| | |
|---|---|
| **Case No. :** GTS20240102009-1-2 | |
| **Ambient Condition**: 23 ℃, 51 %RH | |
| **According Standard:** ■Part15C | |
| **Test Date:** 2024.3.14 | **Test Engineer:** Evan ouyang |

# Appendix A.1: 20dB Emission Bandwidth

## Test Result

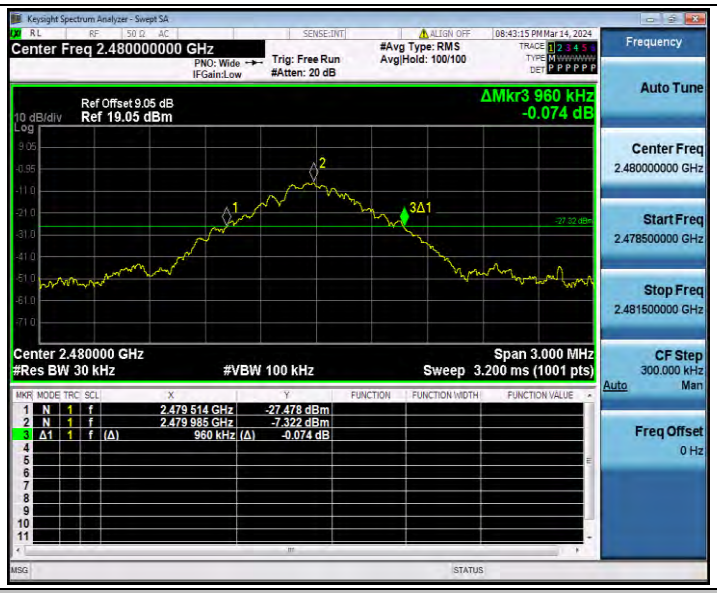
| TestMode | Antenna | Freq(MHz) | 20dB EBW[MHz] | FL[MHz] | FH[MHz] | Limit[MHz] | Verdict |
|---|---|---|---|---|---|---|---|
| DH1 | Ant1 | 2402 | 0.954 | 2401.517 | 2402.471 | --- | --- |
| | | 2441 | 0.960 | 2440.514 | 2441.474 | --- | --- |
| | | 2480 | 0.960 | 2479.514 | 2480.474 | --- | --- |
| 2DH1 | Ant1 | 2402 | 1.290 | 2401.343 | 2402.633 | --- | --- |
| | | 2441 | 1.293 | 2440.340 | 2441.633 | --- | --- |
| | | 2480 | 1.293 | 2479.340 | 2480.633 | --- | --- |
| 3DH1 | Ant1 | 2402 | 1.296 | 2401.340 | 2402.636 | --- | --- |
| | | 2441 | 1.302 | 2440.334 | 2441.636 | --- | --- |
| | | 2480 | 1.305 | 2479.328 | 2480.633 | --- | --- |

## Test Graphs

DH1_Ant1_2402

DH1_Ant1_2441

DH1_Ant1_2480




2DH1_Ant1_2402

2DH1_Ant1_2441

2DH1_Ant1_2480

3DH1_Ant1_2402

3DH1_Ant1_2441

3DH1_Ant1_2480

# Appendix A.2: Occupied Channel Bandwidth

## Test Result

| TestMode | Antenna | Freq(MHz) | OCB [MHz] | FL[MHz] | FH[MHz] | Limit[MHz] | Verdict |
|---|---|---|---|---|---|---|---|
| DH1 | Ant1 | 2402 | 0.88800 | 2401.5421 | 2402.4301 | --- | --- |
| | | 2441 | 0.89261 | 2440.5393 | 2441.4319 | --- | --- |
| | | 2480 | 0.89337 | 2479.5376 | 2480.4310 | --- | --- |
| 2DH1 | Ant1 | 2402 | 1.1716 | 2401.3911 | 2402.5627 | --- | --- |
| | | 2441 | 1.1735 | 2440.3894 | 2441.5629 | --- | --- |
| | | 2480 | 1.1674 | 2479.3940 | 2480.5614 | --- | --- |
| 3DH1 | Ant1 | 2402 | 1.1704 | 2401.3905 | 2402.5609 | --- | --- |
| | | 2441 | 1.1872 | 2440.3743 | 2441.5615 | --- | --- |
| | | 2480 | 1.1870 | 2479.3756 | 2480.5626 | --- | --- |

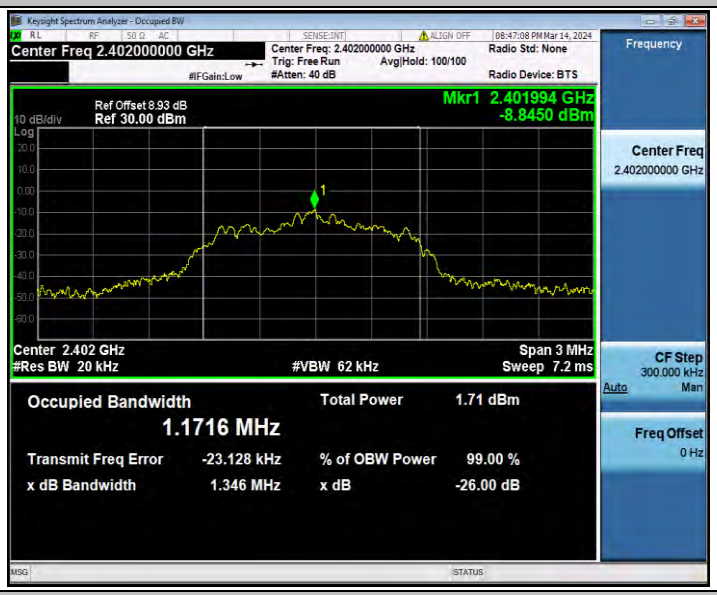
## Test Graphs

DH1_Ant1_2402

DH1_Ant1_2441

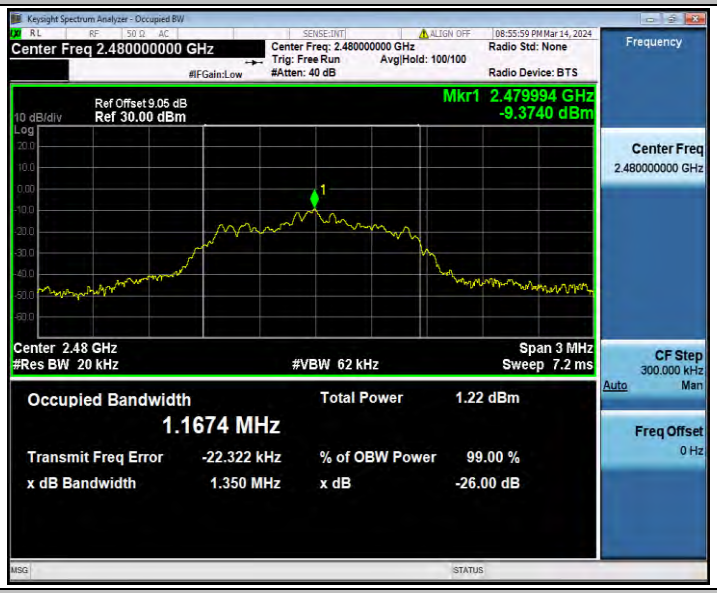
DH1_Ant1_2480

2DH1_Ant1_2402



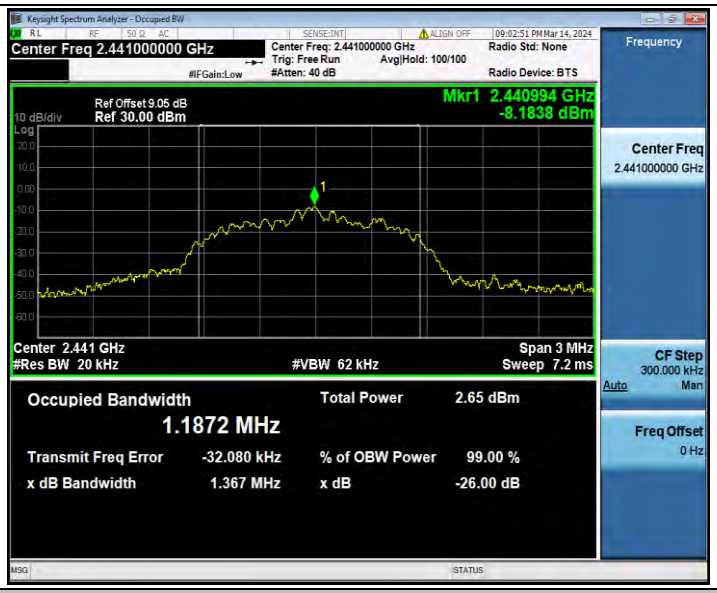

2DH1_Ant1_2441

2DH1_Ant1_2480




3DH1_Ant1_2402

3DH1_Ant1_2441




3DH1_Ant1_2480

# Appendix A.3: Maximum conducted output power

## Test Result

| Test Mode | Antenna | Freq(MHz) | Conducted Peak Powert[dBm] | Conducted Limit[dBm] | Verdict |
|---|---|---|---|---|---|
| DH1 | Ant1 | 2402 | -2.74 | ≤20.97 | PASS |
| | | 2441 | -2.05 | ≤20.97 | PASS |
| | | 2480 | -3.57 | ≤20.97 | PASS |
| 2DH1 | Ant1 | 2402 | -2.81 | ≤20.97 | PASS |
| | | 2441 | -2.25 | ≤20.97 | PASS |
| | | 2480 | -3.19 | ≤20.97 | PASS |
| 3DH1 | Ant1 | 2402 | -2.54 | ≤20.97 | PASS |
| | | 2441 | -1.55 | ≤20.97 | PASS |
| | | 2480 | -3.02 | ≤20.97 | PASS |

Note：

1.The Duty Cycle Factor and RBW Factor is compensated in the data.

# Appendix A.4: Carrier frequency separation

## Test Result

| TestMode | Antenna | Freq(MHz) | Result[MHz] | Limit[MHz] | Verdict |
|---|---|---|---|---|---|
| DH1 | Ant1 | Hop_2402 | 1 | ≥0.640 | PASS |
| | | Hop_2441 | 0.946 | ≥0.640 | PASS |
| | | Hop_2480 | 0.878 | ≥0.640 | PASS |
| 2DH1 | Ant1 | Hop_2402 | 1.002 | ≥0.862 | PASS |
| | | Hop_2441 | 1.152 | ≥0.862 | PASS |
| | | Hop_2480 | 0.926 | ≥0.862 | PASS |
| 3DH1 | Ant1 | Hop_2402 | 1.108 | ≥0.870 | PASS |
| | | Hop_2441 | 0.994 | ≥0.870 | PASS |
| | | Hop_2480 | 0.99 | ≥0.870 | PASS |

