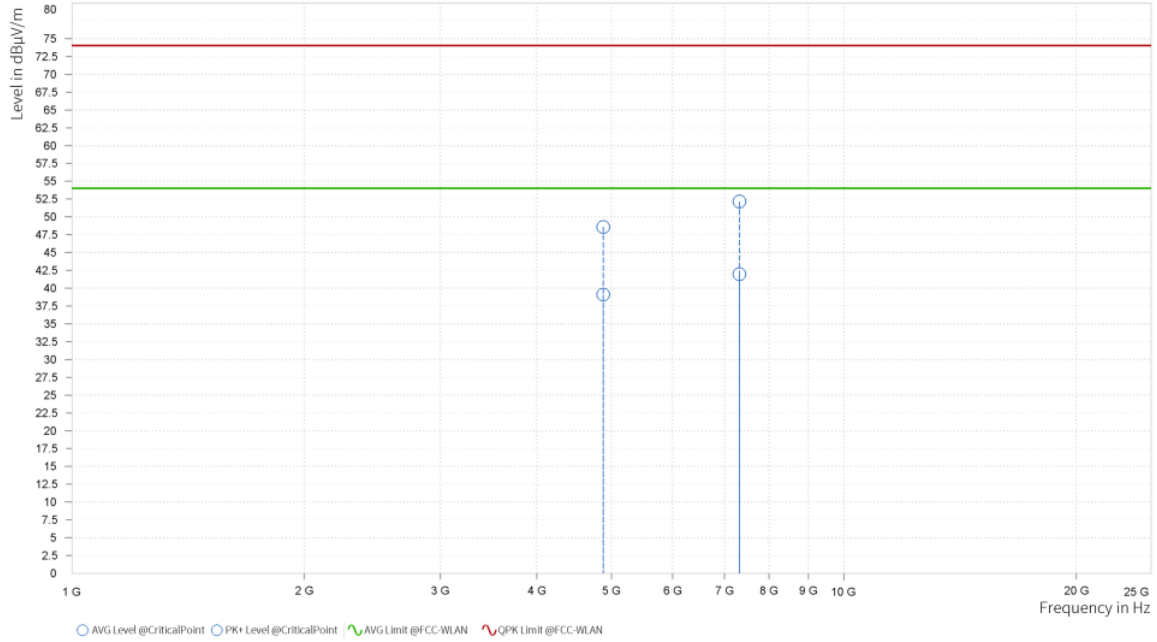
## ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

| Rg | Frequency [MHz] | PK+ Level [dBµV/m] | PK+: QPK Limit [dBµV/m] | PK+ Margin [dB] | AVG Level [dBµV/m] | AVG Limit [dBµV/m] | AVG Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 4,880.000 | 48.58 | 74.0 | 25.42 | 39.1 | 54.0 | 14.9 | 13.72 | V | 359 | 1.0 |
| 3 | 7,320.000 | 52.15 | 74.0 | 21.85 | 41.96 | 54.0 | 12.04 | 17.86 | V | 359 | 2.0 |



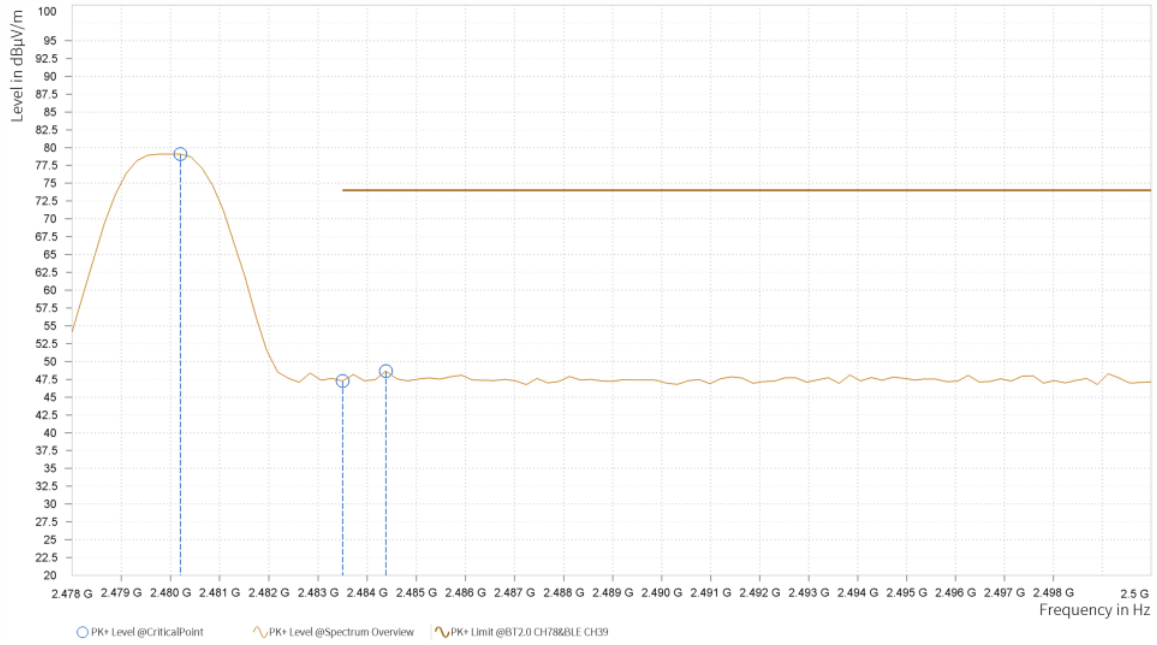

**REMARKS:**

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Limit value–Emission level.
2. 2440MHz: Fundamental frequency.

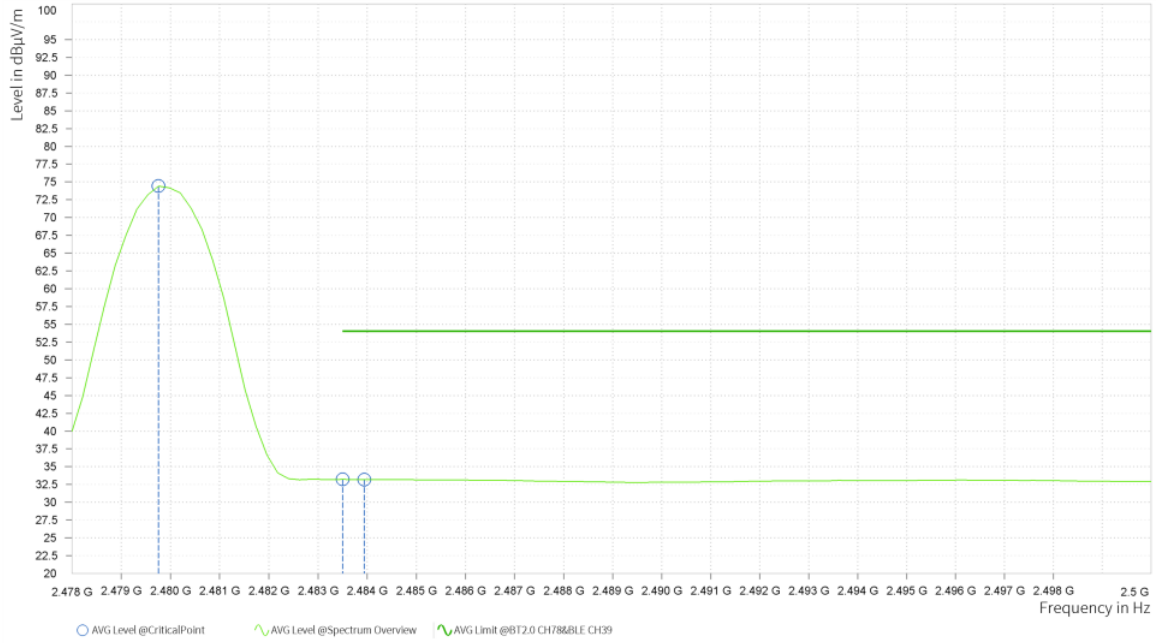
| | | | |
|---|---|---|---|
| **CHANNEL** | TX Channel 39 | **DETECTOR FUNCTION** | Peak (PK)<br>Average (AV) |
| **FREQUENCY RANGE** | 1GHz ~ 25GHz | | |

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

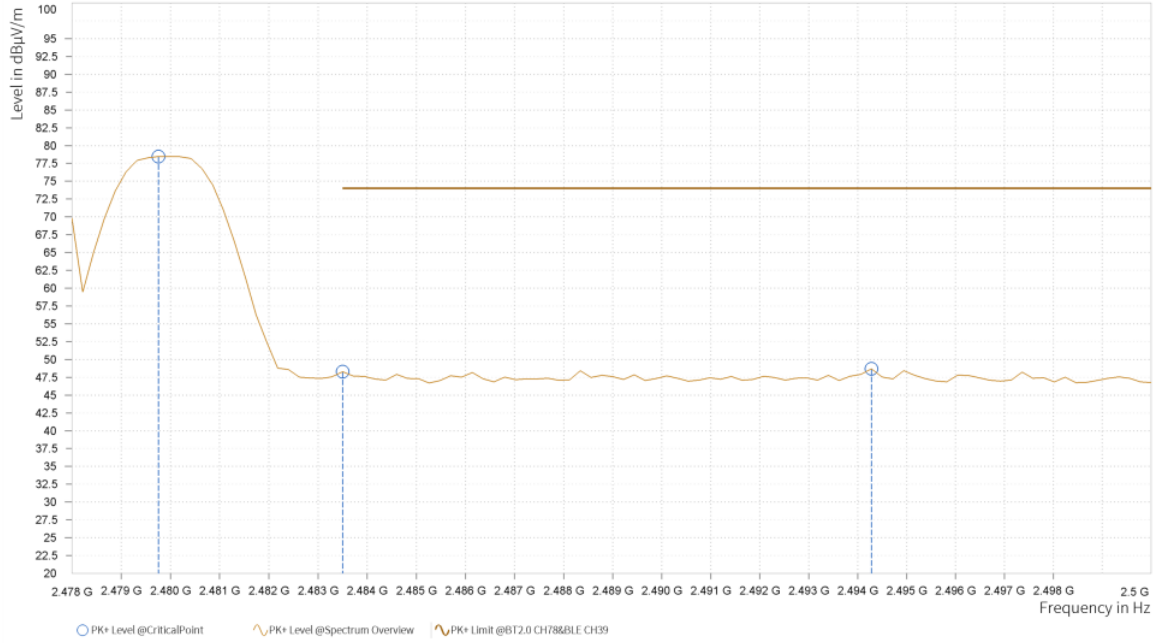
| Rg | Frequency [MHz] | PK+ Level [dBµV/m] | PK+ Limit [dBµV/m] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 6 | 2,480.200 | 79.1 | | | 9.07 | H | 339.5 | 1.0 |
| 6 | 2,483.500 | 47.27 | 74.0 | 26.73 | 9.11 | H | 339.5 | 1.0 |
| 6 | 2,484.380 | 48.65 | 74.0 | 25.35 | 9.12 | H | 358.1 | 1.0 |



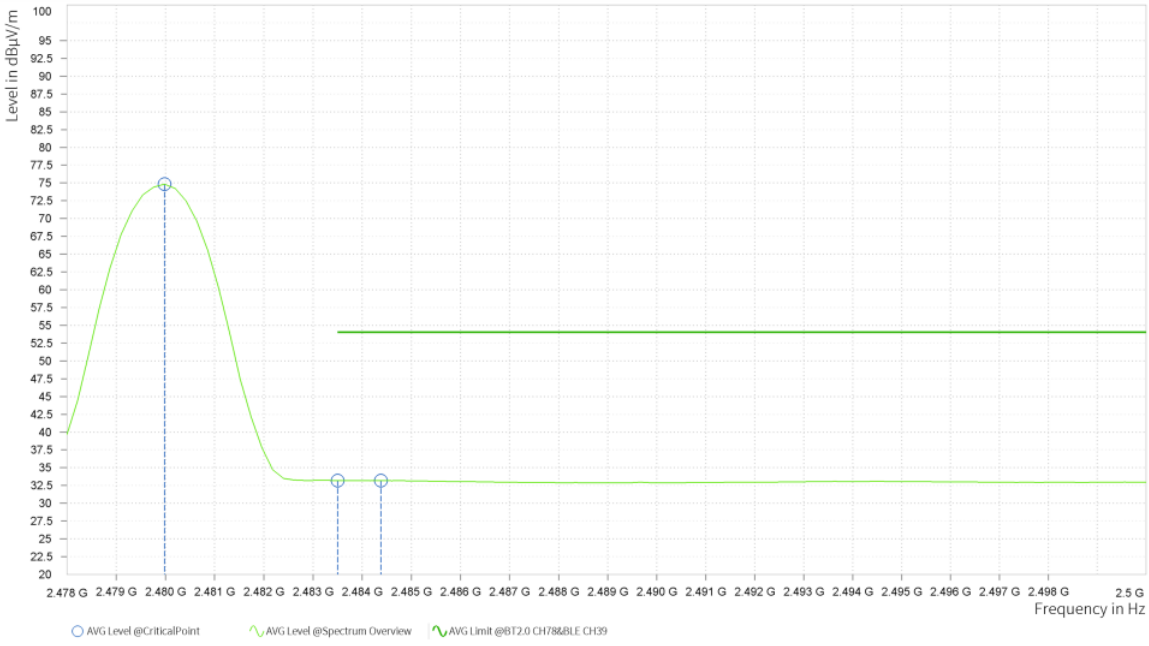
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Rg | Frequency [MHz] | AVG Level [dBµV/m] | AVG Limit [dBµV/m] | AVG Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
| 6 | 2,479.760 | 74.42 | | | 9.07 | H | 355.5 | 2.0 |
| 6 | 2,483.500 | 33.21 | 54.0 | 20.79 | 9.11 | H | 1.0 | 1.0 |
| 6 | 2,483.940 | 33.2 | 54.0 | 20.8 | 9.12 | H | 95.2 | 2.0 |



| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Rg | Frequency [MHz] | PK+ Level [dBµV/m] | PK+ Limit [dBµV/m] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
| 6 | 2,479.760 | 78.47 | | | 9.07 | V | 5.1 | 1.0 |
| 6 | 2,483.500 | 48.28 | 74.0 | 25.72 | 9.11 | V | 144.1 | 1.0 |
| 6 | 2,494.280 | 48.68 | 74.0 | 25.32 | 9.24 | V | 244.6 | 1.0 |



| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Rg | Frequency [MHz] | AVG Level [dBµV/m] | AVG Limit [dBµV/m] | AVG Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
| 6 | 2,479.980 | 74.83 | | | 9.07 | V | 86.8 | 2.0 |
| 6 | 2,483.500 | 33.2 | 54.0 | 20.8 | 9.11 | V | 86.8 | 2.0 |
| 6 | 2,484.380 | 33.19 | 54.0 | 20.81 | 9.12 | V | 86.8 | 2.0 |




**REMARKS:**

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Limit value–Emission level.
2. 2480MHz: Fundamental frequency.

## 3.2 6 dB BANDWIDTH MEASUREMENT

### 3.2.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum 6dB Bandwidth Measurement is 0.5 MHz.

### 3.2.2 TEST INSTRUMENTS

| Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Next Cal. |
|---|---|---|---|---|---|
| EMI Test Receiver | R&S | ESW 44 | 101973 | Mar.28,24 | Mar.27,26 |
| Open Switch and Control Unit | R&S | OSP-B157W8 | 100836 | N/A | N/A |
| Vector Signal Generator | R&S | SMBV100B | 102176 | Mar.29,24 | Mar.28,26 |
| Signal Generator | R&S | SMB100A03 | 182185 | Mar.29,24 | Mar.28,26 |
| WIDEBANDRADIO COMMUNICATION TESTER | R&S | CMW500 | 169399 | Jun.19,24 | Jun.18,26 |
| Hygrothermograph | DELI | 20210528 | SZ015 | Sep.06,22 | Sep.05,24 |
| Hygrothermograph | DELI | 20210528 | SZ015 | Sep.05,24 | Sep.04,26 |
| PC | LENOVO | E14 | HRSW0024 | N/A | N/A |
| CABLE | R&S | J12J103539-00-1 | SEP-03-20-069 | Apr.27,24 | Apr.26,25 |
| CABLE | R&S | J12J103539-00-1 | SEP-03-20-070 | Apr.27,24 | Apr.26,25 |
| Test Software | EMC32 | EMC32 | N/A | N/A | N/A |
| Temperature Chamber | votsch | VT4002 | 58566078100050 | May.30,24 | May.29,26 |
| Power Meter | R&S | NRX | 102380 | Mar.28,24 | Mar.27,26 |
| Power Meter probe | R&S | NRP6A | 102942 | Mar.28,24 | Mar.27,26 |

**NOTE:**

1. The calibration interval of the above test instruments is 12/ 24 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
2. The test was performed in RF Oven room.

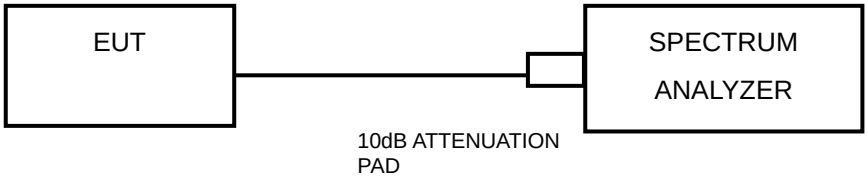
### 3.2.3 TEST PROCEDURE

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

### 3.2.4 DEVIATION FROM TEST STANDARD

No deviation.

### 3.2.5 TEST SETUP




### 3.2.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

### 3.2.7 TEST RESULTS

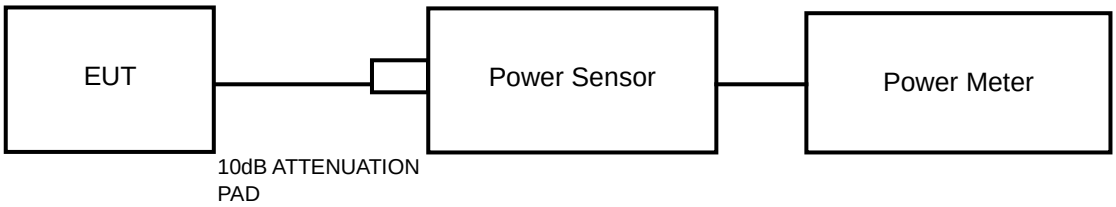
Please Refer to Appendix Of this test report..

## 3.3 CONDUCTED OUTPUT POWER

### 3.3.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

For systems using digital modulation in the 2400–2483.5 MHz band: 1 Watt (30dBm)

### 3.3.2 TEST SETUP




### 3.3.3 TEST INSTRUMENTS

Refer to section 3.3.2 to get information of above instrument.

### 3.3.4 TEST PROCEDURES

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

### 3.3.5 DEVIATION FROM TEST STANDARD

No deviation.

### 3.3.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

## 3.3.7 TEST RESULTS

### 3.4.7.1 MAXIMUM PEAK OUTPUT POWER

Please Refer to Appendix Of this test report.

### 3.4.7.2 AVERAGE OUTPUT POWER (FOR REFERENCE)

The average power sensor was used on the output port of the EUT. A power meter was used to read the response of the power sensor. Record the power level.

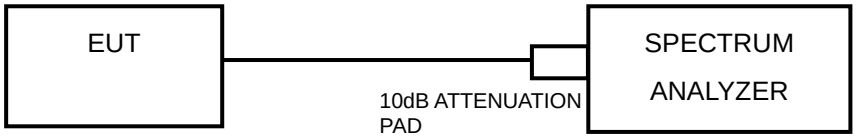
Please Refer to Appendix Of this test report.

## 3.4 POWER SPECTRAL DENSITY MEASUREMENT

### 3.4.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm/3KHz.

### 3.4.2 TEST SETUP




### 3.4.3 TEST INSTRUMENTS

Refer to section 3.3.2 to get information of above instrument.

### 3.4.4 TEST PROCEDURE

1. Set the span to 1.5 times the DTS bandwidth
2. Set the RBW = 3 kHz, VBW ≥ 3 x RBW, Detector = peak.
3. Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
4. Use the peak marker function to determine the maximum amplitude level.

### 3.4.5 DEVIATION FROM TEST STANDARD

No deviation.

### 3.4.6 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

### 3.4.7 TEST RESULTS

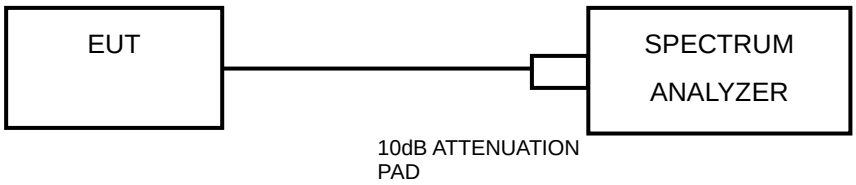
Please Refer to Appendix Of this test report.

## 3.5 OUT OF BAND EMISSION MEASUREMENT

### 3.5.1 LIMITS OF OUT OF BAND EMISSION MEASUREMENT

Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

### 3.5.2 TEST SETUP




### 3.5.3 TEST INSTRUMENTS

Refer to section 3.3.2 to get information of above instrument.

### 3.5.4 TEST PROCEDURE

**MEASUREMENT PROCEDURE REF**

1. Set the RBW = 100 kHz.
2. Set the VBW ≥ 300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

**MEASUREMENT PROCEDURE OOBE**

1. Set RBW = 100 kHz.
2. Set VBW ≥ 300 kHz.
3. Set span to encompass the spectrum to be examined
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.

### 3.5.5 DEVIATION FROM TEST STANDARD

No deviation.

### 3.5.6 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

### 3.5.7 TEST RESULTS

The spectrum plots are attached on the following images. D1 line indicates the highest level. D2 line indicates the 20dB offset below D1. It shows compliance to the requirement.

Please Refer to Appendix Of this test report.

## 3.6 ANTENNA REQUIREMENTS

### 3.6.1 STANDARD APPLICABLE

If transmitting antenna directional gain is greater than 6 dBi, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### 3.6.2 ANTENNA CONNECTED CONSTRUCTION

An embedded-in antenna design is used.

### 3.6.3 ANTENNA GAIN

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit and PSD limit.

