# Appendix A

## RF Test Data for BT (Conducted Measurement)

**Product Name: Lamp with Bluetooth speaker and charging base**

**Test Model: Ambience**

**Environmental Conditions**

| | |
|---|---|
| Temperature: | 23.8° C |
| Relative Humidity: | 52.1% |
| ATM Pressure: | 100.0 kPa |
| Test Engineer: | Jay Luo |
| Supervised by: | Nick Peng |

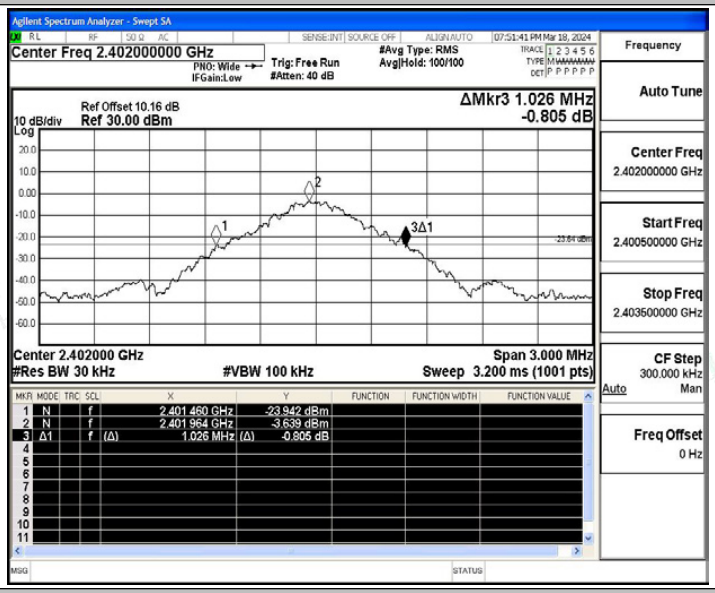
# A.1 20dB Emission Bandwidth

## Test Result

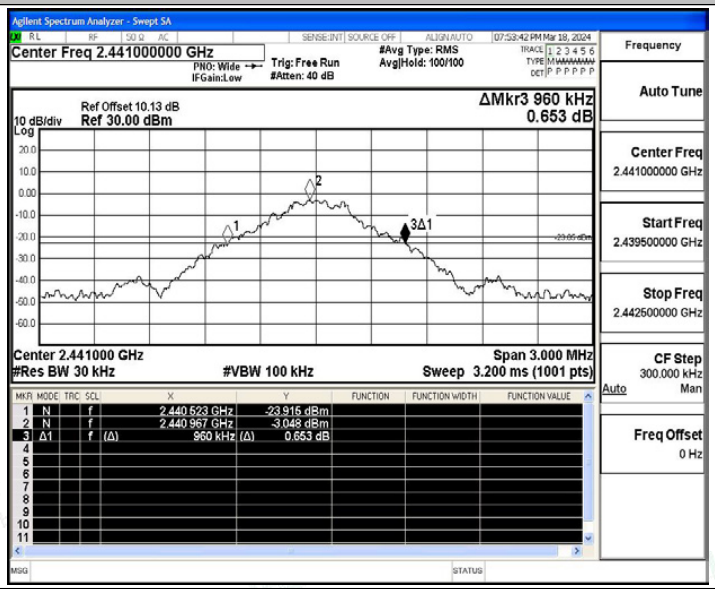
| TestMode | Antenna | Frequency[MHz] | 20db EBW[MHz] | FL[MHz] | FH[MHz] | Limit[MHz] | Verdict |
|---|---|---|---|---|---|---|---|
| DH5 | Ant1 | 2402 | 1.026 | 2401.460 | 2402.486 | --- | --- |
| | | 2441 | 0.960 | 2440.523 | 2441.483 | --- | --- |
| | | 2480 | 1.032 | 2479.457 | 2480.489 | --- | --- |
| 2DH5 | Ant1 | 2402 | 1.314 | 2401.331 | 2402.645 | --- | --- |
| | | 2441 | 1.284 | 2440.355 | 2441.639 | --- | --- |
| | | 2480 | 1.284 | 2479.352 | 2480.636 | --- | --- |
| 3DH5 | Ant1 | 2402 | 1.272 | 2401.340 | 2402.612 | --- | --- |
| | | 2441 | 1.305 | 2440.337 | 2441.642 | --- | --- |
| | | 2480 | 1.299 | 2479.334 | 2480.633 | --- | --- |