## Test Graphs

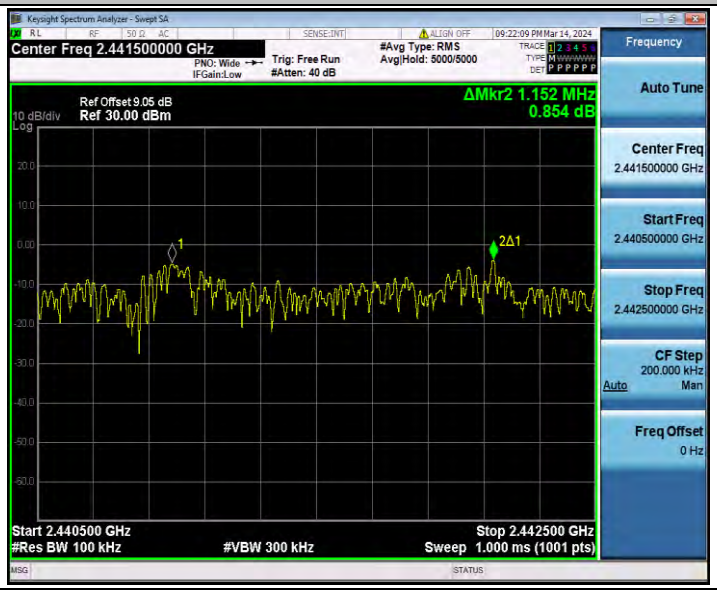
DH1_Ant1_Hop_2402

DH1_Ant1_Hop_2441

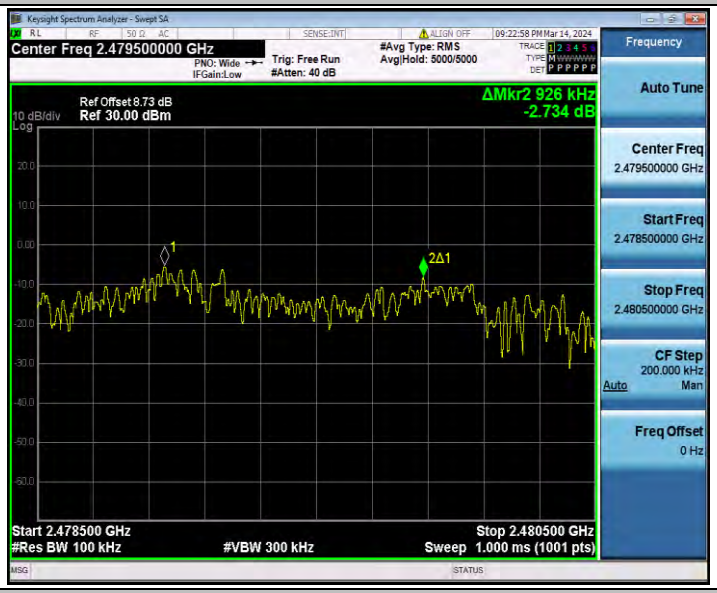
DH1_Ant1_Hop_2480

2DH1_Ant1_Hop_2402

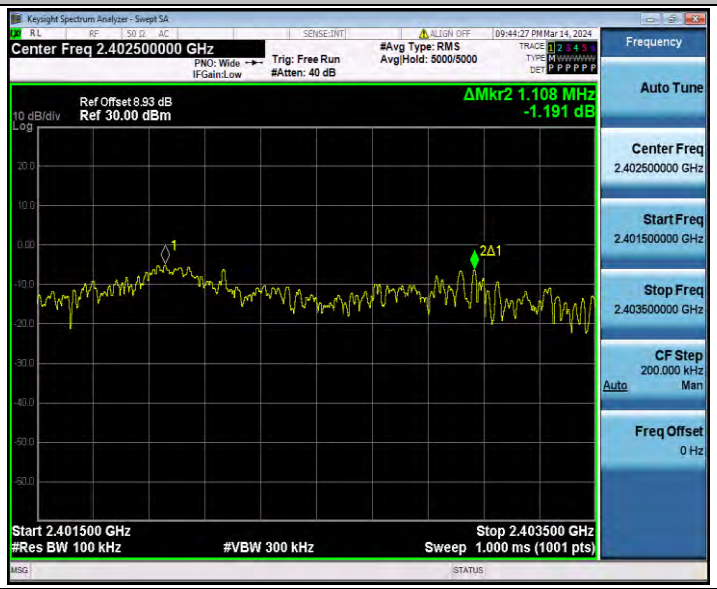
2DH1_Ant1_Hop_2441



2DH1_Ant1_Hop_2480




3DH1_Ant1_Hop_2402




3DH1_Ant1_Hop_2441

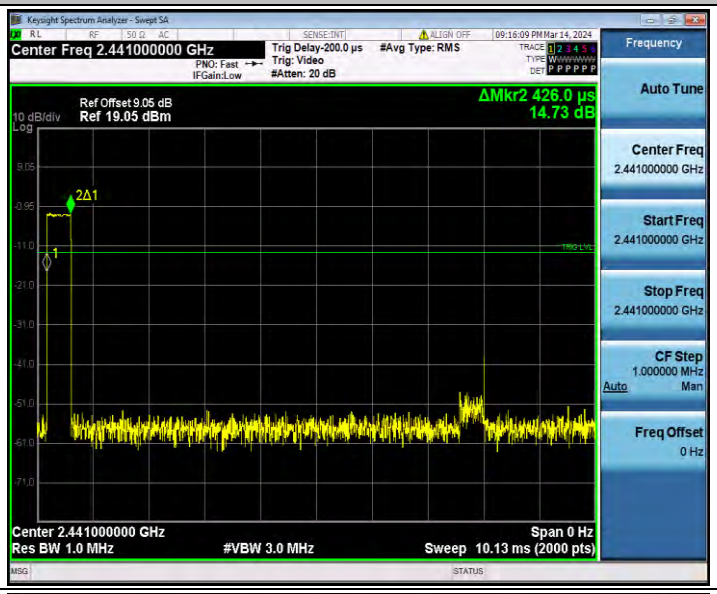
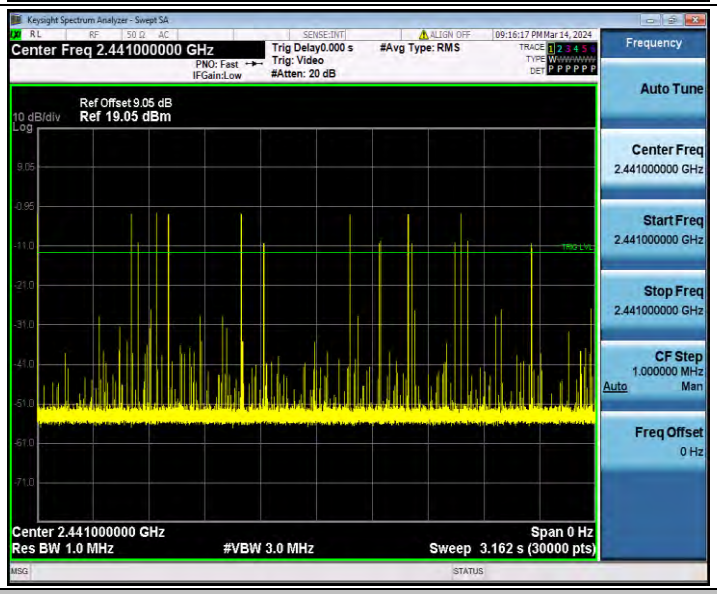
3DH1_Ant1_Hop_2480

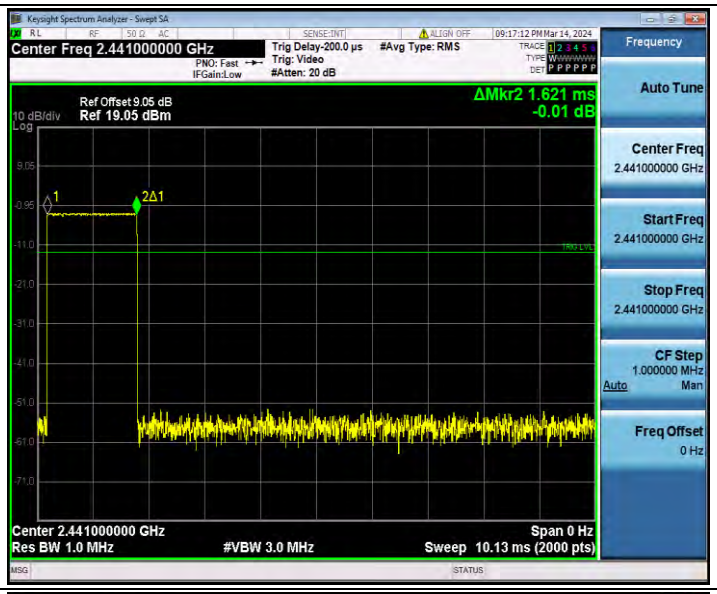
# Appendix A.5: Time of occupancy

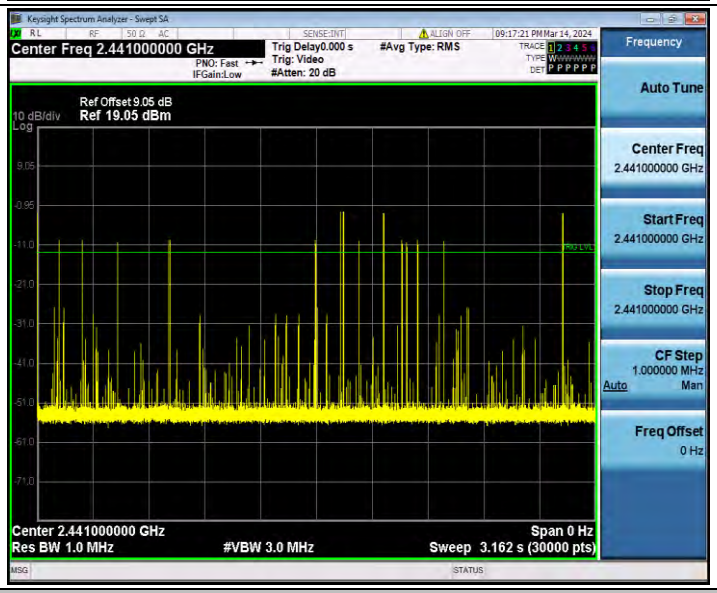
## Test Result

| TestMode | Antenna | Freq(MHz) | BurstWidth [ms] | TotalHops [Num] | Result[s] | Limit[s] | Verdict |
|---|---|---|---|---|---|---|---|
| DH1 | Ant1 | Hop | 0.426 | 80 | 0.034 | ≤0.4 | PASS |
| DH3 | Ant1 | Hop | 1.621 | 50 | 0.081 | ≤0.4 | PASS |
| DH5 | Ant1 | Hop | 2.827 | 70 | 0.198 | ≤0.4 | PASS |
| 2DH1 | Ant1 | Hop | 0.481 | 100 | 0.048 | ≤0.4 | PASS |
| 2DH3 | Ant1 | Hop | 1.687 | 40 | 0.067 | ≤0.4 | PASS |
| 2DH5 | Ant1 | Hop | 2.888 | 20 | 0.058 | ≤0.4 | PASS |
| 3DH1 | Ant1 | Hop | 0.410 | 50 | 0.021 | ≤0.4 | PASS |
| 3DH3 | Ant1 | Hop | 1.662 | 70 | 0.116 | ≤0.4 | PASS |
| 3DH5 | Ant1 | Hop | 2.756 | 60 | 0.165 | ≤0.4 | PASS |

## Test Graphs

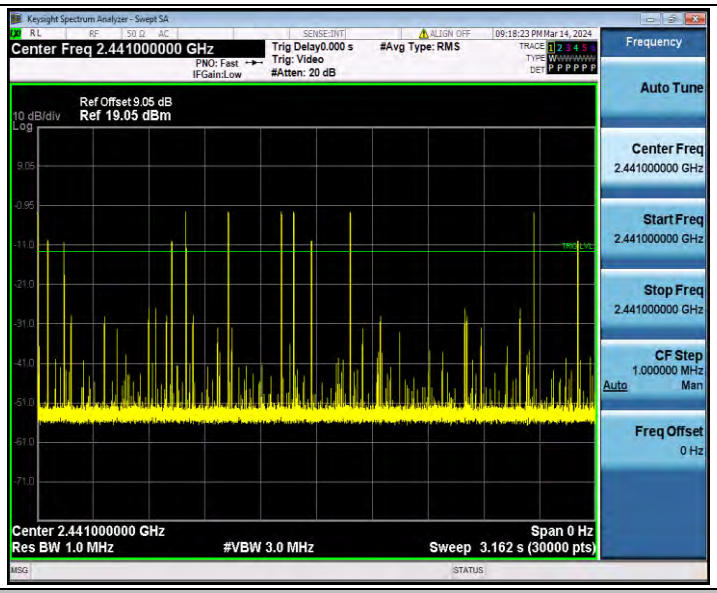
| DH1_Ant1_Hop |
|---|
|  |
|  |
| DH3_Ant1_Hop |


Keysight Spectrum Analyzer - Swept SA
Center Freq 2.441000000 GHz
Trig Delay-200.0 µs
#Avg Type: RMS
Trig: Video
#Atten: 20 dB
Ref Offset 9.05 dB
10 dB/div
Ref 19.05 dBm
ΔMkr2 1.621 ms
-0.01 dB
Center 2.441000000 GHz
Span 0 Hz
Res BW 1.0 MHz
#VBW 3.0 MHz
Sweep 10.13 ms (2000 pts)
Frequency
Auto Tune
Center Freq
2.441000000 GHz
Start Freq
2.441000000 GHz
Stop Freq
2.441000000 GHz
CF Step
1.000000 MHz
Freq Offset
0 Hz

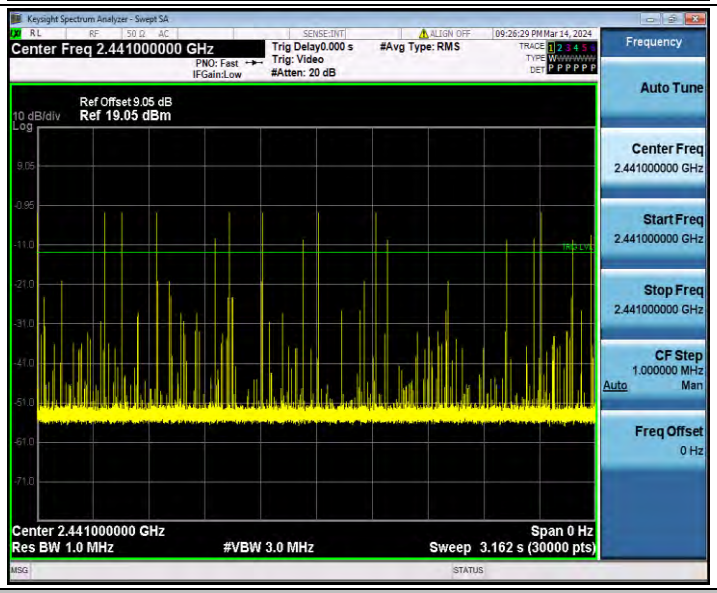

Keysight Spectrum Analyzer - Swept SA
Center Freq 2.441000000 GHz
Trig Delay0.000 s
#Avg Type: RMS
Trig: Video
#Atten: 20 dB
Ref Offset 9.05 dB
10 dB/div
Ref 19.05 dBm
Center 2.441000000 GHz
Span 0 Hz
Res BW 1.0 MHz
#VBW 3.0 MHz
Sweep 3.162 s (30000 pts)
Frequency
Auto Tune
Center Freq
2.441000000 GHz
Start Freq
2.441000000 GHz
Stop Freq
2.441000000 GHz
CF Step
1.000000 MHz
Freq Offset
0 Hz