# 4 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).

# 5 MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

# 6 Appendix

## WLAN

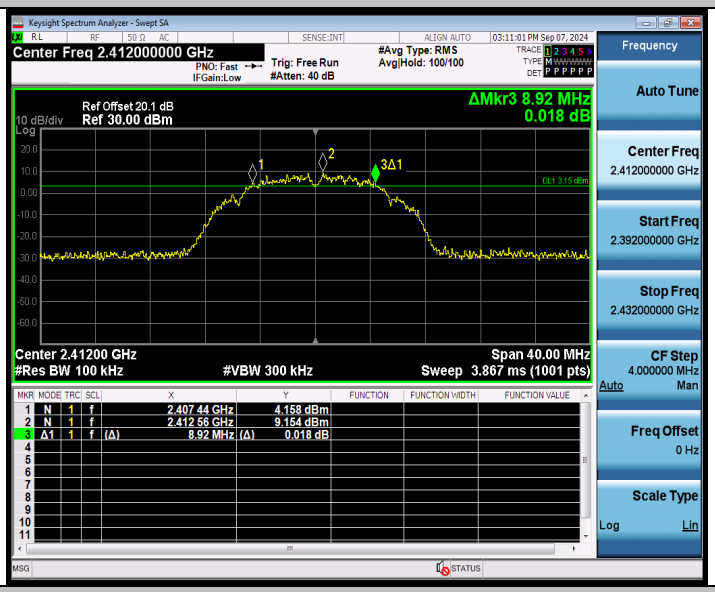
## DTS BANDWIDTH

## TEST RESULT

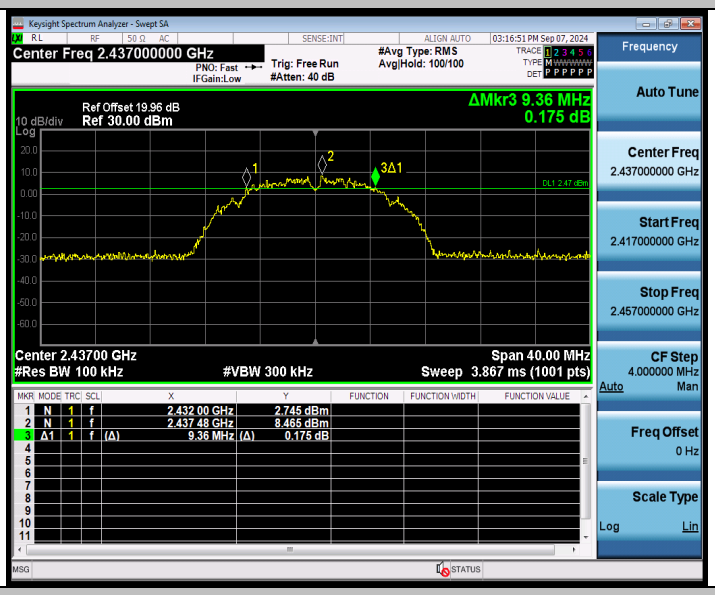
| TestMode | Antenna | Frequency[MHz] | DTS BW [MHz] | FL[MHz] | FH[MHz] | Limit[MHz] | Verdict |
|---|---|---|---|---|---|---|---|
| 11B | Ant1 | 2412 | 8.920 | 2407.440 | 2416.360 | 0.5 | PASS |
| | | 2437 | 9.360 | 2432.000 | 2441.360 | 0.5 | PASS |
| | | 2462 | 9.320 | 2456.960 | 2466.280 | 0.5 | PASS |
| 11G | Ant1 | 2412 | 16.360 | 2403.800 | 2420.160 | 0.5 | PASS |
| | | 2437 | 16.320 | 2428.840 | 2445.160 | 0.5 | PASS |
| | | 2462 | 16.320 | 2453.840 | 2470.160 | 0.5 | PASS |
| 11N20SISO | Ant1 | 2412 | 17.000 | 2403.480 | 2420.480 | 0.5 | PASS |
| | | 2437 | 16.920 | 2428.560 | 2445.480 | 0.5 | PASS |
| | | 2462 | 16.720 | 2453.760 | 2470.480 | 0.5 | PASS |
| 11N40SISO | Ant1 | 2422 | 31.840 | 2406.080 | 2437.920 | 0.5 | PASS |
| | | 2437 | 31.680 | 2421.320 | 2453.000 | 0.5 | PASS |
| | | 2452 | 31.680 | 2436.320 | 2468.000 | 0.5 | PASS |

## TEST GRAPHS

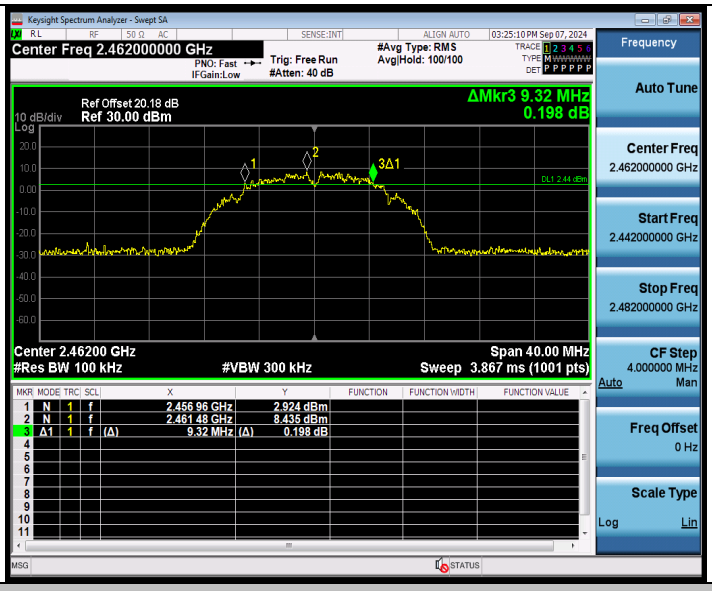
11B_Ant1_2412



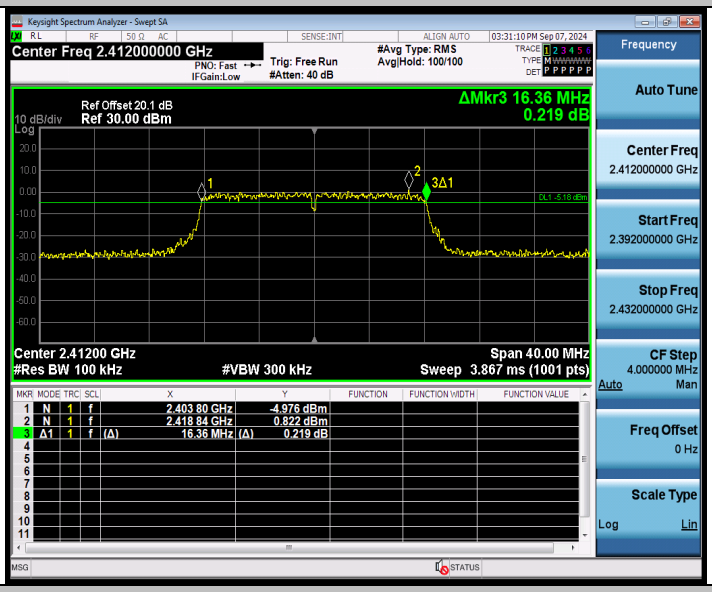

11B_Ant1_2437



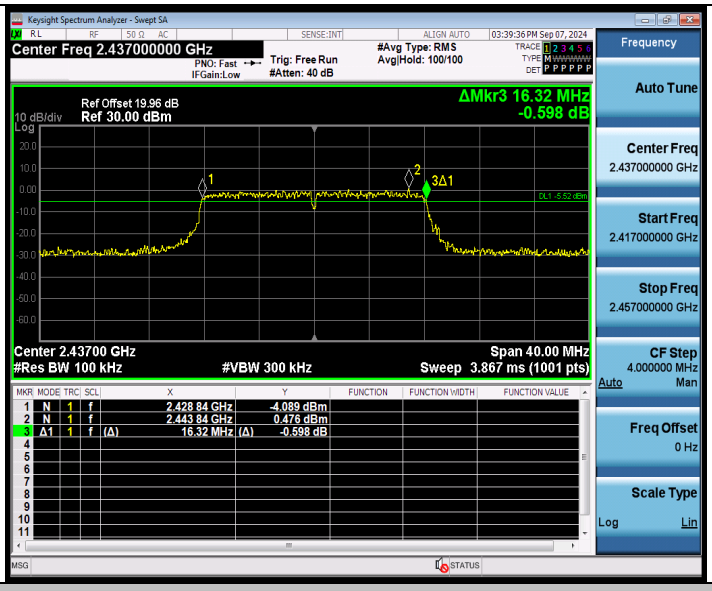

11B_Ant1_2462



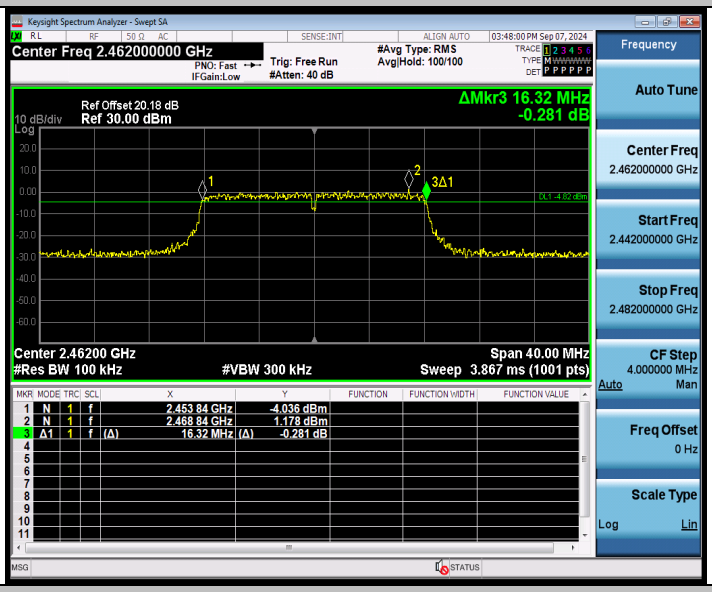

11G_Ant1_2412



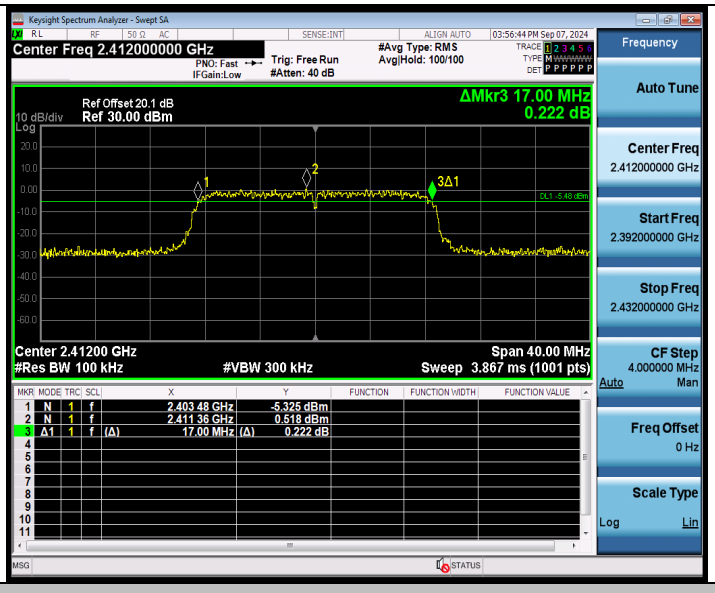

11G_Ant1_2437



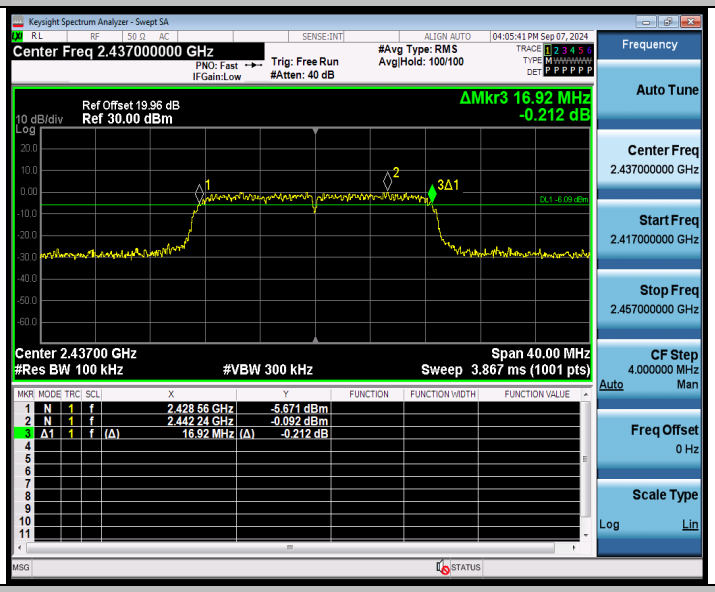

11G_Ant1_2462



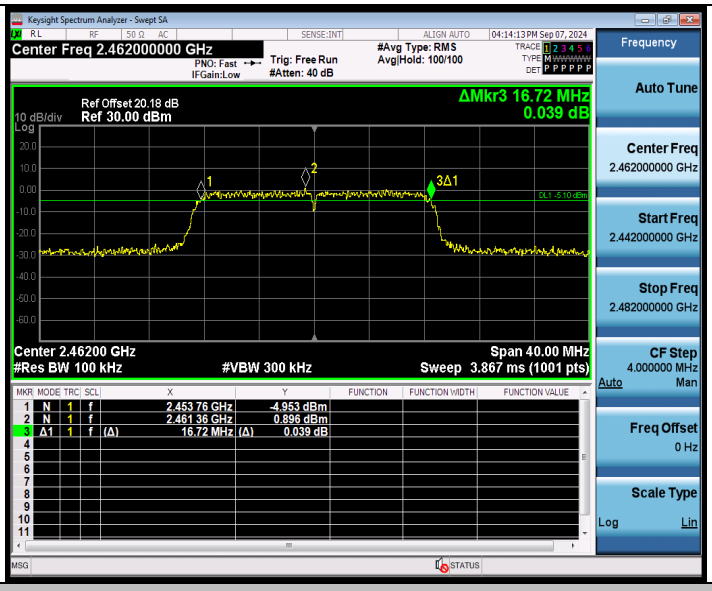

11N20SISO_Ant1_2412



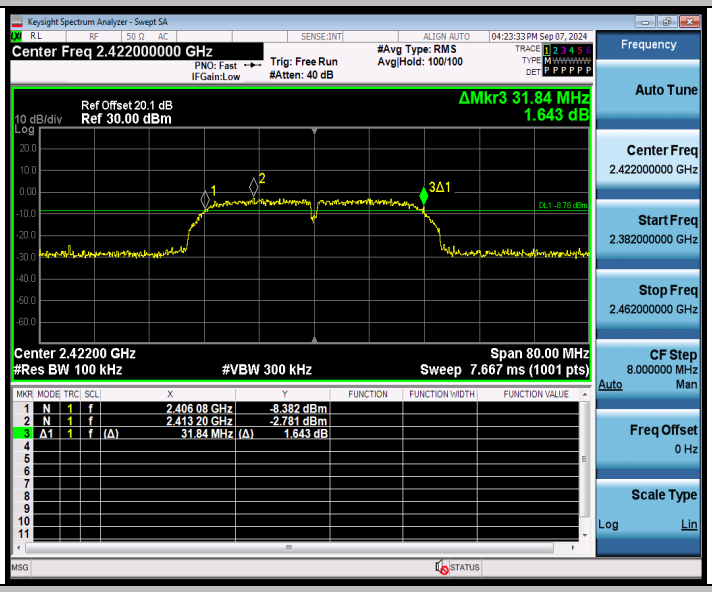

11N20SISO_Ant1_2437



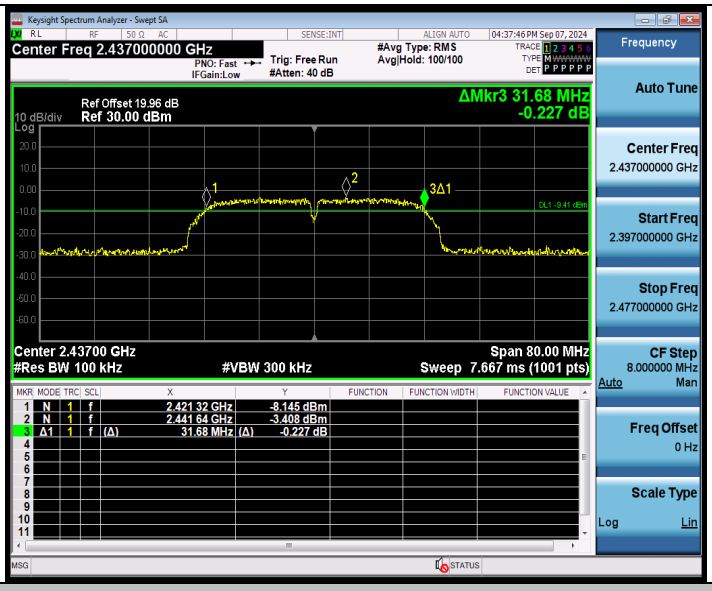

11N20SISO_Ant1_2462



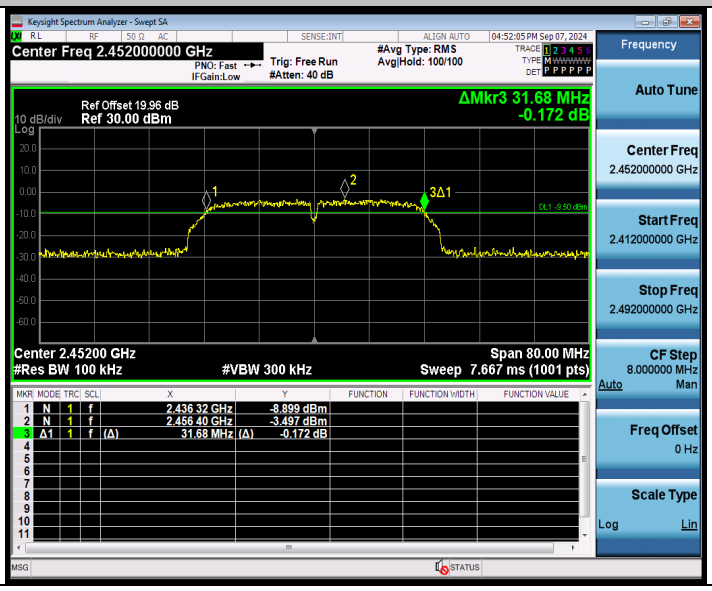

11N40SISO_Ant1_2422




11N40SISO_Ant1_2437




11N40SISO_Ant1_2452



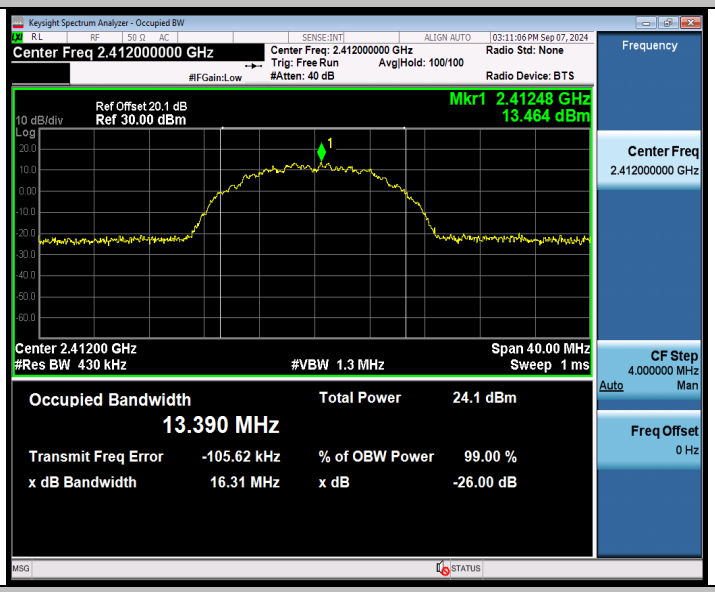
## OCCUPIED CHANNEL BANDWIDTH

## TEST RESULT

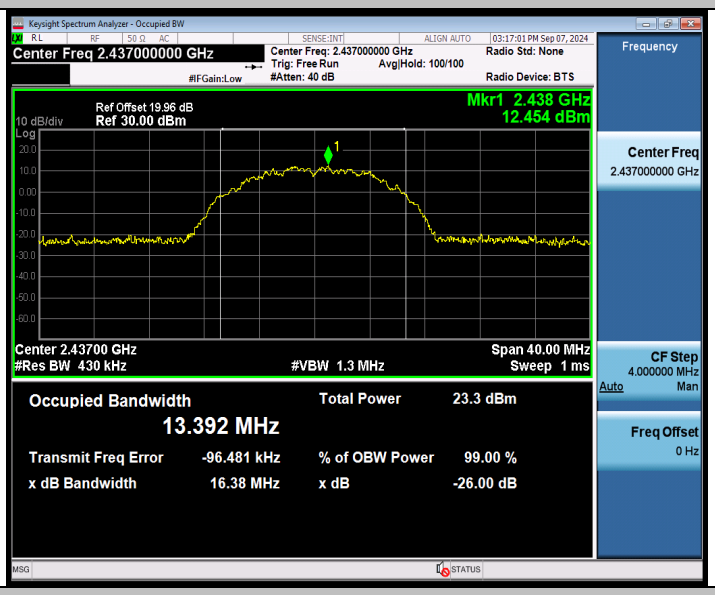
| TestMode | Antenna | Channel Frequency[MHz] | OCB [MHz] | FL[MHz] | FH[MHz] | Limit[MHz] | Verdict |
|---|---|---|---|---|---|---|---|
| 11B | Ant1 | 2412 | 13.390 | 2405.1994 | 2418.5894 | --- | --- |
| | | 2437 | 13.392 | 2430.2075 | 2443.5995 | --- | --- |
| | | 2462 | 13.385 | 2455.2267 | 2468.6117 | --- | --- |
| 11G | Ant1 | 2412 | 16.545 | 2403.7435 | 2420.2885 | --- | --- |
| | | 2437 | 16.581 | 2428.7153 | 2445.2963 | --- | --- |
| | | 2462 | 16.615 | 2453.6982 | 2470.3132 | --- | --- |
| 11N20SISO | Ant1 | 2412 | 17.319 | 2403.3147 | 2420.6337 | --- | --- |
| | | 2437 | 17.347 | 2428.3125 | 2445.6595 | --- | --- |
| | | 2462 | 17.331 | 2453.3420 | 2470.6730 | --- | --- |
| 11N40SISO | Ant1 | 2422 | 34.809 | 2404.6260 | 2439.4350 | --- | --- |
| | | 2437 | 34.785 | 2419.6181 | 2454.4031 | --- | --- |
| | | 2452 | 34.866 | 2434.6252 | 2469.4912 | --- | --- |

