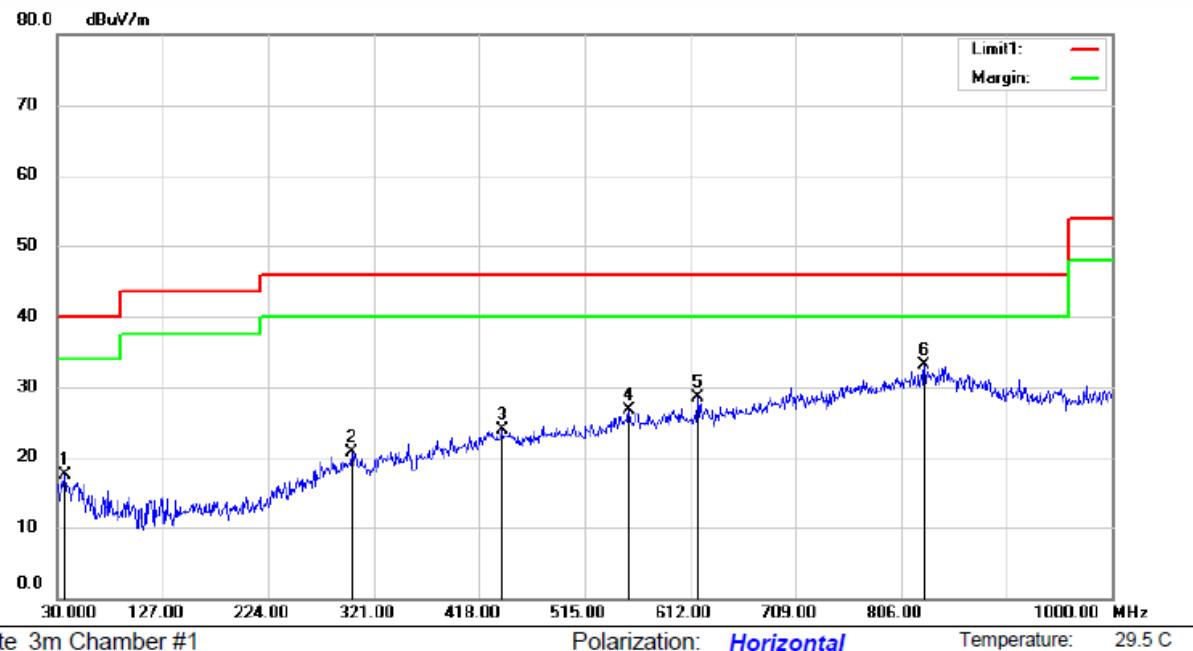
Power: DC 3.3V

Humidity: 48 %

Note:

| No. | Mk. | Freq. | Reading | Correct | Measure- | Limit | Over | Antenna | Table | |
|-----|-----|----------|---------|---------|----------|-------|----------|---------|--------|---------|
| | | | Level | Factor | ment | | | | | |
| | | MHz | dBuV | dB | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 35.9411 | 34.52 | -13.55 | 20.97 | 40.00 | -19.03 | QP | | |
| 2 | | 103.5986 | 32.27 | -14.44 | 17.83 | 43.50 | -25.67 | QP | | |
| 3 | | 415.9386 | 30.25 | -6.14 | 24.11 | 46.00 | -21.89 | QP | | |
| 4 | | 619.5175 | 31.88 | -2.50 | 29.38 | 46.00 | -16.62 | QP | | |
| 5 | | 724.6412 | 31.67 | -0.29 | 31.38 | 46.00 | -14.62 | QP | | |
| 6 | * | 849.1650 | 30.03 | 2.92 | 32.95 | 46.00 | -13.05 | QP | | |





