# Appendix A

# RF Test Data for BT (Conducted Measurement)

**Product Name: Multl-functiona Lamp**

**Test Model: LZ-S2017**

**Environmental Conditions**

| | |
|---|---|
| Temperature: | 23.5° C |
| Relative Humidity: | 52.2% |
| ATM Pressure: | 100.0 kPa |
| Test Engineer: | Kay Hu |
| Supervised by: | Li Huan |

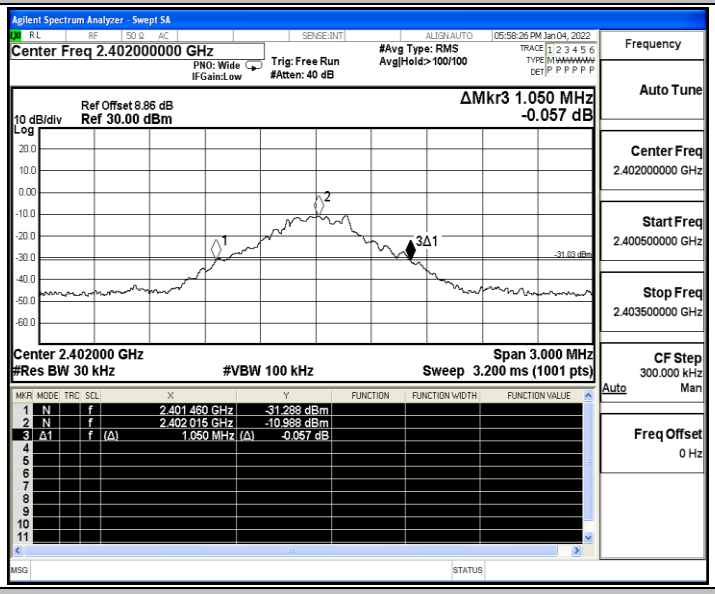
# A.1 20dB Emission Bandwidth

## Test Result

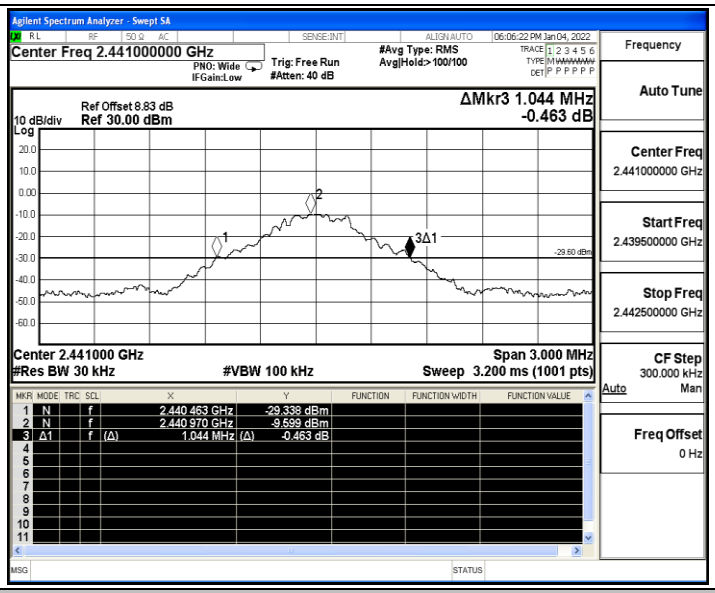
| TestMode | Antenna | Frequency[MHz] | 20db EBW[MHz] | FL[MHz] | FH[MHz] | Limit[MHz] | Verdict |
|---|---|---|---|---|---|---|---|
| DH5 | Ant1 | 2402 | 1.050 | 2401.460 | 2402.510 | --- | --- |
| | | 2441 | 1.044 | 2440.463 | 2441.507 | --- | --- |
| | | 2480 | 1.035 | 2479.466 | 2480.501 | --- | --- |
| 2DH5 | Ant1 | 2402 | 1.314 | 2401.343 | 2402.657 | --- | --- |
| | | 2441 | 1.317 | 2440.337 | 2441.654 | --- | --- |
| | | 2480 | 1.320 | 2479.340 | 2480.660 | --- | --- |
| 3DH5 | Ant1 | 2402 | 1.299 | 2401.349 | 2402.648 | --- | --- |
| | | 2441 | 1.302 | 2440.349 | 2441.651 | --- | --- |
| | | 2480 | 1.305 | 2479.346 | 2480.651 | --- | --- |

## Test Graphs

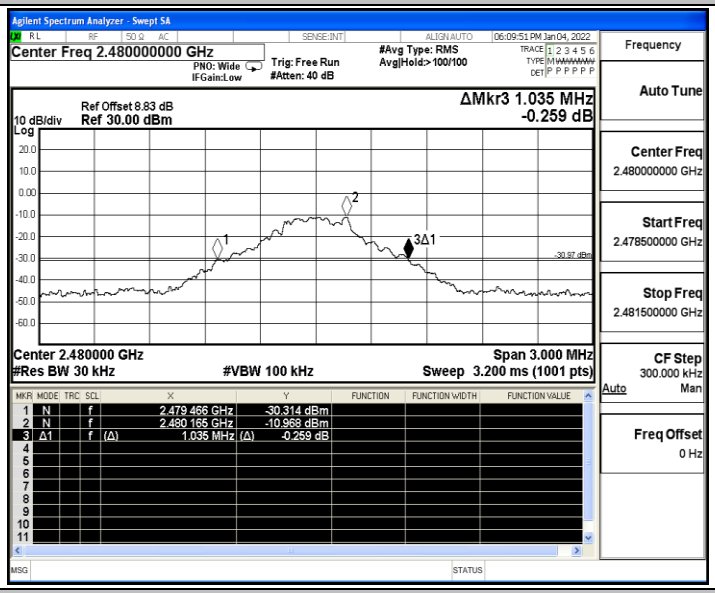
DH5_Ant1_2402



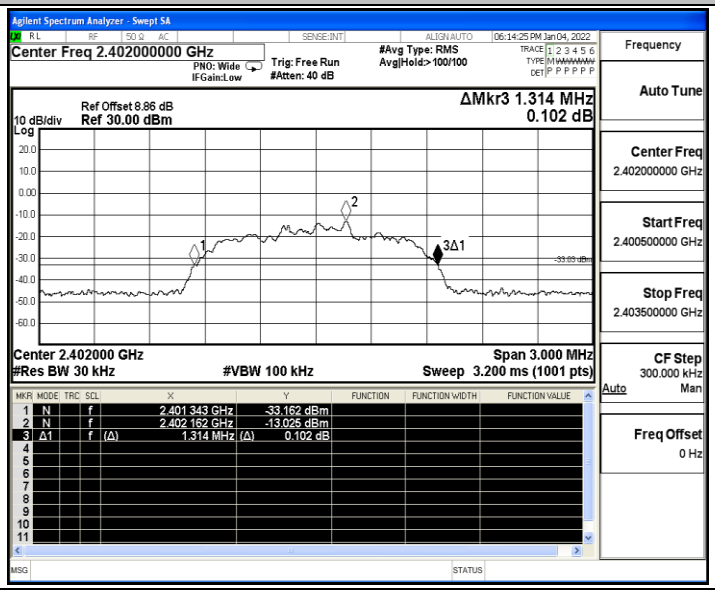

DH5_Ant1_2441



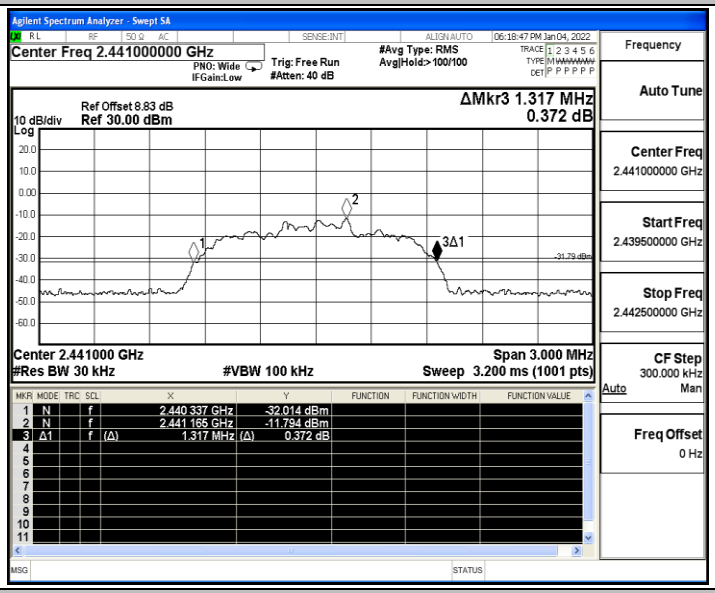

DH5_Ant1_2480



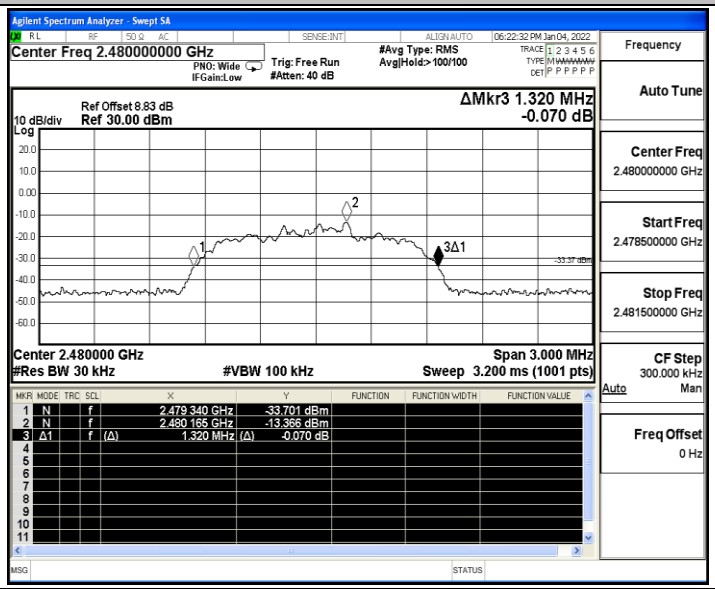

2DH5_Ant1_2402



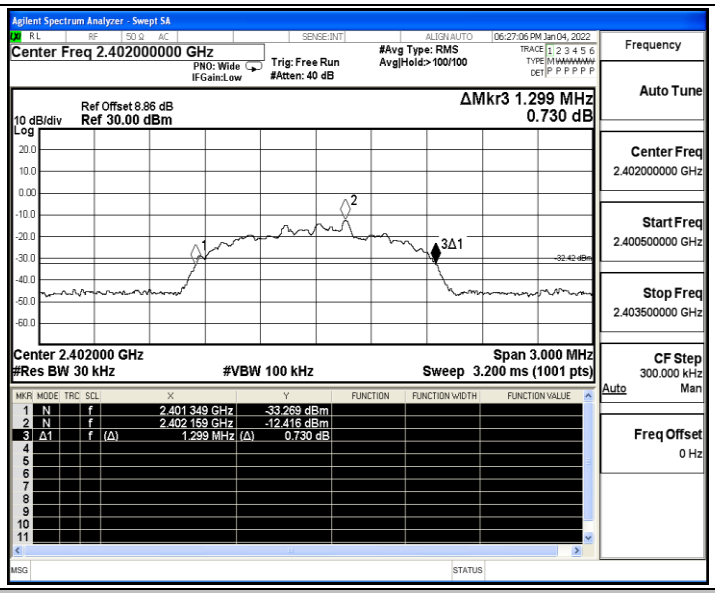
2DH5_Ant1_2441



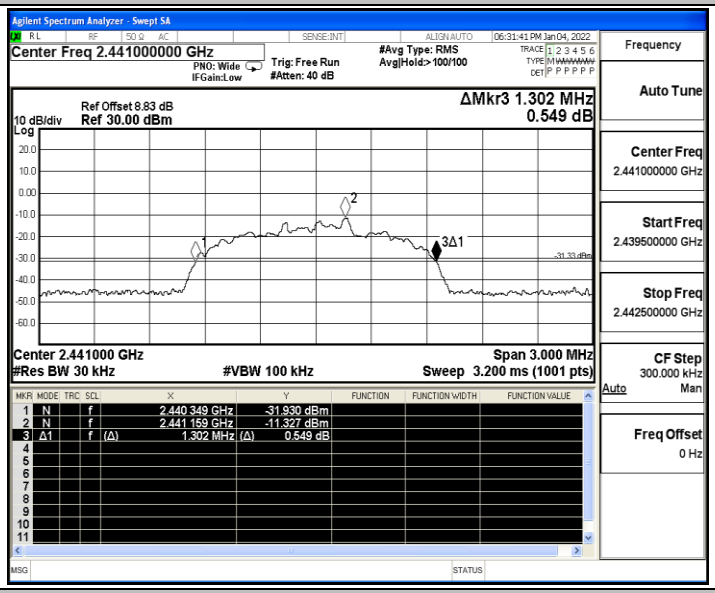

2DH5_Ant1_2480



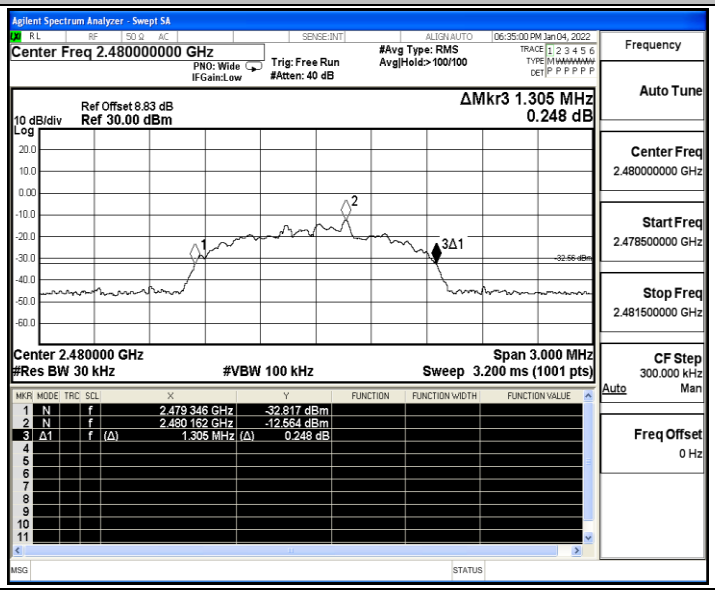

3DH5_Ant1_2402




3DH5_Ant1_2441




3DH5_Ant1_2480



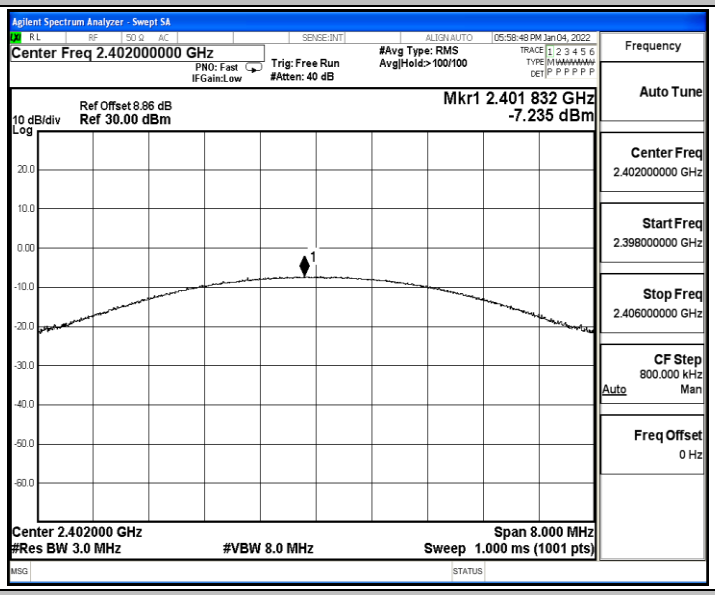
# A.2 Maximum conducted output power

## Test Result Peak

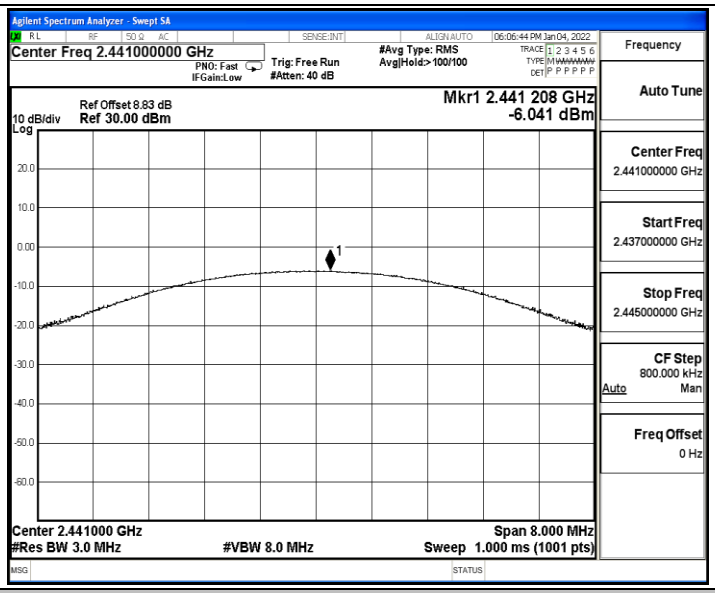
| Test Mode | Antenna | Frequency[MHz] | Conducted Peak Powert[dBm] | Conducted Limit[dBm] | Verdict |
|---|---|---|---|---|---|
| DH5 | Ant1 | 2402 | -7.24 | ≤20.97 | PASS |
| | | 2441 | -6.04 | ≤20.97 | PASS |
| | | 2480 | -7.43 | ≤20.97 | PASS |
| 2DH5 | Ant1 | 2402 | -8.52 | ≤20.97 | PASS |
| | | 2441 | -7.14 | ≤20.97 | PASS |
| | | 2480 | -8.82 | ≤20.97 | PASS |
| 3DH5 | Ant1 | 2402 | -8.54 | ≤20.97 | PASS |
| | | 2441 | -7.34 | ≤20.97 | PASS |
| | | 2480 | -8.57 | ≤20.97 | PASS |