## TEST GRAPHS

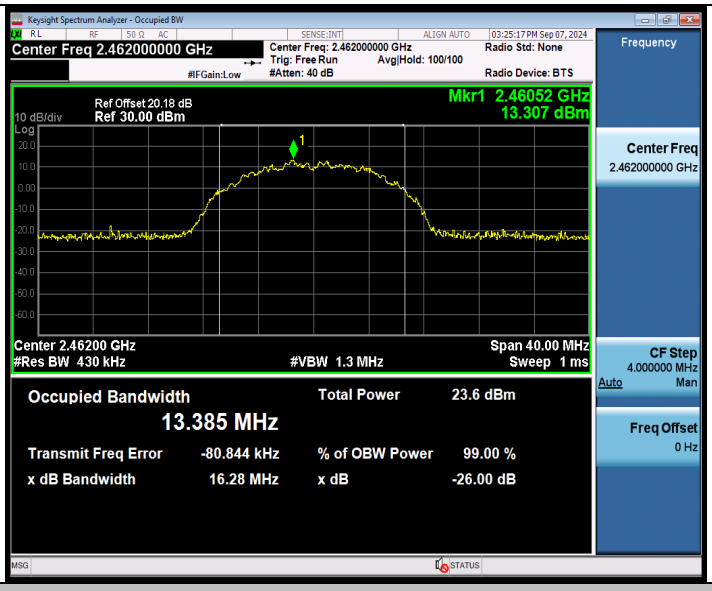
11B_Ant1_2412



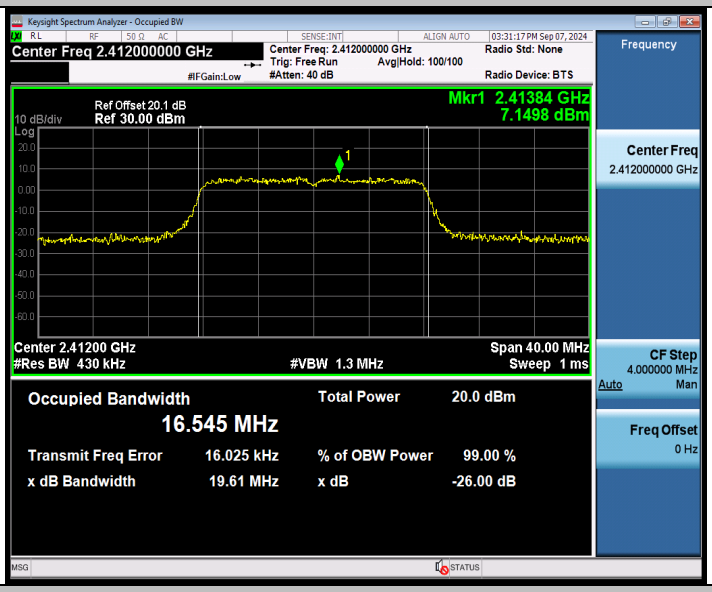

11B_Ant1_2437



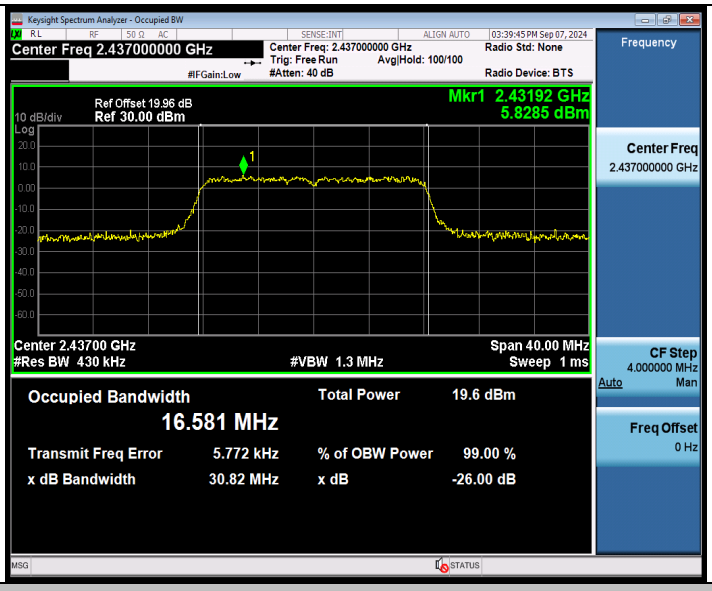

11B_Ant1_2462



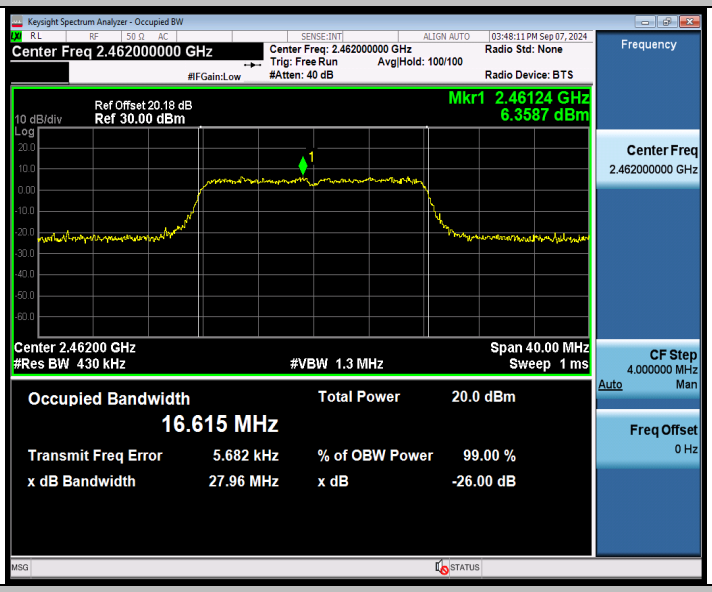

11G_Ant1_2412



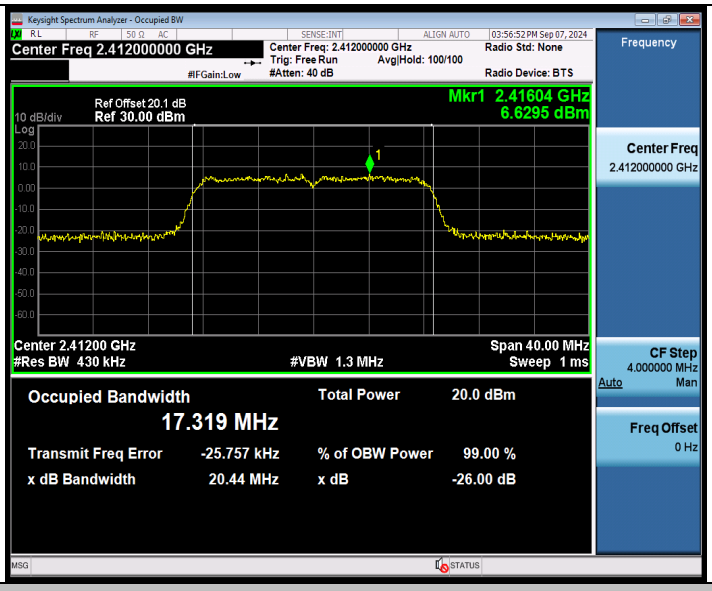

11G_Ant1_2437



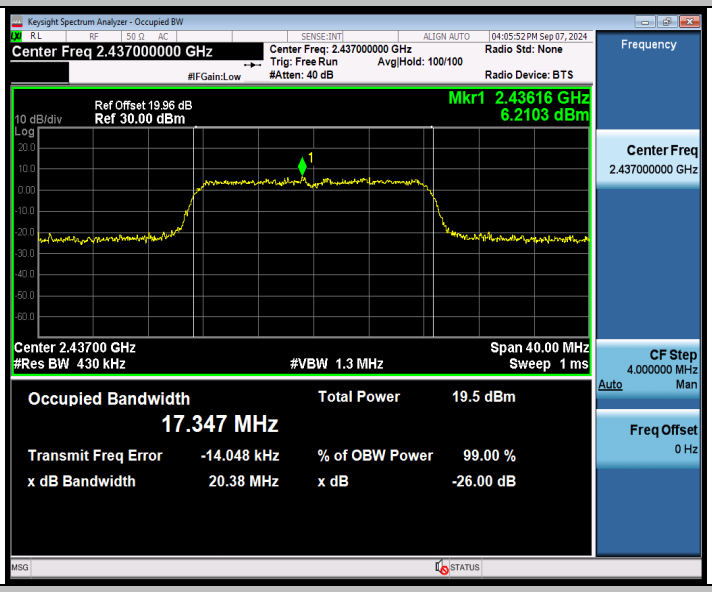

11G_Ant1_2462



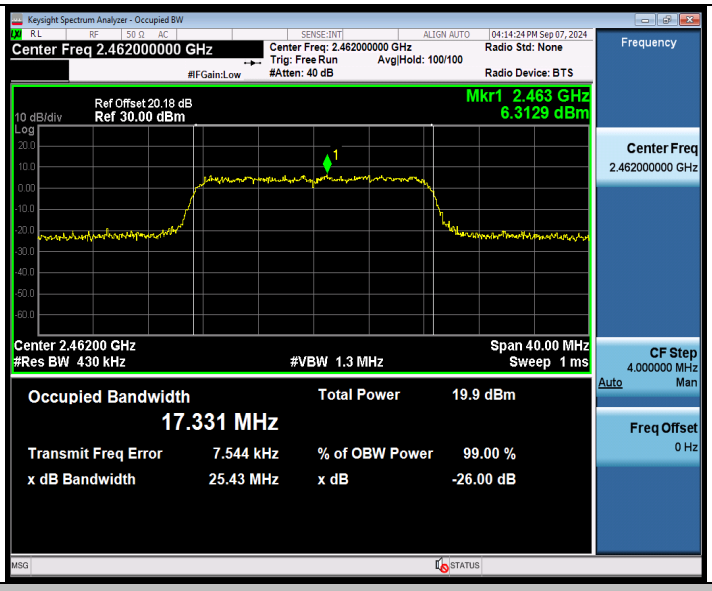

11N20SISO_Ant1_2412



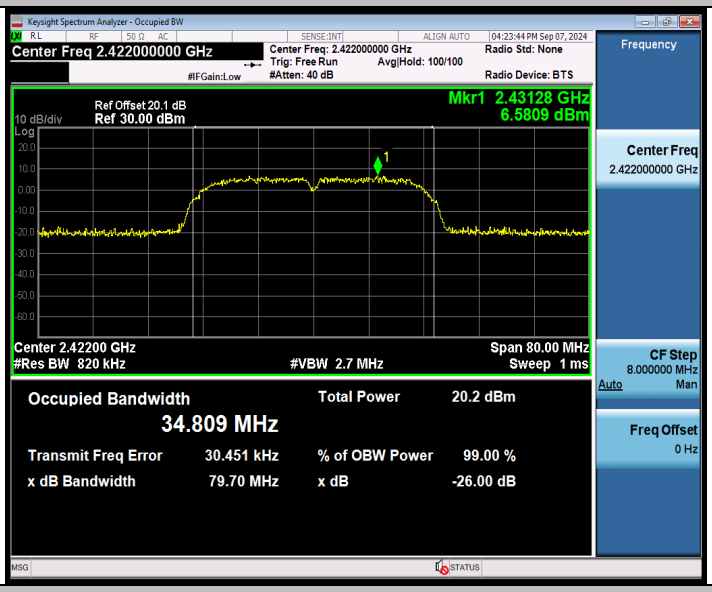

11N20SISO_Ant1_2437



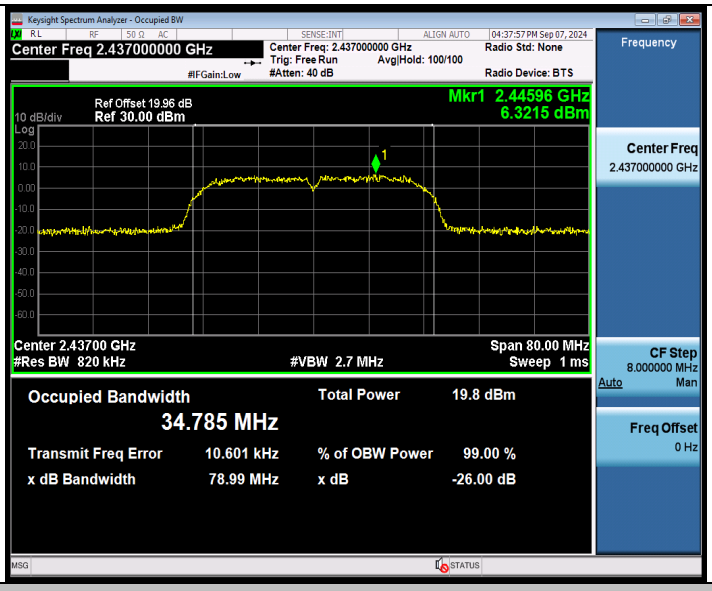

11N20SISO_Ant1_2462



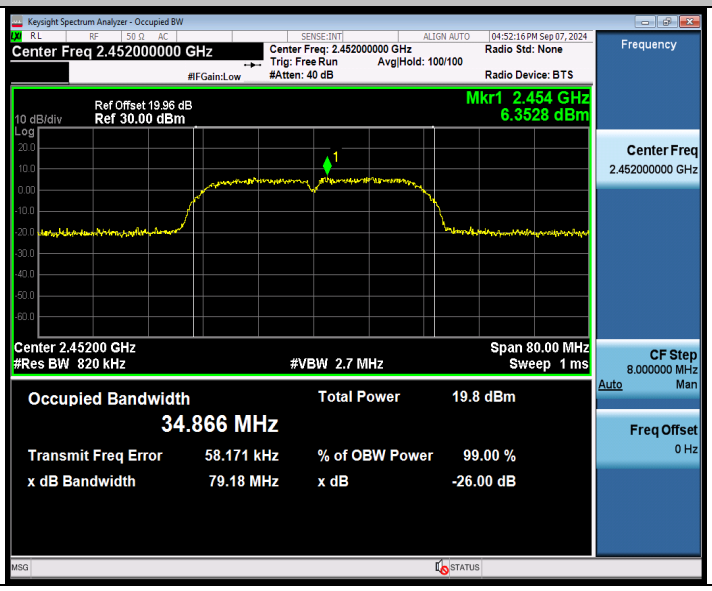

11N40SISO_Ant1_2422




11N40SISO_Ant1_2437




11N40SISO_Ant1_2452



## MAXIMUM CONDUCTED OUTPUT POWER

## TEST RESULT

| Test Mode | TX Mod. | Freq. [MHz] | Ant. | Average power [dBm] | Peak power [dBm] | Peak power [mw] | Conducted Power Limit [dBm] | EIRP power [dBm] | EIRP power [mw] | EIRP Limit [dBm] | Verdict | Power Setting |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11B | SISO | 2412 | ANT1 | 6.91 | 10.70 | 11.75 | ≤30.00 | 10.87 | 12.22 | ≤36.00 | PASS | 41 |
| | | 2437 | ANT1 | 8.47 | 12.26 | 16.81 | ≤30.00 | 12.43 | 17.50 | ≤36.00 | PASS | 41 |
| | | 2462 | ANT1 | 9.78 | 13.53 | 22.55 | ≤30.00 | 13.70 | 23.44 | ≤36.00 | PASS | 41 |
| 11G | SISO | 2412 | ANT1 | 13.87 | 19.84 | 96.38 | ≤30.00 | 20.01 | 100.23 | ≤36.00 | PASS | 8 |
| | | 2437 | ANT1 | 13.91 | 19.86 | 96.83 | ≤30.00 | 20.03 | 100.69 | ≤36.00 | PASS | 8 |
| | | 2462 | ANT1 | 13.89 | 19.75 | 94.41 | ≤30.00 | 19.92 | 98.17 | ≤36.00 | PASS | 8 |
| 11N20 | SISO | 2412 | ANT1 | 13.71 | 20.29 | 106.91 | ≤30.00 | 20.46 | 111.17 | ≤36.00 | PASS | 8 |
| | | 2437 | ANT1 | 13.61 | 20.19 | 104.47 | ≤30.00 | 20.36 | 108.64 | ≤36.00 | PASS | 8 |
| | | 2462 | ANT1 | 13.55 | 20.13 | 103.04 | ≤30.00 | 20.30 | 107.15 | ≤36.00 | PASS | 8 |
| 11N40 | SISO | 2422 | ANT1 | 13.31 | 19.74 | 94.19 | ≤30.00 | 19.91 | 97.95 | ≤36.00 | PASS | 8 |
| | | 2437 | ANT1 | 13.1 | 19.42 | 87.50 | ≤30.00 | 19.59 | 90.99 | ≤36.00 | PASS | 8 |
| | | 2452 | ANT1 | 13.04 | 19.39 | 86.90 | ≤30.00 | 19.56 | 90.36 | ≤36.00 | PASS | 8 |
| Note:The Average power with duty cycle factor. | | | | | | | | | | | | |

## MAXIMUM POWER SPECTRAL DENSITY

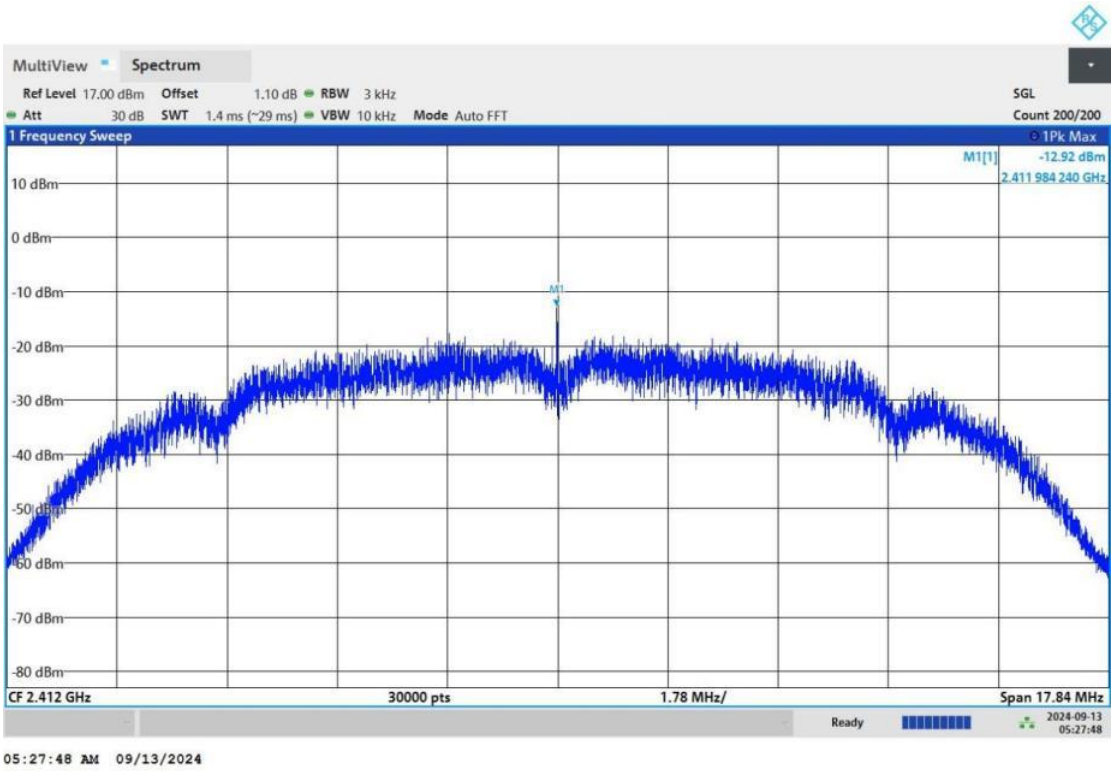
## TEST RESULT

| TestMode | Antenna | Frequency[MHz] | Result[dBm/3-100kHz] | Limit[dBm/3kHz] | Verdict |
|---|---|---|---|---|---|
| 11B | Ant1 | 2412 | -12.92 | ≤8.00 | PASS |
| | | 2437 | -13.14 | ≤8.00 | PASS |
| | | 2462 | -12.77 | ≤8.00 | PASS |
| 11G | Ant1 | 2412 | -14.14 | ≤8.00 | PASS |
| | | 2437 | -14.44 | ≤8.00 | PASS |
| | | 2462 | -14.16 | ≤8.00 | PASS |

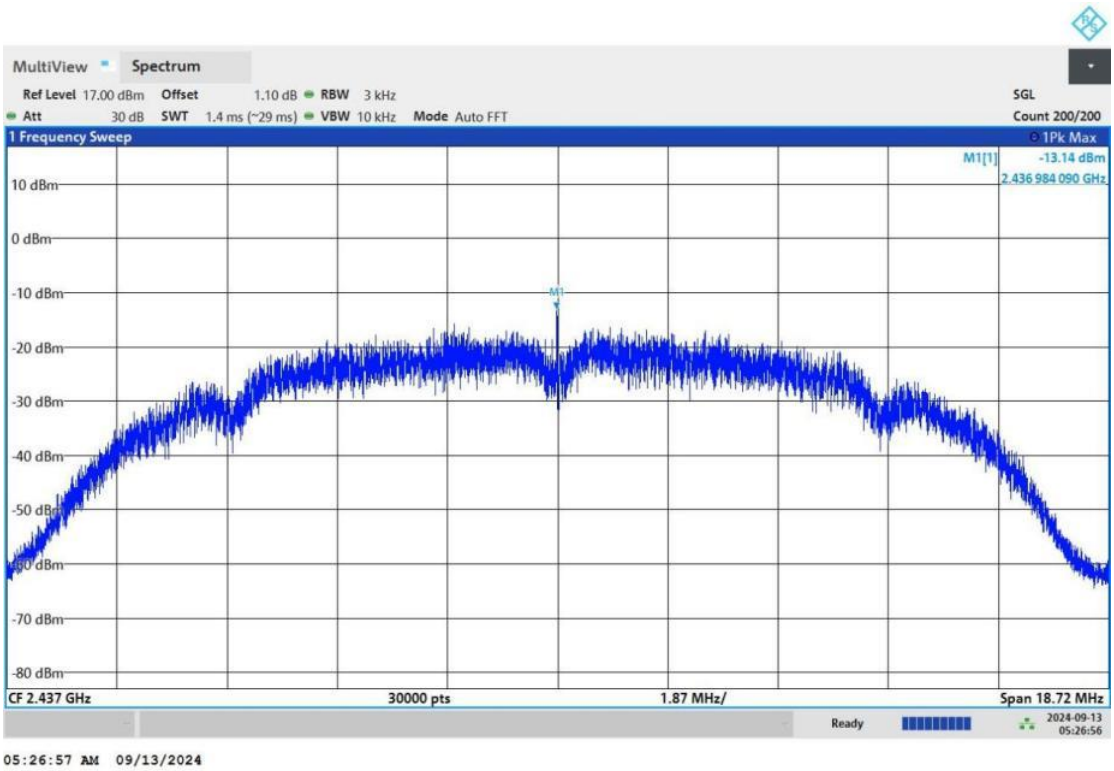
| | | | | | |
|---|---|---|---|---|---|
| 11N20SISO | Ant1 | 2412 | -13.94 | ≤8.00 | PASS |
| | | 2437 | -14.18 | ≤8.00 | PASS |
| | | 2462 | -13.76 | ≤8.00 | PASS |
| 11N40SISO | Ant1 | 2422 | -15.02 | ≤8.00 | PASS |
| | | 2437 | -15.39 | ≤8.00 | PASS |
| | | 2452 | -15.30 | ≤8.00 | PASS |

