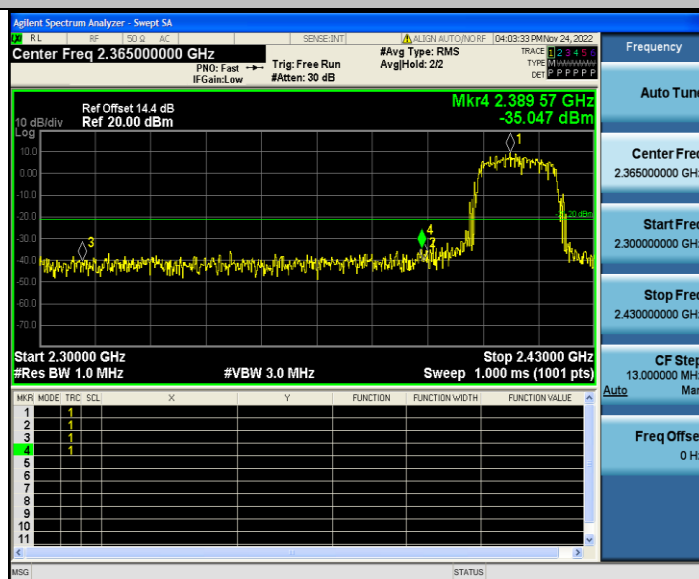




## 11N20SISO\_Ant2\_Low\_2412\_AV



## 11N20SISO\_Ant2\_Low\_2412\_Peak

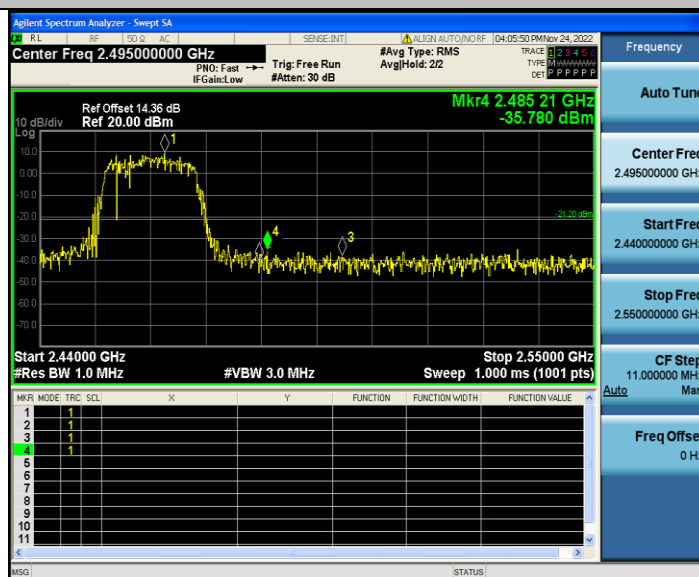




### 11N20SISO\_Ant1\_High\_2462\_AV



### 11N20SISO\_Ant1\_High\_2462\_Peak

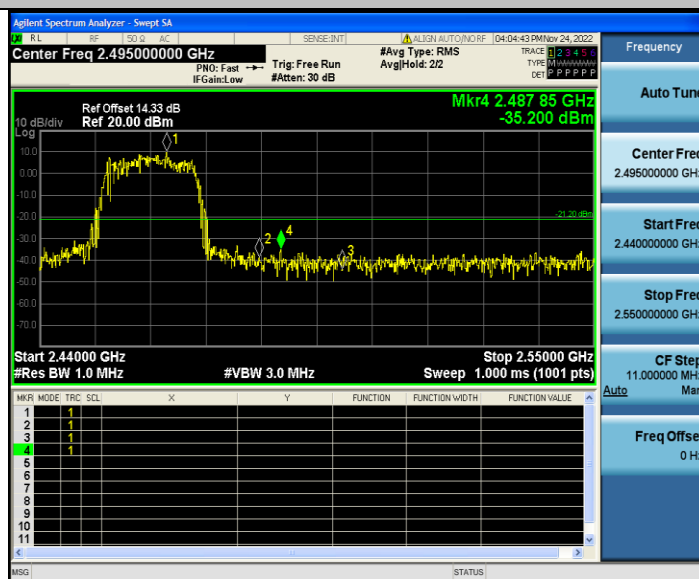




## 11N20SISO\_Ant2\_High\_2462\_AV



## 11N20SISO\_Ant2\_High\_2462\_Peak





## 8 Band Edge Measurement

|                  |  |
|------------------|--|
| Test Requirement | : Section 15.247(d) In addition, radiated emissions which fall in the restricted bands. as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).  |
| Test Method      | : ANSI C63.10:2013   |
| Test Limit       | : Regulation 15.247 (d),In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. 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)). |

### 8.1 Test Procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz, Sweep = auto  
Detector function = peak, Trace = max hold
- 3.Set up:



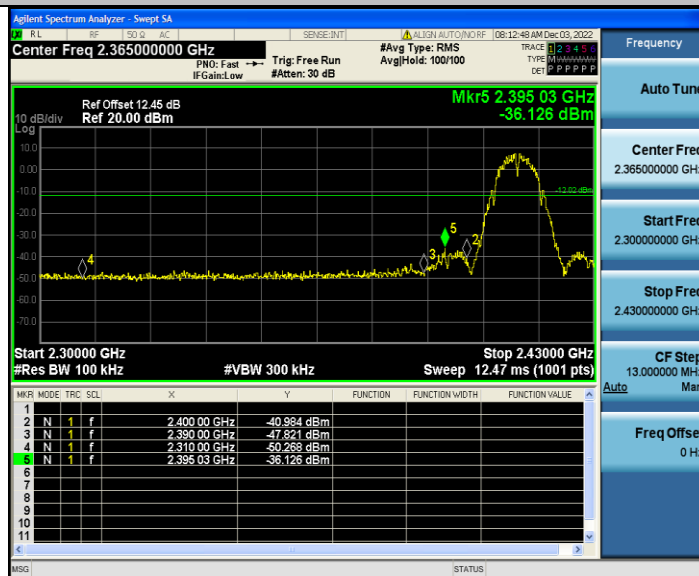


## 8.2 Test Result

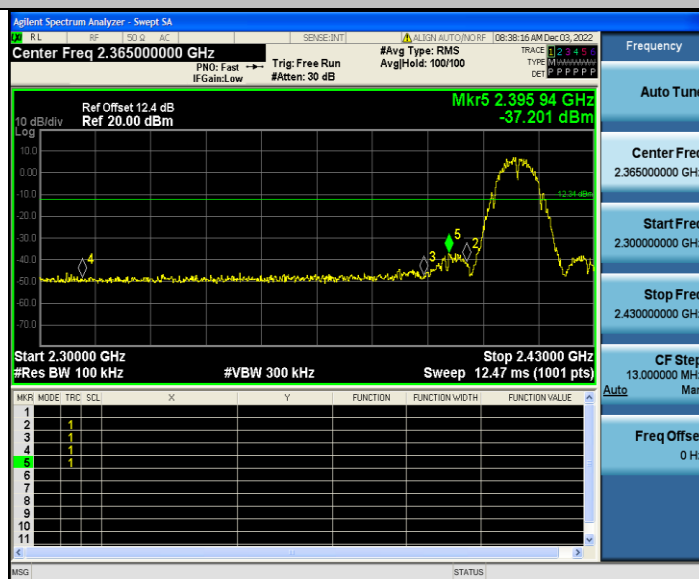
| TestMode  | Antenna | ChName | Frequency[MHz] | RefLevel[dBm] | Result[dBm] | Limit[dBm]    | Verdict |
|-----------|---------|--------|----------------|---------------|-------------|---------------|---------|
| 11B       | Ant1    | Low    | 2412           | 7.98          | -36.13      | $\leq -12.02$ | PASS    |
|           | Ant2    | Low    | 2412           | 7.66          | -37.2       | $\leq -12.34$ | PASS    |
|           | Ant1    | High   | 2462           | 6.77          | -46.24      | $\leq -13.23$ | PASS    |
|           | Ant2    | High   | 2462           | 6.75          | -45.58      | $\leq -13.25$ | PASS    |
| 11G       | Ant1    | Low    | 2412           | 3.56          | -34.37      | $\leq -16.44$ | PASS    |
|           | Ant2    | Low    | 2412           | 3.59          | -33.27      | $\leq -16.41$ | PASS    |
|           | Ant1    | High   | 2462           | 3.25          | -41.73      | $\leq -16.75$ | PASS    |
|           | Ant2    | High   | 2462           | 2.53          | -45.04      | $\leq -17.47$ | PASS    |
| 11N20SISO | Ant1    | Low    | 2412           | 2.43          | -32.85      | $\leq -17.57$ | PASS    |
|           | Ant2    | Low    | 2412           | 3.05          | -32.8       | $\leq -16.95$ | PASS    |
|           | Ant1    | High   | 2462           | 2.11          | -42.66      | $\leq -17.89$ | PASS    |
|           | Ant2    | High   | 2462           | 2.43          | -43.82      | $\leq -17.57$ | PASS    |
| 11N40SISO | Ant1    | Low    | 2422           | -4.81         | -44.33      | $\leq -24.81$ | PASS    |
|           | Ant2    | Low    | 2422           | -4.57         | -46.39      | $\leq -24.57$ | PASS    |
|           | Ant1    | High   | 2452           | -4.16         | -45.47      | $\leq -24.16$ | PASS    |
|           | Ant2    | High   | 2452           | -3.76         | -46.16      | $\leq -23.76$ | PASS    |