## Test Graphs

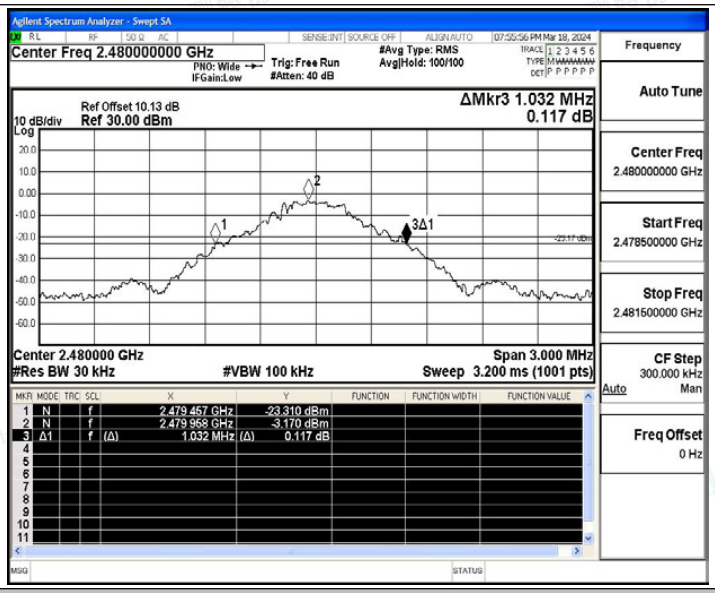
DH5_Ant1_2402



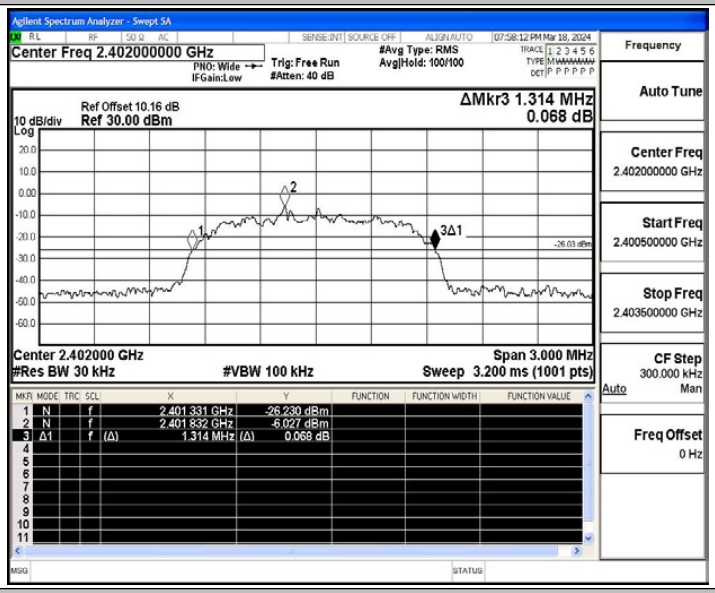

DH5_Ant1_2441



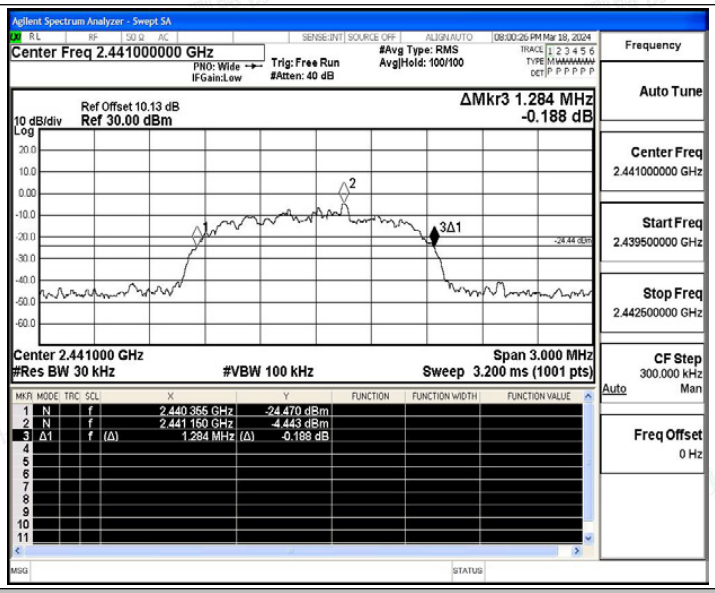

DH5_Ant1_2480



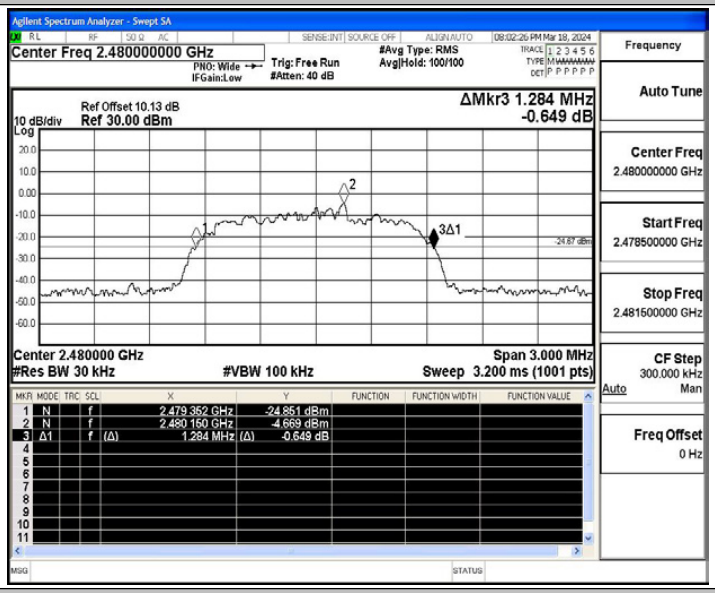

2DH5_Ant1_2402



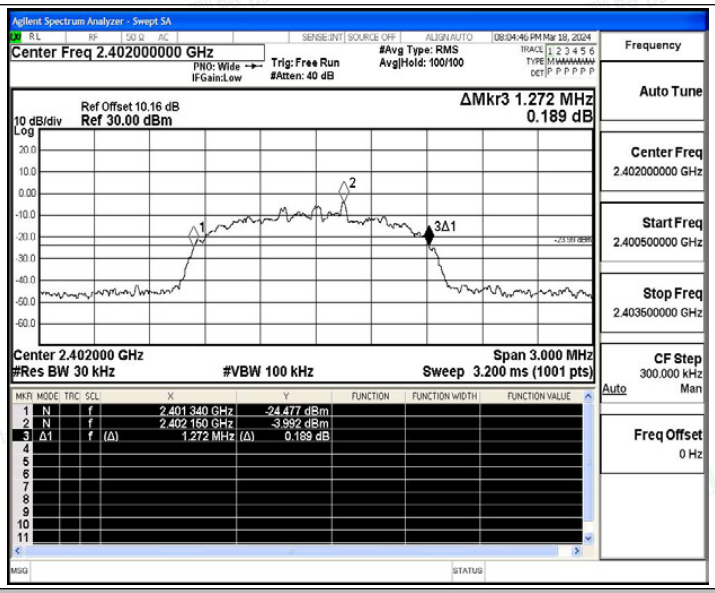

2DH5_Ant1_2441



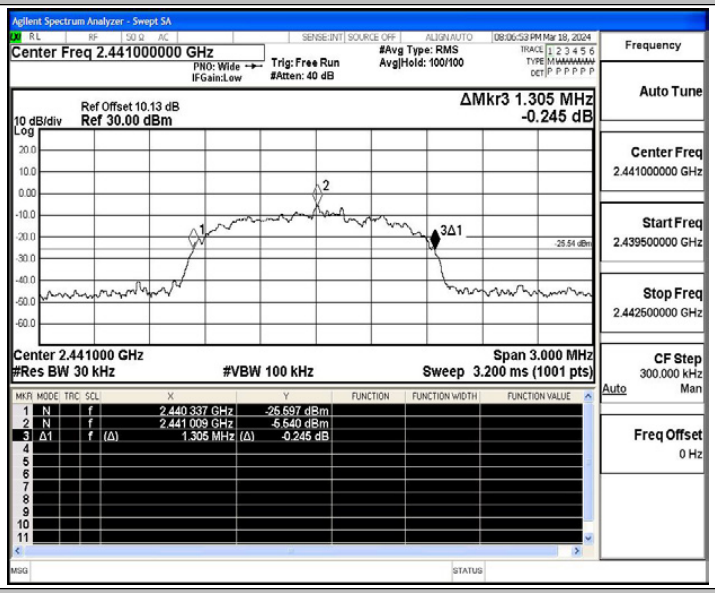

2DH5_Ant1_2480



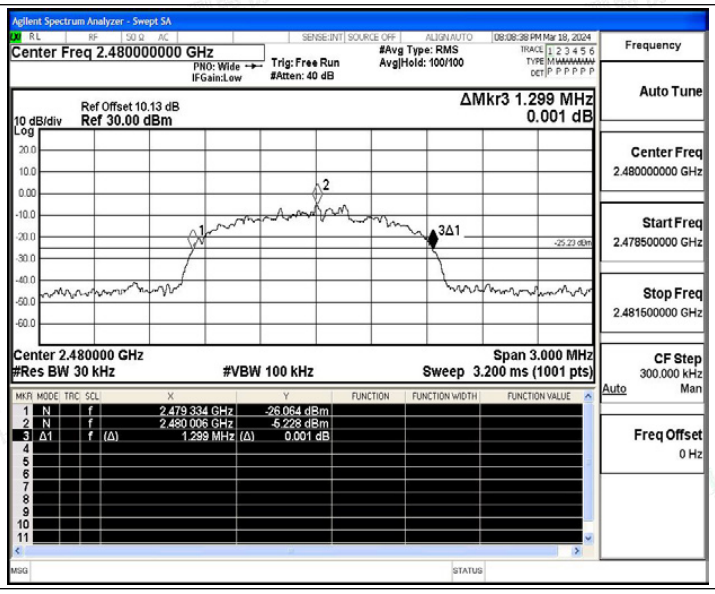

3DH5_Ant1_2402




3DH5_Ant1_2441




3DH5_Ant1_2480


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 40 dB
#Avg Type: RMS
Avg|Hold: 100/100
08:09:38 PM Mar 18, 2024
Ref Offset 10.13 dB
10 dB/div Ref 30.00 dBm
Log
ΔMkr3 1.299 MHz
0.001 dB
Center 2.480000 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 3.000 MHz
Sweep 3.200 ms (1001 pts)
1 N f 2.479 334 GHz -26.064 dBm
2 N f 2.480 006 GHz -5.228 dBm
3 Δ1 f (Δ) 1.299 MHz (Δ) 0.001 dB
Frequency
Auto Tune
Center Freq 2.480000000 GHz
Start Freq 2.478500000 GHz
Stop Freq 2.481500000 GHz
CF Step 300.000 kHz Auto Man
Freq Offset 0 Hz

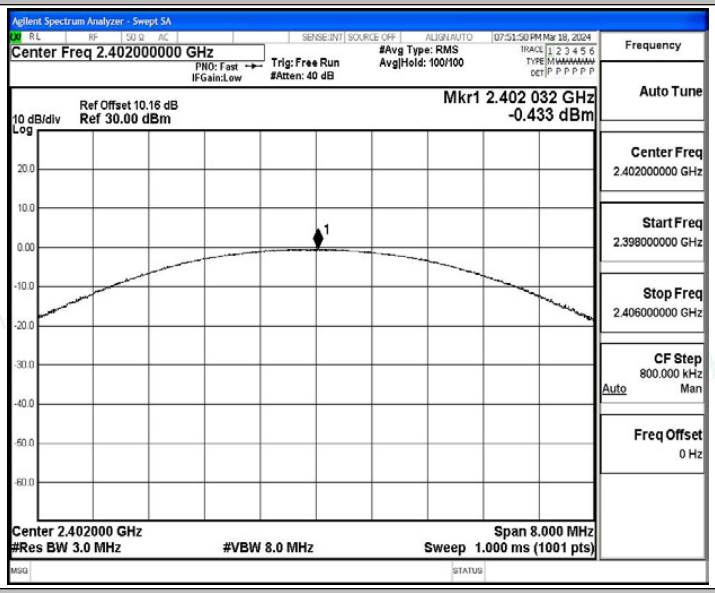
# A.2 Maximum Peak conducted output power

## Test Result

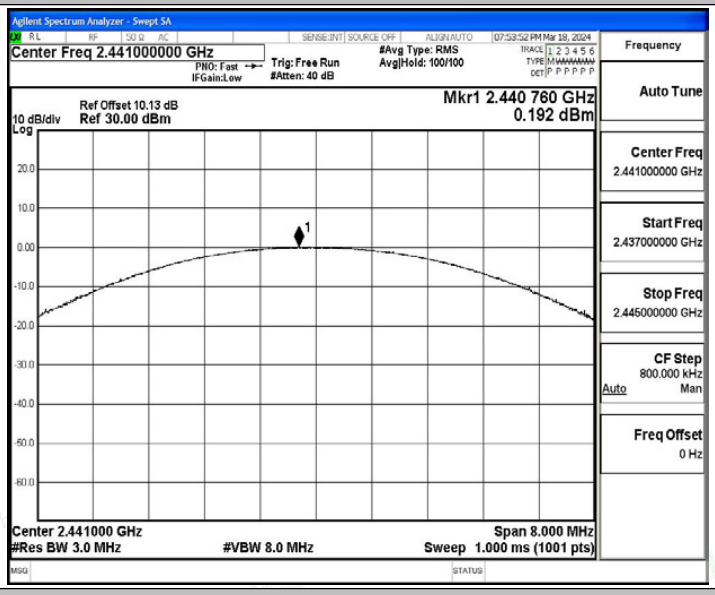
| Test Mode | Antenna | Frequency[MHz] | Conducted Peak Powert[dBm] | Conducted Limit[dBm] | Verdict |
|---|---|---|---|---|---|
| DH5 | Ant1 | 2402 | -0.43 | ≤20.97 | PASS |
| | | 2441 | 0.19 | ≤20.97 | PASS |
| | | 2480 | **0.23** | ≤20.97 | PASS |
| 2DH5 | Ant1 | 2402 | -0.49 | ≤20.97 | PASS |
| | | 2441 | -0.31 | ≤20.97 | PASS |
| | | 2480 | -0.10 | ≤20.97 | PASS |
| 3DH5 | Ant1 | 2402 | -0.49 | ≤20.97 | PASS |
| | | 2441 | -0.35 | ≤20.97 | PASS |
| | | 2480 | -0.07 | ≤20.97 | PASS |