DH5_Ant1_Hop

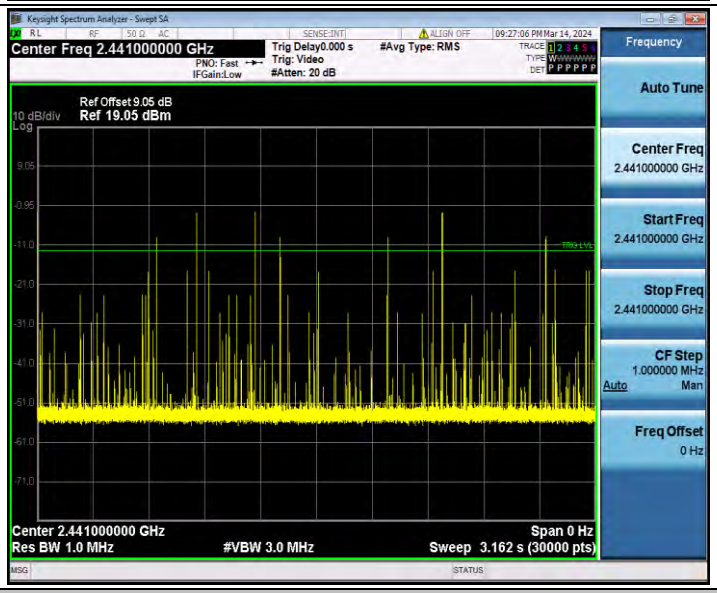
Keysight Spectrum Analyzer - Swept SA
Center Freq 2.441000000 GHz
Trig Delay-200.0 µs
#Avg Type: RMS
Trig: Video
#Atten: 20 dB
Ref Offset 9.05 dB
10 dB/div
Ref 19.05 dBm
ΔMkr2 2.827 ms
11.51 dB
Center 2.441000000 GHz
Span 0 Hz
Res BW 1.0 MHz
#VBW 3.0 MHz
Sweep 10.13 ms (2000 pts)
Frequency
Auto Tune
Center Freq
2.441000000 GHz
Start Freq
2.441000000 GHz
Stop Freq
2.441000000 GHz
CF Step
1.000000 MHz
Freq Offset
0 Hz



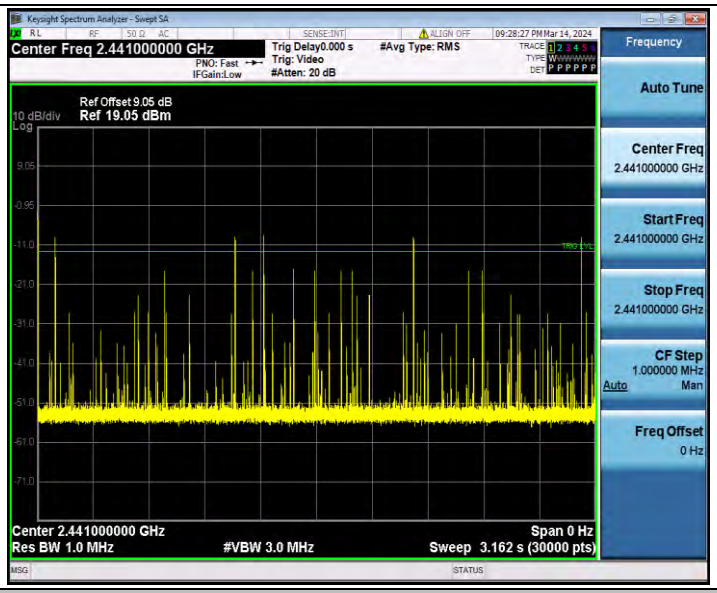

2DH1_Ant1_Hop



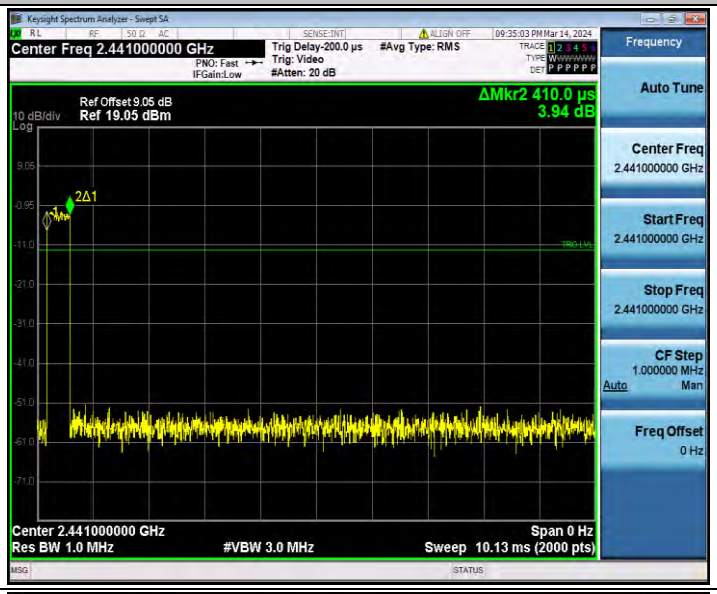

2DH3_Ant1_Hop

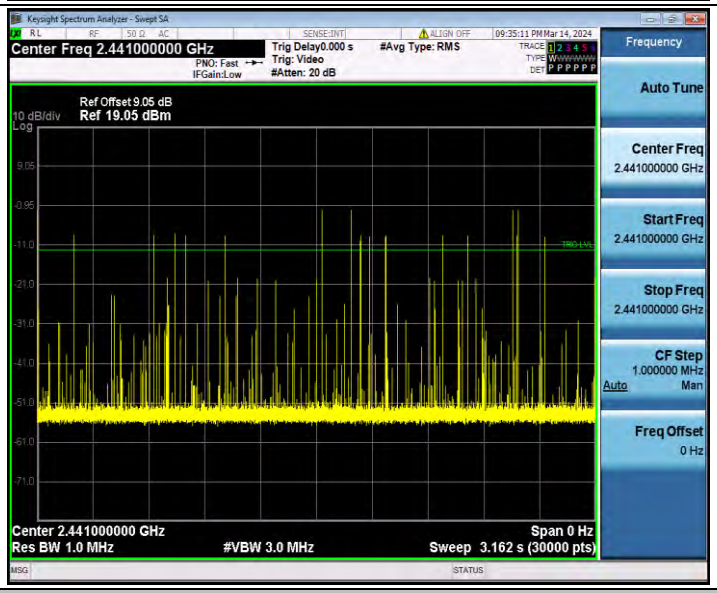



2DH5_Ant1_Hop

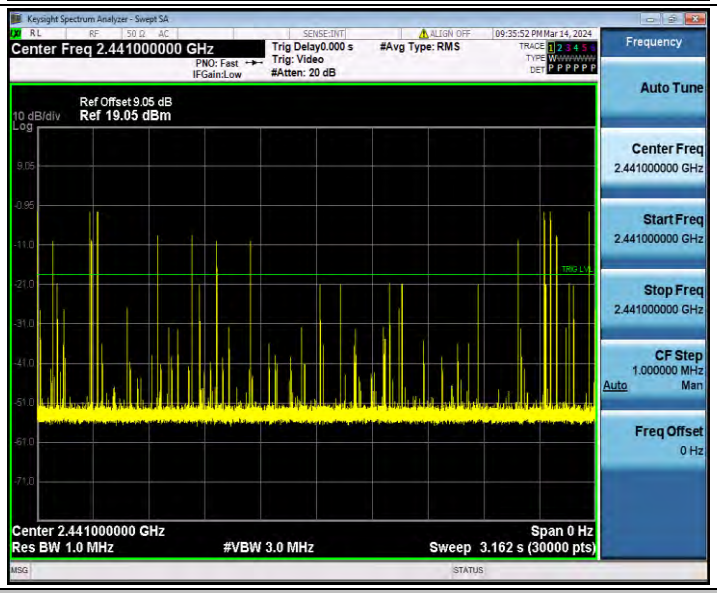



3DH1_Ant1_Hop

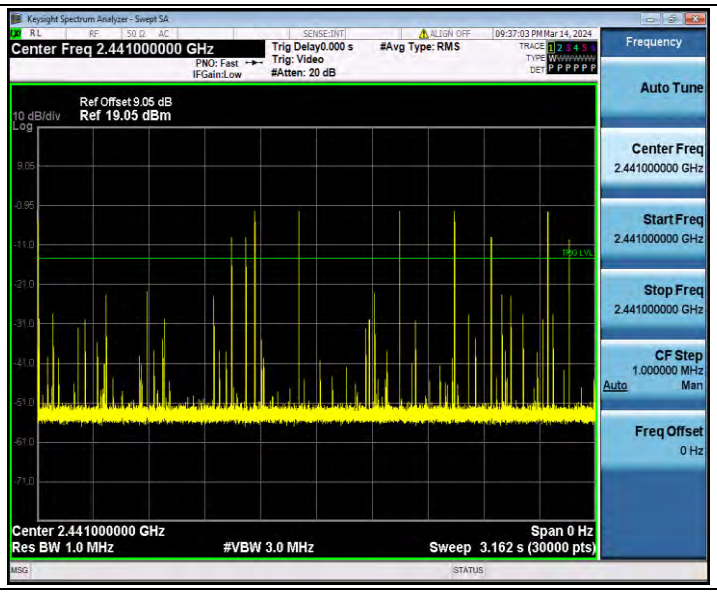



3DH3_Ant1_Hop




3DH5_Ant1_Hop


Keysight Spectrum Analyzer - Swept SA
Center Freq 2.441000000 GHz
PNO: Fast
IFGain:Low
Trig Delay0.000 s
Trig: Video
#Atten: 20 dB
#Avg Type: RMS
09:37:03 PM Mar 14, 2024
Frequency
Auto Tune
Center Freq
2.441000000 GHz
Start Freq
2.441000000 GHz
Stop Freq
2.441000000 GHz
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz
Ref Offset 9.05 dB
10 dB/div
Ref 19.05 dBm
Log
Center 2.441000000 GHz
Span 0 Hz
Res BW 1.0 MHz
#VBW 3.0 MHz
Sweep 3.162 s (30000 pts)

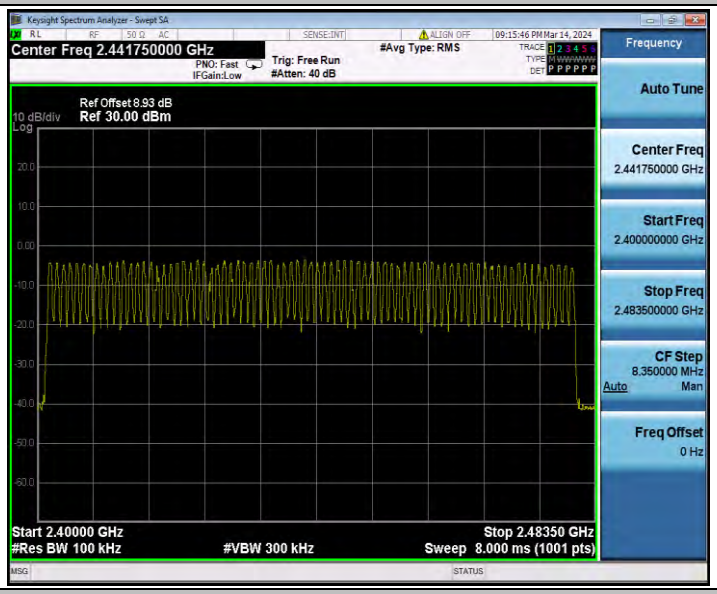
# Appendix A.6: Number of hopping channels

## Test Result

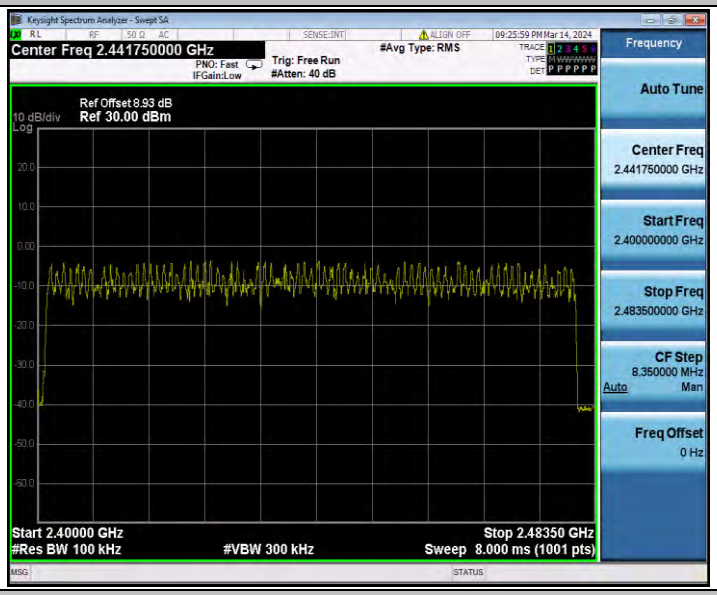
| TestMode | Antenna | Freq(MHz) | Result[Num] | Limit[Num] | Verdict |
|---|---|---|---|---|---|
| DH1 | Ant1 | Hop | 79 | ≥15 | PASS |
| 2DH1 | Ant1 | Hop | 79 | ≥15 | PASS |
| 3DH1 | Ant1 | Hop | 79 | ≥15 | PASS |

## Test Graphs

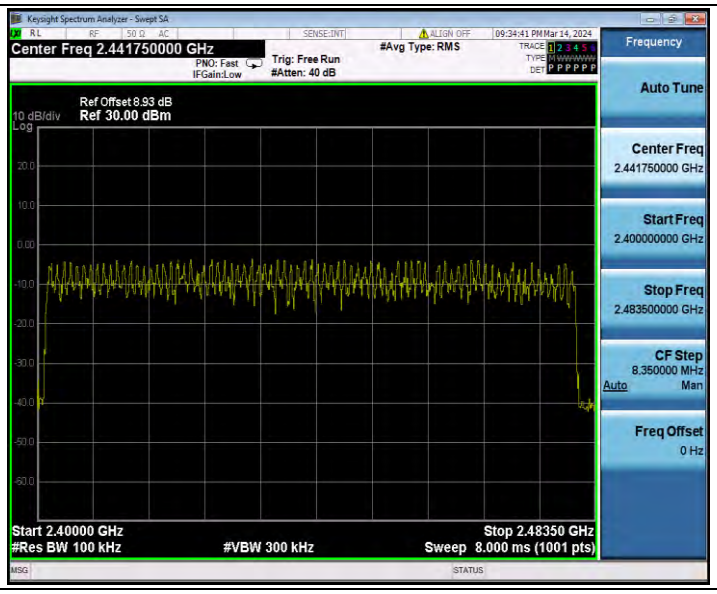
DH1_Ant1_Hop




2DH1_Ant1_Hop




3DH1_Ant1_Hop


Keysight Spectrum Analyzer - Swept SA
Center Freq 2.441750000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
#Avg Type: RMS
09:34:41 PM Mar 14, 2024
Ref Offset 8.93 dB
10 dB/div
Ref 30.00 dBm
Log
Start 2.40000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.48350 GHz
Sweep 8.000 ms (1001 pts)
Frequency
Auto Tune
Center Freq
2.441750000 GHz
Start Freq
2.400000000 GHz
Stop Freq
2.483500000 GHz
CF Step
8.350000 MHz
Auto
Man
Freq Offset
0 Hz