## 11B\_Ant1\_Low\_2412

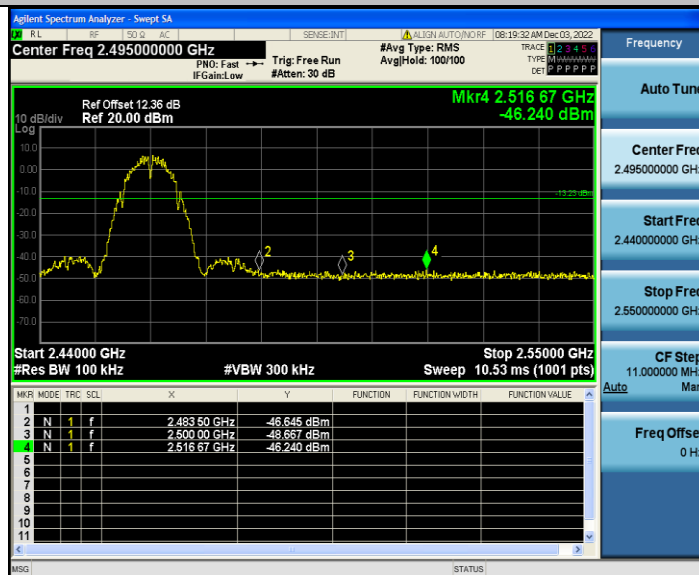


## 11B\_Ant2\_Low\_2412

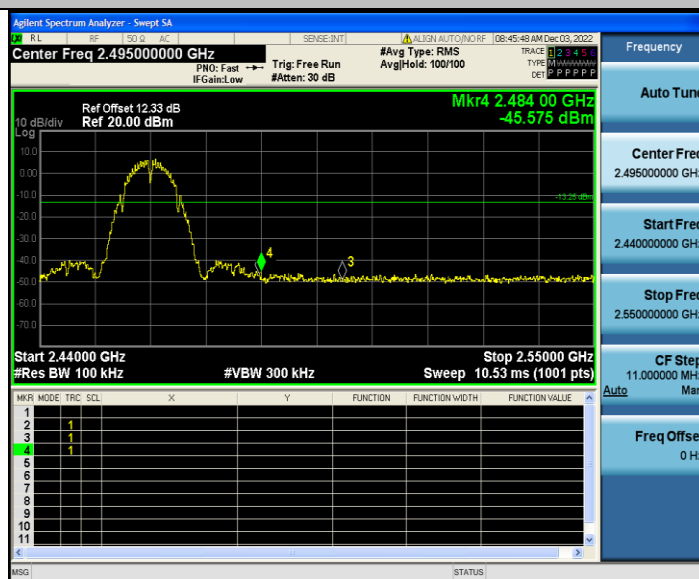




## 11B\_Ant1\_High\_2462



## 11B\_Ant2\_High\_2462

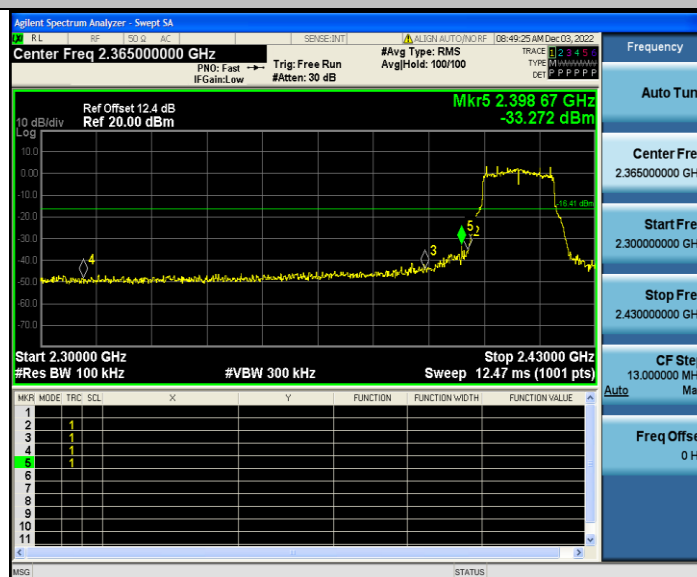




## 11G\_Ant1\_Low\_2412



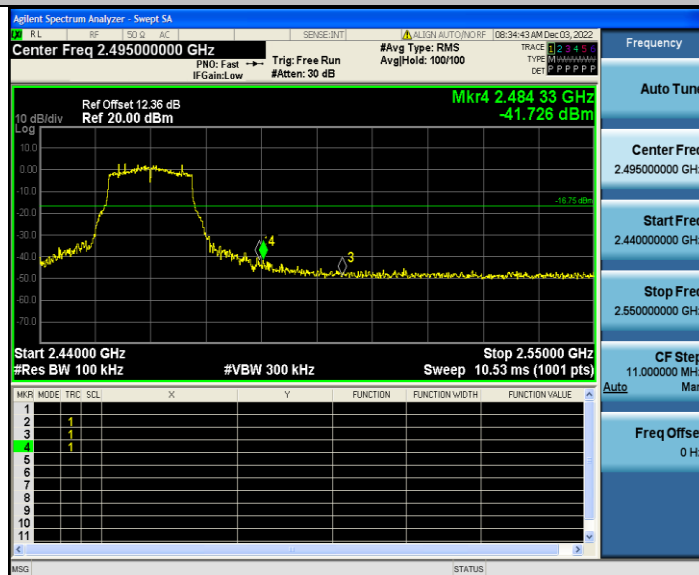
## 11G\_Ant2\_Low\_2412



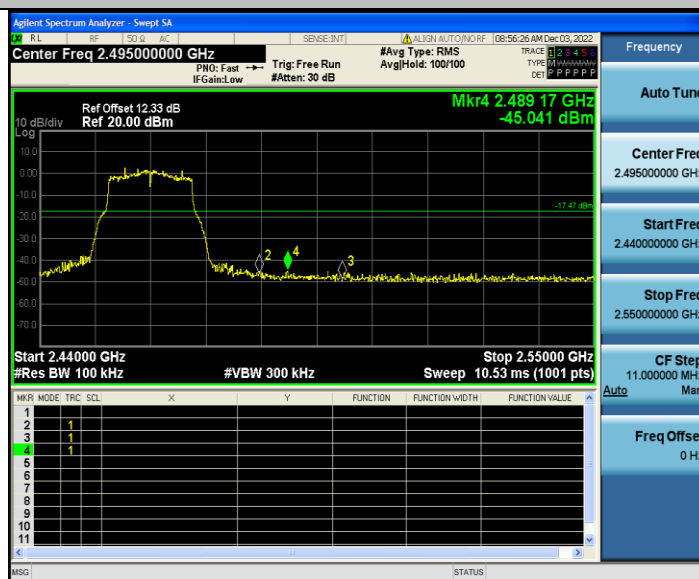




## 11G\_Ant1\_High\_2462

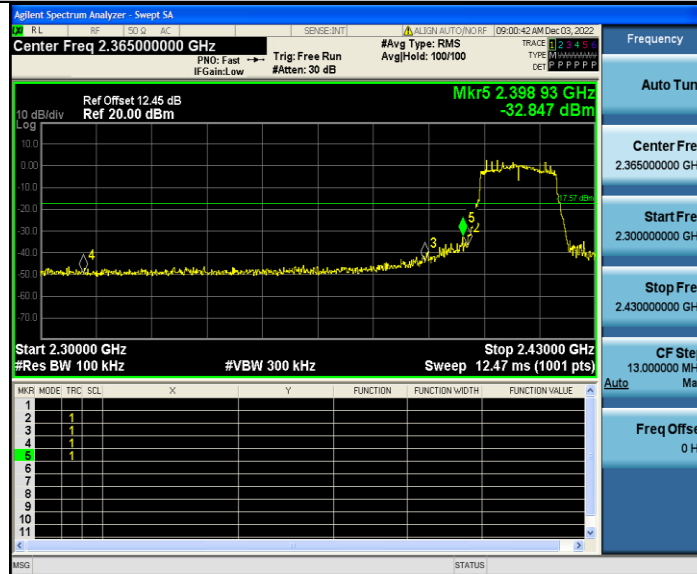


## 11G\_Ant2\_High\_2462

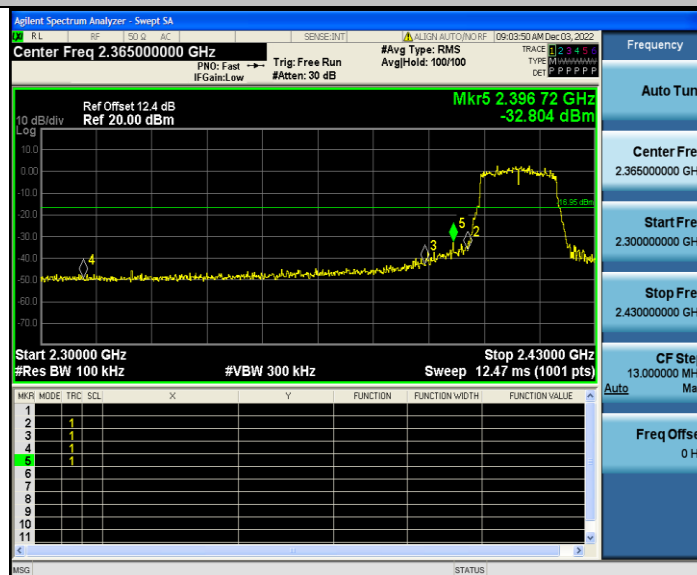




11N20SISO\_Ant1\_Low\_2412



11N20SISO\_Ant2\_Low\_2412

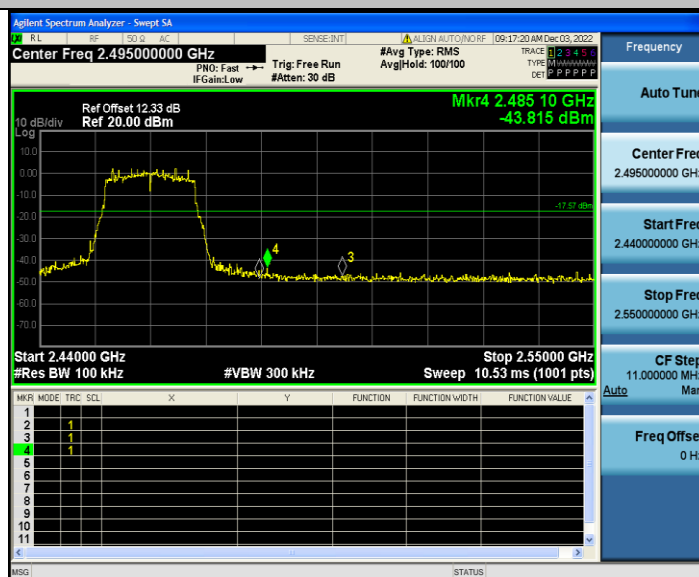




## 11N20SISO\_Ant1\_High\_2462



## 11N20SISO\_Ant2\_High\_2462





## 9 6dB Bandwidth Measurement

Test Requirement : FCC CFR47 Part 15 Section 15.247

Test Method : ANSI C63.10:2013

Test Limit : Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

### 9.1 Test Procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz
3. Set up:



### 9.2 Test Result

| TestMode | Antenna | Frequency[MHz] | DTS BW [MHz] | FL[MHz]  | FH[MHz]  | Limit[MHz] | Verdict |
|----------|---------|----------------|--------------|----------|----------|------------|---------|
| 11B      | Ant1    | 2412           | 7.040        | 2408.480 | 2415.520 | 0.5        | PASS    |
|          | Ant2    | 2412           | 7.080        | 2408.440 | 2415.520 | 0.5        | PASS    |
|          | Ant1    | 2437           | 7.520        | 2433.480 | 2441.000 | 0.5        | PASS    |
|          | Ant2    | 2437           | 7.080        | 2433.480 | 2440.560 | 0.5        | PASS    |
|          | Ant1    | 2462           | 6.560        | 2458.480 | 2465.040 | 0.5        | PASS    |
|          | Ant2    | 2462           | 7.080        | 2458.480 | 2465.560 | 0.5        | PASS    |
| 11G      | Ant1    | 2412           | 16.280       | 2403.840 | 2420.120 | 0.5        | PASS    |
|          | Ant2    | 2412           | 16.320       | 2403.840 | 2420.160 | 0.5        | PASS    |
|          | Ant1    | 2437           | 16.320       | 2428.840 | 2445.160 | 0.5        | PASS    |
|          | Ant2    | 2437           | 16.280       | 2428.840 | 2445.120 | 0.5        | PASS    |
|          | Ant1    | 2462           | 16.320       | 2453.840 | 2470.160 | 0.5        | PASS    |
|          | Ant2    | 2462           | 16.320       | 2453.840 | 2470.160 | 0.5        | PASS    |



