Appendix A

RF Test Data for BT (Conducted Measurement)

Product Name: Game Controller

Test Model: P48

Environmental Conditions

Temperature:	23.8 ° C
Relative Humidity:	52.1%
ATM Pressure:	100.0 kPa
Test Engineer:	Nick Peng
Supervised by:	Joker Hu

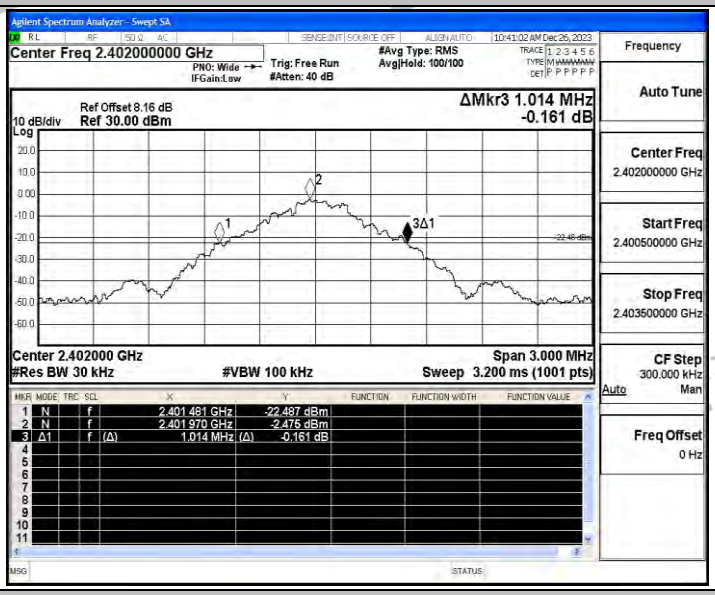
A.1 20dB Emission Bandwidth

Test Result

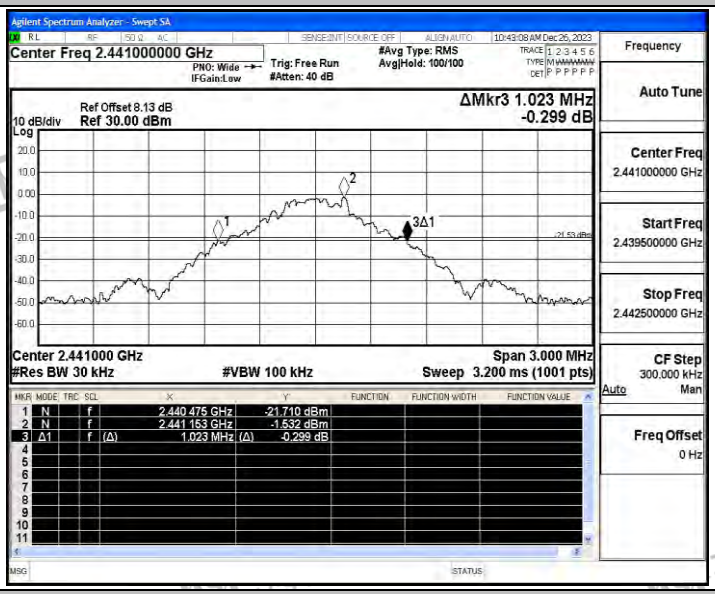
TestMode	Antenna	Frequency[MHz]	20db EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant	2402	1.014	2401.481	2402.495	---	---
		2441	1.023	2440.475	2441.498	---	---
		2480	1.041	2479.460	2480.501	---	---
2DH5	Ant	2402	1.287	2401.358	2402.645	---	---
		2441	1.299	2440.352	2441.651	---	---
		2480	1.320	2479.331	2480.651	---	---
3DH5	Ant	2402	1.302	2401.340	2402.642	---	---
		2441	1.311	2440.340	2441.651	---	---
		2480	1.305	2479.340	2480.645	---	---

Test Graphs

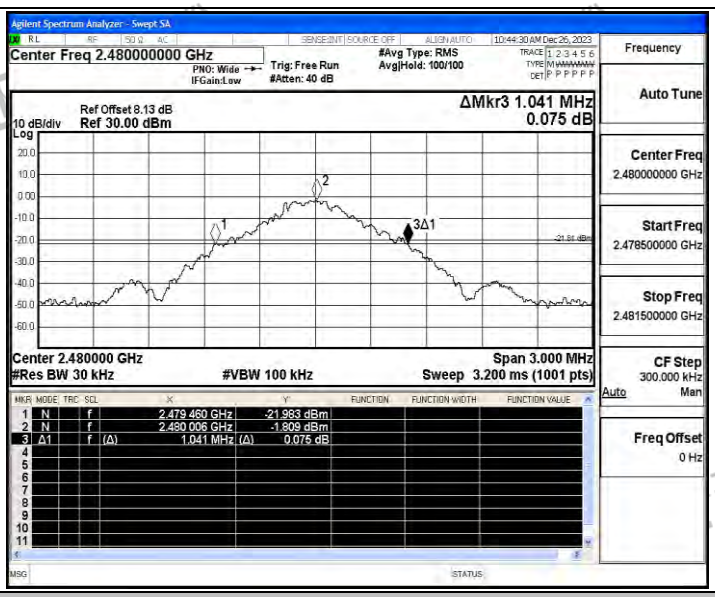
DH5_Ant_2402



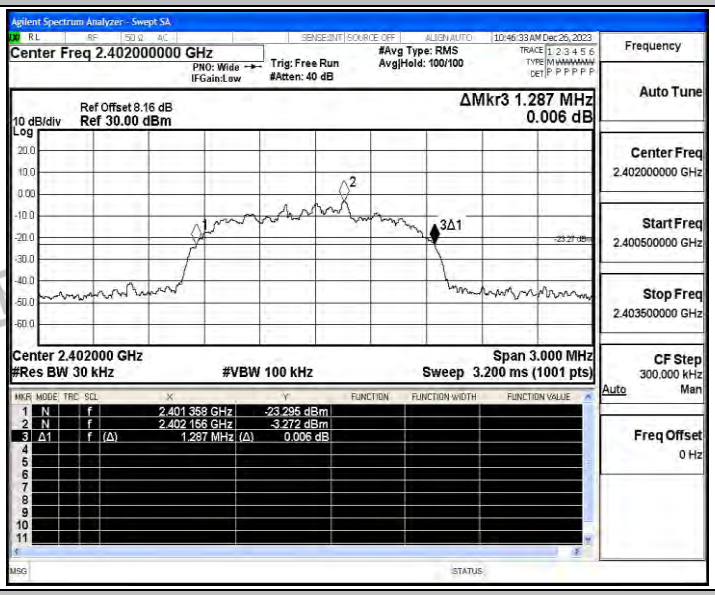
DH5_Ant_2441



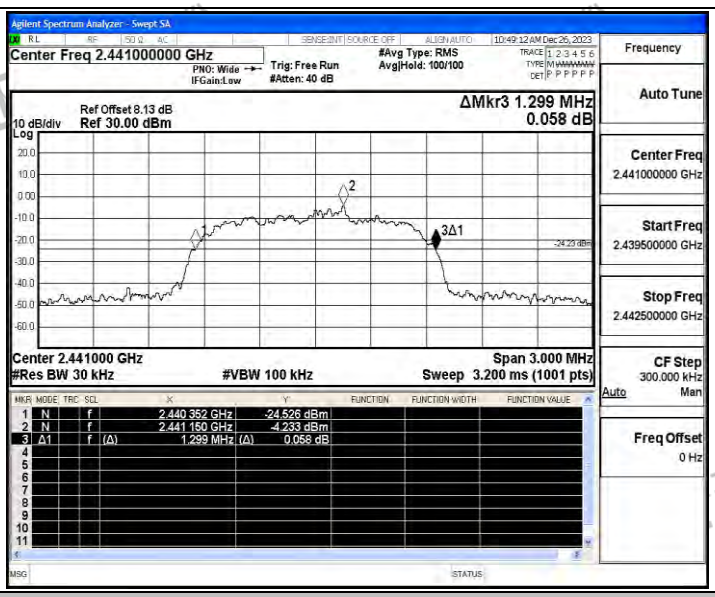
DH5_Ant_2480



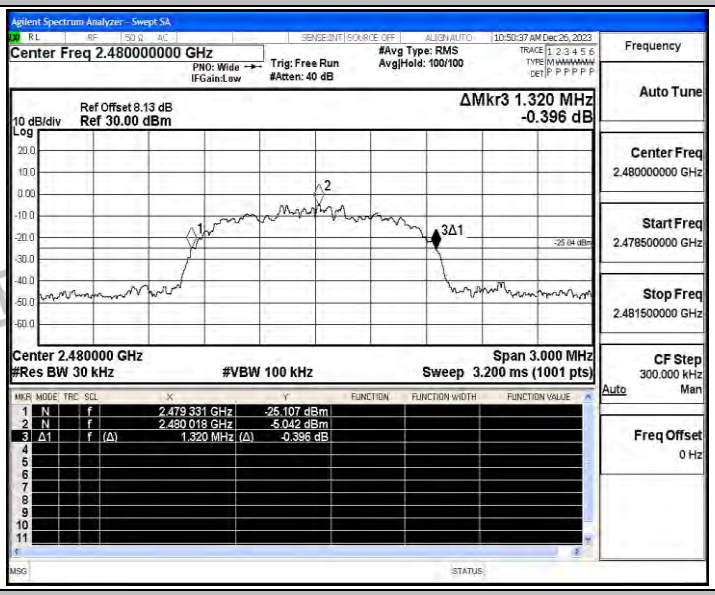
2DH5_Ant_2402



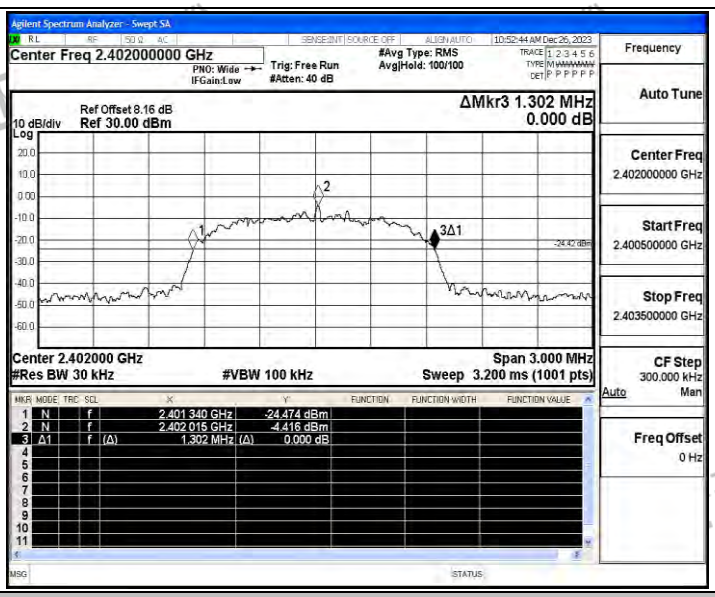
2DH5_Ant_2441



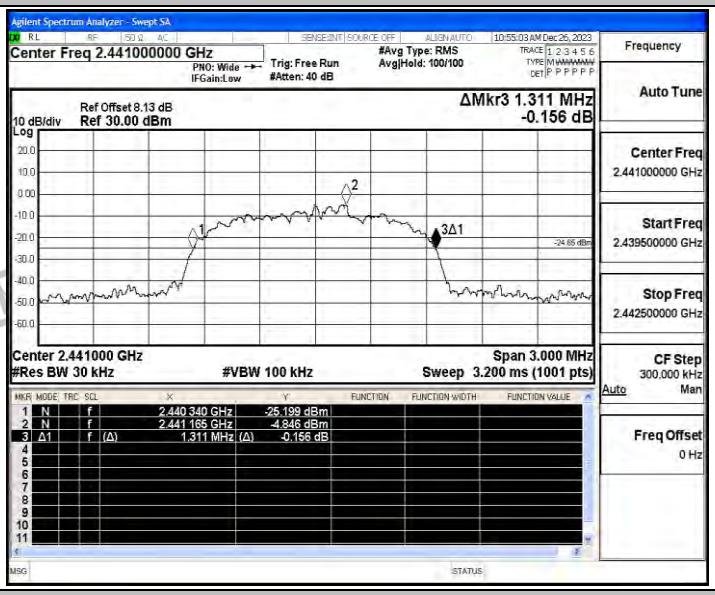
2DH5_Ant_2480



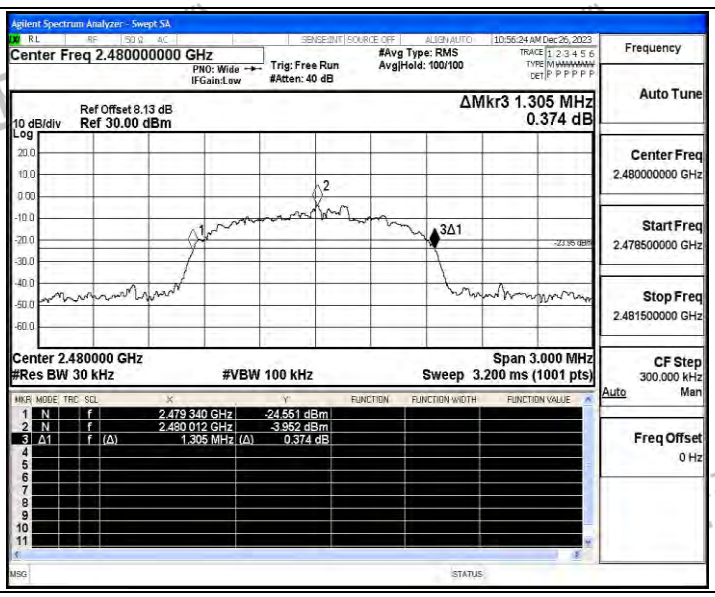
3DH5_Ant_2402



3DH5_Ant_2441



3DH5_Ant_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
10:56:24 AM Dec 26, 2023
Frequency
Auto Tune
Ref Offset 8.13 dB
10 dB/div Ref 30.00 dBm
Log
ΔMkr3 1.305 MHz
0.374 dB
Center Freq
2.480000000 GHz
Start Freq
2.478500000 GHz
Stop Freq
2.481500000 GHz
Center 2.480000 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 3.000 MHz
Sweep 3.200 ms (1001 pts)
CF Step
300.000 kHz
Auto Man
Freq Offset
0 Hz
1 N f 2.479 340 GHz -24.551 dBm
2 N f 2.480 012 GHz -3.952 dBm
3 Δ1 f (Δ) 1.305 MHz (Δ) 0.374 dB

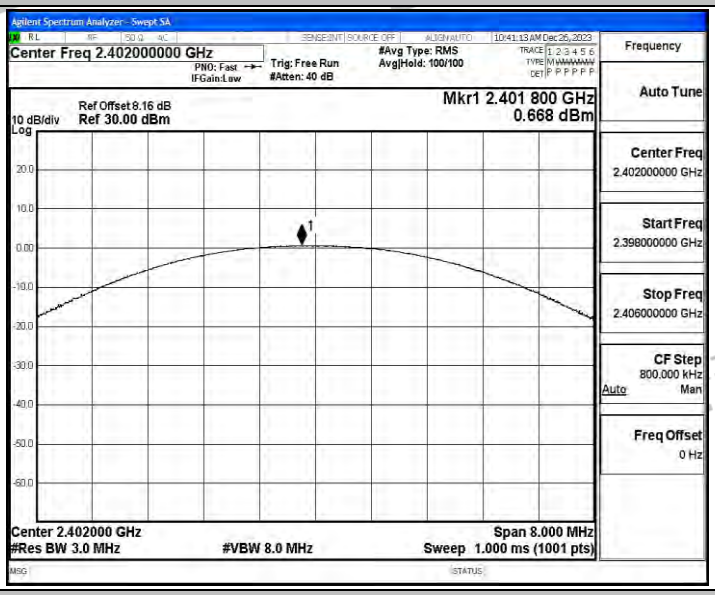
A.2 Maximum conducted output power

Test Result Peak

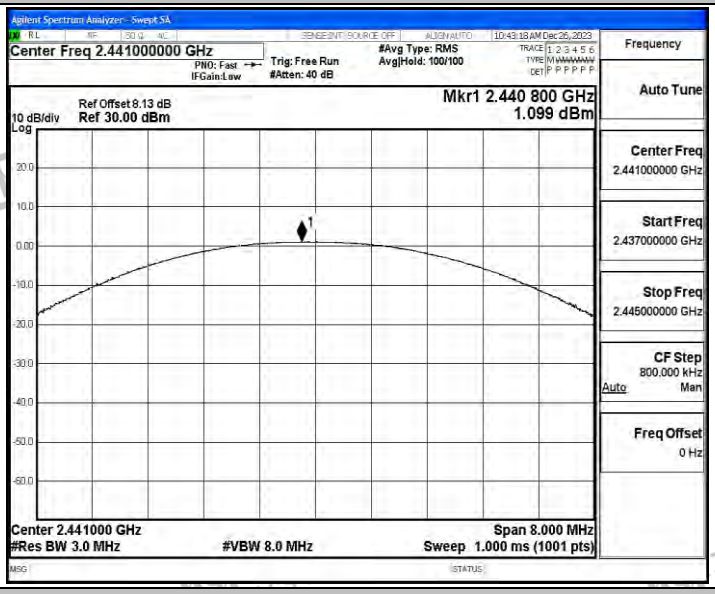
Test Mode	Antenna	Frequency[MHz]	Conducted Peak Powert[dBm]	Conducted Limit[dBm]	Verdict
DH5	Ant	2402	0.67	≤20.97	PASS
		2441	1.1	≤20.97	PASS
		2480	1.2	≤20.97	PASS
2DH5	Ant	2402	0.62	≤20.97	PASS
		2441	0.85	≤20.97	PASS
		2480	1.01	≤20.97	PASS
3DH5	Ant	2402	0.72	≤20.97	PASS
		2441	0.93	≤20.97	PASS
		2480	1.09	≤20.97	PASS