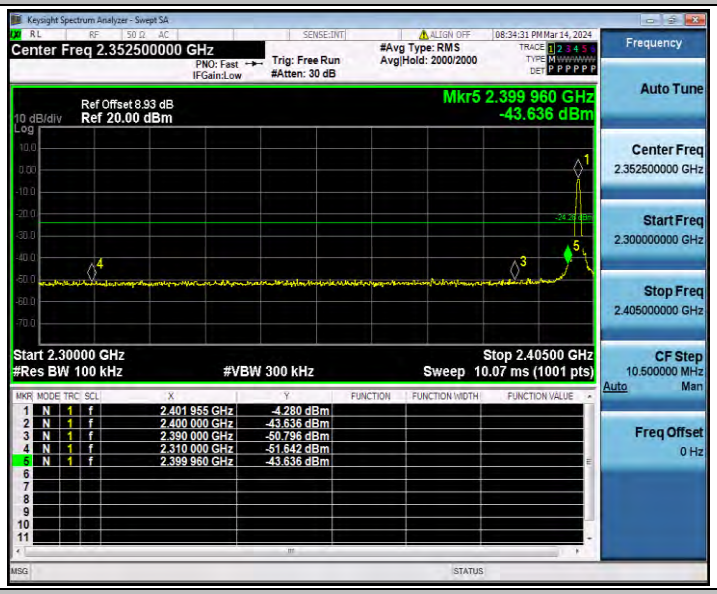
# Appendix A.7: Band edge measurements

## Test Result

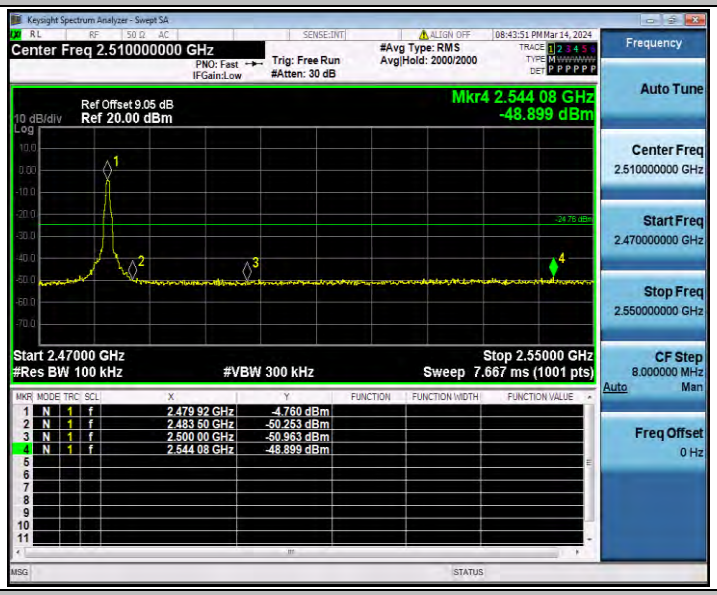
| TestMode | Antenna | ChName | Freq(MHz) | RefLevel [dBm] | Result [dBm] | Limit [dBm] | Verdict |
|---|---|---|---|---|---|---|---|
| DH1 | Ant1 | Low | 2402 | -4.28 | -43.64 | ≤-24.28 | PASS |
| | | High | 2480 | -4.76 | -48.9 | ≤-24.76 | PASS |
| | | Low | Hop_2402 | -5.19 | -48.5 | ≤-25.19 | PASS |
| | | High | Hop_2480 | -3.94 | -48.3 | ≤-23.94 | PASS |
| 2DH1 | Ant1 | Low | 2402 | -4.24 | -37.56 | ≤-24.24 | PASS |
| | | High | 2480 | -4.81 | -45.94 | ≤-24.81 | PASS |
| | | Low | Hop_2402 | -6.30 | -40.58 | ≤-26.3 | PASS |
| | | High | Hop_2480 | -5.32 | -49.14 | ≤-25.32 | PASS |
| 3DH1 | Ant1 | Low | 2402 | -4.25 | -37.91 | ≤-24.25 | PASS |
| | | High | 2480 | -4.75 | -43.9 | ≤-24.75 | PASS |
| | | Low | Hop_2402 | -5.06 | -42.25 | ≤-25.06 | PASS |
| | | High | Hop_2480 | -4.47 | -48.3 | ≤-24.47 | PASS |