## Test Graphs

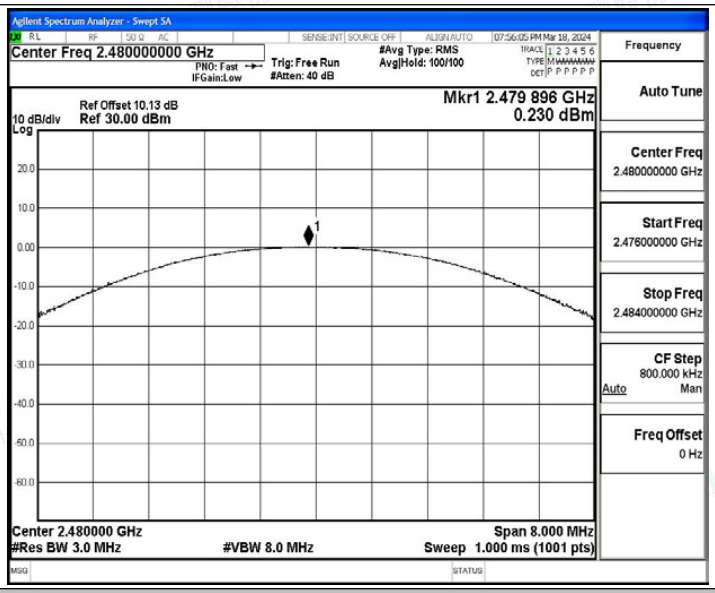
DH5_Ant1_2402



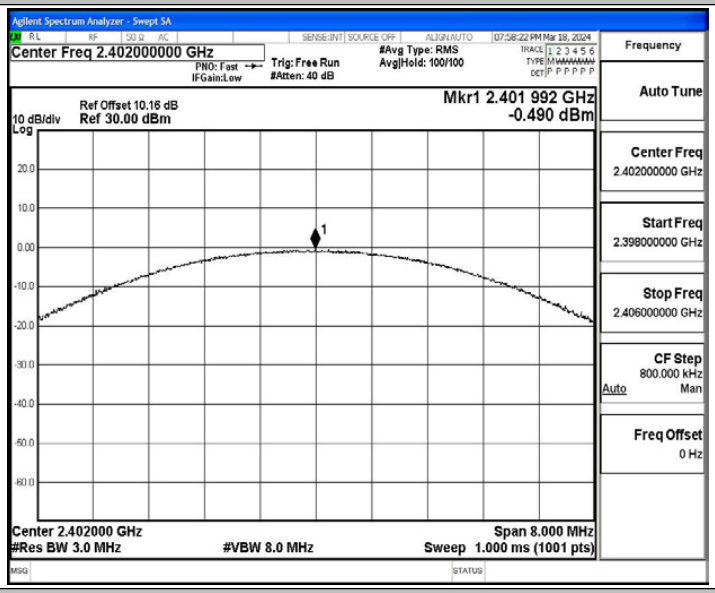

DH5_Ant1_2441



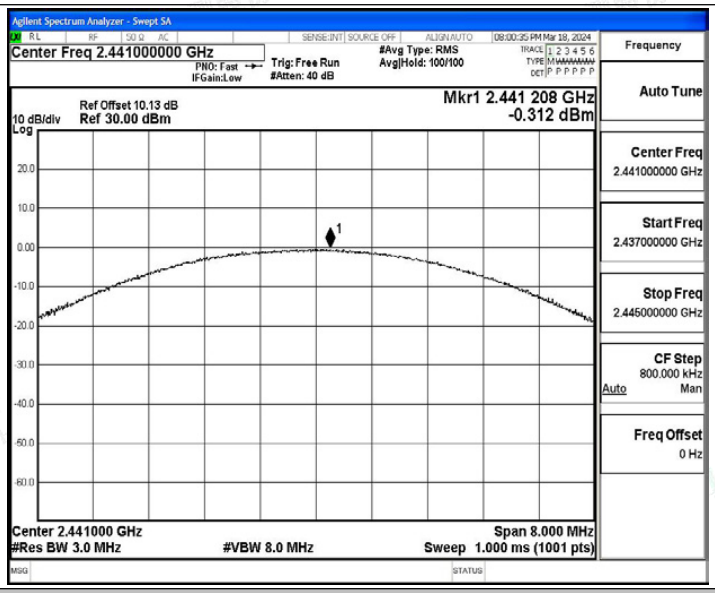

DH5_Ant1_2480



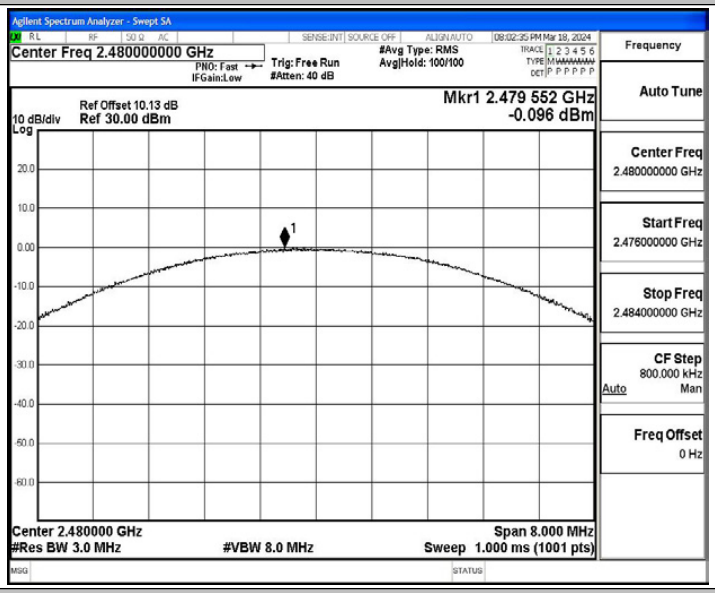

2DH5_Ant1_2402



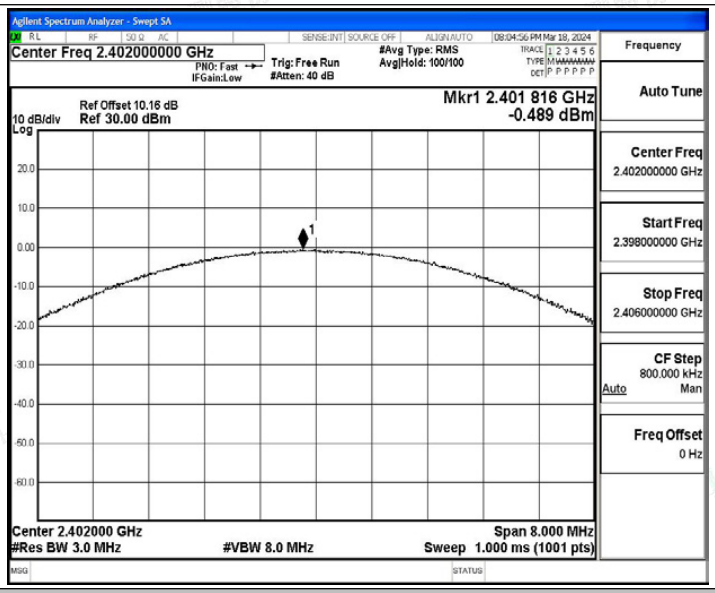

2DH5_Ant1_2441



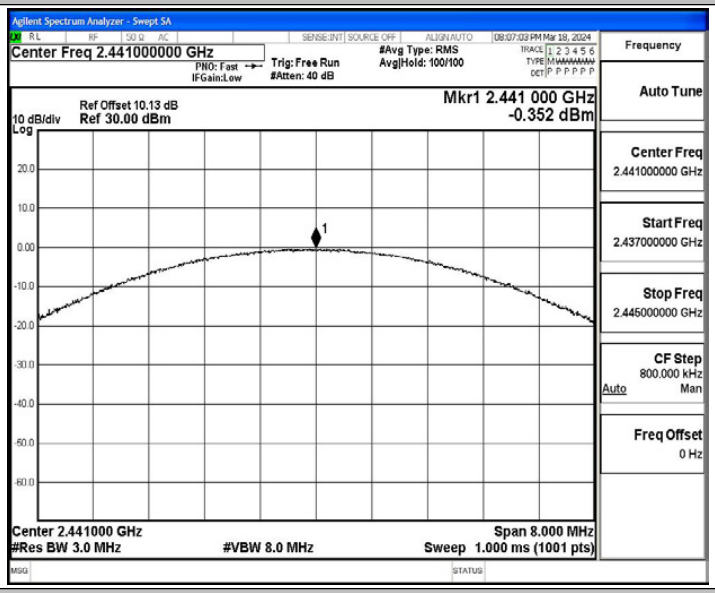

2DH5_Ant1_2480



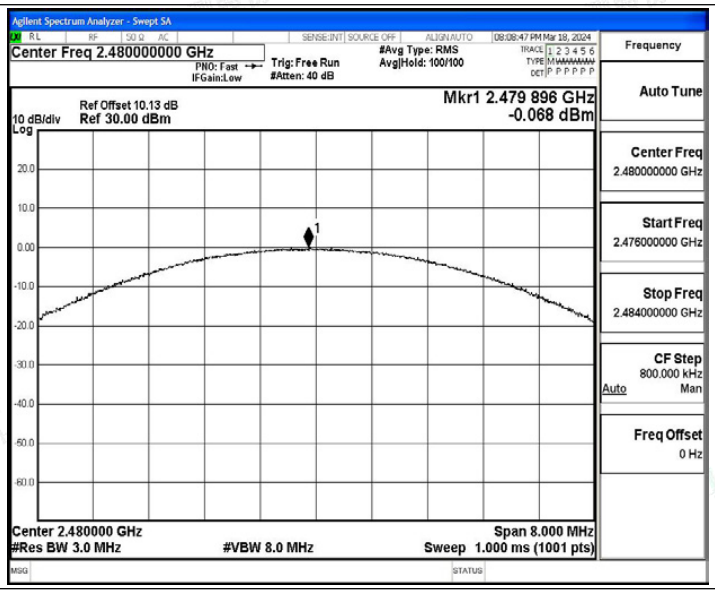

3DH5_Ant1_2402




3DH5_Ant1_2441




3DH5_Ant1_2480


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
#Avg Type: RMS
Avg|Hold: 100/100
08:09:47 PM Mar 18, 2024
Ref Offset 10.13 dB
10 dB/div Ref 30.00 dBm
Log
Mkr1 2.479 896 GHz
-0.068 dBm
Center 2.480000 GHz
#Res BW 3.0 MHz
#VBW 8.0 MHz
Span 8.000 MHz
Sweep 1.000 ms (1001 pts)
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.476000000 GHz
Stop Freq
2.484000000 GHz
CF Step
800.000 kHz
Auto
Man
Freq Offset
0 Hz