## TEST GRAPHS

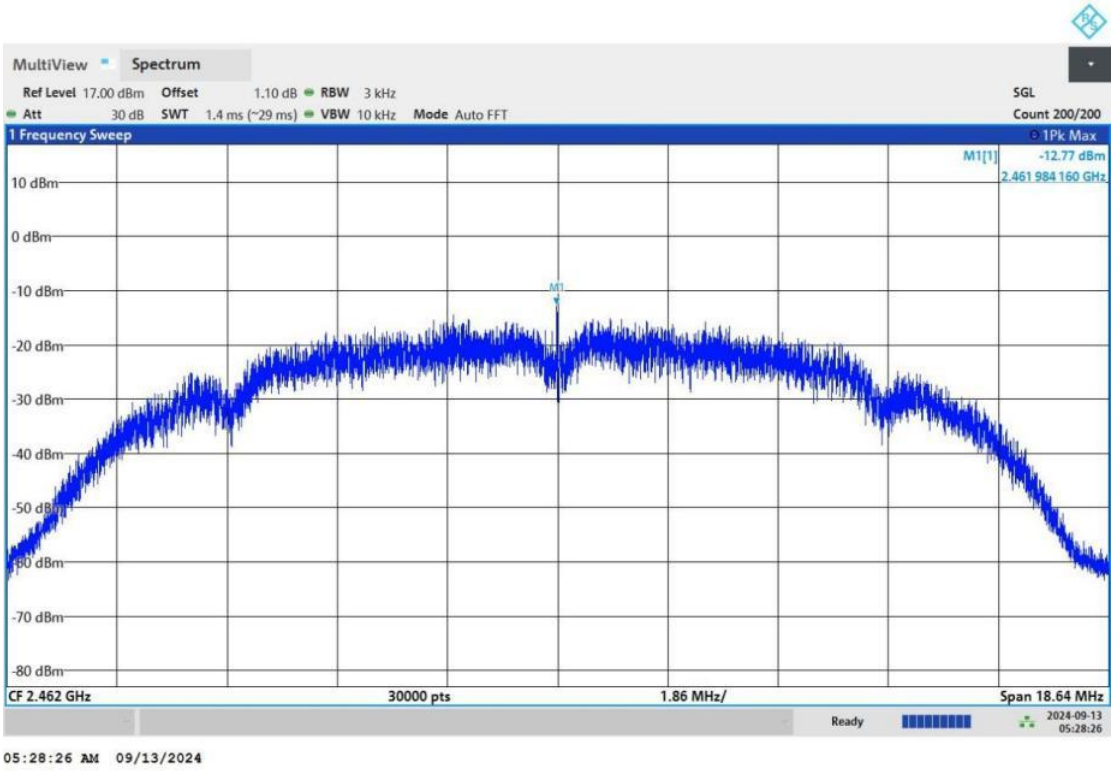
11B_Ant1_2412



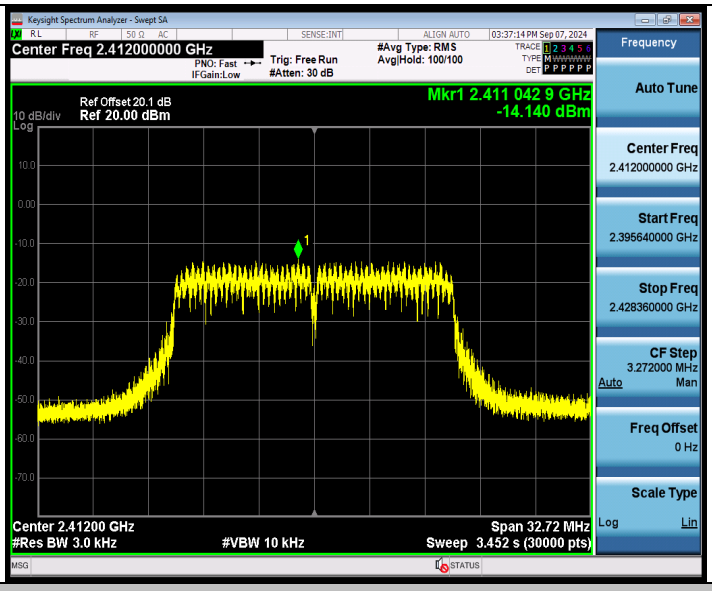

11B_Ant1_2437



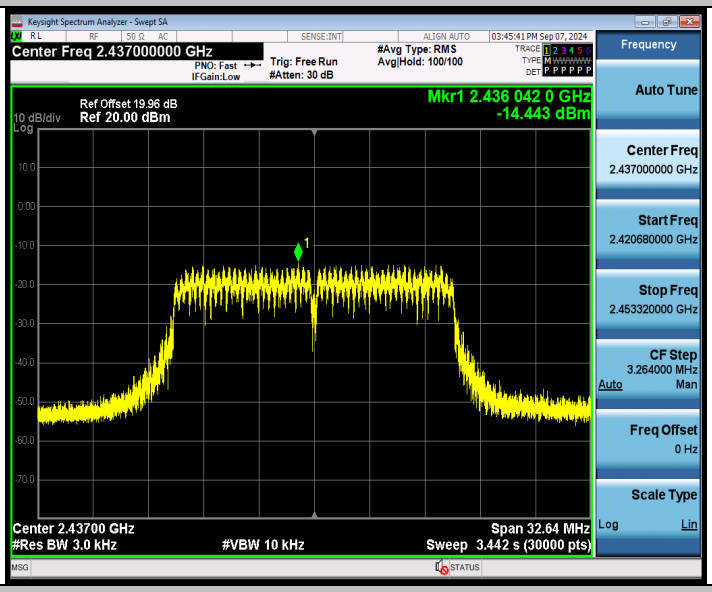

11B_Ant1_2462



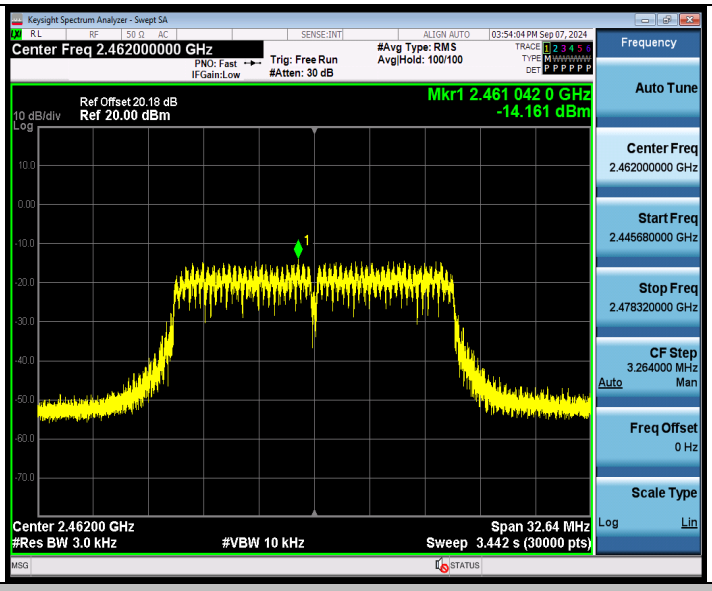

11G_Ant1_2412



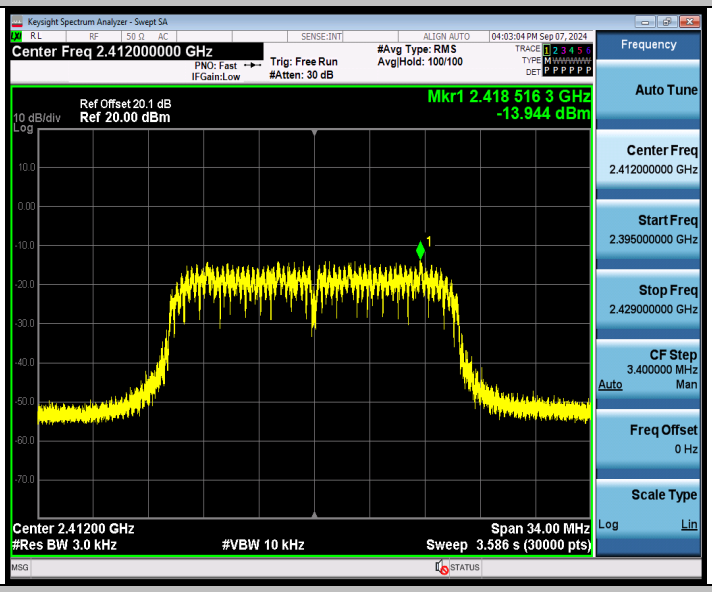

11G_Ant1_2437



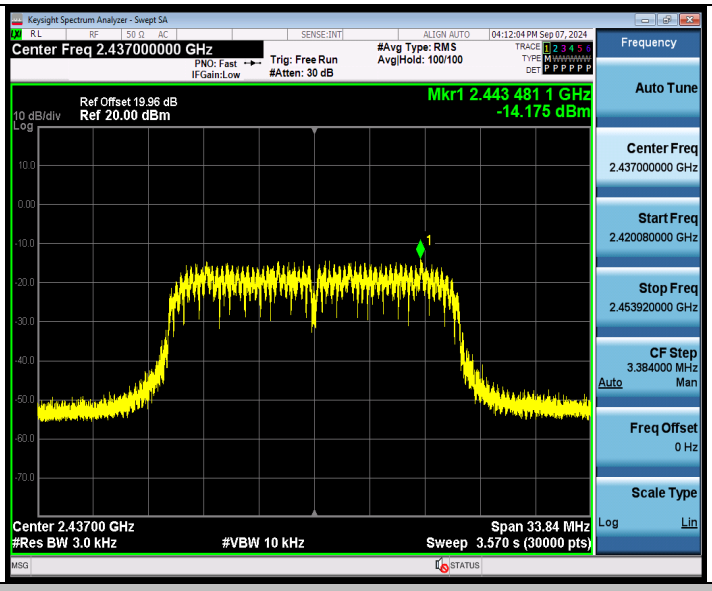

11G_Ant1_2462



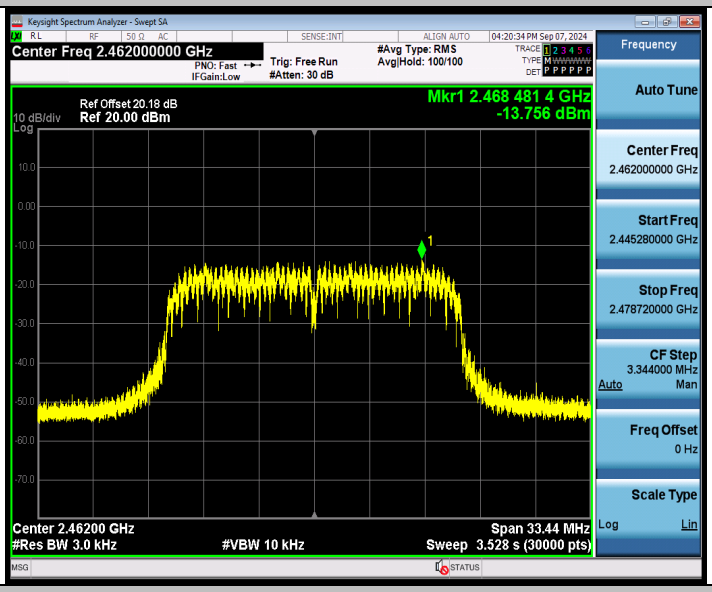

11N20SISO_Ant1_2412



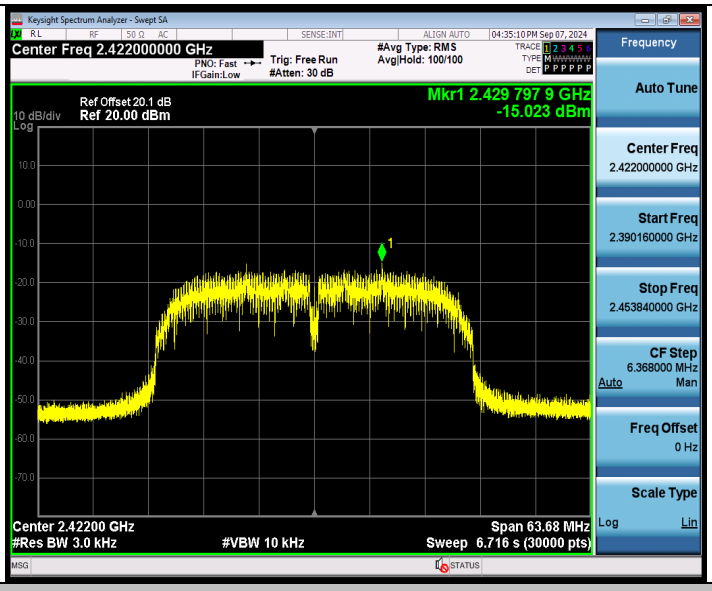

11N20SISO_Ant1_2437



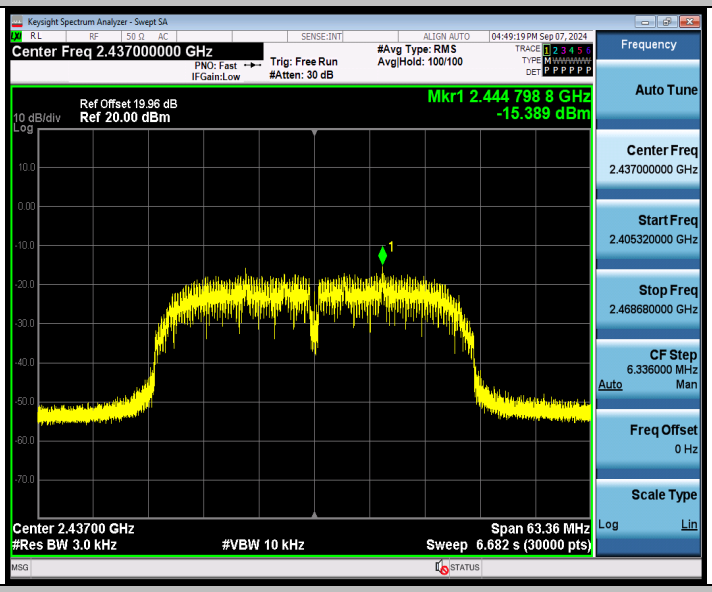

11N20SISO_Ant1_2462



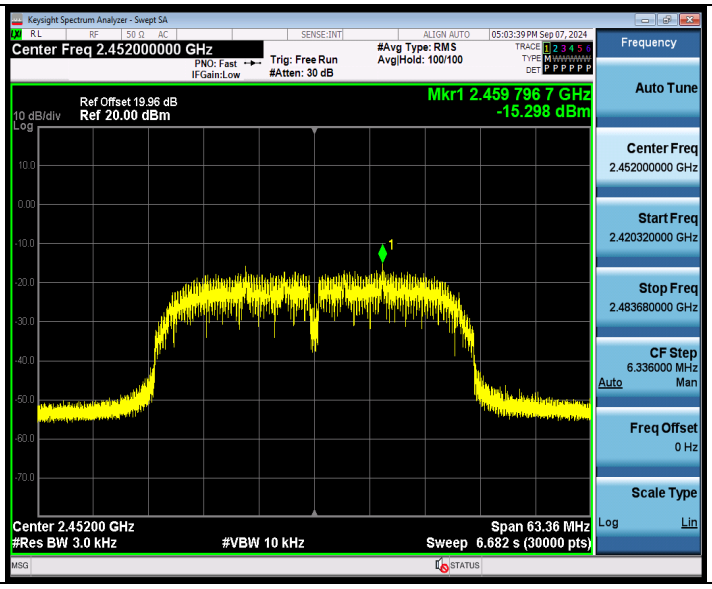

11N40SISO_Ant1_2422




11N40SISO_Ant1_2437




11N40SISO_Ant1_2452


Keysight Spectrum Analyzer - Swept SA
Center Freq 2.452000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold: 100/100
05:03:39 PM Sep 07, 2024
Ref Offset 19.96 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.459 796 7 GHz
-15.298 dBm
Center 2.45200 GHz
#Res BW 3.0 kHz
#VBW 10 kHz
Span 63.36 MHz
Sweep 6.682 s (30000 pts)
Frequency
Auto Tune
Center Freq
2.452000000 GHz
Start Freq
2.420320000 GHz
Stop Freq
2.483680000 GHz
CF Step
6.336000 MHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin

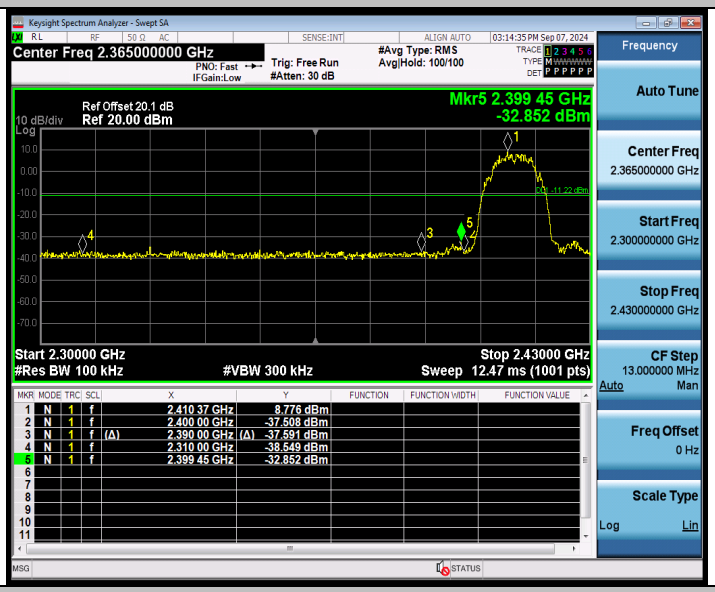
## BAND EDGE MEASUREMENTS

## TEST RESULT

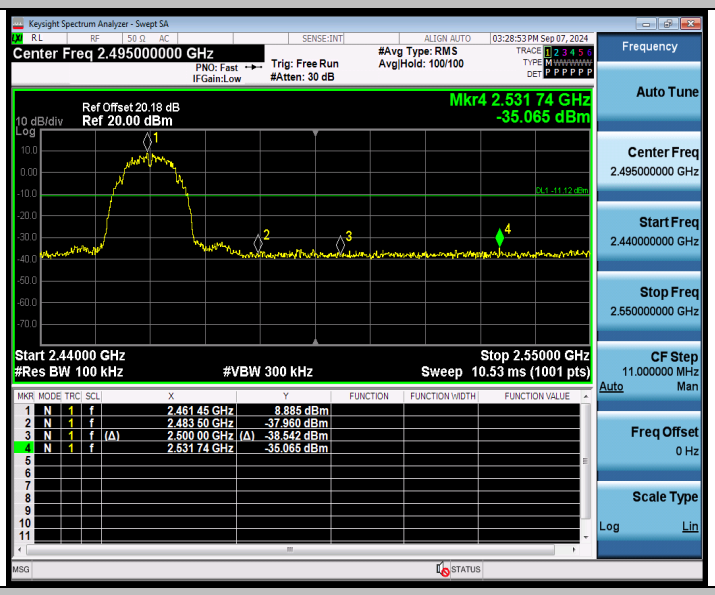
| TestMode | Antenna | ChName | Frequency[MHz] | RefLevel[dBm] | Result[dBm] | Limit[dBm] | Verdict |
|---|---|---|---|---|---|---|---|
| 11B | Ant1 | Low | 2412 | 8.78 | -32.85 | ≤-11.22 | PASS |
| | | High | 2462 | 8.89 | -35.07 | ≤-11.12 | PASS |
| 11G | Ant1 | Low | 2412 | 0.85 | -35.15 | ≤-19.15 | PASS |
| | | High | 2462 | 0.28 | -34.65 | ≤-19.72 | PASS |
| 11N20SISO | Ant1 | Low | 2412 | 0.06 | -34.42 | ≤-19.94 | PASS |
| | | High | 2462 | 0.39 | -34.15 | ≤-19.61 | PASS |
| 11N40SISO | Ant1 | Low | 2422 | -2.62 | -35.31 | ≤-22.62 | PASS |
| | | High | 2452 | -3.27 | -35.41 | ≤-23.27 | PASS |

## TEST GRAPHS

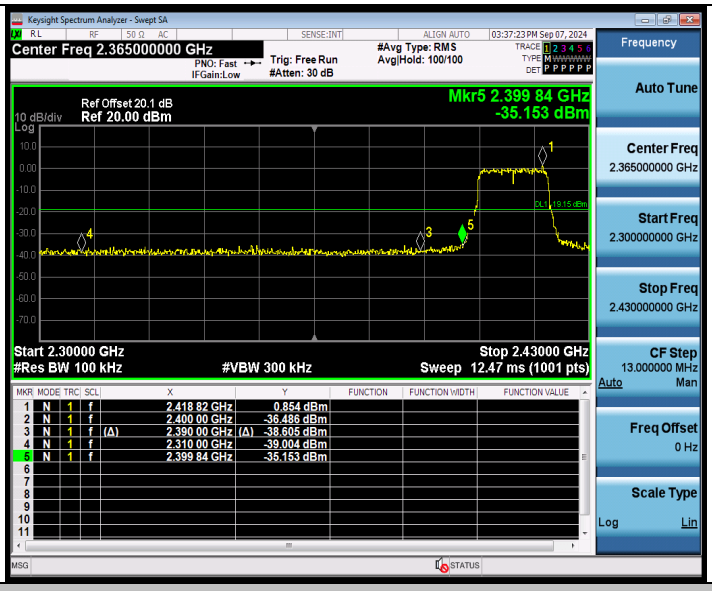
11B_Ant1_Low_2412



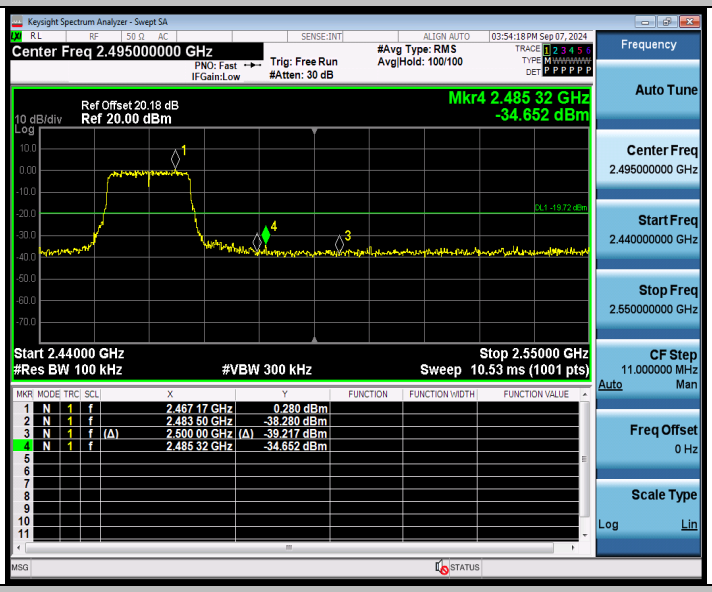

11B_Ant1_High_2462



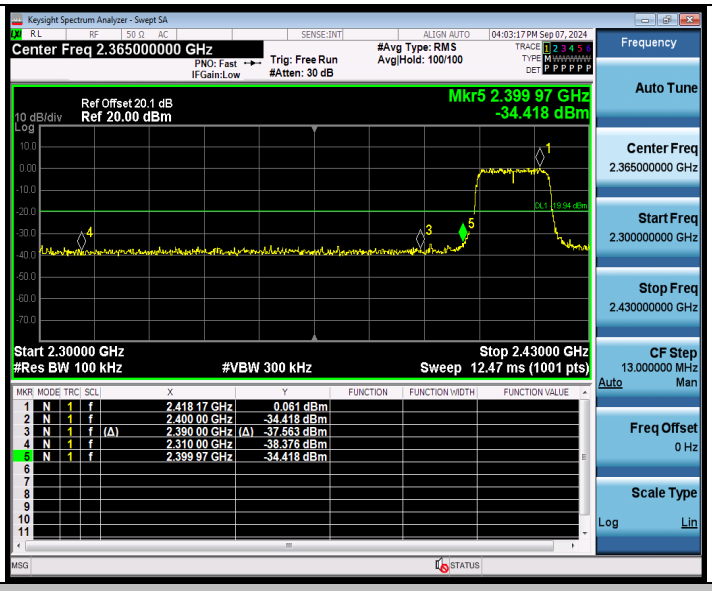

11G_Ant1_Low_2412



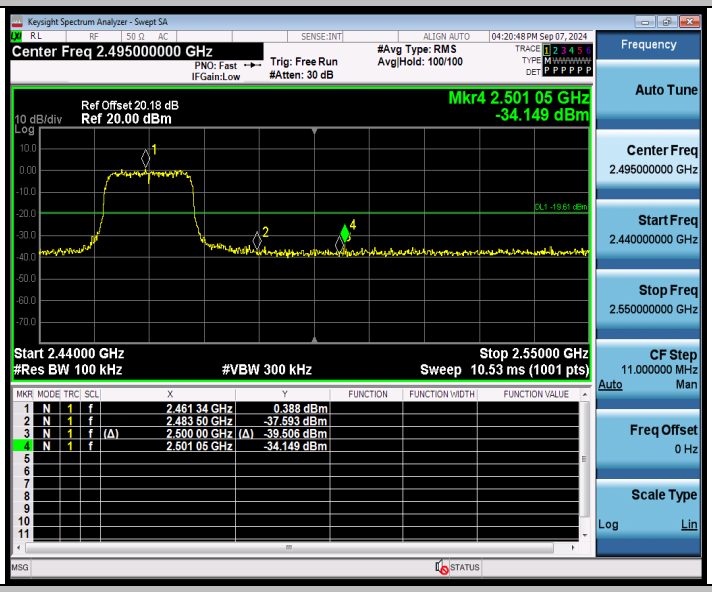

11G_Ant1_High_2462



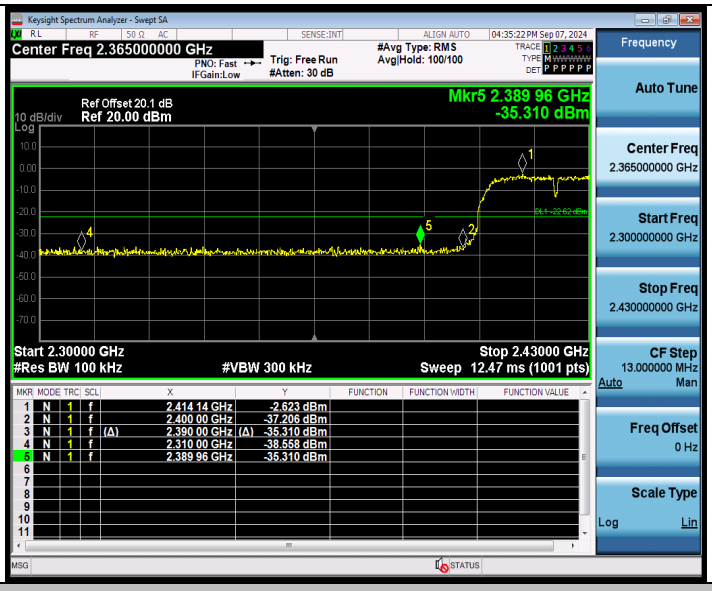

11N20SISO_Ant1_Low_2412



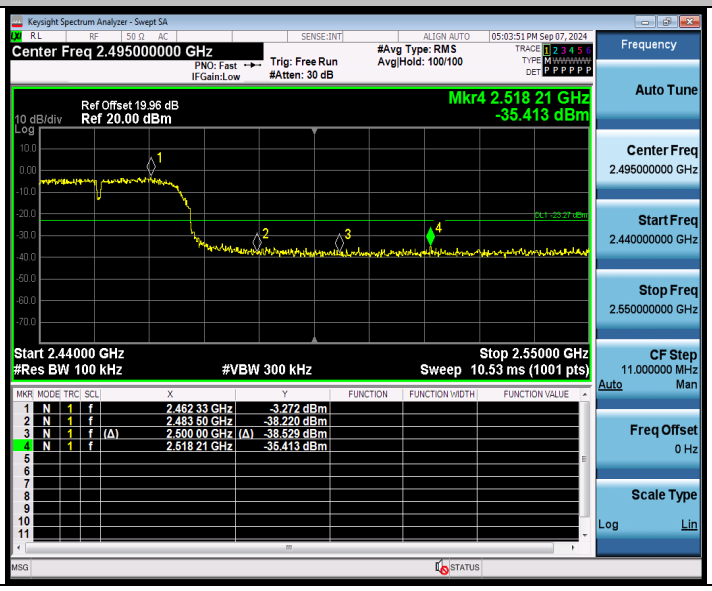

11N20SISO_Ant1_High_2462




11N40SISO_Ant1_Low_2422




11N40SISO_Ant1_High_2452



## CONDUCTED SPURIOUS EMISSION

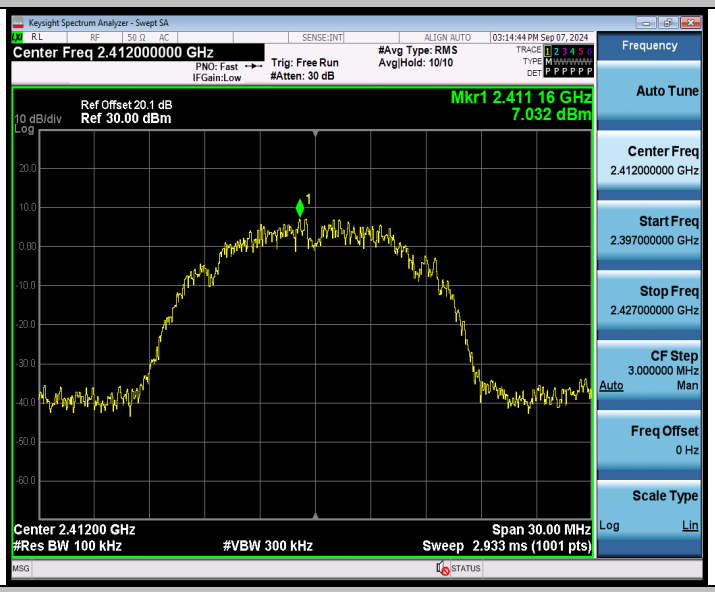
## TEST RESULT

| TestMode | Antenna | Frequency[MHz] | FreqRange [Mhz] | RefLevel [dBm] | Result [dBm] | Limit [dBm] | Verdict |
|---|---|---|---|---|---|---|---|
| 11B | Ant1 | 2412 | Reference | 7.03 | 7.03 | --- | PASS |
| | | | 30~1000 | 7.03 | -52.98 | ≤-12.97 | PASS |
| | | | 1000~26500 | 7.03 | -23.19 | ≤-12.97 | PASS |
| | | 2437 | Reference | 8.02 | 8.02 | --- | PASS |
| | | | 30~1000 | 8.02 | -52.26 | ≤-11.98 | PASS |
| | | | 1000~26500 | 8.02 | -24.43 | ≤-11.98 | PASS |
| | | 2462 | Reference | 8.04 | 8.04 | --- | PASS |
| | | | 30~1000 | 8.04 | -53.04 | ≤-11.96 | PASS |
| | | | 1000~26500 | 8.04 | -22.64 | ≤-11.96 | PASS |
| 11G | Ant1 | 2412 | Reference | -0.84 | -0.84 | --- | PASS |
| | | | 30~1000 | -0.84 | -53.94 | ≤-20.84 | PASS |
| | | | 1000~26500 | -0.84 | -35.2 | ≤-20.84 | PASS |
| | | 2437 | Reference | -1.08 | -1.08 | --- | PASS |
| | | | 30~1000 | -1.08 | -54.24 | ≤-21.08 | PASS |
| | | | 1000~26500 | -1.08 | -35.34 | ≤-21.08 | PASS |
| | | 2462 | Reference | -0.48 | -0.48 | --- | PASS |
| | | | 30~1000 | -0.48 | -54.04 | ≤-20.48 | PASS |
| | | | 1000~26500 | -0.48 | -34.73 | ≤-20.48 | PASS |
| 11N20SISO | Ant1 | 2412 | Reference | 0.00 | 0.00 | --- | PASS |
| | | | 30~1000 | 0.00 | -54.5 | ≤-20 | PASS |
| | | | 1000~26500 | 0.00 | -34.9 | ≤-20 | PASS |
| | | 2437 | Reference | 0.06 | 0.06 | --- | PASS |
| | | | 30~1000 | 0.06 | -54.01 | ≤-19.94 | PASS |
| | | | 1000~26500 | 0.06 | -35.95 | ≤-19.94 | PASS |
| | | 2462 | Reference | -0.14 | -0.14 | --- | PASS |
| | | | 30~1000 | -0.14 | -53.32 | ≤-20.14 | PASS |
| | | | 1000~26500 | -0.14 | -35.23 | ≤-20.14 | PASS |
| 11N40SISO | Ant1 | 2422 | Reference | -3.57 | -3.57 | --- | PASS |
| | | | 30~1000 | -3.57 | -53.4 | ≤-23.57 | PASS |
| | | | 1000~26500 | -3.57 | -35.84 | ≤-23.57 | PASS |

