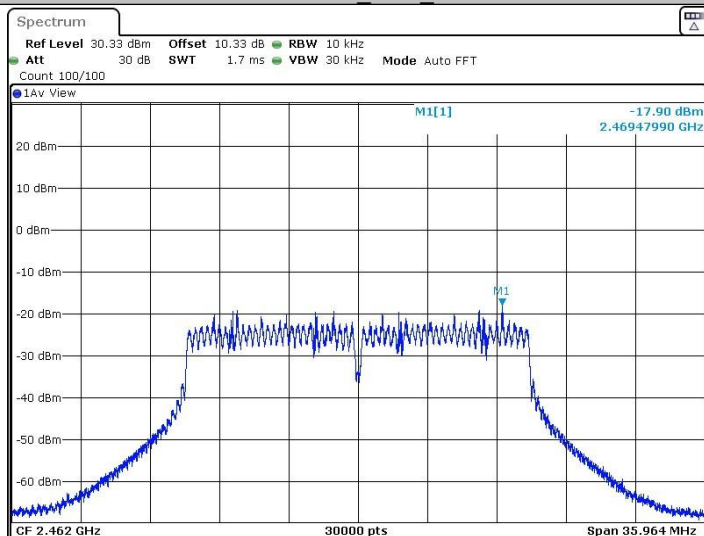
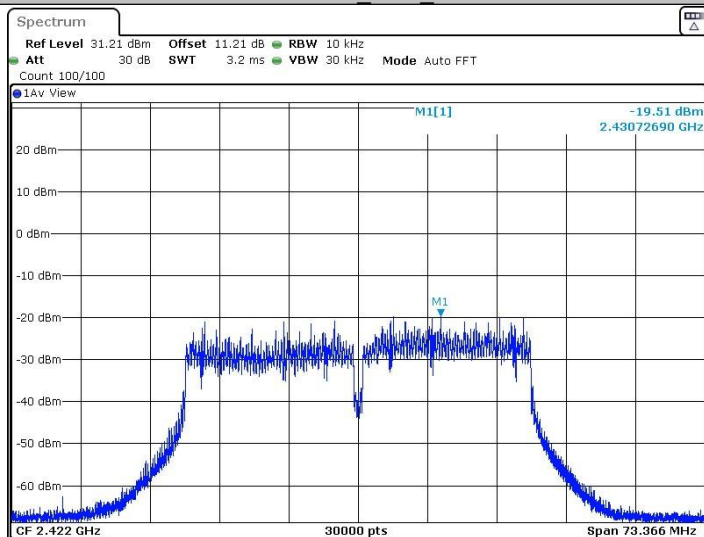


11N20SISO\_Ant1\_2462



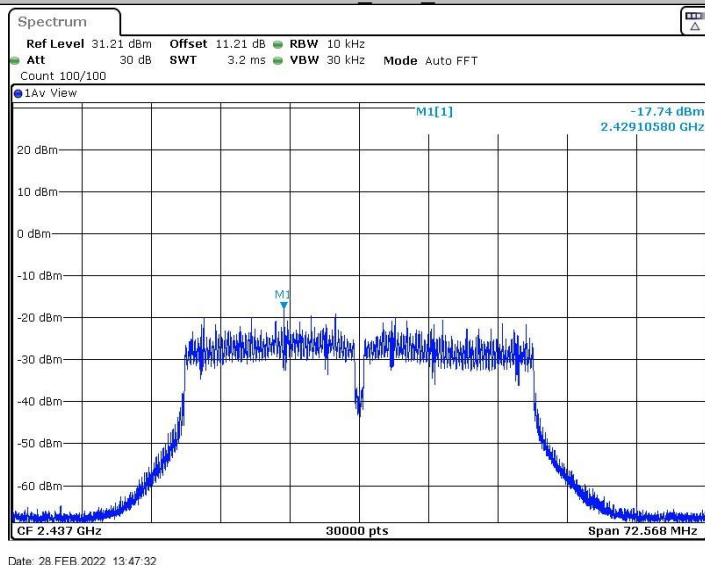
Date: 28.FEB.2022 13:40:28

11N40SISO\_Ant1\_2422

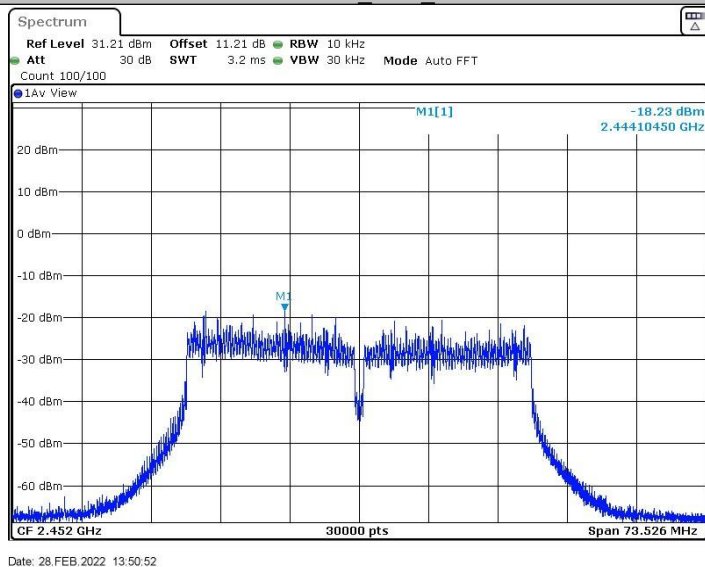


Date: 28.FEB.2022 13:44:28

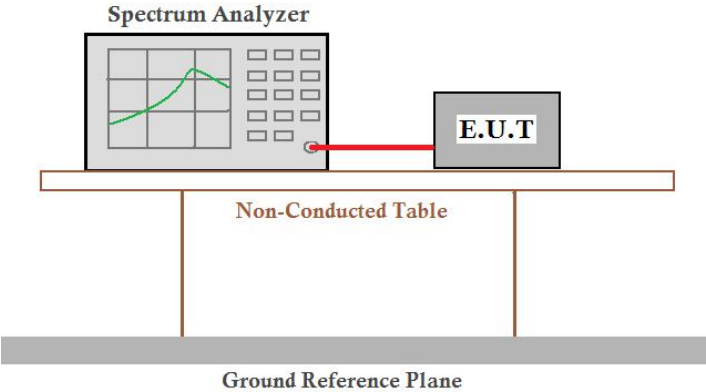
11N40SISO\_Ant1\_2437



11N40SISO\_Ant1\_2452



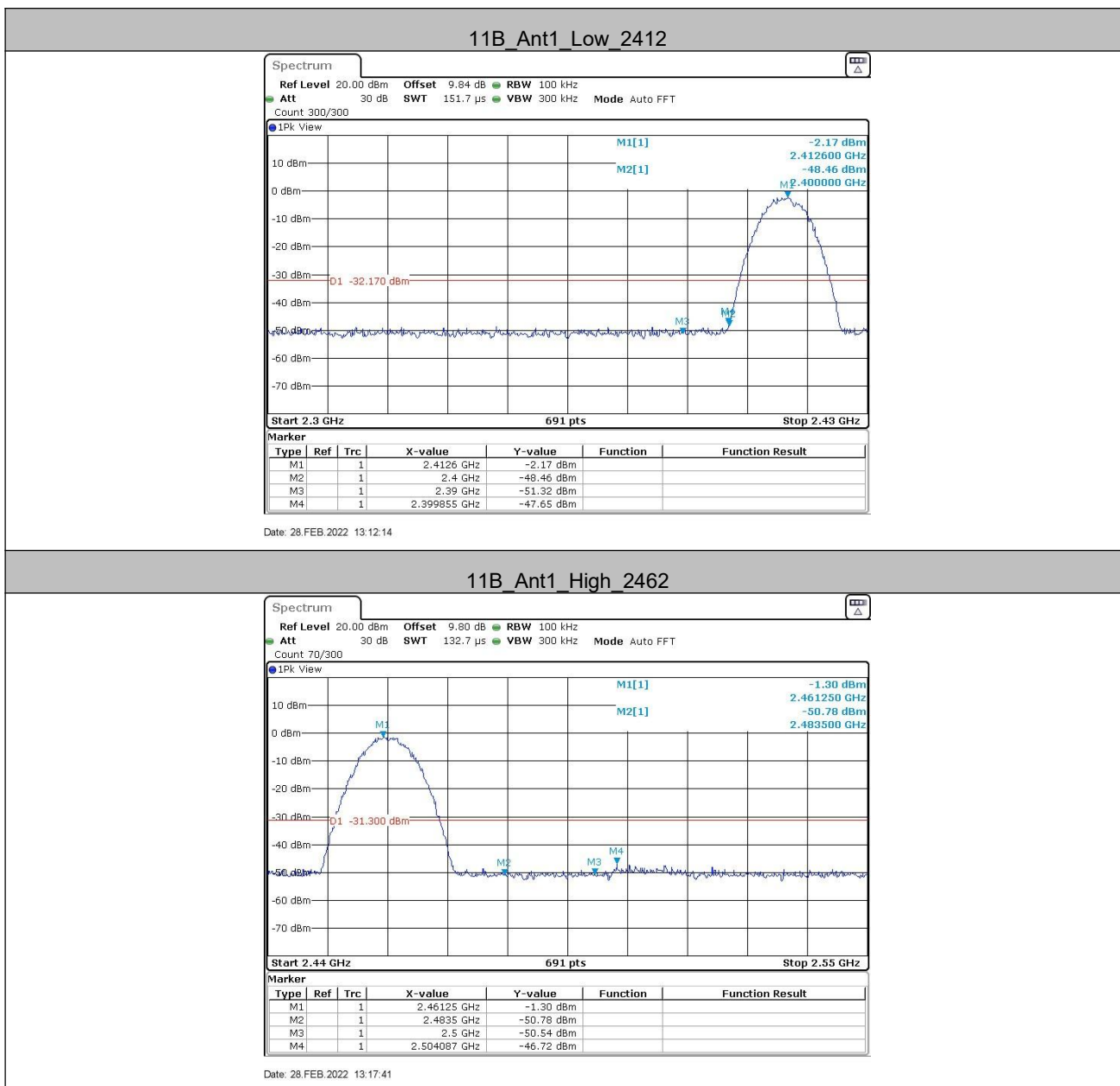
## 5.6 Band-edge for RF Conducted Emissions

|                        |                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement:      | 47 CFR Part 15C Section 15.247 (d)                                                                                                                                                                                                                                                                                                                                                      |
| Test Method:           | ANSI C63.10: 2013                                                                                                                                                                                                                                                                                                                                                                       |
| Test Setup:            |  <p>Offset=cable loss+ attenuation factor</p>                                                                                                                                                                                                                                                         |
| Exploratory Test Mode: | Transmitting with all kind of modulations, data rates                                                                                                                                                                                                                                                                                                                                   |
| Final Test Mode:       | Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g; 6.5Mbps of rate is the worst case of 802.11n(HT20); 13.5Mbps of rate is the worst case of 802.11n(HT40). Only the worst case is recorded in the report.                                                                                                              |
| Limit:                 | In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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. |
| Test Results:          | Pass                                                                                                                                                                                                                                                                                                                                                                                    |

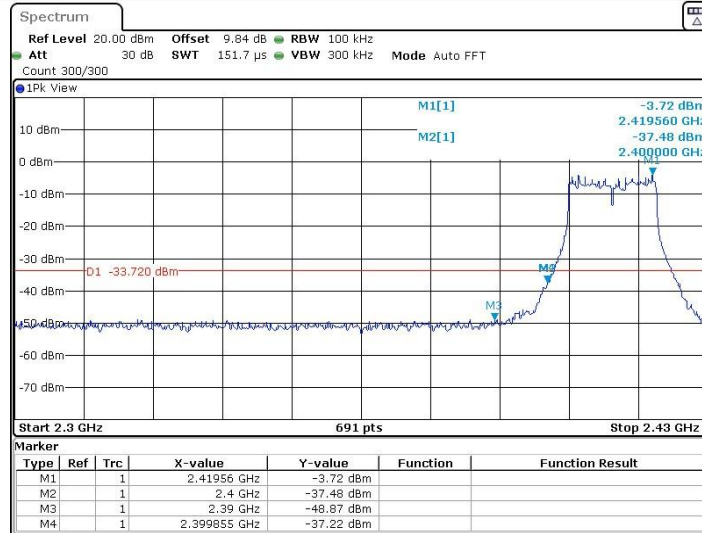
**Test Result**

| TestMode  | Antenna | ChName | Channel | RefLevel[dBm] | Result[dBm] | Limit[dBm]    | Verdict |
|-----------|---------|--------|---------|---------------|-------------|---------------|---------|
| 11B       | Ant1    | Low    | 2412    | -2.17         | -47.65      | $\leq -32.17$ | PASS    |
|           |         | High   | 2462    | -1.30         | -46.72      | $\leq -31.3$  | PASS    |
| 11G       | Ant1    | Low    | 2412    | -3.72         | -37.22      | $\leq -33.72$ | PASS    |
|           |         | High   | 2462    | -3.71         | -46.38      | $\leq -33.71$ | PASS    |
| 11N20SISO | Ant1    | Low    | 2412    | -3.58         | -36.35      | $\leq -33.58$ | PASS    |
|           |         | High   | 2462    | -3.76         | -47.19      | $\leq -33.76$ | PASS    |
| 11N40SISO | Ant1    | Low    | 2422    | -5.64         | -39.12      | $\leq -35.64$ | PASS    |
|           |         | High   | 2452    | -5.64         | -47.56      | $\leq -35.64$ | PASS    |