Site 3m Chamber #1

 Polarization: **Horizontal**

Temperature: 29.5 C

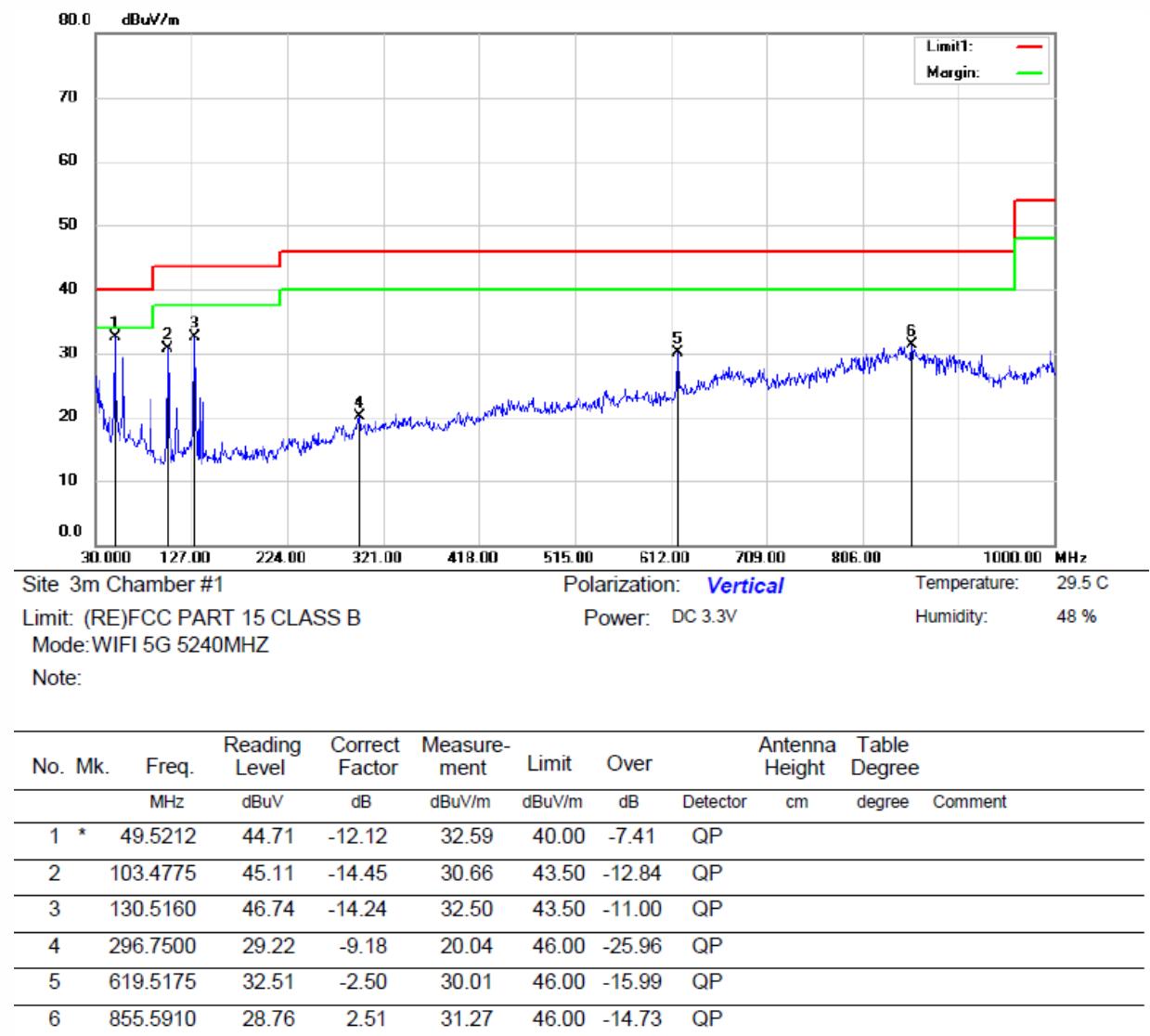
 Limit: (RE)FCC PART 15 CLASS B
 Mode: WIFI 5G 5240MHZ

Power: DC 3.3V

Humidity: 48 %

Note:

| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV/m | Limit dBuV/m | Over dB | Antenna Height cm | Table Degree | Comment |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|------------|-------------------------|-----------------|---------|
| | | | | | | | | Detector | cm | |
| 1 | | 37.0324 | 30.89 | -13.42 | 17.47 | 40.00 | -22.53 | QP | | |
| 2 | | 300.9936 | 29.63 | -8.99 | 20.64 | 46.00 | -25.36 | QP | | |
| 3 | | 439.9461 | 29.74 | -5.89 | 23.85 | 46.00 | -22.15 | QP | | |
| 4 | | 555.9823 | 30.49 | -3.88 | 26.61 | 46.00 | -19.39 | QP | | |
| 5 | | 619.5175 | 31.07 | -2.50 | 28.57 | 46.00 | -17.43 | QP | | |
| 6 | * | 827.5823 | 30.69 | 2.32 | 33.01 | 46.00 | -12.99 | QP | | |