## Test Graphs

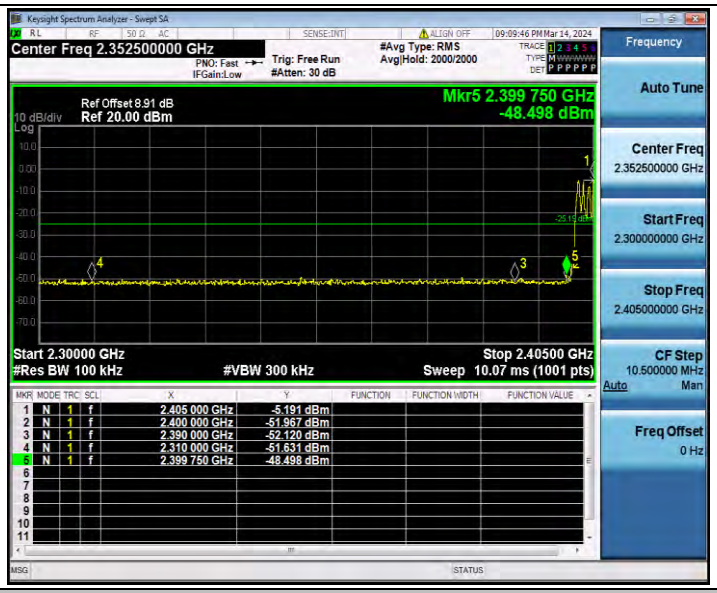
DH1_Ant1_Low_2402



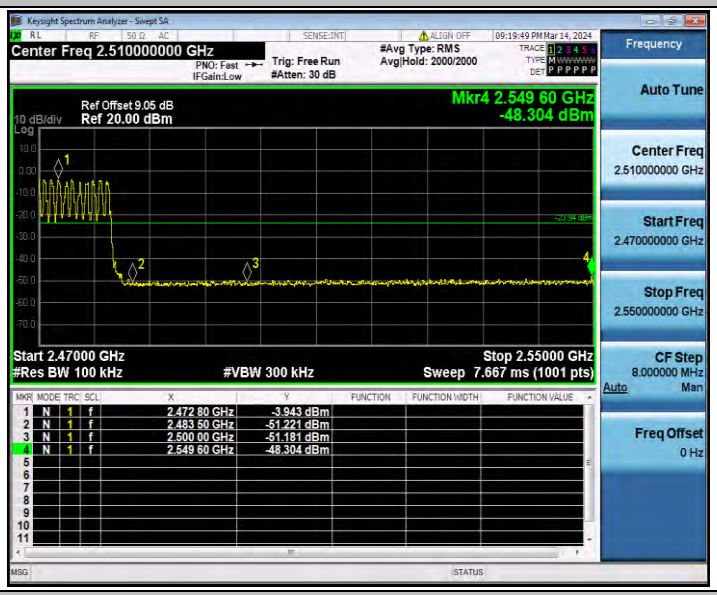

DH1_Ant1_High_2480



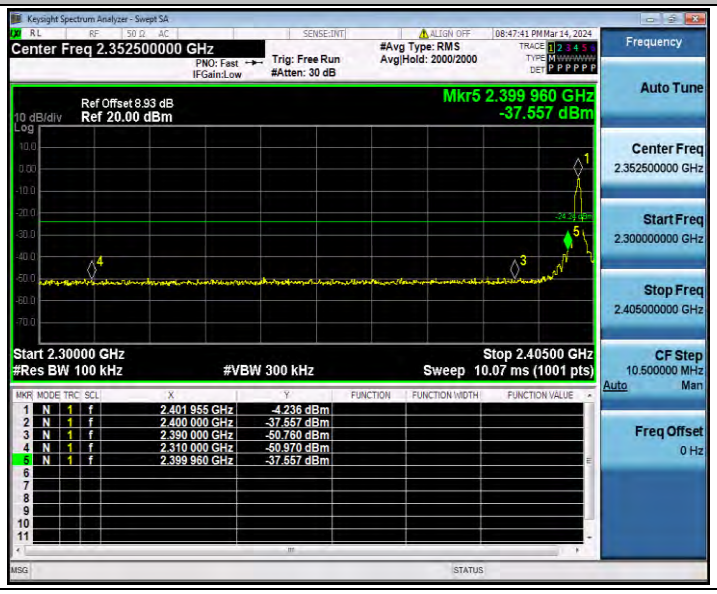

DH1_Ant1_Low_Hop_2402



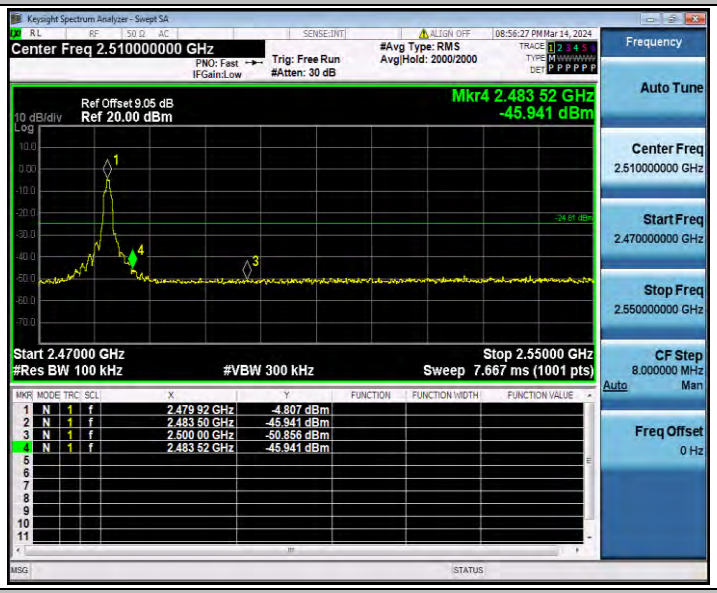

DH1_Ant1_High_Hop_2480



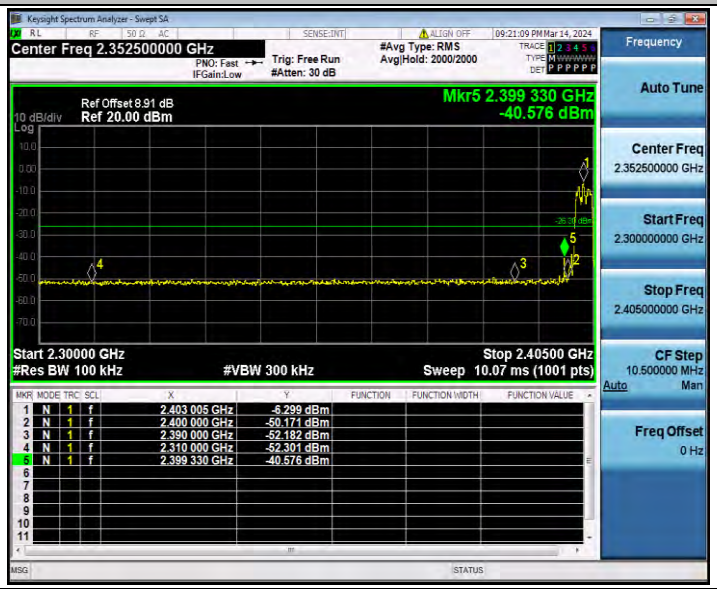

2DH1_Ant1_Low_2402



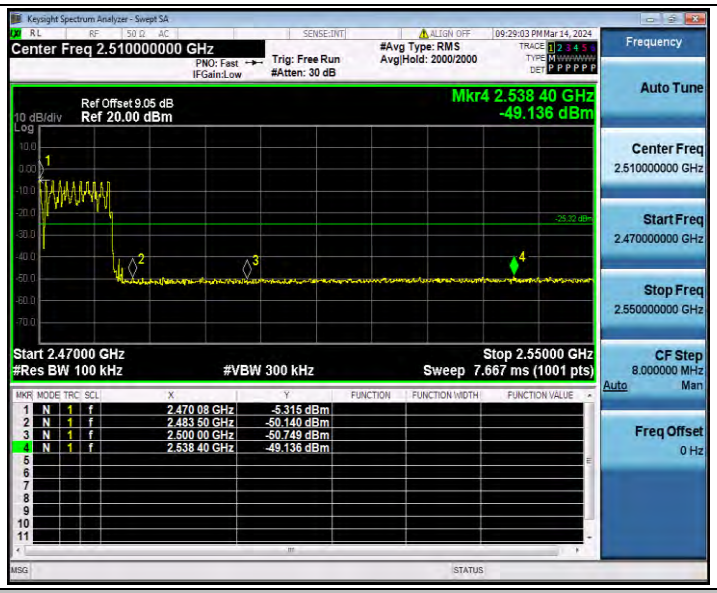
2DH1_Ant1_High_2480



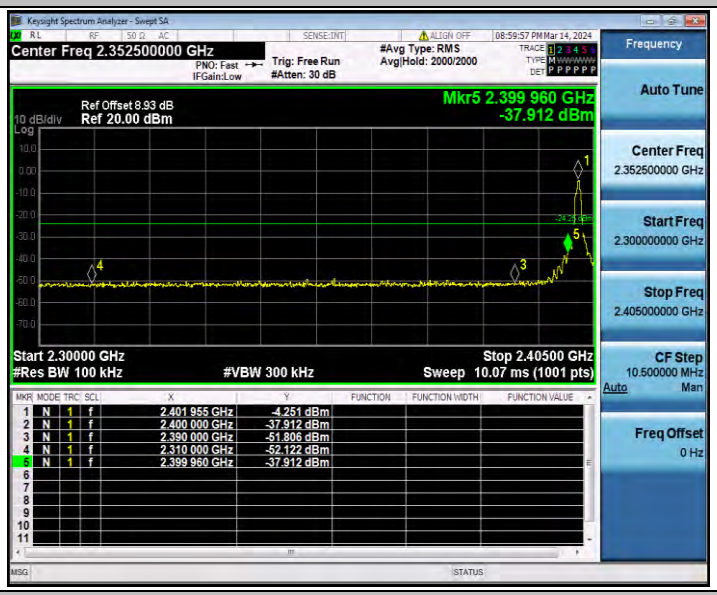

2DH1_Ant1_Low_Hop_2402



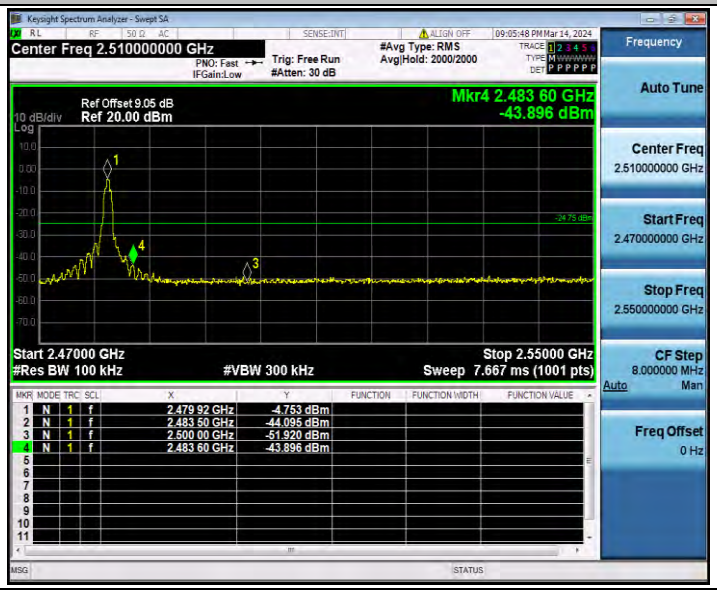

2DH1_Ant1_High_Hop_2480

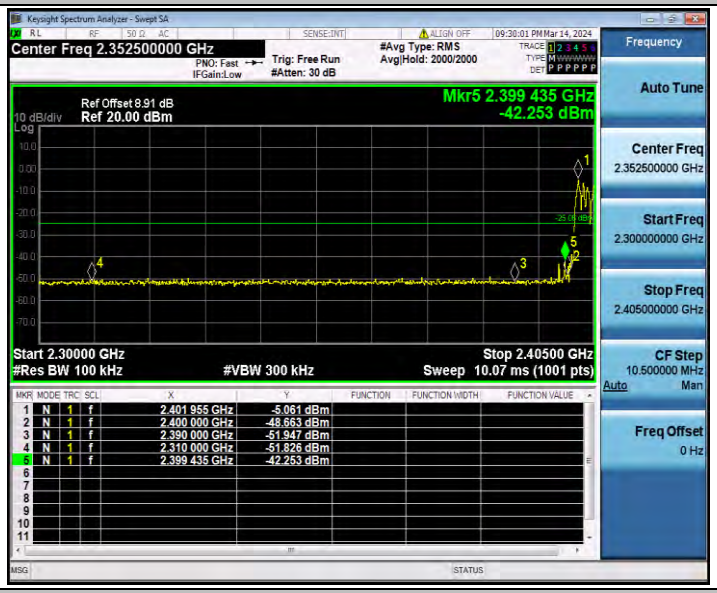



3DH1_Ant1_Low_2402

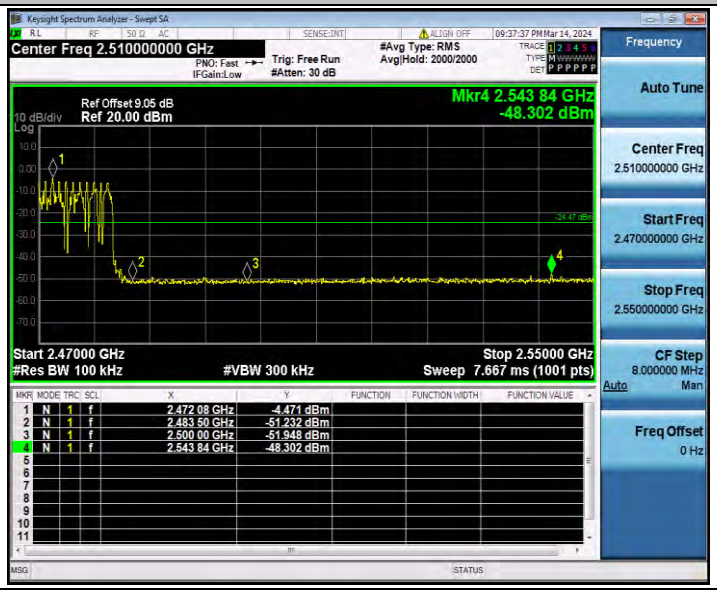



3DH1_Ant1_High_2480



| 3DH1_Ant1_Low_Hop_2402 |
|---|
|  |



| 3DH1_Ant1_High_Hop_2480 |
|---|
|  |

# Appendix A.8: Conducted Spurious Emission

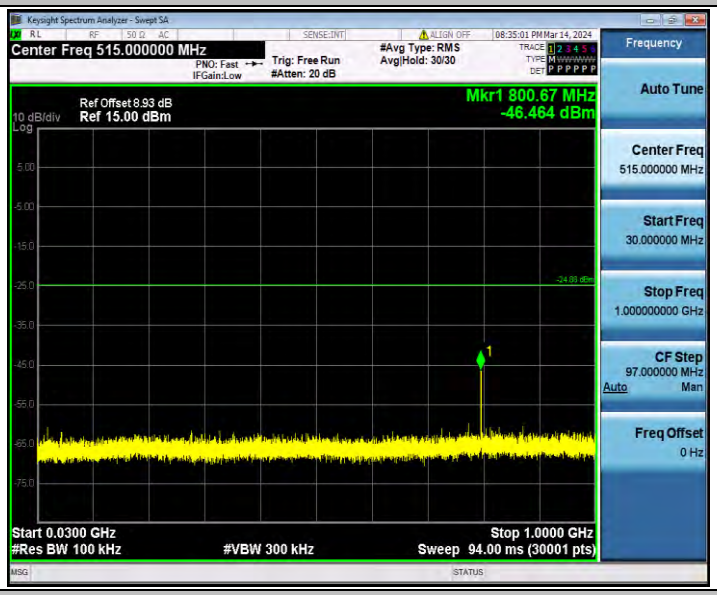
## Test Result

| TestMode | Antenna | Freq(MHz) | FreqRange [MHz] | RefLevel [dBm] | Result [dBm] | Limit [dBm] | Verdict |
|---|---|---|---|---|---|---|---|
| DH1 | Ant1 | 2402 | Reference | -4.88 | -4.88 | --- | PASS |
| | | | 30~1000 | -4.88 | -46.46 | ≤-24.88 | PASS |
| | | | 1000~26500 | -4.88 | -40.25 | ≤-24.88 | PASS |
| | | 2441 | Reference | -3.86 | -3.86 | --- | PASS |
| | | | 30~1000 | -3.86 | -46.36 | ≤-23.86 | PASS |
| | | | 1000~26500 | -3.86 | -25.19 | ≤-23.86 | PASS |
| | | 2480 | Reference | -5.21 | -5.21 | --- | PASS |
| | | | 30~1000 | -5.21 | -46.29 | ≤-25.21 | PASS |
| | | | 1000~26500 | -5.21 | -35.58 | ≤-25.21 | PASS |
| 2DH1 | Ant1 | 2402 | Reference | -4.87 | -4.87 | --- | PASS |
| | | | 30~1000 | -4.87 | -45.69 | ≤-24.87 | PASS |
| | | | 1000~26500 | -4.87 | -40.47 | ≤-24.87 | PASS |
| | | 2441 | Reference | -4.14 | -4.14 | --- | PASS |
| | | | 30~1000 | -4.14 | -46.34 | ≤-24.14 | PASS |
| | | | 1000~26500 | -4.14 | -40.85 | ≤-24.14 | PASS |
| | | 2480 | Reference | -5.46 | -5.46 | --- | PASS |
| | | | 30~1000 | -5.46 | -46.53 | ≤-25.46 | PASS |
| | | | 1000~26500 | -5.46 | -42.65 | ≤-25.46 | PASS |
| 3DH1 | Ant1 | 2402 | Reference | -4.91 | -4.91 | --- | PASS |
| | | | 30~1000 | -4.91 | -49.16 | ≤-24.91 | PASS |
| | | | 1000~26500 | -4.91 | -40.51 | ≤-24.91 | PASS |
| | | 2441 | Reference | -4.08 | -4.08 | --- | PASS |
| | | | 30~1000 | -4.08 | -47 | ≤-24.08 | PASS |
| | | | 1000~26500 | -4.08 | -40.93 | ≤-24.08 | PASS |
| | | 2480 | Reference | -5.43 | -5.43 | --- | PASS |
| | | | 30~1000 | -5.43 | -46.89 | ≤-25.43 | PASS |
| | | | 1000~26500 | -5.43 | -42.43 | ≤-25.43 | PASS |