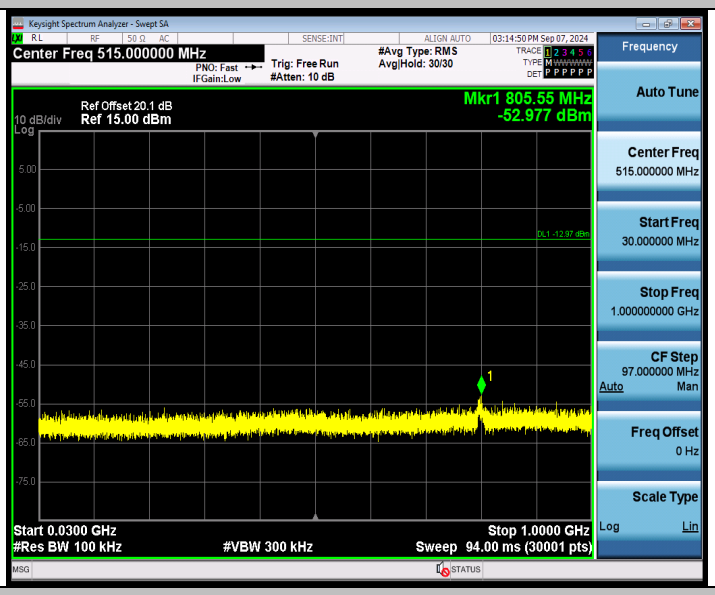
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | 2437 | Reference | -3.68 | -3.68 | --- | PASS |
| | | | 30~1000 | -3.68 | -53.81 | ≤-23.68 | PASS |
| | | | 1000~26500 | -3.68 | -34.55 | ≤-23.68 | PASS |
| | | 2452 | Reference | -3.84 | -3.84 | --- | PASS |
| | | | 30~1000 | -3.84 | -53.39 | ≤-23.84 | PASS |
| | | | 1000~26500 | -3.84 | -35.63 | ≤-23.84 | PASS |