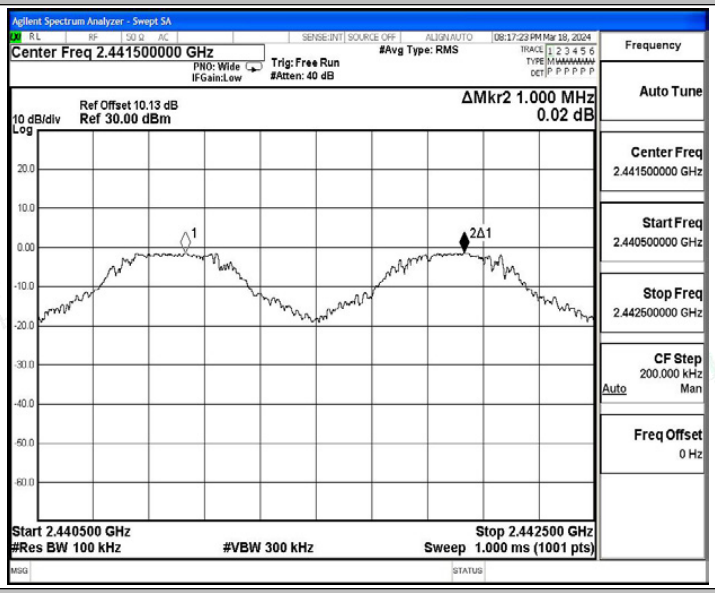
# A.3 Carrier frequency separation

## Test Result

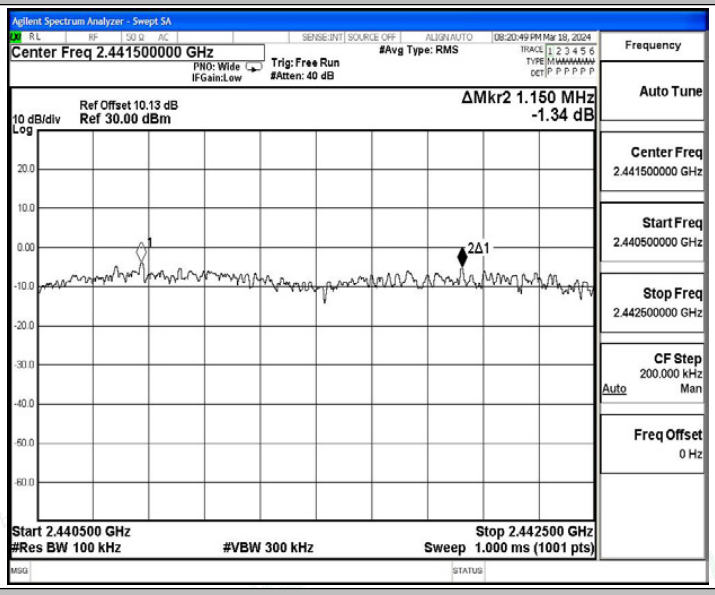
| TestMode | Antenna | Frequency[MHz] | Result[MHz] | Limit[MHz] | Verdict |
|---|---|---|---|---|---|
| DH5 | Ant1 | Hop | 1 | ≥0.688 | PASS |
| 2DH5 | Ant1 | Hop | 1.15 | ≥0.876 | PASS |
| 3DH5 | Ant1 | Hop | 1.048 | ≥0.870 | PASS |

## Test Graphs

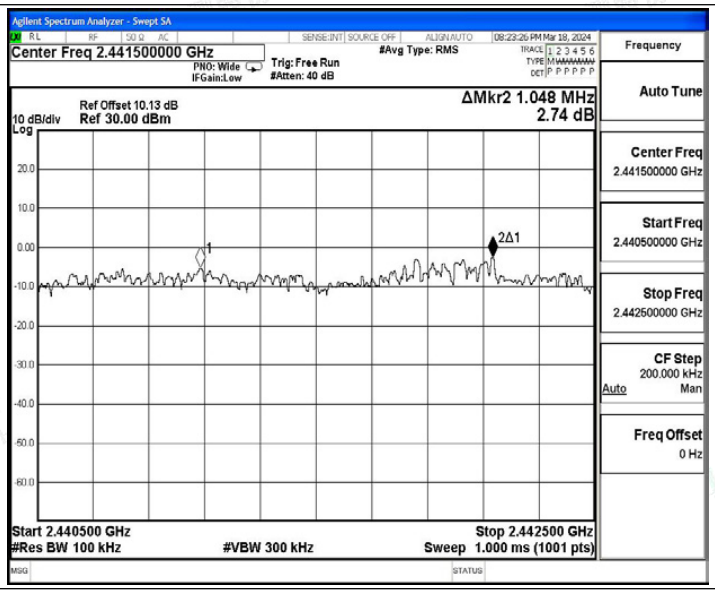
DH5_Ant1_Hop




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
08:23:26 PM Mar 18, 2024
Ref Offset 10.13 dB
10 dB/div Ref 30.00 dBm
Log
ΔMkr2 1.048 MHz
2.74 dB
Start 2.440500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.442500 GHz
Sweep 1.000 ms (1001 pts)
Frequency
Auto Tune
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

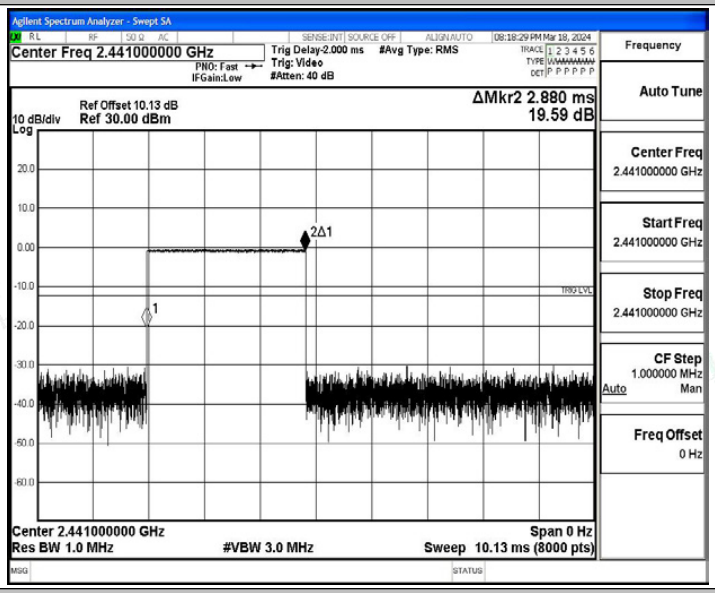
# A.4 Time of occupancy

## Test Result

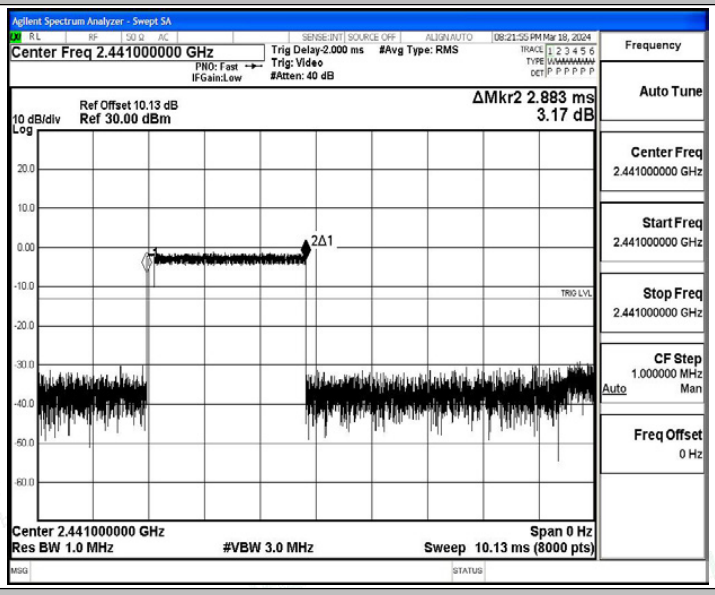
| TestMode | Antenna | Frequency[MHz] | BurstWidth [ms] | TotalHops [Num] | Result[s] | Limit[s] | Verdict |
|---|---|---|---|---|---|---|---|
| DH5 | Ant1 | Hop | 2.880 | 106.67 | 0.307 | ≤0.4 | PASS |
| 2DH5 | Ant1 | Hop | 2.883 | 106.67 | 0.308 | ≤0.4 | PASS |
| 3DH5 | Ant1 | Hop | 2.887 | 106.67 | 0.308 | ≤0.4 | PASS |

## Test Graphs

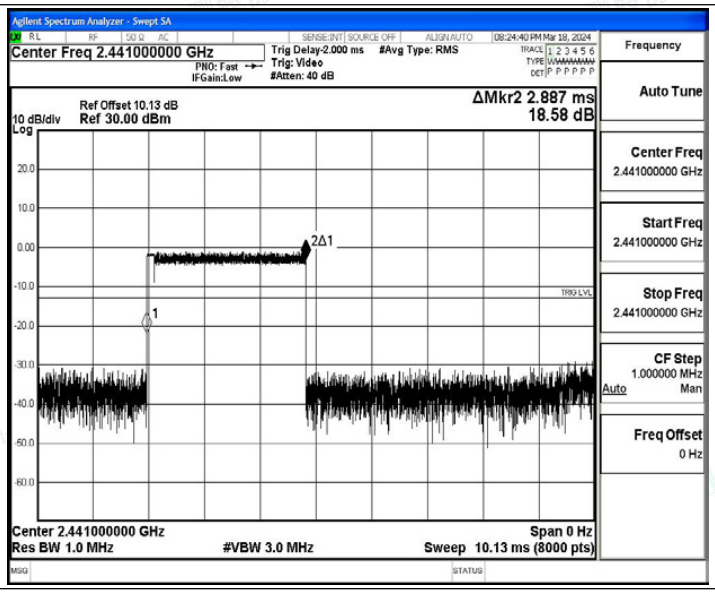
DH5_Ant1_Hop




2DH5_Ant1_Hop




3DH5_Ant1_Hop


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.441000000 GHz
Trig Delay-2.000 ms
#Avg Type: RMS
Trig: Video
#Atten: 40 dB
Ref Offset 10.13 dB
10 dB/div Ref 30.00 dBm
ΔMkr2 2.887 ms
18.58 dB
2Δ1
1
Center 2.441000000 GHz
Span 0 Hz
Res BW 1.0 MHz
#VBW 3.0 MHz
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