## Test Graphs

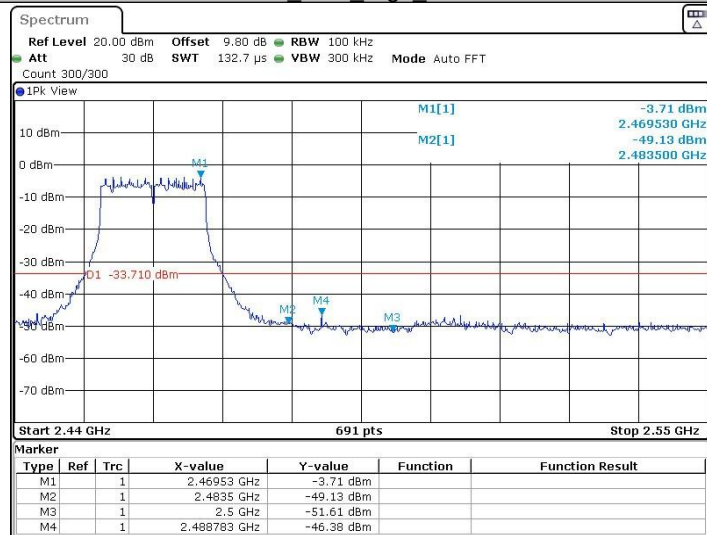


11G\_Ant1\_Low\_2412



Date: 28.FEB.2022 13:22:22

11G\_Ant1\_High\_2462



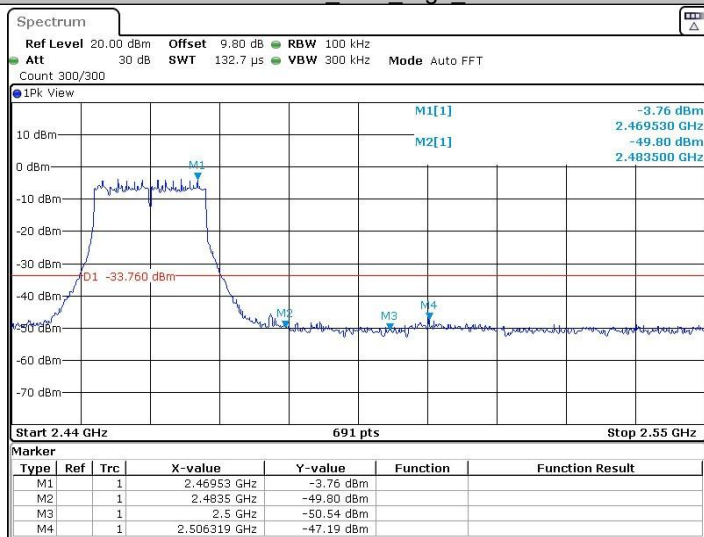
Date: 28.FEB.2022 13:28:29

11N20SISO\_Ant1\_Low\_2412



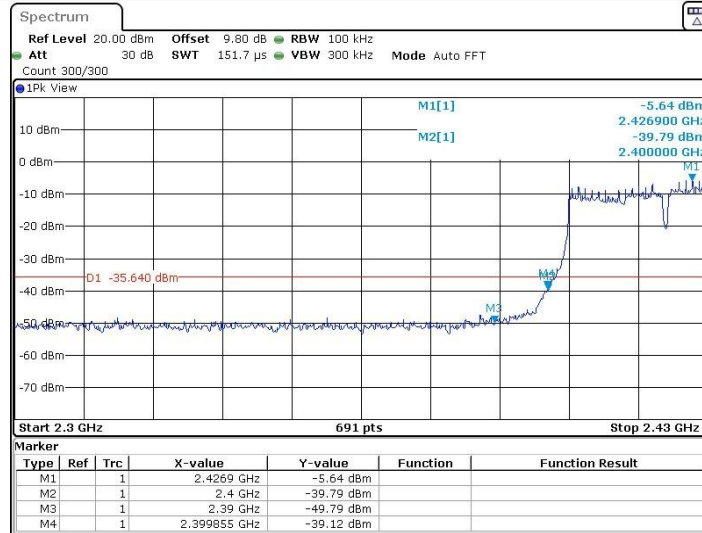
Date: 28.FEB.2022 13:31:30

11N20SISO\_Ant1\_High\_2462



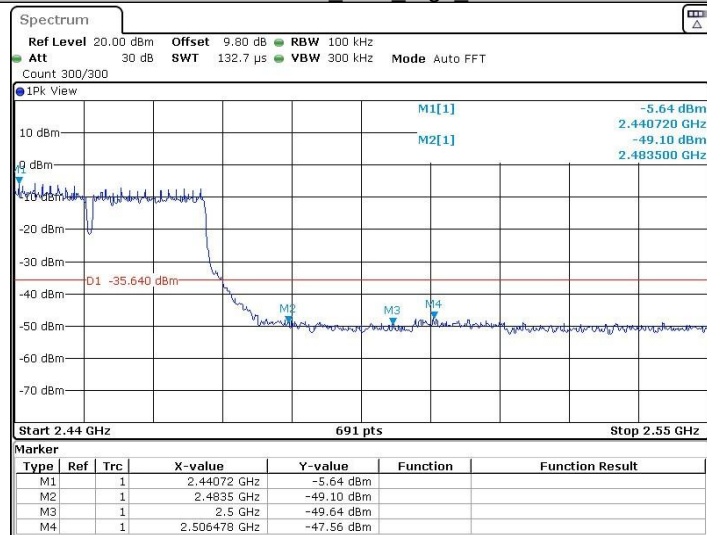
Date: 28.FEB.2022 13:40:37

11N40SISO\_Ant1\_Low\_2422



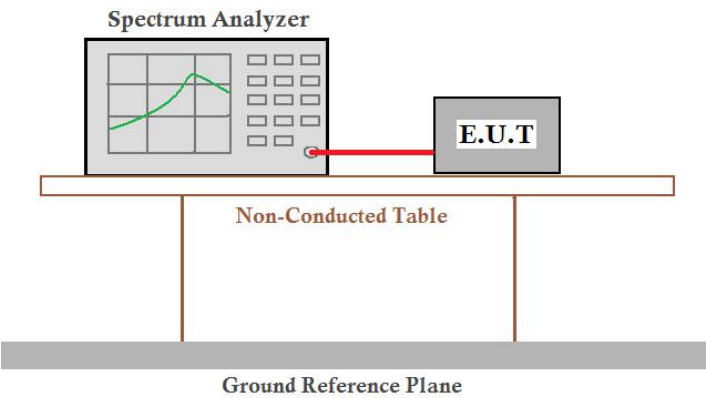
Date: 28.FEB.2022 13:44:38

11N40SISO\_Ant1\_High\_2452



Date: 28.FEB.2022 13:51:02

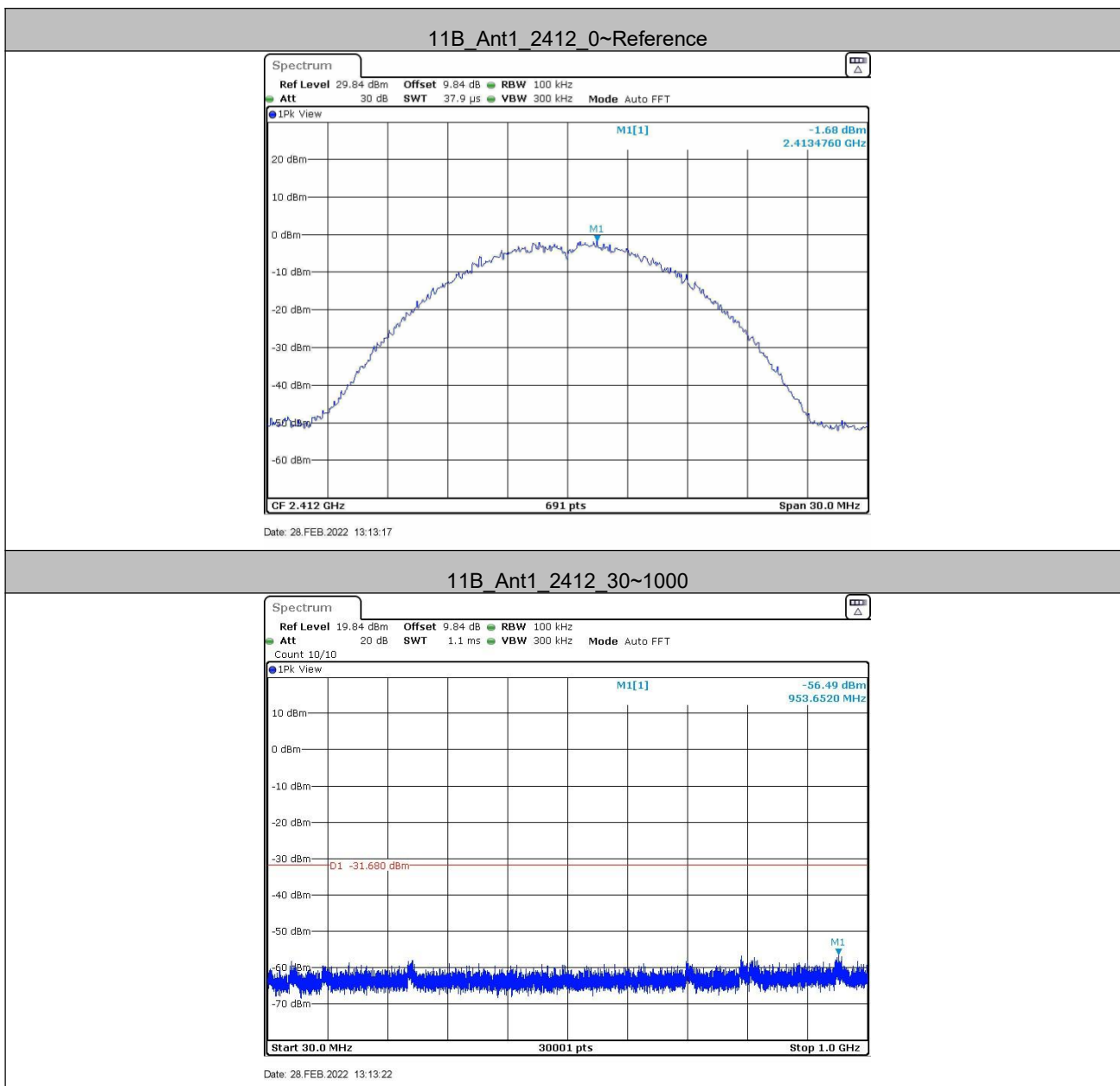
## 5.7 RF Conducted Spurious Emissions

|                        |                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement:      | 47 CFR Part 15C Section 15.247 (d)                                                                                                                                                                                                                                                                                                                                                      |
| Test Method:           | ANSI C63.10: 2013                                                                                                                                                                                                                                                                                                                                                                       |
| Test Setup:            |  <p>Offset=cable loss+ attenuation factor</p>                                                                                                                                                                                                                                                         |
| Exploratory Test Mode: | Transmitting with all kind of modulations, data rates                                                                                                                                                                                                                                                                                                                                   |
| Final Test Mode:       | Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g; 6.5Mbps of rate is the worst case of 802.11n(HT20); 13.5Mbps of rate is the worst case of 802.11n(HT40). Only the worst case is recorded in the report.                                                                                                              |
| Limit:                 | In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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. |
| Test Results:          | Pass                                                                                                                                                                                                                                                                                                                                                                                    |

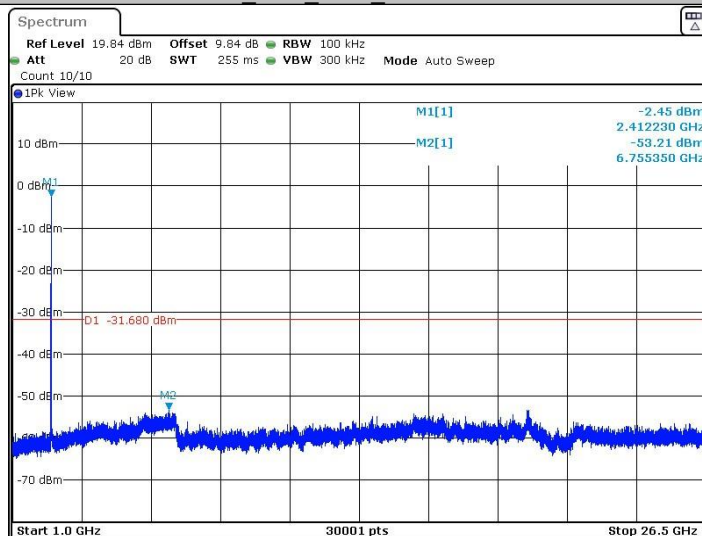
## Test Result

| TestMode  | Antenna | Channel | FreqRange [Mhz] | RefLevel [dBm] | Result [dBm] | Limit [dBm]   | Verdict |
|-----------|---------|---------|-----------------|----------------|--------------|---------------|---------|
| 11B       | Ant1    | 2412    | Reference       | -1.68          | -1.68        | ---           | PASS    |
|           |         |         | 30~1000         | -1.68          | -56.49       | $\leq -31.68$ | PASS    |
|           |         |         | 1000~26500      | -1.68          | -53.21       | $\leq -31.68$ | PASS    |
|           |         | 2437    | Reference       | 0.04           | 0.04         | ---           | PASS    |
|           |         |         | 30~1000         | 0.04           | -57.16       | $\leq -29.96$ | PASS    |
|           |         |         | 1000~26500      | 0.04           | -53.05       | $\leq -29.96$ | PASS    |
|           |         | 2462    | Reference       | -0.92          | -0.92        | ---           | PASS    |
|           |         |         | 30~1000         | -0.92          | -57.16       | $\leq -30.92$ | PASS    |
|           |         |         | 1000~26500      | -0.92          | -53.51       | $\leq -30.92$ | PASS    |
| 11G       | Ant1    | 2412    | Reference       | -3.54          | -3.54        | ---           | PASS    |
|           |         |         | 30~1000         | -3.54          | -56.56       | $\leq -33.54$ | PASS    |
|           |         |         | 1000~26500      | -3.54          | -53.76       | $\leq -33.54$ | PASS    |
|           |         | 2437    | Reference       | -2.82          | -2.82        | ---           | PASS    |
|           |         |         | 30~1000         | -2.82          | -55.81       | $\leq -32.82$ | PASS    |
|           |         |         | 1000~26500      | -2.82          | -52.48       | $\leq -32.82$ | PASS    |
|           |         | 2462    | Reference       | -3.65          | -3.65        | ---           | PASS    |
|           |         |         | 30~1000         | -3.65          | -56.44       | $\leq -33.65$ | PASS    |
|           |         |         | 1000~26500      | -3.65          | -53.27       | $\leq -33.65$ | PASS    |
| 11N20SISO | Ant1    | 2412    | Reference       | -3.57          | -3.57        | ---           | PASS    |
|           |         |         | 30~1000         | -3.57          | -56.27       | $\leq -33.57$ | PASS    |
|           |         |         | 1000~26500      | -3.57          | -53.12       | $\leq -33.57$ | PASS    |
|           |         | 2437    | Reference       | -2.72          | -2.72        | ---           | PASS    |
|           |         |         | 30~1000         | -2.72          | -57.22       | $\leq -32.72$ | PASS    |
|           |         |         | 1000~26500      | -2.72          | -52.66       | $\leq -32.72$ | PASS    |
|           |         | 2462    | Reference       | -3.55          | -3.55        | ---           | PASS    |
|           |         |         | 30~1000         | -3.55          | -56.36       | $\leq -33.55$ | PASS    |
|           |         |         | 1000~26500      | -3.55          | -53.49       | $\leq -33.55$ | PASS    |
| 11N40SISO | Ant1    | 2422    | Reference       | -5.42          | -5.42        | ---           | PASS    |
|           |         |         | 30~1000         | -5.42          | -56.68       | $\leq -35.42$ | PASS    |
|           |         |         | 1000~26500      | -5.42          | -53.28       | $\leq -35.42$ | PASS    |
|           |         | 2437    | Reference       | -5.22          | -5.22        | ---           | PASS    |
|           |         |         | 30~1000         | -5.22          | -56.69       | $\leq -35.22$ | PASS    |
|           |         |         | 1000~26500      | -5.22          | -52.81       | $\leq -35.22$ | PASS    |
|           |         | 2452    | Reference       | -4.79          | -4.79        | ---           | PASS    |
|           |         |         | 30~1000         | -4.79          | -54.71       | $\leq -34.79$ | PASS    |
|           |         |         | 1000~26500      | -4.79          | -53.22       | $\leq -34.79$ | PASS    |