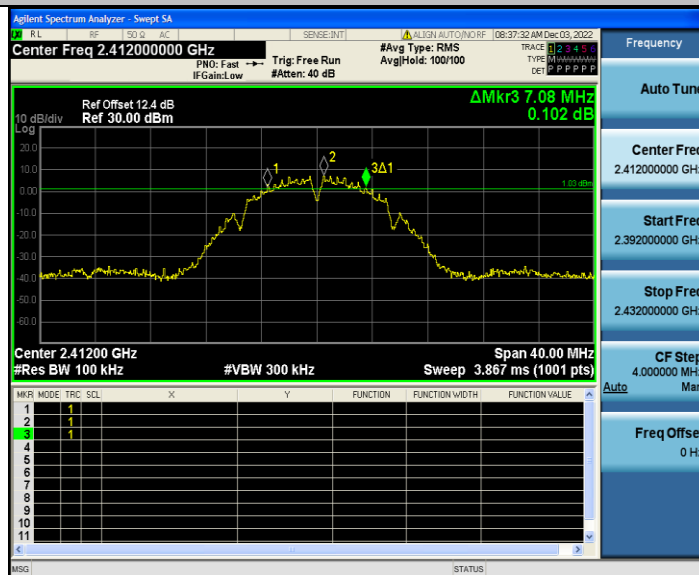
|           |      |      |        |          |          |     |      |
|-----------|------|------|--------|----------|----------|-----|------|
| 11N20SISO | Ant1 | 2412 | 17.280 | 2403.240 | 2420.520 | 0.5 | PASS |
|           | Ant2 | 2412 | 17.560 | 2403.200 | 2420.760 | 0.5 | PASS |
|           | Ant1 | 2437 | 17.120 | 2428.240 | 2445.360 | 0.5 | PASS |
|           | Ant2 | 2437 | 17.560 | 2428.200 | 2445.760 | 0.5 | PASS |
|           | Ant1 | 2462 | 17.560 | 2453.200 | 2470.760 | 0.5 | PASS |
|           | Ant2 | 2462 | 17.600 | 2453.200 | 2470.800 | 0.5 | PASS |
| 11N40SISO | Ant1 | 2422 | 35.360 | 2404.400 | 2439.760 | 0.5 | PASS |
|           | Ant2 | 2422 | 35.440 | 2404.480 | 2439.920 | 0.5 | PASS |
|           | Ant1 | 2437 | 34.000 | 2418.760 | 2452.760 | 0.5 | PASS |
|           | Ant2 | 2437 | 30.800 | 2418.920 | 2449.720 | 0.5 | PASS |
|           | Ant1 | 2452 | 36.160 | 2433.760 | 2469.920 | 0.5 | PASS |
|           | Ant2 | 2452 | 36.000 | 2433.760 | 2469.760 | 0.5 | PASS |