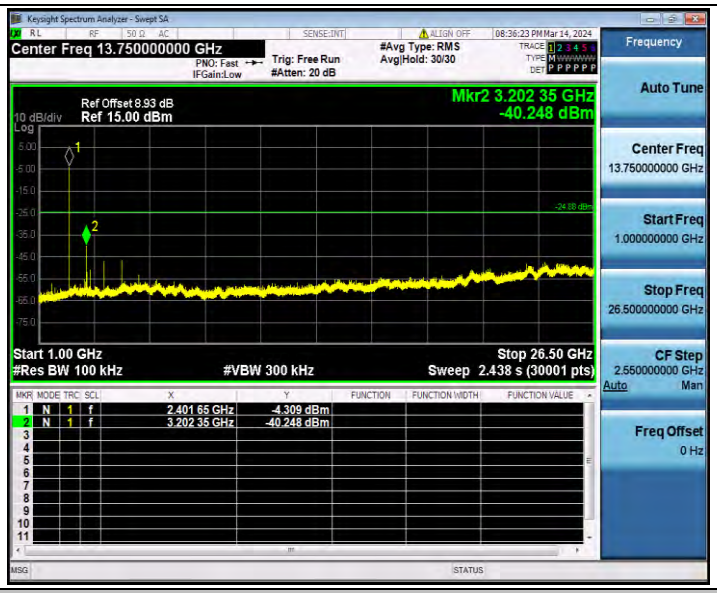
## Test Graphs

DH1_Ant1_2402_0~Reference

DH1_Ant1_2402_30~1000



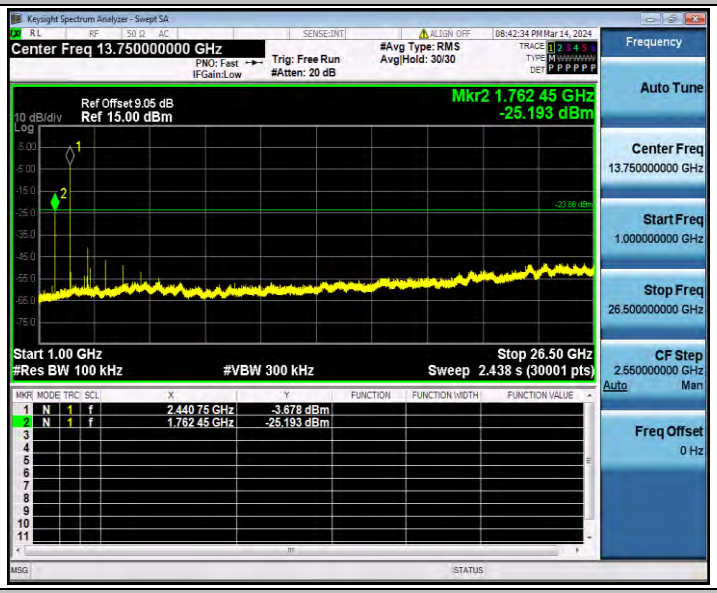

DH1_Ant1_2402_1000~26500




DH1_Ant1_2441_0~Reference

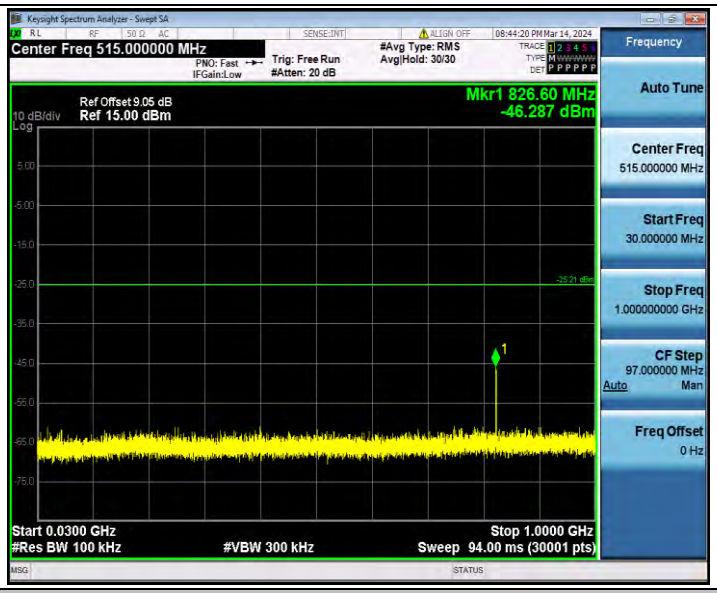
DH1_Ant1_2441_30~1000

DH1_Ant1_2441_1000~26500

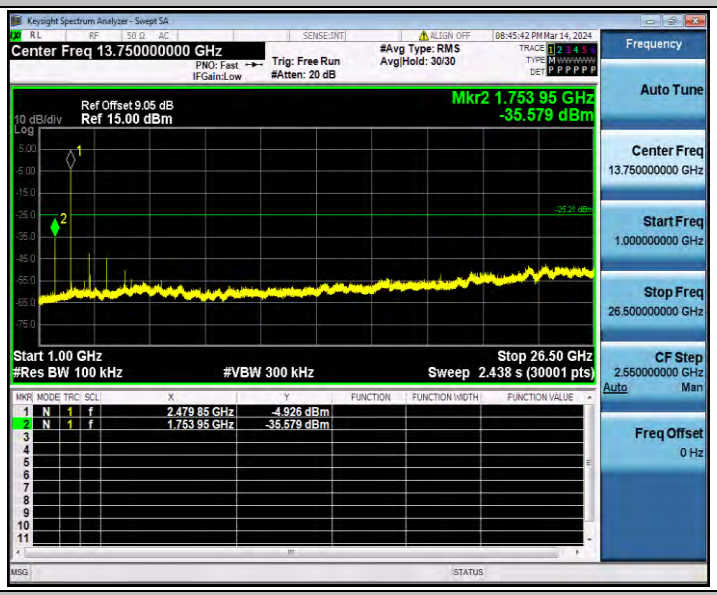



DH1_Ant1_2480_0~Reference

DH1_Ant1_2480_30~1000

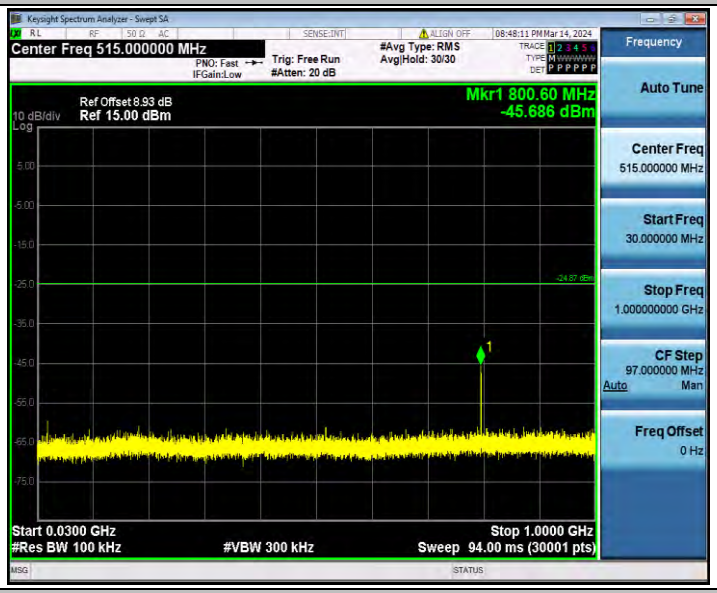



DH1_Ant1_2480_1000~26500

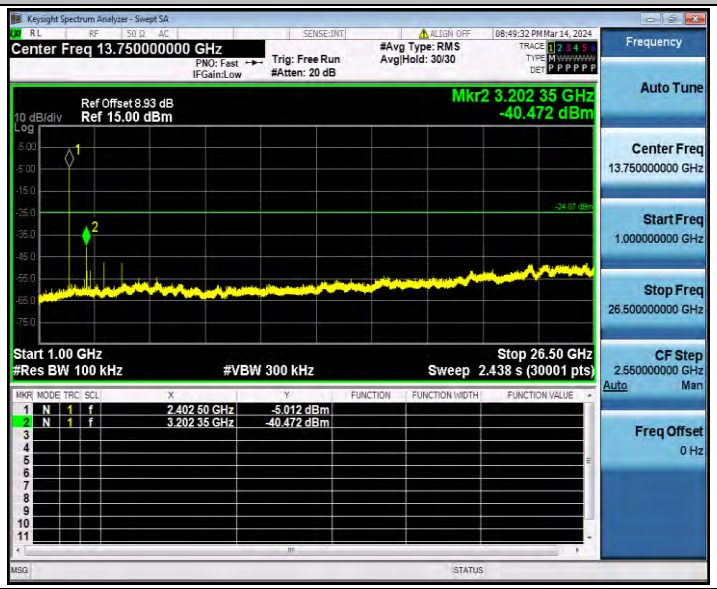



2DH1_Ant1_2402_0~Reference

2DH1_Ant1_2402_30~1000

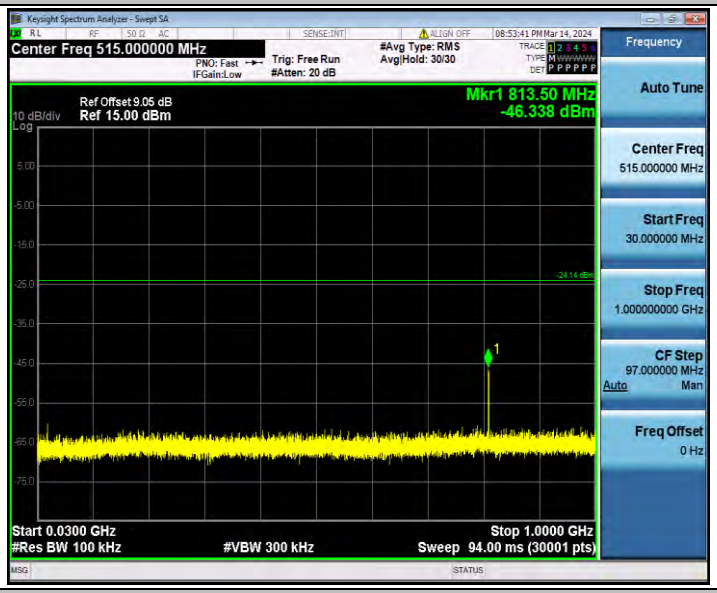



2DH1_Ant1_2402_1000~26500

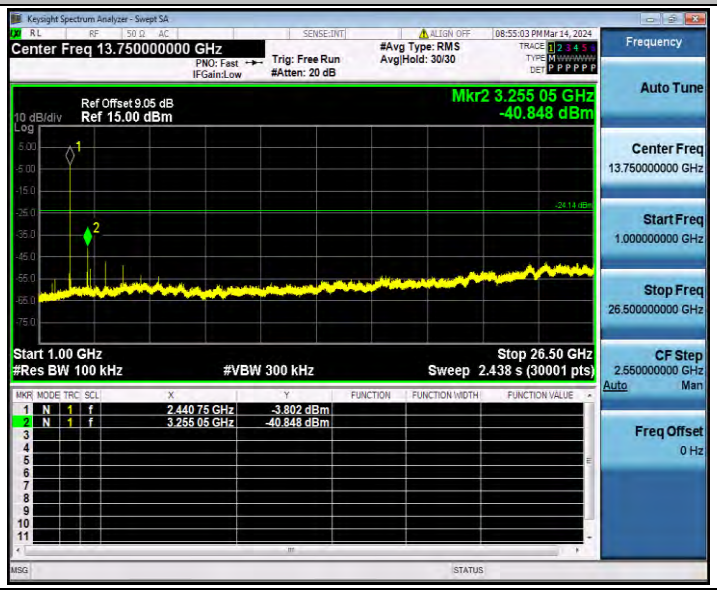



2DH1_Ant1_2441_0~Reference

2DH1_Ant1_2441_30~1000

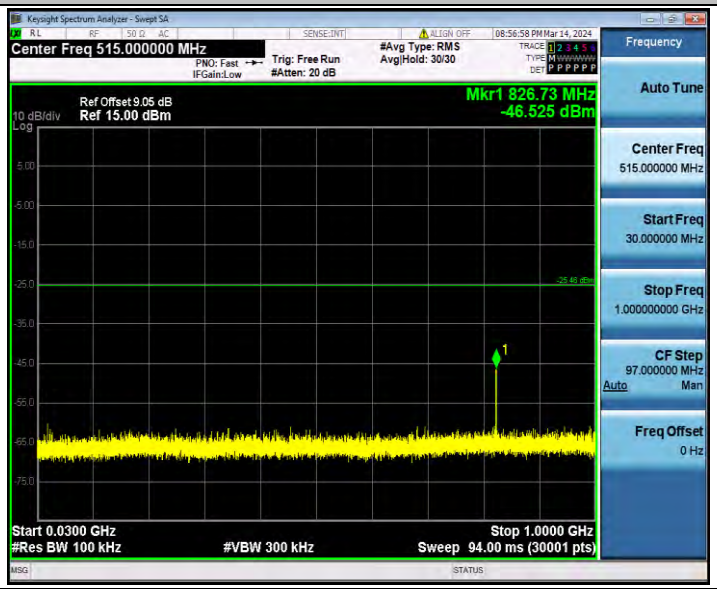



2DH1_Ant1_2441_1000~26500

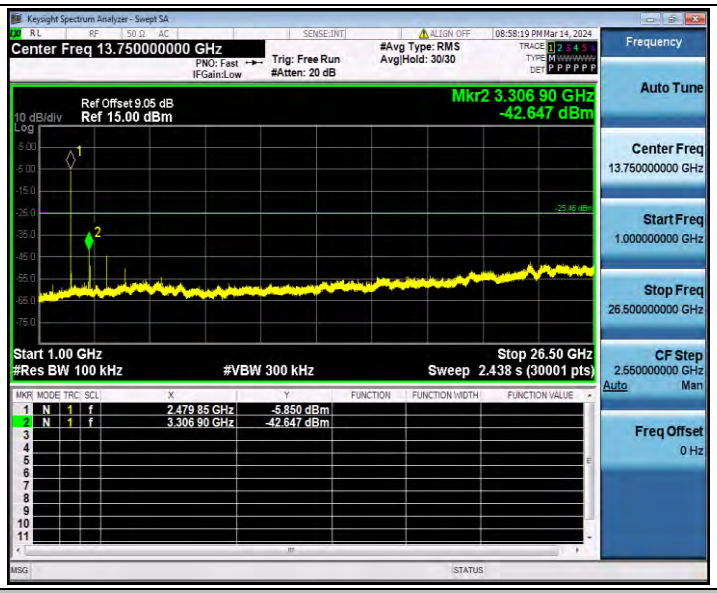


2DH1_Ant1_2480_0~Reference

2DH1_Ant1_2480_30~1000

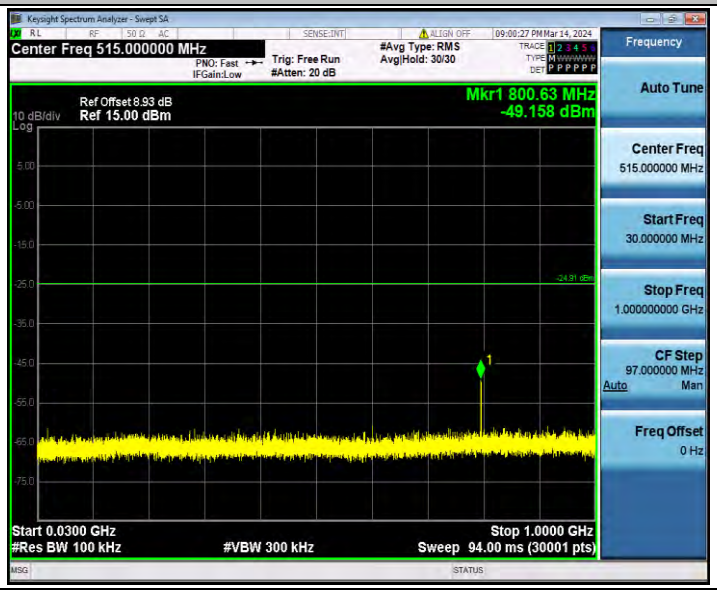



2DH1_Ant1_2480_1000~26500

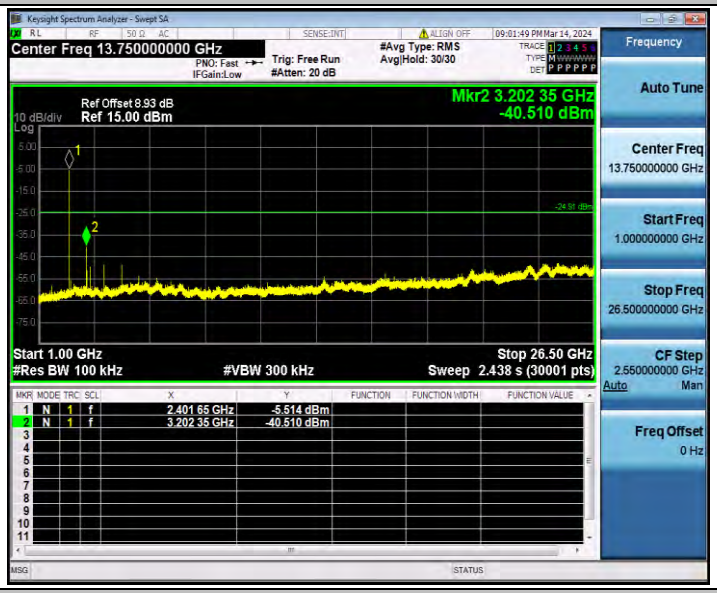



3DH1_Ant1_2402_0~Reference

3DH1_Ant1_2402_30~1000

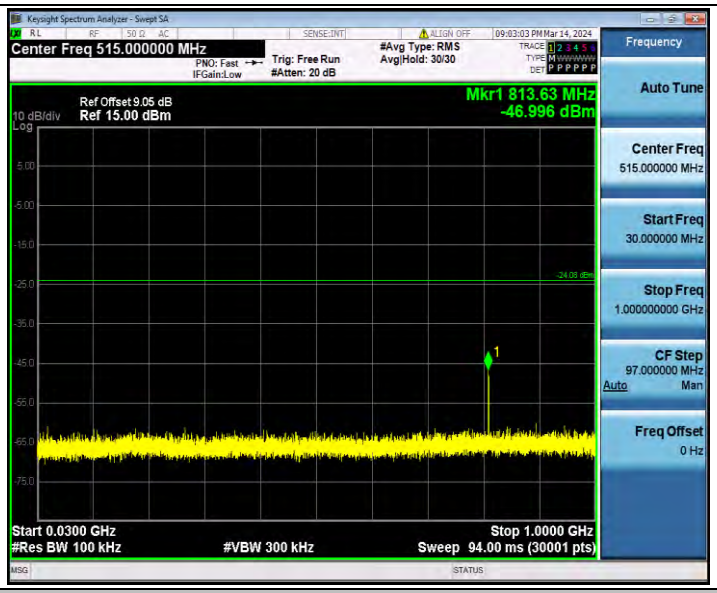


3DH1_Ant1_2402_1000~26500

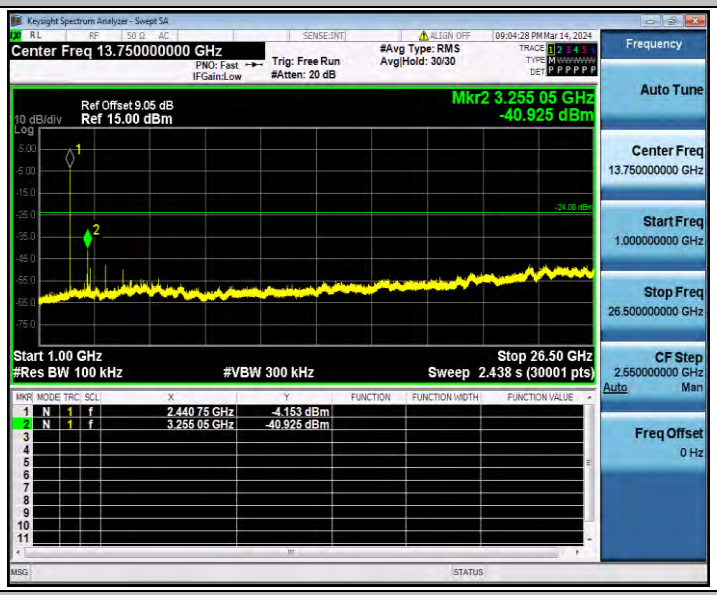



3DH1_Ant1_2441_0~Reference

3DH1_Ant1_2441_30~1000

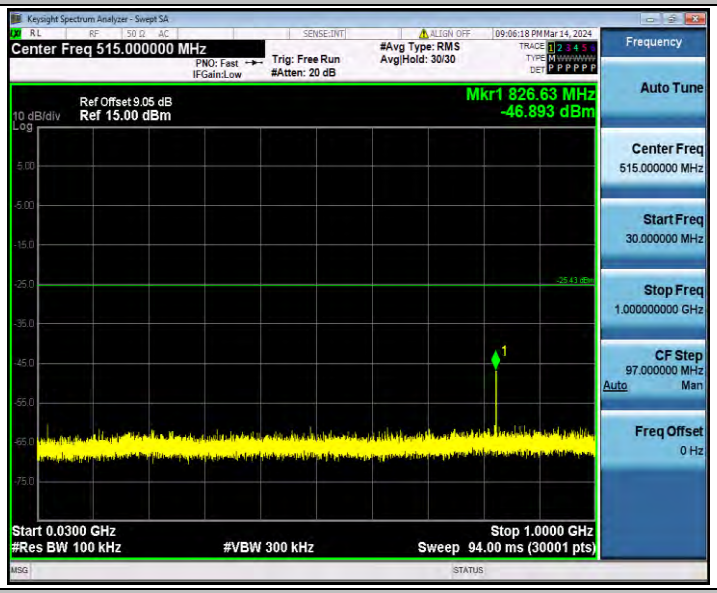



3DH1_Ant1_2441_1000~26500

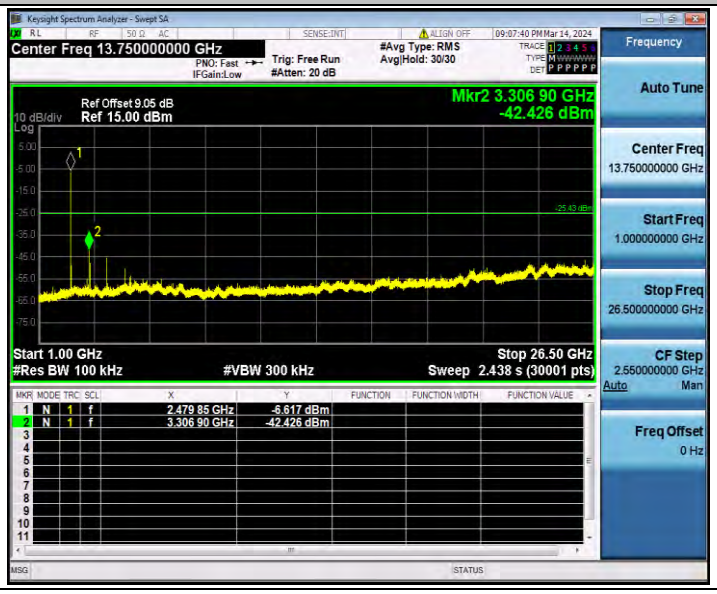



3DH1_Ant1_2480_0~Reference

3DH1_Ant1_2480_30~1000




3DH1_Ant1_2480_1000~26500



# Appendix A.9: Emissions in Restricted Bands

## Test Result

| TestMode | Antenna | ChName | Freq (MHz) | Detector | Freq [MHz] | Result [dBm] | Limit [dBm] | Result [dBuV/m] | Limit [dBuV/m] | Verdict |
|---|---|---|---|---|---|---|---|---|---|---|
| DH1 | Ant1 | Low | 2402 | AV | 2310.000 | -49.38 | ≤-41.20 | 45.82 | ≤54 | PASS |
| | | | | AV | 2388.620 | -48.95 | ≤-41.20 | 46.25 | ≤54 | PASS |
| | | | | AV | 2390.000 | -49.12 | ≤-41.20 | 46.08 | ≤54 | PASS |
| | | | | Peak | 2310.000 | -42.42 | ≤-21.20 | 52.78 | ≤74 | PASS |
| | | | | Peak | 2363.735 | -38.13 | ≤-21.20 | 57.07 | ≤74 | PASS |
| | | | | Peak | 2390.000 | -42.97 | ≤-21.20 | 52.23 | ≤74 | PASS |
| | | High | 2480 | AV | 2483.500 | -47.26 | ≤-41.20 | 47.94 | ≤54 | PASS |
| | | | | AV | 2483.520 | -47.26 | ≤-41.20 | 47.94 | ≤54 | PASS |