## Test Graphs

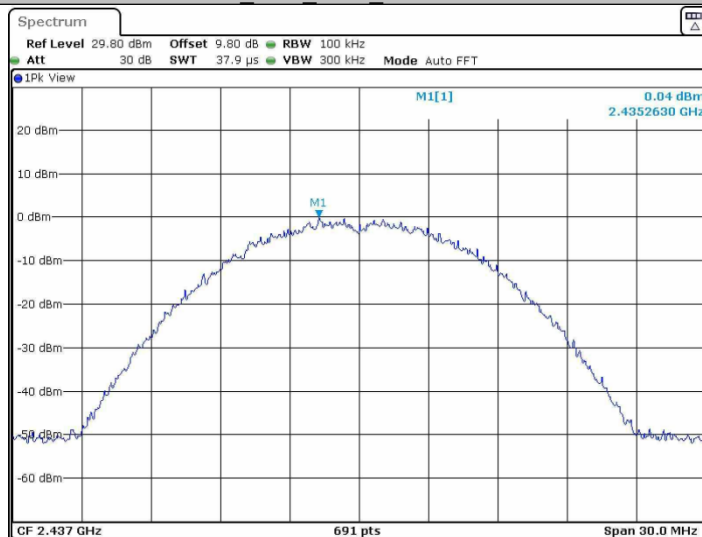


11B\_Ant1\_2412\_1000~26500



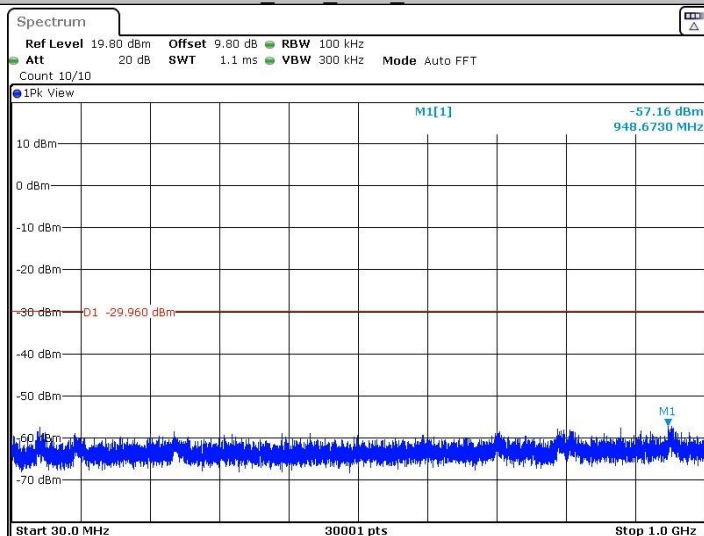
Date: 28.FEB.2022 13:13:44

11B\_Ant1\_2437\_0~Reference



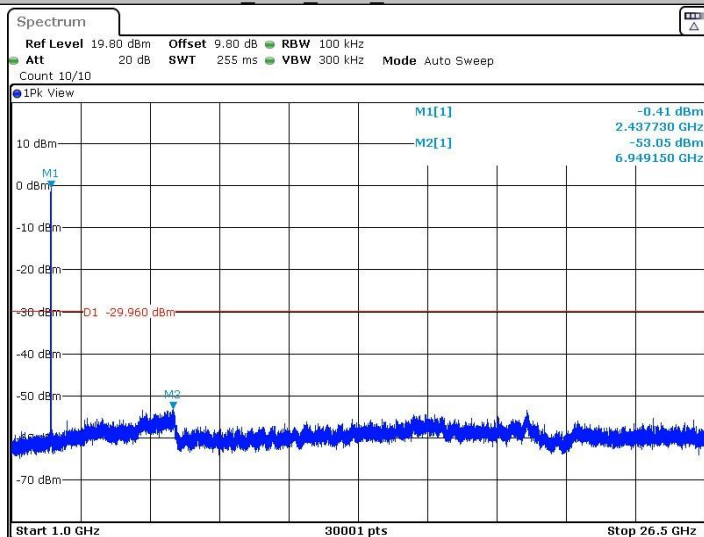
Date: 28.FEB.2022 13:16:08

11B\_Ant1\_2437\_30~1000



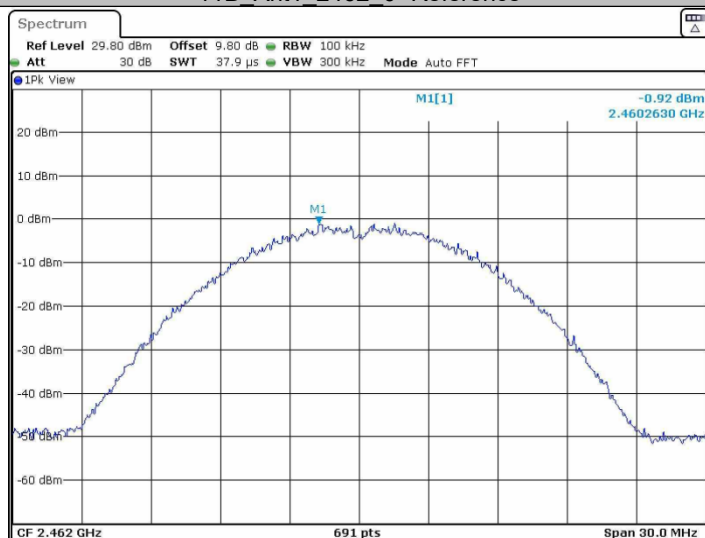
Date: 28.FEB.2022 13:16:12

11B\_Ant1\_2437\_1000~26500



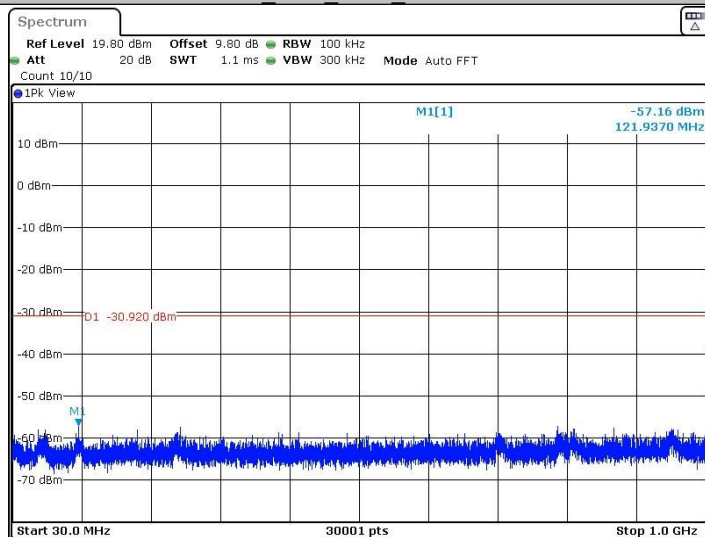
Date: 28.FEB.2022 13:16:34

11B\_Ant1\_2462\_0~Reference



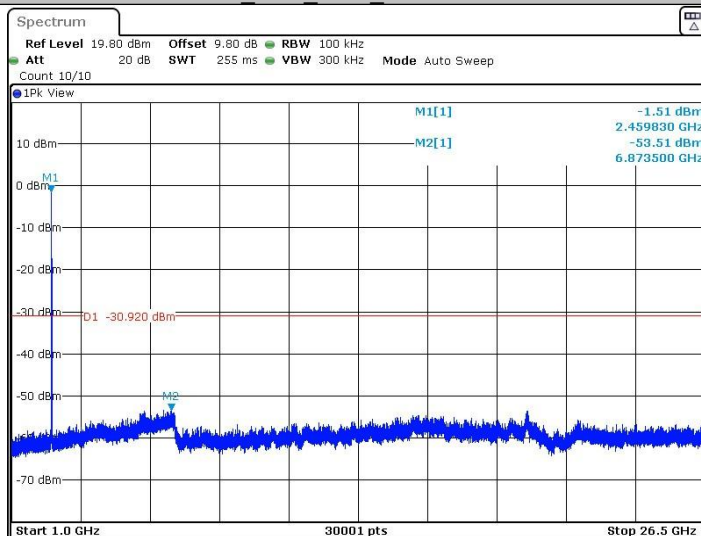
Date: 28.FEB.2022 13:18:44

11B\_Ant1\_2462\_30~1000



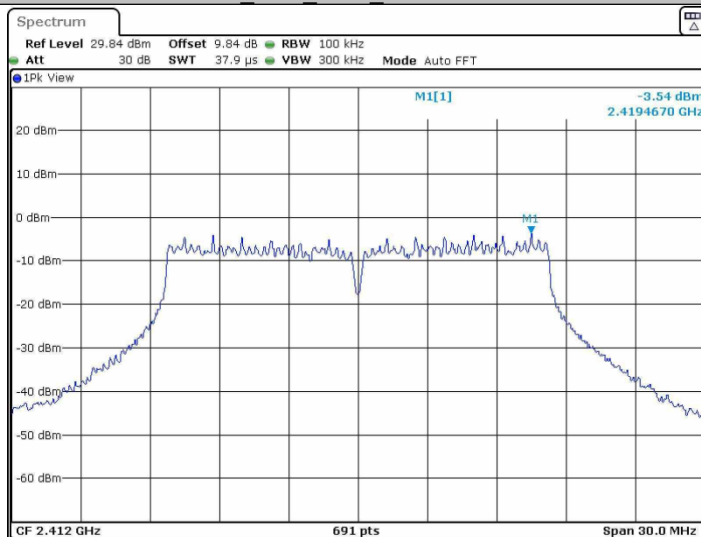
Date: 28.FEB.2022 13:18:49

11B\_Ant1\_2462\_1000~26500



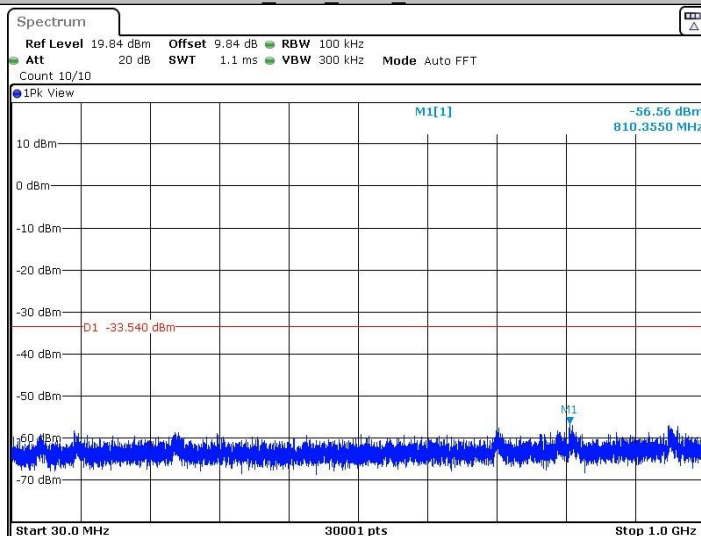
Date: 28.FEB.2022 13:19:11

11G\_Ant1\_2412\_0~Reference



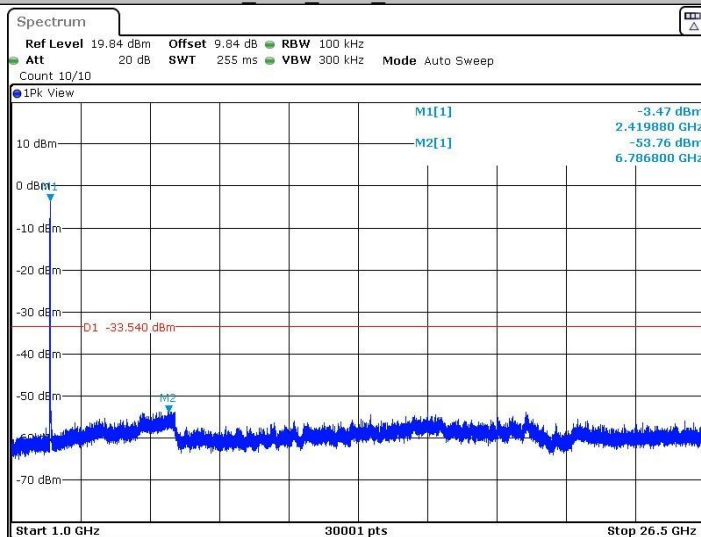
Date: 28.FEB.2022 13:23:25

11G\_Ant1\_2412\_30~1000



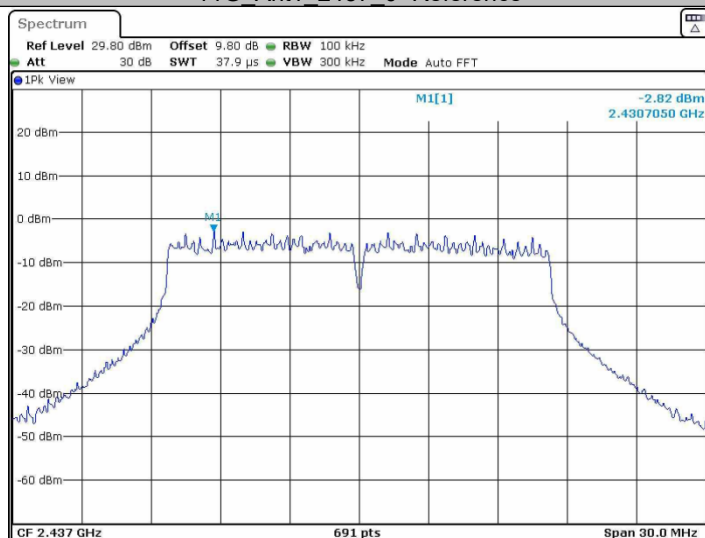
Date: 28.FEB.2022 13:23:29

11G\_Ant1\_2412\_1000~26500



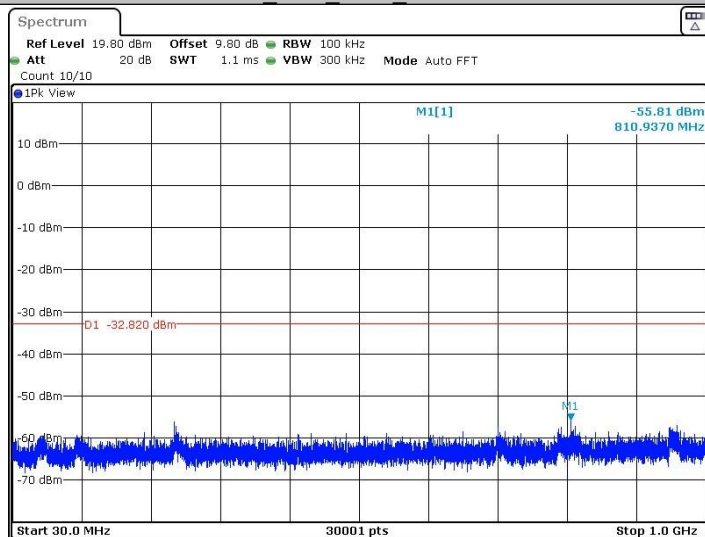
Date: 28.FEB.2022 13:23:51

11G\_Ant1\_2437\_0~Reference



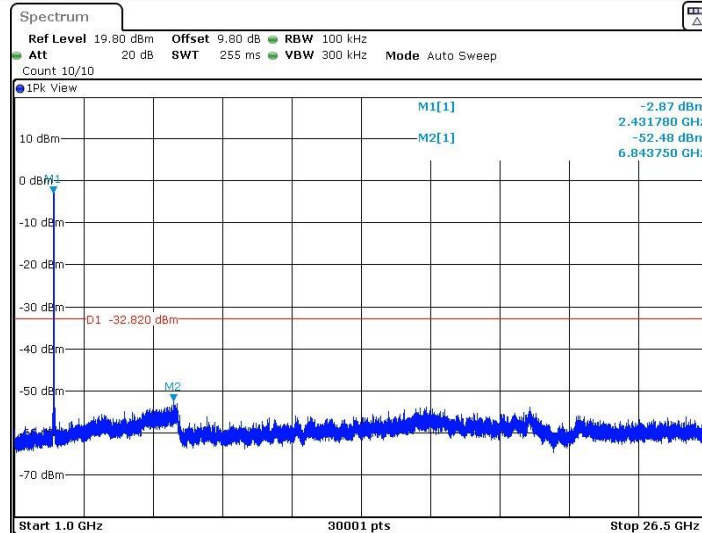
Date: 28.FEB.2022 13:26:15

11G\_Ant1\_2437\_30~1000



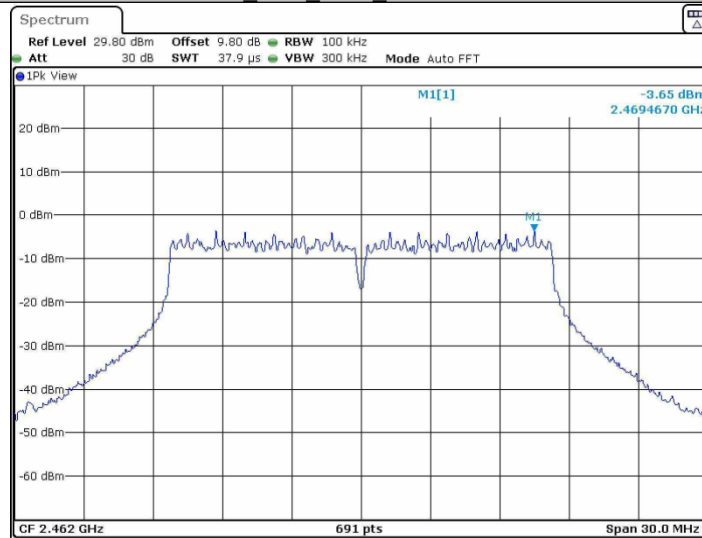
Date: 28.FEB.2022 13:26:19

11G\_Ant1\_2437\_1000~26500



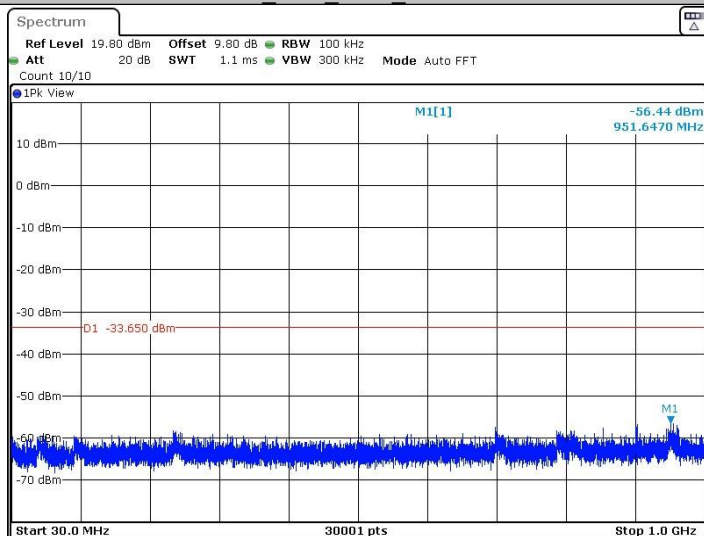
Date: 28.FEB.2022 13:26:41

11G\_Ant1\_2462\_0~Reference

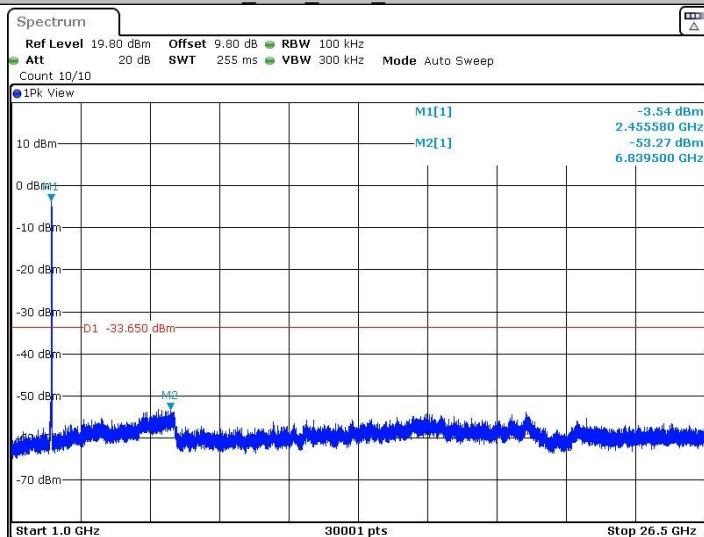


Date: 28.FEB.2022 13:29:32

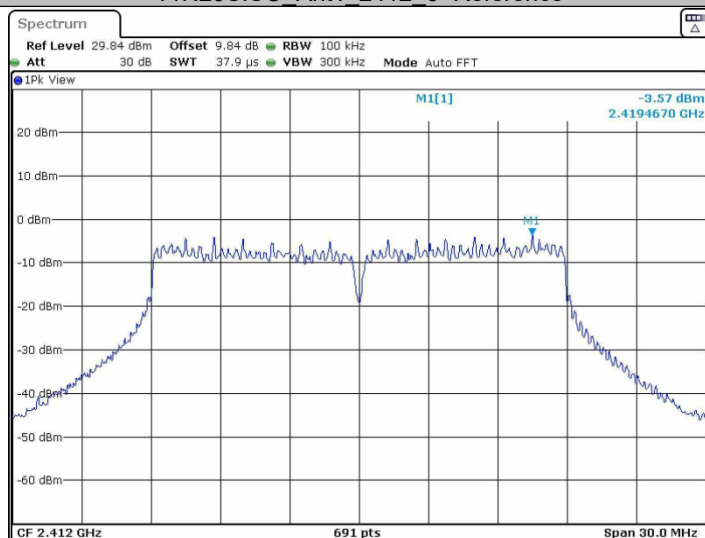
11G\_Ant1\_2462\_30~1000



11G\_Ant1\_2462\_1000~26500

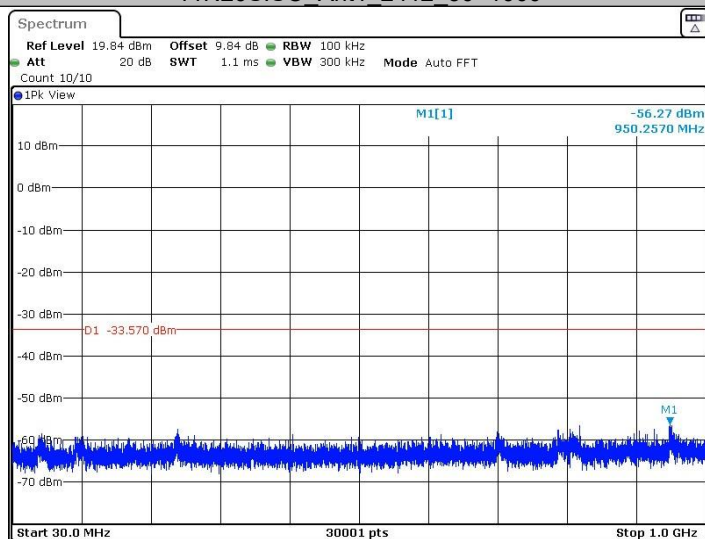


11N20SISO\_Ant1\_2412\_0~Reference



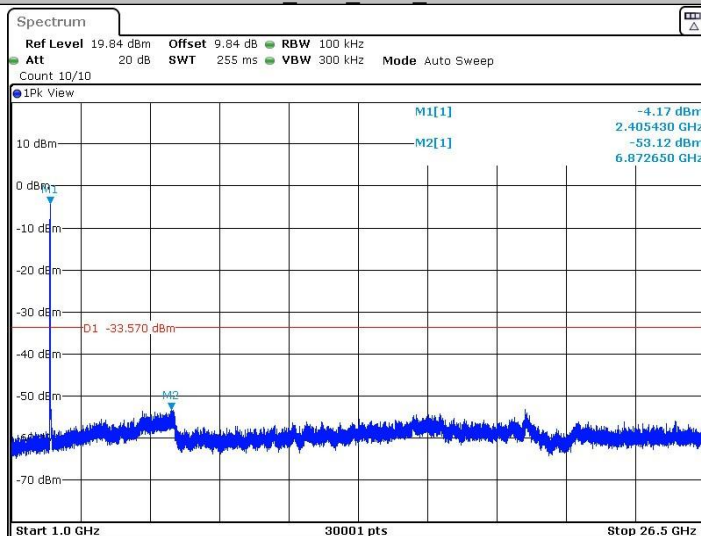
Date: 28.FEB.2022 13:32:33

11N20SISO\_Ant1\_2412\_30~1000



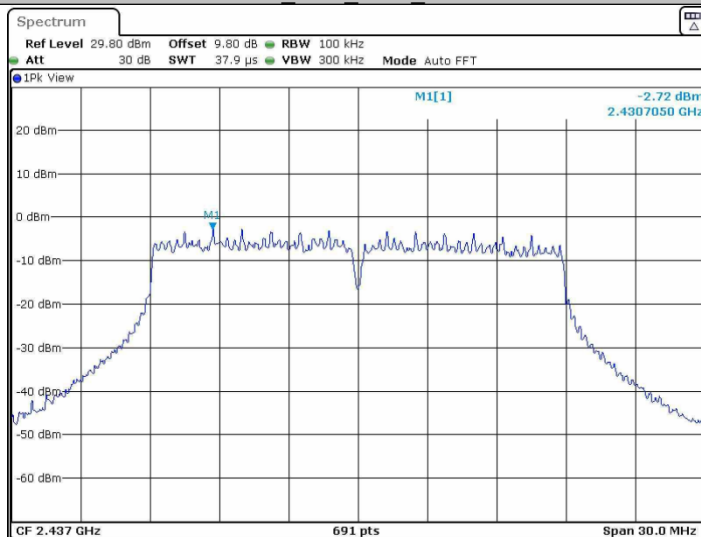
Date: 28.FEB.2022 13:32:38

11N20SISO\_Ant1\_2412\_1000~26500



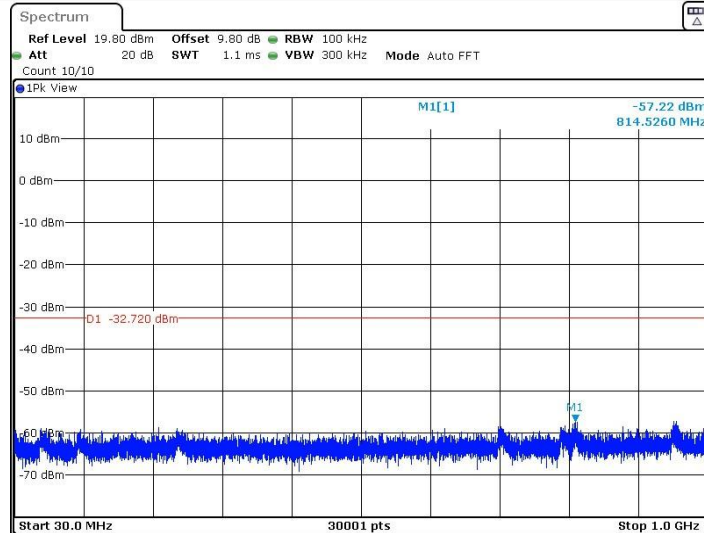
Date: 28.FEB.2022 13:33:00

11N20SISO\_Ant1\_2437\_0~Reference



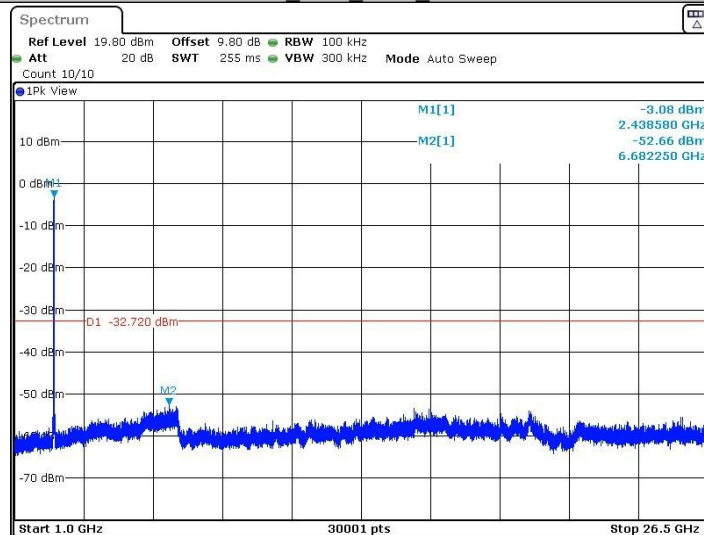
Date: 28.FEB.2022 13:36:02

11N20SISO\_Ant1\_2437\_30~1000



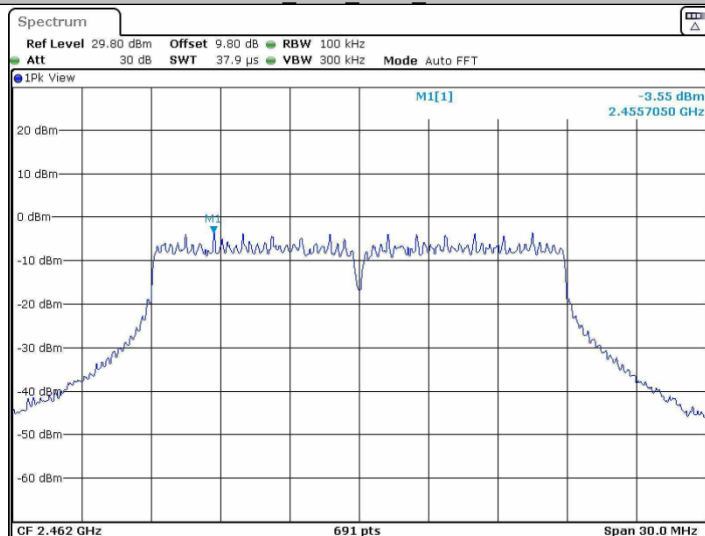
Date: 28.FEB.2022 13:36:06

11N20SISO\_Ant1\_2437\_1000~26500



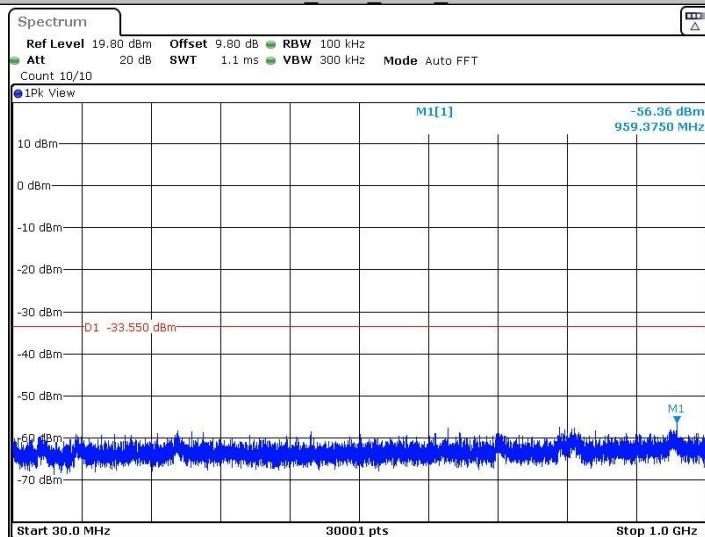
Date: 28.FEB.2022 13:36:28

11N20SISO\_Ant1\_2462\_0~Reference



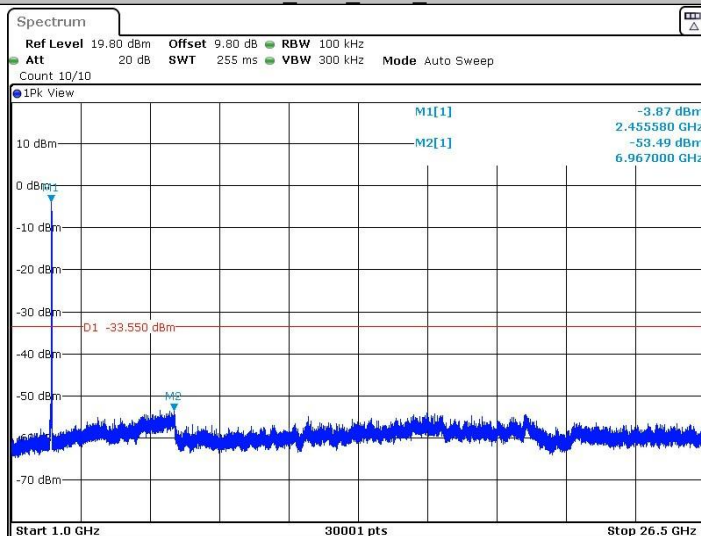
Date: 28.FEB.2022 13:41:40

11N20SISO\_Ant1\_2462\_30~1000



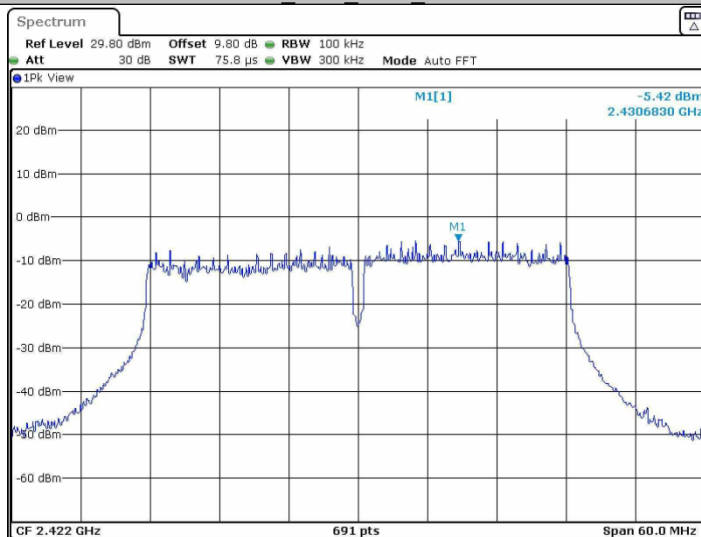
Date: 28.FEB.2022 13:41:45

11N20SISO\_Ant1\_2462\_1000~26500



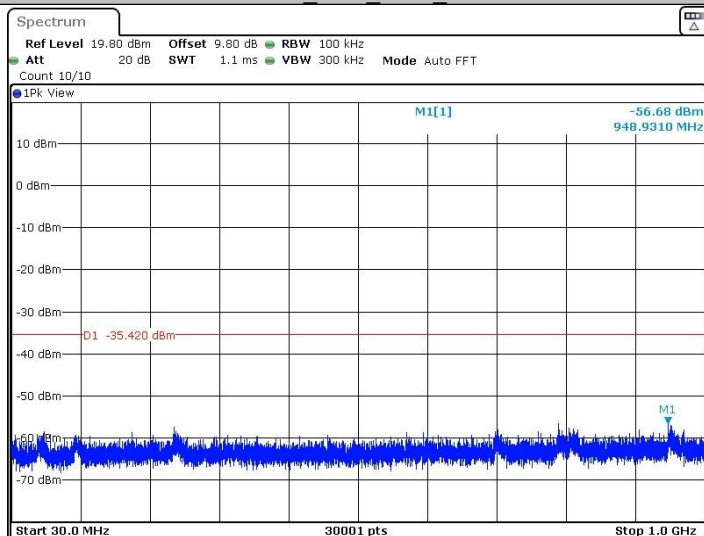
Date: 28.FEB.2022 13:42:07

11N40SISO\_Ant1\_2422\_0~Reference

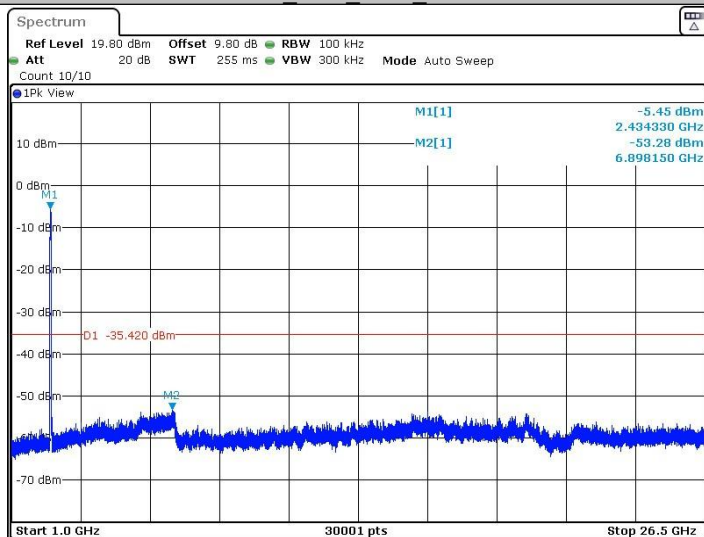


Date: 28.FEB.2022 13:45:46

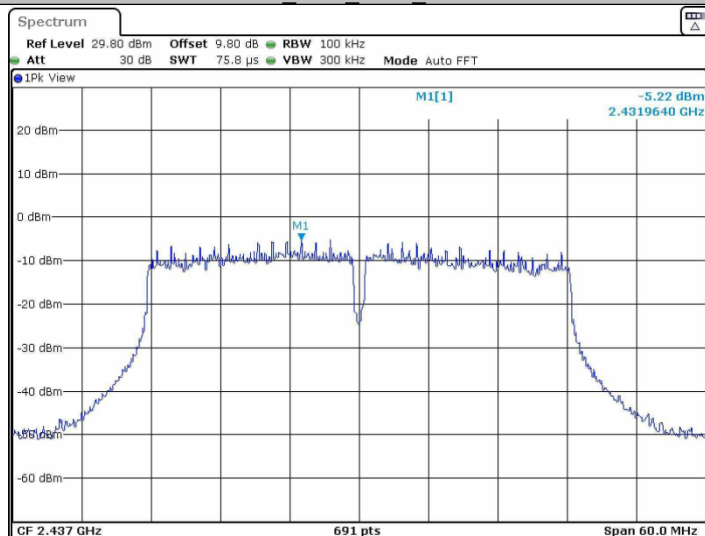
11N40SISO\_Ant1\_2422\_30~1000



11N40SISO\_Ant1\_2422\_1000~26500

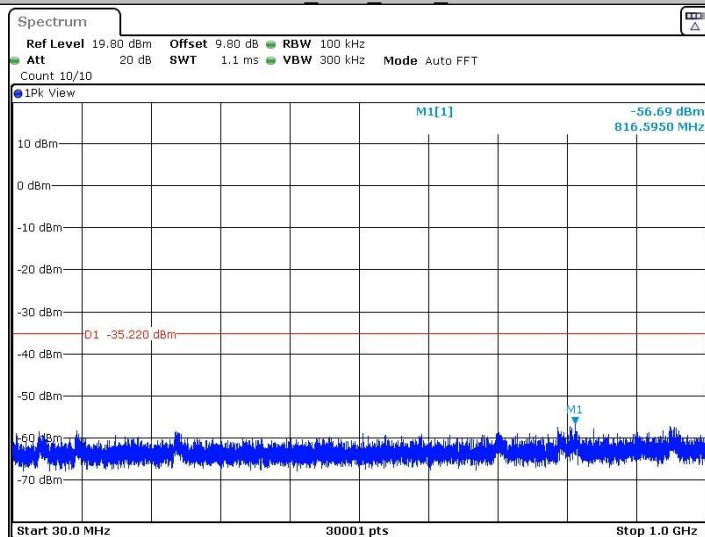


11N40SISO\_Ant1\_2437\_0~Reference



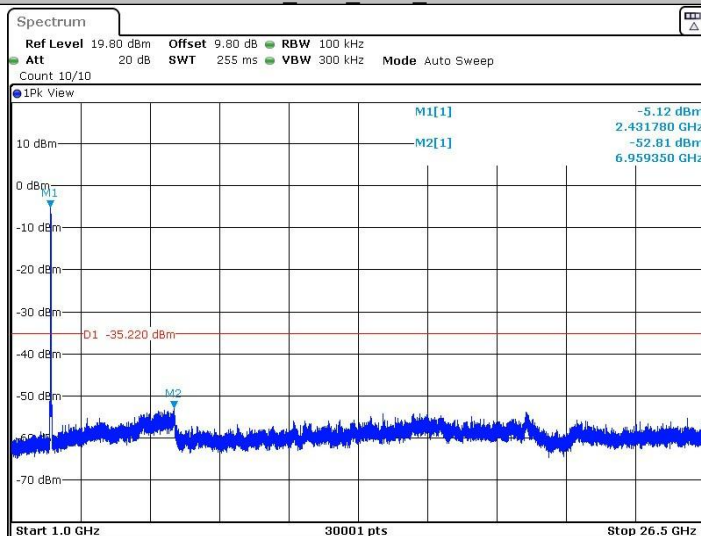
Date: 28.FEB.2022 13:47:42

11N40SISO\_Ant1\_2437\_30~1000



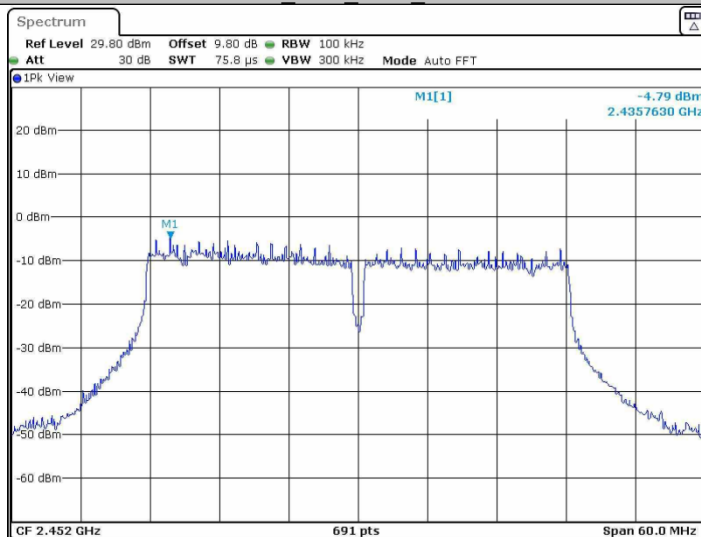
Date: 28.FEB.2022 13:47:46

11N40SISO\_Ant1\_2437\_1000~26500

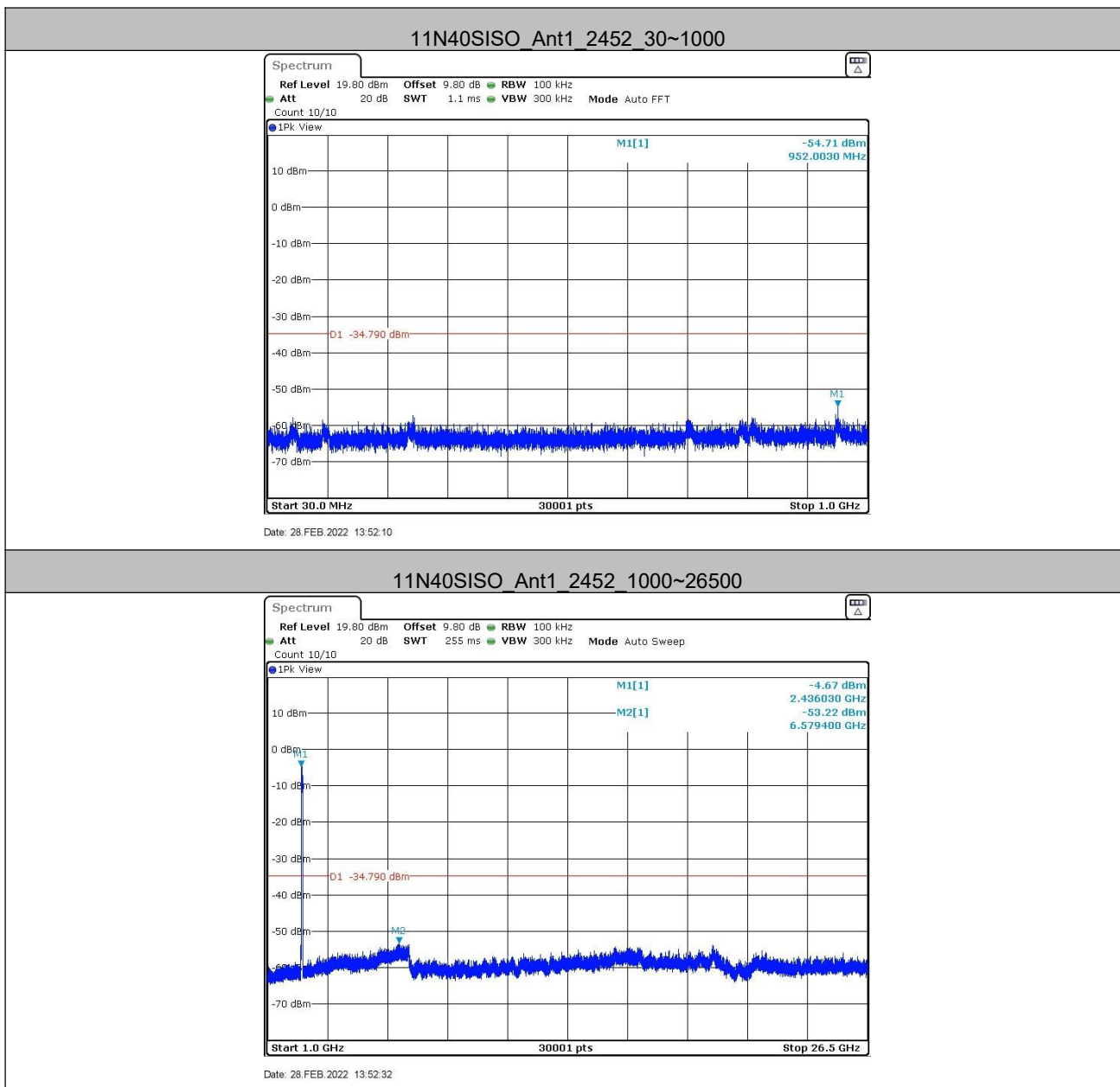


Date: 28.FEB.2022 13:48:08

11N40SISO\_Ant1\_2452\_0~Reference



Date: 28.FEB.2022 13:52:06



**Remark:**

Pretest 9kHz to 25GHz, find the highest point when testing, so only the worst data were shown in the test report. Per FCC Part 15.33 (a) and 15.31 (o) ,The amplitude of spurious emissions from intentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part.