11B\_Ant1\_2412

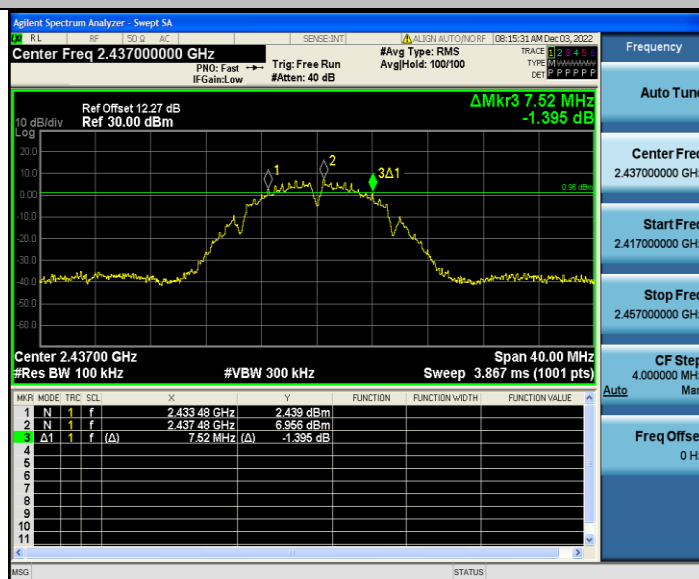


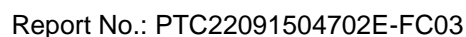


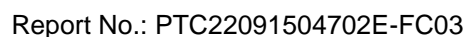
## 11B\_Ant2\_2412



## 11B\_Ant1\_2437



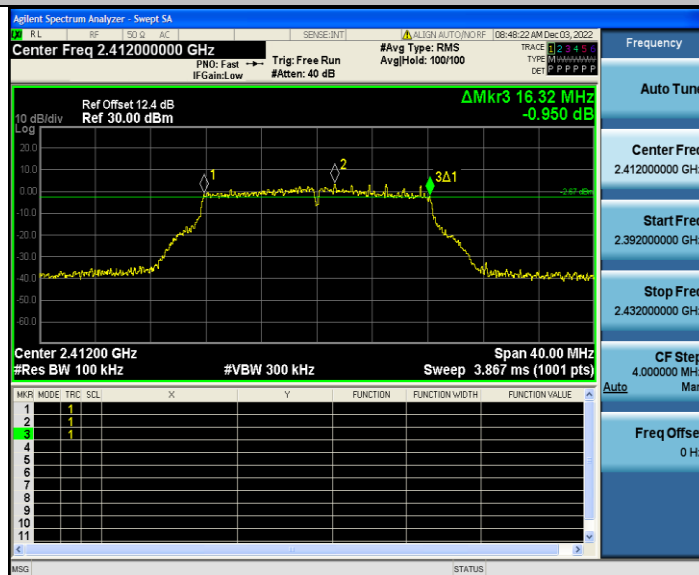








## 11G\_Ant2\_2412



## 11G\_Ant1\_2437





## 11G\_Ant2\_2437

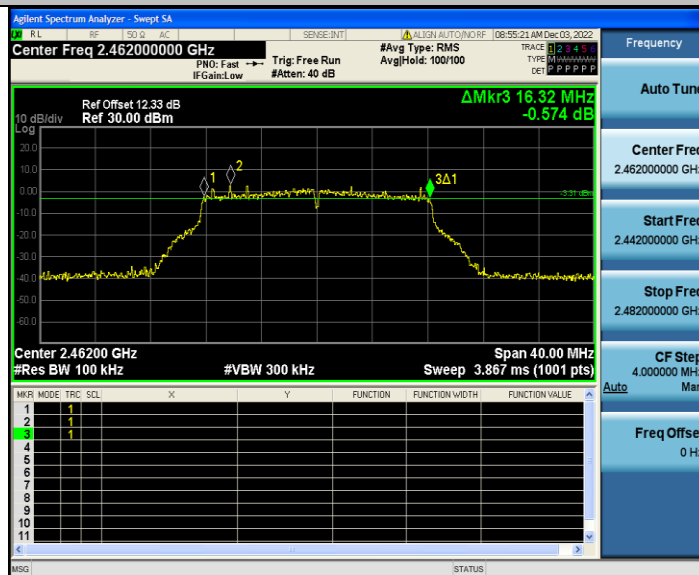


## 11G\_Ant1\_2462

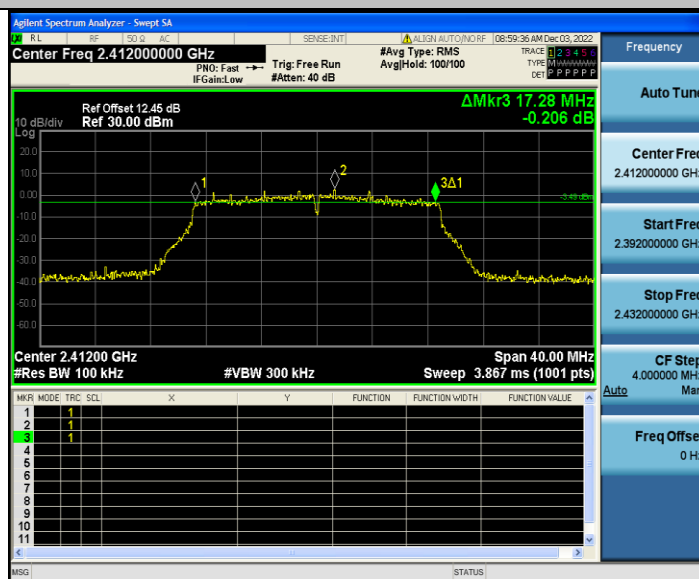




## 11G\_Ant2\_2462

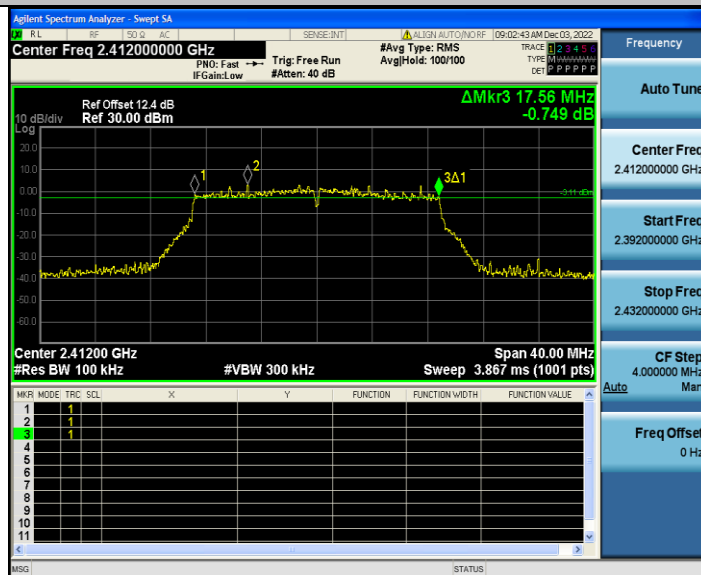


## 11N20SISO\_Ant1\_2412





## 11N20SISO\_Ant2\_2412

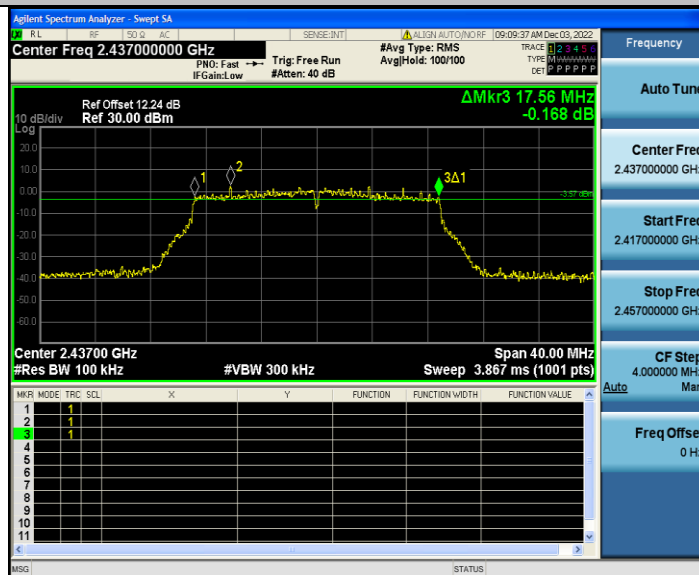


## 11N20SISO\_Ant1\_2437



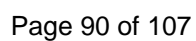
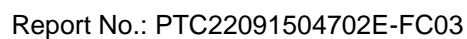


## 11N20SISO\_Ant2\_2437



## 11N20SISO\_Ant1\_2462







## 10 Maximum Peak Output Power

Test Requirement : FCC CFR47 Part 15 Section 15.247

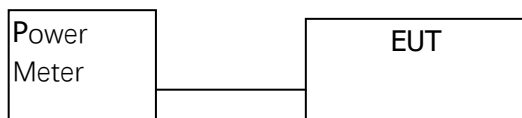
Test Method : ANSI C63.10:2013

Test Limit : Regulation 15.247 (b)(3), For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power.

### 10.1 Test Procedure

1. The testing follows the Measurement Procedure of FCC KDB No. 558074 D01 15.247 Meas Guidance v05 section 8.3.1.
2. The RF output of EUT was connected to the spectrum by RF cable . The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.

5.Set up:



### 10.2 Test Result

For SISO

| TestMode | Antenna | Frequency[MHz] | Set Power | Peak Power[dBm] | Conducted Limit[dBm] | Verdict |
|----------|---------|----------------|-----------|-----------------|----------------------|---------|
| 11B      | Ant1    | 2412           | ---       | 17.97           | ≤30.00               | PASS    |
|          | Ant2    | 2412           | ---       | 17.94           | ≤30.00               | PASS    |
|          | Ant1    | 2437           | ---       | 17.53           | ≤30.00               | PASS    |
|          | Ant2    | 2437           | ---       | 17.41           | ≤30.00               | PASS    |
|          | Ant1    | 2462           | ---       | 16.76           | ≤30.00               | PASS    |
|          | Ant2    | 2462           | ---       | 16.91           | ≤30.00               | PASS    |
| 11G      | Ant1    | 2412           | ---       | 22.50           | ≤30.00               | PASS    |
|          | Ant2    | 2412           | ---       | 22.39           | ≤30.00               | PASS    |
|          | Ant1    | 2437           | ---       | 22.03           | ≤30.00               | PASS    |
|          | Ant2    | 2437           | ---       | 21.96           | ≤30.00               | PASS    |