## TEST GRAPHS

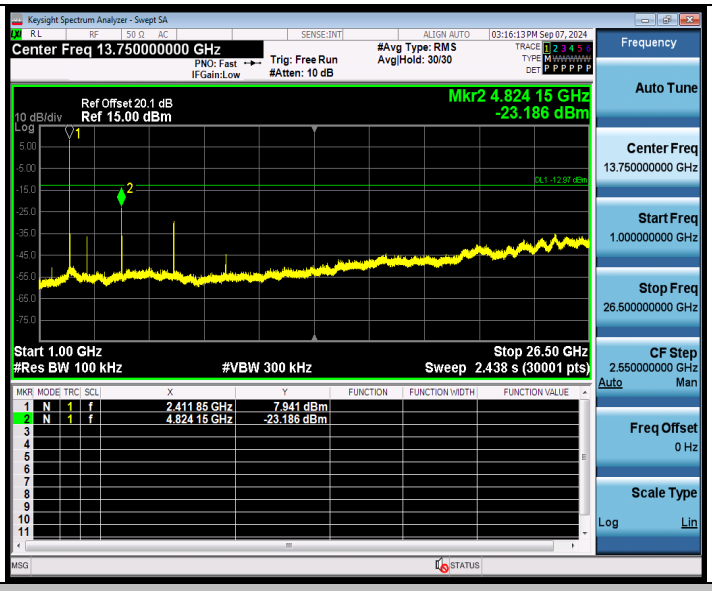
11B_Ant1_2412_0~Reference




11B_Ant1_2412_30~1000

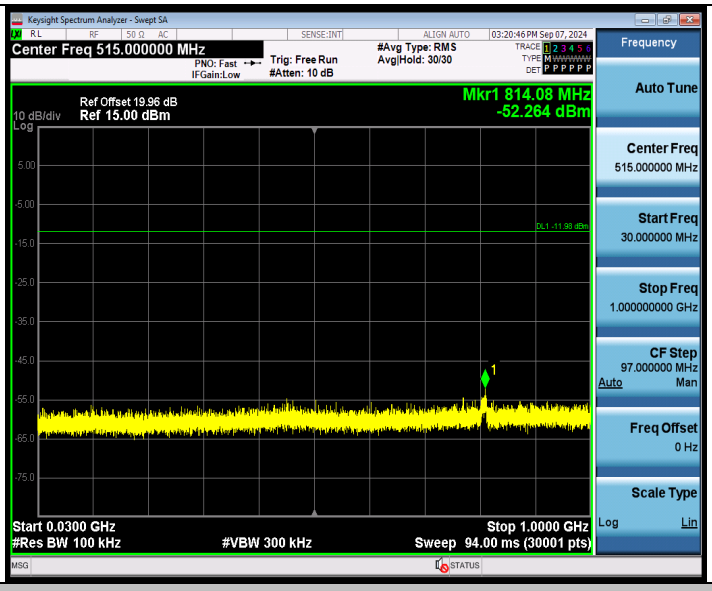



11B_Ant1_2412_1000~26500

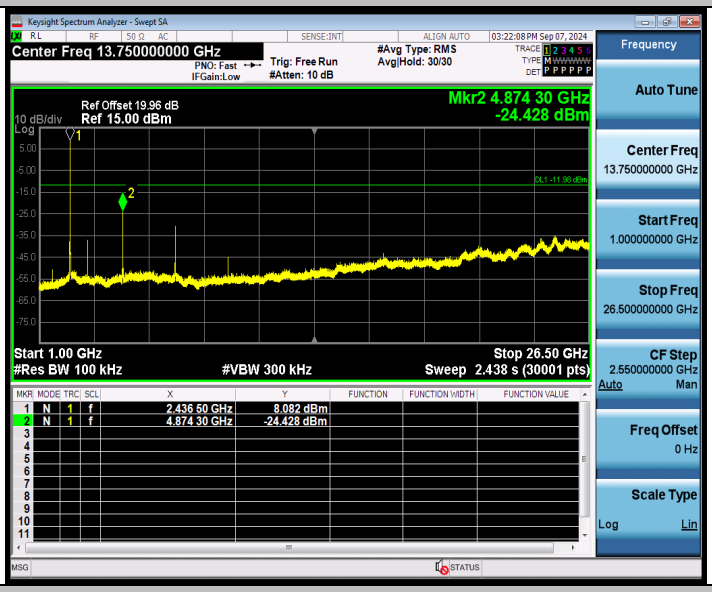



11B_Ant1_2437_0~Reference

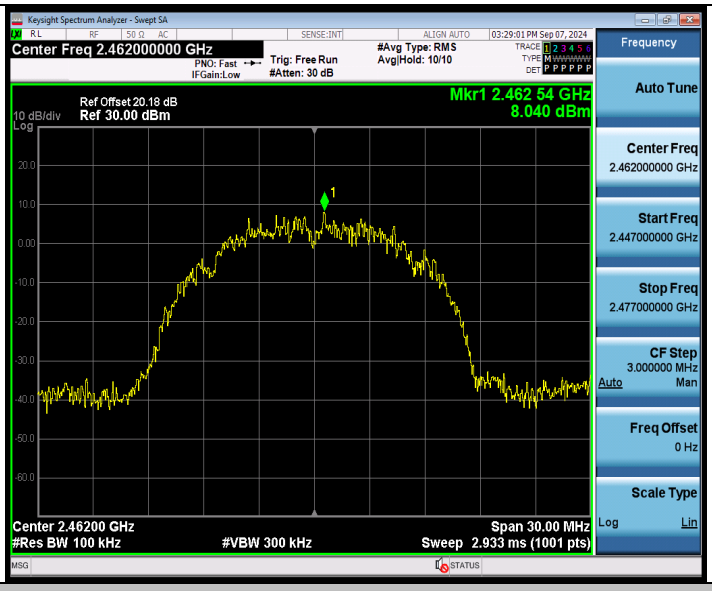
11B_Ant1_2437_30~1000



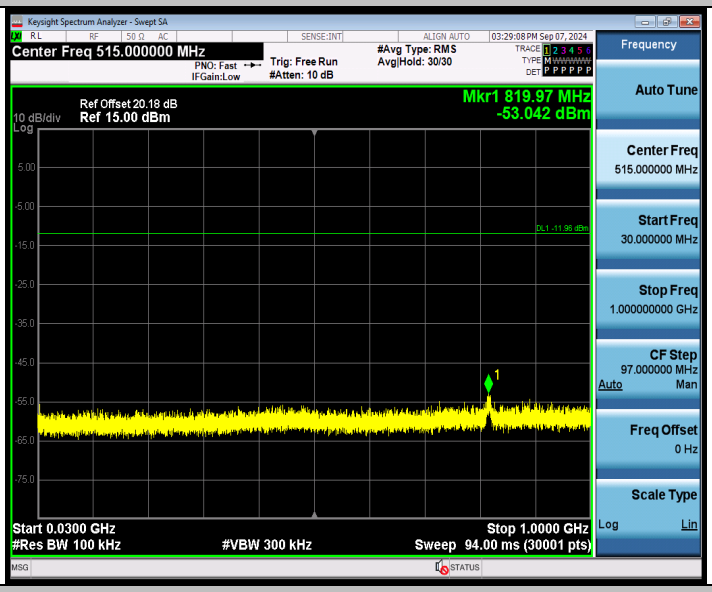

11B_Ant1_2437_1000~26500



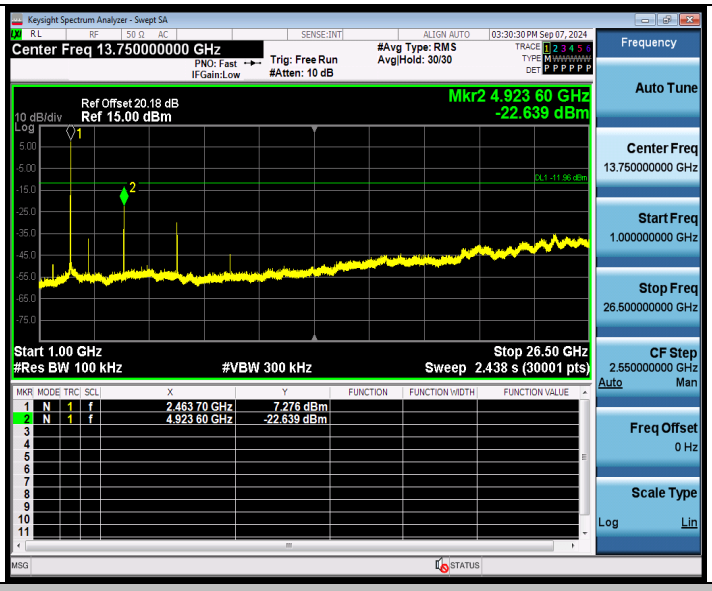

11B_Ant1_2462_0~Reference



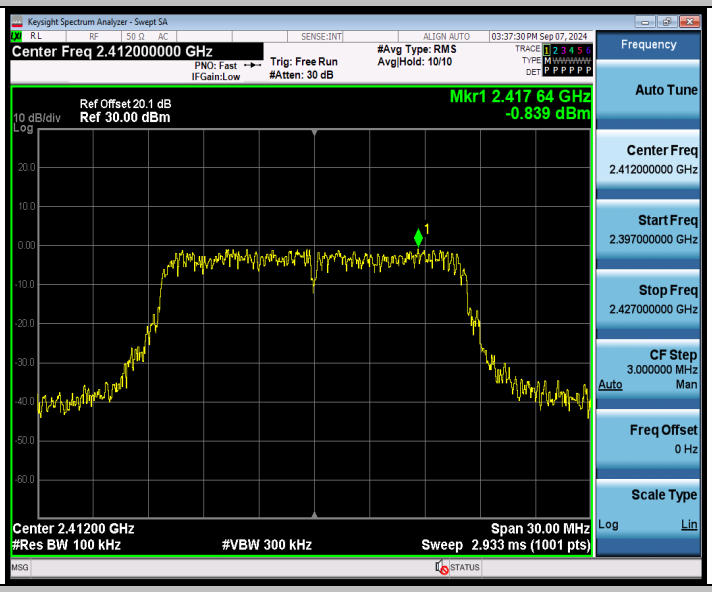

11B_Ant1_2462_30~1000



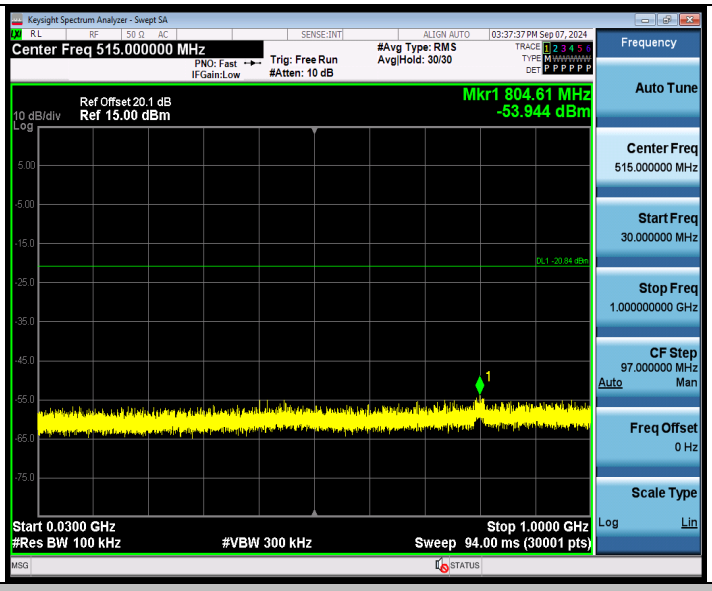

11B_Ant1_2462_1000~26500



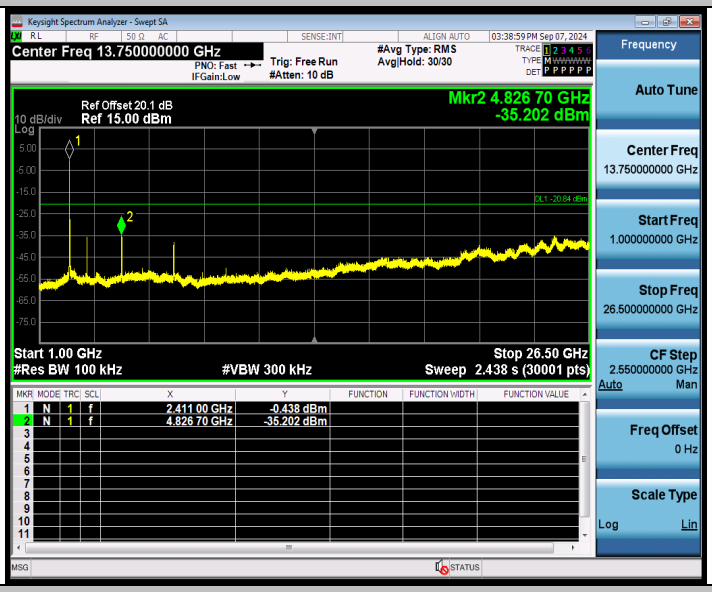

11G_Ant1_2412_0~Reference



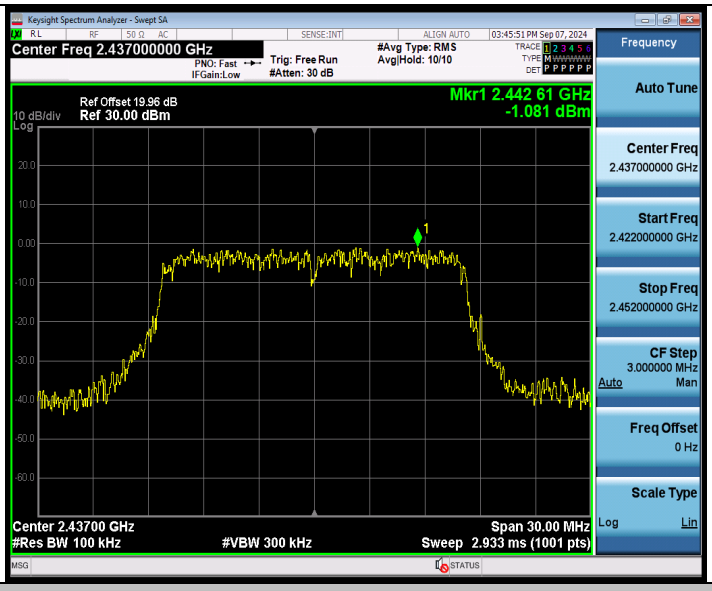

11G_Ant1_2412_30~1000



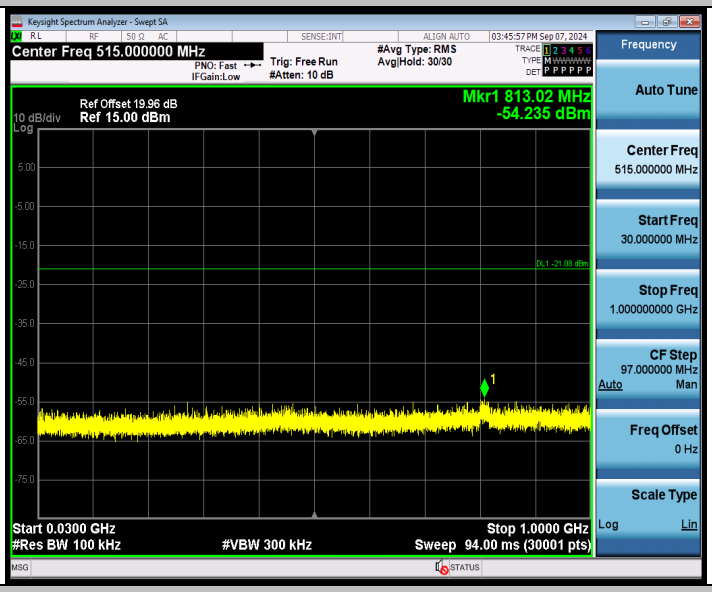

11G_Ant1_2412_1000~26500



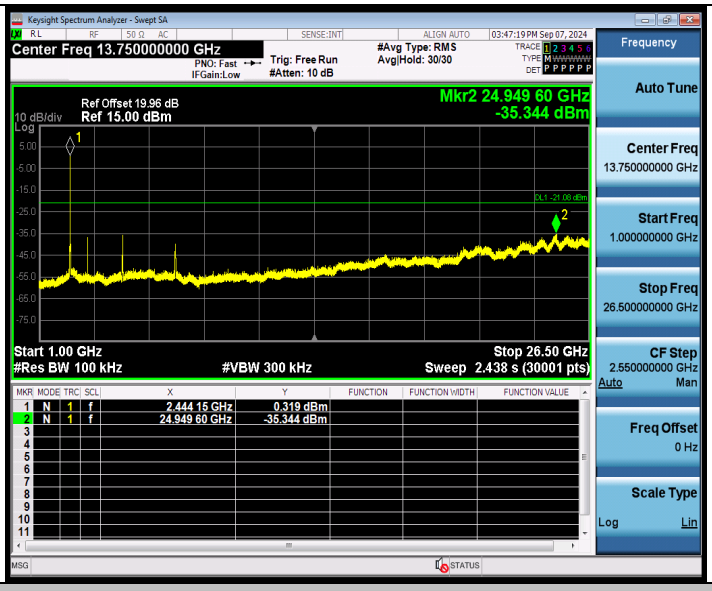

11G_Ant1_2437_0~Reference



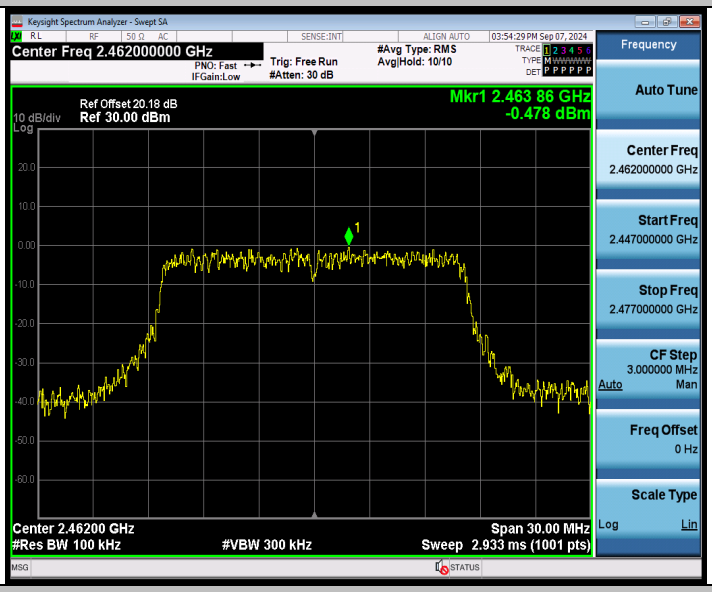

11G_Ant1_2437_30~1000



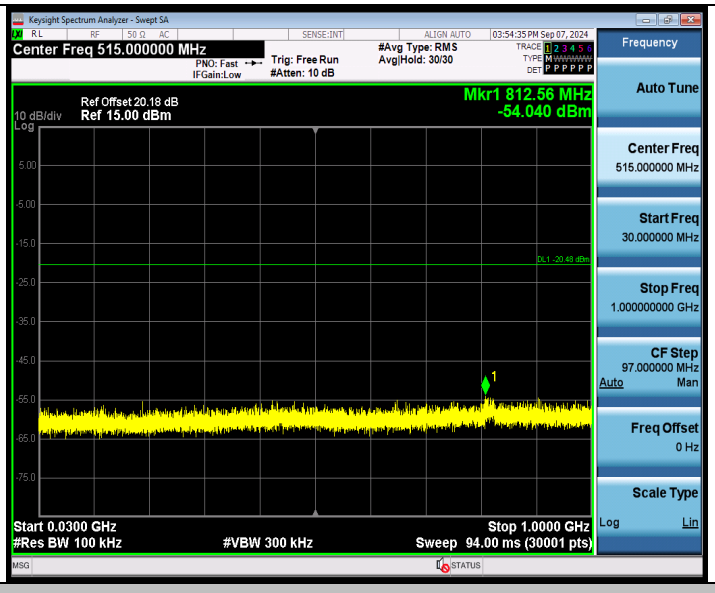

11G_Ant1_2437_1000~26500



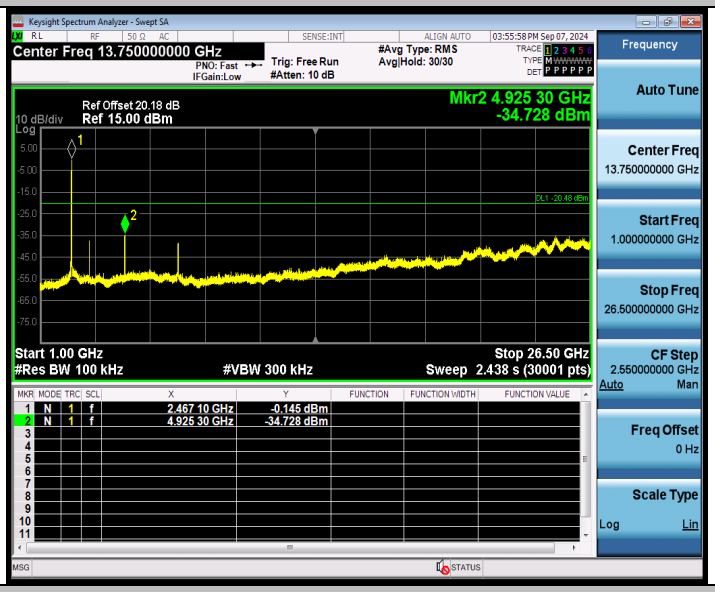

11G_Ant1_2462_0~Reference



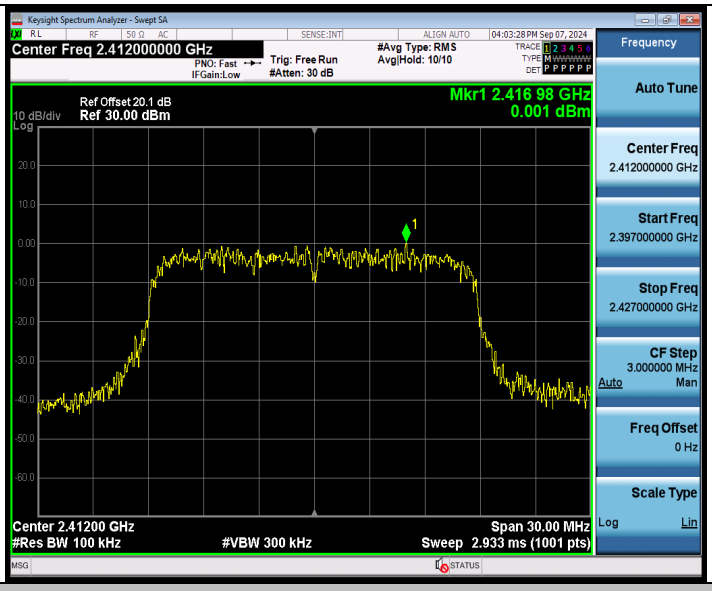

11G_Ant1_2462_30~1000



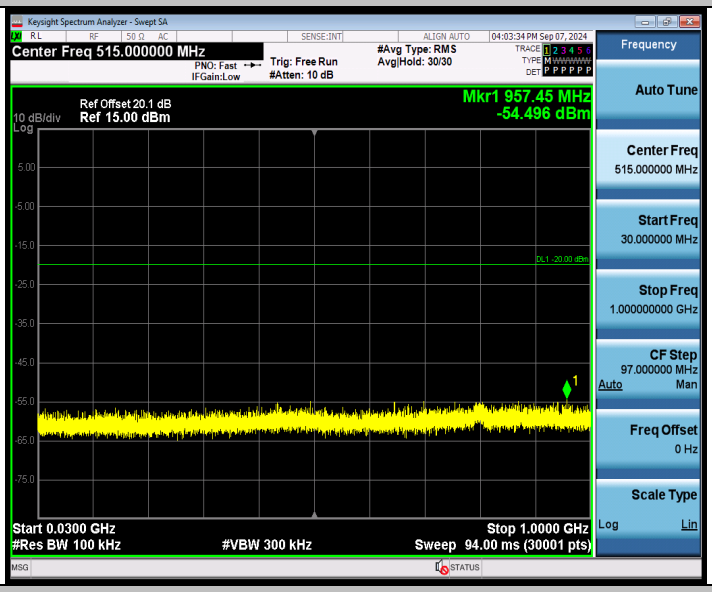

11G_Ant1_2462_1000~26500



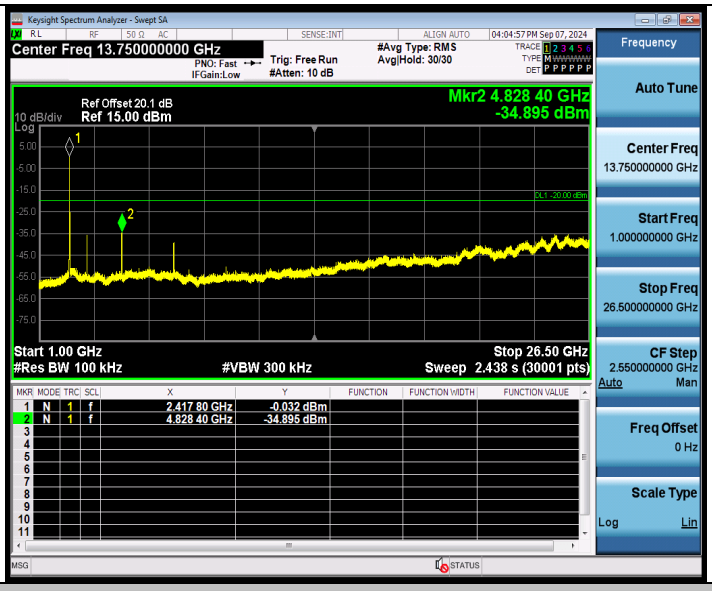

11N20SISO_Ant1_2412_0~Reference



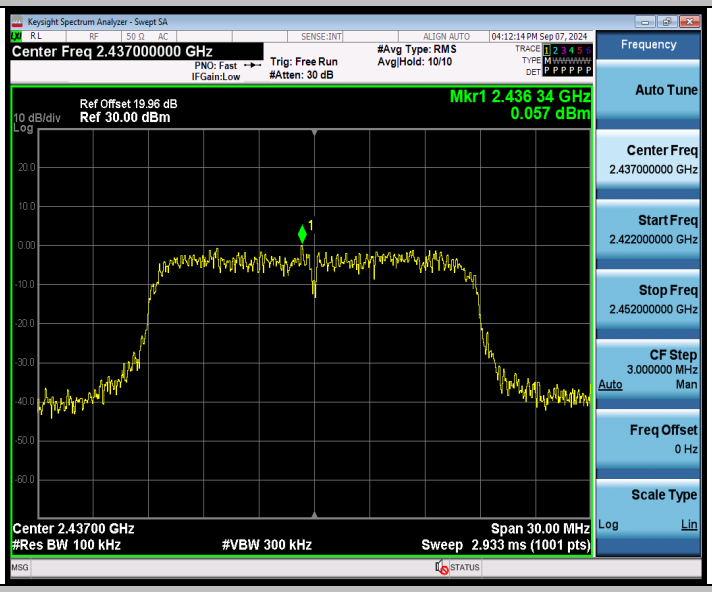

11N20SISO_Ant1_2412_30~1000



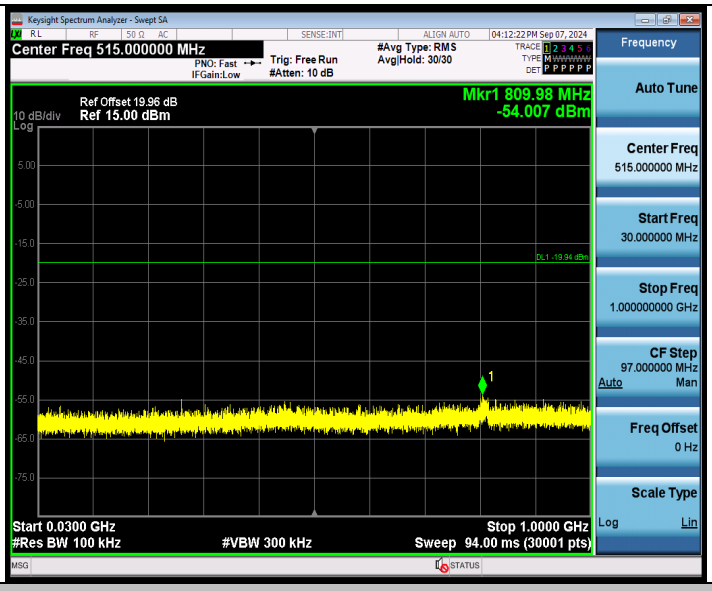

11N20SISO_Ant1_2412_1000~26500



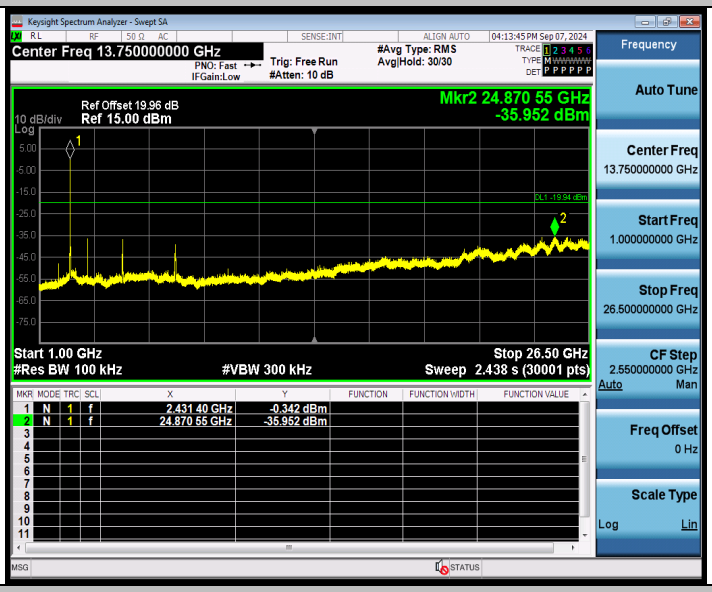

11N20SISO_Ant1_2437_0~Reference



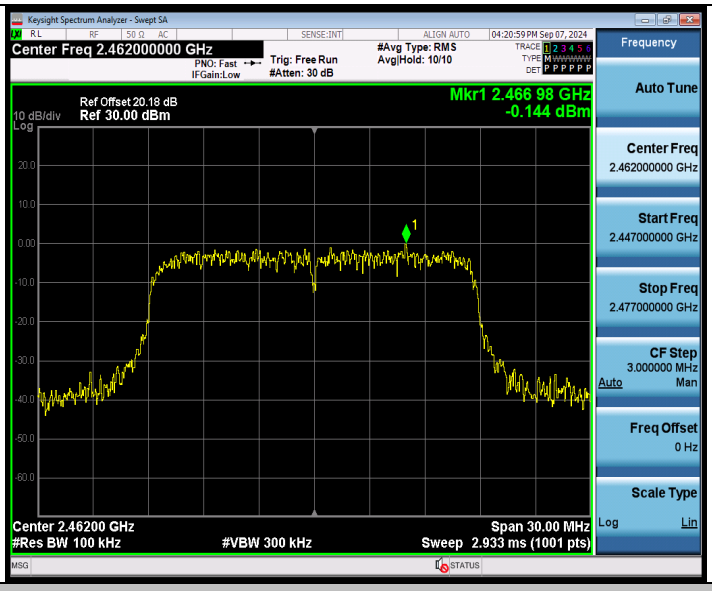

11N20SISO_Ant1_2437_30~1000



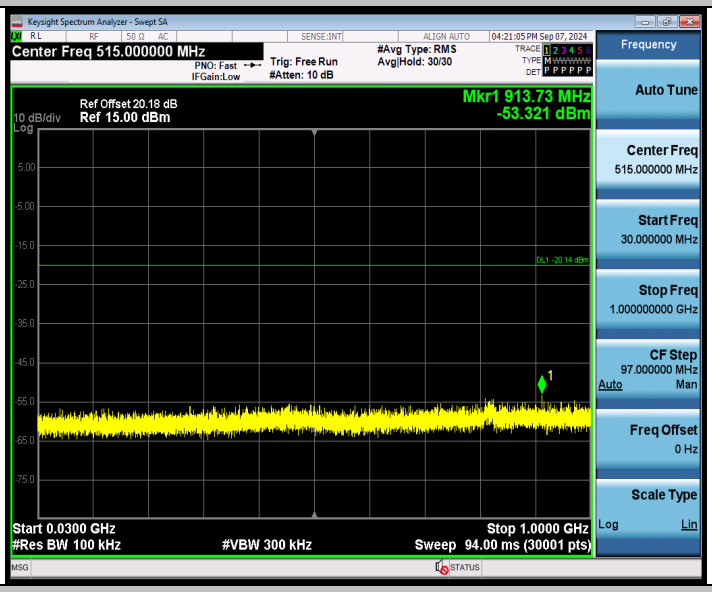

11N20SISO_Ant1_2437_1000~26500



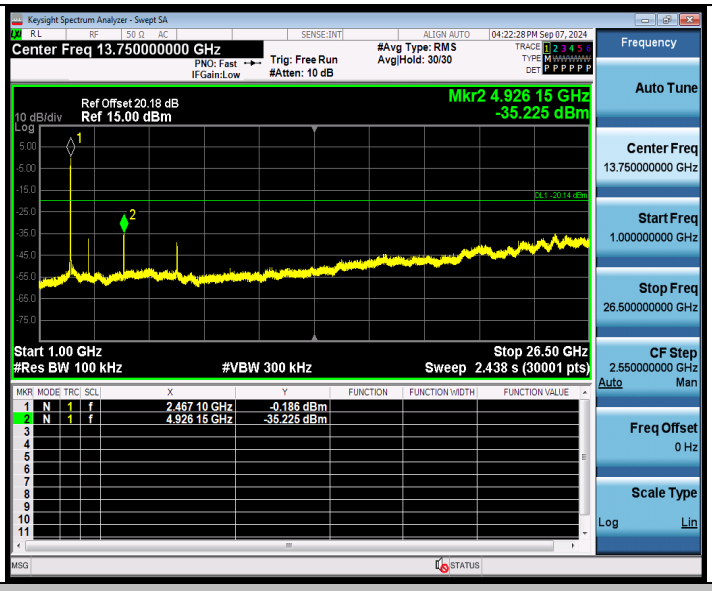

11N20SISO_Ant1_2462_0~Reference



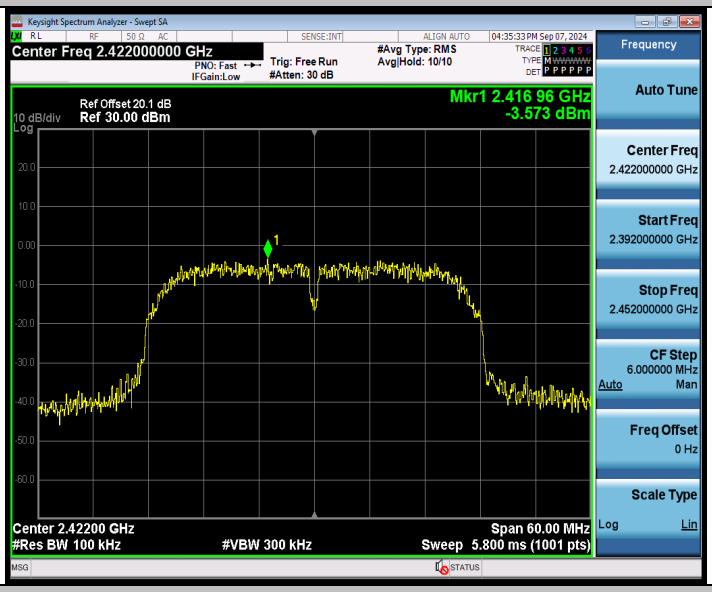

11N20SISO_Ant1_2462_30~1000



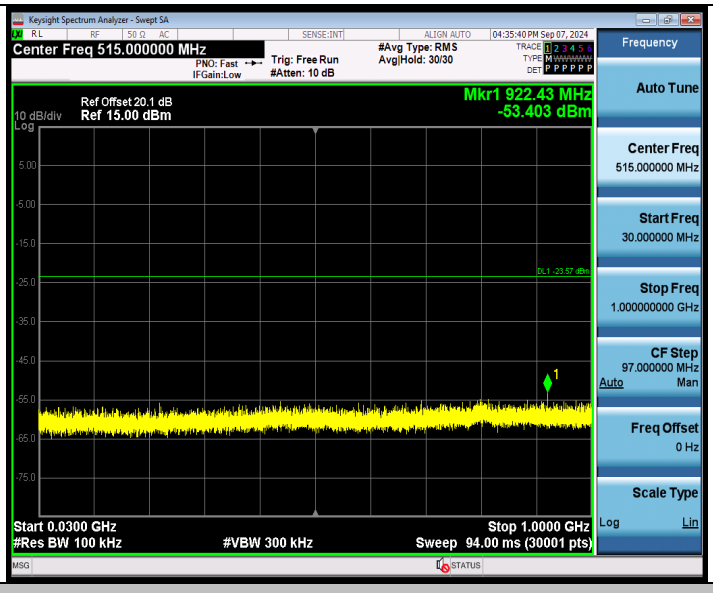

11N20SISO_Ant1_2462_1000~26500



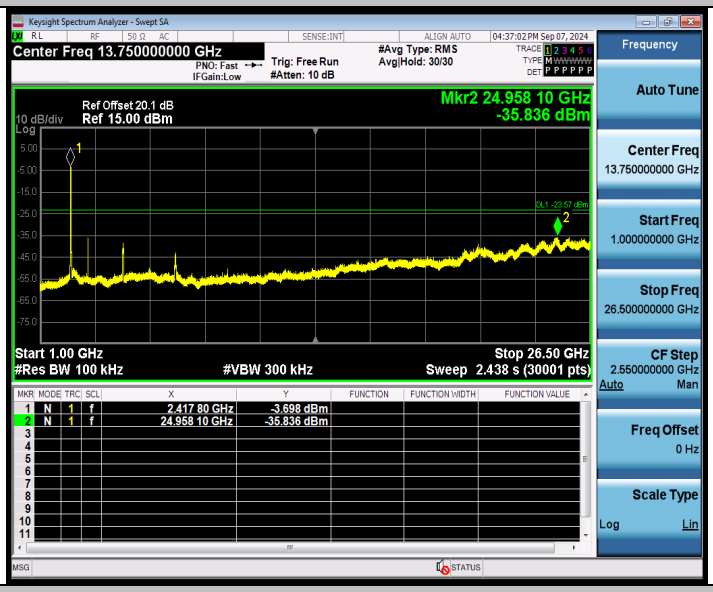

11N40SISO_Ant1_2422_0~Reference



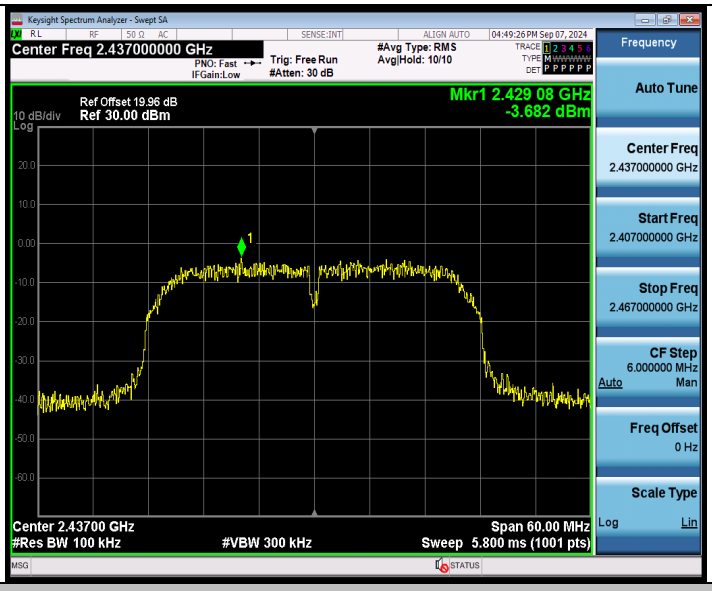

11N40SISO_Ant1_2422_30~1000



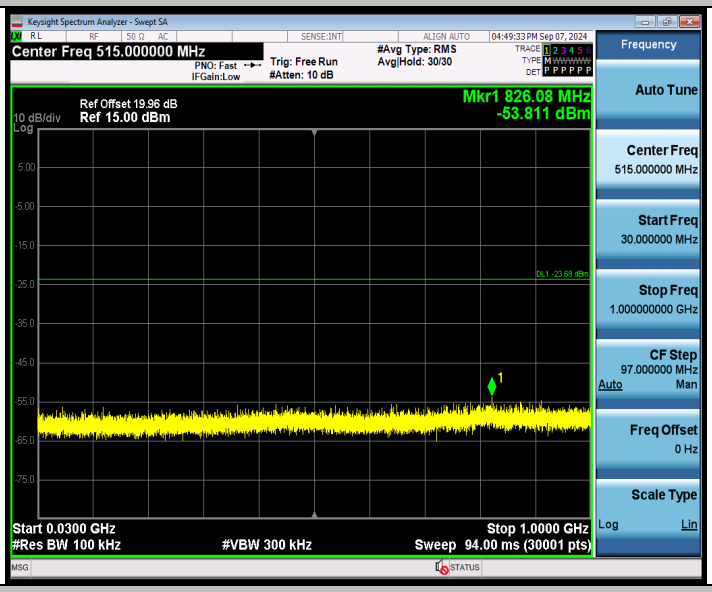

11N40SISO_Ant1_2422_1000~26500



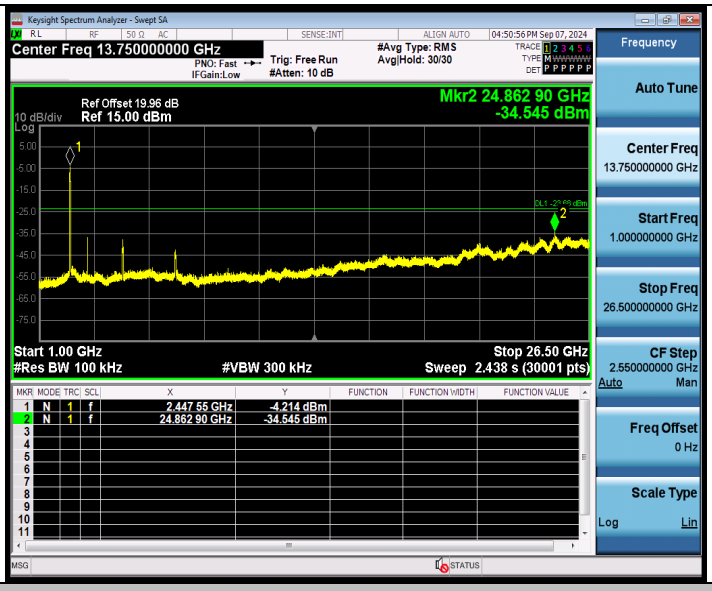

11N40SISO_Ant1_2437_0~Reference



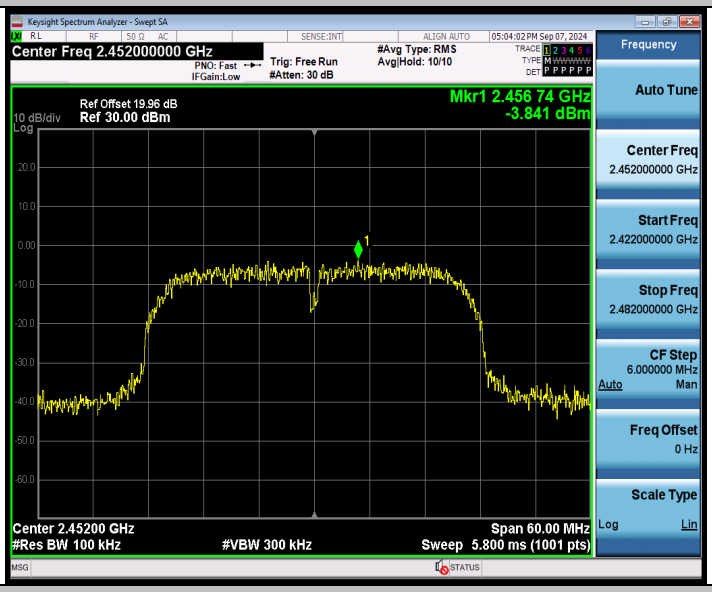

11N40SISO_Ant1_2437_30~1000



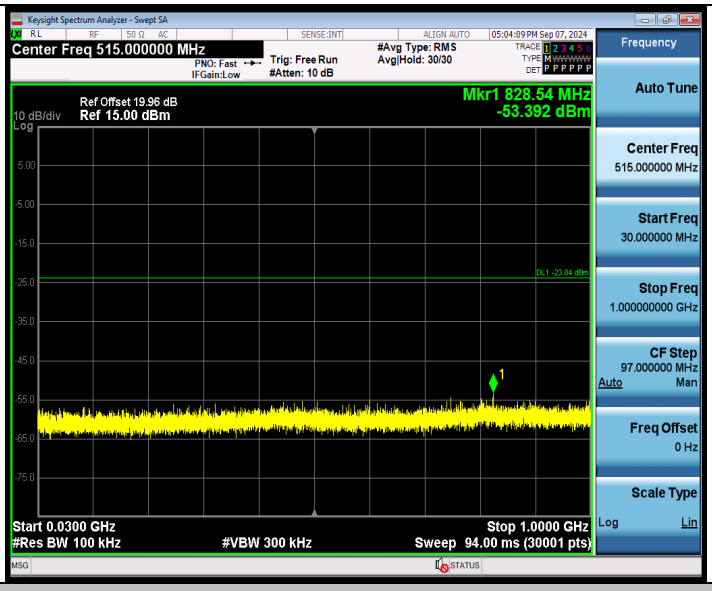

11N40SISO_Ant1_2437_1000~26500



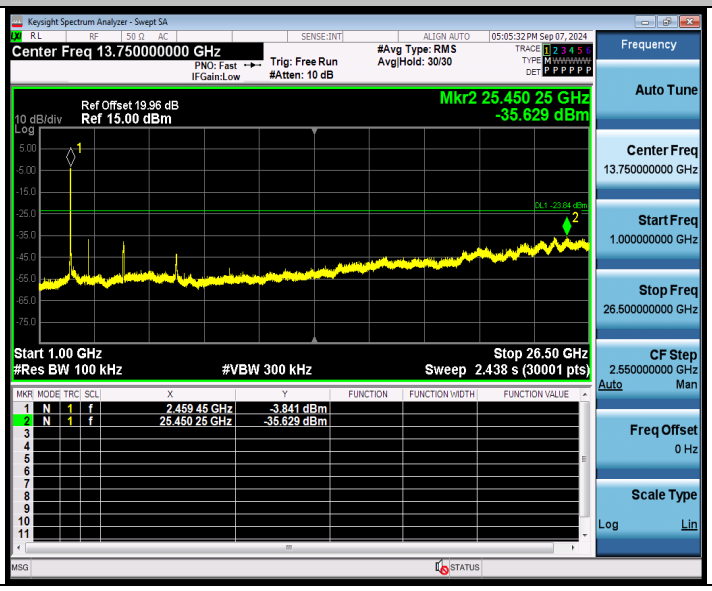

11N40SISO_Ant1_2452_0~Reference




11N40SISO_Ant1_2452_30~1000




11N40SISO_Ant1_2452_1000~26500