## 5.8 Radiated Spurious Emissions

|                   |                                                                                                                                                                                                                                                                             |                                     |                   |            |                             |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------|------------|-----------------------------|
| Test Requirement: | 47 CFR Part 15C Section 15.209 and 15.205                                                                                                                                                                                                                                   |                                     |                   |            |                             |
| Test Method:      | ANSI C63.10 2013                                                                                                                                                                                                                                                            |                                     |                   |            |                             |
| Test Site:        | Measurement Distance: 3m (Semi-Anechoic Chamber)                                                                                                                                                                                                                            |                                     |                   |            |                             |
| Receiver Setup:   | Frequency                                                                                                                                                                                                                                                                   | Detector                            | RBW               | VBW        | Remark                      |
|                   | 0.009MHz-0.090MHz                                                                                                                                                                                                                                                           | Peak                                | 10kHz             | 30kHz      | Peak                        |
|                   | 0.009MHz-0.090MHz                                                                                                                                                                                                                                                           | Average                             | 10kHz             | 30kHz      | Average                     |
|                   | 0.090MHz-0.110MHz                                                                                                                                                                                                                                                           | Quasi-peak                          | 10kHz             | 30kHz      | Quasi-peak                  |
|                   | 0.110MHz-0.490MHz                                                                                                                                                                                                                                                           | Peak                                | 10kHz             | 30kHz      | Peak                        |