|               |      |      |     |       |        |      |
|---------------|------|------|-----|-------|--------|------|
|               | Ant1 | 2462 | --- | 21.77 | ≤30.00 | PASS |
|               | Ant2 | 2462 | --- | 21.47 | ≤30.00 | PASS |
| 11N20SIS<br>O | Ant1 | 2412 | --- | 21.05 | ≤30.00 | PASS |
|               | Ant2 | 2412 | --- | 22.28 | ≤30.00 | PASS |
|               | MIMO | 2412 | --- | 24.72 | ≤30.00 | PASS |
|               | Ant1 | 2437 | --- | 20.93 | ≤30.00 | PASS |
|               | Ant2 | 2437 | --- | 21.57 | ≤30.00 | PASS |
|               | MIMO | 2437 | --- | 24.27 | ≤30.00 | PASS |
|               | Ant1 | 2462 | --- | 20.88 | ≤30.00 | PASS |
|               | Ant2 | 2462 | --- | 21.13 | ≤30.00 | PASS |
|               | MIMO |      | --- | 24.02 | ≤30.00 | PASS |
|               |      |      |     |       |        |      |
| 11N40SIS<br>O | Ant1 | 2422 | --- | 18.60 | ≤30.00 | PASS |
|               | Ant2 | 2422 | --- | 17.27 | ≤30.00 | PASS |
|               | MIMO | 2422 | --- | 21.00 | ≤30.00 | PASS |
|               | Ant1 | 2437 | --- | 17.89 | ≤30.00 | PASS |
|               | Ant2 | 2437 | --- | 16.73 | ≤30.00 | PASS |
|               | MIMO | 2437 | --- | 20.36 | ≤30.00 | PASS |
|               | Ant1 | 2452 | --- | 17.89 | ≤30.00 | PASS |
|               | Ant2 | 2452 | --- | 17.73 | ≤30.00 | PASS |
|               | MIMO | 2452 | --- | 20.82 | ≤30.00 | PASS |
|               |      |      |     |       |        |      |





## 11 Power Spectral density

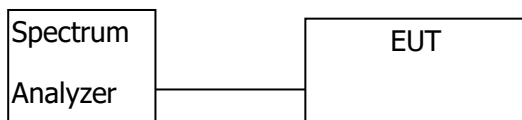
Test Requirement : FCC CFR47 Part 15 Section 15.247

Test Method : ANSI C63.10:2013

Test Limit : Regulation 15.247(f) The power spectral density conducted from the intentional radiator to the antenna due to the digital modulation operation of the hybrid system, with the frequency hopping operation turned off, shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

### 11.1 Test Procedure

1. Connect the antenna port(s) to the spectrum analyzer input.
2. Configure the spectrum analyzer as shown below:  
Center frequency=DTS channel center frequency  
Span = 1.5 times the DTS bandwidth  
RBW = 3KHz, VBW = 10KHz  
Sweep time = auto couple  
Detector = peak  
Trace mode =max hold
3. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter wave form on the spectrum analyzer.
4. Use the peak marker function to determine the maximum amplitude level within the RBW.
5. If measured value exceeds limit, reduce RBW(no less than 3KHz) and repeat.
- 6.Set up:



### 11.2 Test Result

| TestMode | Antenna | Frequency[MHz] | Result[dBm/3-100kHz] | Limit[dBm/3kHz] | Verdict |
|----------|---------|----------------|----------------------|-----------------|---------|
| 11B      | Ant1    | 2412           | -5.98                | ≤8.00           | PASS    |
|          | Ant2    | 2412           | -5.38                | ≤8.00           | PASS    |
|          | Ant1    | 2437           | -6.77                | ≤8.00           | PASS    |
|          | Ant2    | 2437           | -7.46                | ≤8.00           | PASS    |
|          | Ant1    | 2462           | -5.88                | ≤8.00           | PASS    |
|          | Ant2    | 2462           | -7.36                | ≤8.00           | PASS    |
| 11G      | Ant1    | 2412           | -8.9                 | ≤8.00           | PASS    |
|          | Ant2    | 2412           | -8.87                | ≤8.00           | PASS    |



Report No.: PTC22091504702E-FC03

|           |      |      |        |       |      |
|-----------|------|------|--------|-------|------|
|           | Ant1 | 2437 | -9.36  | ≤8.00 | PASS |
|           | Ant2 | 2437 | -9.41  | ≤8.00 | PASS |
|           | Ant1 | 2462 | -9.41  | ≤8.00 | PASS |
|           | Ant2 | 2462 | -9.75  | ≤8.00 | PASS |
| 11N20SISO | Ant1 | 2412 | -10.5  | ≤8.00 | PASS |
|           | Ant2 | 2412 | -9.04  | ≤8.00 | PASS |
|           | Ant1 | 2437 | -9.21  | ≤8.00 | PASS |
|           | Ant2 | 2437 | -9.4   | ≤8.00 | PASS |
|           | Ant1 | 2462 | -10.5  | ≤8.00 | PASS |
|           | Ant2 | 2462 | -10.46 | ≤8.00 | PASS |
| 11N40SISO | Ant1 | 2422 | -16.83 | ≤8.00 | PASS |
|           | Ant2 | 2422 | -18.2  | ≤8.00 | PASS |
|           | Ant1 | 2437 | -17.05 | ≤8.00 | PASS |
|           | Ant2 | 2437 | -18.13 | ≤8.00 | PASS |
|           | Ant1 | 2452 | -17.6  | ≤8.00 | PASS |
|           | Ant2 | 2452 | -16.85 | ≤8.00 | PASS |