| | | | | AV | 2500.000 | -48.92 | ≤-41.20 | 46.28 | ≤54 | PASS |
| | | | | Peak | 2483.500 | -38.77 | ≤-21.20 | 56.43 | ≤74 | PASS |
| | | | | Peak | 2484.480 | -35.21 | ≤-21.20 | 59.99 | ≤74 | PASS |
| | | | | Peak | 2500.000 | -41.73 | ≤-21.20 | 53.47 | ≤74 | PASS |
| 2DH1 | Ant1 | Low | 2402 | AV | 2310.000 | -49.55 | ≤-41.20 | 45.65 | ≤54 | PASS |
| | | | | AV | 2381.060 | -48.99 | ≤-41.20 | 46.21 | ≤54 | PASS |
| | | | | AV | 2390.000 | -49.16 | ≤-41.20 | 46.04 | ≤54 | PASS |
| | | | | Peak | 2310.000 | -42.84 | ≤-21.20 | 52.36 | ≤74 | PASS |
| | | | | Peak | 2335.595 | -38.17 | ≤-21.20 | 57.03 | ≤74 | PASS |
| | | | | Peak | 2390.000 | -41.94 | ≤-21.20 | 53.26 | ≤74 | PASS |
| | | High | 2480 | AV | 2483.500 | -46.1 | ≤-41.20 | 49.10 | ≤54 | PASS |
| | | | | AV | 2483.520 | -46.09 | ≤-41.20 | 49.11 | ≤54 | PASS |
| | | | | AV | 2500.000 | -48.81 | ≤-41.20 | 46.39 | ≤54 | PASS |
| | | | | Peak | 2483.500 | -25.87 | ≤-21.20 | 69.33 | ≤74 | PASS |
| | | | | Peak | 2483.520 | -25.87 | ≤-21.20 | 69.33 | ≤74 | PASS |
| | | | | Peak | 2500.000 | -42.16 | ≤-21.20 | 53.04 | ≤74 | PASS |
| 3DH1 | Ant1 | Low | 2402 | AV | 2310.000 | -49.57 | ≤-41.20 | 45.63 | ≤54 | PASS |
| | | | | AV | 2389.460 | -48.91 | ≤-41.20 | 46.29 | ≤54 | PASS |
| | | | | AV | 2390.000 | -49.12 | ≤-41.20 | 46.08 | ≤54 | PASS |
| | | | | Peak | 2310.000 | -41.45 | ≤-21.20 | 53.75 | ≤74 | PASS |
| | | | | Peak | 2383.055 | -38.01 | ≤-21.20 | 57.19 | ≤74 | PASS |
| | | | | Peak | 2390.000 | -41.69 | ≤-21.20 | 53.51 | ≤74 | PASS |
| | | High | 2480 | AV | 2483.500 | -46.31 | ≤-41.20 | 48.89 | ≤54 | PASS |
| | | | | AV | 2483.520 | -46.31 | ≤-41.20 | 48.89 | ≤54 | PASS |
| | | | | AV | 2500.000 | -48.79 | ≤-41.20 | 46.41 | ≤54 | PASS |
| | | | | Peak | 2483.500 | -37.89 | ≤-21.20 | 57.31 | ≤74 | PASS |
| | | | | Peak | 2483.760 | -29.17 | ≤-21.20 | 66.03 | ≤74 | PASS |

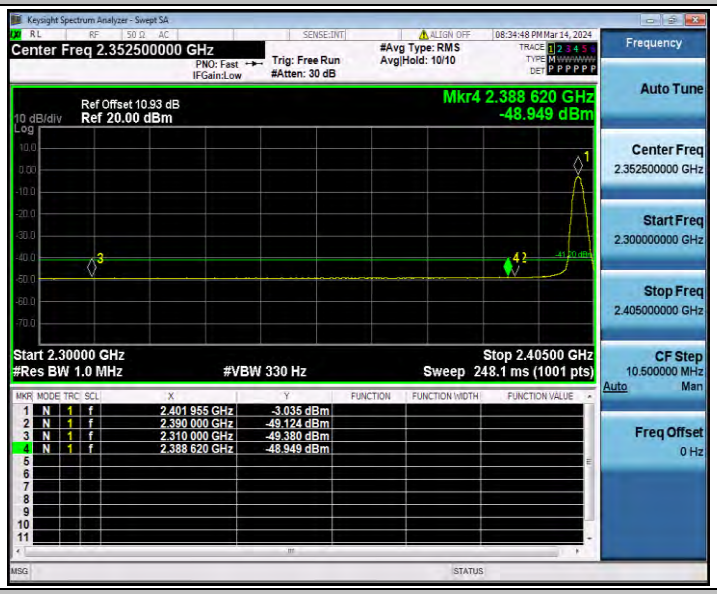
| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Peak | 2500.000 | -42.26 | ≤-21.20 | 52.94 | ≤74 | PASS |

Note：

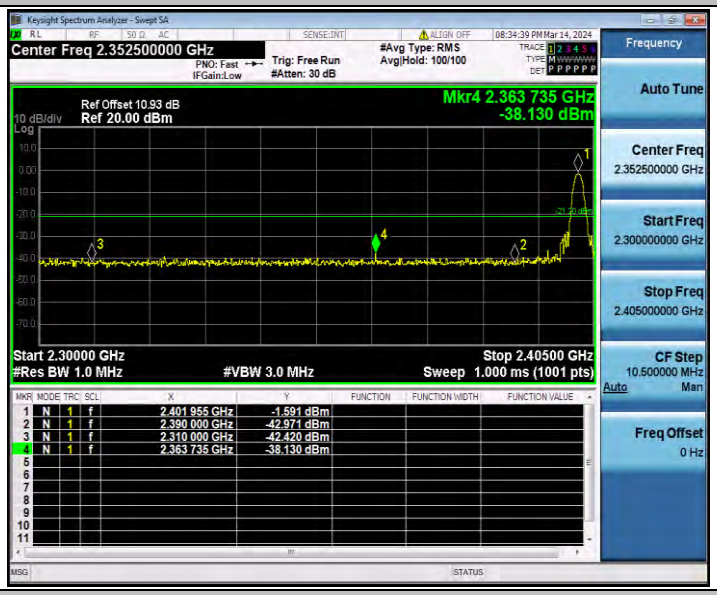
1. The Antenna Gain is compensated in the graph.
2. The Duty Cycle Factor and RBW Factor is compensated in the graph.
3. The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