## Test Graphs

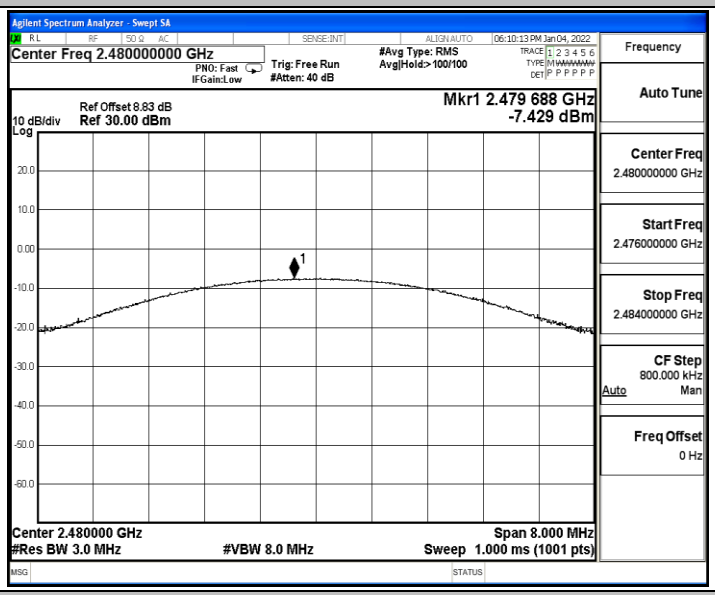
DH5_Ant1_2402



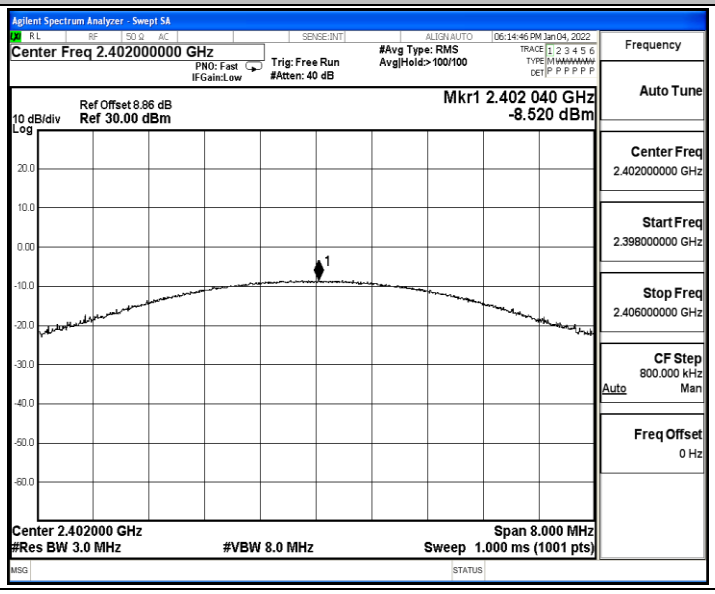

DH5_Ant1_2441



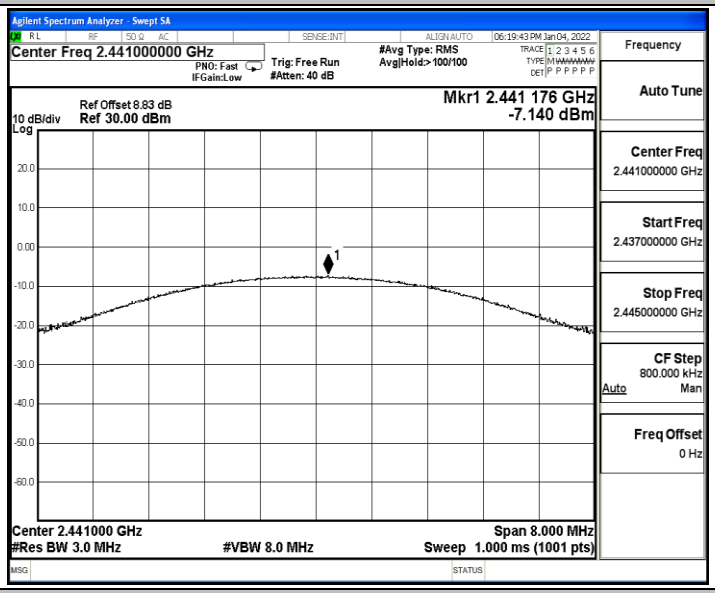

DH5_Ant1_2480



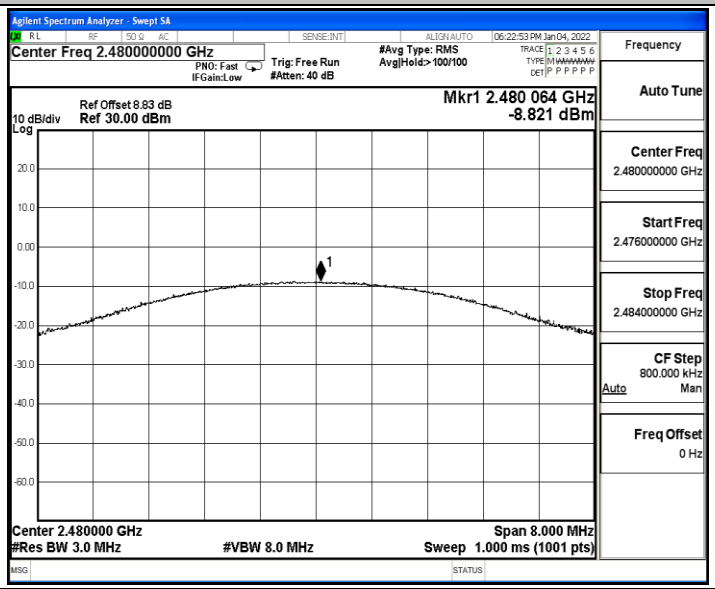

2DH5_Ant1_2402



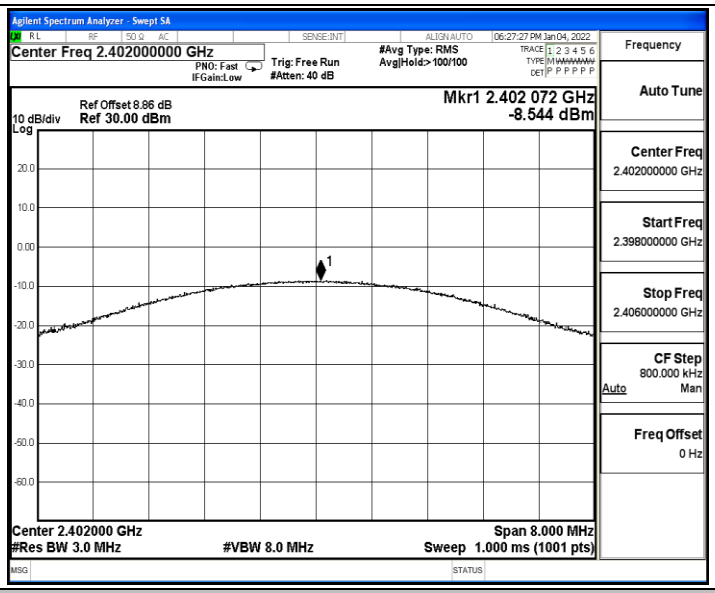
2DH5_Ant1_2441



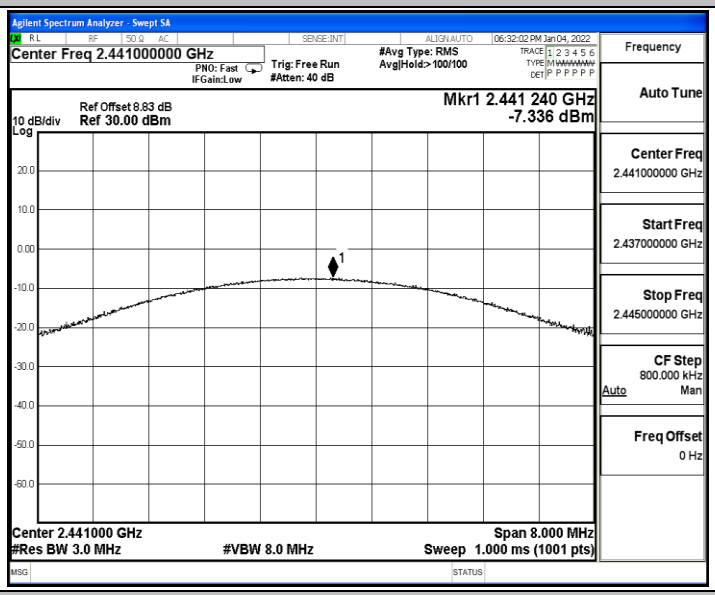

2DH5_Ant1_2480



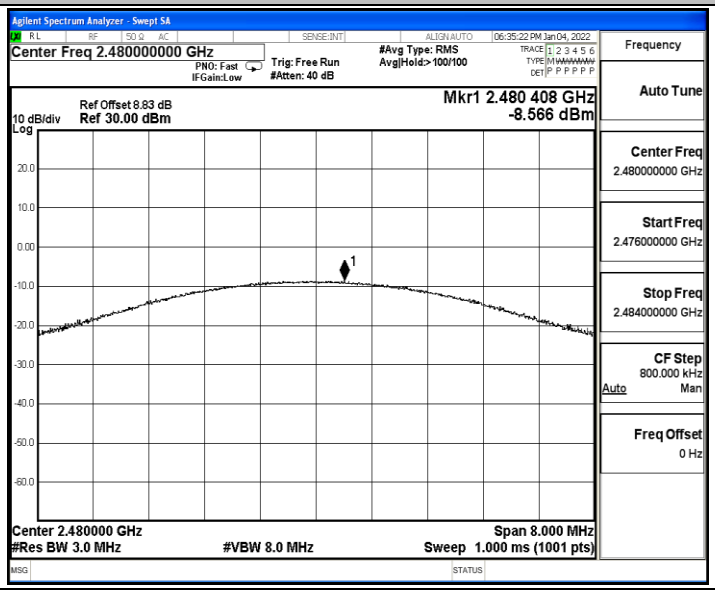

3DH5_Ant1_2402




3DH5_Ant1_2441




3DH5_Ant1_2480



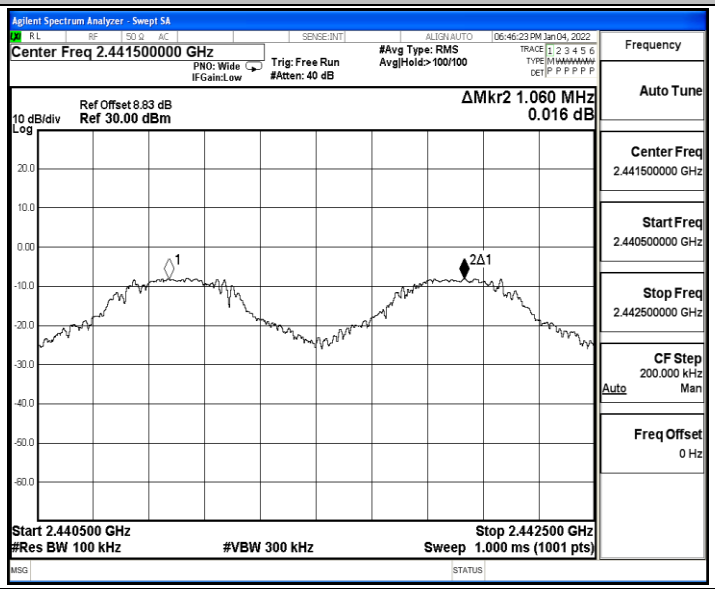
# A.3 Carrier frequency separation

## Test Result

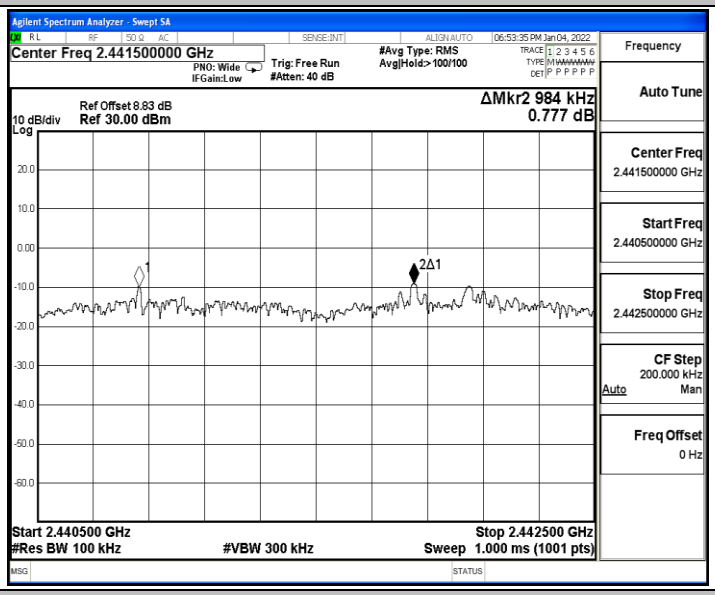
| TestMode | Antenna | Frequency[MHz] | Result[MHz] | Limit[MHz] | Verdict |
|---|---|---|---|---|---|
| DH5 | Ant1 | Hop | 1.06 | ≥0.7 | PASS |
| 2DH5 | Ant1 | Hop | 0.984 | ≥0.88 | PASS |
| 3DH5 | Ant1 | Hop | 0.986 | ≥0.87 | PASS |

## Test Graphs

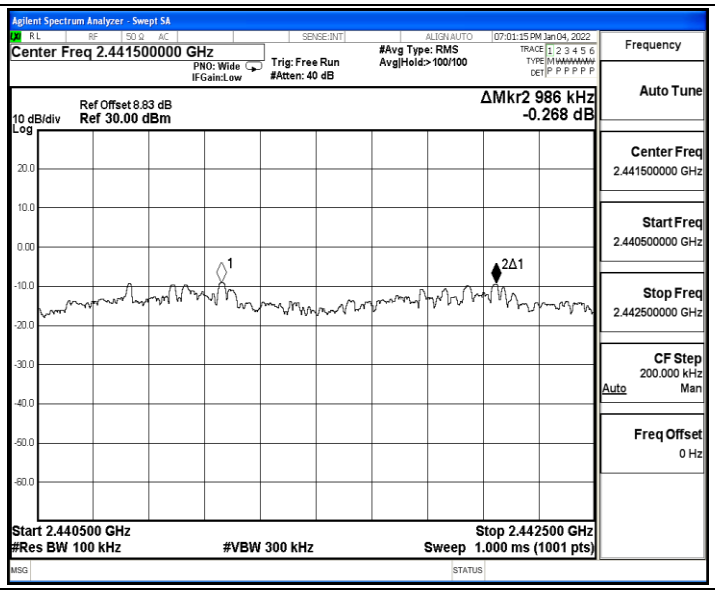
DH5_Ant1_Hop




2DH5_Ant1_Hop




3DH5_Ant1_Hop


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.441500000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 40 dB
#Avg Type: RMS
Avg|Hold:>100/100
07:01:15 PM Jan 04, 2022
Frequency
Auto Tune
Ref Offset 8.83 dB
10 dB/div
Ref 30.00 dBm
Log
ΔMkr2 986 kHz
-0.268 dB
Center Freq
2.441500000 GHz
Start Freq
2.440500000 GHz
Stop Freq
2.442500000 GHz
CF Step
200.000 kHz
Auto
Man
Freq Offset
0 Hz
Start 2.440500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.442500 GHz
Sweep 1.000 ms (1001 pts)