Test Graphs

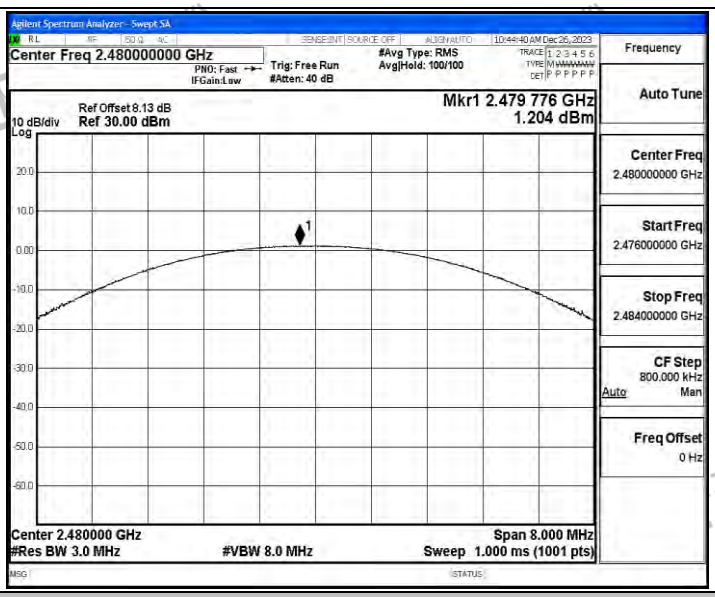
DH5_Ant_2402



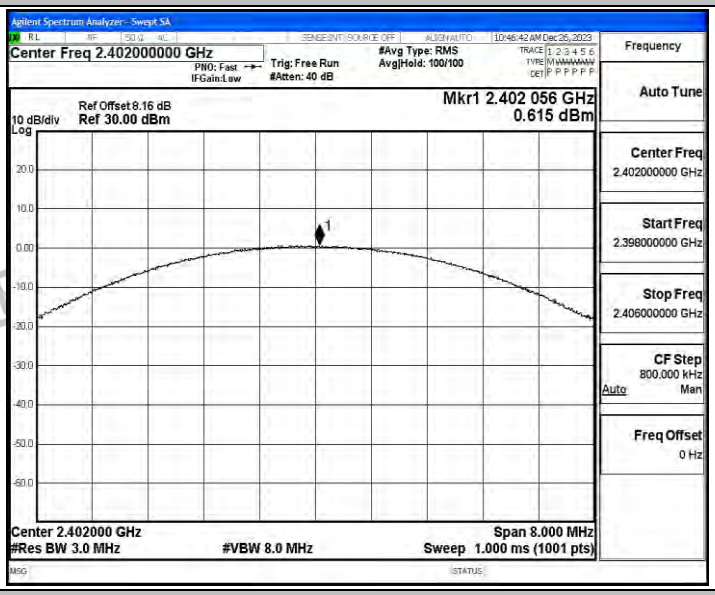
DH5_Ant_2441



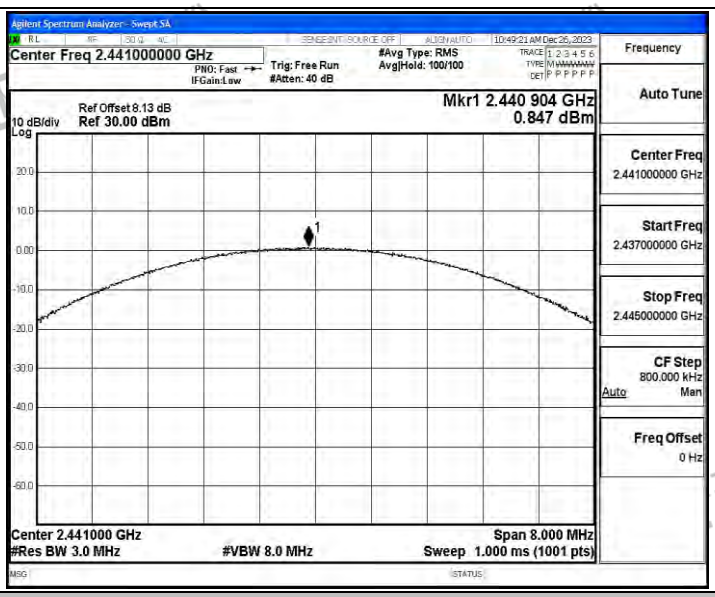
DH5_Ant_2480



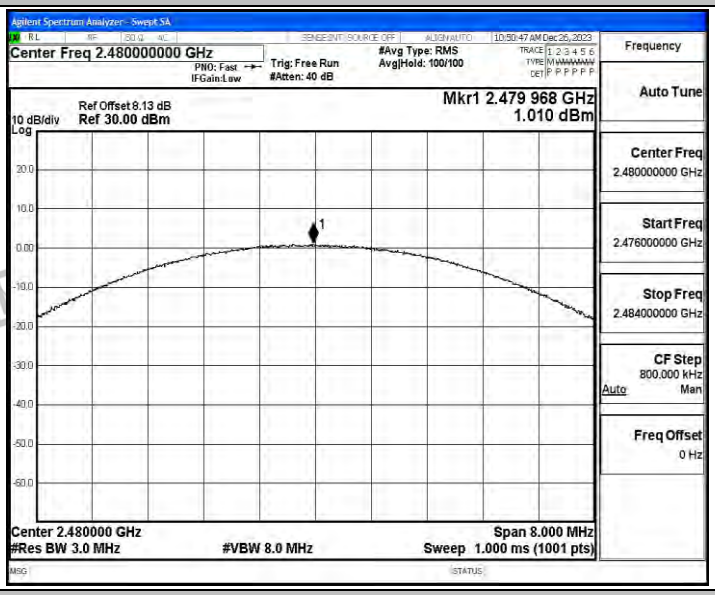
2DH5_Ant_2402



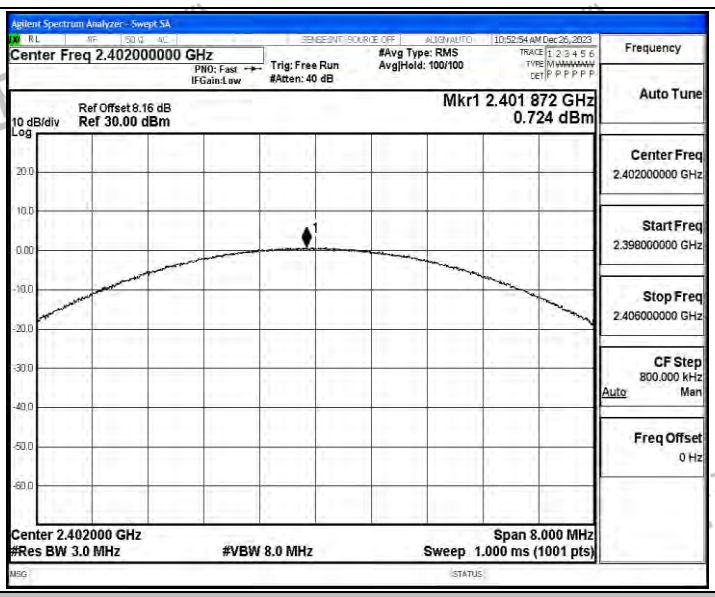
2DH5_Ant_2441



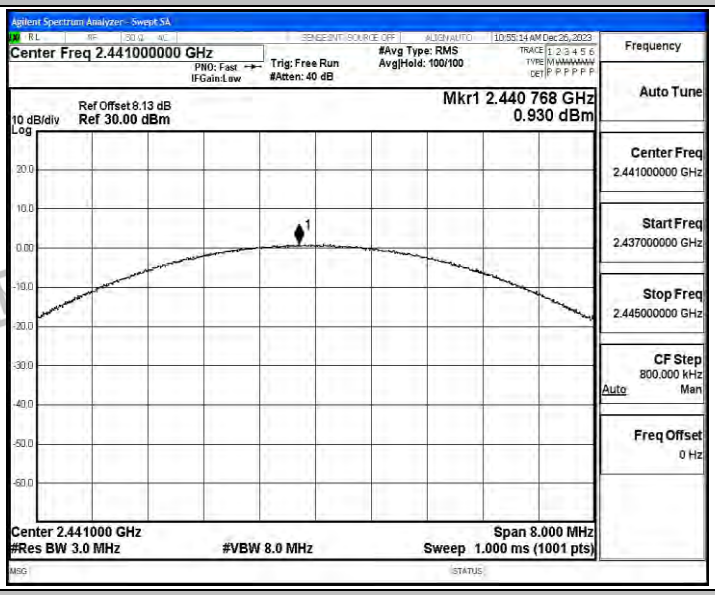
2DH5_Ant_2480



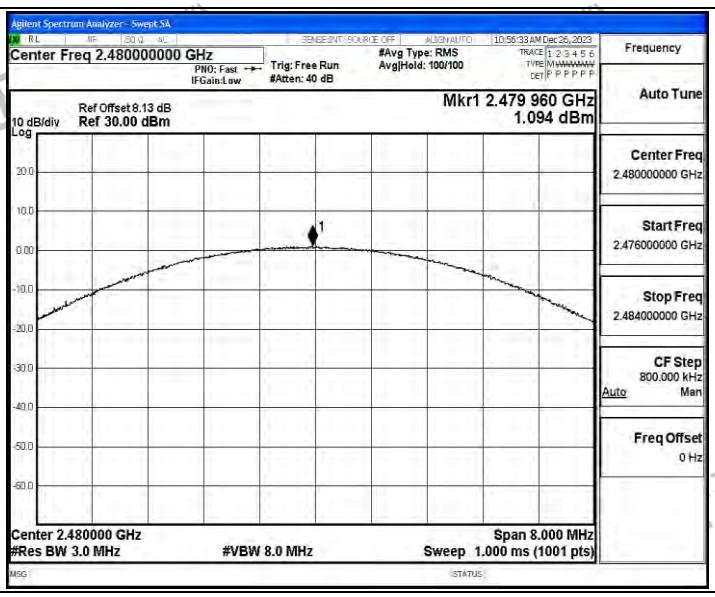
3DH5_Ant_2402



3DH5_Ant_2441



3DH5_Ant_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
10:56:33 AM Dec 26, 2023
Frequency
Auto Tune
Ref Offset 8.13 dB
10 dB/div Ref 30.00 dBm
Log
Mkr1 2.479 960 GHz
1.094 dBm
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
Center 2.480000 GHz
#Res BW 3.0 MHz
#VBW 8.0 MHz
Span 8.000 MHz
Sweep 1.000 ms (1001 pts)

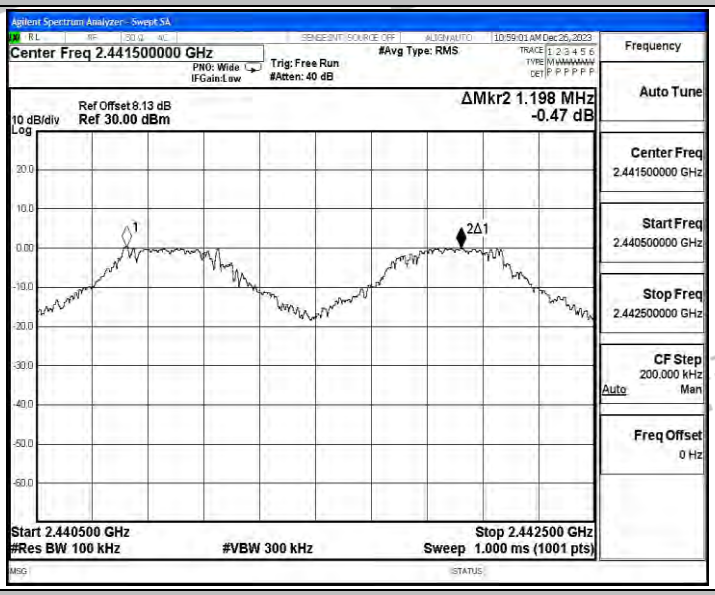
A.3 Carrier frequency separation

Test Result

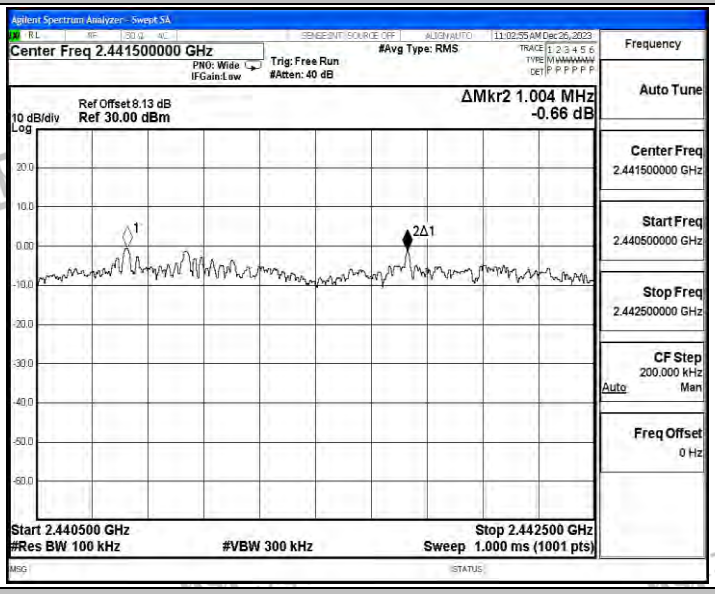
TestMode	Antenna	Frequency[MHz]	Result[MHz]	Limit[MHz]	Verdict
DH5	Ant	Hop	1.198	≥0.694	PASS
2DH5	Ant	Hop	1.004	≥0.880	PASS
3DH5	Ant	Hop	1.256	≥0.874	PASS

Test Graphs

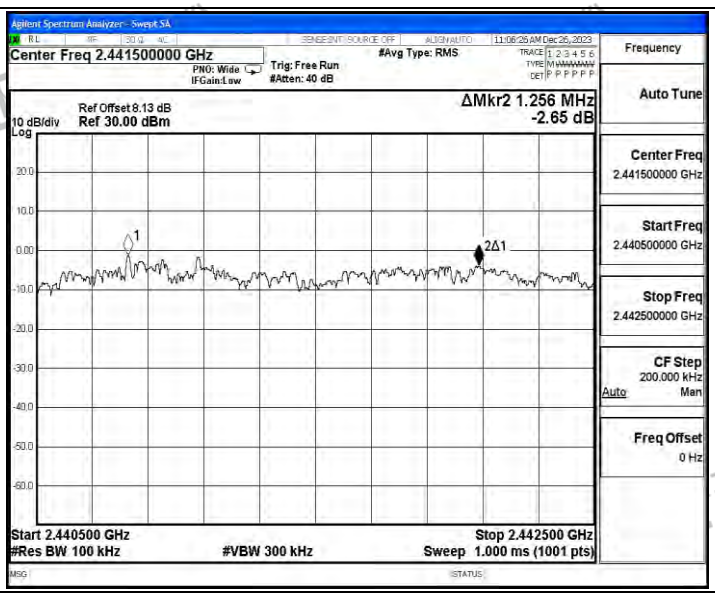
DH5_Ant_Hop



2DH5_Ant_Hop



3DH5_Ant_Hop


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.441500000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 40 dB
#Avg Type: RMS
Ref Offset 8.13 dB
10 dB/div Ref 30.00 dBm
Log
ΔMkr2 1.256 MHz
-2.65 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

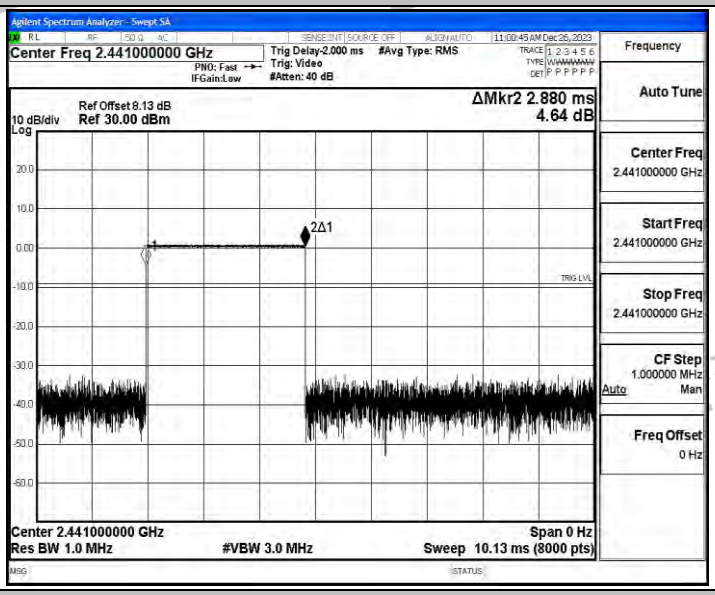
A.4 Time of occupancy

Test Result

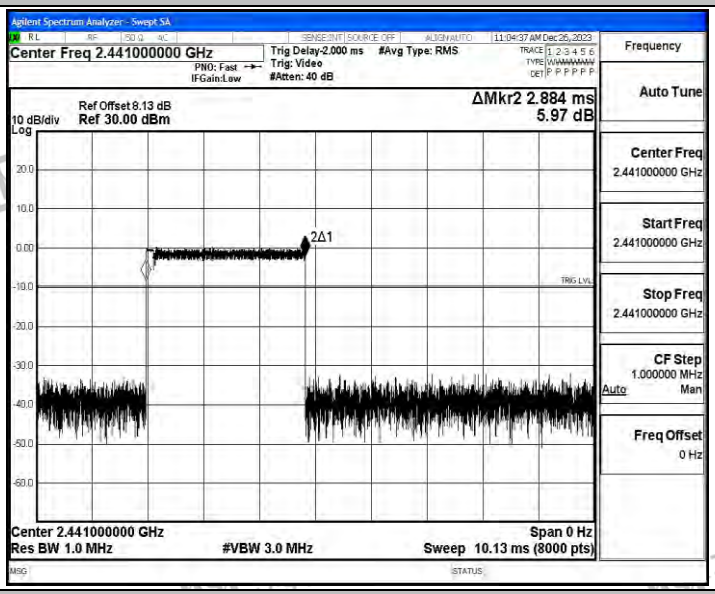
TestMode	Antenna	Frequency[MHz]	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH5	Ant	Hop	2.880	106.67	0.307	≤0.4	PASS
2DH5	Ant	Hop	2.884	106.67	0.308	≤0.4	PASS
3DH5	Ant	Hop	2.887	106.67	0.308	≤0.4	PASS