8.6 POWER LINE CONDUCTED EMISSIONS

8.6.1 Applicable Standard

According to FCC Part 15.207(a)

8.6.2 Conformance Limit

| Frequency(MHz) | Conducted Emission Limit | |
|----------------|--------------------------|---------|
| | Quasi-peak | Average |
| 0.15-0.5 | 66-56 | 56-46 |
| 0.5-5.0 | 56 | 46 |
| 5.0-30.0 | 60 | 50 |

Note: 1. The lower limit shall apply at the transition frequencies

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

8.6.3 Test Configuration

Test according to clause 6.3 conducted emission test setup

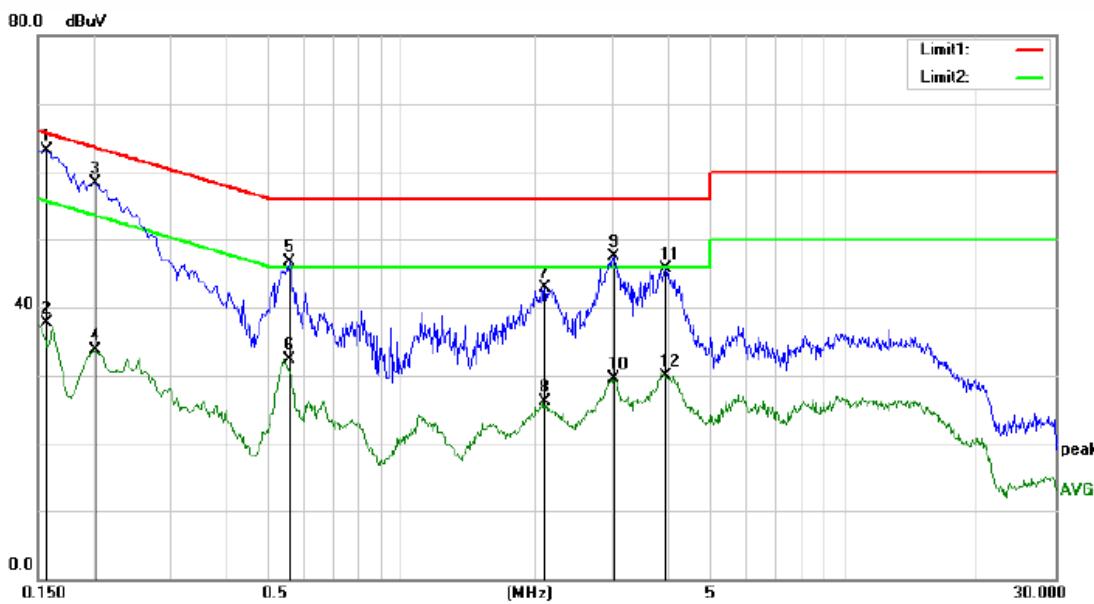
8.6.4 Test Procedure

The EUT was placed on a table which is 0.8m above ground plane.

Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Repeat above procedures until all frequency measured were complete.

