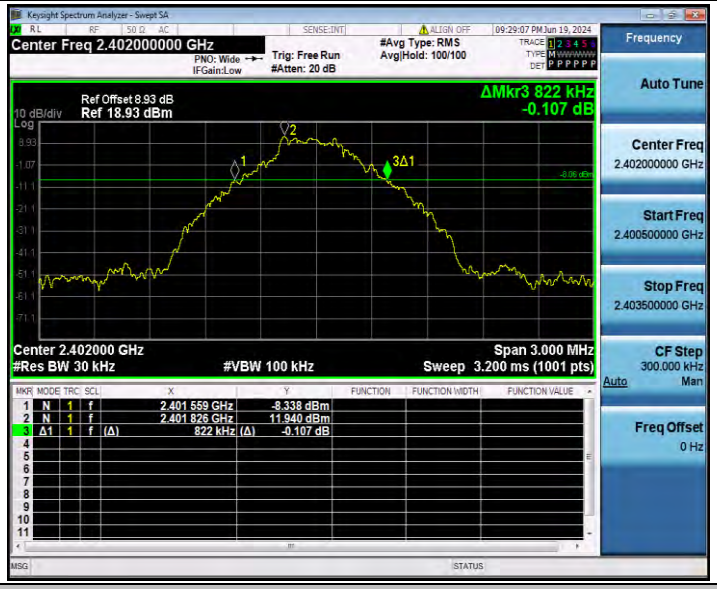
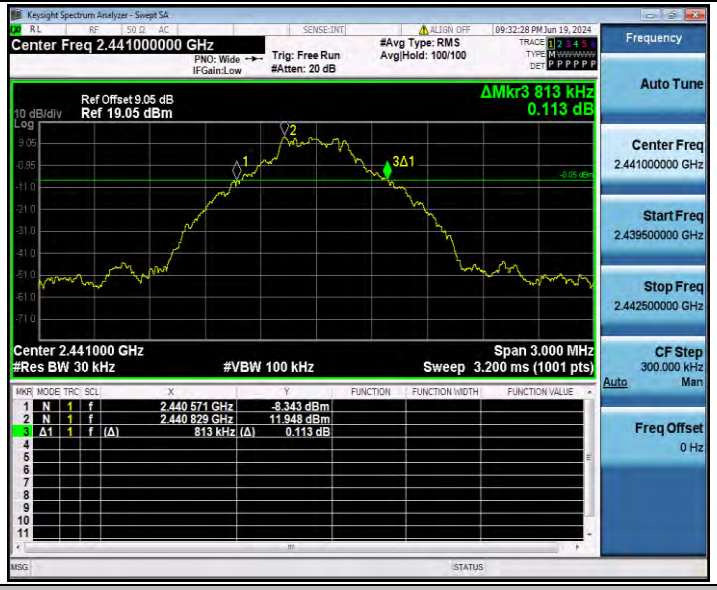
Case No. : CTA24070301801	
Ambient Condition: 23 ℃, 51 %RH	
According Standard: ■Part15C	
Test Date: 2024.6.9-2024.7.10	**Test Engineer:** Lushan Kong

Appendix A.1: 20dB Emission Bandwidth

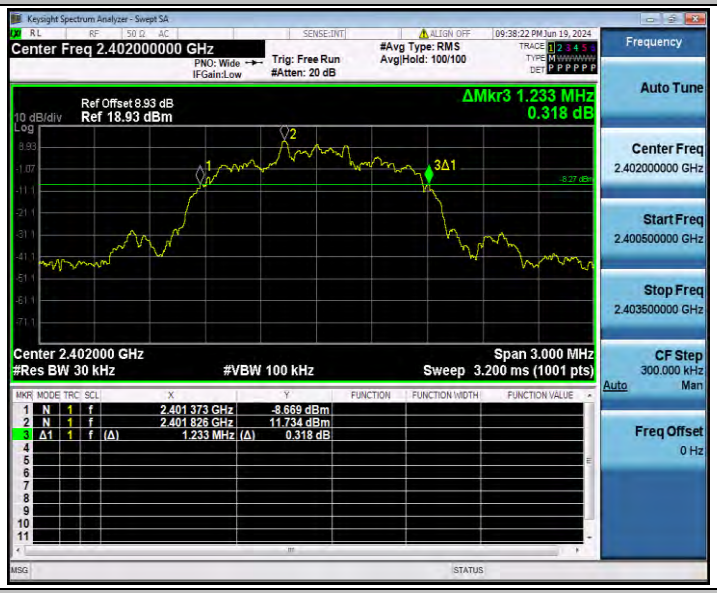
Test Result

TestMode	Antenna	Freq(MHz)	20dB EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH1	Ant1	2402	0.822	2401.559	2402.381	---	---
		2441	0.813	2440.571	2441.384	---	---
		2480	0.792	2479.586	2480.378	---	---
2DH1	Ant1	2402	1.233	2401.373	2402.606	---	---
		2441	1.263	2440.358	2441.621	---	---
		2480	1.248	2479.364	2480.612	---	---
3DH1	Ant1	2402	1.227	2401.388	2402.615	---	---
		2441	1.227	2440.388	2441.615	---	---
		2480	1.221	2479.391	2480.612	---	---