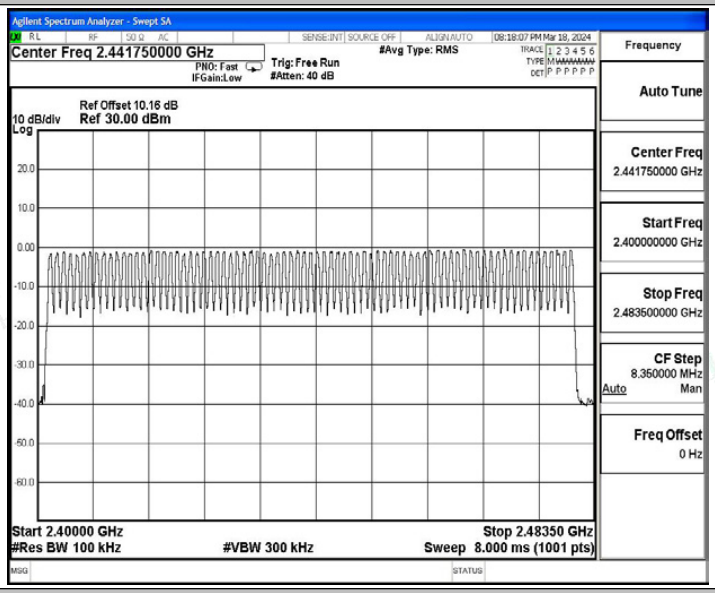
# A.5 Number of hopping channels

## Test Result

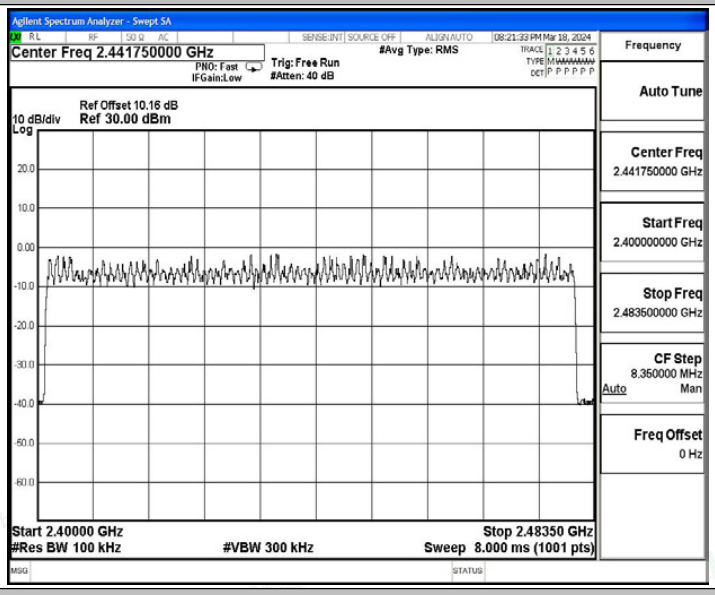
| TestMode | Antenna | Frequency[MHz] | Result[Num] | Limit[Num] | Verdict |
|---|---|---|---|---|---|
| DH5 | Ant1 | Hop | 79 | ≥15 | PASS |
| 2DH5 | Ant1 | Hop | 79 | ≥15 | PASS |
| 3DH5 | Ant1 | Hop | 79 | ≥15 | PASS |

## Test Graphs

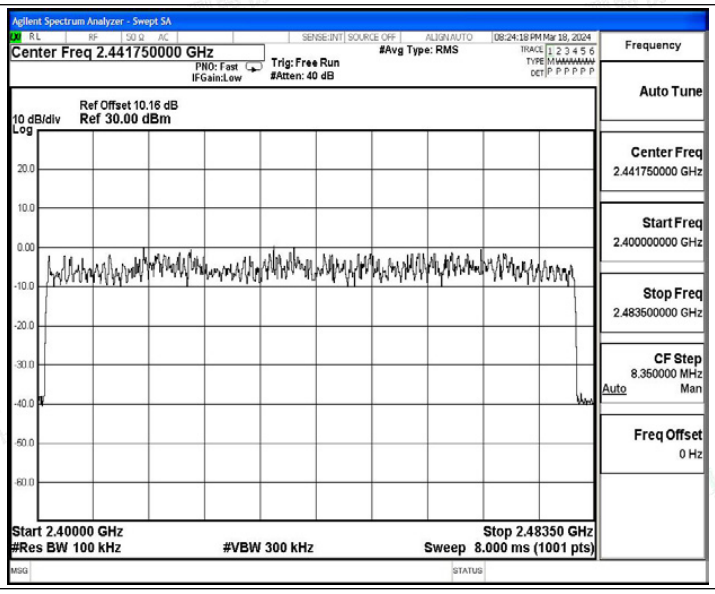
DH5_Ant1_Hop




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
08:24:18 PM Mar 18, 2024
Ref Offset 10.16 dB
10 dB/div Ref 30.00 dBm
Log
20.0
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
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

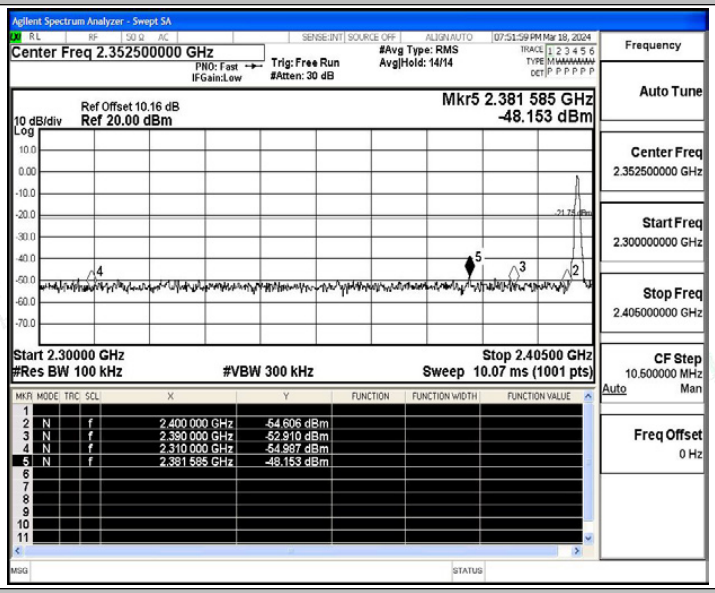
# A.6 Band edge measurements

## Test Result

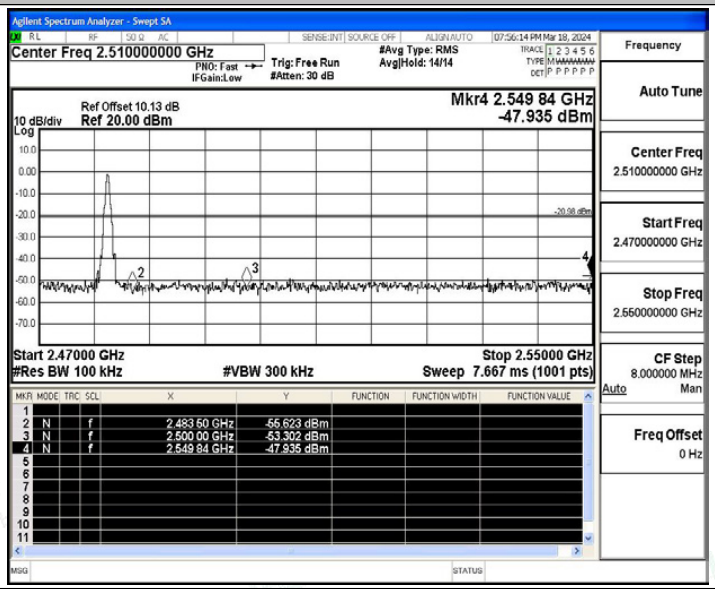
| TestMode | Antenna | ChName | Frequency[MHz] | RefLevel [dBm] | Result [dBm] | Limit [dBm] | Verdict |
|---|---|---|---|---|---|---|---|
| DH5 | Ant1 | Low | 2402 | -1.75 | -48.15 | ≤-21.75 | PASS |
| | | High | 2480 | -0.98 | -47.94 | ≤-20.98 | PASS |
| | | Low | Hop_2402 | -1.48 | -48.31 | ≤-21.48 | PASS |
| | | High | Hop_2480 | -0.75 | -46.44 | ≤-20.75 | PASS |
| 2DH5 | Ant1 | Low | 2402 | -2.16 | -48.97 | ≤-22.16 | PASS |
| | | High | 2480 | -2.17 | -48.48 | ≤-22.17 | PASS |
| | | Low | Hop_2402 | -4.43 | -48.21 | ≤-24.43 | PASS |
| | | High | Hop_2480 | -1.59 | -47.1 | ≤-21.59 | PASS |
| 3DH5 | Ant1 | Low | 2402 | -2.89 | -48.96 | ≤-22.89 | PASS |
| | | High | 2480 | -1.52 | -48.14 | ≤-21.52 | PASS |
| | | Low | Hop_2402 | -5.93 | -48.29 | ≤-25.93 | PASS |
| | | High | Hop_2480 | -1.69 | -47.64 | ≤-21.69 | PASS |