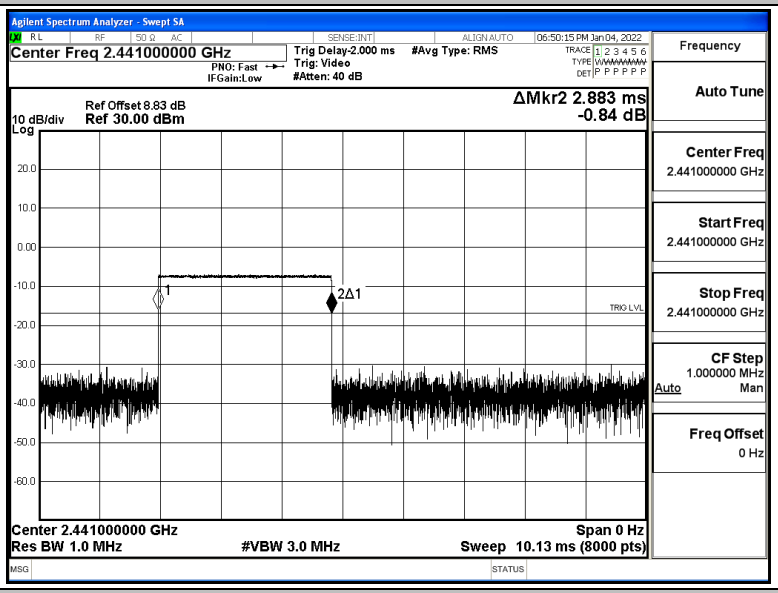
# A.4 Time of occupancy

## Test Result

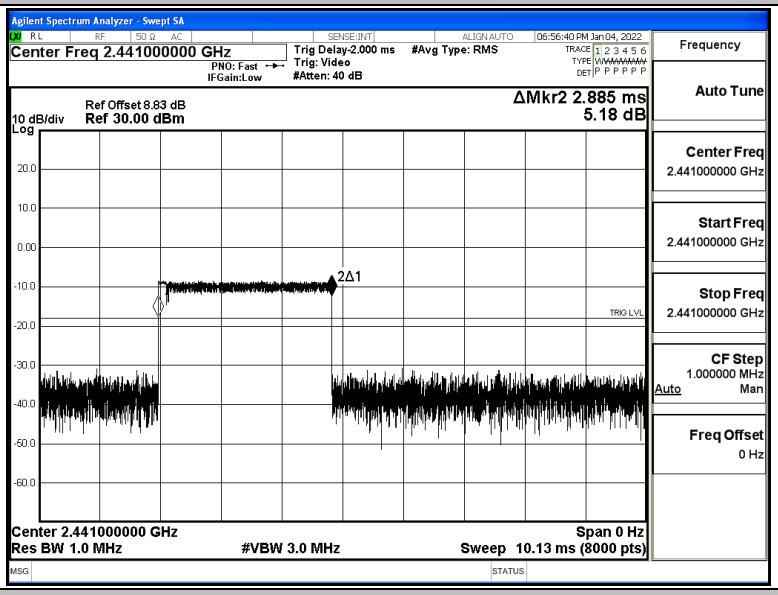
| TestMode | Antenna | Frequency[MHz] | BurstWidth [ms] | TotalHops [Num] | Result[s] | Limit[s] | Verdict |
|---|---|---|---|---|---|---|---|
| DH5 | Ant1 | Hop | 2.883 | 106.67 | 0.308 | ≤0.4 | PASS |
| 2DH5 | Ant1 | Hop | 2.885 | 106.67 | 0.308 | ≤0.4 | PASS |
| 3DH5 | Ant1 | Hop | 2.888 | 106.67 | 0.308 | ≤0.4 | PASS |

## Test Graphs

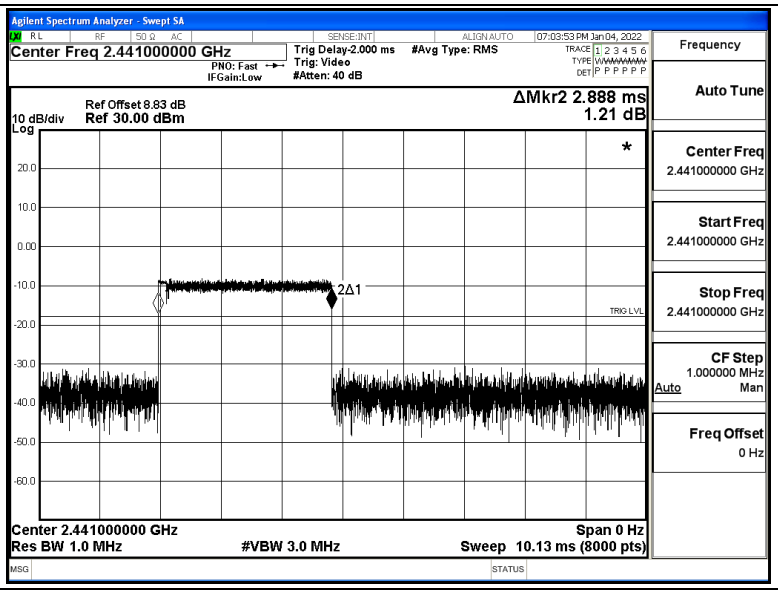
DH5_Ant1_Hop




2DH5_Ant1_Hop




3DH5_Ant1_Hop


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.441000000 GHz
PNO: Fast
IFGain:Low
Trig Delay-2.000 ms
Trig: Video
#Atten: 40 dB
#Avg Type: RMS
07:03:53 PM Jan 04, 2022
Ref Offset 8.83 dB
10 dB/div
Ref 30.00 dBm
Log
ΔMkr2 2.888 ms
1.21 dB
2Δ1
TRIG LVL
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 10.13 ms (8000 pts)
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

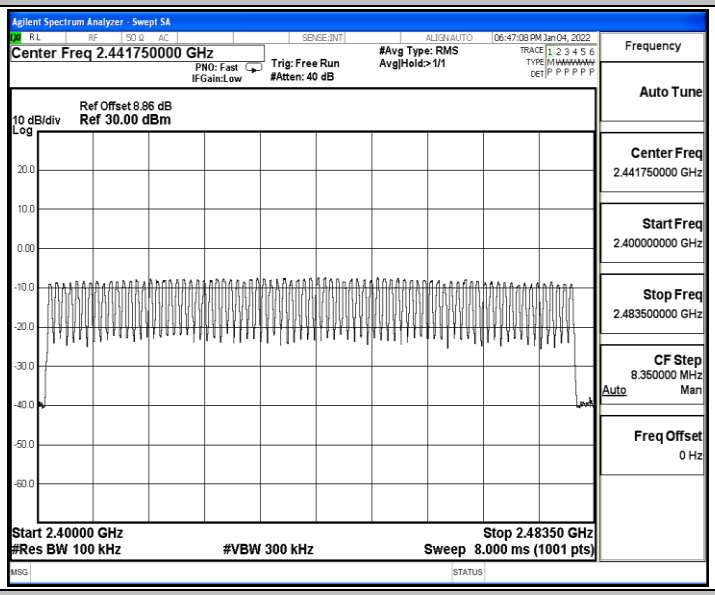
# A.5 Number of hopping channels

## Test Result

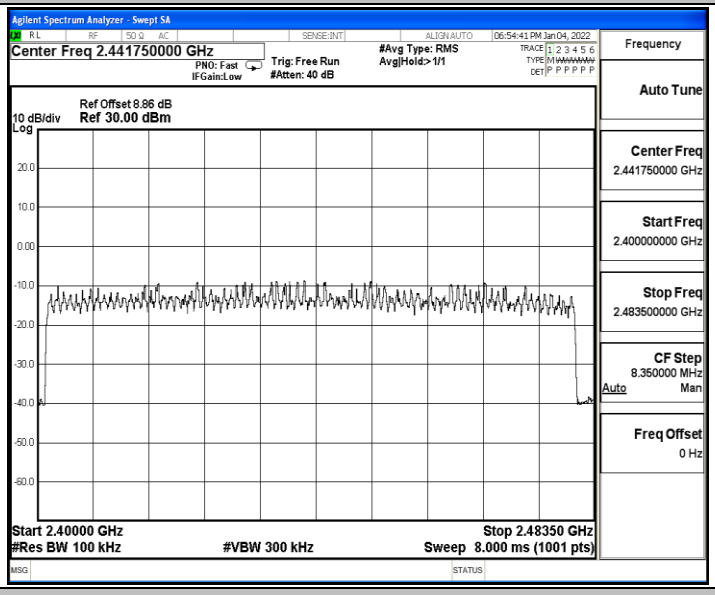
| TestMode | Antenna | Frequency[MHz] | Result[Num] | Limit[Num] | Verdict |
|---|---|---|---|---|---|
| DH5 | Ant1 | Hop | 79 | ≥15 | PASS |
| 2DH5 | Ant1 | Hop | 79 | ≥15 | PASS |
| 3DH5 | Ant1 | Hop | 79 | ≥15 | PASS |

## Test Graphs

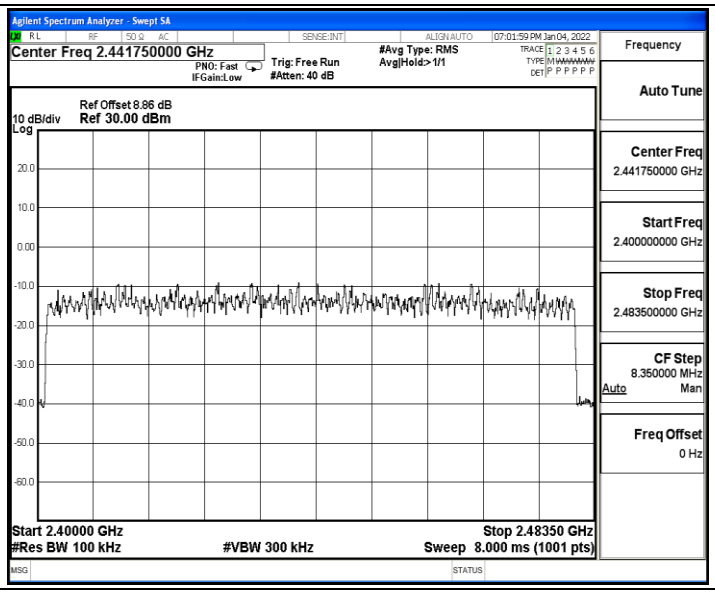
DH5_Ant1_Hop




2DH5_Ant1_Hop




3DH5_Ant1_Hop


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.441750000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
#Avg Type: RMS
Avg|Hold:>1/1
07:01:59 PM Jan 04, 2022
Ref Offset 8.86 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

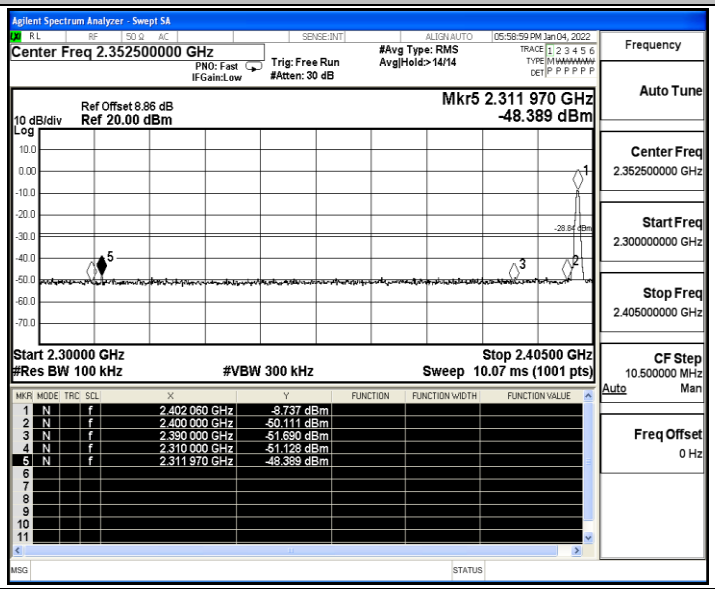
# A.6 Band edge measurements

## Test Result

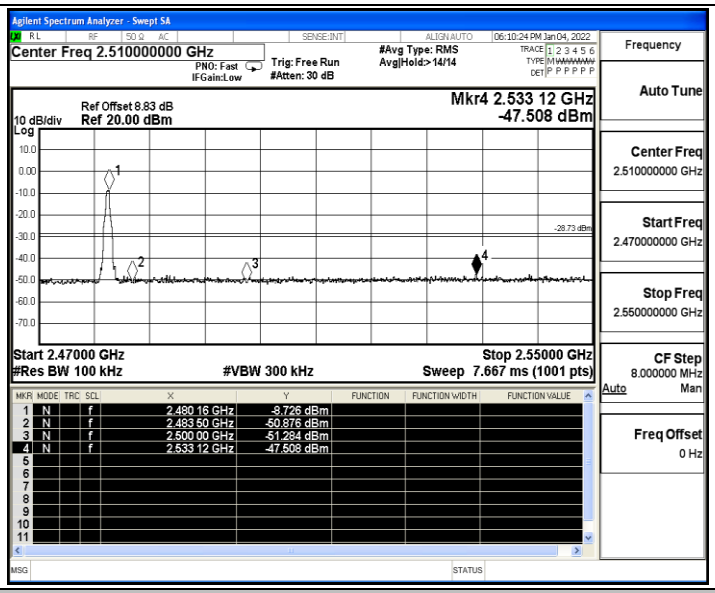
| TestMode | Antenna | ChName | Frequency[MHz] | RefLevel [dBm] | Result [dBm] | Limit [dBm] | Verdict |
|---|---|---|---|---|---|---|---|
| DH5 | Ant1 | Low | 2402 | -8.84 | -48.39 | ≤-28.84 | PASS |
| | | High | 2480 | -8.73 | -47.51 | ≤-28.73 | PASS |
| | | Low | Hop_2402 | -9.43 | -49.09 | ≤-29.43 | PASS |
| | | High | Hop_2480 | -8.71 | -46.33 | ≤-28.71 | PASS |
| 2DH5 | Ant1 | Low | 2402 | -11.44 | -48.63 | ≤-31.44 | PASS |
| | | High | 2480 | -10.92 | -47.23 | ≤-30.92 | PASS |
| | | Low | Hop_2402 | -10.87 | -48.9 | ≤-30.87 | PASS |
| | | High | Hop_2480 | -10.94 | -48.19 | ≤-30.94 | PASS |
| 3DH5 | Ant1 | Low | 2402 | -10.36 | -49.13 | ≤-30.36 | PASS |
| | | High | 2480 | -10.26 | -48.14 | ≤-30.26 | PASS |
| | | Low | Hop_2402 | -14.34 | -49.32 | ≤-34.34 | PASS |
| | | High | Hop_2480 | -12.78 | -47.77 | ≤-32.78 | PASS |