Test Graphs

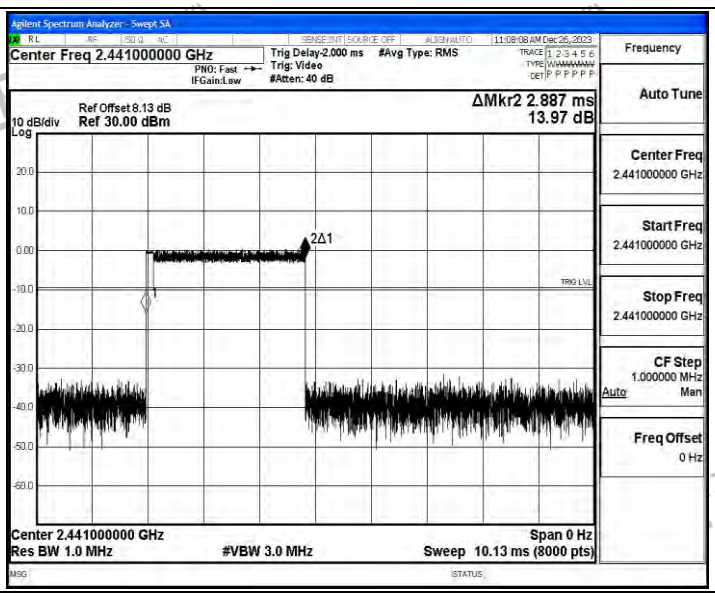
DH5_Ant_Hop



2DH5_Ant_Hop



3DH5_Ant_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
Ref Offset 8.13 dB
10 dB/div Ref 30.00 dBm
Log
ΔMkr2 2.887 ms
13.97 dB
2Δ1
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

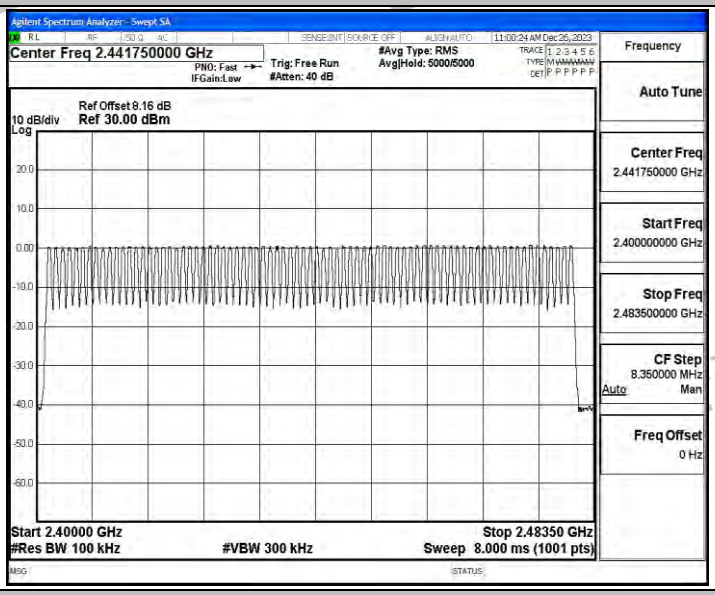
A.5 Number of hopping channels

Test Result

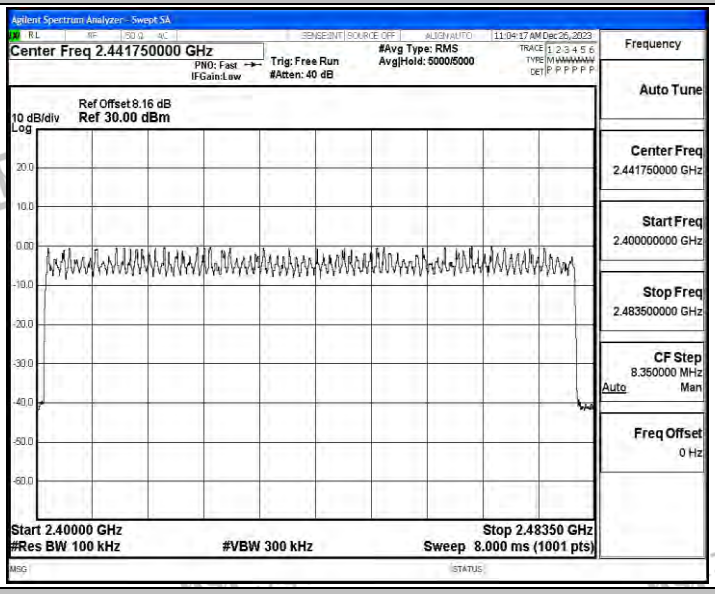
TestMode	Antenna	Frequency[MHz]	Result[Num]	Limit[Num]	Verdict
DH5	Ant	Hop	79	≥15	PASS
2DH5	Ant	Hop	79	≥15	PASS
3DH5	Ant	Hop	79	≥15	PASS

Test Graphs

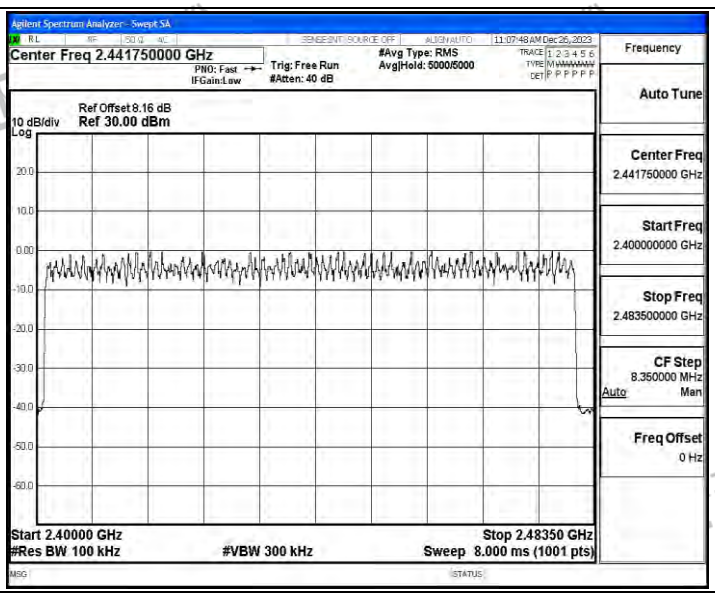
DH5_Ant_Hop



2DH5_Ant_Hop



3DH5_Ant_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: 5000/5000
11:07:48 AM Dec 26, 2023
Ref Offset 8.16 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

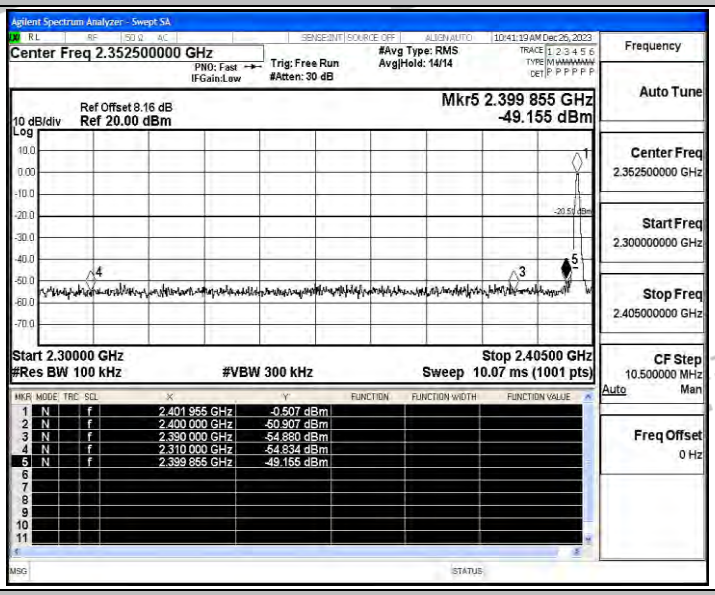
A.6 Band edge measurements

Test Result

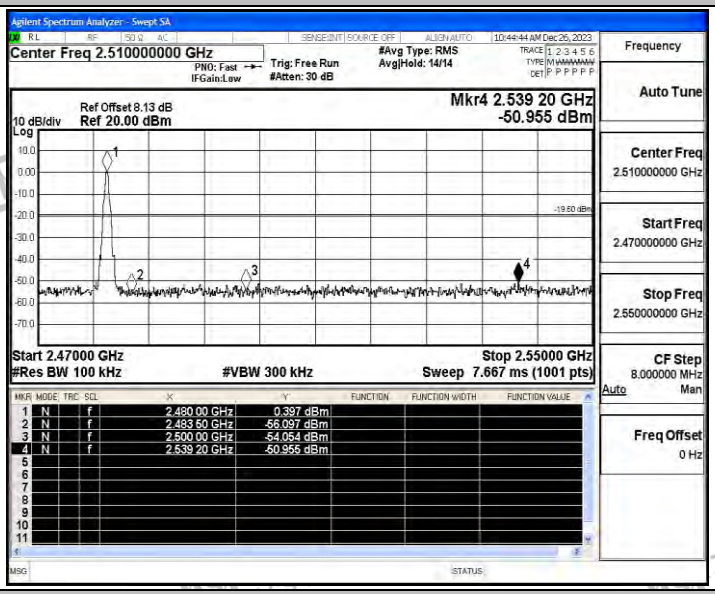
TestMode	Antenna	ChName	Frequency[MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant	Low	2402	-0.51	-49.16	≤-20.51	PASS
		High	2480	0.40	-50.96	≤-19.6	PASS
		Low	Hop_2402	-0.27	-49.24	≤-20.27	PASS
		High	Hop_2480	0.67	-42.93	≤-19.34	PASS
2DH5	Ant	Low	2402	-3.92	-50.99	≤-23.92	PASS
		High	2480	-4.94	-51.15	≤-24.94	PASS
		Low	Hop_2402	-4.76	-50.28	≤-24.76	PASS
		High	Hop_2480	-2.39	-48.69	≤-22.39	PASS
3DH5	Ant	Low	2402	-5.46	-50.86	≤-25.46	PASS
		High	2480	-2.82	-49.96	≤-22.82	PASS
		Low	Hop_2402	-4.13	-49.78	≤-24.13	PASS
		High	Hop_2480	-0.73	-49.41	≤-20.73	PASS