## Test Graphs

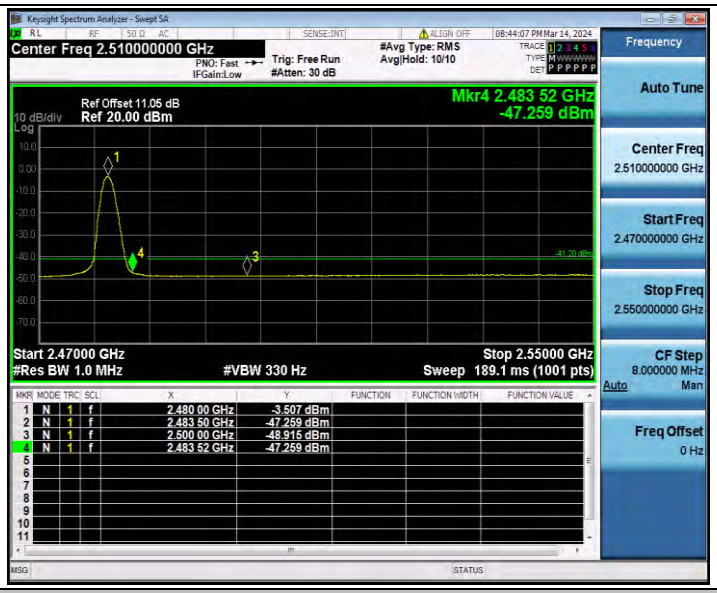
DH1_Ant1_Low_2402_AV



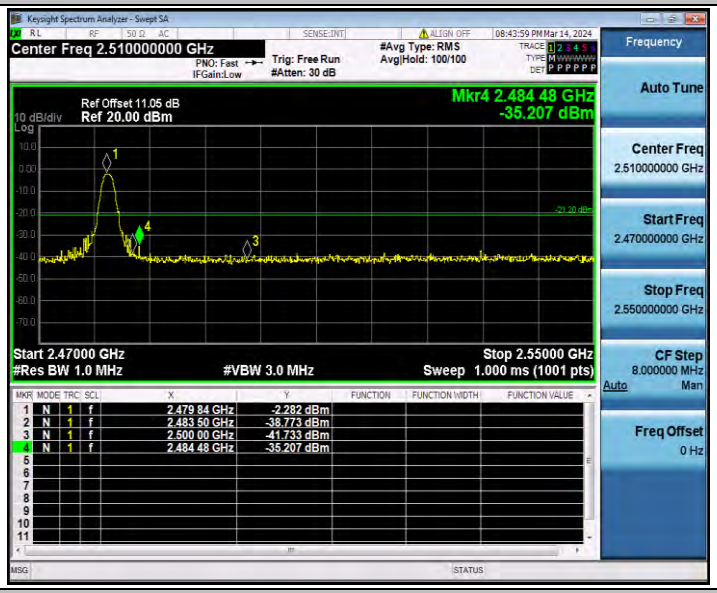

DH1_Ant1_Low_2402_Peak



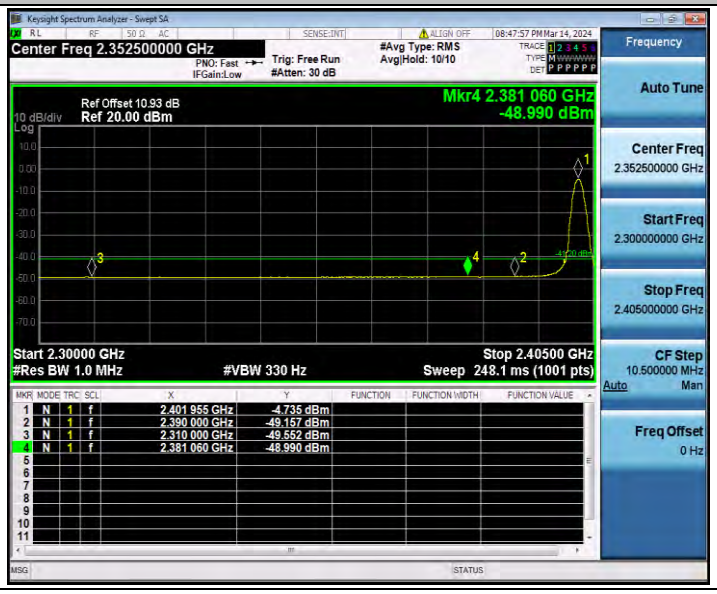

DH1_Ant1_High_2480_AV



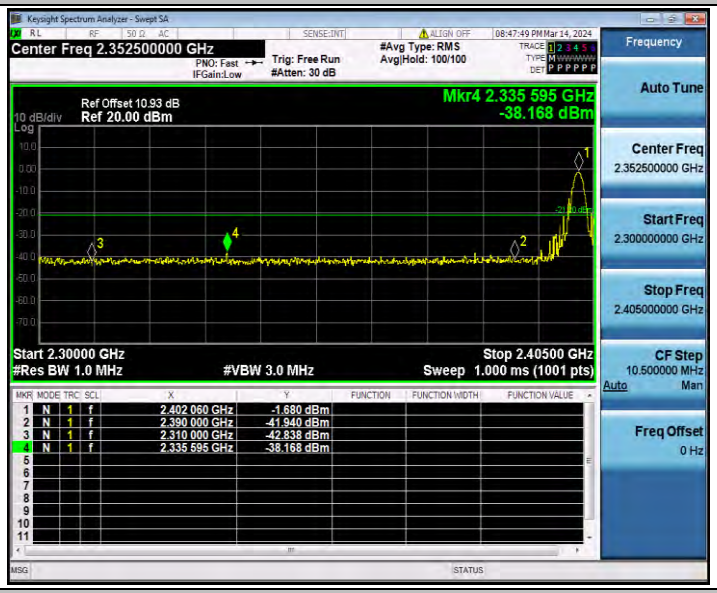

DH1_Ant1_High_2480_Peak



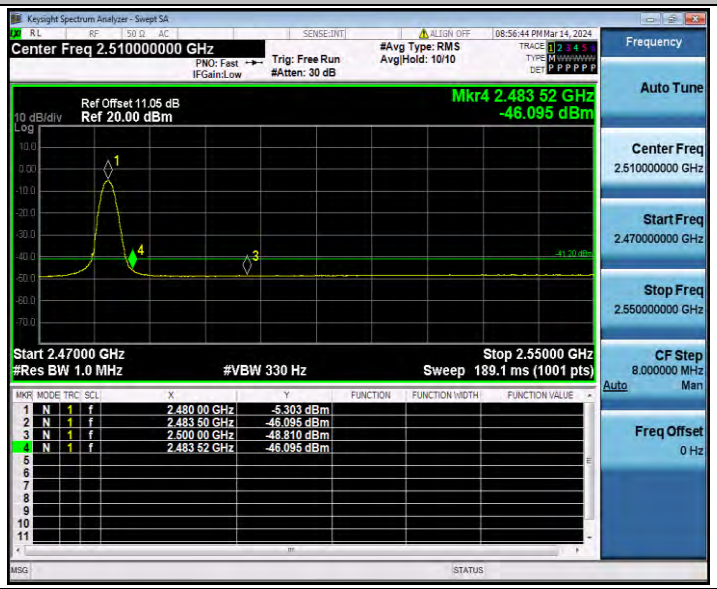

2DH1_Ant1_Low_2402_AV



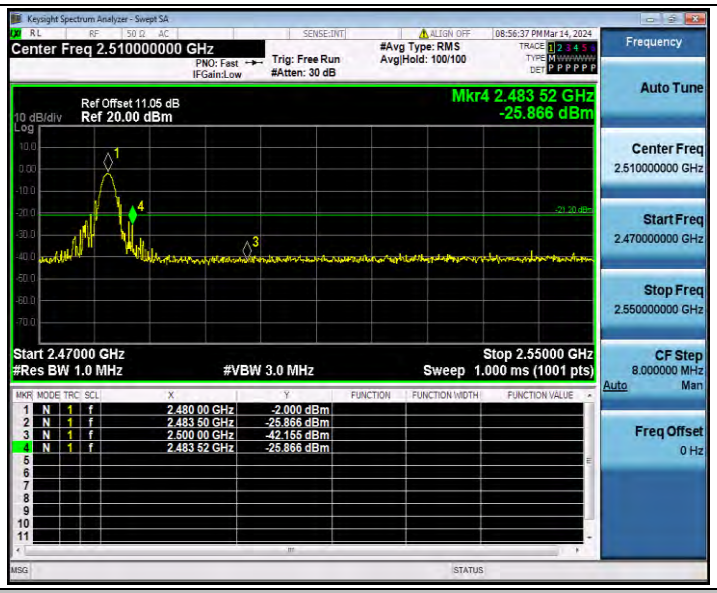
2DH1_Ant1_Low_2402_Peak



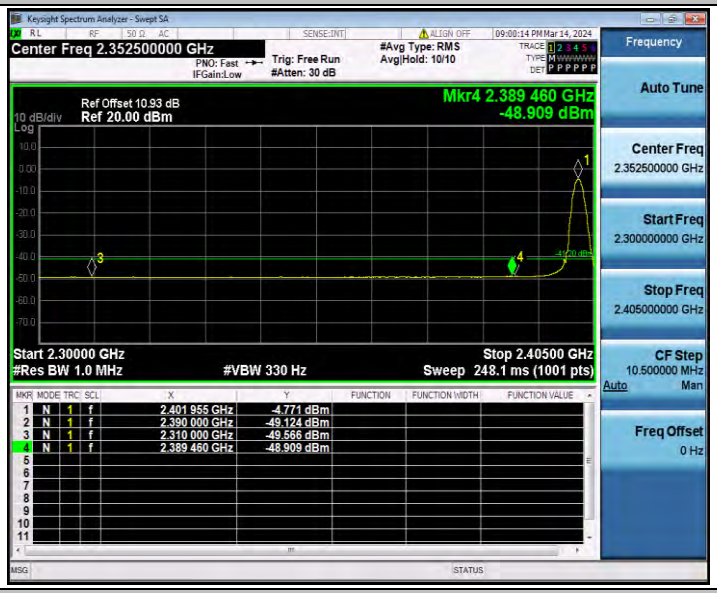

2DH1_Ant1_High_2480_AV



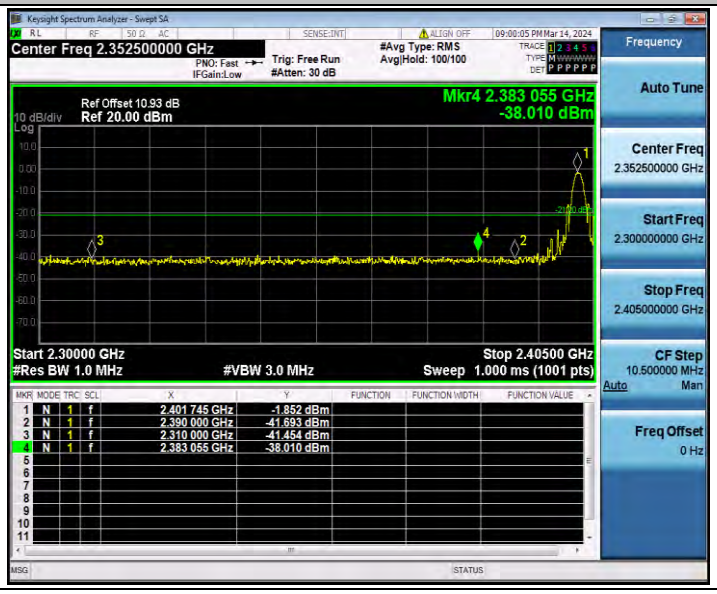

2DH1_Ant1_High_2480_Peak



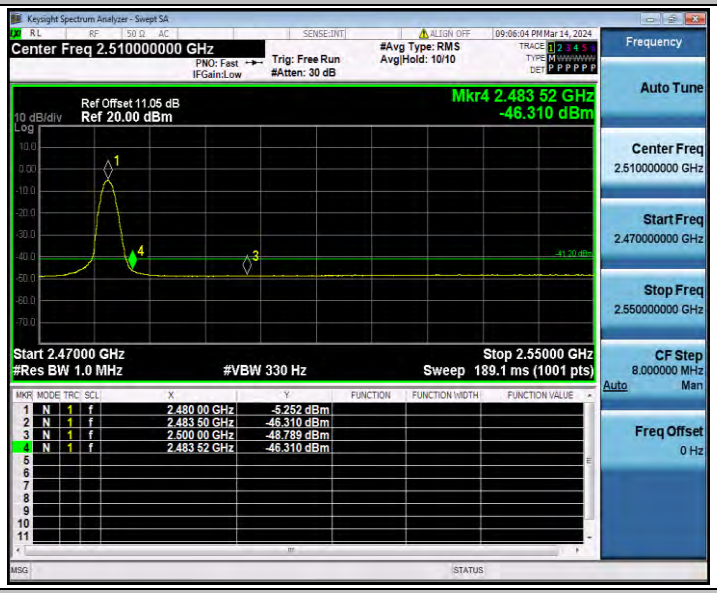

3DH1_Ant1_Low_2402_AV




3DH1_Ant1_Low_2402_Peak



3DH1_Ant1_High_2480_AV




3DH1_Ant1_High_2480_Peak