## Test Graphs

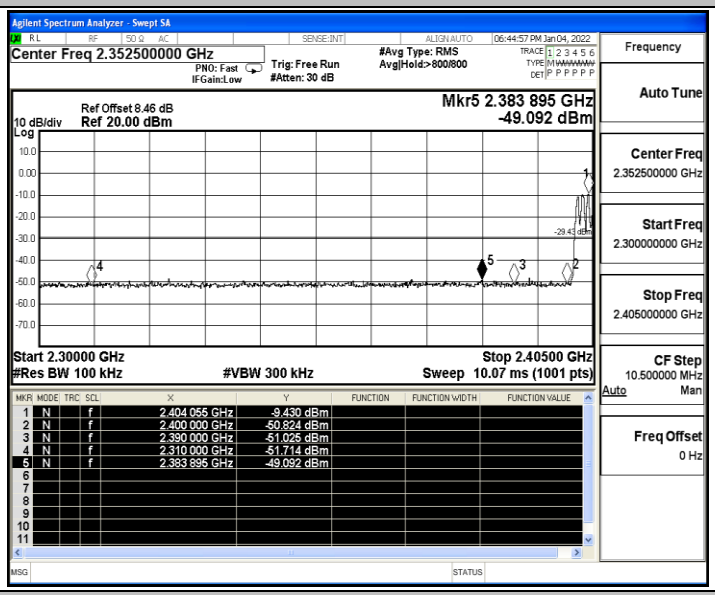
DH5_Ant1_Low_2402



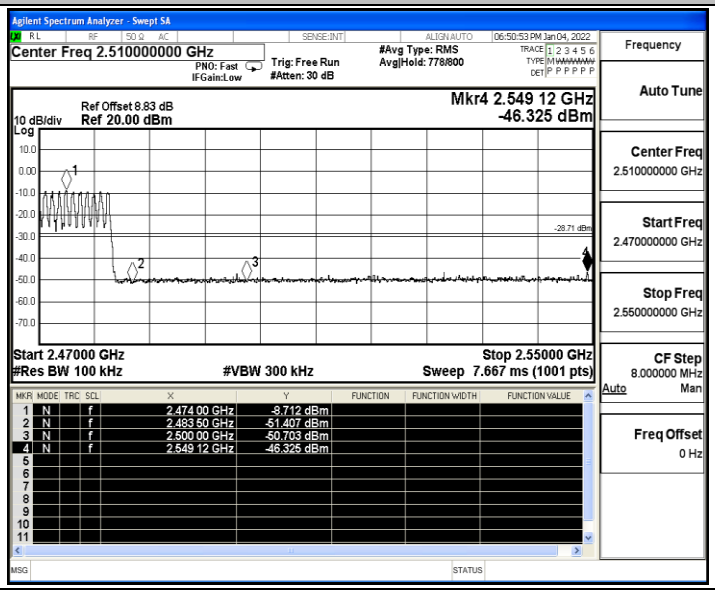

DH5_Ant1_High_2480



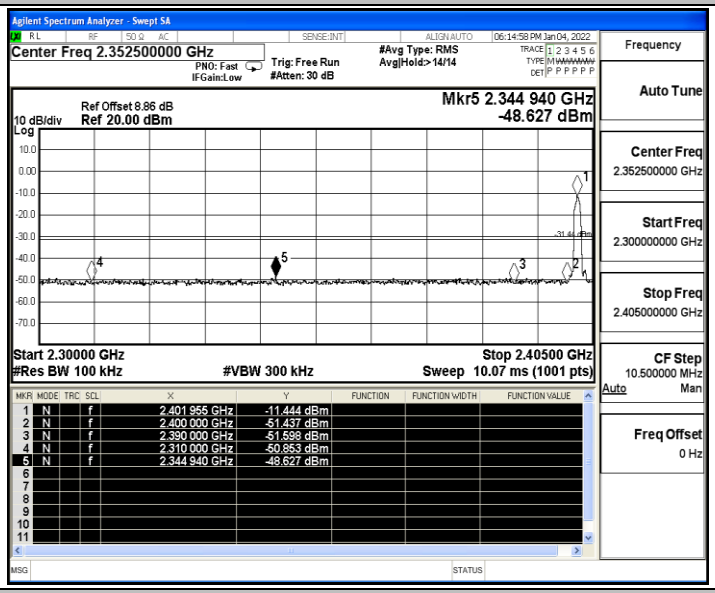

DH5_Ant1_Low_Hop_2402



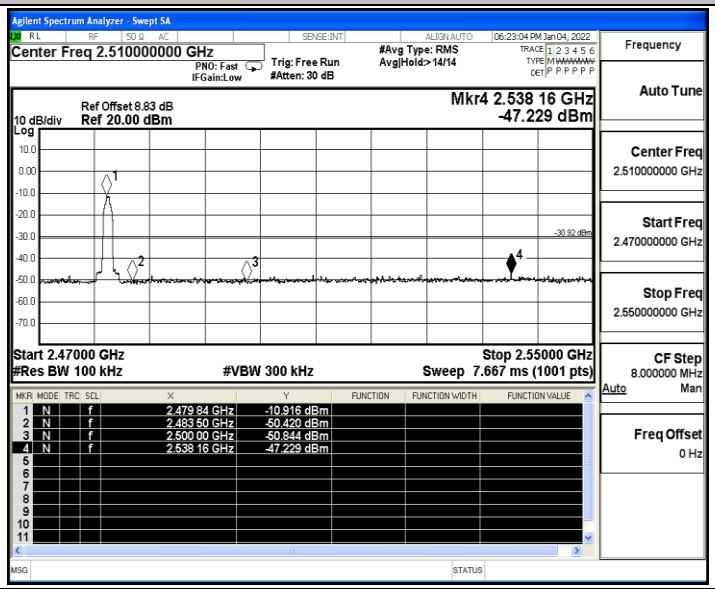

DH5_Ant1_High_Hop_2480



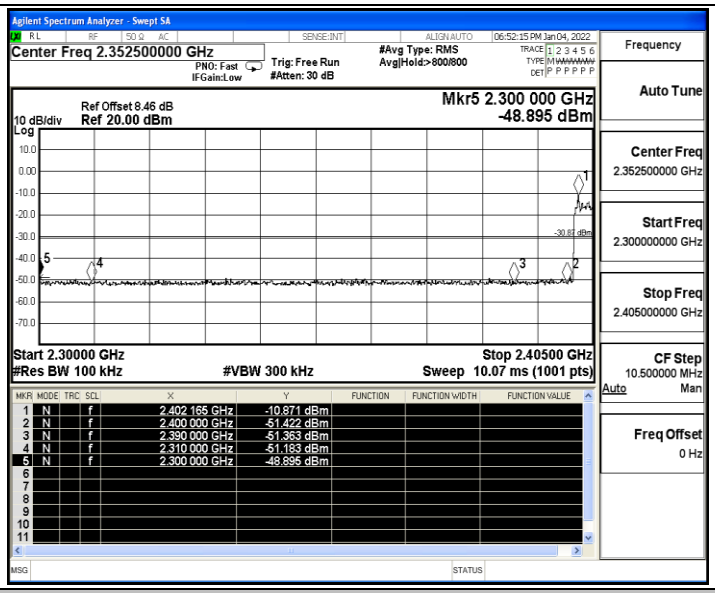
2DH5_Ant1_Low_2402



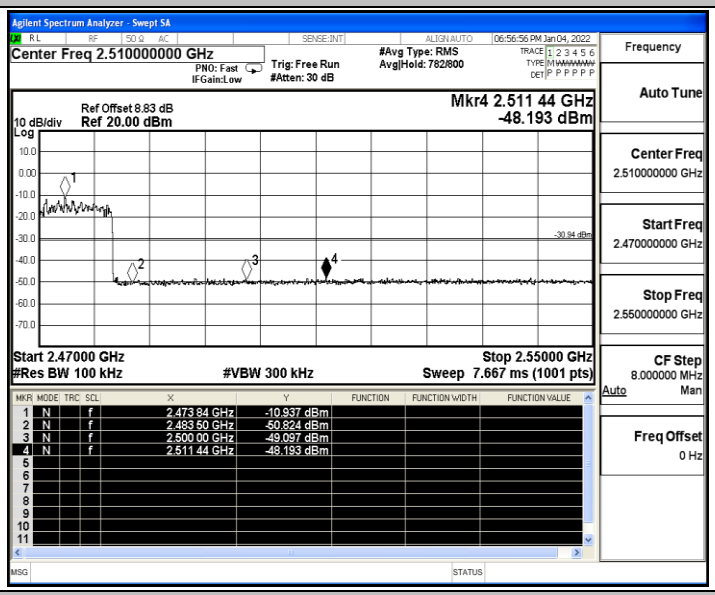

2DH5_Ant1_High_2480



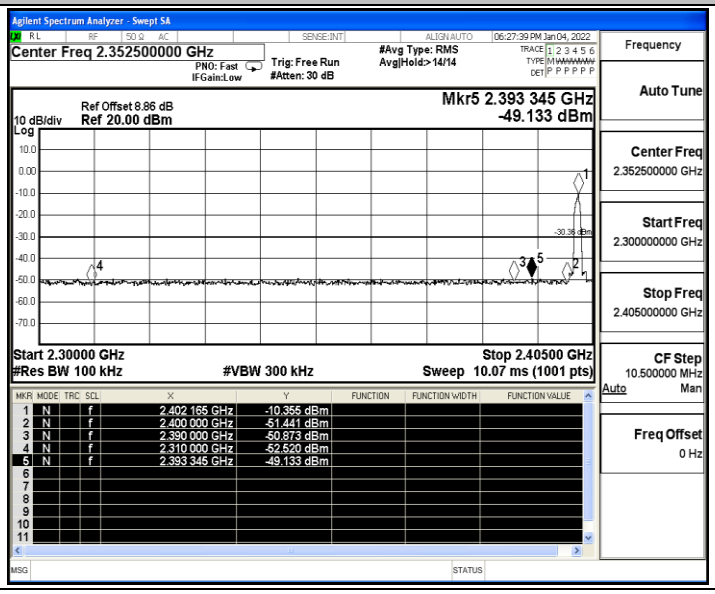

2DH5_Ant1_Low_Hop_2402



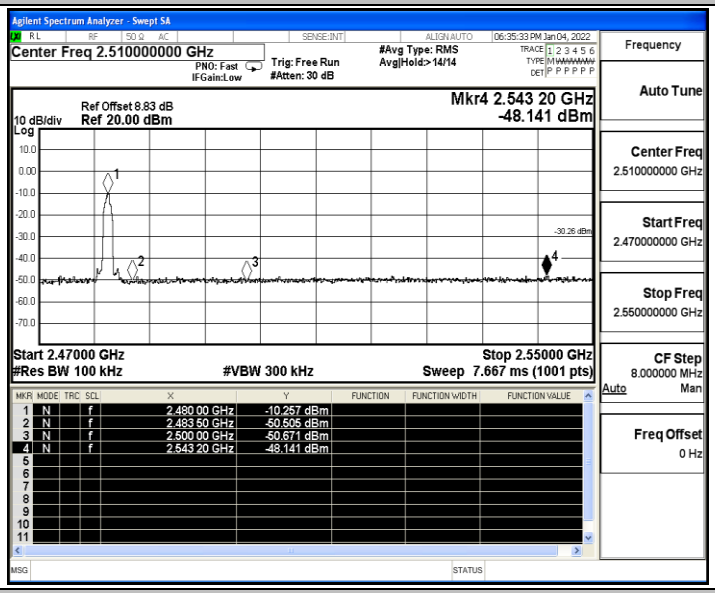

2DH5_Ant1_High_Hop_2480



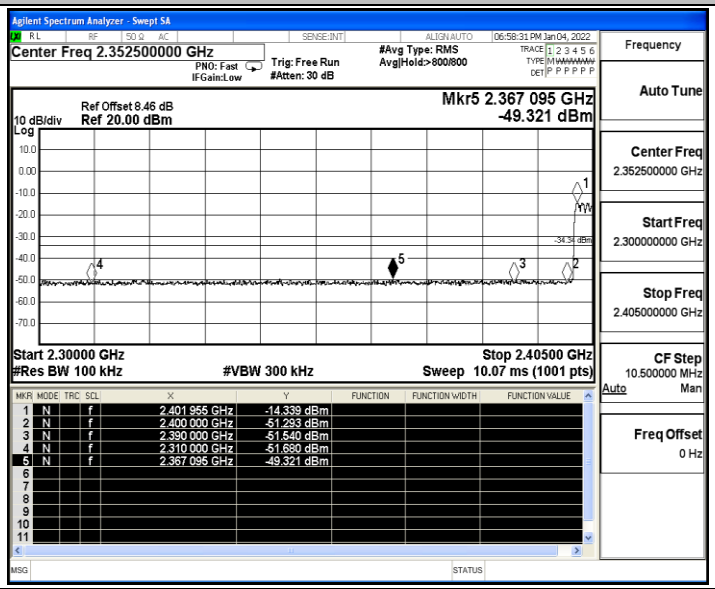

3DH5_Ant1_Low_2402



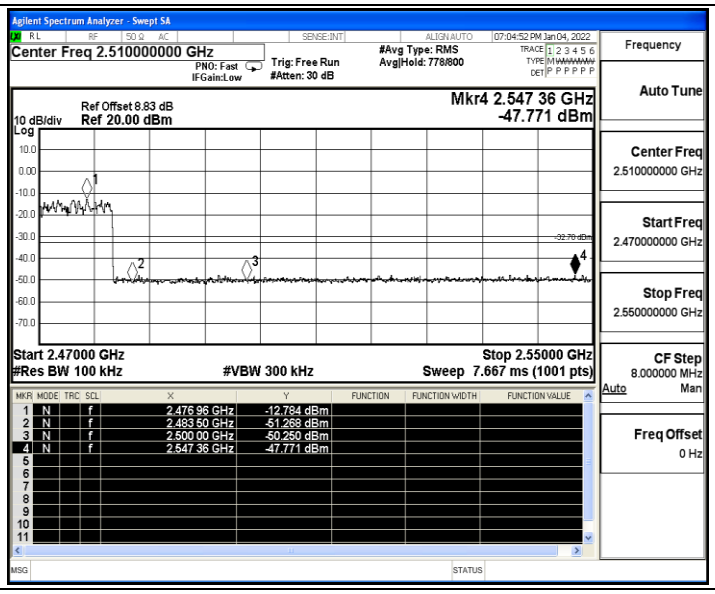
3DH5_Ant1_High_2480




3DH5_Ant1_Low_Hop_2402




3DH5_Ant1_High_Hop_2480


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.510000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold: 778/800
07:04:52 PM Jan 04, 2022
Ref Offset 8.83 dB
10 dB/div Ref 20.00 dBm
Log
Mkr4 2.547 36 GHz
-47.771 dBm
Start 2.47000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.55000 GHz
Sweep 7.667 ms (1001 pts)
1 N f 2.476 96 GHz -12.784 dBm
2 N f 2.483 50 GHz -51.268 dBm
3 N f 2.500 00 GHz -50.250 dBm
4 N f 2.547 36 GHz -47.771 dBm
Frequency
Auto Tune
Center Freq
2.510000000 GHz
Start Freq
2.470000000 GHz
Stop Freq
2.550000000 GHz
CF Step
8.000000 MHz
Auto Man
Freq Offset
0 Hz

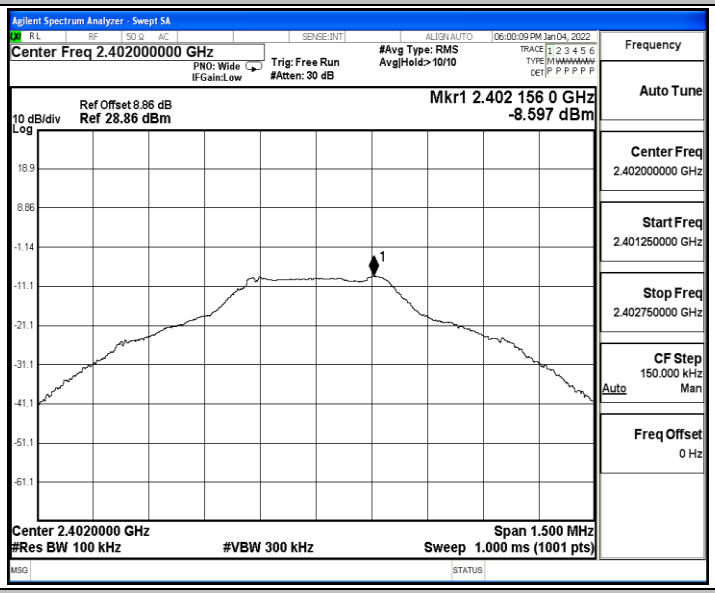
# A.7 Conducted Spurious Emission

## Test Result

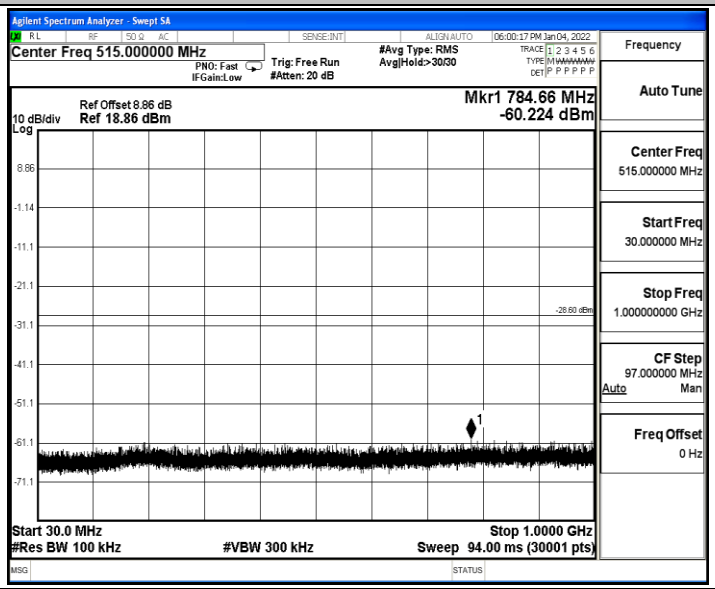
| TestMode | Antenna | Frequency[MHz] | FreqRange [MHz] | RefLevel [dBm] | Result [dBm] | Limit [dBm] | Verdict |
|---|---|---|---|---|---|---|---|
| DH5 | Ant1 | 2402 | Reference | -8.60 | -8.60 | --- | PASS |
| | | | 30~1000 | -8.60 | -60.22 | ≤-28.6 | PASS |
| | | | 1000~26500 | -8.60 | -46.16 | ≤-28.6 | PASS |
| | | 2441 | Reference | -7.59 | -7.59 | --- | PASS |
| | | | 30~1000 | -7.59 | -60.24 | ≤-27.59 | PASS |
| | | | 1000~26500 | -7.59 | -44.55 | ≤-27.59 | PASS |
| | | 2480 | Reference | -8.87 | -8.87 | --- | PASS |
| | | | 30~1000 | -8.87 | -60.41 | ≤-28.87 | PASS |
| | | | 1000~26500 | -8.87 | -45.87 | ≤-28.87 | PASS |
| 2DH5 | Ant1 | 2402 | Reference | -10.33 | -10.33 | --- | PASS |
| | | | 30~1000 | -10.33 | -60.72 | ≤-30.33 | PASS |
| | | | 1000~26500 | -10.33 | -45.96 | ≤-30.33 | PASS |
| | | 2441 | Reference | -9.26 | -9.26 | --- | PASS |
| | | | 30~1000 | -9.26 | -60.51 | ≤-29.26 | PASS |
| | | | 1000~26500 | -9.26 | -46.27 | ≤-29.26 | PASS |
| | | 2480 | Reference | -10.51 | -10.51 | --- | PASS |
| | | | 30~1000 | -10.51 | -59.97 | ≤-30.51 | PASS |
| | | | 1000~26500 | -10.51 | -45.19 | ≤-30.51 | PASS |
| 3DH5 | Ant1 | 2402 | Reference | -10.39 | -10.39 | --- | PASS |
| | | | 30~1000 | -10.39 | -60.35 | ≤-30.39 | PASS |
| | | | 1000~26500 | -10.39 | -45.7 | ≤-30.39 | PASS |
| | | 2441 | Reference | -9.44 | -9.44 | --- | PASS |
| | | | 30~1000 | -9.44 | -60.43 | ≤-29.44 | PASS |
| | | | 1000~26500 | -9.44 | -45.88 | ≤-29.44 | PASS |
| | | 2480 | Reference | -10.52 | -10.52 | --- | PASS |
| | | | 30~1000 | -10.52 | -60.69 | ≤-30.52 | PASS |
| | | | 1000~26500 | -10.52 | -45.97 | ≤-30.52 | PASS |