|                   | 0.110MHz-0.490MHz                                                                                                                                                                                                                                                           | Average                             | 10kHz             | 30kHz      | Average                     |
|                   | 0.490MHz -30MHz                                                                                                                                                                                                                                                             | Quasi-peak                          | 10kHz             | 30kHz      | Quasi-peak                  |
|                   | 30MHz-1GHz                                                                                                                                                                                                                                                                  | Quasi-peak                          | 100 kHz           | 300kHz     | Quasi-peak                  |
|                   | Above 1GHz                                                                                                                                                                                                                                                                  | Peak                                | 1MHz              | 3MHz       | Peak                        |
|                   |                                                                                                                                                                                                                                                                             | Peak                                | 1MHz              | 10Hz       | Average                     |
| Limit:            | Frequency                                                                                                                                                                                                                                                                   | Field strength<br>(microvolt/meter) | Limit<br>(dBuV/m) | Remark     | Measurement<br>distance (m) |
|                   | 0.009MHz-0.490MHz                                                                                                                                                                                                                                                           | 2400/F(kHz)                         | -                 | -          | 300                         |
|                   | 0.490MHz-1.705MHz                                                                                                                                                                                                                                                           | 24000/F(kHz)                        | -                 | -          | 30                          |
|                   | 1.705MHz-30MHz                                                                                                                                                                                                                                                              | 30                                  | -                 | -          | 30                          |
|                   | 30MHz-88MHz                                                                                                                                                                                                                                                                 | 100                                 | 40.0              | Quasi-peak | 3                           |