Test Graphs

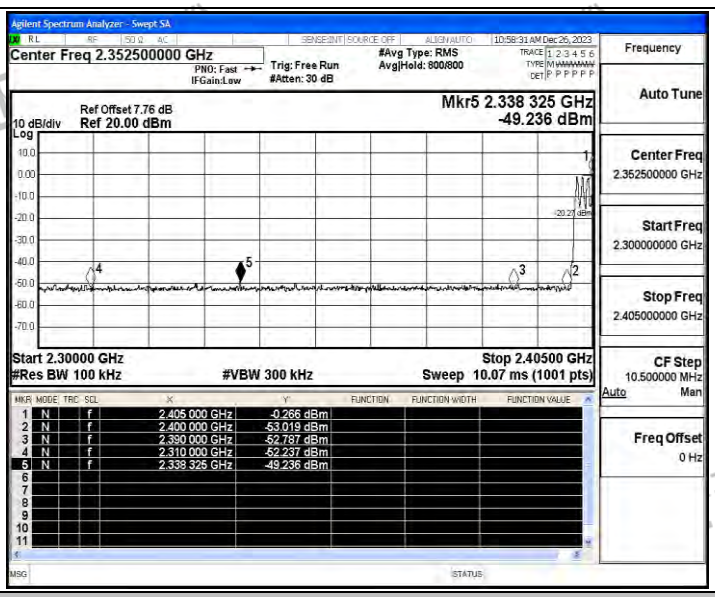
DH5_Ant_Low_2402



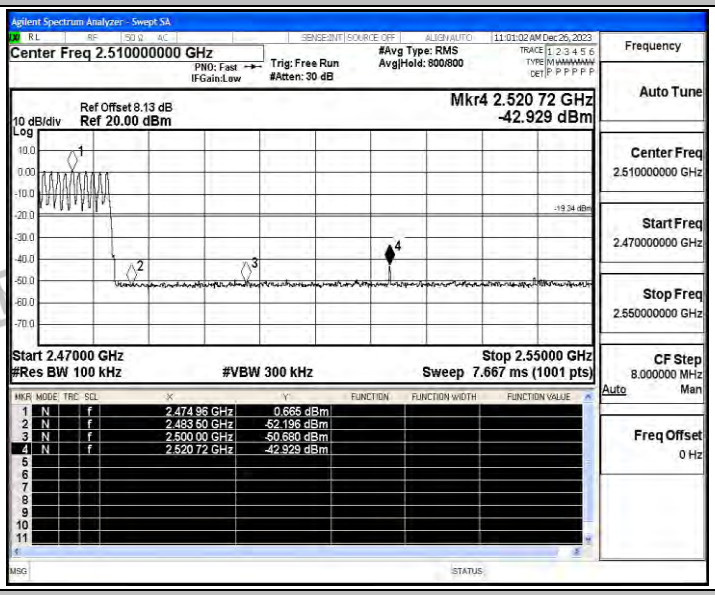
DH5_Ant_High_2480



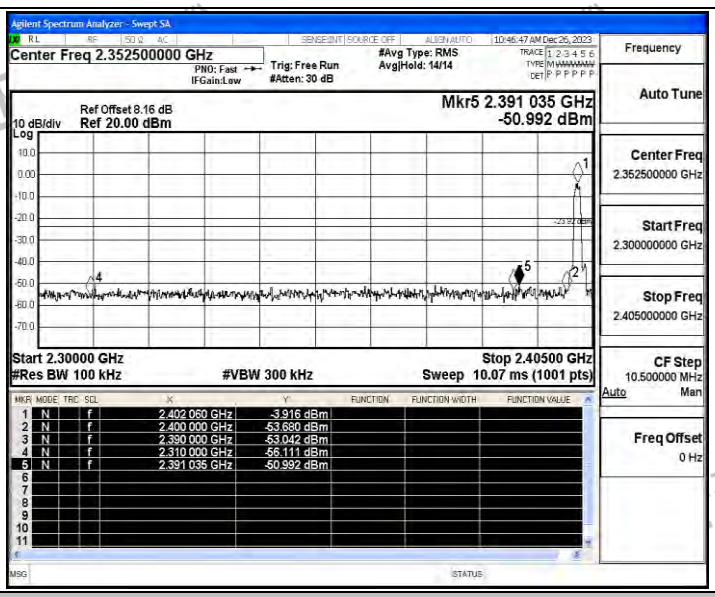
DH5_Ant_Low_Hop_2402



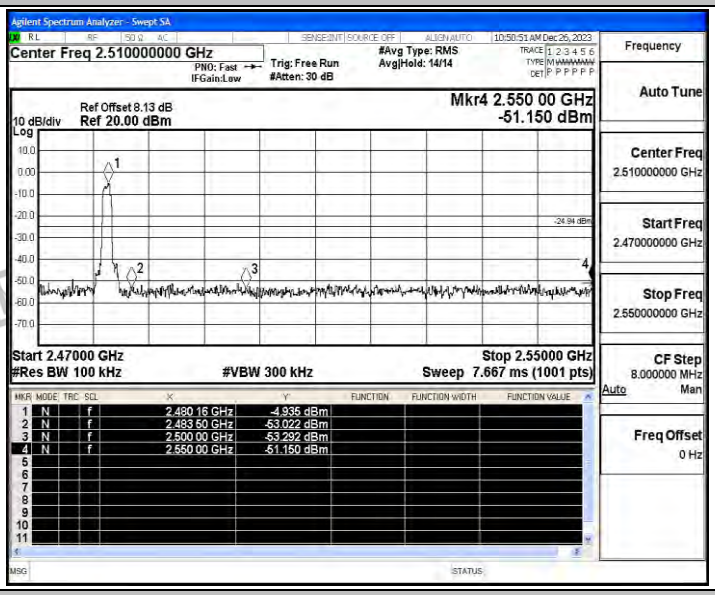
DH5_Ant_High_Hop_2480



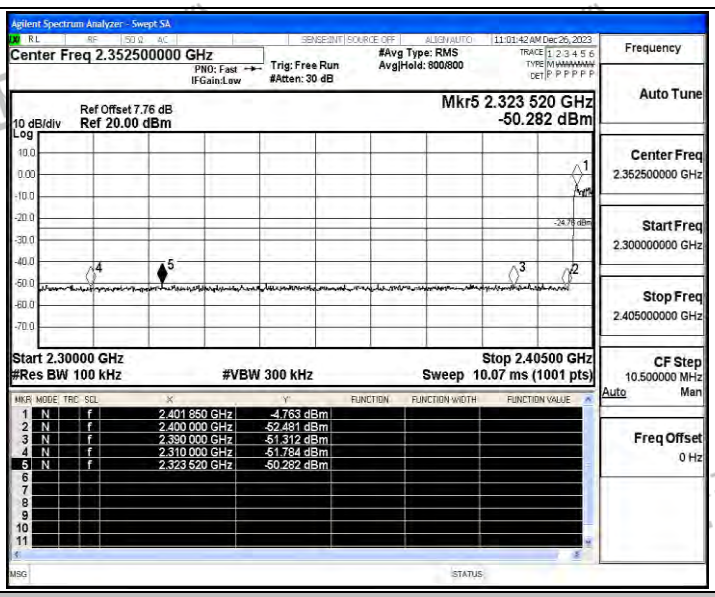
2DH5_Ant_Low_2402



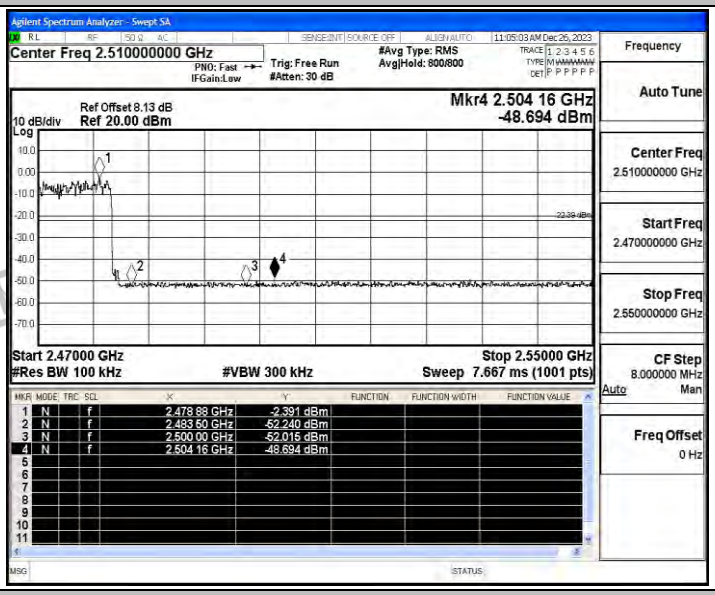
2DH5_Ant_High_2480



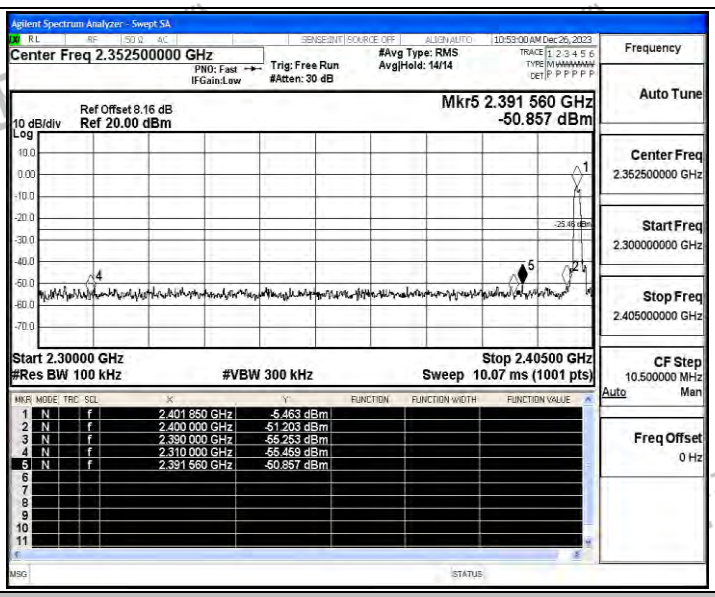
2DH5_Ant_Low_Hop_2402



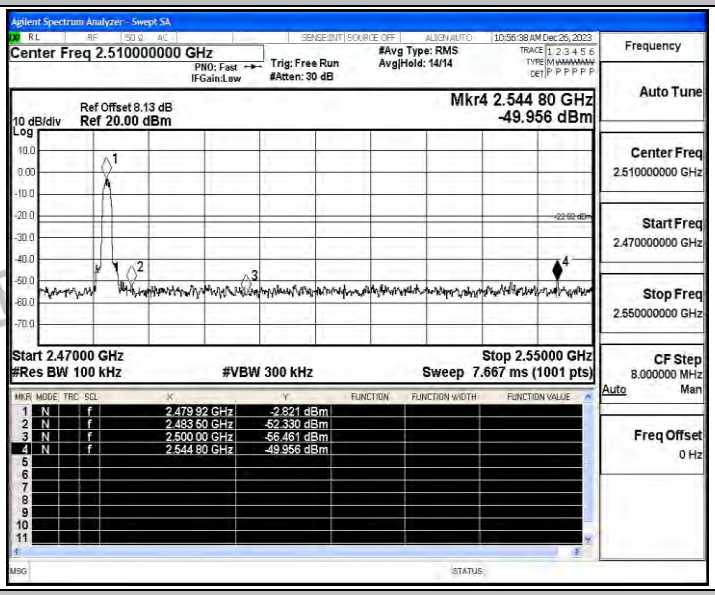
2DH5_Ant_High_Hop_2480



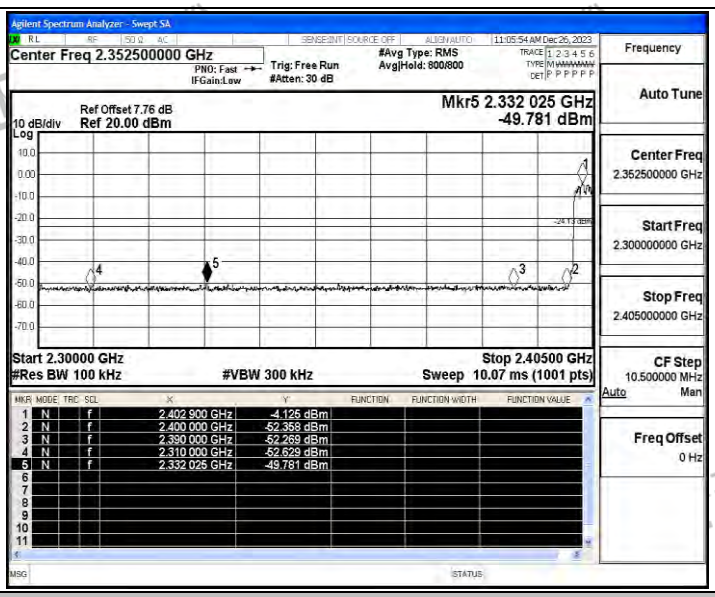
3DH5_Ant_Low_2402



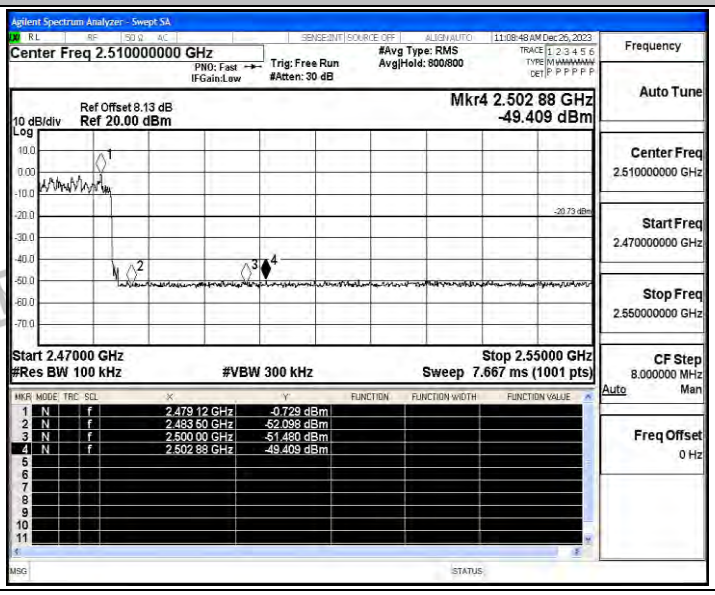
3DH5_Ant_High_2480



3DH5_Ant_Low_Hop_2402



3DH5_Ant_High_Hop_2480



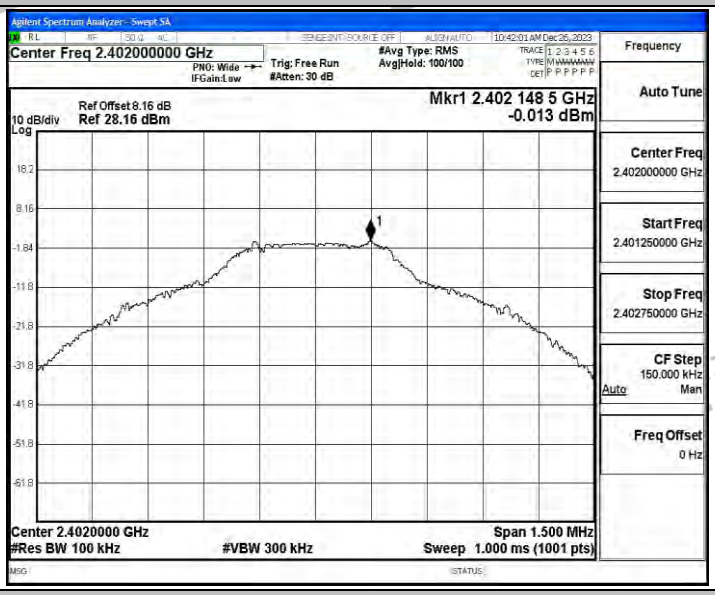
A.7 Conducted Spurious Emission

Test Result

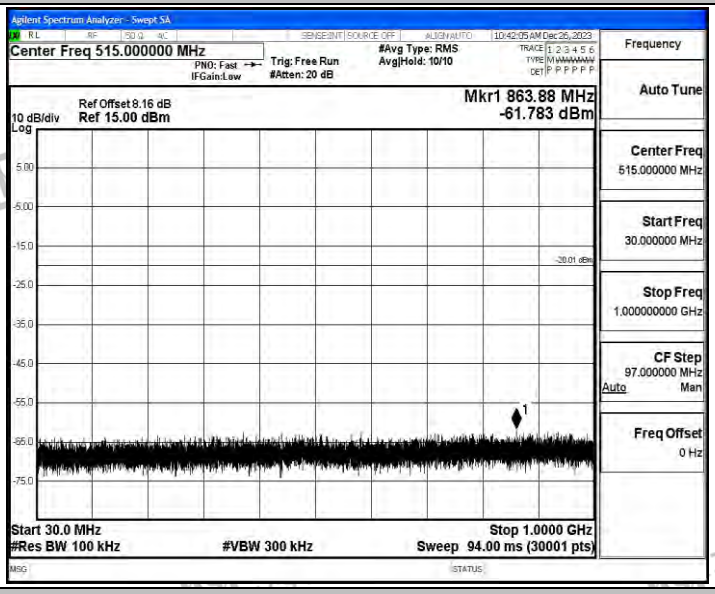
TestMode	Antenna	Frequency[MHz]	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant	2402	Reference	-0.01	-0.01	---	PASS
			30~1000	-0.01	-61.78	≤-20.01	PASS
			1000~26500	-0.01	-49.25	≤-20.01	PASS
		2441	Reference	-0.02	-0.02	---	PASS
			30~1000	-0.02	-61.08	≤-20.02	PASS
			1000~26500	-0.02	-48.96	≤-20.02	PASS
		2480	Reference	0.16	0.16	---	PASS
			30~1000	0.16	-61.5	≤-19.84	PASS
			1000~26500	0.16	-49.18	≤-19.84	PASS
2DH5	Ant	2402	Reference	-0.62	-0.62	---	PASS
			30~1000	-0.62	-61.49	≤-20.62	PASS
			1000~26500	-0.62	-49.47	≤-20.62	PASS
		2441	Reference	-1.88	-1.88	---	PASS
			30~1000	-1.88	-61.76	≤-21.88	PASS
			1000~26500	-1.88	-48.07	≤-21.88	PASS
		2480	Reference	-0.46	-0.46	---	PASS
			30~1000	-0.46	-61.57	≤-20.46	PASS
			1000~26500	-0.46	-48.71	≤-20.46	PASS
3DH5	Ant	2402	Reference	-1.13	-1.13	---	PASS
			30~1000	-1.13	-61.38	≤-21.13	PASS
			1000~26500	-1.13	-49.13	≤-21.13	PASS
		2441	Reference	-0.57	-0.57	---	PASS
			30~1000	-0.57	-60.74	≤-20.57	PASS
			1000~26500	-0.57	-48.92	≤-20.57	PASS
		2480	Reference	-1.28	-1.28	---	PASS
			30~1000	-1.28	-61.07	≤-21.28	PASS
			1000~26500	-1.28	-49.26	≤-21.28	PASS