## Test Graphs

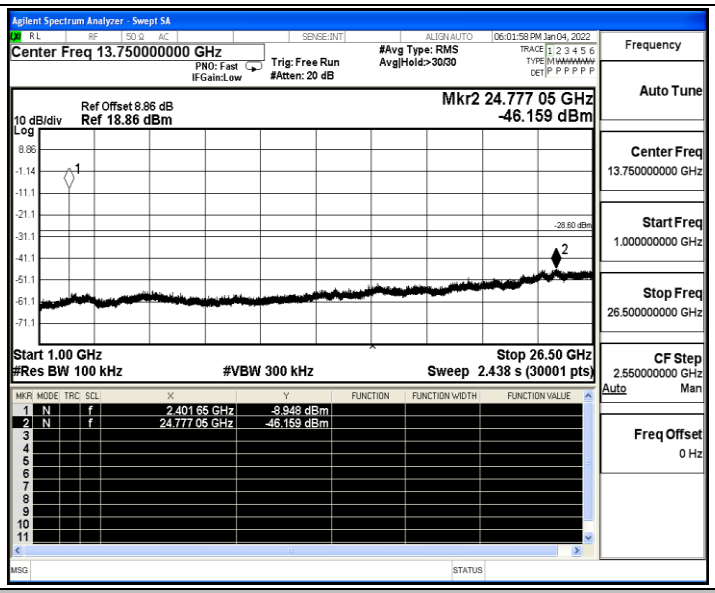
DH5_Ant1_2402_0~Reference



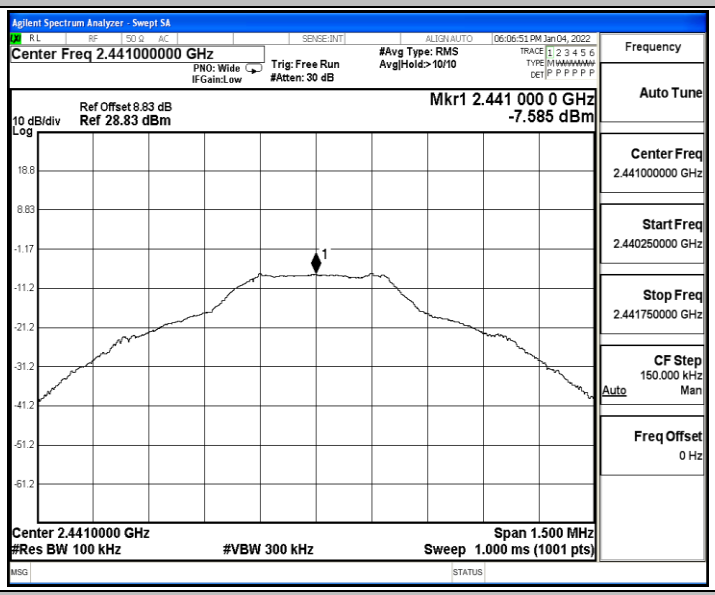

DH5_Ant1_2402_30~1000



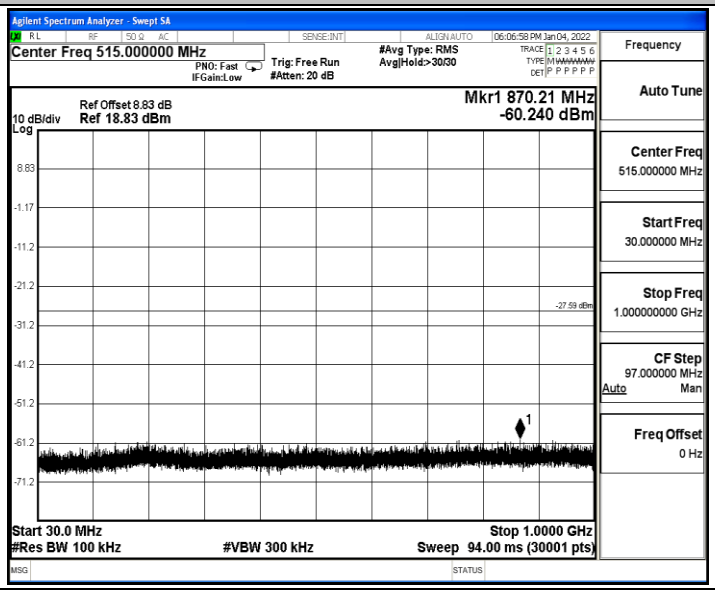

DH5_Ant1_2402_1000~26500



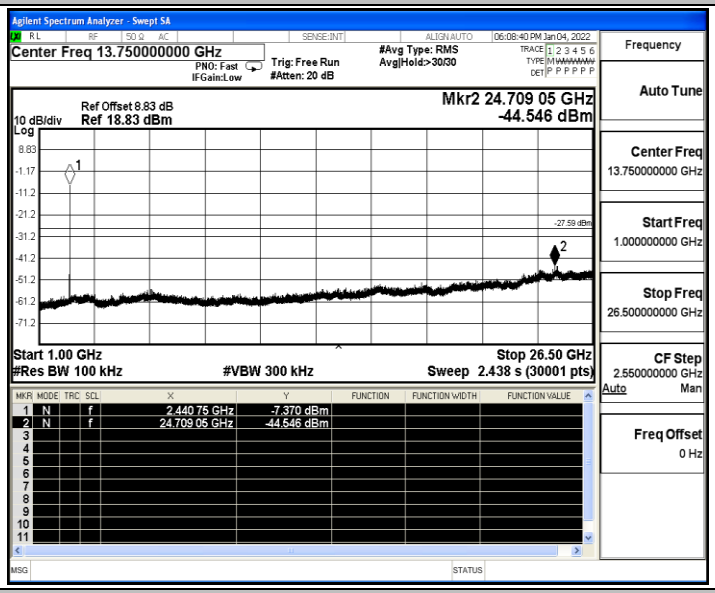

DH5_Ant1_2441_0~Reference



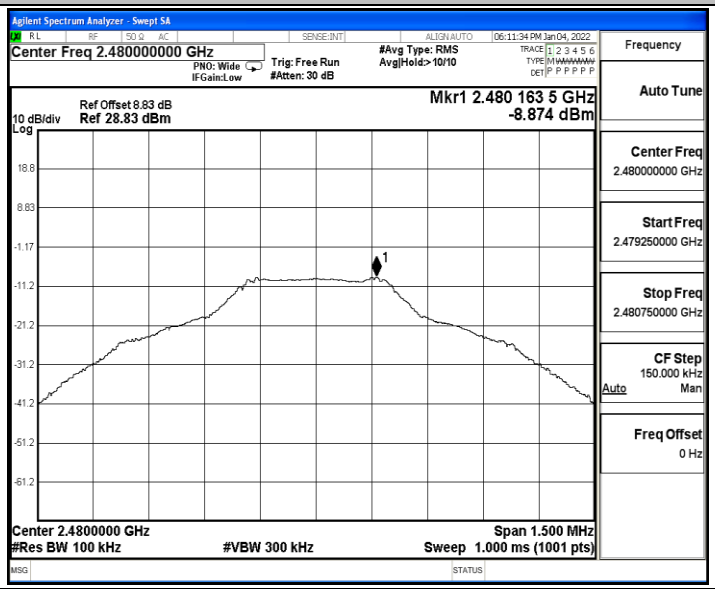

DH5_Ant1_2441_30~1000



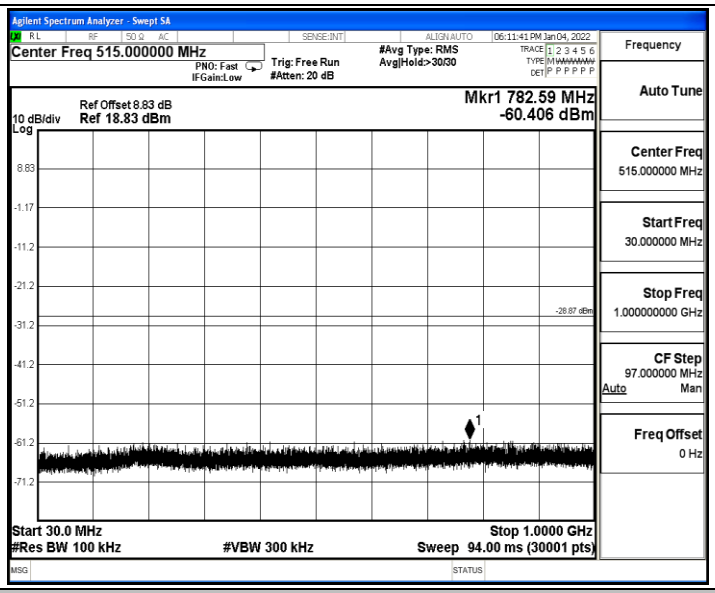
DH5_Ant1_2441_1000~26500



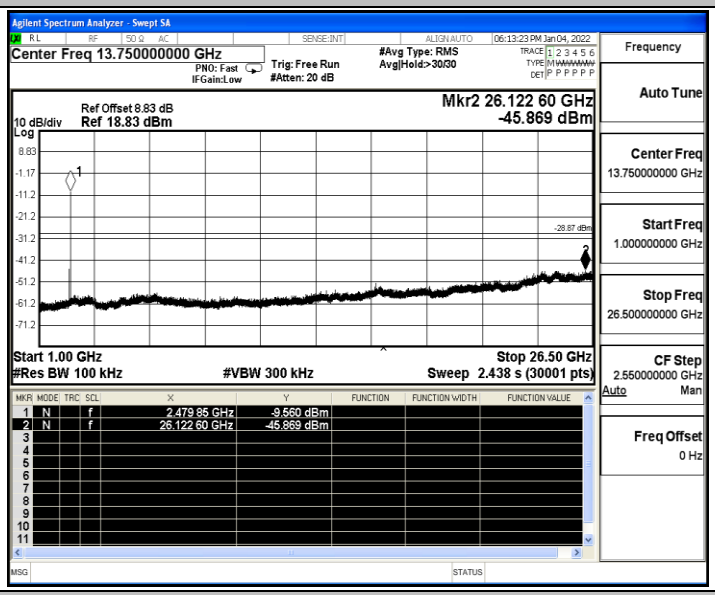

DH5_Ant1_2480_0~Reference



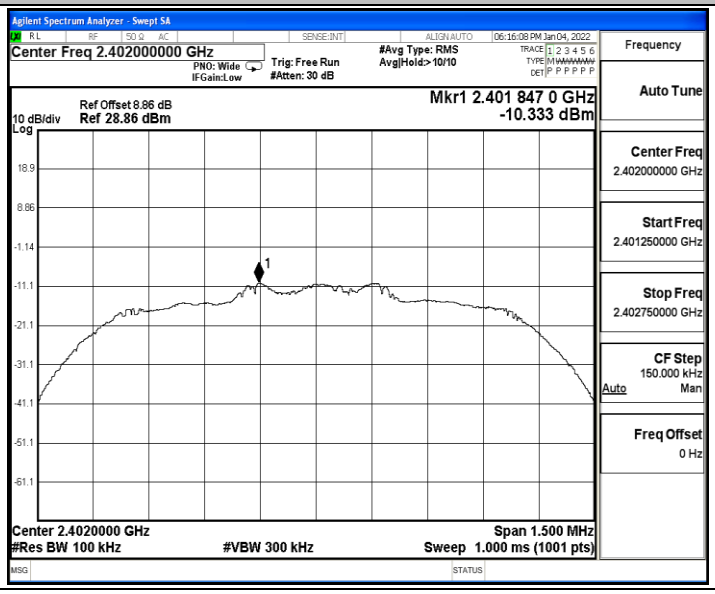

DH5_Ant1_2480_30~1000



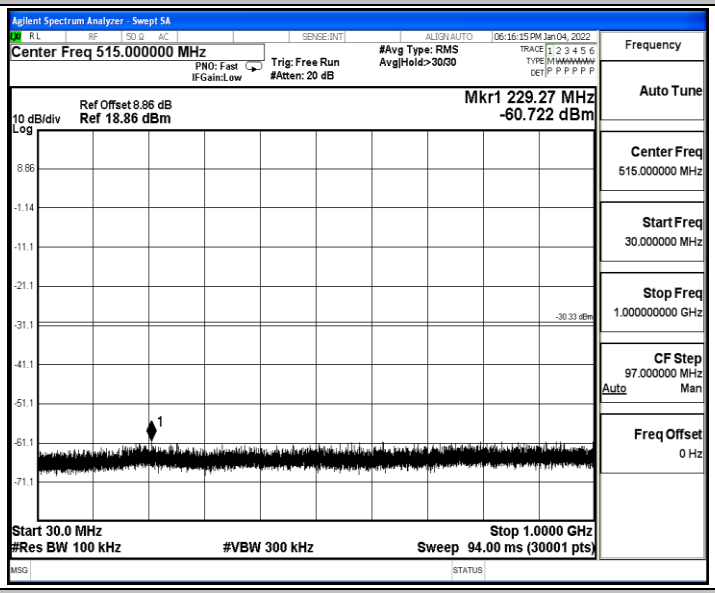

DH5_Ant1_2480_1000~26500



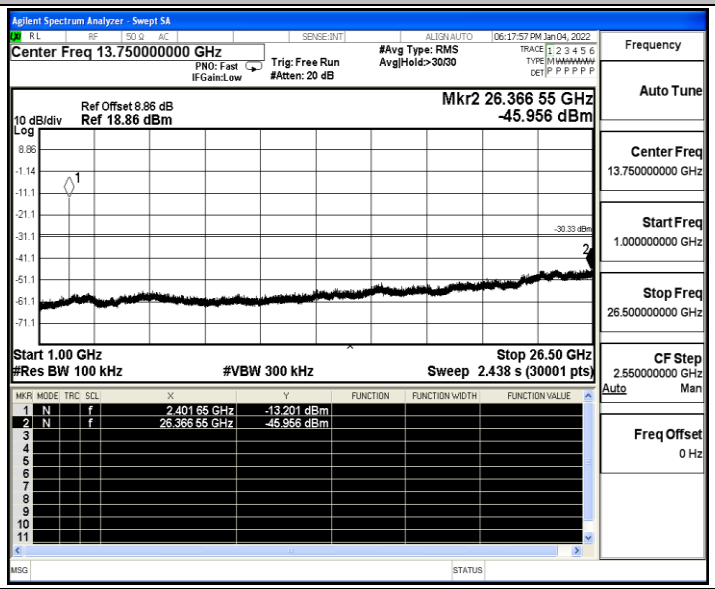

2DH5_Ant1_2402_0~Reference



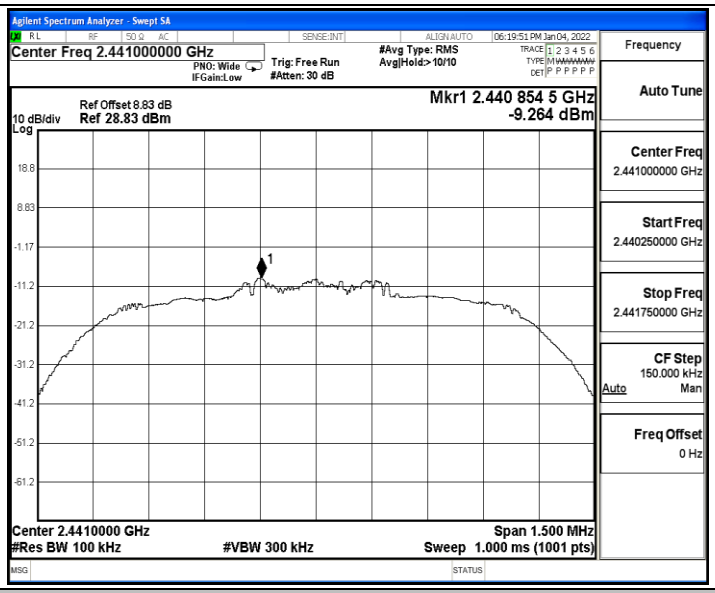
2DH5_Ant1_2402_30~1000



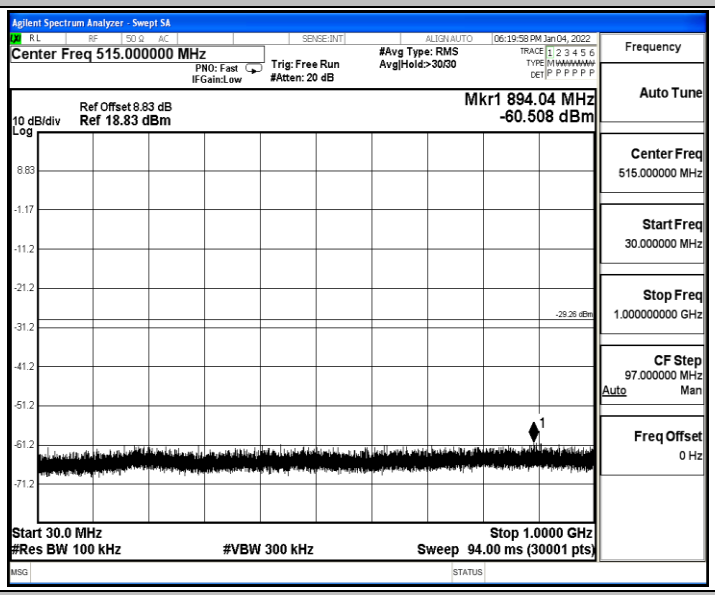

2DH5_Ant1_2402_1000~26500



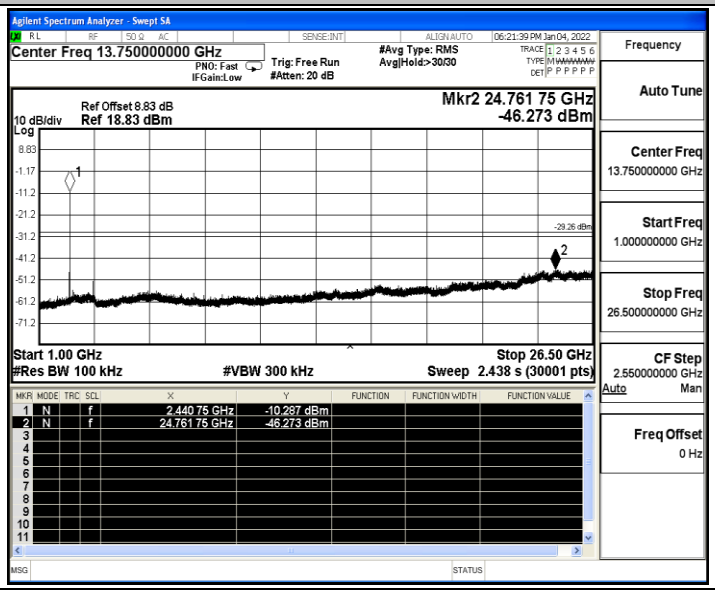

2DH5_Ant1_2441_0~Reference



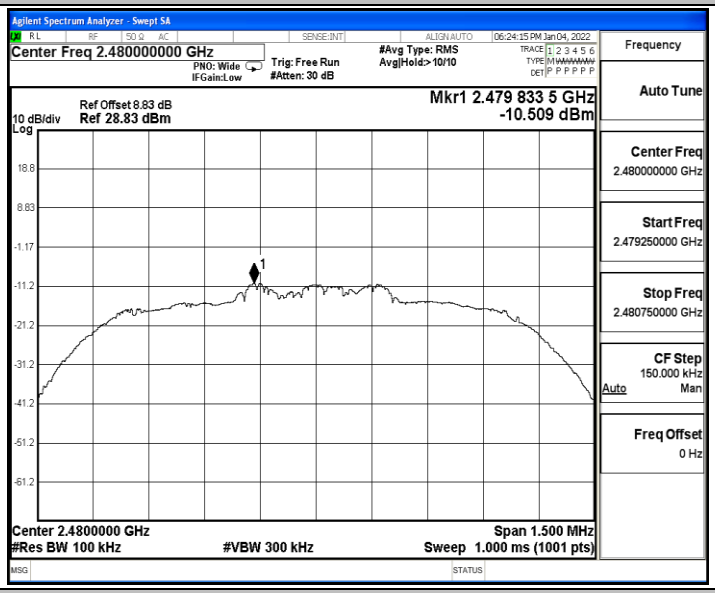

2DH5_Ant1_2441_30~1000



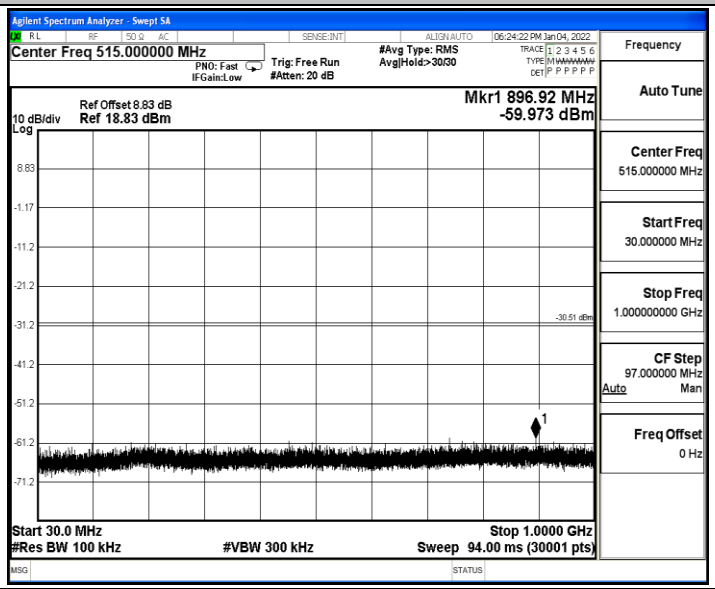

2DH5_Ant1_2441_1000~26500



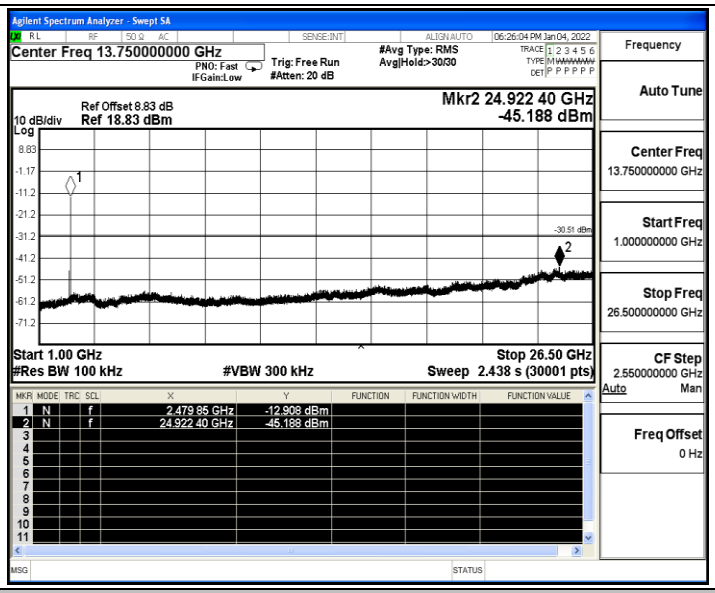
2DH5_Ant1_2480_0~Reference



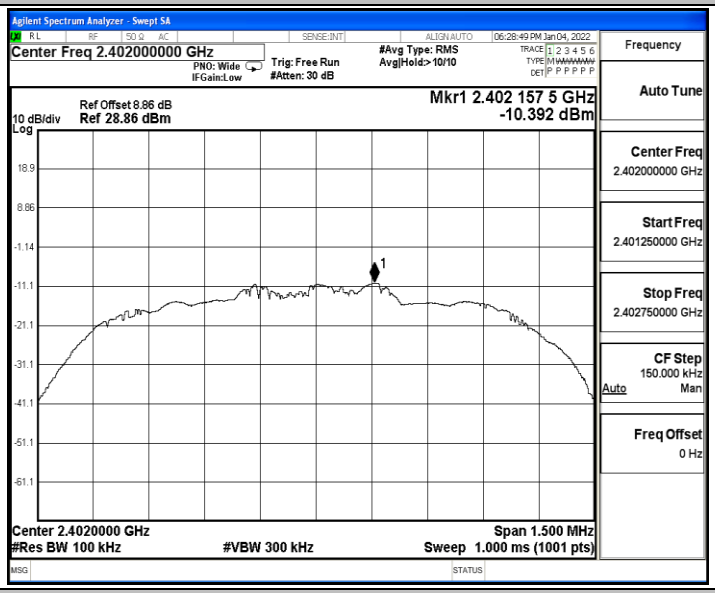

2DH5_Ant1_2480_30~1000



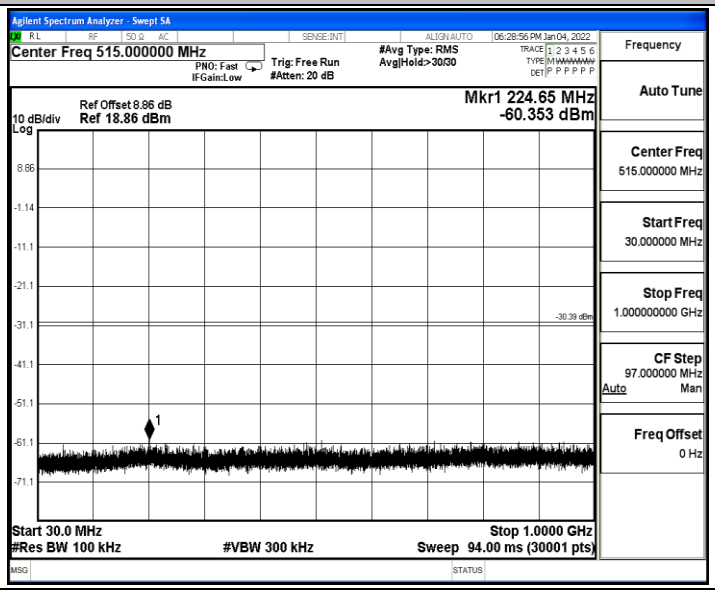

2DH5_Ant1_2480_1000~26500



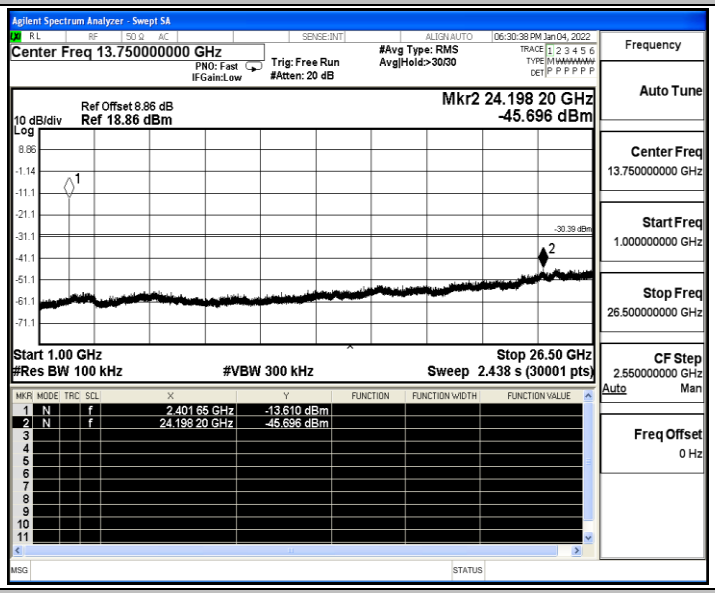

3DH5_Ant1_2402_0~Reference



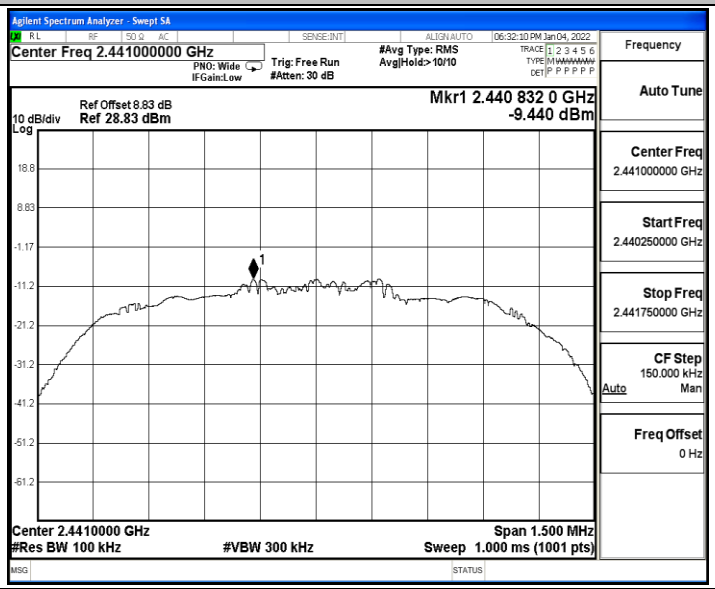

3DH5_Ant1_2402_30~1000



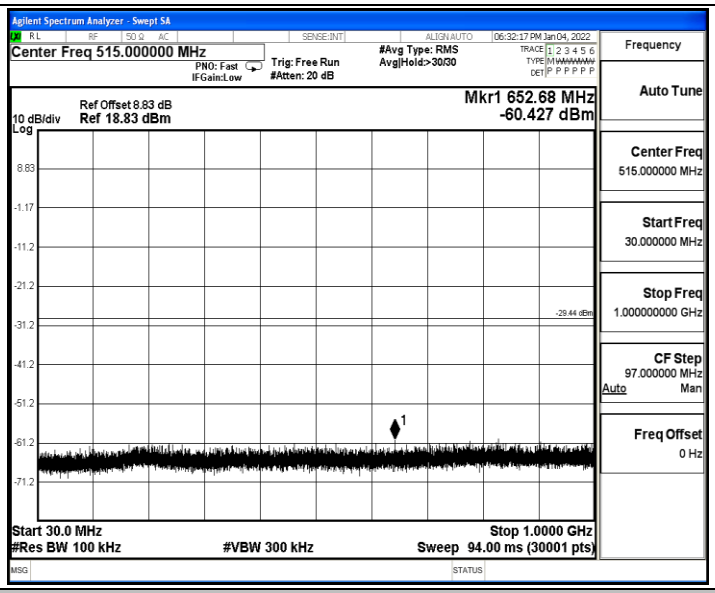
3DH5_Ant1_2402_1000~26500



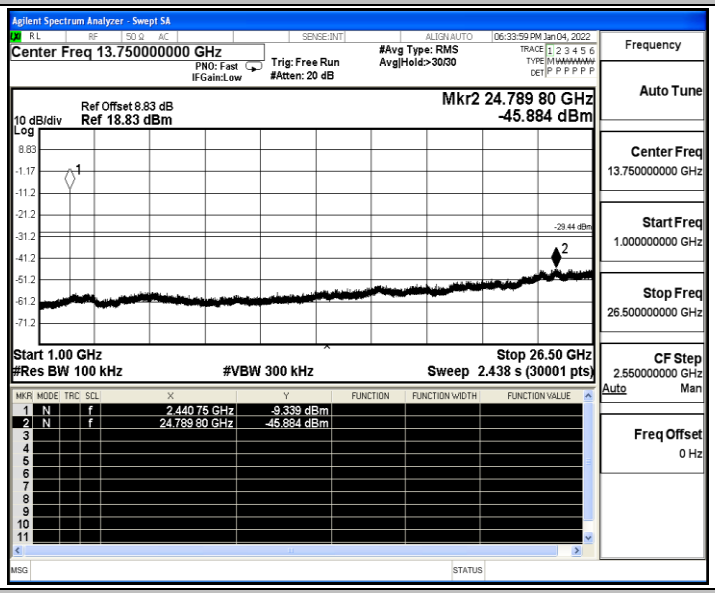

3DH5_Ant1_2441_0~Reference



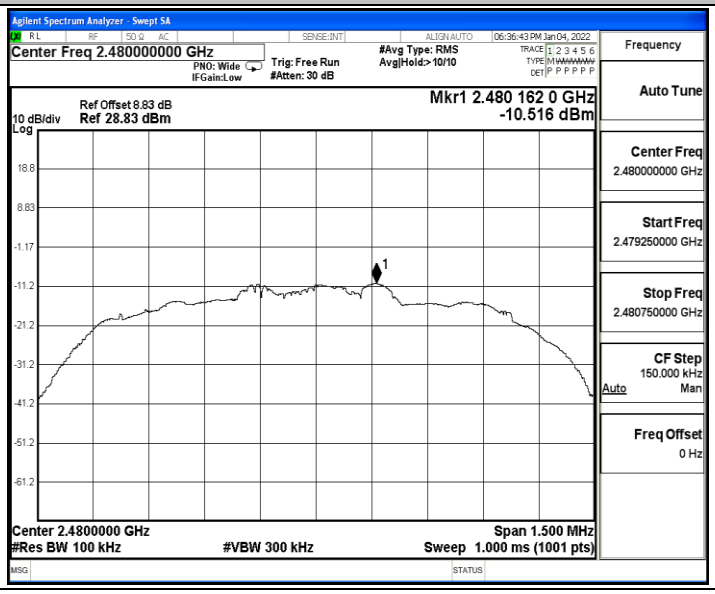

3DH5_Ant1_2441_30~1000



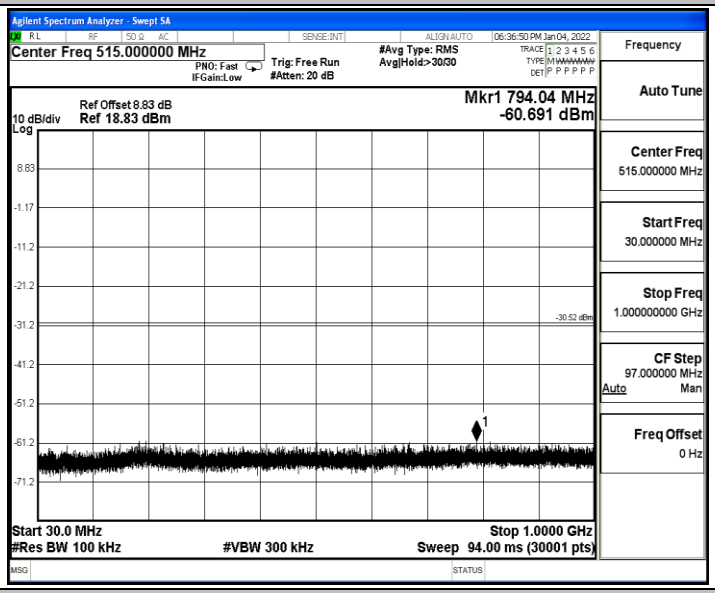

3DH5_Ant1_2441_1000~26500



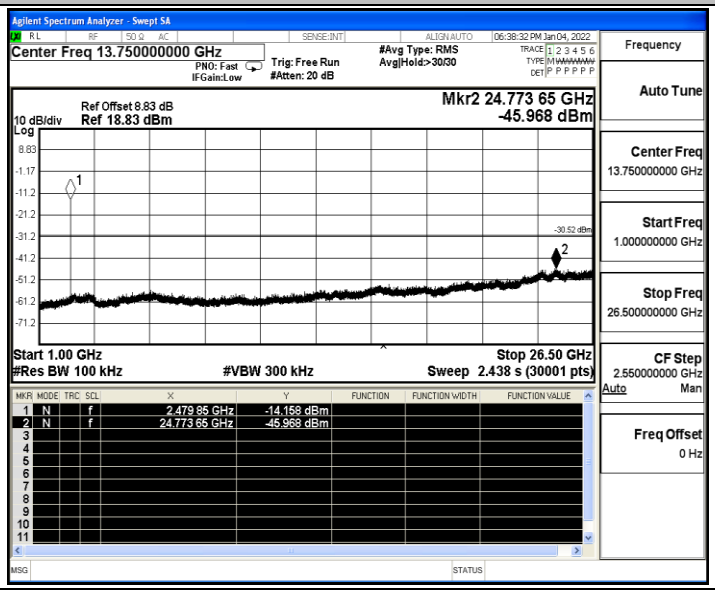

3DH5_Ant1_2480_0~Reference



3DH5_Ant1_2480_30~1000




3DH5_Ant1_2480_1000~26500



# A.8 Emissions in Restricted Bands

## Test Result

| Test Mode | Frequency [MHz] | Detector | Freq [MHz] | Result [dBm] | Limit [dBm] | Result [dBuV/m] | Limit [dBuV/m] | Verdict |
|---|---|---|---|---|---|---|---|---|
| DH5 | 2402 | AV | 2310.000 | -47.92 | ≤-41.20 | 47.28 | ≤54 | PASS |