## Test Graphs

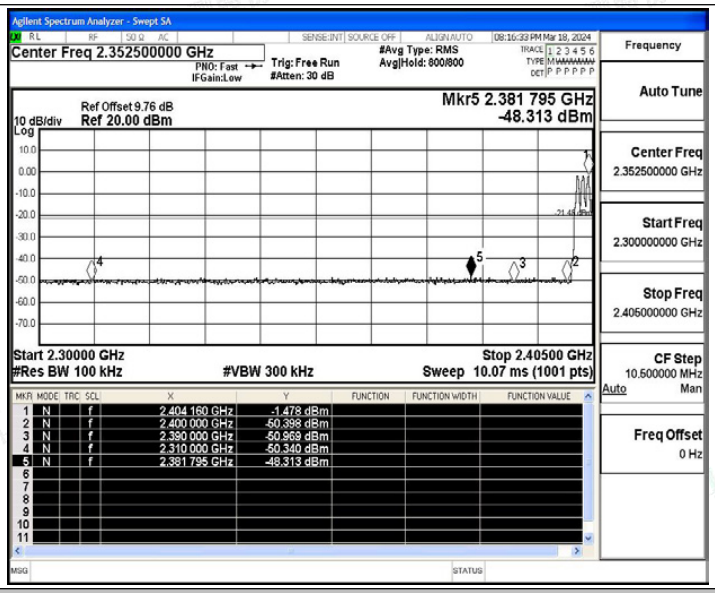
DH5_Ant1_Low_2402



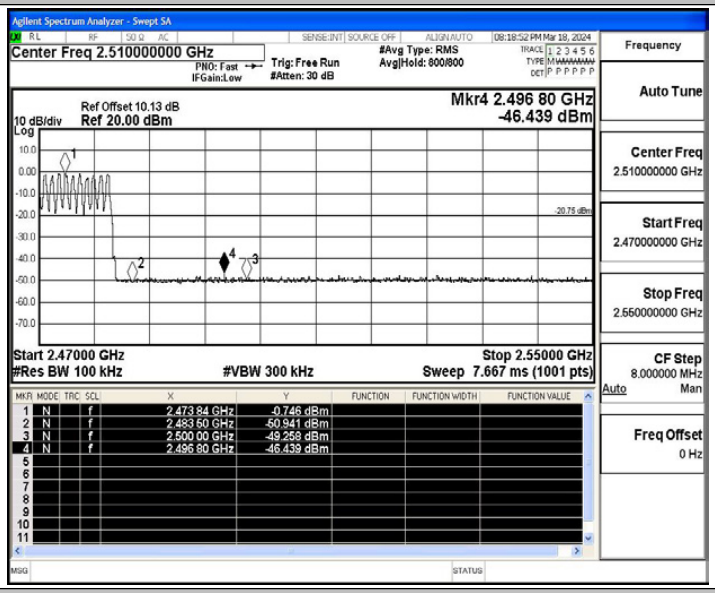

DH5_Ant1_High_2480



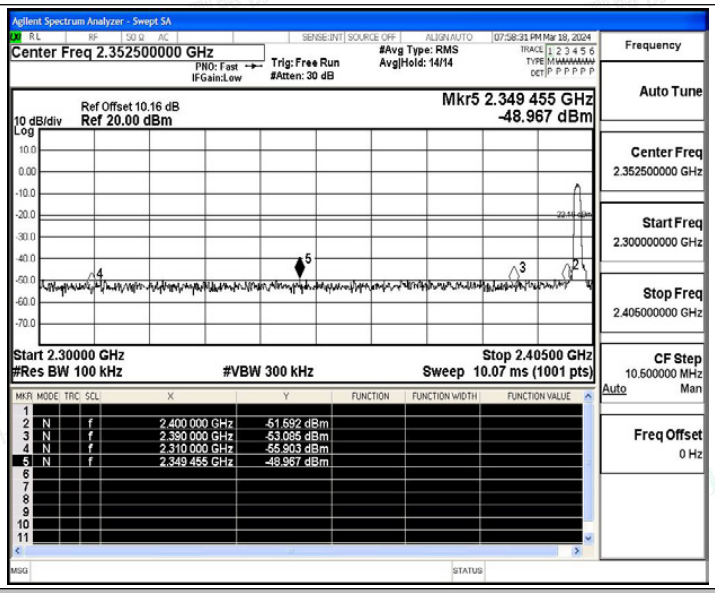

DH5_Ant1_Low_Hop_2402



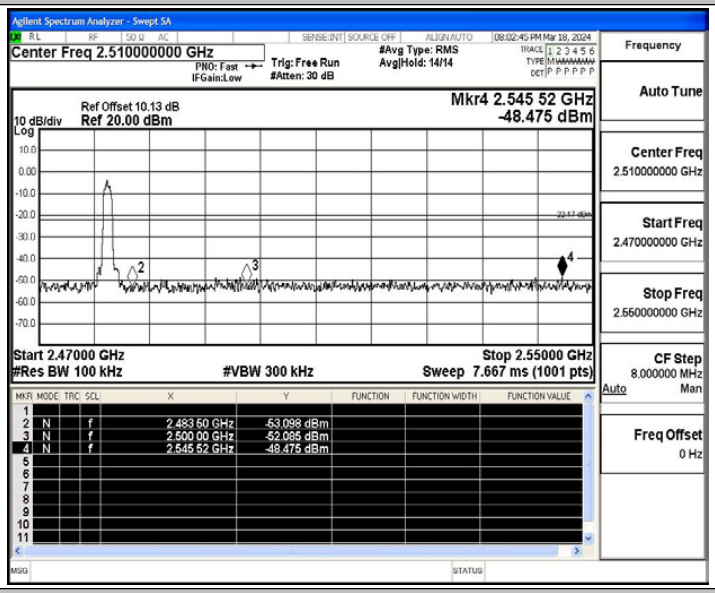

DH5_Ant1_High_Hop_2480



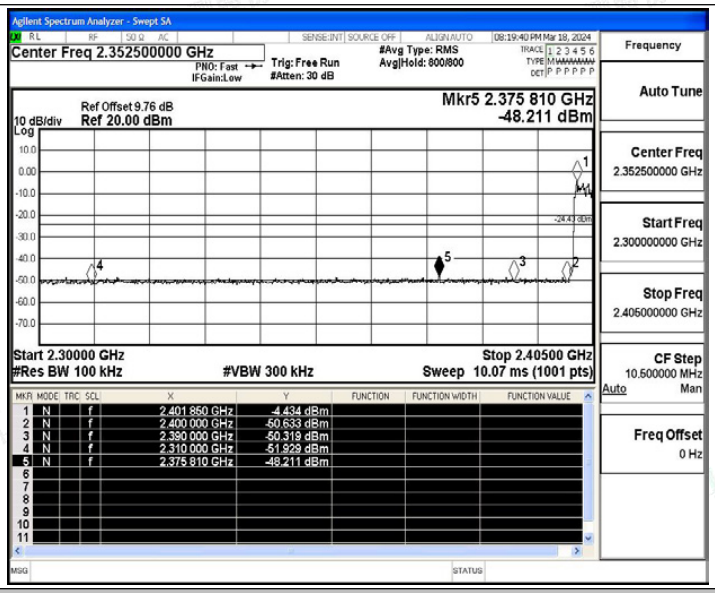

2DH5_Ant1_Low_2402



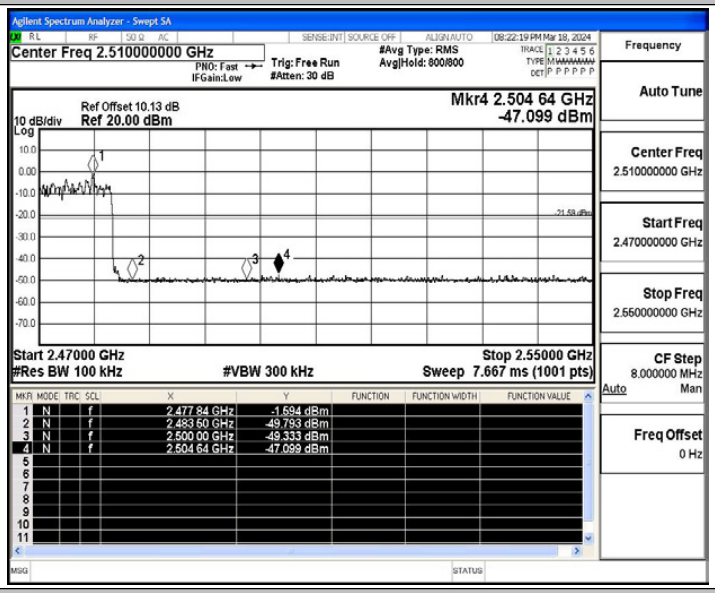

2DH5_Ant1_High_2480



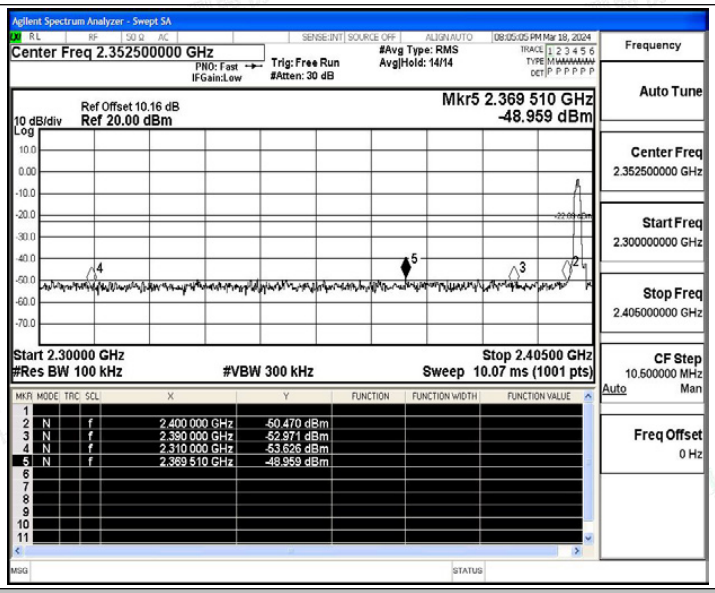

2DH5_Ant1_Low_Hop_2402



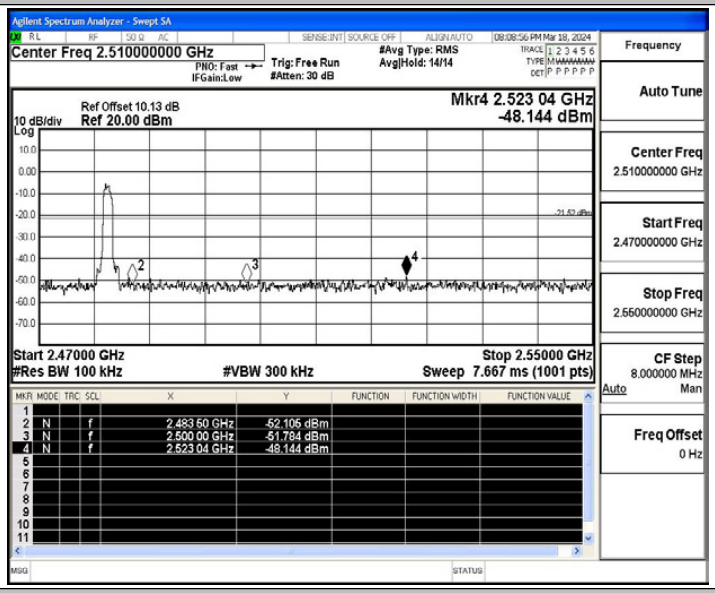

2DH5_Ant1_High_Hop_2480



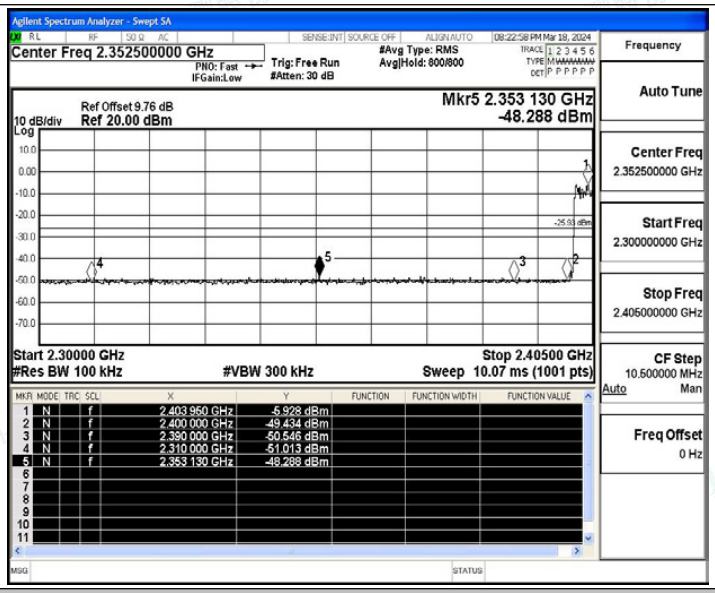

3DH5_Ant1_Low_2402



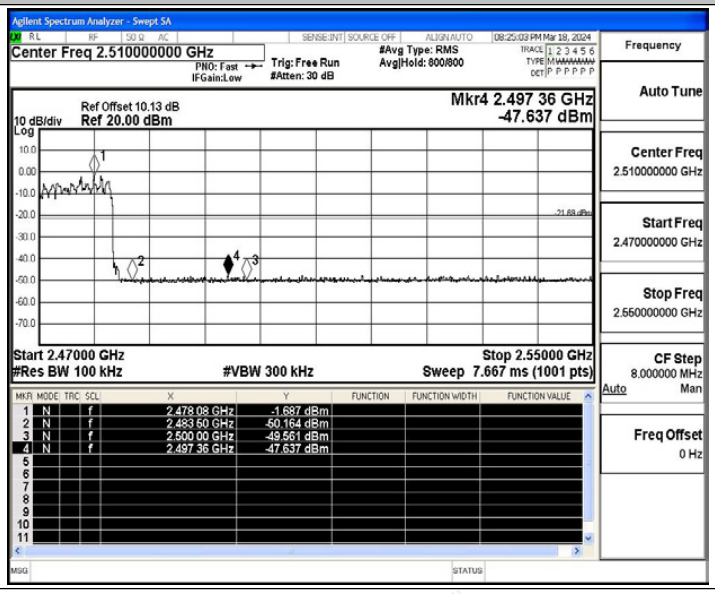

3DH5_Ant1_High_2480




3DH5_Ant1_Low_Hop_2402




3DH5_Ant1_High_Hop_2480



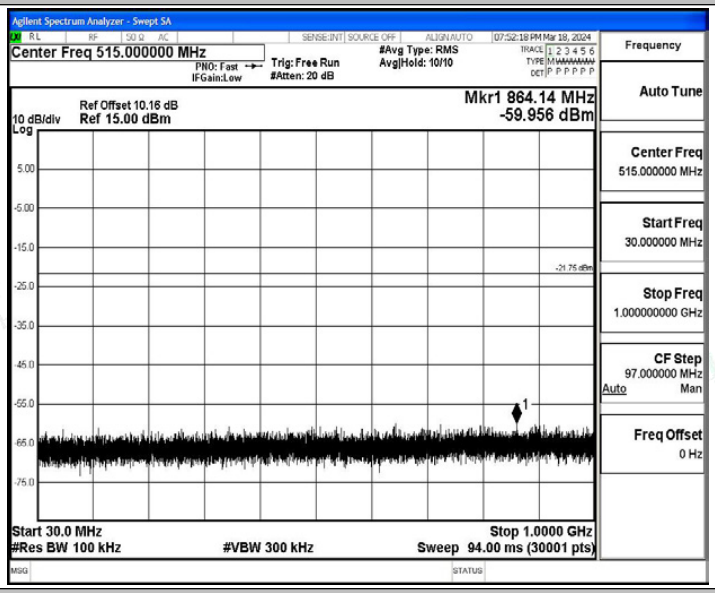
# A.7 Conducted Spurious Emission

## Test Result

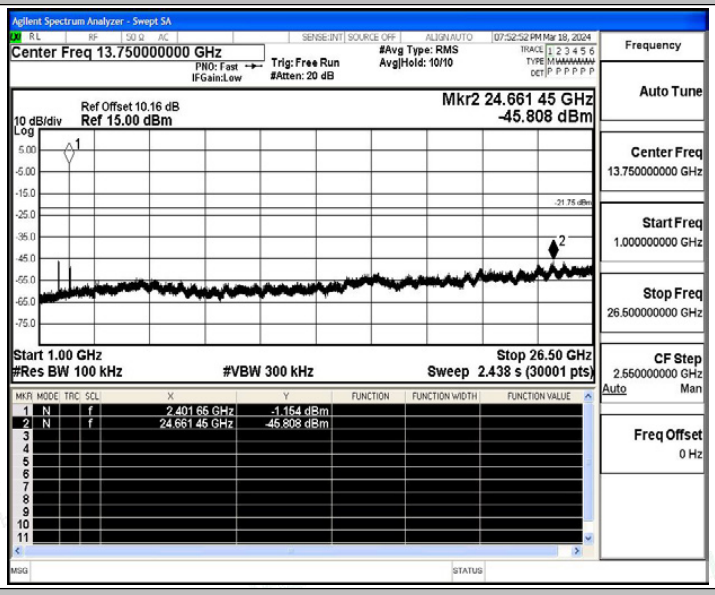
| TestMode | Antenna | Frequency[MHz] | FreqRange [MHz] | RefLevel [dBm] | Result [dBm] | Limit [dBm] | Verdict |
|---|---|---|---|---|---|---|---|