## 11B\_Ant1\_2412

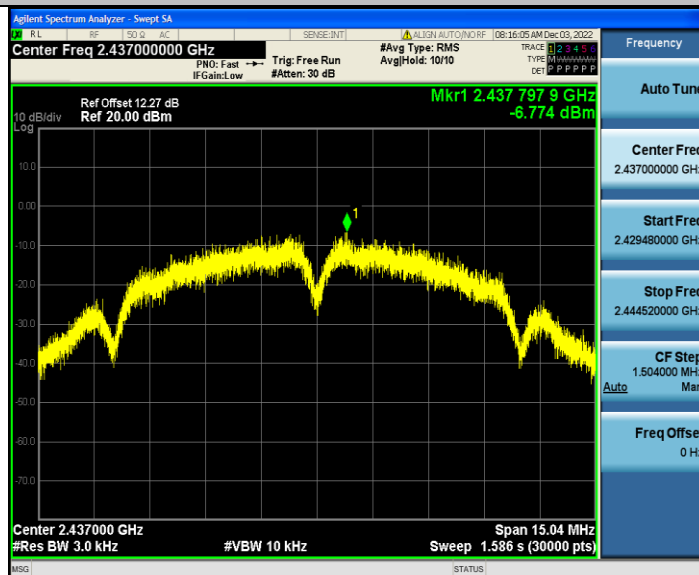


## 11B\_Ant2\_2412





## 11B\_Ant1\_2437

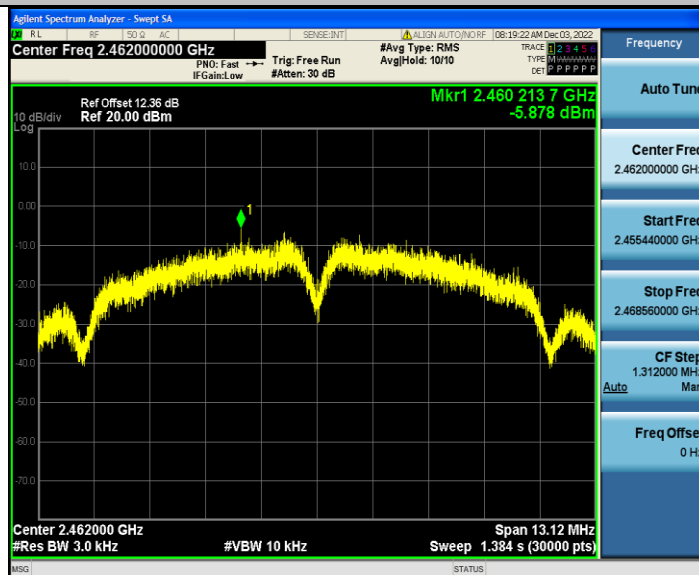


## 11B\_Ant2\_2437





## 11B\_Ant1\_2462

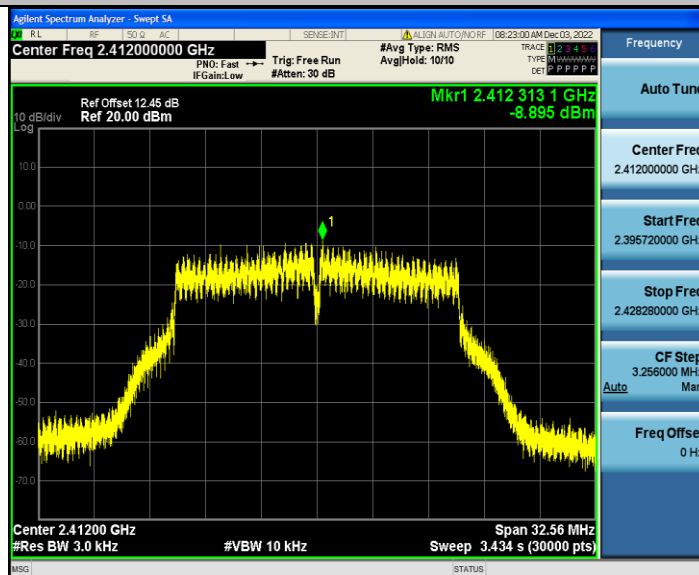


## 11B\_Ant2\_2462

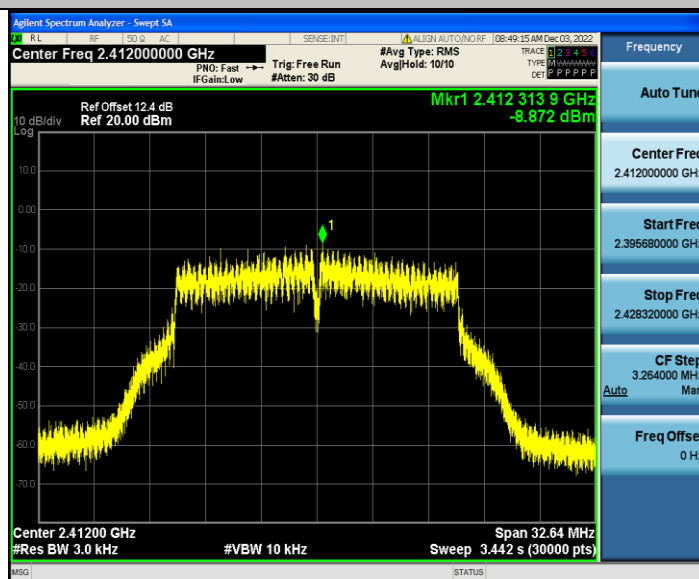




## 11G\_Ant1\_2412

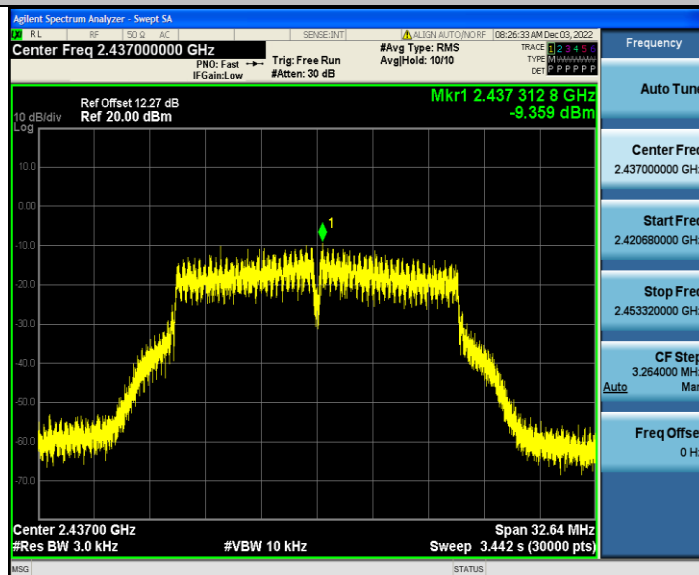


## 11G\_Ant2\_2412

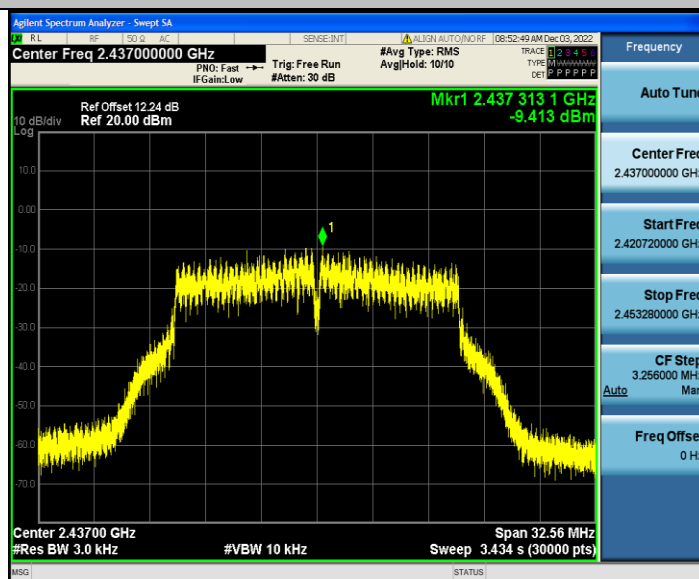




## 11G\_Ant1\_2437

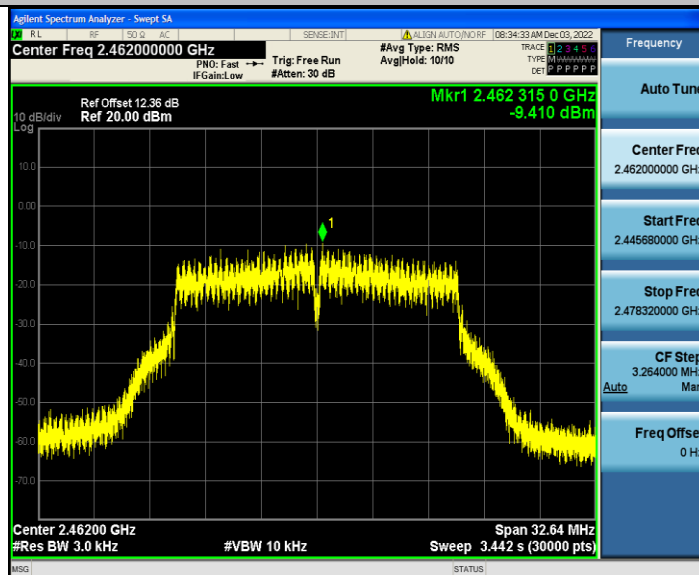


## 11G\_Ant2\_2437

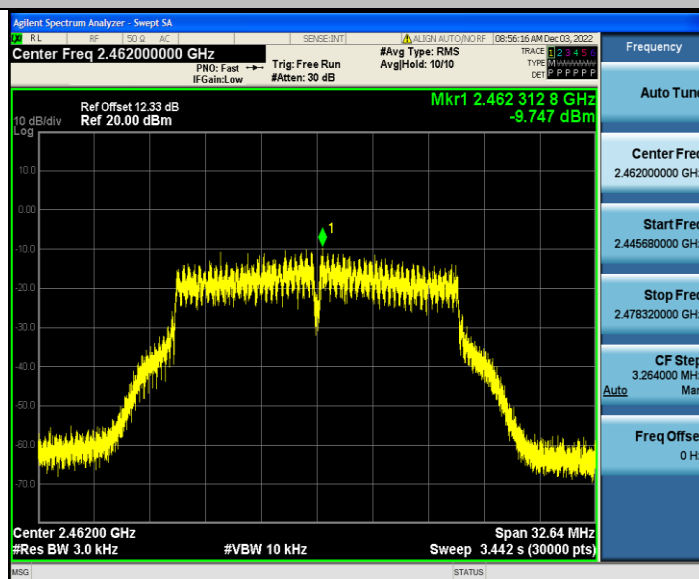




## 11G\_Ant1\_2462



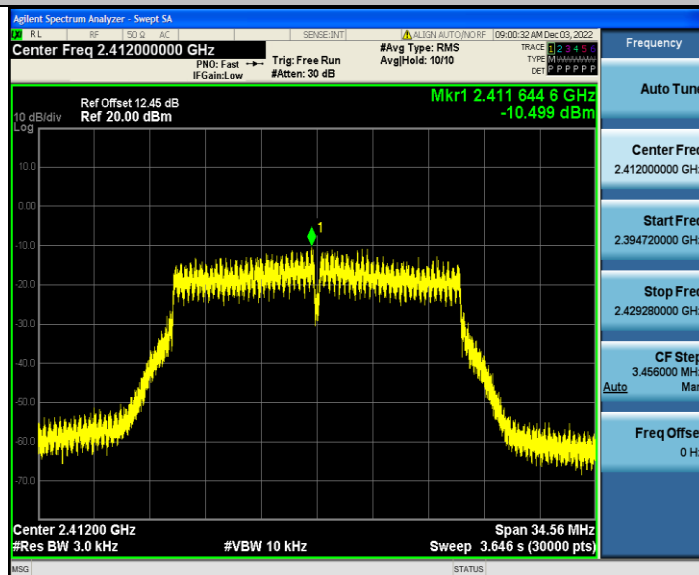
## 11G\_Ant2\_2462



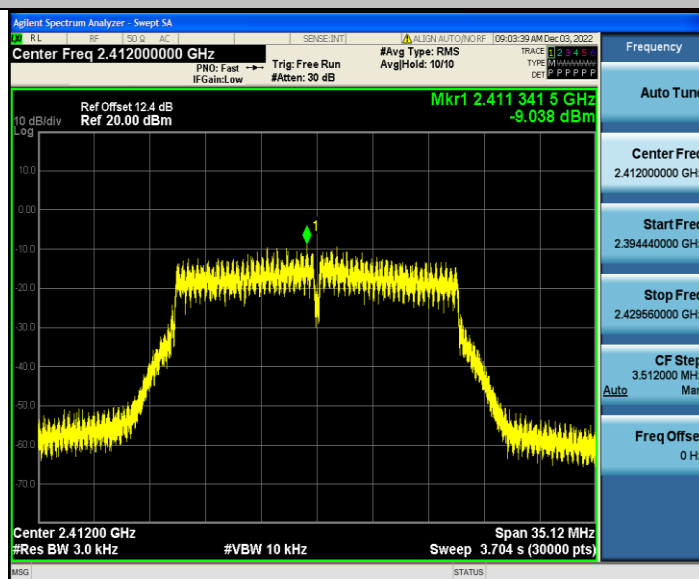




## 11N20SISO\_Ant1\_2412

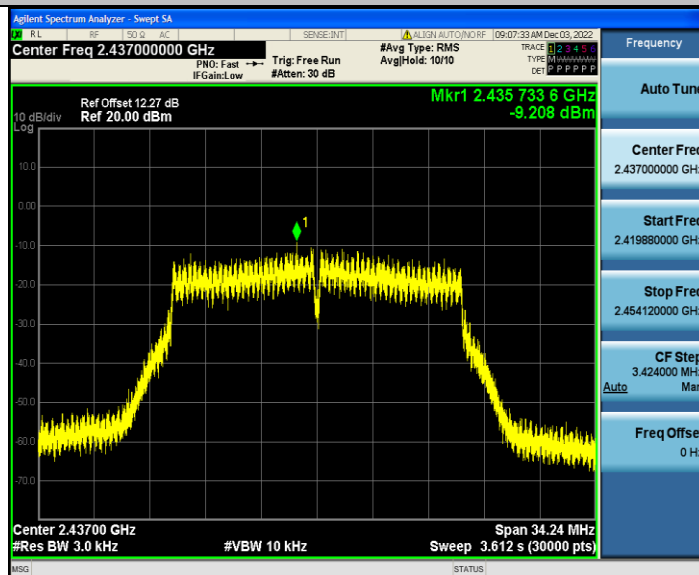


## 11N20SISO\_Ant2\_2412

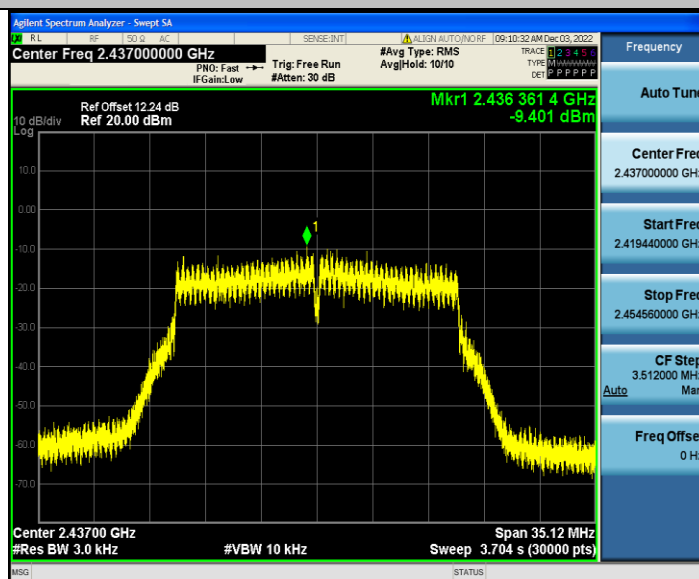