8.6.5 Test Results

PASS



Site Conduction #1

 Phase: *L1*

Temperature: 19.4

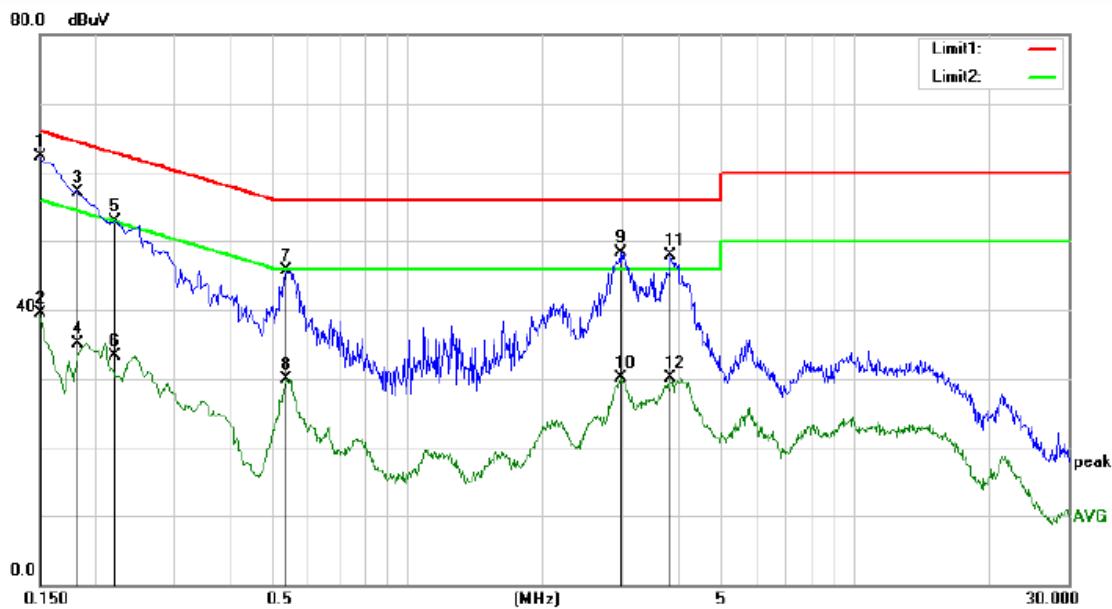
 Limit: (CE)FCC PART 15 class B_QP
 Mode: WIFI Mode

Power: AC120V/60Hz

Humidity: 37 %

Note:

| No. | Mk. | Freq. | Reading | Correct | Measure- | Limit | Over | Detector | Comment |
|-----|-----|--------|---------|---------|----------|-------|--------|----------|---------|
| | | | Level | Factor | ment | | | | |
| | | MHz | dBuV | dB | dBuV | dBuV | dB | | |
| 1 | * | 0.1580 | 53.62 | 9.44 | 63.06 | 65.57 | -2.51 | QP | |
| 2 | | 0.1580 | 28.20 | 9.44 | 37.64 | 55.57 | -17.93 | AVG | |
| 3 | | 0.2020 | 48.80 | 9.44 | 58.24 | 63.53 | -5.29 | QP | |
| 4 | | 0.2020 | 24.22 | 9.44 | 33.66 | 53.53 | -19.87 | AVG | |
| 5 | | 0.5580 | 37.41 | 9.28 | 46.69 | 56.00 | -9.31 | QP | |
| 6 | | 0.5580 | 23.04 | 9.28 | 32.32 | 46.00 | -13.68 | AVG | |
| 7 | | 2.1020 | 33.11 | 9.81 | 42.92 | 56.00 | -13.08 | QP | |
| 8 | | 2.1020 | 16.30 | 9.81 | 26.11 | 46.00 | -19.89 | AVG | |
| 9 | | 3.0180 | 37.64 | 9.82 | 47.46 | 56.00 | -8.54 | QP | |
| 10 | | 3.0180 | 19.73 | 9.82 | 29.55 | 46.00 | -16.45 | AVG | |
| 11 | | 3.9420 | 35.97 | 9.82 | 45.79 | 56.00 | -10.21 | QP | |
| 12 | | 3.9420 | 19.99 | 9.82 | 29.81 | 46.00 | -16.19 | AVG | |



Site Conduction #1

 Phase: **N**

Temperature: 19.4

 Limit: (CE)FCC PART 15 class B_QP
 Mode: WIFI Mode

Power: AC120V/60Hz

Humidity: 37 %

Note:

| No. | Mk. | Freq. | Reading | Correct | Measure- | Limit | Over | Detector | Comment |
|-----|-----|--------|---------|---------|----------|-------|--------|----------|---------|
| | | | Level | Factor | ment | | | | |
| | | MHz | dBuV | dB | dBuV | dBuV | dB | | |
| 1 | * | 0.1500 | 52.78 | 9.44 | 62.22 | 66.00 | -3.78 | QP | |
| 2 | | 0.1500 | 30.08 | 9.44 | 39.52 | 56.00 | -16.48 | AVG | |
| 3 | | 0.1825 | 47.65 | 9.44 | 57.09 | 64.37 | -7.28 | QP | |
| 4 | | 0.1825 | 25.59 | 9.44 | 35.03 | 54.37 | -19.34 | AVG | |
| 5 | | 0.2220 | 43.53 | 9.40 | 52.93 | 62.74 | -9.81 | QP | |
| 6 | | 0.2220 | 23.92 | 9.40 | 33.32 | 52.74 | -19.42 | AVG | |
| 7 | | 0.5340 | 36.44 | 9.27 | 45.71 | 56.00 | -10.29 | QP | |
| 8 | | 0.5340 | 20.64 | 9.27 | 29.91 | 46.00 | -16.09 | AVG | |
| 9 | | 2.9820 | 38.44 | 9.82 | 48.26 | 56.00 | -7.74 | QP | |
| 10 | | 2.9820 | 20.22 | 9.82 | 30.04 | 46.00 | -15.96 | AVG | |
| 11 | | 3.8780 | 38.17 | 9.82 | 47.99 | 56.00 | -8.01 | QP | |
| 12 | | 3.8780 | 20.32 | 9.82 | 30.14 | 46.00 | -15.86 | AVG | |

8.7 ANTENNA APPLICATION

8.7.1 Antenna Requirement

| Standard | Requirement |
|---------------------|--|
| FCC CRF Part 15.203 | An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded. |

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.407 (a), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

8.7.2 Result

PASS.

- The EUT has 2 antenna: One PCB antenna, one IPEX connector antenna; their antenna gains are both 2.0 dBi;

Note: Antennas use a permanently attached antenna which is not replaceable.
 Not using a standard antenna jack or electrical connector for antenna replacement
 The antenna has to be professionally installed (please provide method of installation)

Which in accordance to section 15.203, please refer to the internal photos.

Detail of factor for radiated emission

| Frequency(MHz) | Ant_F(dB) | Cab_L(dB) | Preamp(dB) | Correct Factor(dB) |
|----------------|-----------|-----------|------------|--------------------|
| 0.009 | 20.6 | 0.03 | \ | 20.63 |
| 0.15 | 20.7 | 0.1 | \ | 20.8 |
| 1 | 20.9 | 0.15 | \ | 21.05 |
| 10 | 20.1 | 0.28 | \ | 20.38 |
| 30 | 18.8 | 0.45 | \ | 19.25 |
| | | | | |
| 30 | 11.7 | 0.62 | 27.9 | -15.58 |
| 100 | 12.5 | 1.02 | 27.8 | -14.28 |
| 300 | 12.9 | 1.91 | 27.5 | -12.69 |
| 600 | 19.2 | 2.92 | 27 | -4.88 |
| 800 | 21.1 | 3.54 | 26.6 | -1.96 |
| 1000 | 22.3 | 4.17 | 26.2 | 0.27 |
| | | | | |
| 1000 | 25.6 | 1.76 | 41.4 | -14.04 |
| 3000 | 28.9 | 3.27 | 43.2 | -11.03 |
| 5000 | 31.1 | 4.2 | 44.6 | -9.3 |
| 8000 | 36.2 | 5.95 | 44.7 | -2.55 |
| 10000 | 38.4 | 6.3 | 43.9 | 0.8 |
| 12000 | 38.5 | 7.14 | 42.3 | 3.34 |
| 15000 | 40.2 | 8.15 | 41.4 | 6.95 |
| 18000 | 45.4 | 9.02 | 41.3 | 13.12 |
| | | | | |
| 18000 | 37.9 | 1.81 | 47.9 | -8.19 |
| 21000 | 37.9 | 1.95 | 48.7 | -8.85 |
| 25000 | 39.3 | 2.01 | 42.8 | -1.49 |
| 28000 | 39.6 | 2.16 | 46.0 | -4.24 |
| 31000 | 41.2 | 2.24 | 44.5 | -1.06 |
| 34000 | 41.5 | 2.29 | 46.6 | -2.81 |
| 37000 | 43.8 | 2.30 | 46.4 | -0.3 |
| 40000 | 43.2 | 2.50 | 42.2 | 3.5 |

----- END OF REPORT -----