| | | AV | 2383.475 | -47.43 | ≤-41.20 | 47.77 | ≤54 | PASS |
| | | AV | 2390.000 | -47.65 | ≤-41.20 | 47.55 | ≤54 | PASS |
| | | Peak | 2310.000 | -38.41 | ≤-21.20 | 56.79 | ≤74 | PASS |
| | | Peak | 2378.120 | -35.49 | ≤-21.20 | 59.71 | ≤74 | PASS |
| | | Peak | 2390.000 | -37.42 | ≤-21.20 | 57.78 | ≤74 | PASS |
| | 2480 | AV | 2483.500 | -47.16 | ≤-41.20 | 48.04 | ≤54 | PASS |
| | | AV | 2496.320 | -46.87 | ≤-41.20 | 48.33 | ≤54 | PASS |
| | | AV | 2500.000 | -46.96 | ≤-41.20 | 48.24 | ≤54 | PASS |
| | | Peak | 2483.500 | -37.49 | ≤-21.20 | 57.71 | ≤74 | PASS |
| | | Peak | 2493.360 | -35.94 | ≤-21.20 | 59.26 | ≤74 | PASS |
| | | Peak | 2500.000 | -38.17 | ≤-21.20 | 57.03 | ≤74 | PASS |
| | Hop_2402 | Peak | 2310.000 | -39.33 | ≤-21.20 | 55.87 | ≤74 | PASS |
| | | Peak | 2319.950 | -36.2 | ≤-21.20 | 59.00 | ≤74 | PASS |
| | | Peak | 2390.000 | -38.96 | ≤-21.20 | 56.24 | ≤74 | PASS |
| | Hop_2480 | Peak | 2483.500 | -37.6 | ≤-21.20 | 57.60 | ≤74 | PASS |
| | | Peak | 2494.240 | -35.91 | ≤-21.20 | 59.29 | ≤74 | PASS |
| | | Peak | 2500.000 | -37.65 | ≤-21.20 | 57.55 | ≤74 | PASS |
| 2DH5 | 2402 | AV | 2310.000 | -47.85 | ≤-41.20 | 47.35 | ≤54 | PASS |
| | | AV | 2384.105 | -47.45 | ≤-41.20 | 47.75 | ≤54 | PASS |
| | | AV | 2390.000 | -47.62 | ≤-41.20 | 47.58 | ≤54 | PASS |
| | | Peak | 2310.000 | -38.29 | ≤-21.20 | 56.91 | ≤74 | PASS |
| | | Peak | 2342.315 | -36.24 | ≤-21.20 | 58.96 | ≤74 | PASS |
| | | Peak | 2390.000 | -38.21 | ≤-21.20 | 56.99 | ≤74 | PASS |
| | 2480 | AV | 2483.500 | -47.16 | ≤-41.20 | 48.04 | ≤54 | PASS |
| | | AV | 2499.760 | -46.95 | ≤-41.20 | 48.25 | ≤54 | PASS |
| | | AV | 2500.000 | -47.06 | ≤-41.20 | 48.14 | ≤54 | PASS |
| | | Peak | 2483.500 | -37.95 | ≤-21.20 | 57.25 | ≤74 | PASS |
| | | Peak | 2488.000 | -36.08 | ≤-21.20 | 59.12 | ≤74 | PASS |
| | | Peak | 2500.000 | -37.59 | ≤-21.20 | 57.61 | ≤74 | PASS |
| | Hop_2402 | Peak | 2310.000 | -39.36 | ≤-21.20 | 55.84 | ≤74 | PASS |
| | | Peak | 2381.585 | -36.69 | ≤-21.20 | 58.51 | ≤74 | PASS |
| | | Peak | 2390.000 | -38.94 | ≤-21.20 | 56.26 | ≤74 | PASS |