|                   | 88MHz-216MHz                                                                                                                                                                                                                                                                | 150                                 | 43.5              | Quasi-peak | 3                           |
|                   | 216MHz-960MHz                                                                                                                                                                                                                                                               | 200                                 | 46.0              | Quasi-peak | 3                           |
|                   | 960MHz-1GHz                                                                                                                                                                                                                                                                 | 500                                 | 54.0              | Quasi-peak | 3                           |
|                   | Above 1GHz                                                                                                                                                                                                                                                                  | 500                                 | 54.0              | Average    | 3                           |
|                   | Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device. |                                     |                   |            |                             |

Test Setup:

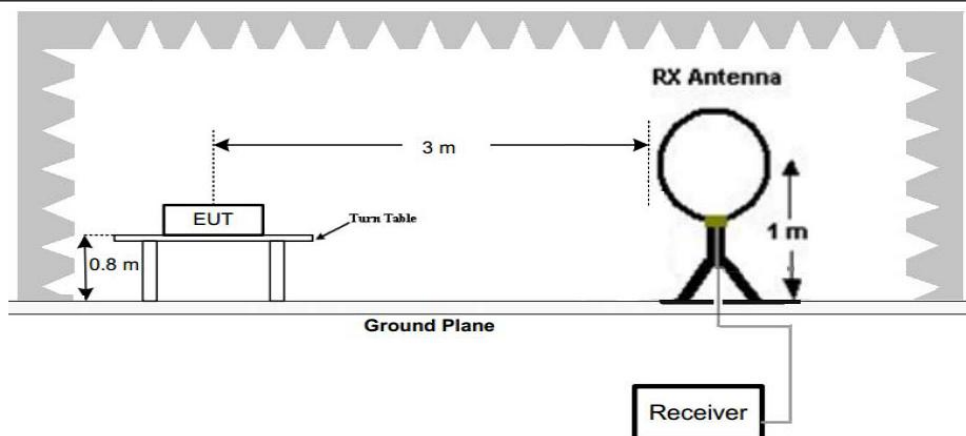


Figure 1. Below 30MHz

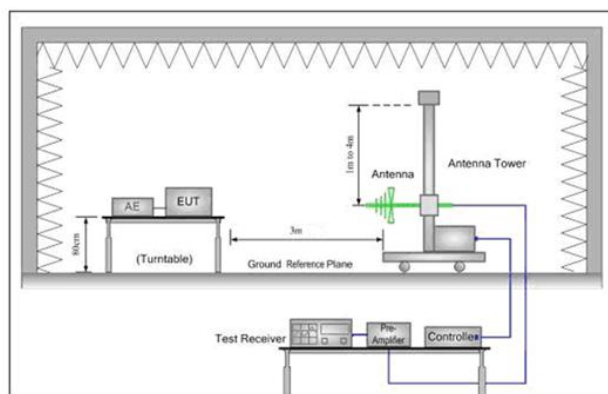


Figure 2. 30MHz to 1GHz

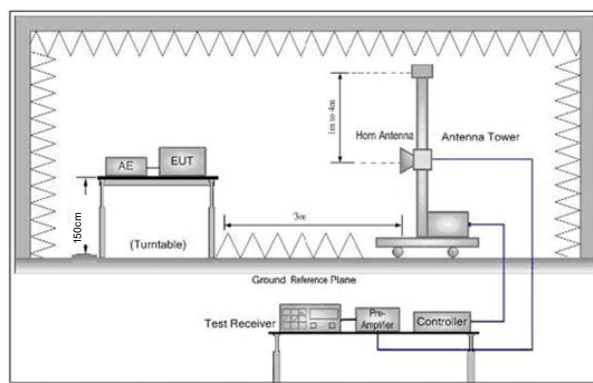


Figure 3. Above 1 GHz

Test Procedure:

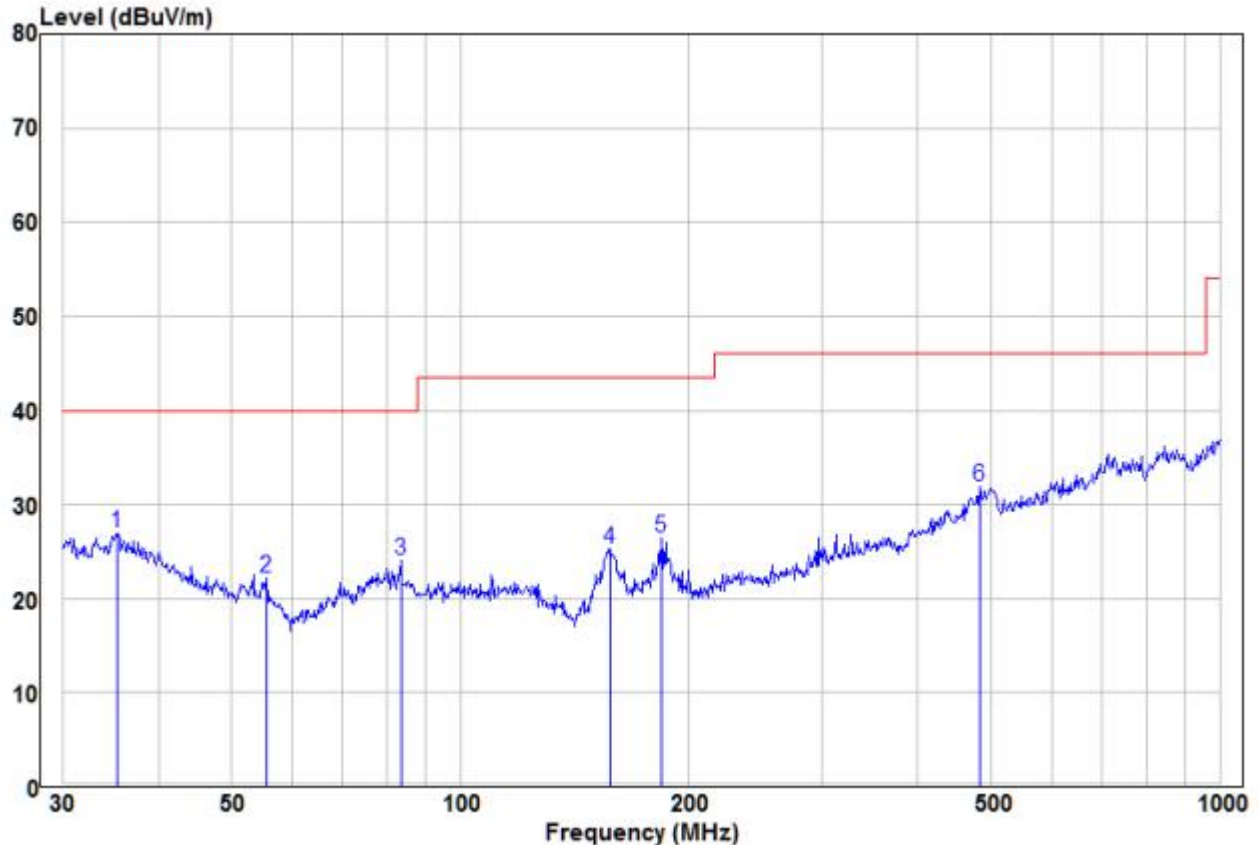
- a. 1) Below 1G: The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.  
2) Above 1G: The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.  
Note: For the radiated emission test above 1GHz:  
Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                        | <p>d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.</p> <p>e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</p> <p>g. Test the EUT in the lowest channel, the middle channel, the Highest channel.</p> <p>h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case.</p> <p>i. Repeat above procedures until all frequencies measured was complete.</p> |
| Exploratory Test Mode: | Transmitting with all kind of modulations, data rates at lowest, middle and highest channel.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Final Test Mode:       | <p>Pretest the EUT at Transmitting mode and Charge +Transmitting mode, found the Charge +Transmitting mode which it is worse case.</p> <p>Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g; 6.5Mbps of rate is the worst case of 802.11n(HT20); 13.5Mbps of rate is the worst case of 802.11n(HT40).</p> <p>For below 1GHz, through Pre-scan, find the 1Mbps of rate of 802.11b at middle channel is the worst case.</p> <p>Only the worst case is recorded in the report.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Test Results:          | Pass                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