Test Graphs

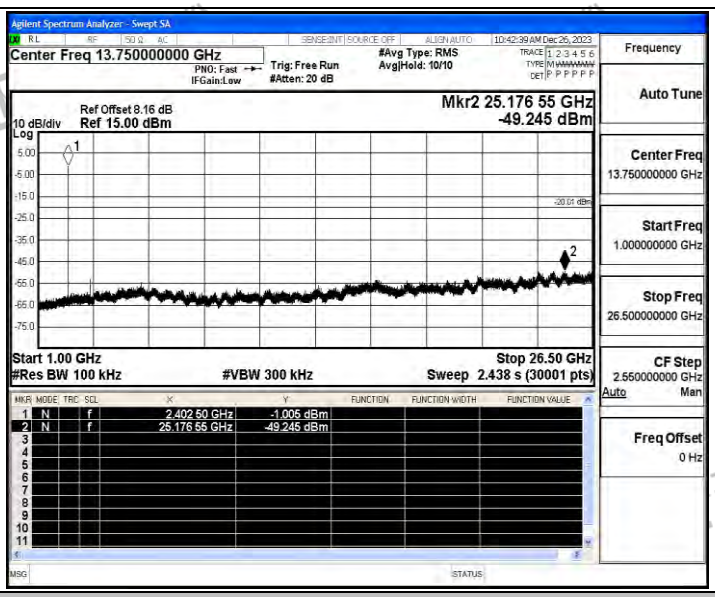
DH5_Ant_2402_0~Reference



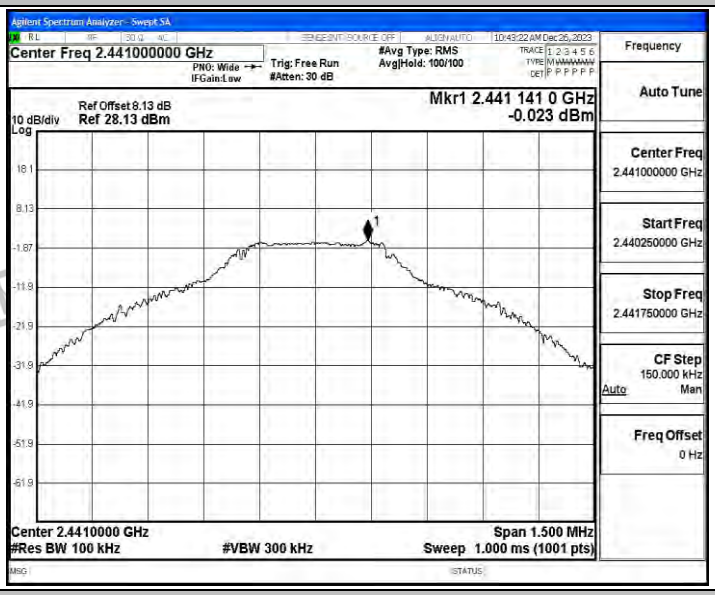
DH5_Ant_2402_30~1000



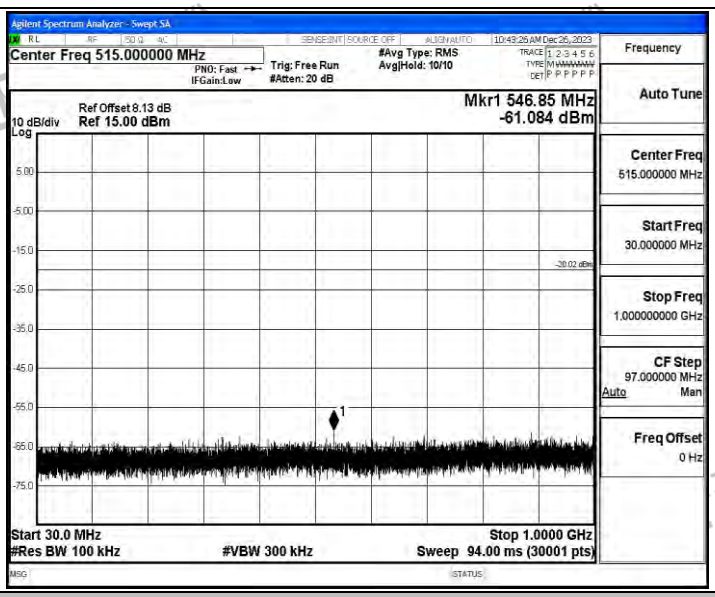
DH5_Ant_2402_1000~26500



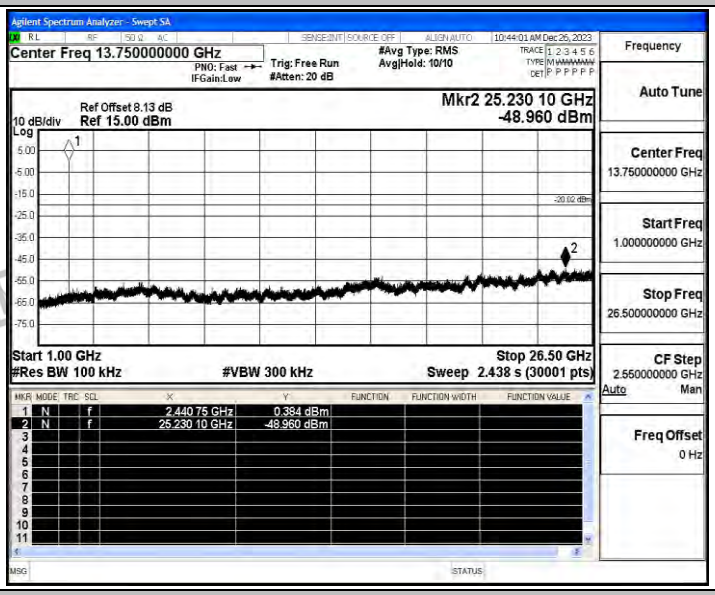
DH5_Ant_2441_0~Reference



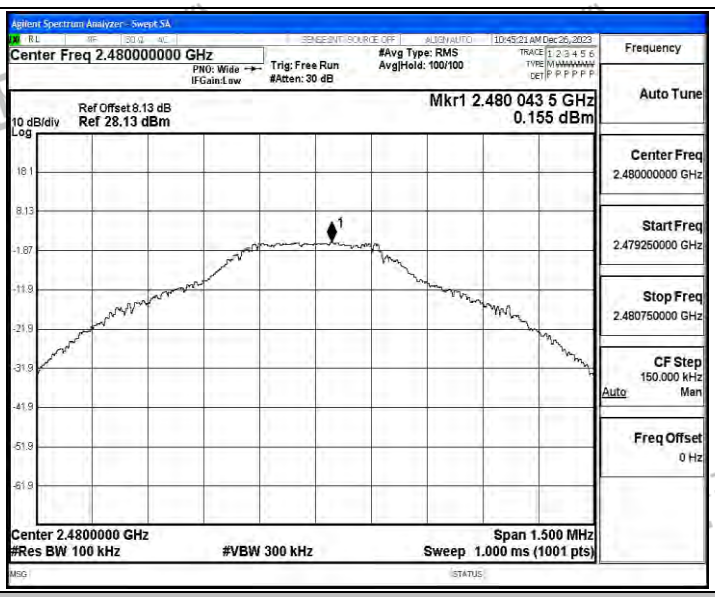
DH5_Ant_2441_30~1000



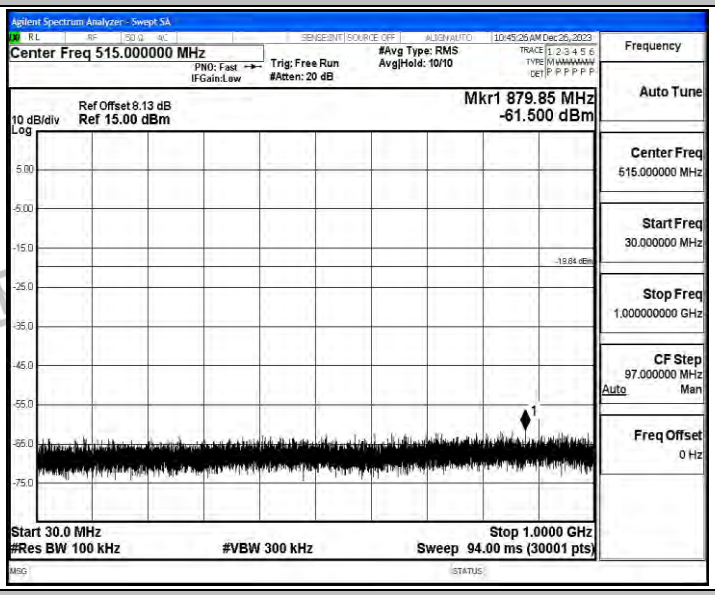
DH5_Ant_2441_1000~26500



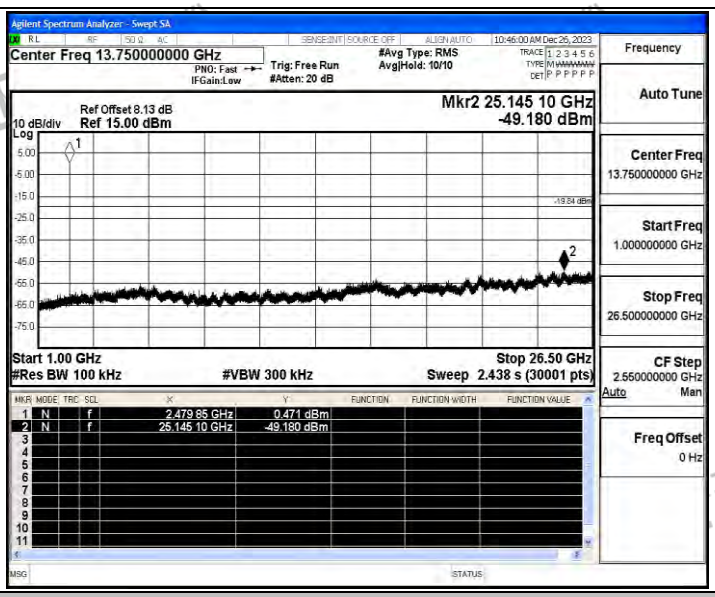
DH5_Ant_2480_0~Reference



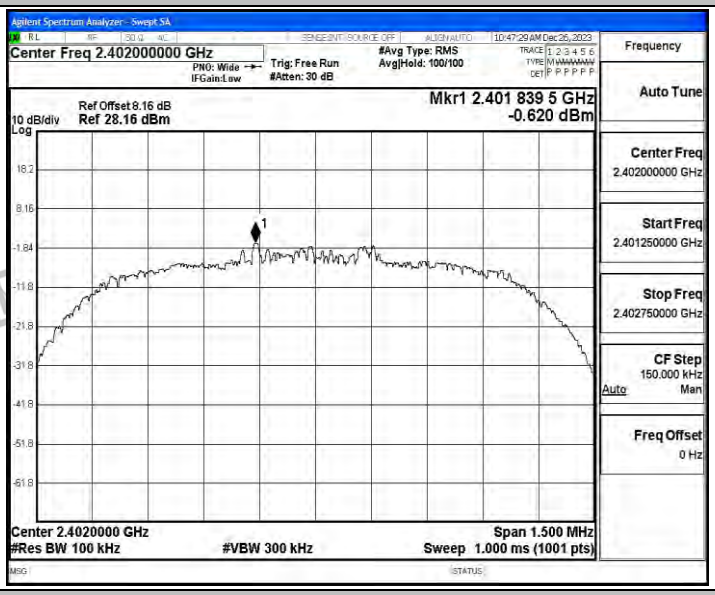
DH5_Ant_2480_30~1000



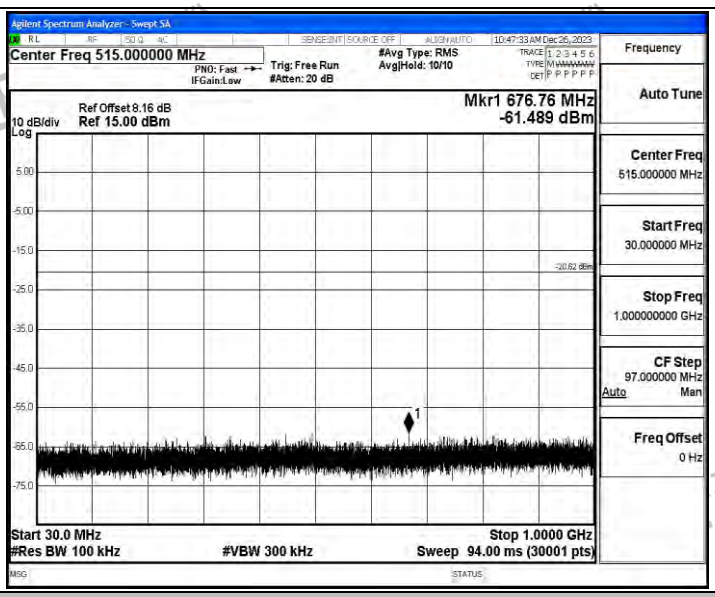
DH5_Ant_2480_1000~26500



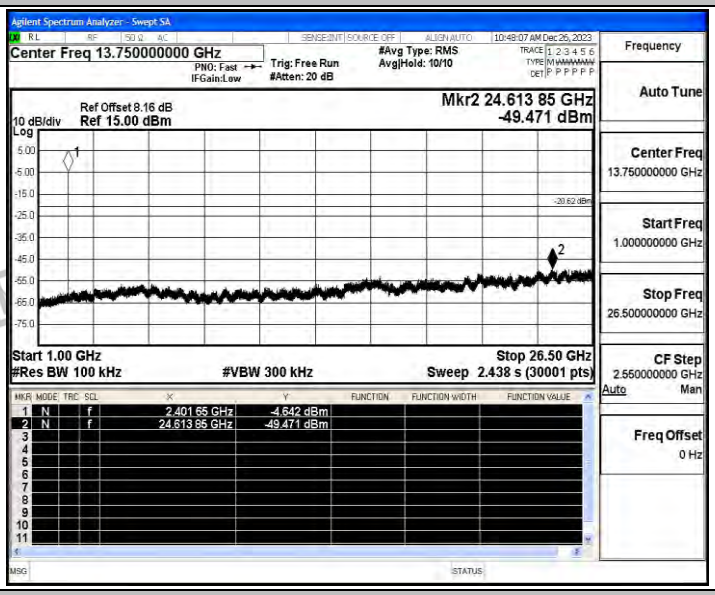
2DH5_Ant_2402_0~Reference



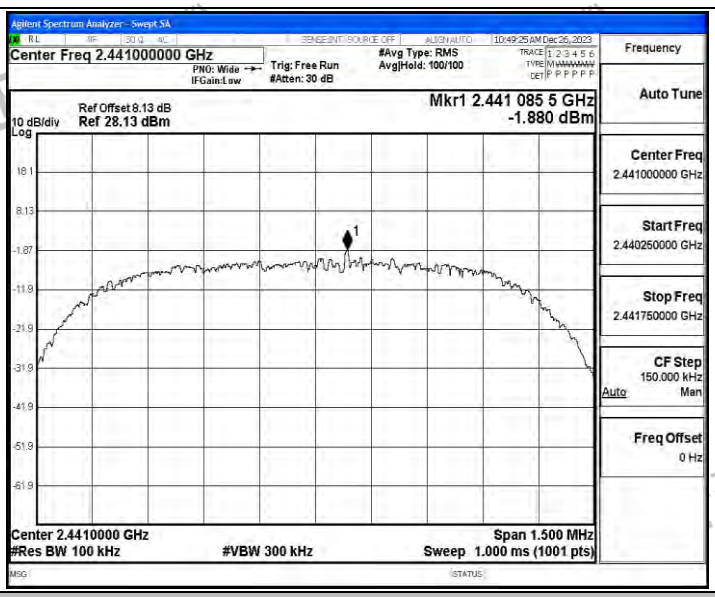
2DH5_Ant_2402_30~1000



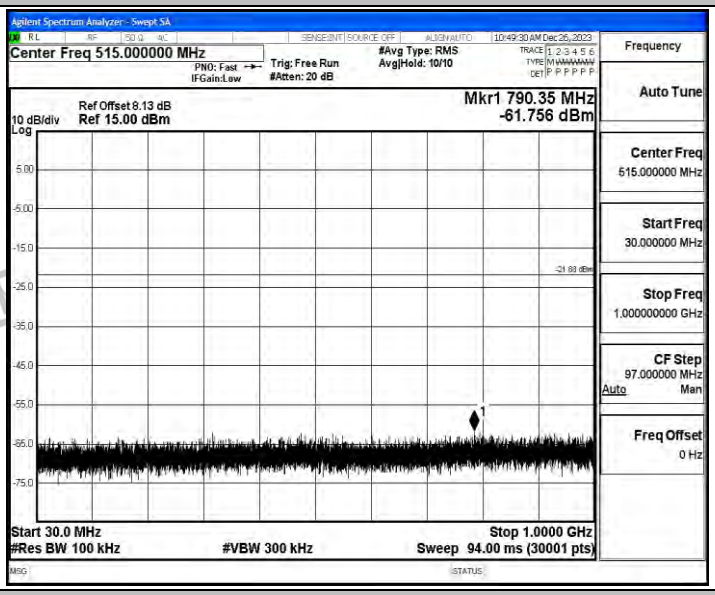
2DH5_Ant_2402_1000~26500



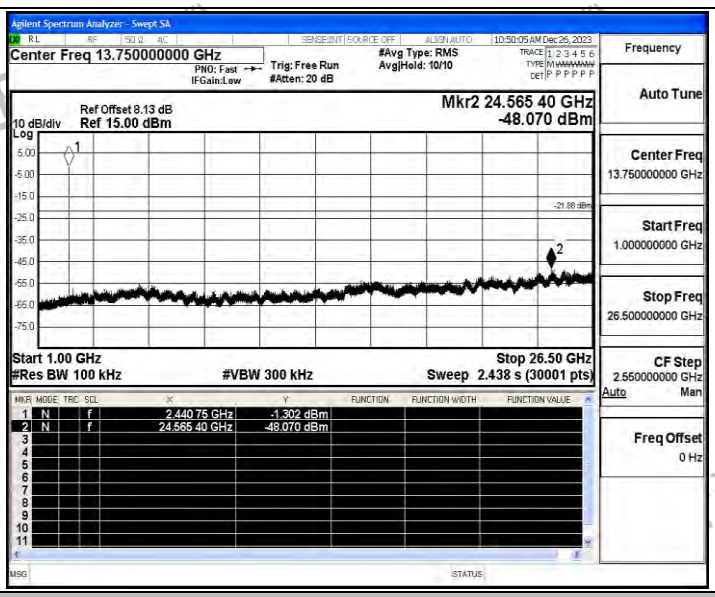
2DH5_Ant_2441_0~Reference



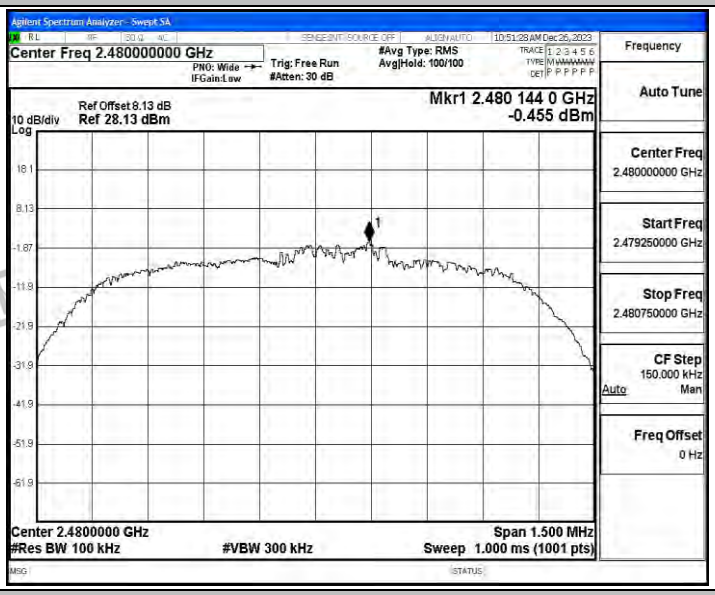
2DH5_Ant_2441_30~1000



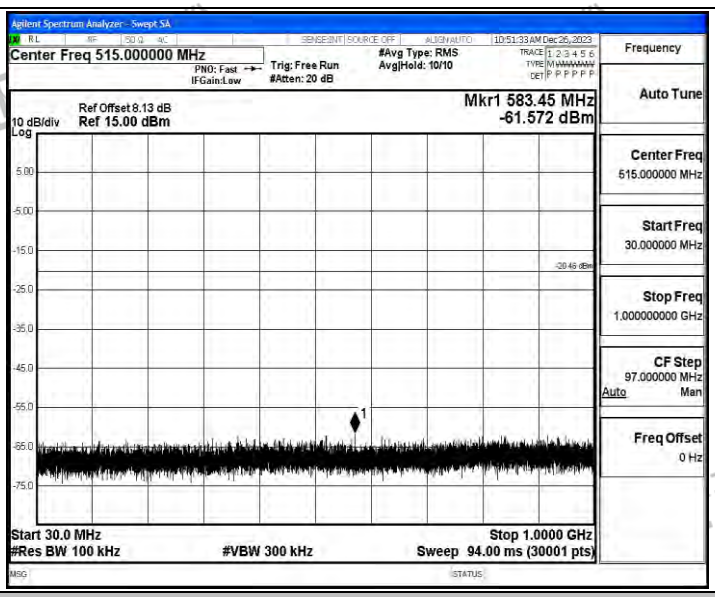
2DH5_Ant_2441_1000~26500



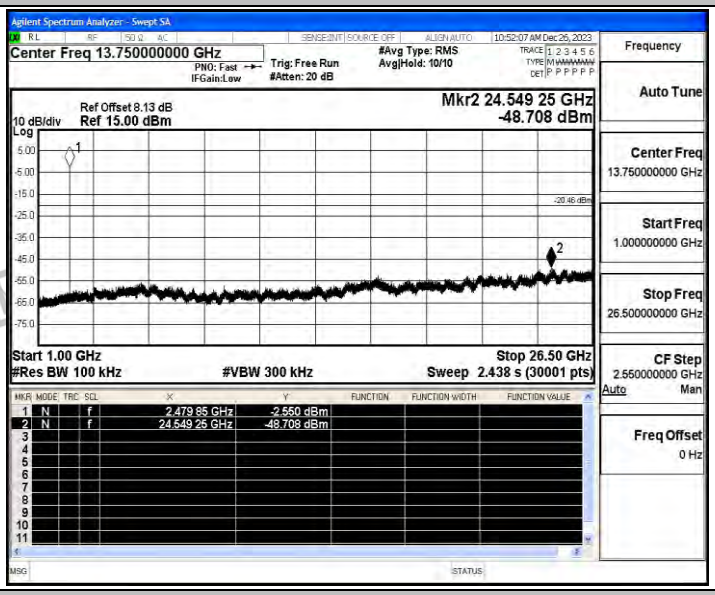
2DH5_Ant_2480_0~Reference



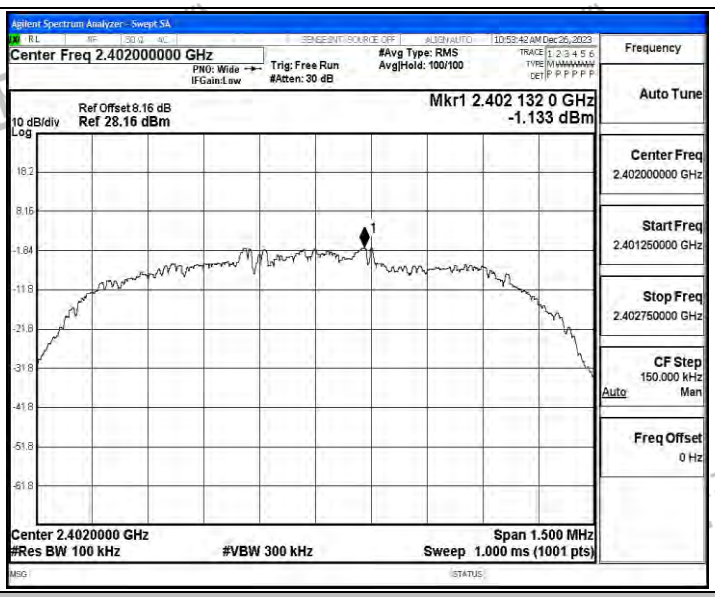
2DH5_Ant_2480_30~1000



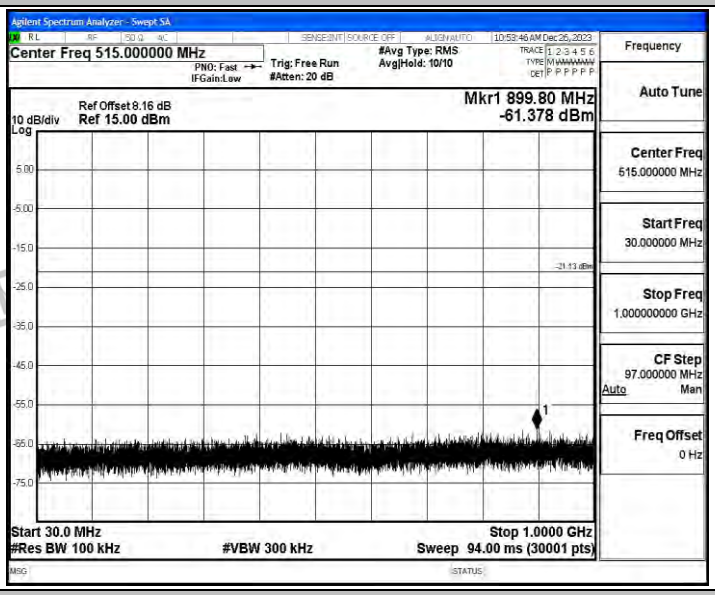
2DH5_Ant_2480_1000~26500



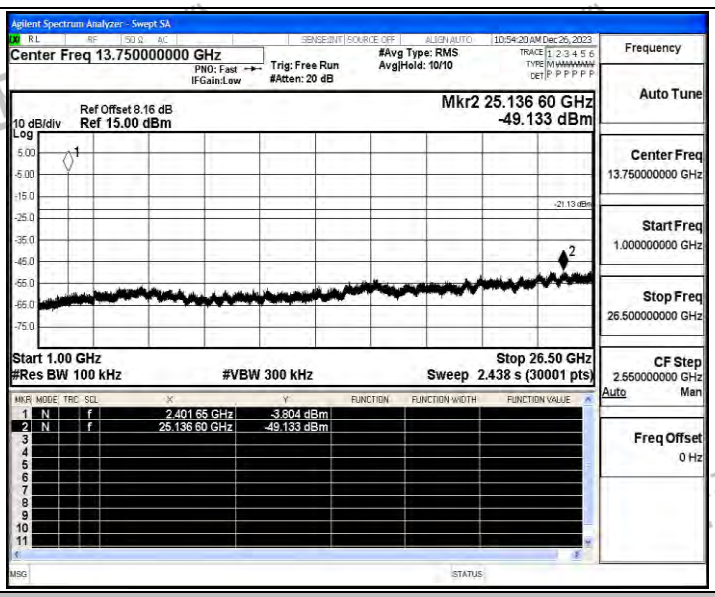
3DH5_Ant_2402_0~Reference



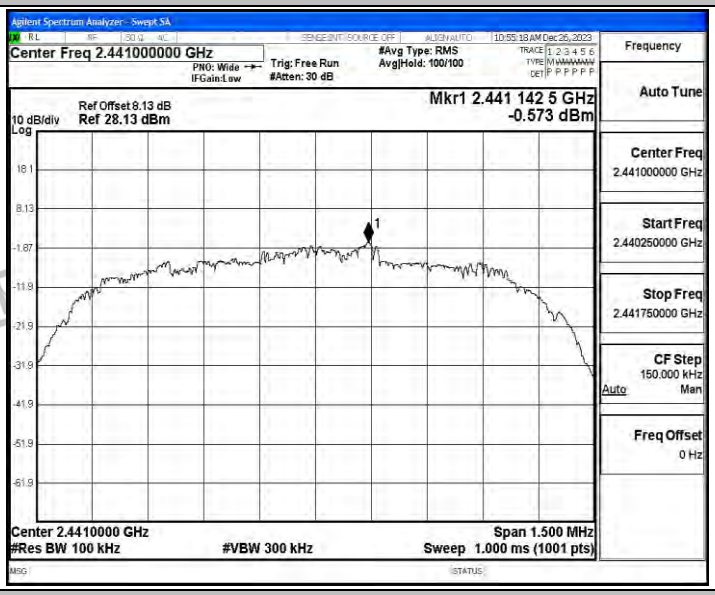
3DH5_Ant_2402_30~1000



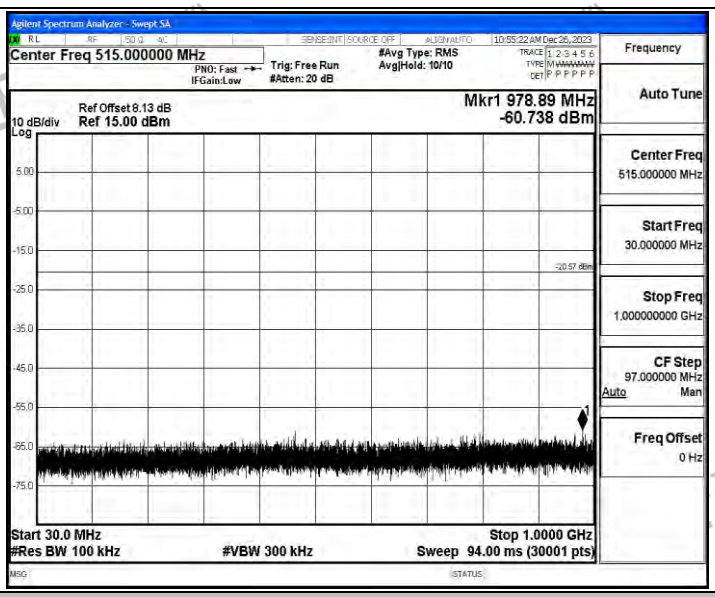
3DH5_Ant_2402_1000~26500