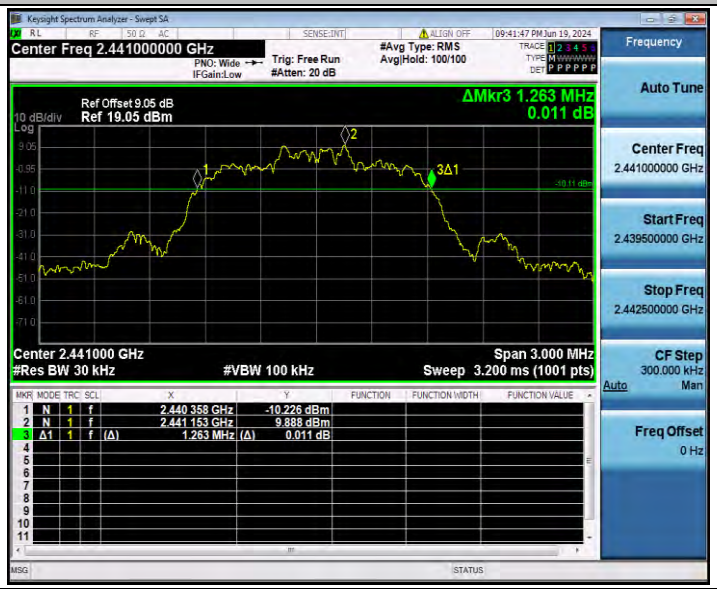
Test Graphs

DH1_Ant1_2402

DH1_Ant1_2441

DH1_Ant1_2480

2DH1_Ant1_2402



2DH1_Ant1_2441



2DH1_Ant1_2480

3DH1_Ant1_2402

3DH1_Ant1_2441

3DH1_Ant1_2480

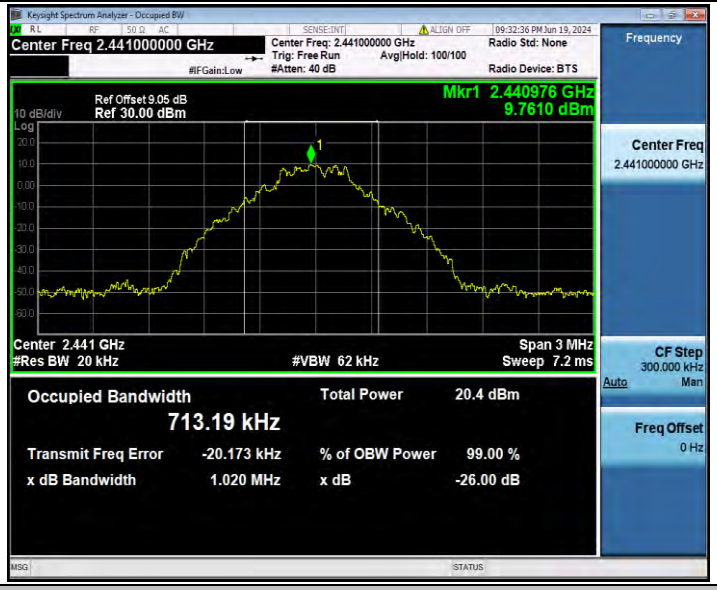
Appendix A.2: Occupied Channel Bandwidth