### 5.8.1 Radiated emission below 1GHz

30MHz~1GHz

Vertical



|      | Read   |        |        | Limit  | Over  |             |            |
|------|--------|--------|--------|--------|-------|-------------|------------|
| Freq | Level  | Factor | Level  | Line   | Limit | Remark      | Pol/Phase  |
| MHz  | dBuV   | dB/m   | dBuV/m | dBuV/m | dB    |             |            |
| 1 pp | 35.25  | 12.39  | 14.51  | 26.90  | 40.00 | -13.10 Peak | HORIZONTAL |
| 2    | 55.61  | 15.45  | 6.81   | 22.26  | 40.00 | -17.74 Peak | HORIZONTAL |
| 3    | 83.52  | 14.11  | 9.87   | 23.98  | 40.00 | -16.02 Peak | HORIZONTAL |
| 4    | 157.56 | 17.35  | 7.96   | 25.31  | 43.50 | -18.19 Peak | HORIZONTAL |
| 5    | 183.84 | 18.21  | 8.20   | 26.41  | 43.50 | -17.09 Peak | HORIZONTAL |
| 6    | 482.22 | 14.26  | 17.72  | 31.98  | 46.00 | -14.02 Peak | HORIZONTAL |

Remark:

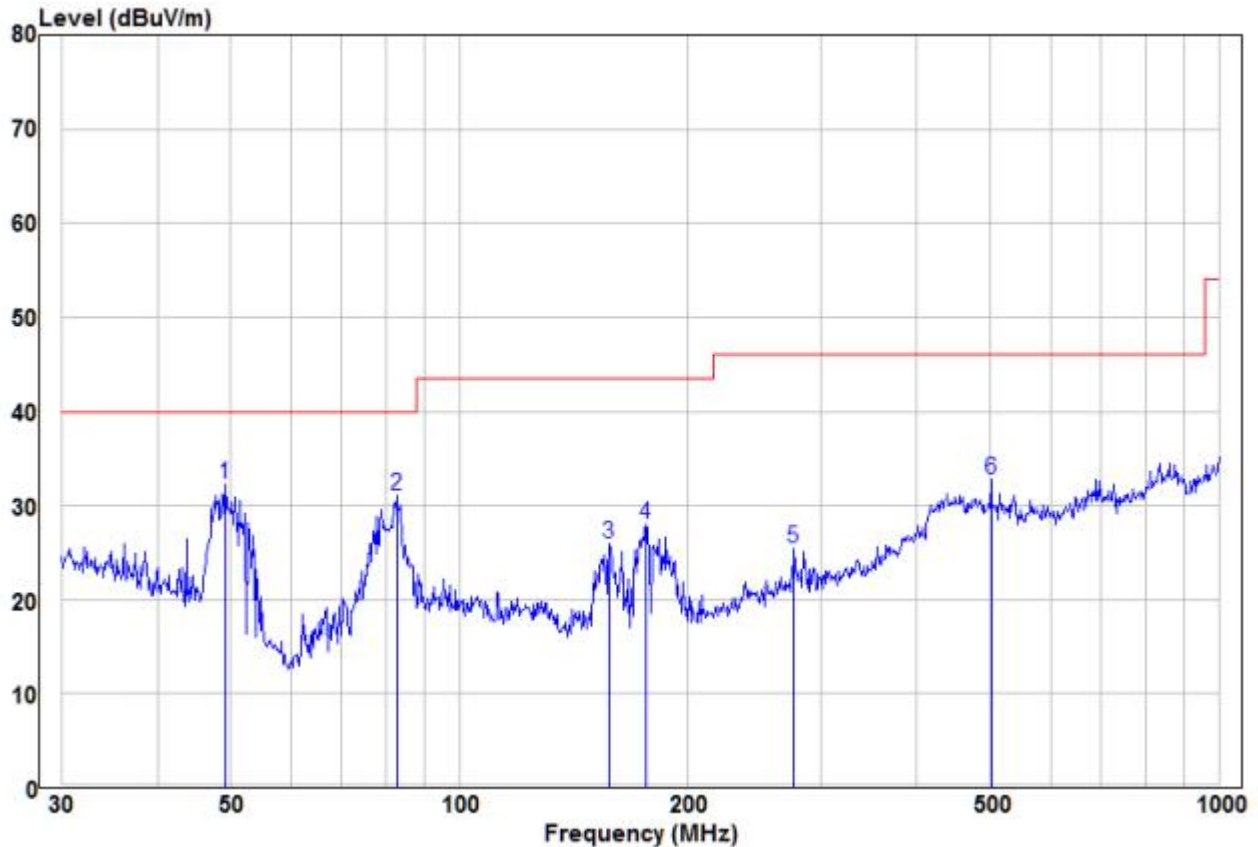
The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Factor= Antenna Factor + Cable Factor – Preamplifier Factor,

Level = Read Level + Factor,

Over Limit=Level-Limit Line.

Horizontal



|   |      | Read   |        | Limit  | Over   |       |             |
|---|------|--------|--------|--------|--------|-------|-------------|
|   | Freq | Level  | Factor | Level  | Line   | Limit | Remark      |
|   | MHz  | dBuV   | dB/m   | dBuV/m | dBuV/m | dB    | Pol/Phase   |
| 1 | pp   | 49.19  | 23.85  | 8.47   | 32.32  | 40.00 | -7.68 Peak  |
| 2 |      | 82.65  | 21.21  | 9.84   | 31.05  | 40.00 | -8.95 Peak  |
| 3 |      | 157.56 | 18.01  | 7.96   | 25.97  | 43.50 | -17.53 Peak |
| 4 |      | 176.27 | 19.92  | 8.07   | 27.99  | 43.50 | -15.51 Peak |
| 5 |      | 276.12 | 12.43  | 12.94  | 25.37  | 46.00 | -20.63 Peak |
| 6 |      | 501.18 | 14.49  | 18.29  | 32.78  | 46.00 | -13.22 Peak |

Remark:

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Factor= Antenna Factor + Cable Factor – Preamplifier Factor,

Level = Read Level + Factor,

Over Limit=Level-Limit Line.

## 5.8.2 Transmitter emission above 1GHz

WiFi and BT transmit at the same time

| Test mode: |               | 802.11b(1Mbps) |                | Test channel: |        | Lowest        |           |
|------------|---------------|----------------|----------------|---------------|--------|---------------|-----------|
| Frequency  | Meter Reading | Factor         | Emission Level | Limits        | Over   | Detector Type | Ant. Pol. |
| (MHz)      | (dBμV)        | (dB)           | (dBμV/m)       | (dBμV/m)      | (dB)   |               | H/V       |
| 4824.000   | 53.88         | -4.26          | 49.62          | 74            | -24.38 | peak          | H         |
| 4824.000   | 37.03         | -4.26          | 32.77          | 54            | -21.23 | AVG           | H         |
| 7236.000   | 50.59         | 1.18           | 51.77          | 74            | -22.23 | peak          | H         |
| 7236.000   | 37.33         | 1.18           | 38.51          | 54            | -15.49 | AVG           | H         |
| 4804       | 53.94         | -4.33          | 49.61          | 74            | -24.39 | Peak          | H         |
| 7206       | 49.67         | 1.01           | 50.68          | 74            | -23.32 | Peak          | H         |
| 4824.000   | 54.25         | -4.26          | 49.99          | 74            | -24.01 | peak          | V         |
| 4824.000   | 38.52         | -4.26          | 34.26          | 54            | -19.74 | AVG           | V         |
| 7236.000   | 51.01         | 1.18           | 52.19          | 74            | -21.81 | peak          | V         |
| 7236.000   | 36.07         | 1.18           | 37.25          | 54            | -16.75 | AVG           | V         |
| 4804       | 53.13         | -4.33          | 48.80          | 74            | -25.20 | Peak          | V         |
| 7206       | 50.75         | 1.01           | 51.76          | 74            | -22.24 | Peak          | V         |

| Test mode: |               | 802.11b(1Mbps) |                | Test channel: |        | Middle        |           |
|------------|---------------|----------------|----------------|---------------|--------|---------------|-----------|
| Frequency  | Meter Reading | Factor         | Emission Level | Limits        | Over   | Detector Type | Ant. Pol. |
| (MHz)      | (dBμV)        | (dB)           | (dBμV/m)       | (dBμV/m)      | (dB)   |               | H/V       |
| 4874.000   | 51.56         | -4.12          | 47.44          | 74            | -26.56 | peak          | H         |
| 4874.000   | 36.95         | -4.12          | 32.83          | 54            | -21.17 | AVG           | H         |
| 7311.000   | 49.63         | 1.46           | 51.09          | 74            | -22.91 | peak          | H         |
| 7311.000   | 35.31         | 1.46           | 36.77          | 54            | -17.23 | AVG           | H         |
| 4882       | 52.69         | -4.11          | 48.58          | 74            | -25.42 | peak          | H         |
| 7323       | 50.00         | 1.51           | 51.51          | 74            | -22.49 | peak          | H         |
| 4874.000   | 52.47         | -4.12          | 48.35          | 74            | -25.65 | peak          | V         |
| 4874.000   | 37.86         | -4.12          | 33.74          | 54            | -20.26 | AVG           | V         |
| 7311.000   | 49.59         | 1.46           | 51.05          | 74            | -22.95 | peak          | V         |
| 7311.000   | 36.19         | 1.46           | 37.65          | 54            | -16.35 | AVG           | V         |
| 4882       | 53.80         | -4.11          | 49.69          | 74            | -24.31 | peak          | V         |
| 7323       | 50.68         | 1.51           | 52.19          | 74            | -21.81 | peak          | V         |

| Test mode: |               | 802.11b(1Mbps) |                | Test channel: |        | Highest       |           |
|------------|---------------|----------------|----------------|---------------|--------|---------------|-----------|
| Frequency  | Meter Reading | Factor         | Emission Level | Limits        | Over   | Detector Type | Ant. Pol. |
| (MHz)      | (dBμV)        | (dB)           | (dBμV/m)       | (dBμV/m)      | (dB)   |               | H/V       |
| 4924.000   | 52.86         | -4.03          | 48.83          | 74            | -25.17 | peak          | H         |
| 4924.000   | 37.25         | -4.03          | 33.22          | 54            | -20.78 | AVG           | H         |
| 7386.000   | 50.67         | 1.66           | 52.33          | 74            | -21.67 | peak          | H         |
| 7386.000   | 37.75         | 1.66           | 39.41          | 54            | -14.59 | AVG           | H         |
| 4960       | 50.97         | -4.04          | 46.93          | 74            | -27.07 | Peak          | H         |
| 7440       | 50.02         | 1.57           | 51.59          | 74            | -22.41 | Peak          | H         |
| 4924.000   | 54.12         | -4.03          | 50.09          | 74            | -23.91 | peak          | V         |
| 4924.000   | 37.99         | -4.03          | 33.96          | 54            | -20.04 | AVG           | V         |
| 7386.000   | 51.13         | 1.66           | 52.79          | 74            | -21.21 | peak          | V         |
| 7386.000   | 36.23         | 1.66           | 37.89          | 54            | -16.11 | AVG           | V         |
| 4960       | 48.79         | -4.04          | 44.75          | 74            | -29.25 | Peak          | V         |
| 7440       | 48.73         | 1.57           | 50.30          | 74            | -23.70 | Peak          | V         |

Remark:

- 1) The 1Mbps of rate of 802.11b is the worst case.
- 2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:  
Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor
- 3) Scan from 9kHz to 25GHz, The disturbance above 13GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

## 5.9 Restricted bands around fundamental frequency

|                   |                                                  |                    |                  |
|-------------------|--------------------------------------------------|--------------------|------------------|
| Test Requirement: | 47 CFR Part 15C Section 15.209 and 15.205        |                    |                  |
| Test Method:      | ANSI C63.10 2013                                 |                    |                  |
| Test Site:        | Measurement Distance: 3m (Semi-Anechoic Chamber) |                    |                  |
| Limit:            | Frequency                                        | Limit (dBuV/m @3m) | Remark           |
|                   | 30MHz-88MHz                                      | 40.0               | Quasi-peak Value |
|                   | 88MHz-216MHz                                     | 43.5               | Quasi-peak Value |
|                   | 216MHz-960MHz                                    | 46.0               | Quasi-peak Value |
|                   | 960MHz-1GHz                                      | 54.0               | Quasi-peak Value |
|                   | Above 1GHz                                       | 54.0               | Average Value    |
|                   |                                                  | 74.0               | Peak Value       |
| Test Setup:       |                                                  |                    |                  |

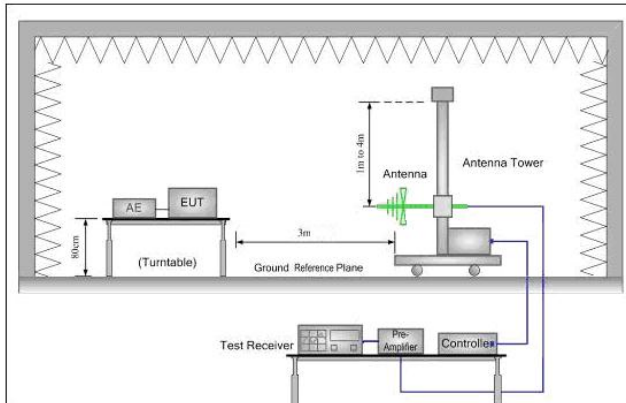


Figure 1. 30MHz to 1GHz

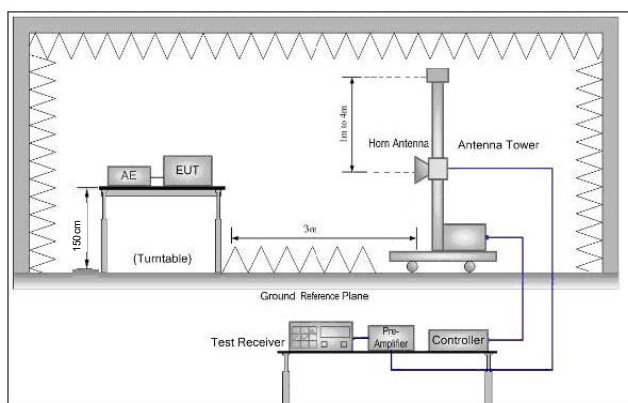


Figure 2. Above 1 GHz

### Test Procedure:

- 1) Below 1G: The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
  - 2) Above 1G: The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- Note: For the radiated emission test above 1GHz:
- Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
  - The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
  - For each suspected emission, the EUT was arranged to its worst case and