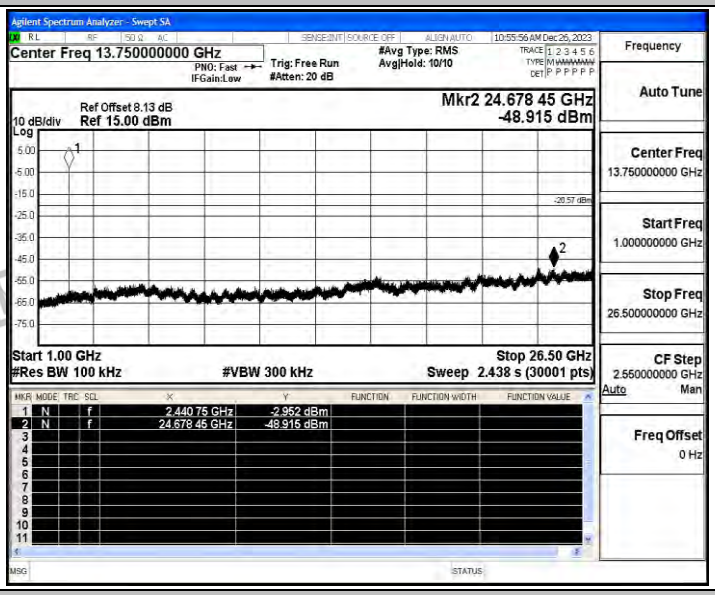
3DH5_Ant_2441_0~Reference



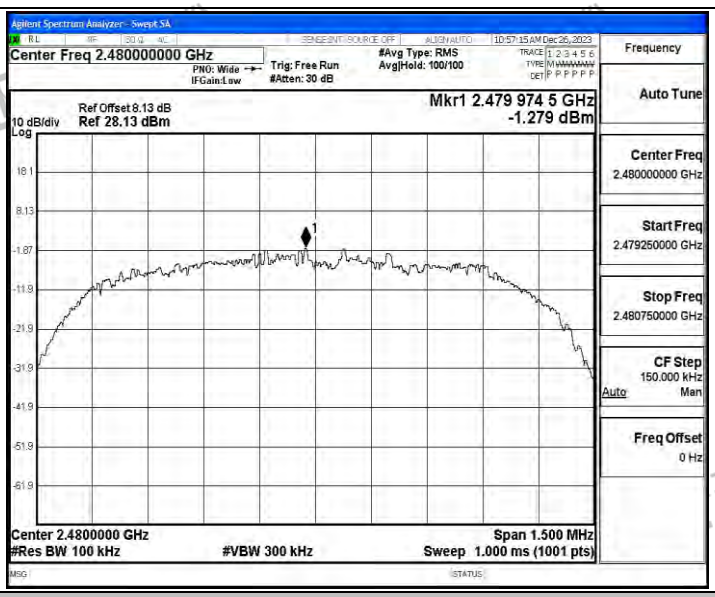
3DH5_Ant_2441_30~1000



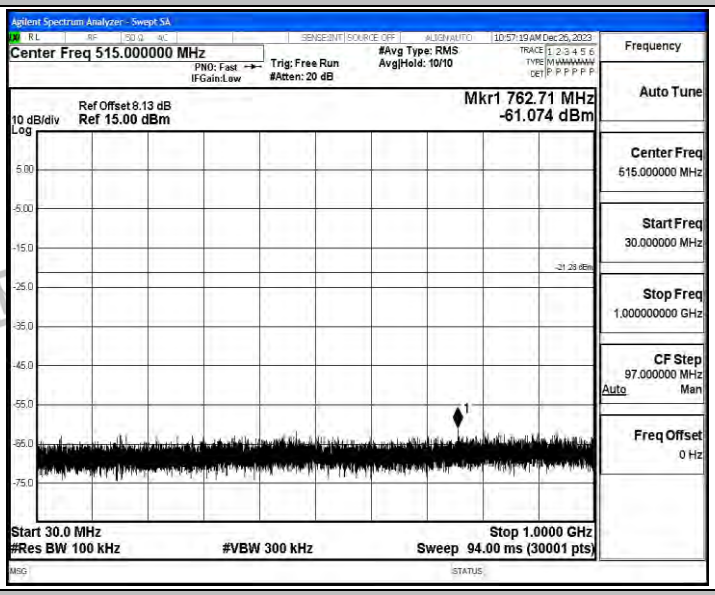
3DH5_Ant_2441_1000~26500



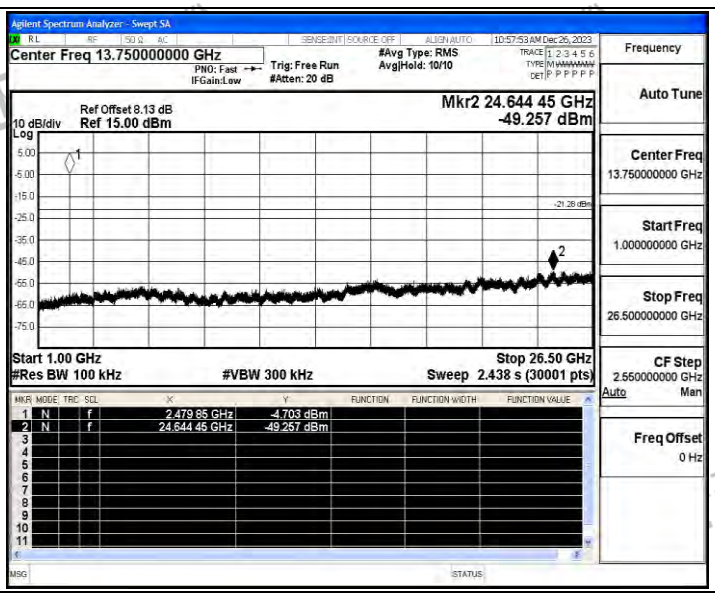
3DH5_Ant_2480_0~Reference



3DH5_Ant_2480_30~1000



3DH5_Ant_2480_1000~26500


Agilent Spectrum Analyzer - Swept SA
Center Freq 13.750000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
#Avg Type: RMS
Avg|Hold: 10/10
10:57:53 AM Dec 26, 2023
Ref Offset 8.13 dB
10 dB/div Ref 15.00 dBm
Log
Mkr2 24.644 45 GHz
-49.257 dBm
-21.26 dBm
Start 1.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.50 GHz
Sweep 2.438 s (30001 pts)
1 N f 2.479 85 GHz -4.703 dBm
2 N f 24.644 45 GHz -49.257 dBm
Frequency
Auto Tune
Center Freq
13.750000000 GHz
Start Freq
1.000000000 GHz
Stop Freq
26.500000000 GHz
CF Step
2.550000000 GHz
Auto Man
Freq Offset
0 Hz

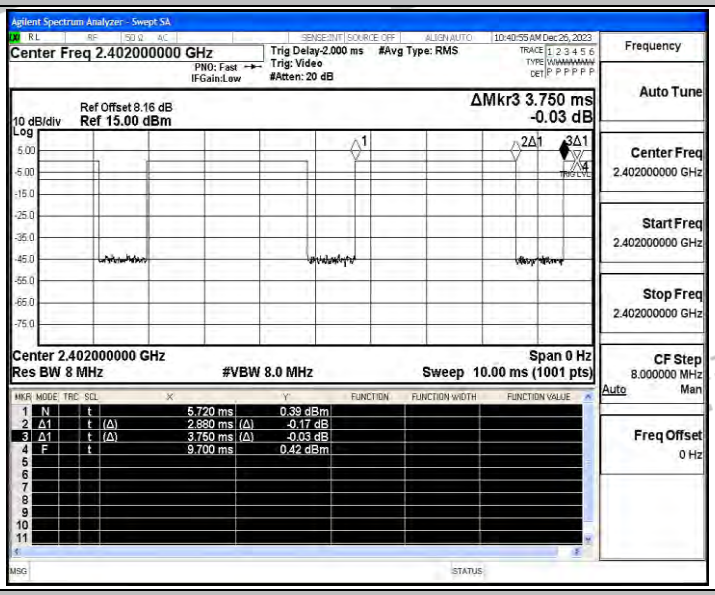
A.8 Duty Cycle

Test Result

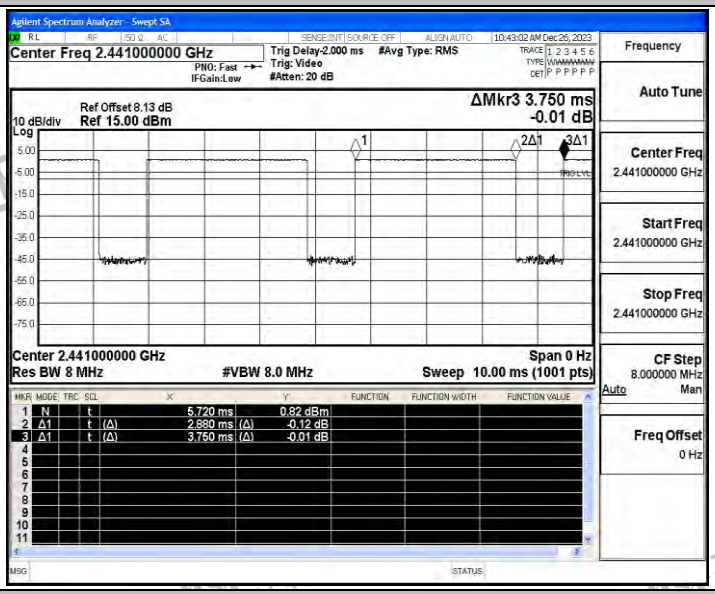
TestMode	Antenna	Frequency[MHz]	ON Time [ms]	Period [ms]	Duty Cycle [%]	Duty Cycle Factor[dB]	1/T Factor[kHz]
DH5	Ant	2402	2.88	3.75	76.80	1.15	0.35
		2441	2.88	3.75	76.80	1.15	0.35
		2480	2.88	3.75	76.80	1.15	0.35
2DH5	Ant	2402	2.88	3.75	76.80	1.15	0.35
		2441	2.88	3.75	76.80	1.15	0.35
		2480	2.89	3.75	77.07	1.13	0.35
3DH5	Ant	2402	2.89	3.75	77.07	1.13	0.35
		2441	2.89	3.75	77.07	1.13	0.35
		2480	2.89	3.75	77.07	1.13	0.35