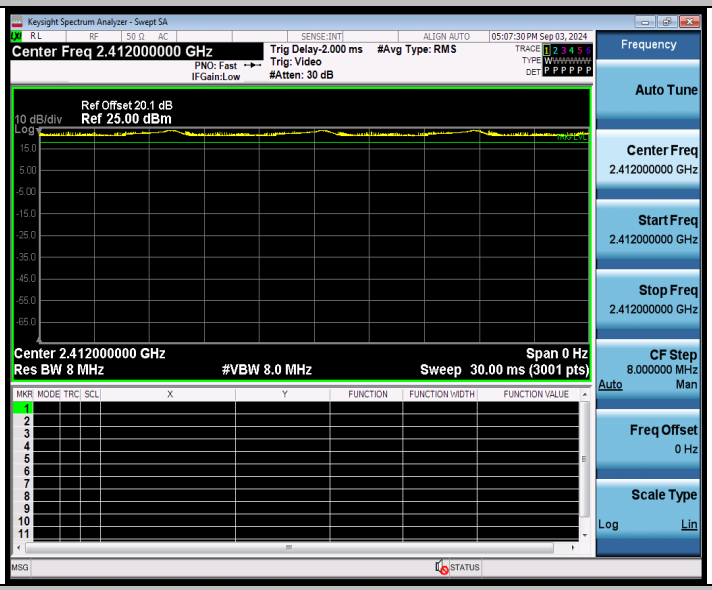
## DUTY CYCLE

## TEST RESULT

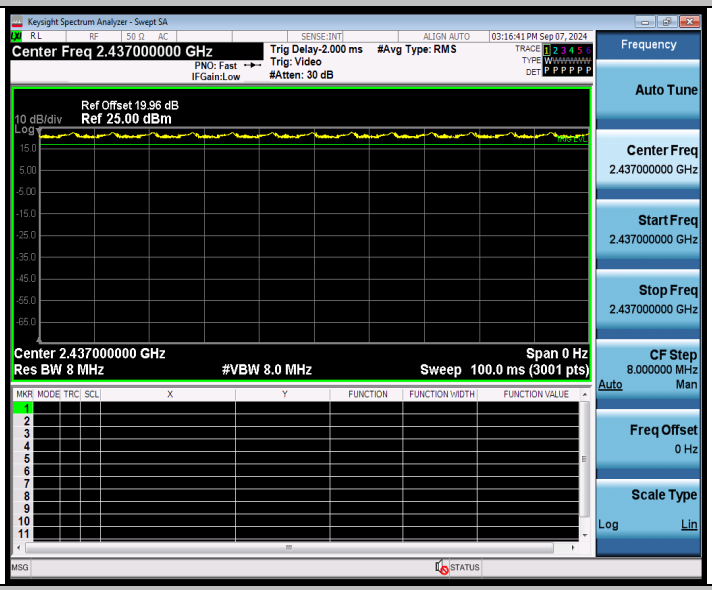
| TestMode | Antenna | Frequency[MHz] | Transmission Duration [ms] | Transmission Period [ms] | Duty Cycle [%] | Factor |
|---|---|---|---|---|---|---|
| 11B | Ant1 | 2412 | 30.00 | 30.00 | 100.00 | 0.00 |
| | | 2437 | 100.00 | 100.00 | 100.00 | 0.00 |
| | | 2462 | 100.00 | 100.00 | 100.00 | 0.00 |
| 11G | Ant1 | 2412 | 100.00 | 100.00 | 100.00 | 0.00 |
| | | 2437 | 100.00 | 100.00 | 100.00 | 0.00 |
| | | 2462 | 100.00 | 100.00 | 100.00 | 0.00 |
| 11N20SISO | Ant1 | 2412 | 100.00 | 100.00 | 100.00 | 0.00 |
| | | 2437 | 100.00 | 100.00 | 100.00 | 0.00 |
| | | 2462 | 100.00 | 100.00 | 100.00 | 0.00 |
| 11N40SISO | Ant1 | 2422 | 100.00 | 100.00 | 100.00 | 0.00 |
| | | 2437 | 100.00 | 100.00 | 100.00 | 0.00 |
| | | 2452 | 100.00 | 100.00 | 100.00 | 0.00 |

## TEST GRAPHS

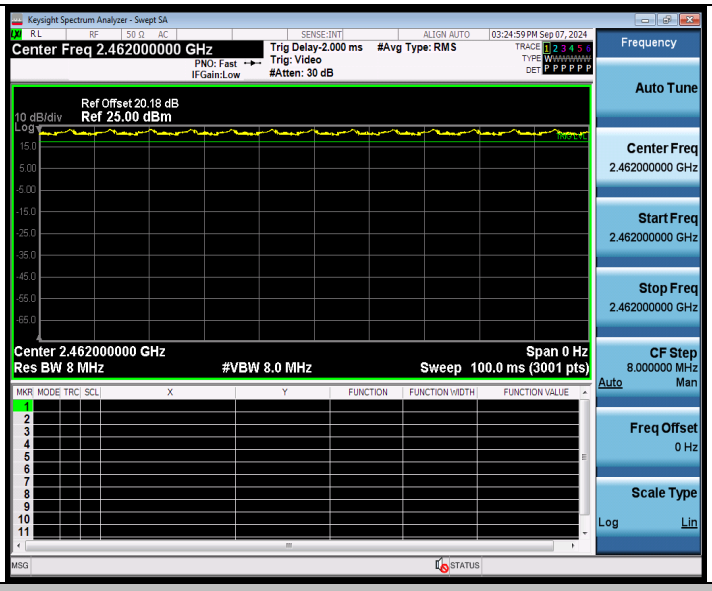
11B_Ant1_2412



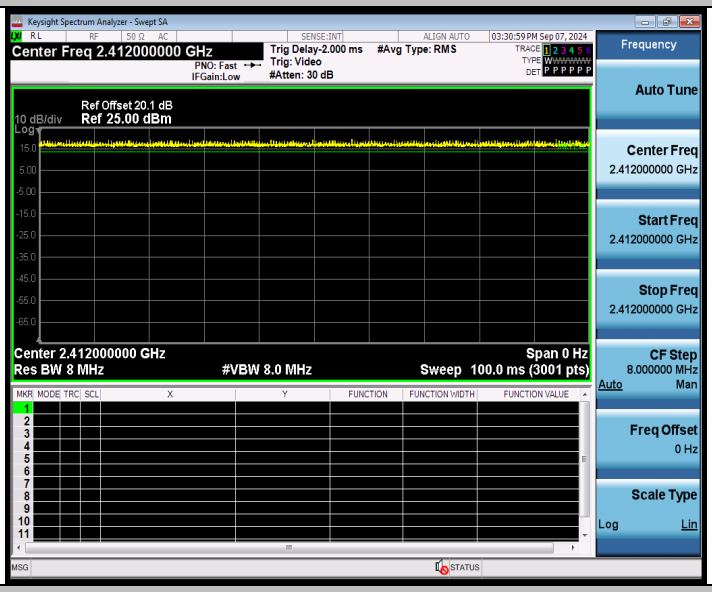

11B_Ant1_2437



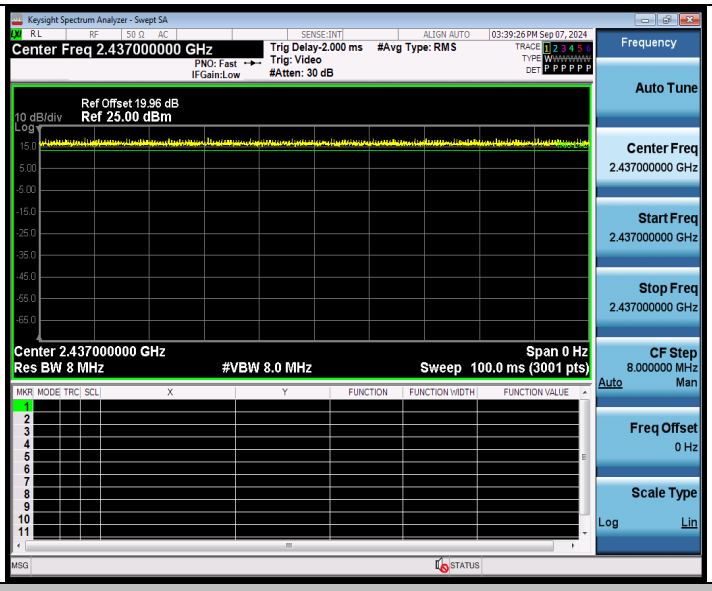

11B_Ant1_2462



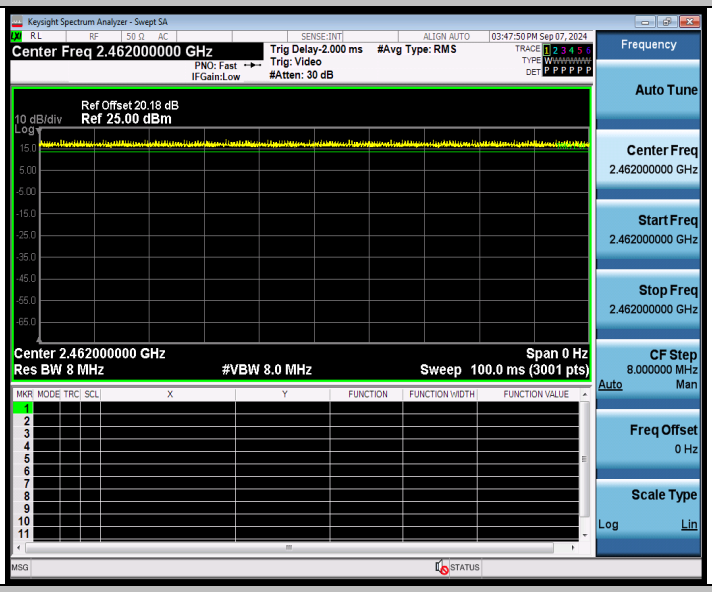

11G_Ant1_2412



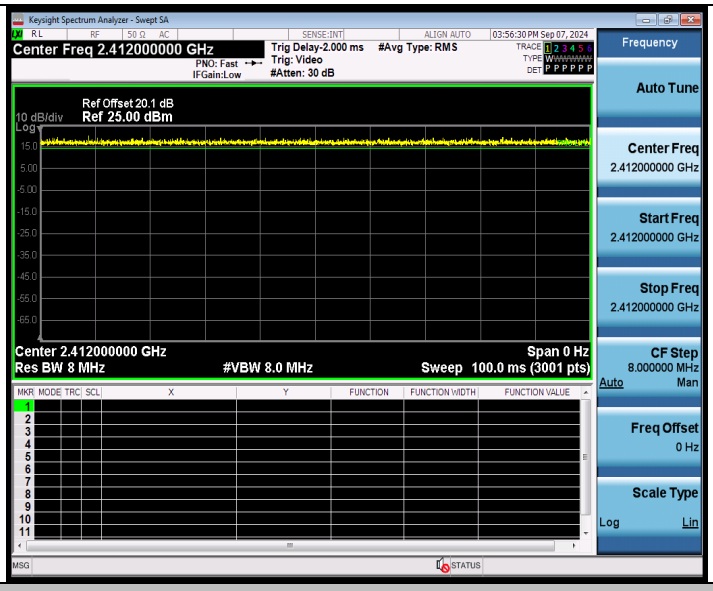

11G_Ant1_2437



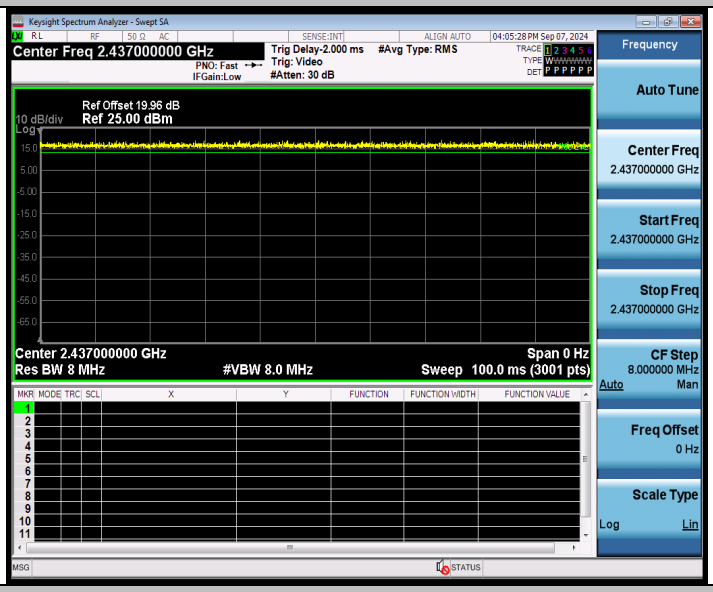

11G_Ant1_2462



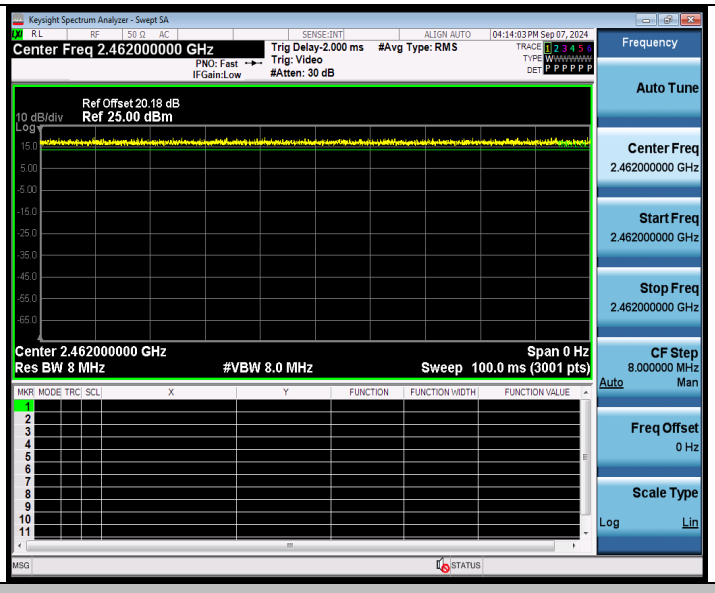

11N20SISO_Ant1_2412



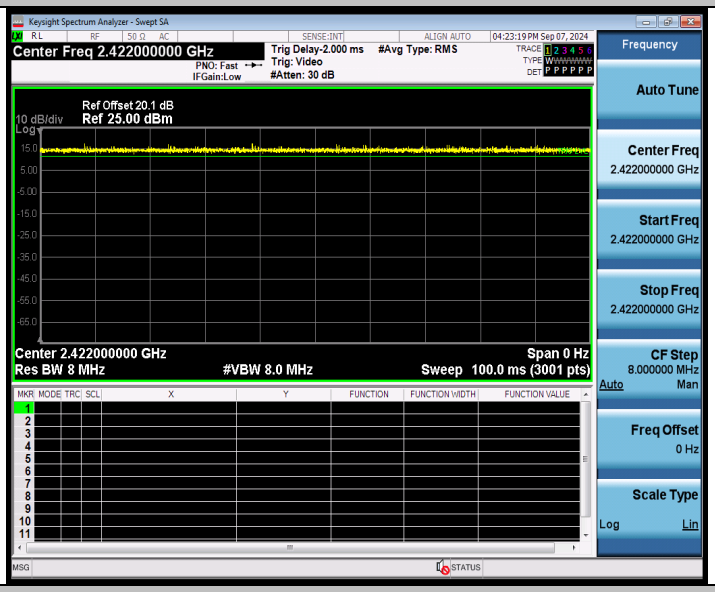

11N20SISO_Ant1_2437



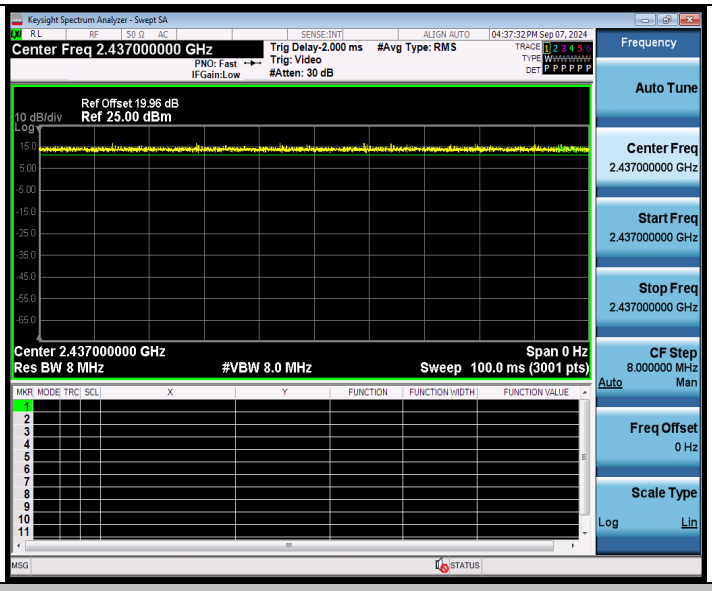

11N20SISO_Ant1_2462



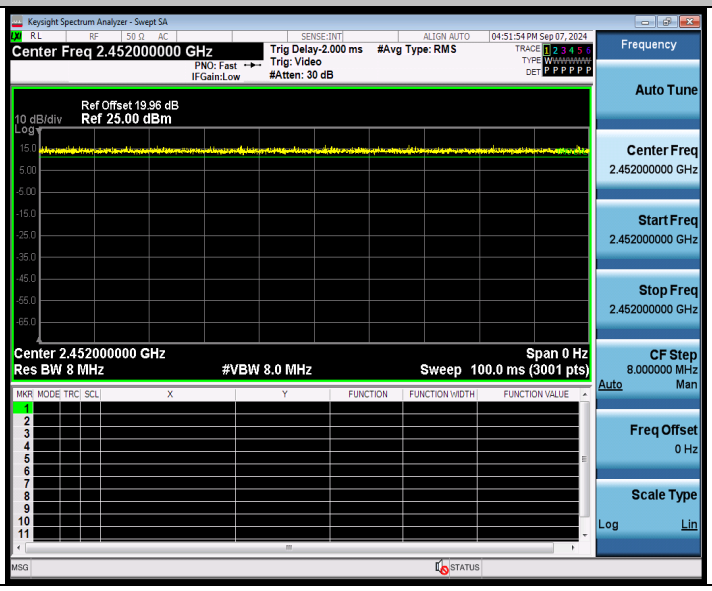

11N40SISO_Ant1_2422




11N40SISO_Ant1_2437




11N40SISO_Ant1_2452



## BLE

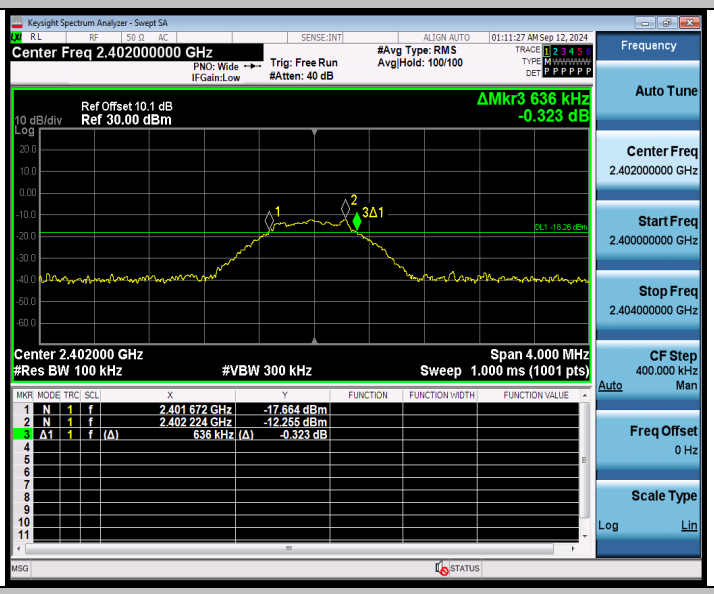
## DTS BANDWIDTH

## TEST RESULT

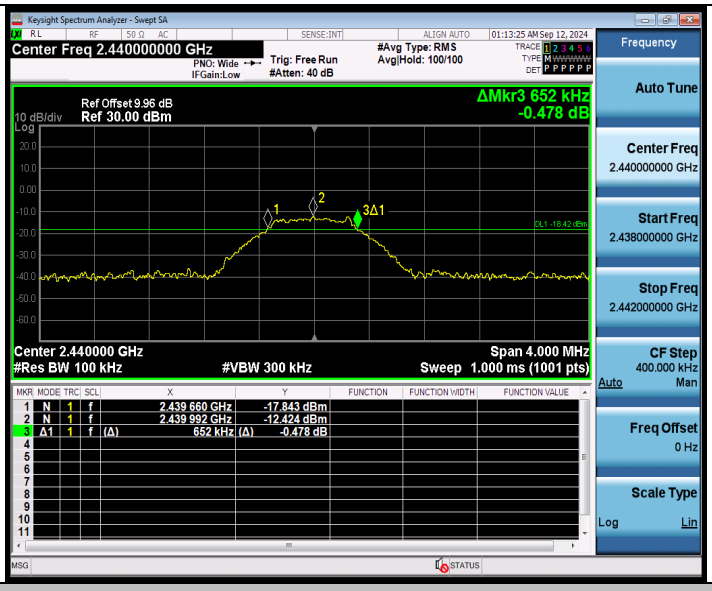
| TestMode | Antenna | Frequency[MHz] | DTS BW [MHz] | FL[MHz] | FH[MHz] | Limit[MHz] | Verdict |
|---|---|---|---|---|---|---|---|
| BLE_1M | Ant1 | 2402 | 0.636 | 2401.672 | 2402.308 | 0.5 | PASS |
| | | 2440 | 0.652 | 2439.660 | 2440.312 | 0.5 | PASS |
| | | 2480 | 0.664 | 2479.660 | 2480.324 | 0.5 | PASS |

## TEST GRAPHS

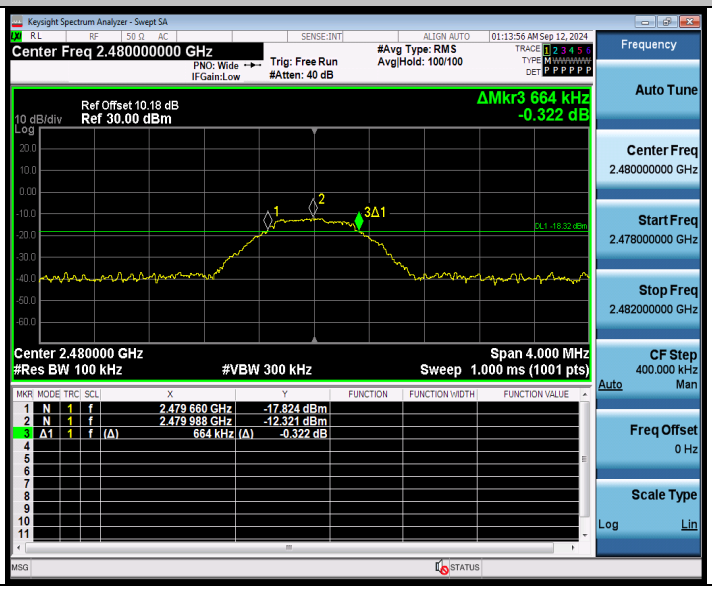
BLE_1M_Ant1_2402




BLE_1M_Ant1_2440




BLE_1M_Ant1_2480



# OCCUPIED CHANNEL BANDWIDTH

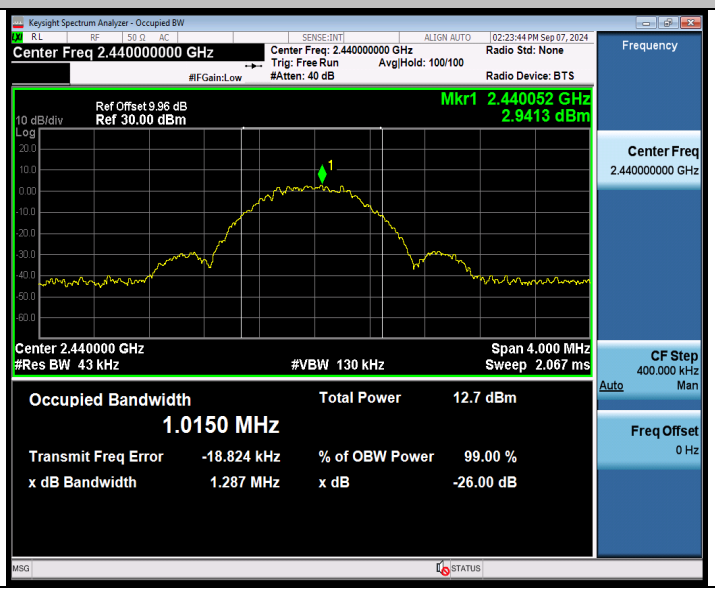
## TEST RESULT

| TestMode | Antenna | Frequency[MHz] | OCB [MHz] | FL[MHz] | FH[MHz] | Limit[MHz] | Verdict |
|---|---|---|---|---|---|---|---|
| BLE_1M | Ant1 | 2402 | 1.0020 | 2401.4803 | 2402.4823 | --- | --- |
| | | 2440 | 1.0150 | 2439.4737 | 2440.4887 | --- | --- |
| | | 2480 | 1.0124 | 2479.4744 | 2480.4868 | --- | --- |