## 11N20SISO\_Ant1\_2437

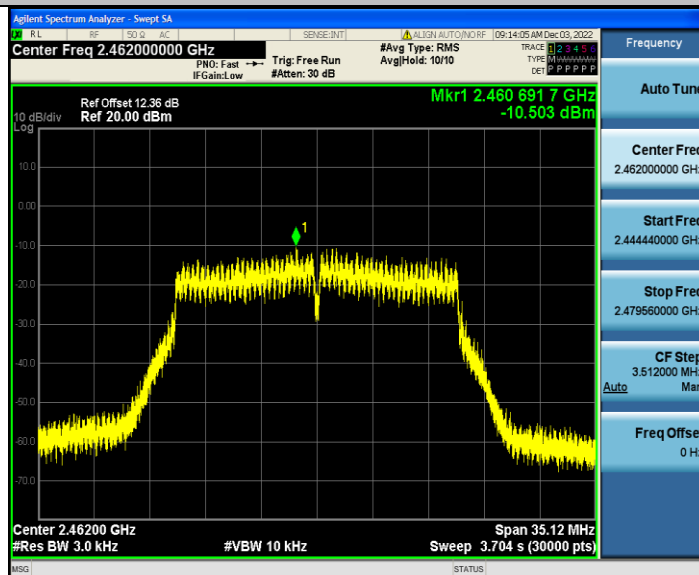


## 11N20SISO\_Ant2\_2437

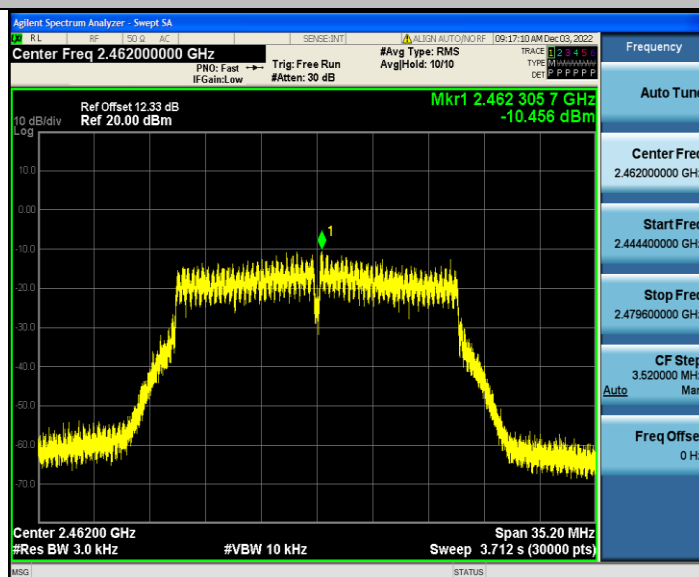




## 11N20SISO\_Ant1\_2462



## 11N20SISO\_Ant2\_2462





## **12 Antenna Application**

### **12.1 Antenna Requirement**

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 15.247 (b), 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.

### **12.2 Result**

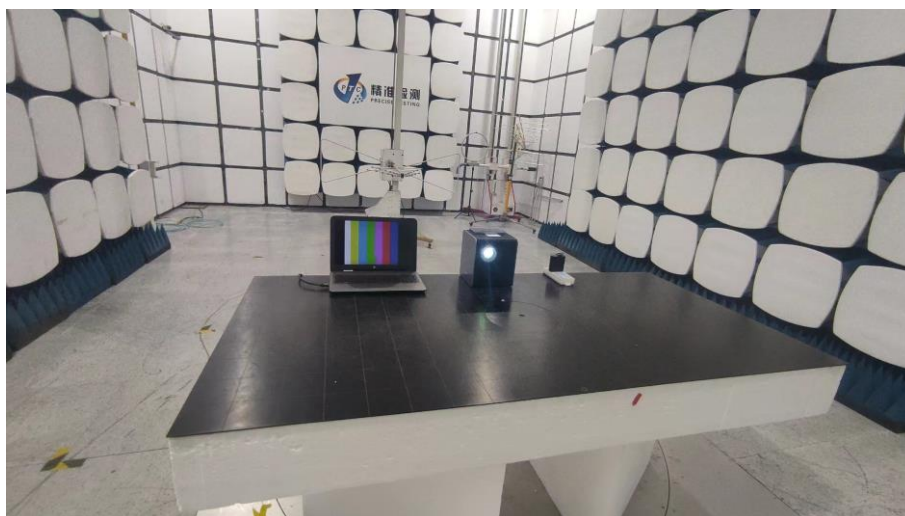
The EUT'S antenna, permanent attached antenna, is Fpcb Antenna. The antenna's gain is 1.61dBi and meets the requirement.

## 13 Test Setup

### Conduction Emissions



### Radiated Spurious Emissions Test Frequency From 30MHz-1000MHz



Test Frequency above 1G





Report No.: PTC22091504702E-FC03

## 14 EUT PHOTOS

Reference file External Photo and Internal Photo.

**\*\*\*\*\*THE END REPORT\*\*\*\*\***