Test Graphs

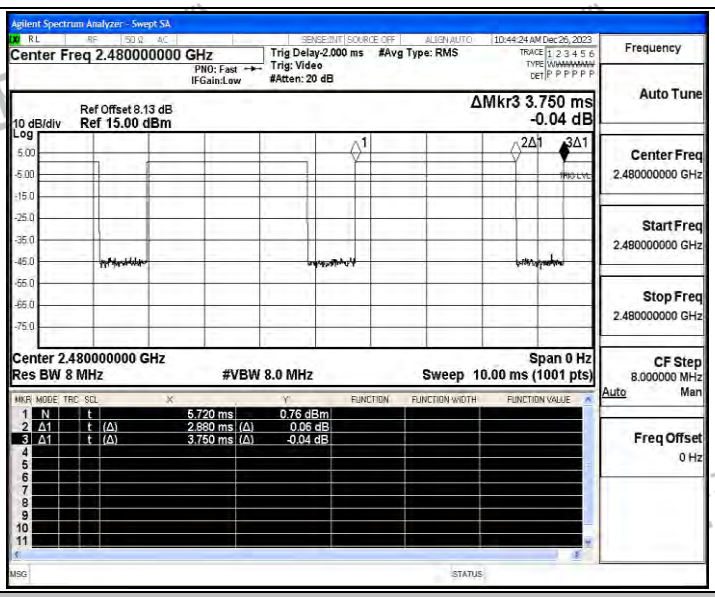
DH5_Ant_2402



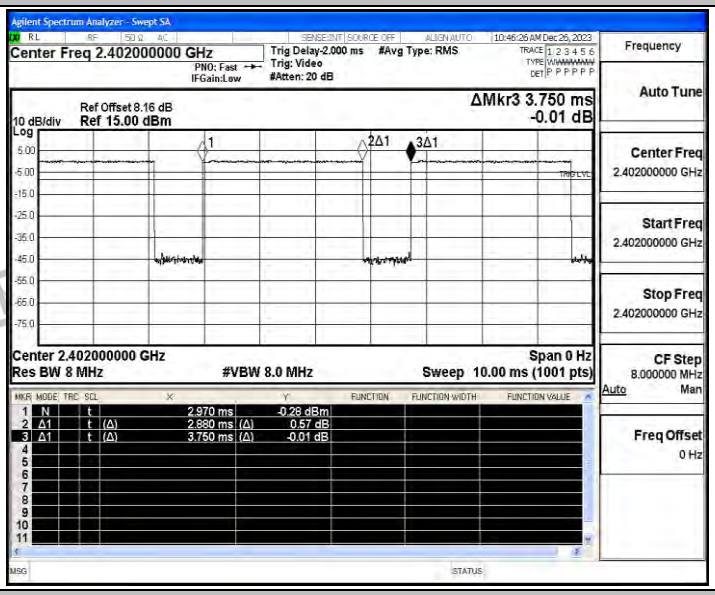
DH5_Ant_2441



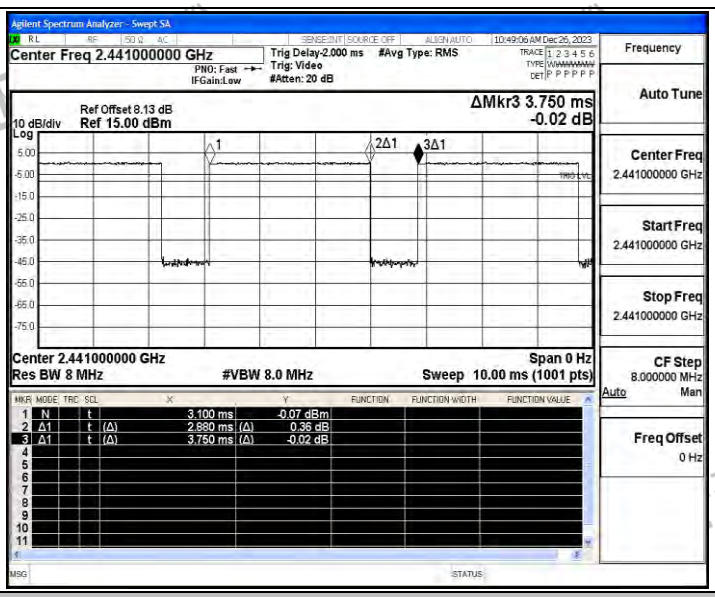
DH5_Ant_2480



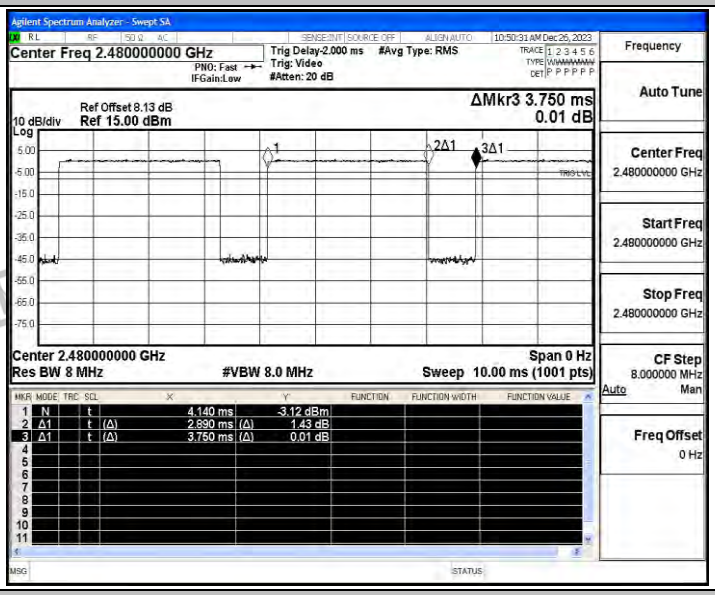
2DH5_Ant_2402



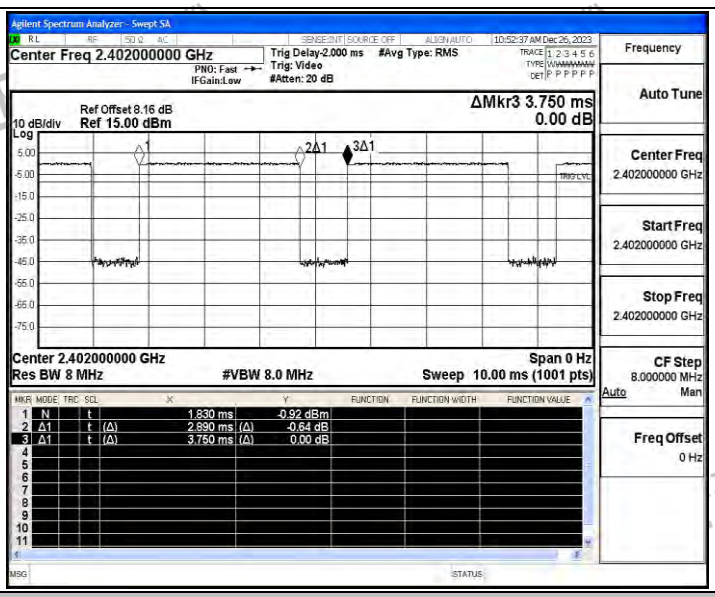
2DH5_Ant_2441



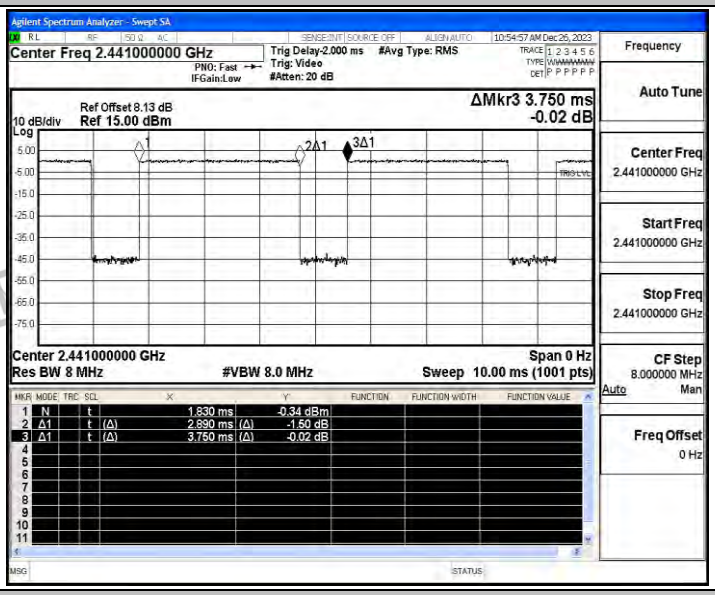
2DH5_Ant_2480



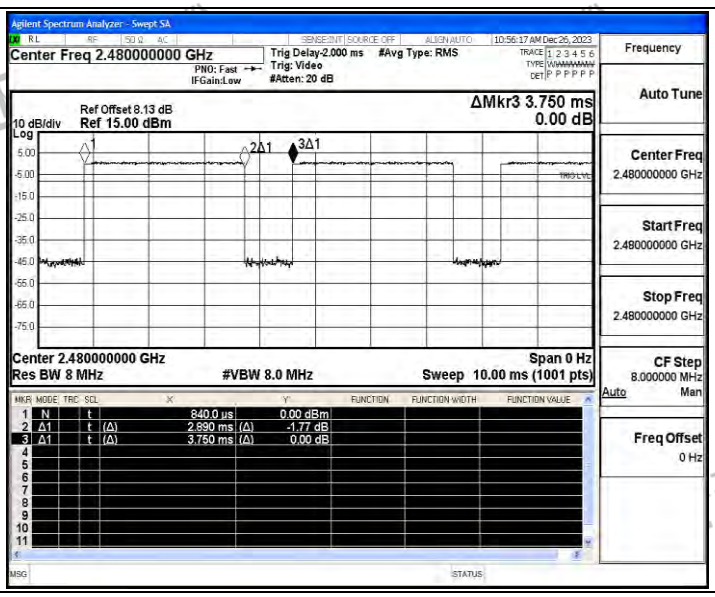
3DH5_Ant_2402



3DH5_Ant_2441



3DH5_Ant_2480


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Fast
IFGain:Low
Trig Delay-2.000 ms
Trig: Video
#Atten: 20 dB
#Avg Type: RMS
10:56:17 AM Dec 26, 2023
Frequency
Auto Tune
Ref Offset 8.13 dB
10 dB/div Ref 15.00 dBm
Log
ΔMkr3 3.750 ms
0.00 dB
Center Freq
2.480000000 GHz
Start Freq
2.480000000 GHz
Stop Freq
2.480000000 GHz
Center 2.480000000 GHz
Res BW 8 MHz
#VBW 8.0 MHz
Span 0 Hz
Sweep 10.00 ms (1001 pts)
CF Step
8.000000 MHz
Auto Man
Freq Offset
0 Hz
1 N 840.0 µs 0.00 dBm
2 Δ1 2.890 ms (Δ) -1.77 dB
3 Δ1 3.750 ms (Δ) 0.00 dB

A.9 Emissions in Restricted Bands

Test Result

TestMode	Antenna	ChName	Frequency[MHz]	Detector	Freq [MHz]	Result [dBm]	Limit [dBm]	Result [dBuV/m]	Limit [dBuV/m]	Verdict
DH5	Ant	Low	2402	AV	2310.000	-49.12	≤-41.20	46.08	≤54	PASS
				AV	2385.785	-48.59	≤-41.20	46.61	≤54	PASS
				AV	2390.000	-48.7	≤-41.20	46.50	≤54	PASS
				Peak	2310.000	-42.71	≤-21.20	52.49	≤74	PASS
				Peak	2350.610	-40.14	≤-21.20	55.06	≤74	PASS
				Peak	2390.000	-44.23	≤-21.20	50.97	≤74	PASS
		High	2480	AV	2483.500	-48.27	≤-41.20	46.93	≤54	PASS
				AV	2483.520	-48.27	≤-41.20	46.93	≤54	PASS
				AV	2500.000	-48.63	≤-41.20	46.57	≤54	PASS
				Peak	2483.500	-44.88	≤-21.20	50.32	≤74	PASS
				Peak	2493.760	-40	≤-21.20	55.20	≤74	PASS
				Peak	2500.000	-44.09	≤-21.20	51.11	≤74	PASS
		Low	Hop_2402	Peak	2310.000	-41.02	≤-21.20	54.18	≤74	PASS
				Peak	2311.655	-38.74	≤-21.20	56.46	≤74	PASS
				Peak	2390.000	-41.71	≤-21.20	53.49	≤74	PASS
		High	Hop_2480	Peak	2483.500	-40.39	≤-21.20	54.81	≤74	PASS
				Peak	2495.440	-37.07	≤-21.20	58.13	≤74	PASS
				Peak	2500.000	-40.08	≤-21.20	55.12	≤74	PASS
2DH5	Ant	Low	2402	AV	2310.000	-49.06	≤-41.20	46.14	≤54	PASS
				AV	2376.020	-48.56	≤-41.20	46.64	≤54	PASS
				AV	2390.000	-48.66	≤-41.20	46.54	≤54	PASS
				Peak	2310.000	-43.73	≤-21.20	51.47	≤74	PASS
				Peak	2364.050	-39.42	≤-21.20	55.78	≤74	PASS
				Peak	2390.000	-42.91	≤-21.20	52.29	≤74	PASS
		High	2480	AV	2483.500	-48.32	≤-41.20	46.88	≤54	PASS
				AV	2483.520	-48.32	≤-41.20	46.88	≤54	PASS
				AV	2500.000	-48.65	≤-41.20	46.55	≤54	PASS
				Peak	2483.500	-41.82	≤-21.20	53.38	≤74	PASS
				Peak	2496.800	-39.43	≤-21.20	55.77	≤74	PASS
				Peak	2500.000	-45.04	≤-21.20	50.16	≤74	PASS
		Low	Hop_2402	Peak	2310.000	-40.36	≤-21.20	54.84	≤74	PASS
				Peak	2381.585	-37.48	≤-21.20	57.72	≤74	PASS
				Peak	2390.000	-40.44	≤-21.20	54.76	≤74	PASS
		High	Hop_248	Peak	2483.500	-40.02	≤-21.20	55.18	≤74	PASS

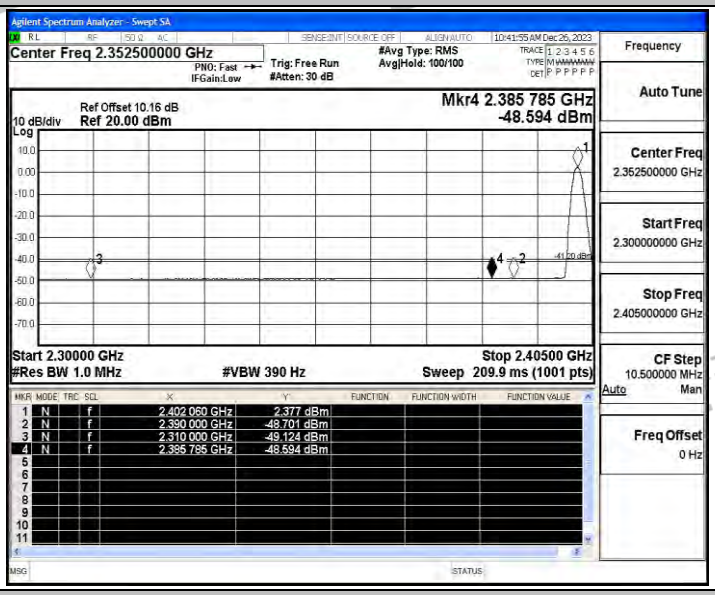
			0	Peak	2489.440	-38.31	≤-21.20	56.89	≤74	PASS
				Peak	2500.000	-40.34	≤-21.20	54.86	≤74	PASS
3DH5	Ant	Low	2402	AV	2310.000	-49.16	≤-41.20	46.04	≤54	PASS
				AV	2372.975	-48.54	≤-41.20	46.66	≤54	PASS
				AV	2390.000	-48.71	≤-41.20	46.49	≤54	PASS
				Peak	2310.000	-41.94	≤-21.20	53.26	≤74	PASS
				Peak	2373.920	-39.16	≤-21.20	56.04	≤74	PASS
				Peak	2390.000	-45.12	≤-21.20	50.08	≤74	PASS
		High	2480	AV	2483.500	-48.28	≤-41.20	46.92	≤54	PASS
				AV	2483.520	-48.28	≤-41.20	46.92	≤54	PASS
				AV	2500.000	-48.6	≤-41.20	46.60	≤54	PASS
				Peak	2483.500	-42.56	≤-21.20	52.64	≤74	PASS
				Peak	2497.600	-40.11	≤-21.20	55.09	≤74	PASS
				Peak	2500.000	-43.53	≤-21.20	51.67	≤74	PASS
		Low	Hop_2402	Peak	2310.000	-41.57	≤-21.20	53.63	≤74	PASS
				Peak	2368.145	-38.08	≤-21.20	57.12	≤74	PASS
				Peak	2390.000	-40.13	≤-21.20	55.07	≤74	PASS
		High	Hop_2480	Peak	2483.500	-40.12	≤-21.20	55.08	≤74	PASS
				Peak	2497.760	-38.55	≤-21.20	56.65	≤74	PASS
				Peak	2500.000	-41.02	≤-21.20	54.18	≤74	PASS

Note：

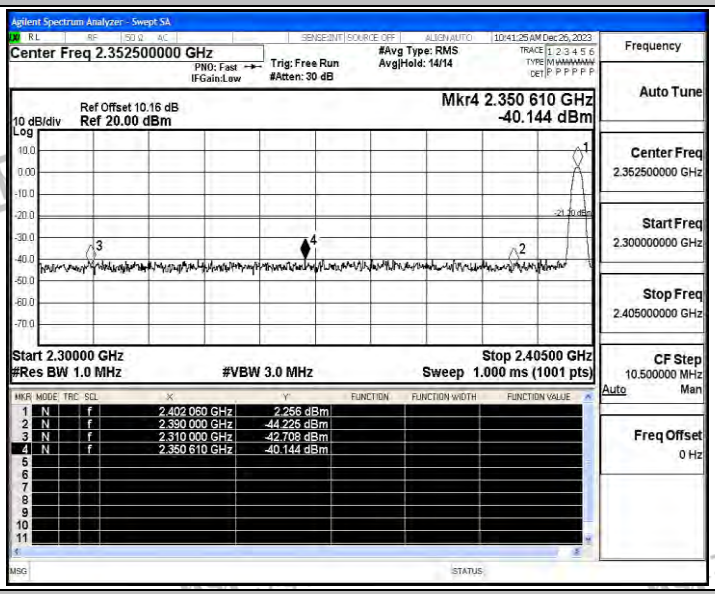
1. The Antenna Gain is compensated in the graph. The Correction Factor is compensated in the graph.
2. The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