## TEST GRAPHS

BLE_1M_Ant1_2402

BLE_1M_Ant1_2440



BLE_1M_Ant1_2480

## MAXIMUM CONDUCTED OUTPUT POWER

## TEST RESULT

| TestMode | Antenna | Channel | Average power [dBm] | Peak power [dBm] | Peak power [mw] | Conducted Limit [dBm] | EIRP [dBm] | EIRP [mw] | EIRP Limit [dBm] | Verdict | Power Setting |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BLE_1M | Ant1 | 2402 | 7.40 | 7.51 | 5.64 | ≤30 | 7.68 | 5.86 | ≤36 | PASS | Defult |
| | | 2440 | 7.51 | 7.55 | 5.69 | ≤30 | 7.72 | 5.92 | ≤36 | PASS | Defult |
| | | 2480 | 7.61 | 7.66 | 5.83 | ≤30 | 7.83 | 6.07 | ≤36 | PASS | Defult |
| **Note:EIRP=Peak Power+Gain** | | | | | | | | | | | |

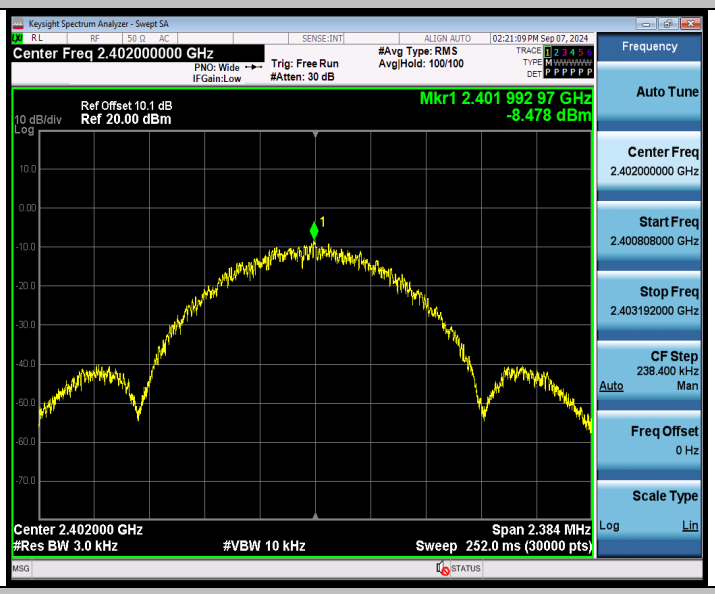
## MAXIMUM POWER SPECTRAL DENSITY

## TEST RESULT

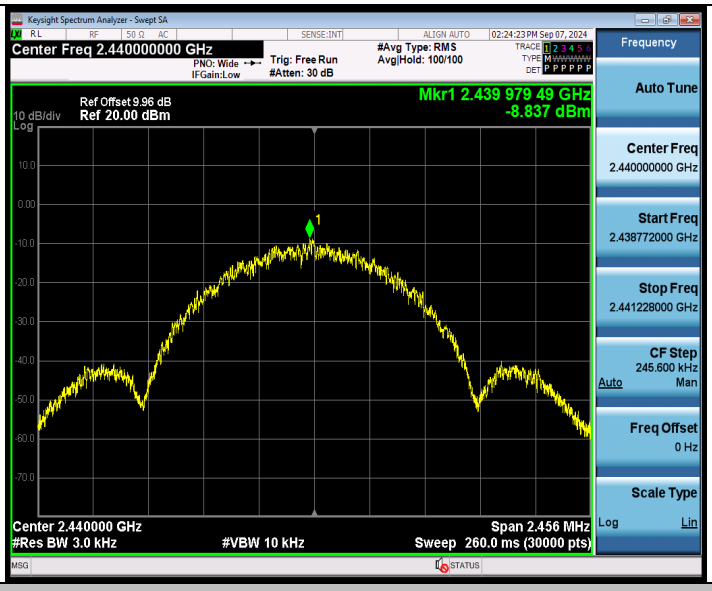
| TestMode | Antenna | Frequency[MHz] | Result[dBm/3kHz] | Limit[dBm/3kHz] | Verdict |
|---|---|---|---|---|---|
| BLE_1M | Ant1 | 2402 | -8.48 | ≤8.00 | PASS |
| | | 2440 | -8.84 | ≤8.00 | PASS |
| | | 2480 | -8.63 | ≤8.00 | PASS |

## TEST GRAPHS

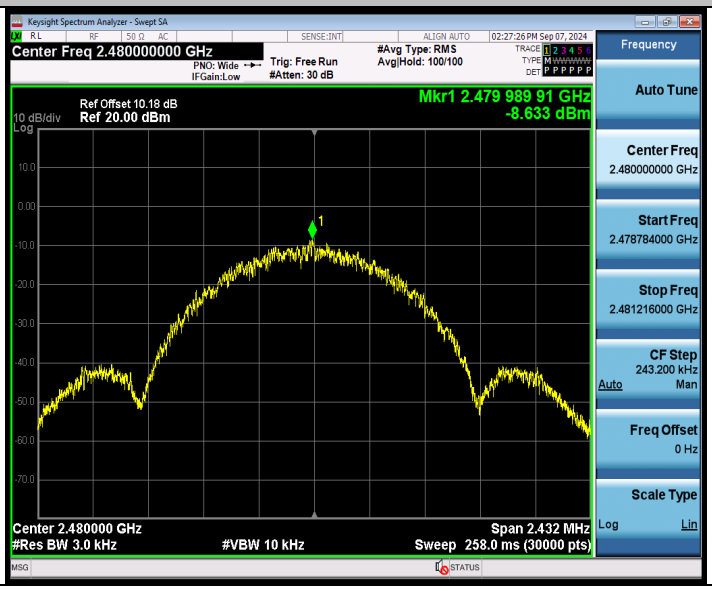
BLE_1M_Ant1_2402




BLE_1M_Ant1_2440




BLE_1M_Ant1_2480



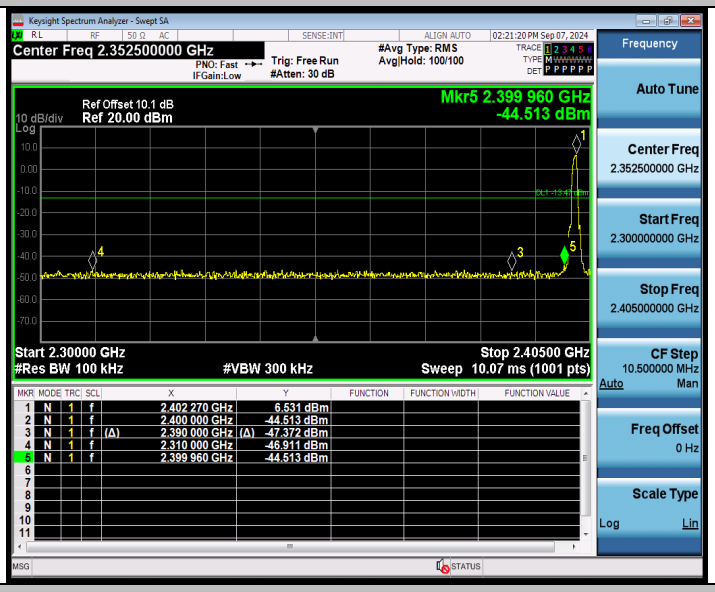
## BAND EDGE MEASUREMENTS

## TEST RESULT

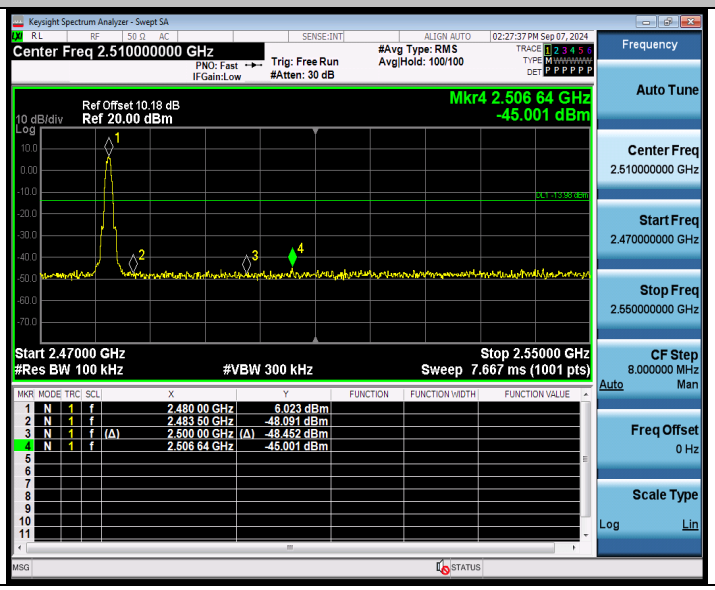
| TestMode | Antenna | ChName | Frequency[MHz] | RefLevel[dBm] | Result[dBm] | Limit[dBm] | Verdict |
|---|---|---|---|---|---|---|---|
| BLE_1M | Ant1 | Low | 2402 | 6.53 | -44.51 | ≤-13.47 | PASS |
| | | High | 2480 | 6.02 | -45 | ≤-13.98 | PASS |

## TEST GRAPHS

BLE_1M_Ant1_Low_2402




BLE_1M_Ant1_High_2480



## CONDUCTED SPURIOUS EMISSION

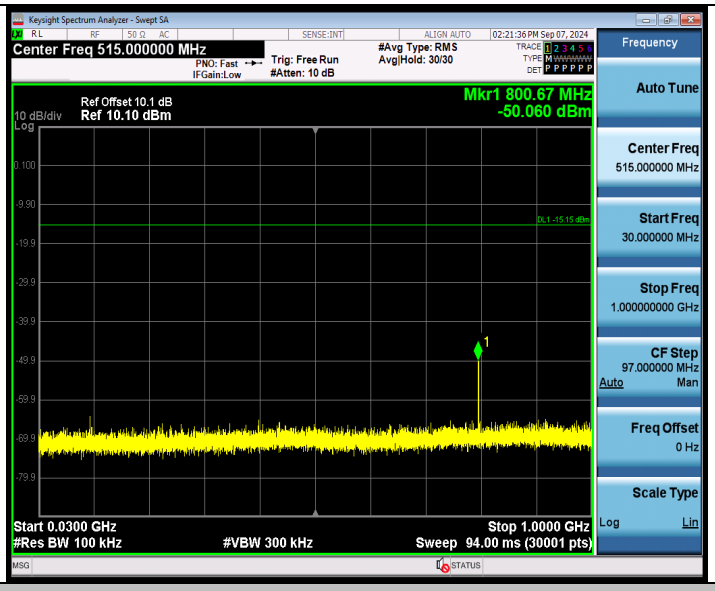
## TEST RESULT

| TestMode | Antenna | Frequency[MHz] | FreqRange [MHz] | RefLevel [dBm] | Result[dBm] | Limit[dBm] | Verdict |
|---|---|---|---|---|---|---|---|
| BLE_1M | Ant1 | 2402 | Reference | 4.85 | 4.85 | --- | PASS |
| | | | 30~1000 | 4.85 | -50.06 | ≤-15.15 | PASS |
| | | | 1000~26500 | 4.85 | -32.31 | ≤-15.15 | PASS |
| | | 2440 | Reference | 4.32 | 4.32 | --- | PASS |
| | | | 30~1000 | 4.32 | -50.65 | ≤-15.68 | PASS |
| | | | 1000~26500 | 4.32 | -33.68 | ≤-15.68 | PASS |
| | | 2480 | Reference | 5.09 | 5.09 | --- | PASS |
| | | | 30~1000 | 5.09 | -50.52 | ≤-14.91 | PASS |
| | | | 1000~26500 | 5.09 | -32.35 | ≤-14.91 | PASS |

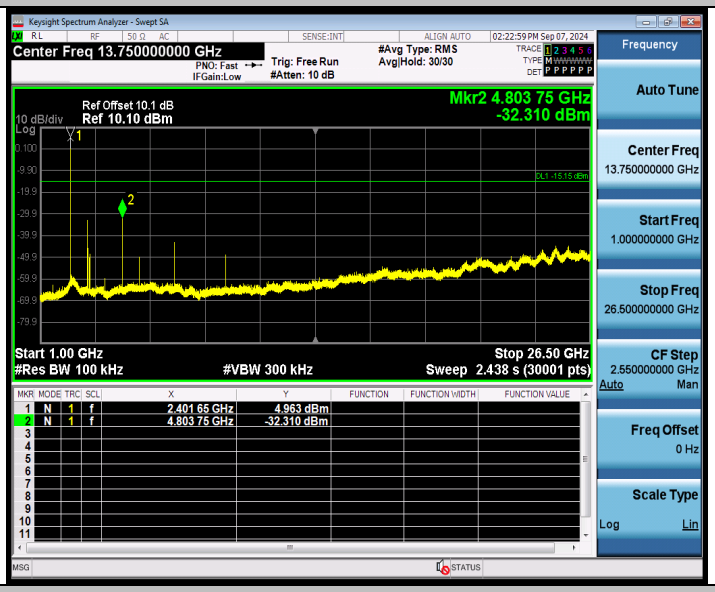
## TEST GRAPHS

BLE_1M_Ant1_2402_0~Reference

BLE_1M_Ant1_2402_30~1000

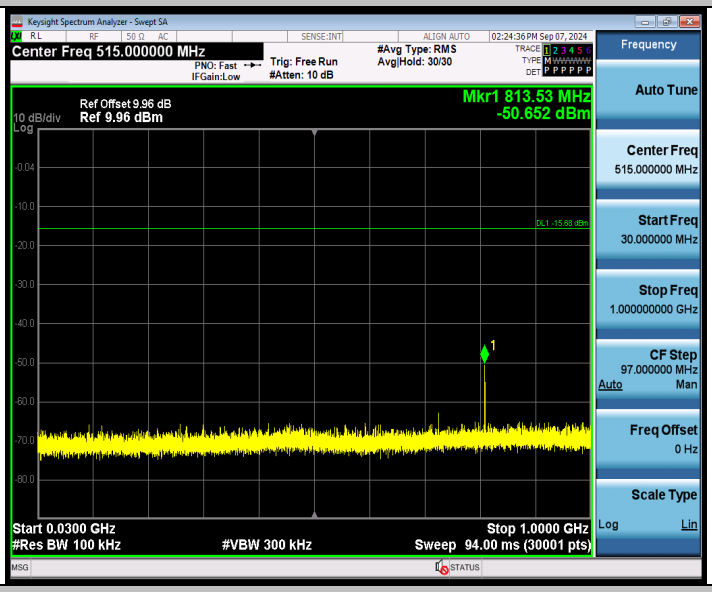



BLE_1M_Ant1_2402_1000~26500

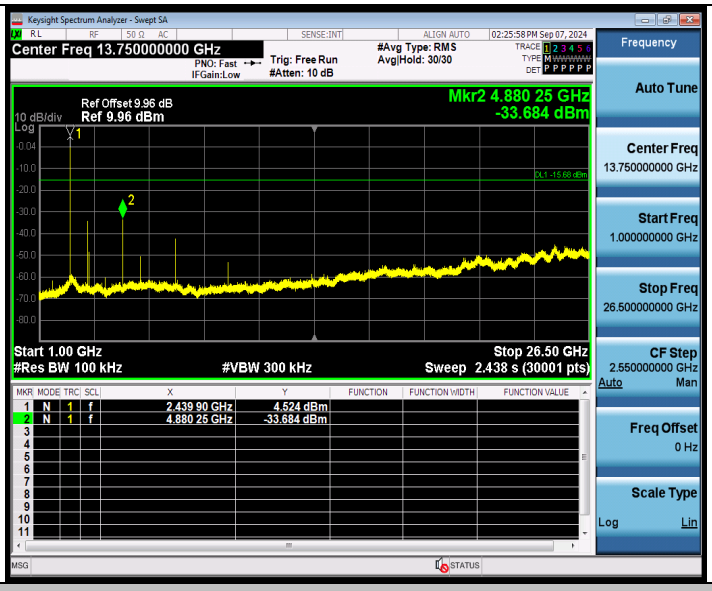



BLE_1M_Ant1_2440_0~Reference

BLE_1M_Ant1_2440_30~1000



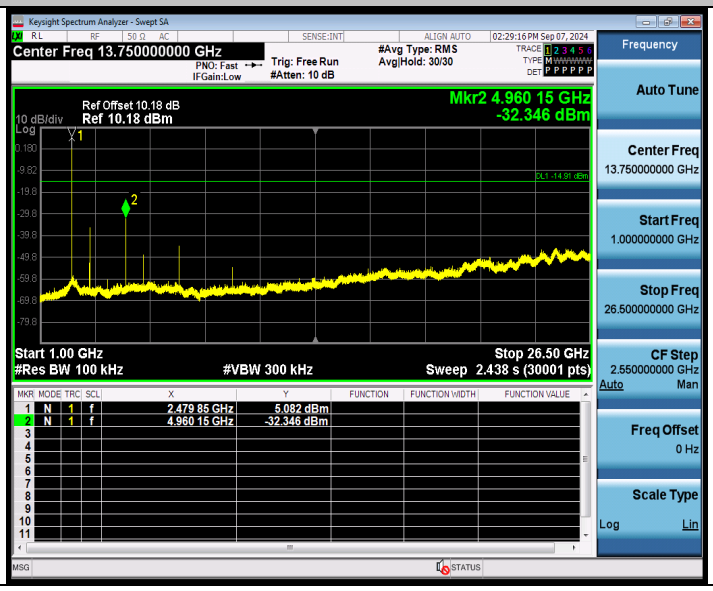

BLE_1M_Ant1_2440_1000~26500




BLE_1M_Ant1_2480_0~Reference

BLE_1M_Ant1_2480_30~1000

BLE_1M_Ant1_2480_1000~26500



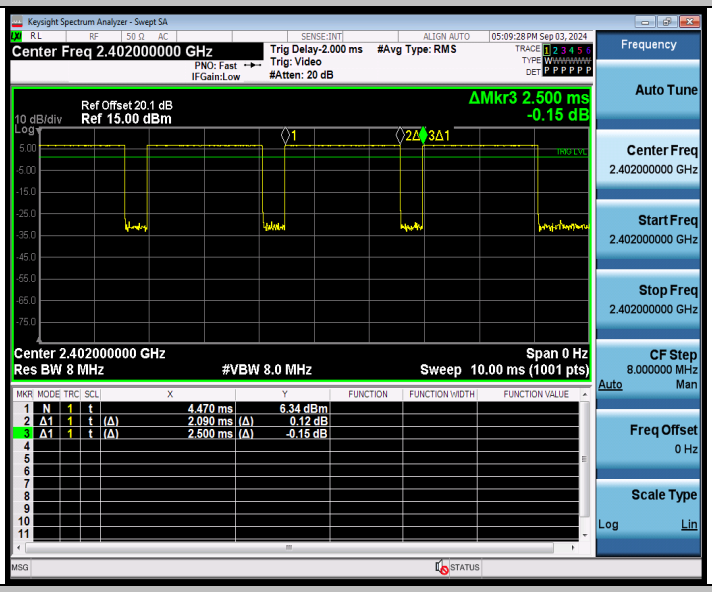

## DUTY CYCLE

## TEST RESULT

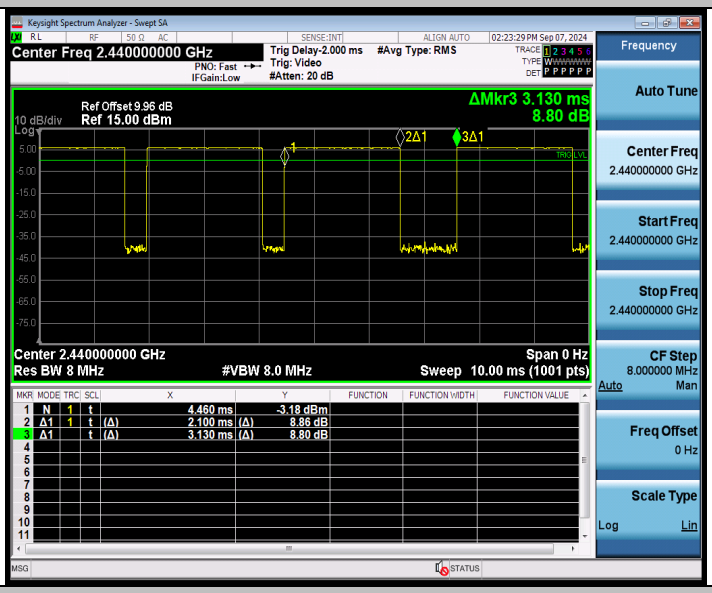
| TestMode | Antenna | Frequency[MHz] | ON Time [ms] | Period [ms] | Duty Cycle [%] | Duty Cycle Factor[dB] |
|---|---|---|---|---|---|---|
| BLE_1M | Ant1 | 2402 | 2.09 | 3.13 | 66.77 | 1.75 |
| | | 2440 | 2.10 | 3.13 | 67.09 | 1.73 |
| | | 2480 | 2.09 | 2.50 | 83.60 | 0.78 |

# TEST GRAPHS

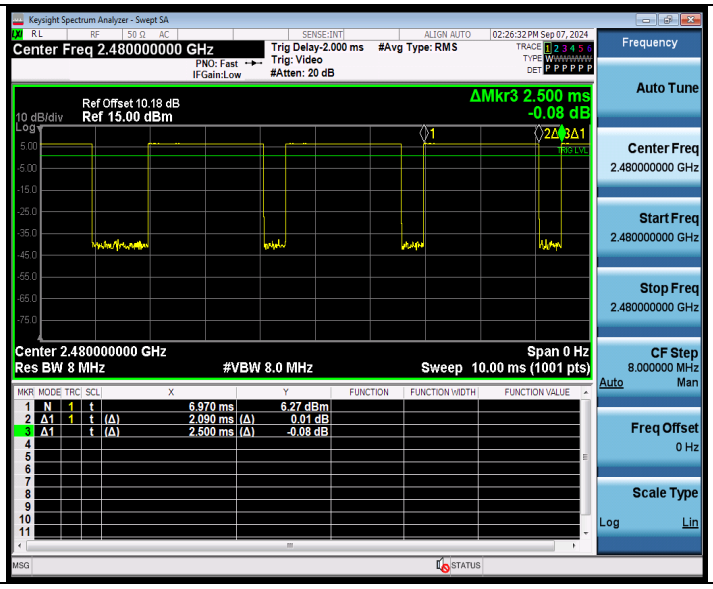
BLE_1M_Ant1_2402




BLE_1M_Ant1_2440




BLE_1M_Ant1_2480


Keysight Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
Trig Delay-2.000 ms
#Avg Type: RMS
Trig: Video
#Atten: 20 dB
PNO: Fast
IFGain:Low
Ref Offset 10.18 dB
10 dB/div
Ref 15.00 dBm
ΔMkr3 2.500 ms
-0.08 dB
Center 2.480000000 GHz
Span 0 Hz
Res BW 8 MHz
#VBW 8.0 MHz
Sweep 10.00 ms (1001 pts)
1 N 1 t 6.970 ms 6.27 dBm
2 Δ1 1 t (Δ) 2.090 ms (Δ) 0.01 dB
3 Δ1 t (Δ) 2.500 ms (Δ) -0.08 dB
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.480000000 GHz
Stop Freq
2.480000000 GHz
CF Step
8.000000 MHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin

**--END--**