| | Hop_2480 | Peak | 2483.500 | -37.96 | ≤-21.20 | 57.24 | ≤74 | PASS |
| | | Peak | 2498.320 | -36.25 | ≤-21.20 | 58.95 | ≤74 | PASS |
| | | Peak | 2500.000 | -37.37 | ≤-21.20 | 57.83 | ≤74 | PASS |
| 3DH5 | 2402 | AV | 2310.000 | -47.84 | ≤-41.20 | 47.36 | ≤54 | PASS |

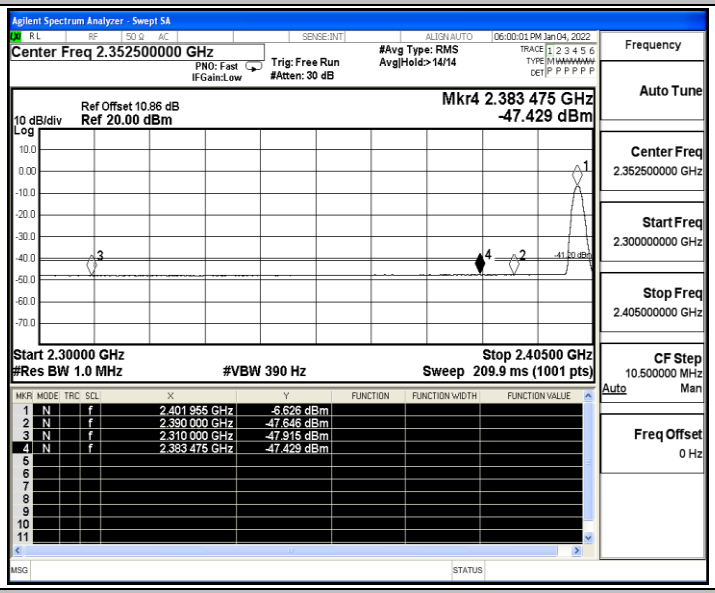
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | AV | 2389.880 | -47.5 | ≤-41.20 | 47.70 | ≤54 | PASS |
| | | AV | 2390.000 | -47.64 | ≤-41.20 | 47.56 | ≤54 | PASS |
| | | Peak | 2310.000 | -38.74 | ≤-21.20 | 56.46 | ≤74 | PASS |
| | | Peak | 2385.680 | -36.2 | ≤-21.20 | 59.00 | ≤74 | PASS |
| | | Peak | 2390.000 | -38.52 | ≤-21.20 | 56.68 | ≤74 | PASS |
| | 2480 | AV | 2483.500 | -47.2 | ≤-41.20 | 48.00 | ≤54 | PASS |
| | | AV | 2499.840 | -46.9 | ≤-41.20 | 48.30 | ≤54 | PASS |
| | | AV | 2500.000 | -47.02 | ≤-41.20 | 48.18 | ≤54 | PASS |
| | | Peak | 2483.500 | -37.21 | ≤-21.20 | 57.99 | ≤74 | PASS |
| | | Peak | 2496.000 | -35.29 | ≤-21.20 | 59.91 | ≤74 | PASS |
| | | Peak | 2500.000 | -36.89 | ≤-21.20 | 58.31 | ≤74 | PASS |
| | Hop_2402 | Peak | 2310.000 | -38.93 | ≤-21.20 | 56.27 | ≤74 | PASS |
| | | Peak | 2347.250 | -36.93 | ≤-21.20 | 58.27 | ≤74 | PASS |
| | | Peak | 2390.000 | -38.22 | ≤-21.20 | 56.98 | ≤74 | PASS |
| | Hop_2480 | Peak | 2483.500 | -38.15 | ≤-21.20 | 57.05 | ≤74 | PASS |
| | | Peak | 2499.600 | -35.72 | ≤-21.20 | 59.48 | ≤74 | PASS |
| | | Peak | 2500.000 | -38.07 | ≤-21.20 | 57.13 | ≤74 | PASS |

Note：

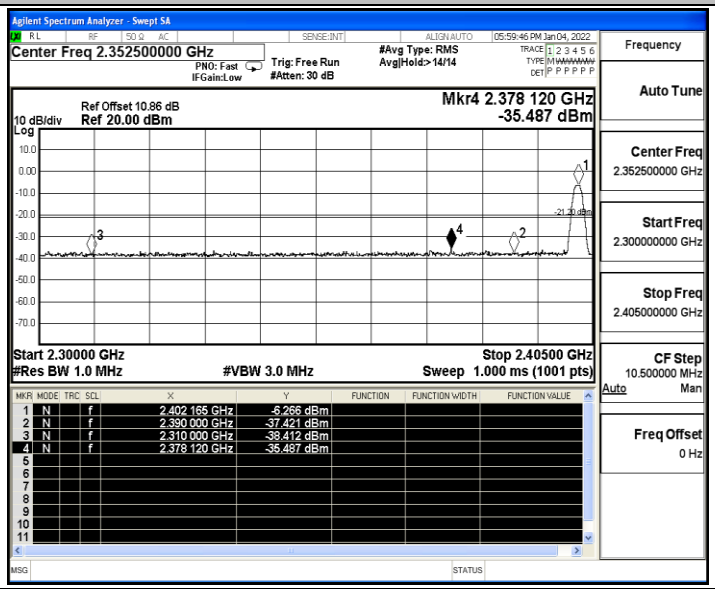
1. The Antenna Gain is compensated in the graph.
2. The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

## Test Graphs

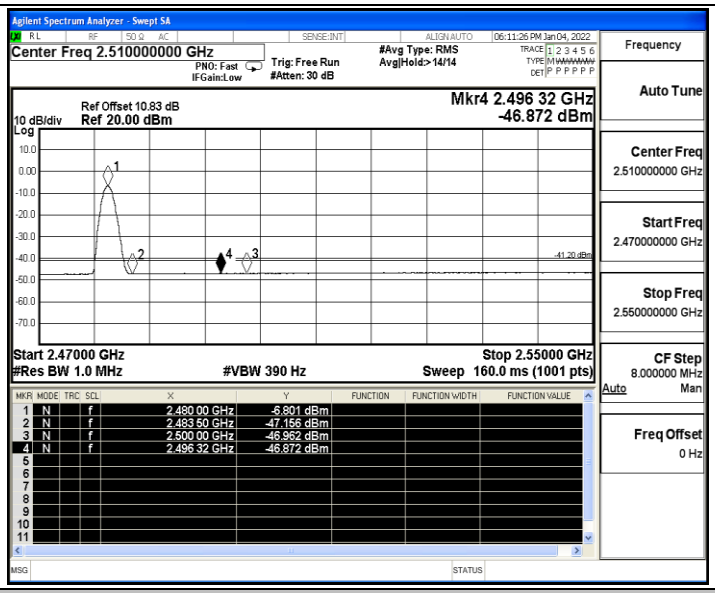
DH5_Ant1_Low_2402_AV



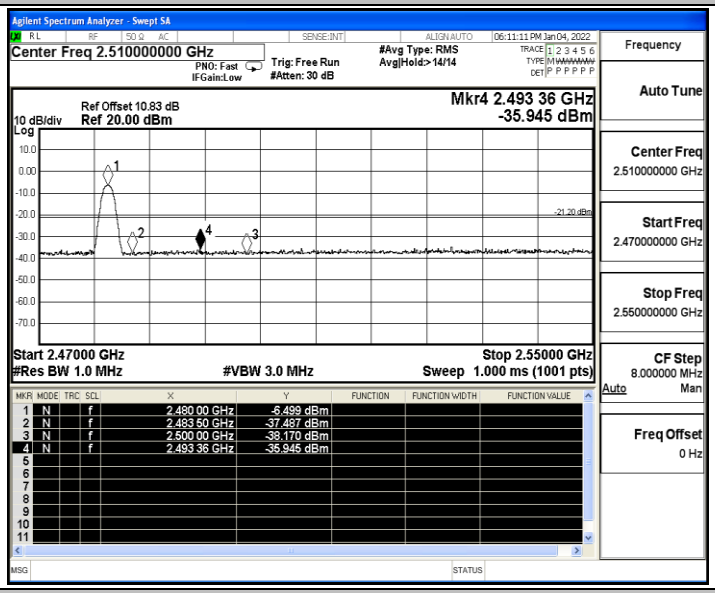

DH5_Ant1_Low_2402_Peak



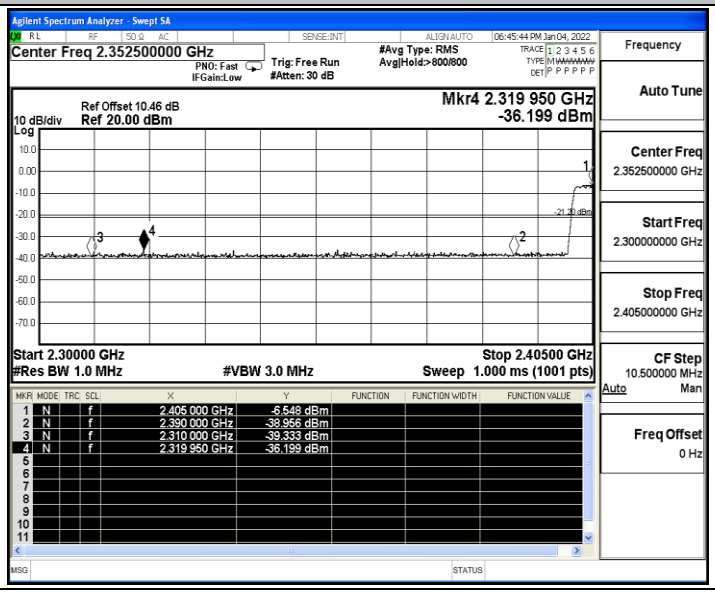

DH5_Ant1_High_2480_AV




DH5_Ant1_High_2480_Peak




DH5_Ant1_Low_Hop_2402_Peak



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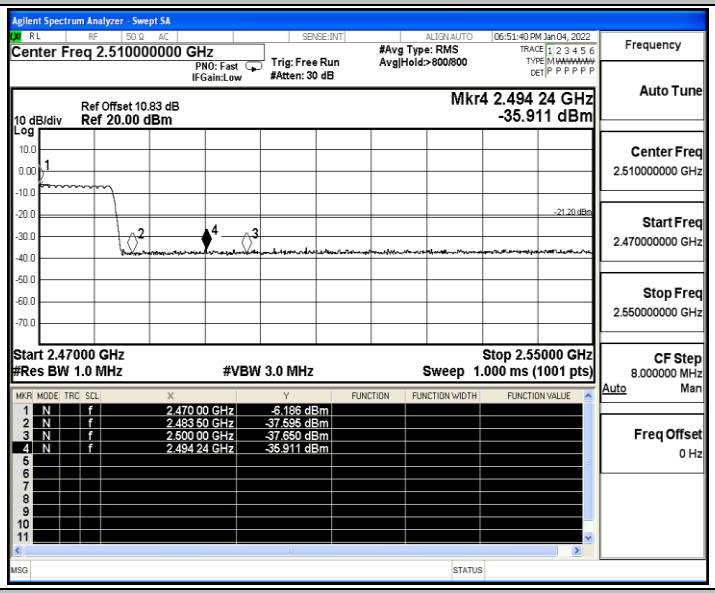
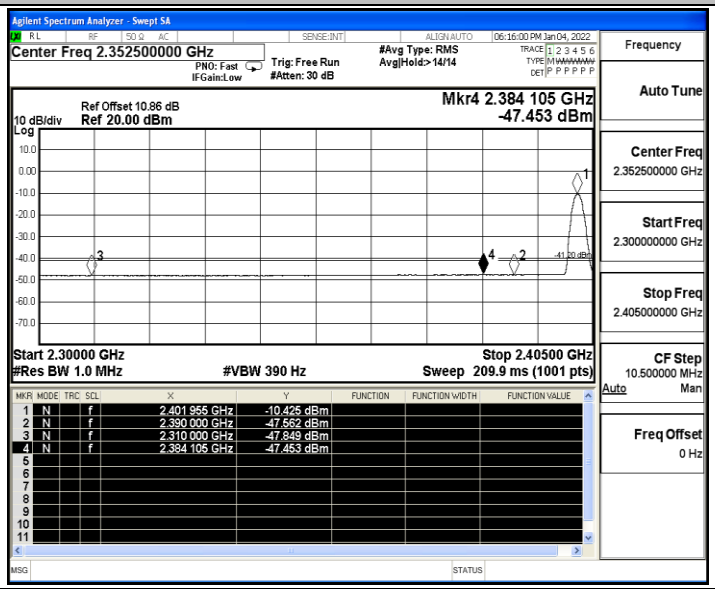
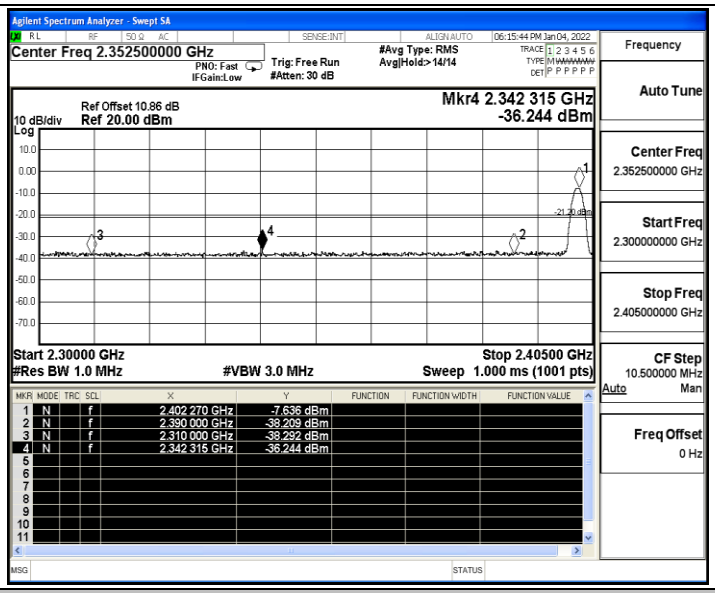