Test Graphs

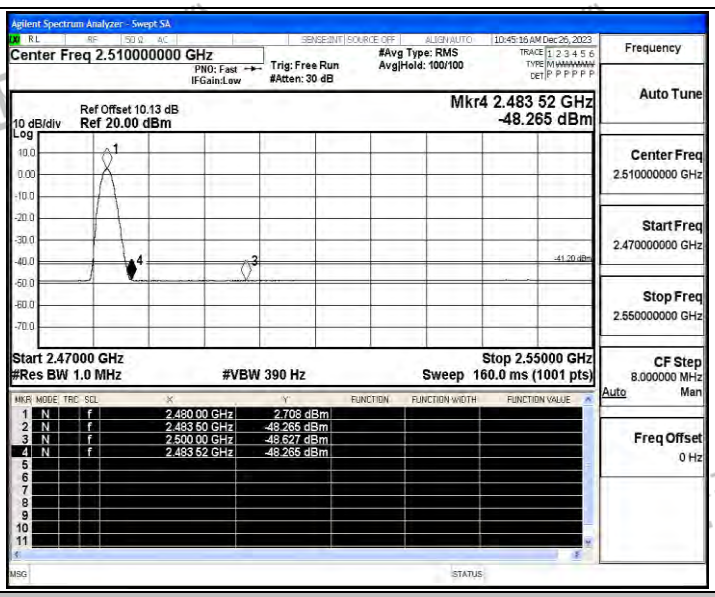
DH5_Ant_Low_2402_AV



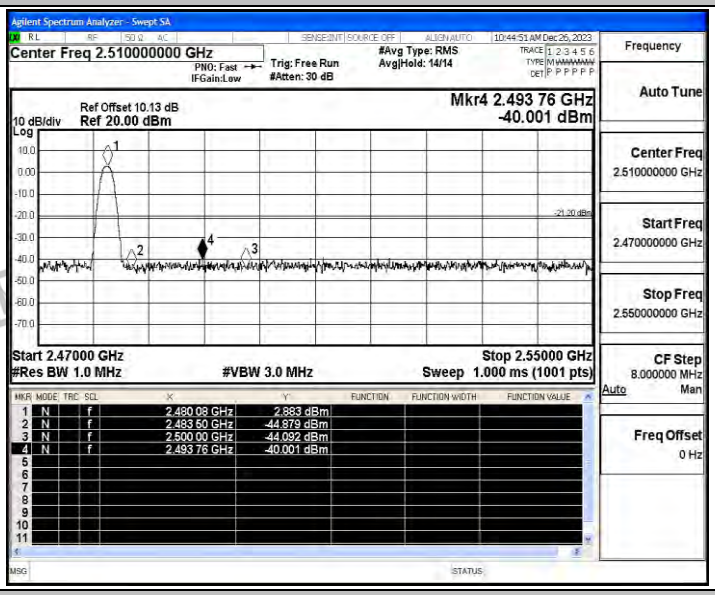
DH5_Ant_Low_2402_Peak



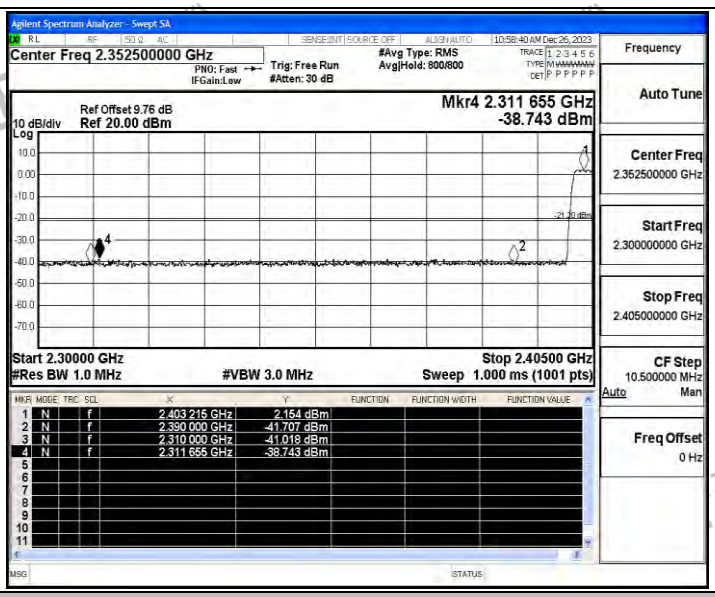
DH5_Ant_High_2480_AV



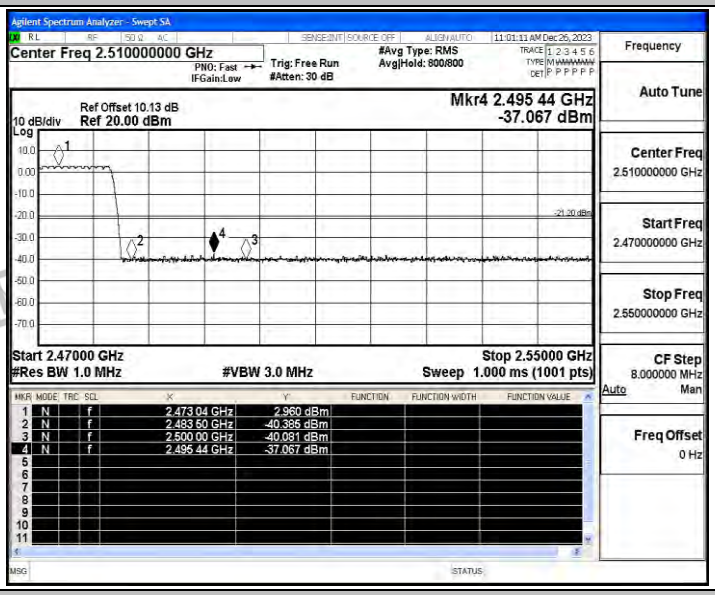
DH5_Ant_High_2480_Peak



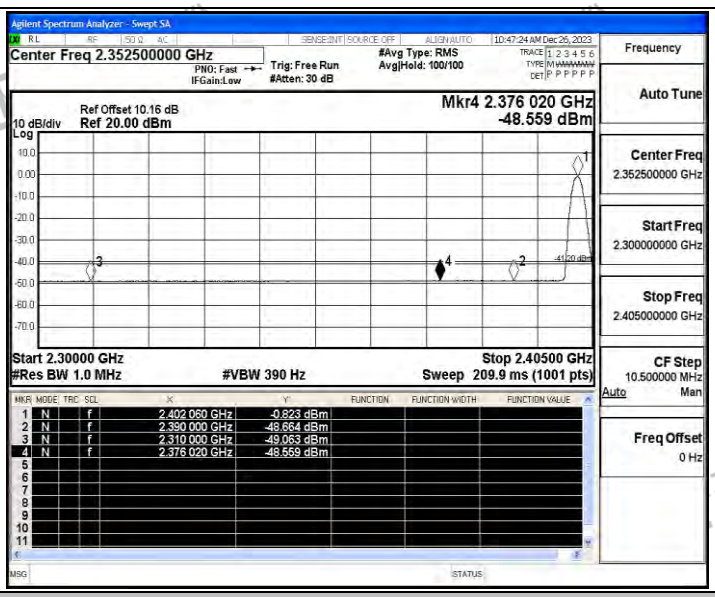
DH5_Ant_Low_Hop_2402_Peak



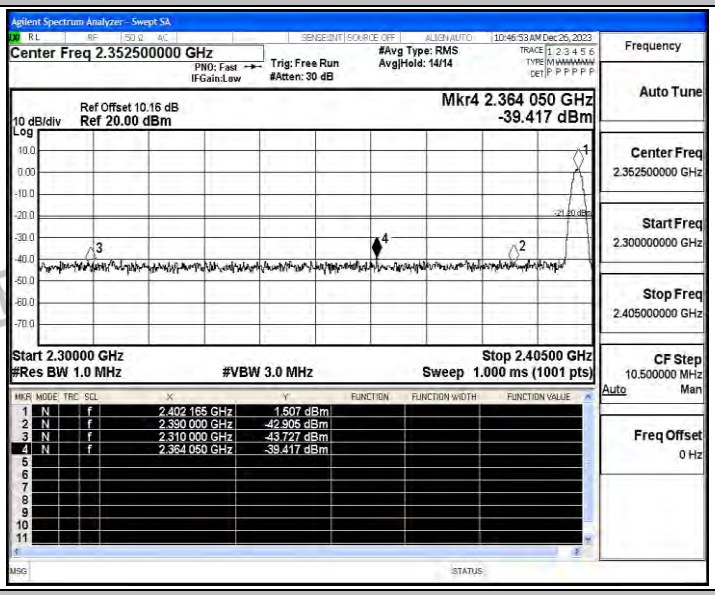
DH5_Ant_High_Hop_2480_Peak



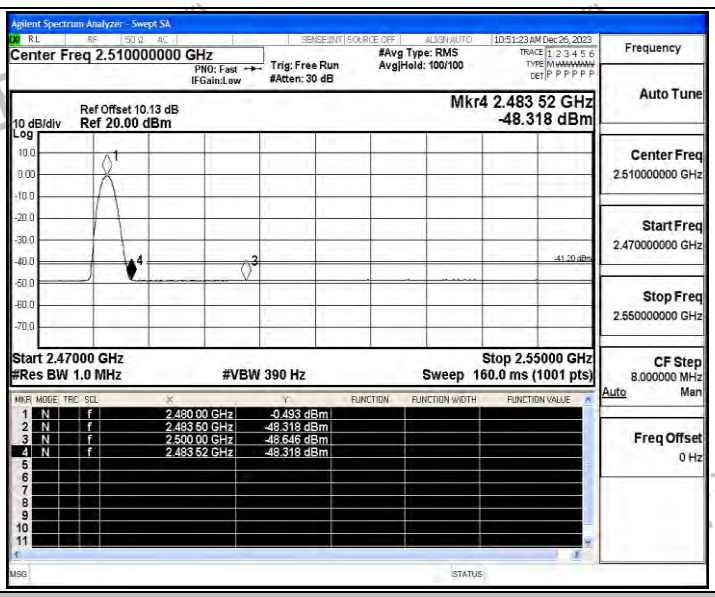
2DH5_Ant_Low_2402_AV



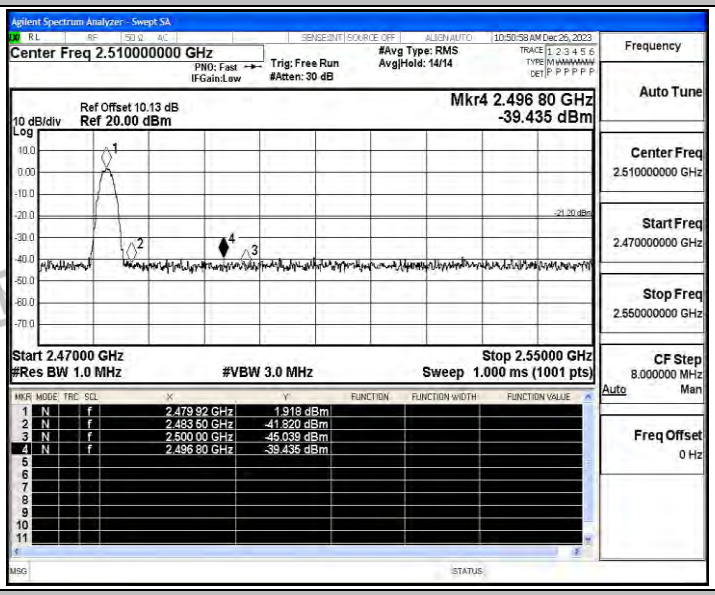
2DH5_Ant_Low_2402_Peak



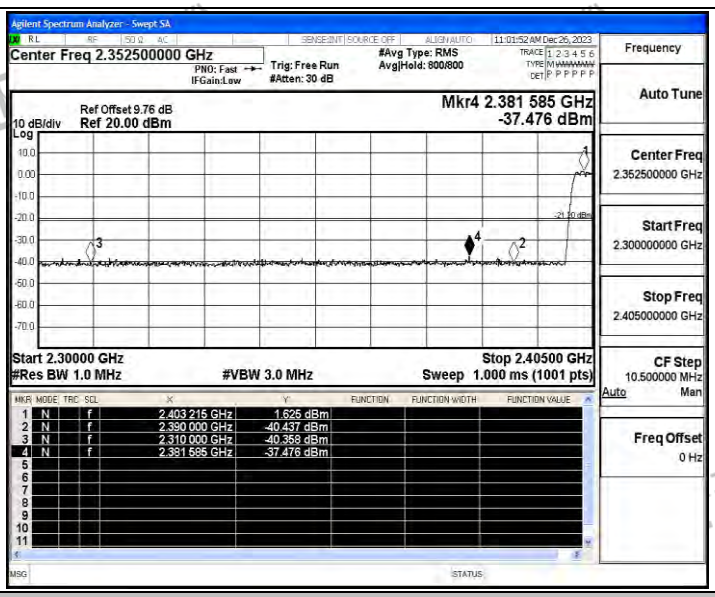
2DH5_Ant_High_2480_AV



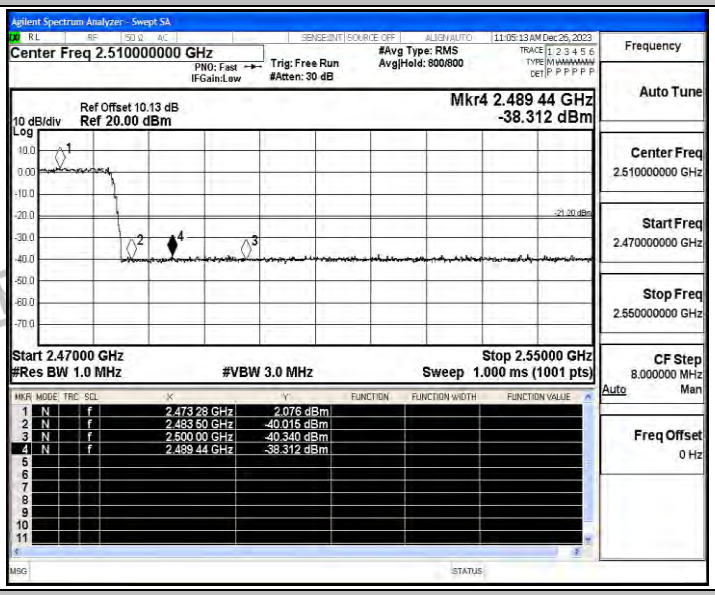
2DH5_Ant_High_2480_Peak



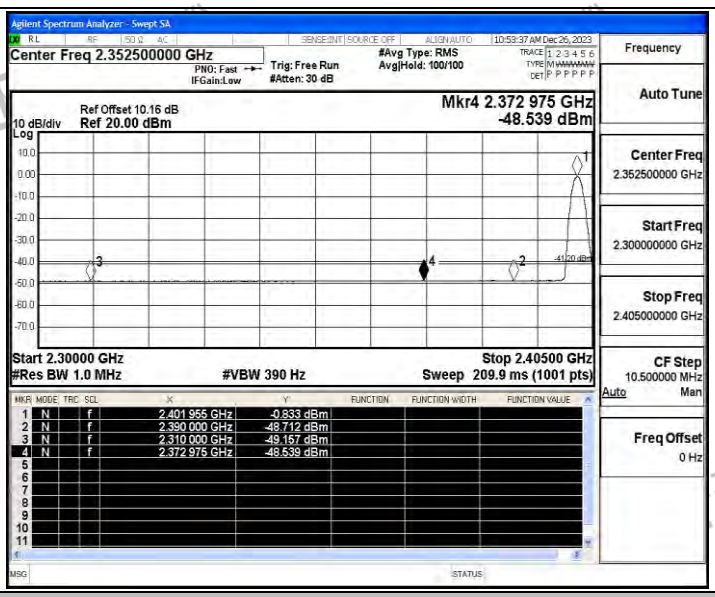
2DH5_Ant_Low_Hop_2402_Peak



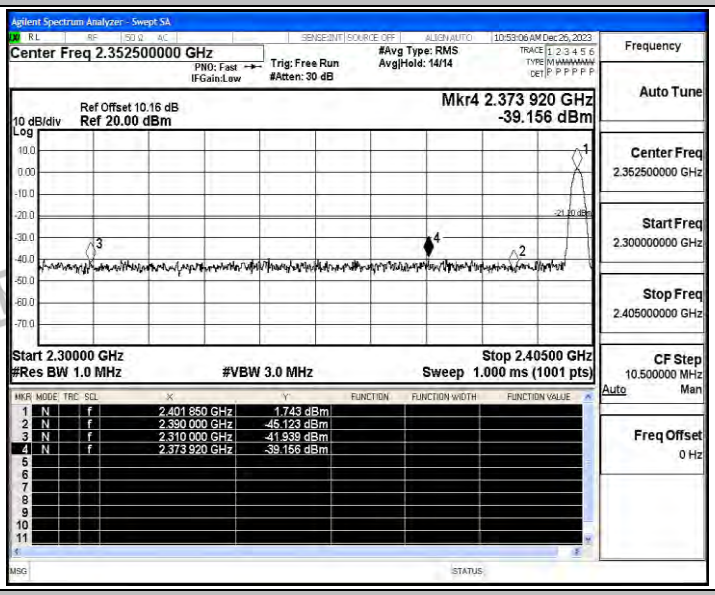
2DH5_Ant_High_Hop_2480_Peak



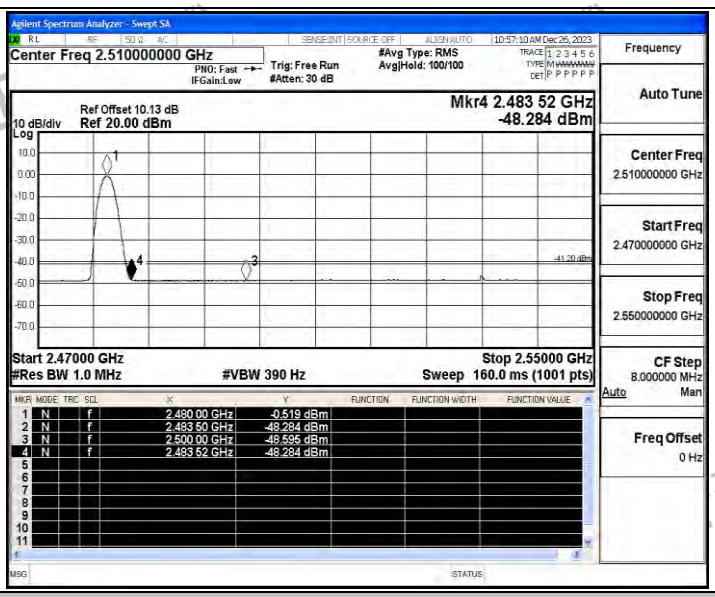
3DH5_Ant_Low_2402_AV



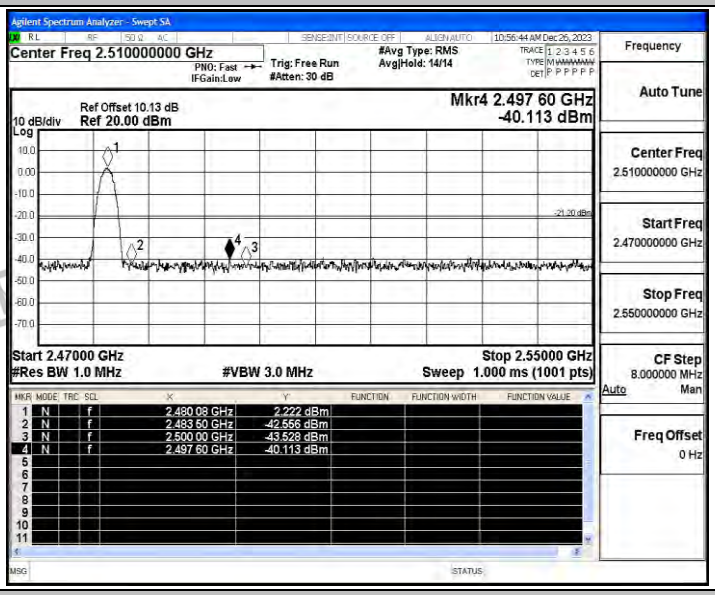
3DH5_Ant_Low_2402_Peak



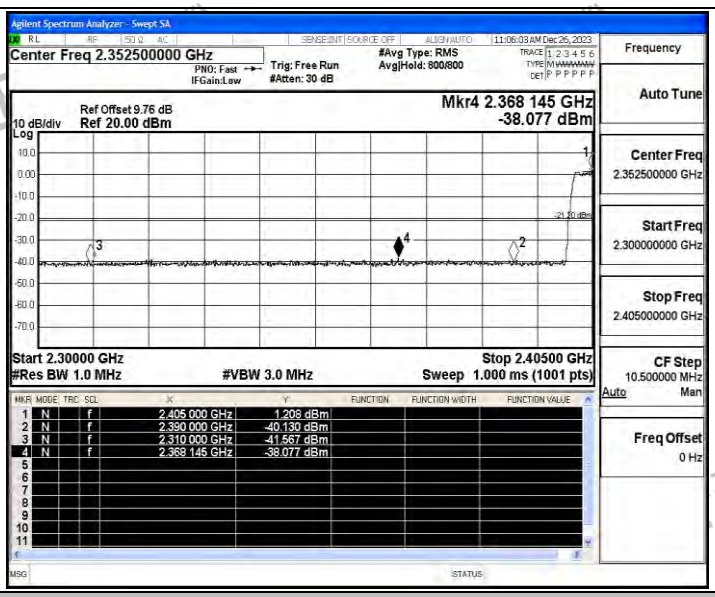
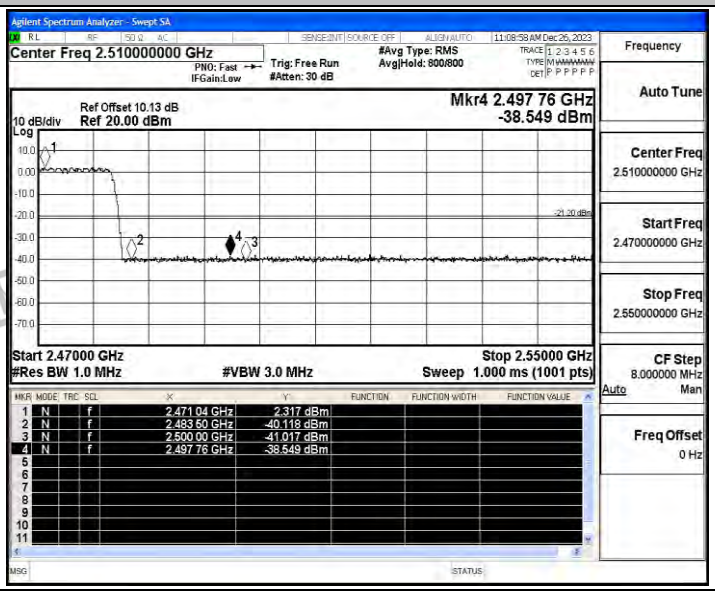
3DH5_Ant_High_2480_AV



3DH5_Ant_High_2480_Peak



3DH5_Ant_Low_Hop_2402_Peak



3DH5_Ant_High_Hop_2480_Peak