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                        | <p>then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.</p> <p>e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>f. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel</p> <p>g. Test the EUT in the lowest channel, the middle channel, the Highest channel.</p> <p>h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case .</p> <p>i. Repeat above procedures until all frequencies measured was complete.</p> |
| Exploratory Test Mode: | <p>Transmitting with all kind of modulations, data rates.</p> <p>Transmitting mode.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Final Test Mode:       | <p>Pretest the EUT at Transmitting mode, found the Transmitting mode which it is worse case.</p> <p>Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g; 6.5Mbps of rate is the worst case of 802.11n(HT20); 13.5Mbps of rate is the worst case of 802.11n(HT40).</p> <p>Only the worst case is recorded in the report.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Test Results:          | Pass                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

**Test data:**

| Worse case mode: |               | 802.11b(1Mbps) |                | Test channel: |        | Lowest        |           |
|------------------|---------------|----------------|----------------|---------------|--------|---------------|-----------|
| Frequency        | Meter Reading | Factor         | Emission Level | Limits        | Over   | Detector Type | Ant. Pol. |
| (MHz)            | (dBμV)        | (dB)           | (dBμV/m)       | (dBμV/m)      | (dB)   |               | H/V       |
| 2390.000         | 59.12         | -9.2           | 49.92          | 74            | -24.08 | peak          | H         |
| 2390.000         | 44.21         | -9.2           | 35.01          | 54            | -18.99 | AVG           | H         |
| 2400.000         | 59.49         | -9.39          | 50.10          | 74            | -23.90 | peak          | H         |
| 2400.000         | 46.59         | -9.39          | 37.20          | 54            | -16.80 | AVG           | H         |
| 2390.000         | 58.45         | -9.2           | 49.25          | 74            | -24.75 | peak          | V         |
| 2390.000         | 44.66         | -9.2           | 35.46          | 54            | -18.54 | AVG           | V         |
| 2400.000         | 59.77         | -9.39          | 50.38          | 74            | -23.62 | peak          | V         |
| 2400.000         | 46.86         | -9.39          | 37.47          | 54            | -16.53 | AVG           | V         |

| Worse case mode: |               | 802.11b(1Mbps) |                | Test channel: |        | Highest       |           |
|------------------|---------------|----------------|----------------|---------------|--------|---------------|-----------|
| Frequency        | Meter Reading | Factor         | Emission Level | Limits        | Over   | Detector Type | Ant. Pol. |
| (MHz)            | (dBμV)        | (dB)           | (dBμV/m)       | (dBμV/m)      | (dB)   |               | H/V       |
| 2483.500         | 57.81         | -9.29          | 48.52          | 74            | -25.48 | peak          | H         |
| 2483.500         | 44.40         | -9.29          | 35.11          | 54            | -18.89 | AVG           | H         |
| 2483.500         | 57.89         | -9.29          | 48.60          | 74            | -25.40 | peak          | V         |
| 2483.500         | 46.36         | -9.29          | 37.07          | 54            | -16.93 | AVG           | V         |

| Worse case mode: |               | 802.11g(6Mbps) |                | Test channel: |        | Lowest        |           |
|------------------|---------------|----------------|----------------|---------------|--------|---------------|-----------|
| Frequency        | Meter Reading | Factor         | Emission Level | Limits        | Over   | Detector Type | Ant. Pol. |
| (MHz)            | (dBμV)        | (dB)           | (dBμV/m)       | (dBμV/m)      | (dB)   |               | H/V       |
| 2390.000         | 59.21         | -9.2           | 50.01          | 74            | -23.99 | peak          | H         |
| 2390.000         | 44.04         | -9.2           | 34.84          | 54            | -19.16 | AVG           | H         |
| 2400.000         | 60.08         | -9.39          | 50.69          | 74            | -23.31 | peak          | H         |
| 2400.000         | 46.54         | -9.39          | 37.15          | 54            | -16.85 | AVG           | H         |
| 2390.000         | 58.62         | -9.2           | 49.42          | 74            | -24.58 | peak          | V         |
| 2390.000         | 44.27         | -9.2           | 35.07          | 54            | -18.93 | AVG           | V         |
| 2400.000         | 59.42         | -9.39          | 50.03          | 74            | -23.97 | peak          | V         |
| 2400.000         | 46.44         | -9.39          | 37.05          | 54            | -16.95 | AVG           | V         |

| Worse case mode: |               | 802.11g(6Mbps) |                | Test channel: |        | Highest       |           |
|------------------|---------------|----------------|----------------|---------------|--------|---------------|-----------|
| Frequency        | Meter Reading | Factor         | Emission Level | Limits        | Over   | Detector Type | Ant. Pol. |
| (MHz)            | (dBμV)        | (dB)           | (dBμV/m)       | (dBμV/m)      | (dB)   |               | H/V       |
| 2483.500         | 57.67         | -9.29          | 48.38          | 74            | -25.62 | peak          | H         |
| 2483.500         | 43.97         | -9.29          | 34.68          | 54            | -19.32 | AVG           | H         |
| 2483.500         | 57.64         | -9.29          | 48.35          | 74            | -25.65 | peak          | V         |
| 2483.500         | 45.85         | -9.29          | 36.56          | 54            | -17.44 | AVG           | V         |

| Worse case mode: |               | 802.11n(HT20)(6.5Mbps) |                | Test channel: |        | Lowest        |           |
|------------------|---------------|------------------------|----------------|---------------|--------|---------------|-----------|
| Frequency        | Meter Reading | Factor                 | Emission Level | Limits        | Over   | Detector Type | Ant. Pol. |
| (MHz)            | (dBμV)        | (dB)                   | (dBμV/m)       | (dBμV/m)      | (dB)   |               | H/V       |
| 2390.000         | 58.98         | -9.2                   | 49.78          | 74            | -24.22 | peak          | H         |
| 2390.000         | 44.06         | -9.2                   | 34.86          | 54            | -19.14 | AVG           | H         |
| 2400.000         | 59.85         | -9.39                  | 50.46          | 74            | -23.54 | peak          | H         |
| 2400.000         | 46.02         | -9.39                  | 36.63          | 54            | -17.37 | AVG           | H         |
| 2390.000         | 58.34         | -9.2                   | 49.14          | 74            | -24.86 | peak          | V         |
| 2390.000         | 44.47         | -9.2                   | 35.27          | 54            | -18.73 | AVG           | V         |
| 2400.000         | 59.38         | -9.39                  | 49.99          | 74            | -24.01 | peak          | V         |
| 2400.000         | 46.24         | -9.39                  | 36.85          | 54            | -17.15 | AVG           | V         |

| Worse case mode: |               | 802.11n(HT20)(6.5Mbps) |                | Test channel: |        | Highest       |           |
|------------------|---------------|------------------------|----------------|---------------|--------|---------------|-----------|
| Frequency        | Meter Reading | Factor                 | Emission Level | Limits        | Over   | Detector Type | Ant. Pol. |
| (MHz)            | (dBμV)        | (dB)                   | (dBμV/m)       | (dBμV/m)      | (dB)   |               | H/V       |
| 2483.500         | 57.54         | -9.29                  | 48.25          | 74            | -25.75 | peak          | H         |
| 2483.500         | 44.05         | -9.29                  | 34.76          | 54            | -19.24 | AVG           | H         |
| 2483.500         | 57.60         | -9.29                  | 48.31          | 74            | -25.69 | peak          | V         |
| 2483.500         | 45.47         | -9.29                  | 36.18          | 54            | -17.82 | AVG           | V         |

| Worse case mode: |               | 802.11n(HT40)(13.5Mbps) |                | Test channel: |        | Lowest   |           |
|------------------|---------------|-------------------------|----------------|---------------|--------|----------|-----------|
| Frequency        | Meter Reading | Factor                  | Emission Level | Limits        | Over   | Detector | Ant. Pol. |
| (MHz)            | (dBμV)        | (dB)                    | (dBμV/m)       | (dBμV/m)      | (dB)   | Type     | H/V       |
| 2390.000         | 58.72         | -9.2                    | 49.52          | 74            | -24.48 | peak     | H         |
| 2390.000         | 44.68         | -9.2                    | 35.48          | 54            | -18.52 | AVG      | H         |
| 2400.000         | 60.11         | -9.39                   | 50.72          | 74            | -23.28 | peak     | H         |
| 2400.000         | 46.60         | -9.39                   | 37.21          | 54            | -16.79 | AVG      | H         |
| 2390.000         | 58.58         | -9.2                    | 49.38          | 74            | -24.62 | peak     | V         |
| 2390.000         | 44.30         | -9.2                    | 35.10          | 54            | -18.90 | AVG      | V         |
| 2400.000         | 59.69         | -9.39                   | 50.30          | 74            | -23.70 | peak     | V         |
| 2400.000         | 46.54         | -9.39                   | 37.15          | 54            | -16.85 | AVG      | V         |

| Worse case mode: |               | 802.11n(HT40)(13.5Mbps) |                | Test channel: |        | Highest  |           |
|------------------|---------------|-------------------------|----------------|---------------|--------|----------|-----------|
| Frequency        | Meter Reading | Factor                  | Emission Level | Limits        | Over   | Detector | Ant. Pol. |
| (MHz)            | (dBμV)        | (dB)                    | (dBμV/m)       | (dBμV/m)      | (dB)   | Type     | H/V       |
| 2483.500         | 57.84         | -9.29                   | 48.55          | 74            | -25.45 | peak     | H         |
| 2483.500         | 44.19         | -9.29                   | 34.90          | 54            | -19.10 | AVG      | H         |
| 2483.500         | 57.88         | -9.29                   | 48.59          | 74            | -25.41 | peak     | V         |
| 2483.500         | 46.40         | -9.29                   | 37.11          | 54            | -16.89 | AVG      | V         |

**Note:**

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

*Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor*

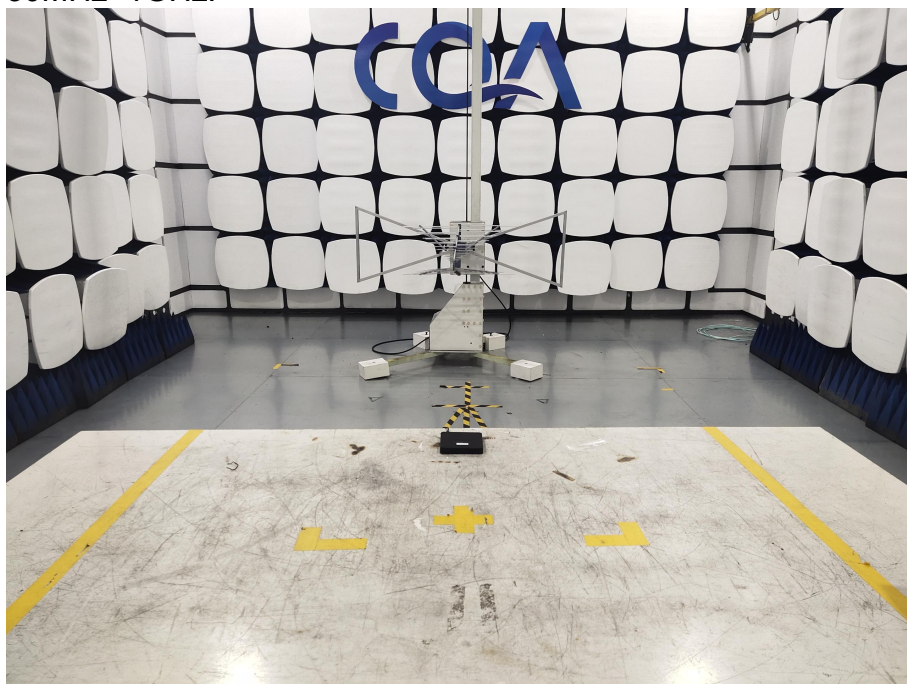
## 6 Photographs - EUT Test Setup

### 6.1 Radiated Spurious Emission

9kHz~30MHz:



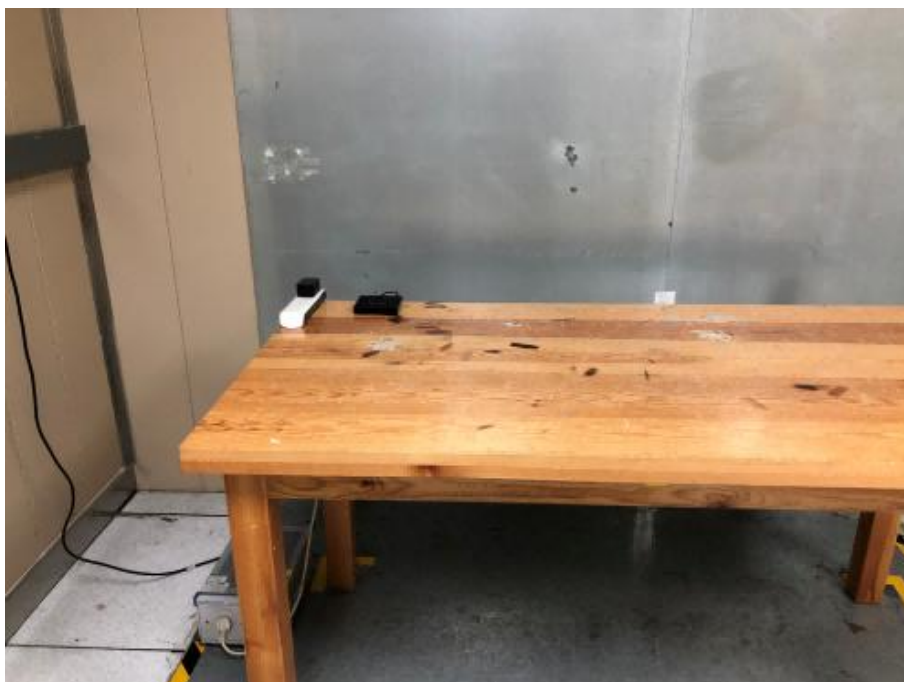
30MHz~1GHz:



Above 1GHz:



## 6.2 Conducted Emission



## 7 Photographs - EUT Constructional Details

Refer to PHOTOGRAPHS OF EUT for CQASZ20220200251E-01.

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