| DH5 | Ant1 | 2402 | 30~1000 | -1.75 | -59.96 | ≤-21.75 | PASS |
| | | | 1000~26500 | -1.75 | -45.81 | ≤-21.75 | PASS |
| | | 2441 | 30~1000 | -0.93 | -58.92 | ≤-20.93 | PASS |
| | | | 1000~26500 | -0.93 | -46.96 | ≤-20.93 | PASS |
| | | 2480 | 30~1000 | -0.98 | -59.48 | ≤-20.98 | PASS |
| | | | 1000~26500 | -0.98 | -46.84 | ≤-20.98 | PASS |
| 2DH5 | Ant1 | 2402 | 30~1000 | -2.16 | -59.72 | ≤-22.16 | PASS |
| | | | 1000~26500 | -2.16 | -47.19 | ≤-22.16 | PASS |
| | | 2441 | 30~1000 | -2.48 | -59.87 | ≤-22.48 | PASS |
| | | | 1000~26500 | -2.48 | -47.47 | ≤-22.48 | PASS |
| | | 2480 | 30~1000 | -2.17 | -56.91 | ≤-22.17 | PASS |
| | | | 1000~26500 | -2.17 | -47.32 | ≤-22.17 | PASS |
| 3DH5 | Ant1 | 2402 | 30~1000 | -2.89 | -59.4 | ≤-22.89 | PASS |
| | | | 1000~26500 | -2.89 | -46.55 | ≤-22.89 | PASS |
| | | 2441 | 30~1000 | -4.85 | -59.24 | ≤-24.85 | PASS |
| | | | 1000~26500 | -4.85 | -46.94 | ≤-24.85 | PASS |
| | | 2480 | 30~1000 | -1.52 | -59.75 | ≤-21.52 | PASS |
| | | | 1000~26500 | -1.52 | -47.08 | ≤-21.52 | PASS |