2DH5_Ant1_Low_2402_AV




2DH5_Ant1_Low_2402_Peak

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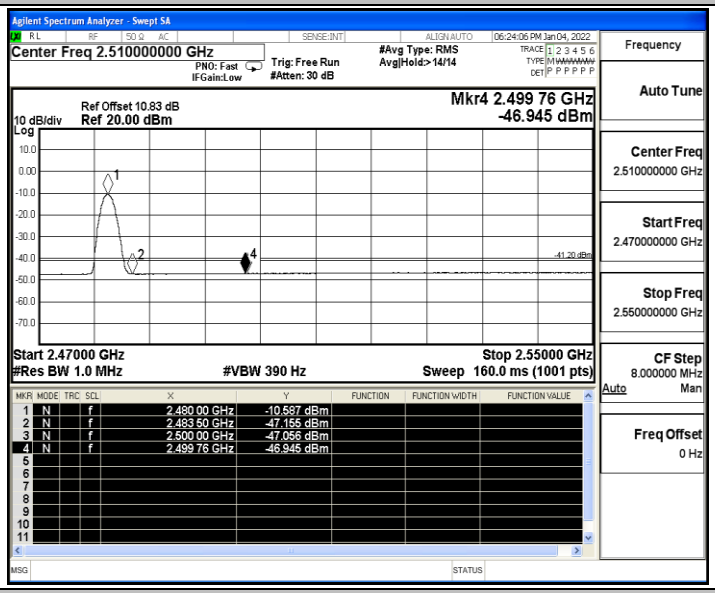


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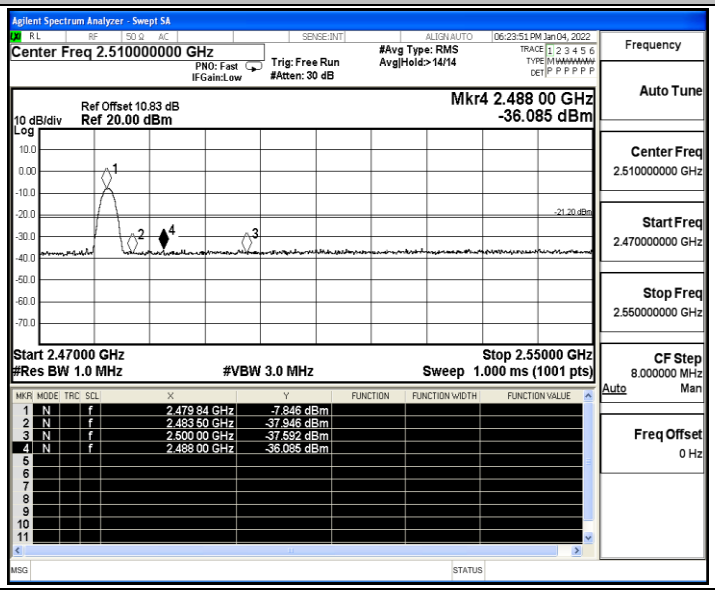
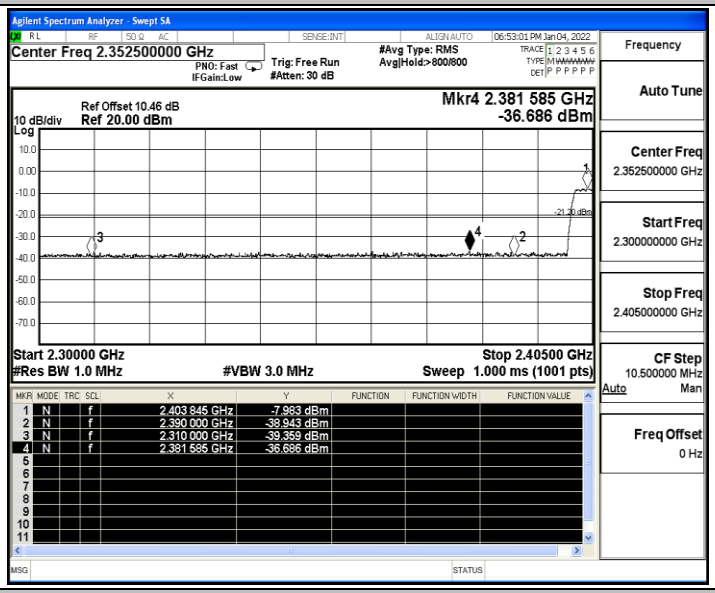
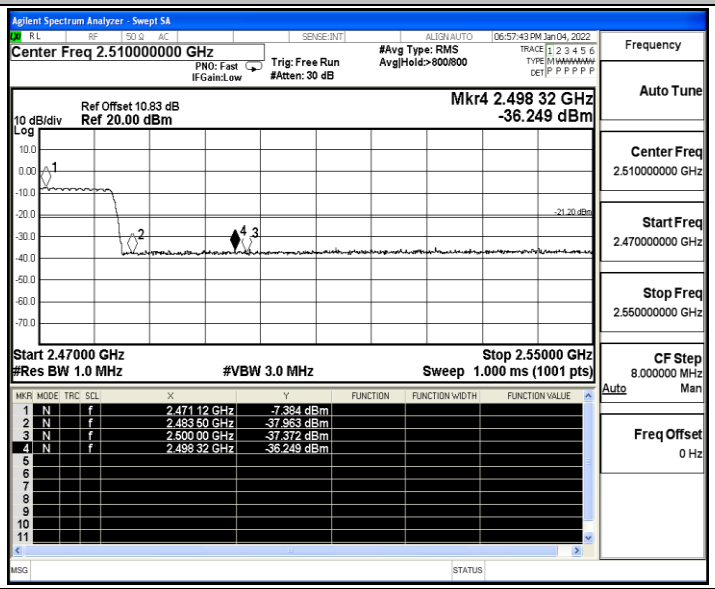


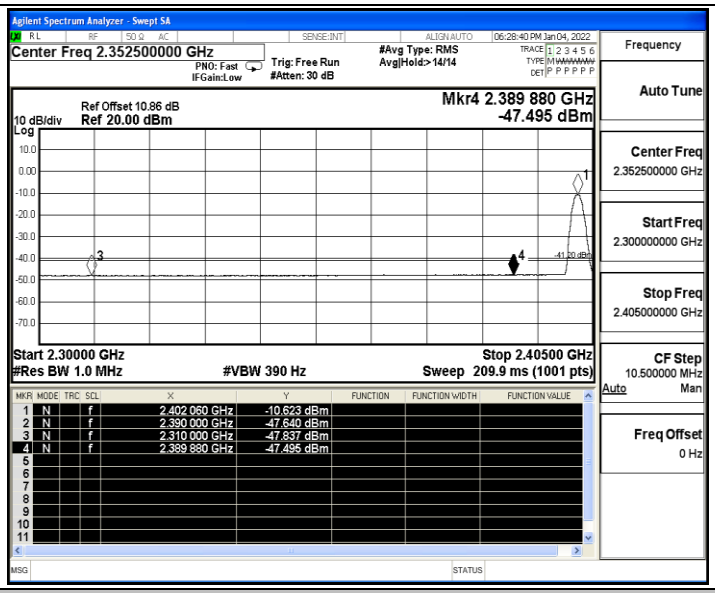
2DH5_Ant1_Low_Hop_2402_Peak



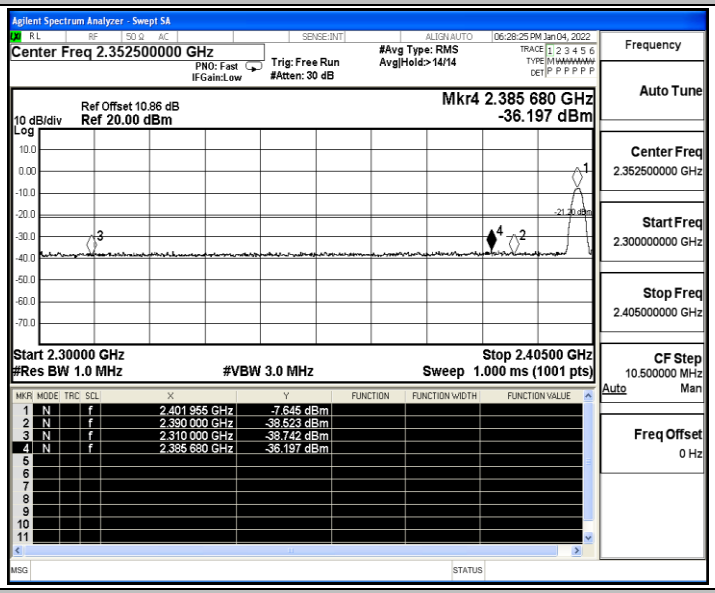

2DH5_Ant1_High_Hop_2480_Peak



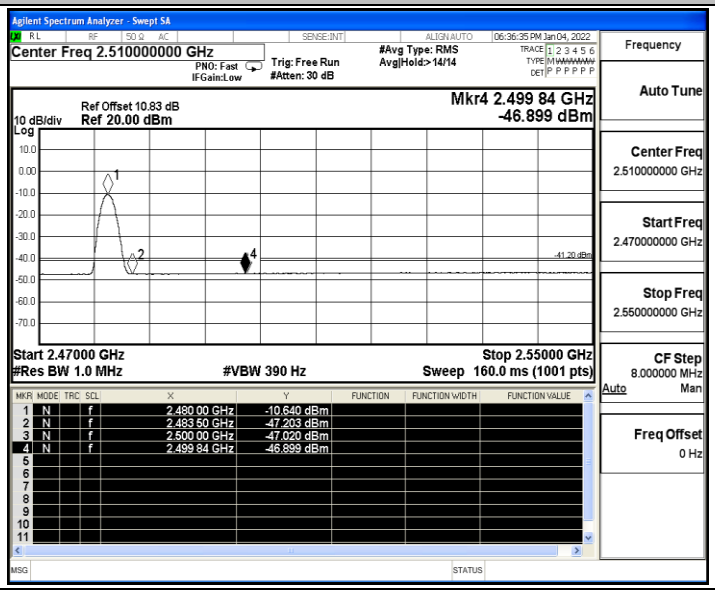

3DH5_Ant1_Low_2402_AV




3DH5_Ant1_Low_2402_Peak




3DH5_Ant1_High_2480_AV



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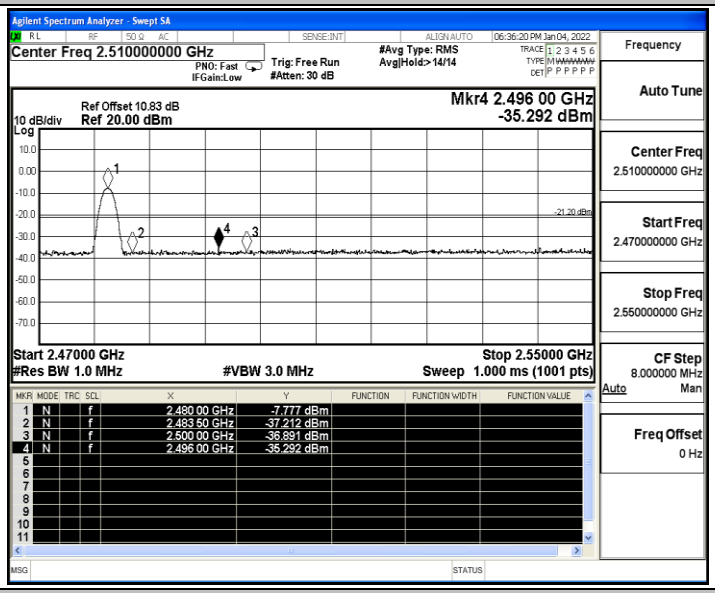
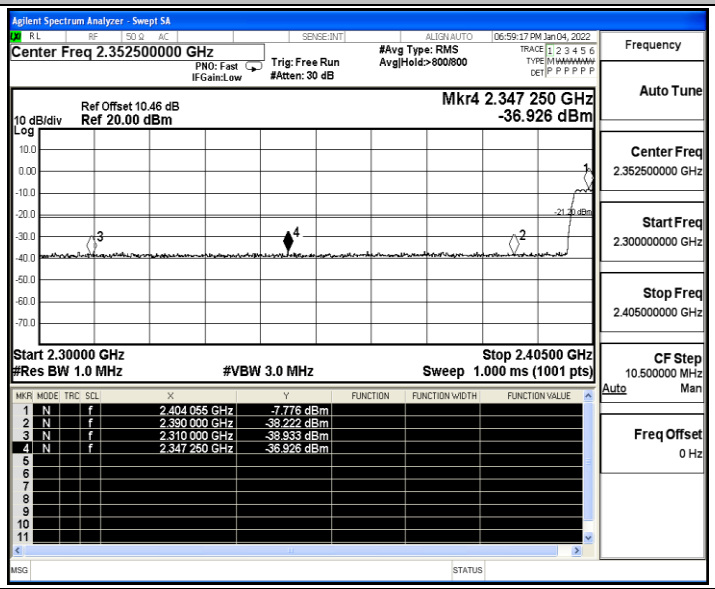
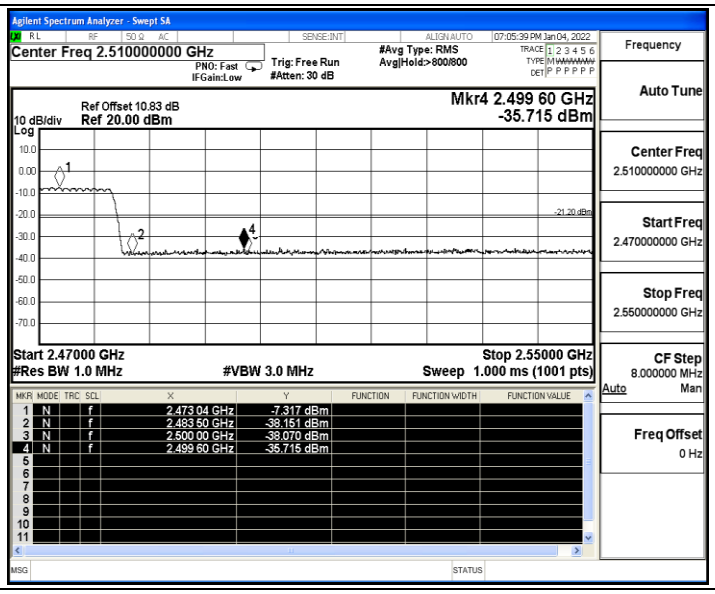



3DH5_Ant1_Low_Hop_2402_Peak




3DH5_Ant1_High_Hop_2480_Peak


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.510000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold:>800/800
07:05:39 PM Jan 04, 2022
Frequency
Auto Tune
Ref Offset 10.83 dB
10 dB/div Ref 20.00 dBm
Log
Mkr4 2.499 60 GHz
-35.715 dBm
-21.20 dBm
Center Freq
2.510000000 GHz
Start Freq
2.470000000 GHz
Stop Freq
2.550000000 GHz
Start 2.47000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 2.55000 GHz
Sweep 1.000 ms (1001 pts)
CF Step
8.000000 MHz
Auto Man
Freq Offset
0 Hz
1 N f 2.473 04 GHz -7.317 dBm
2 N f 2.483 50 GHz -38.151 dBm
3 N f 2.500 00 GHz -38.070 dBm
4 N f 2.499 60 GHz -35.715 dBm