## Test Graphs

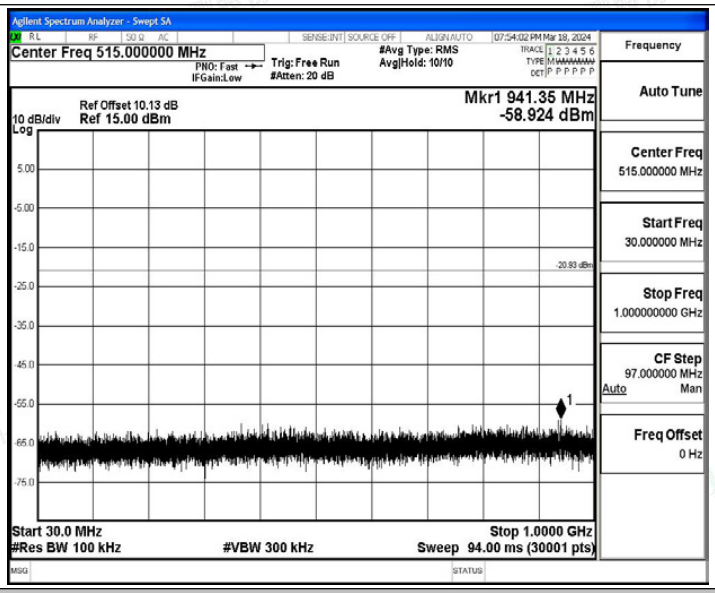
DH5_Ant1_2402_30~1000



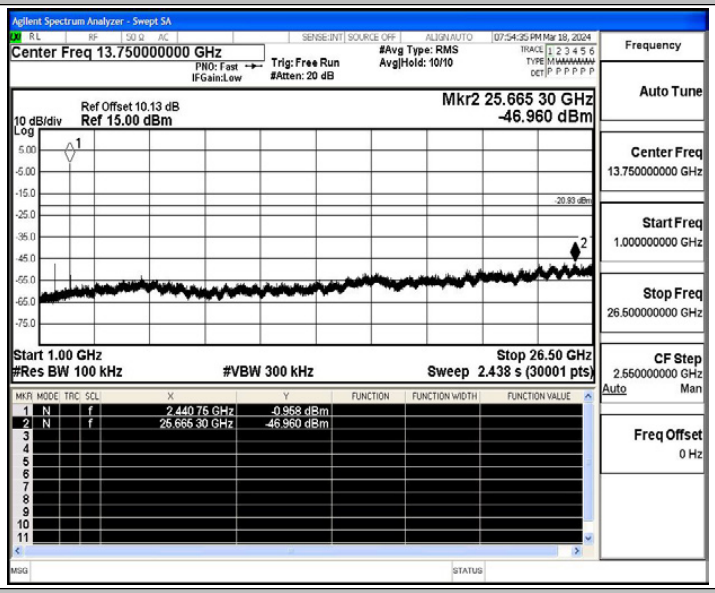

DH5_Ant1_2402_1000~26500



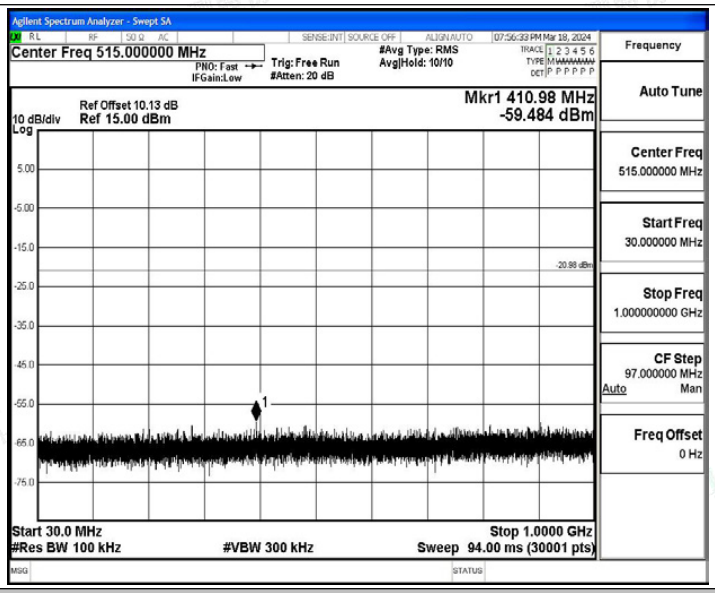

DH5_Ant1_2441_30~1000



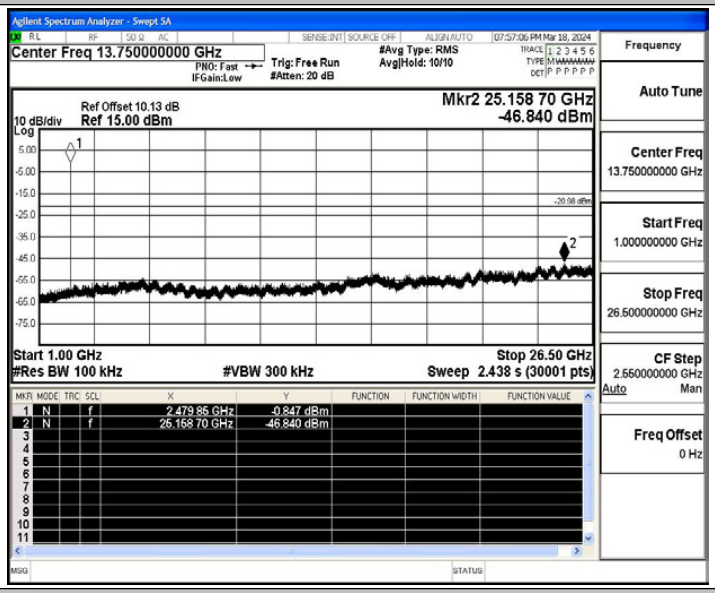

DH5_Ant1_2441_1000~26500



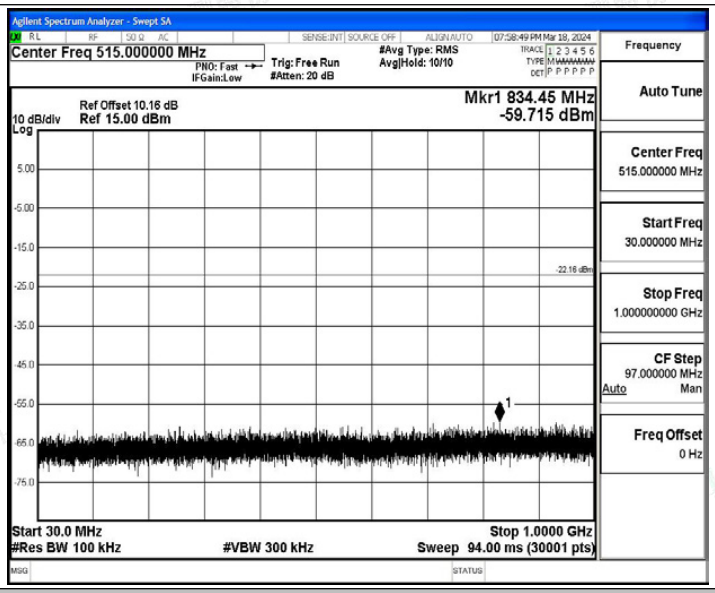

DH5_Ant1_2480_30~1000



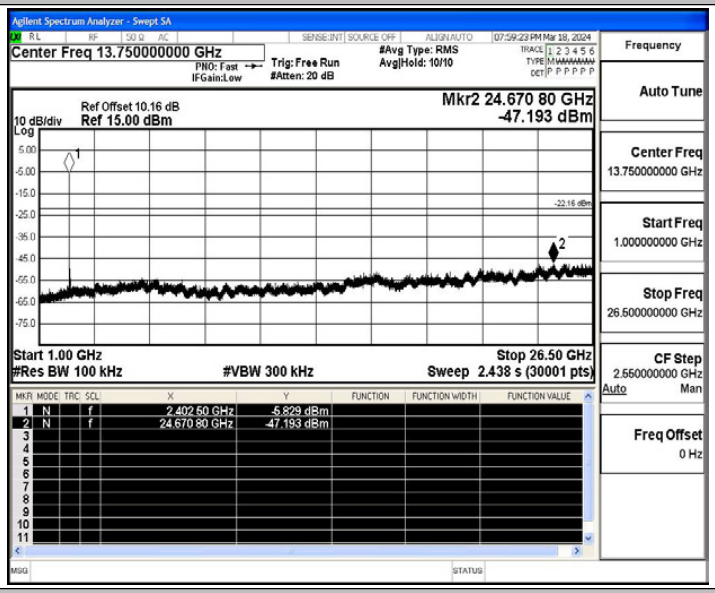

DH5_Ant1_2480_1000~26500



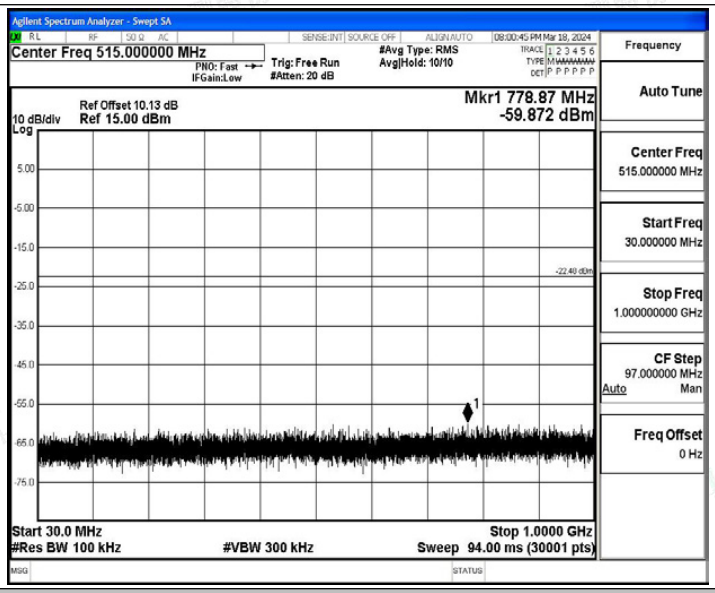

2DH5_Ant1_2402_30~1000



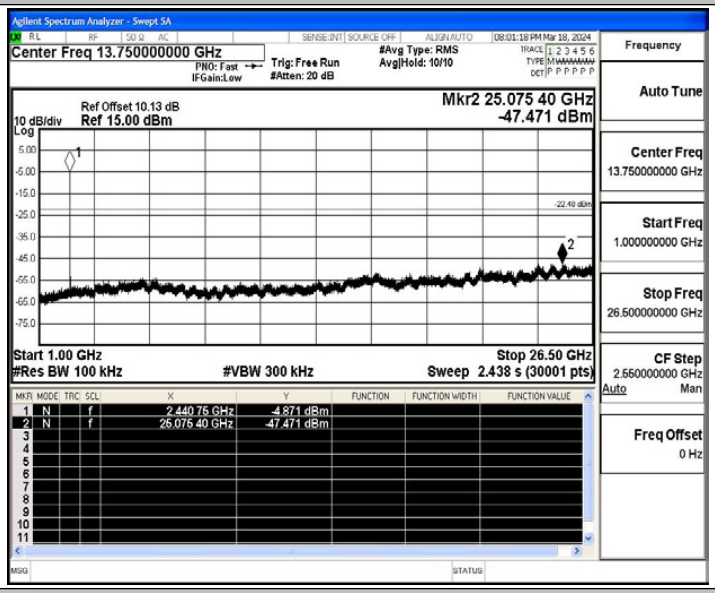

2DH5_Ant1_2402_1000~26500



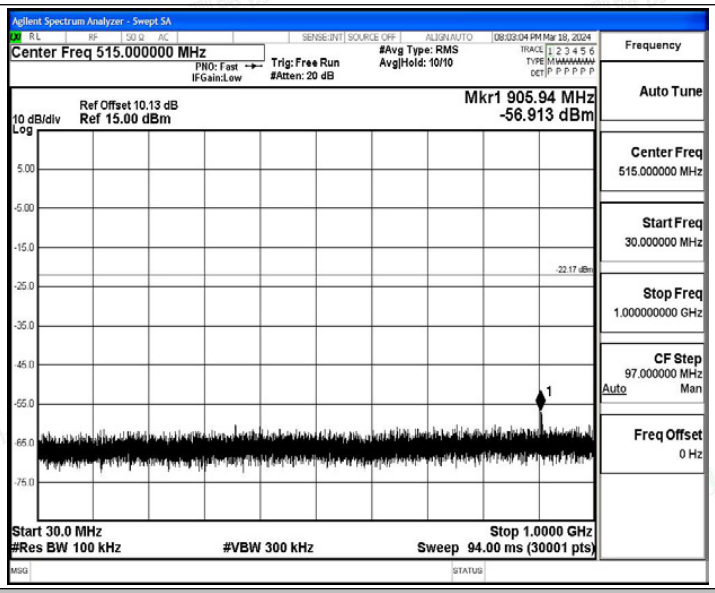

2DH5_Ant1_2441_30~1000



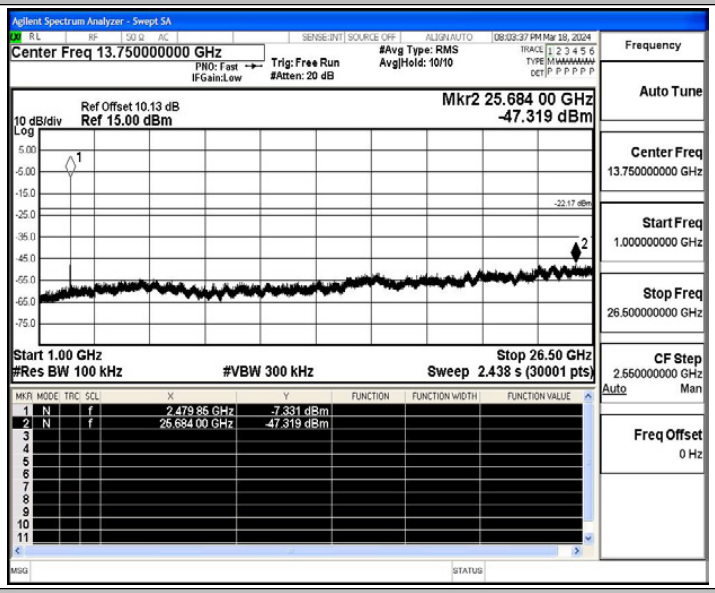

2DH5_Ant1_2441_1000~26500




2DH5_Ant1_2480_30~1000




2DH5_Ant1_2480_1000~26500




3DH5_Ant1_2402_30~1000