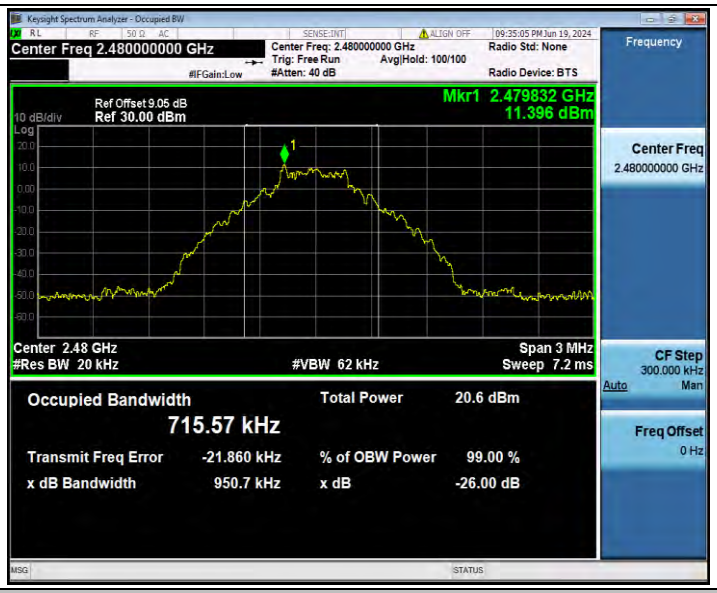
Test Result

TestMode	Antenna	Freq(MHz)	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH1	Ant1	2402	0.70856	2401.6235	2402.3320	---	---
		2441	0.71319	2440.6232	2441.3364	---	---
		2480	0.71557	2479.6204	2480.3359	---	---
2DH1	Ant1	2402	1.1372	2401.4204	2402.5576	---	---
		2441	1.1368	2440.4187	2441.5555	---	---
		2480	1.1389	2479.4176	2480.5565	---	---
3DH1	Ant1	2402	1.1287	2401.4330	2402.5617	---	---
		2441	1.1283	2440.4343	2441.5626	---	---
		2480	1.1274	2479.4318	2480.5592	---	---

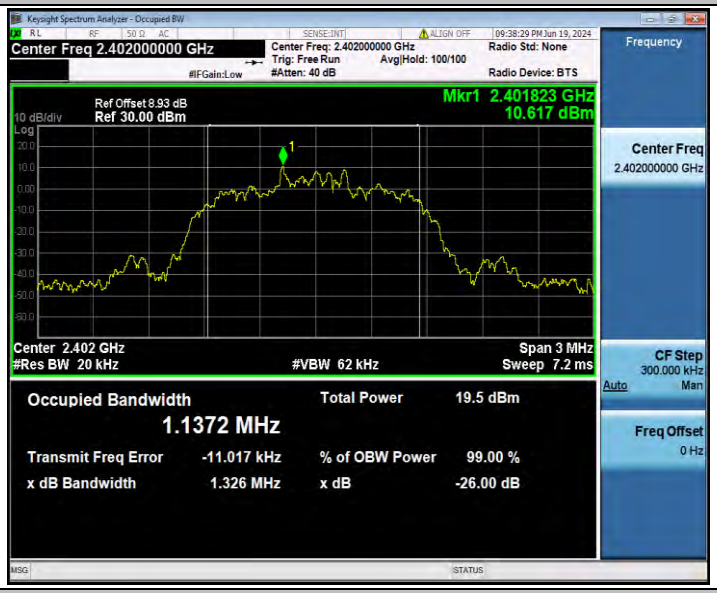
Test Graphs

DH1_Ant1_2402

DH1_Ant1_2441

DH1_Ant1_2480



2DH1_Ant1_2402



2DH1_Ant1_2441

2DH1_Ant1_2480

3DH1_Ant1_2402

3DH1_Ant1_2441

3DH1_Ant1_2480

Appendix A.3: Maximum conducted output power

Test Result Peak

Test Mode	Antenna	Freq(MHz)	Conducted Peak Powert[dBm]	Conducted Limit[dBm]	Verdict
DH1	Ant1	2402	14.67	≤30.00	PASS
		2441	14.82	≤30.00	PASS
		2480	14.86	≤30.00	PASS
2DH1	Ant1	2402	13.90	≤20.97	PASS
		2441	13.99	≤20.97	PASS
		2480	14.11	≤20.97	PASS
3DH1	Ant1	2402	13.83	≤20.97	PASS
		2441	13.93	≤20.97	PASS
		2480	13.25	≤20.97	PASS

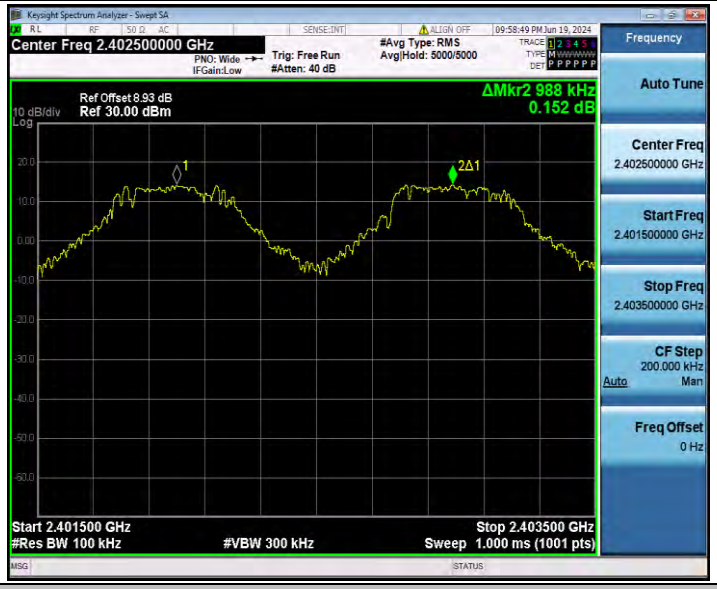
Appendix A.4: Carrier frequency separation

Test Result

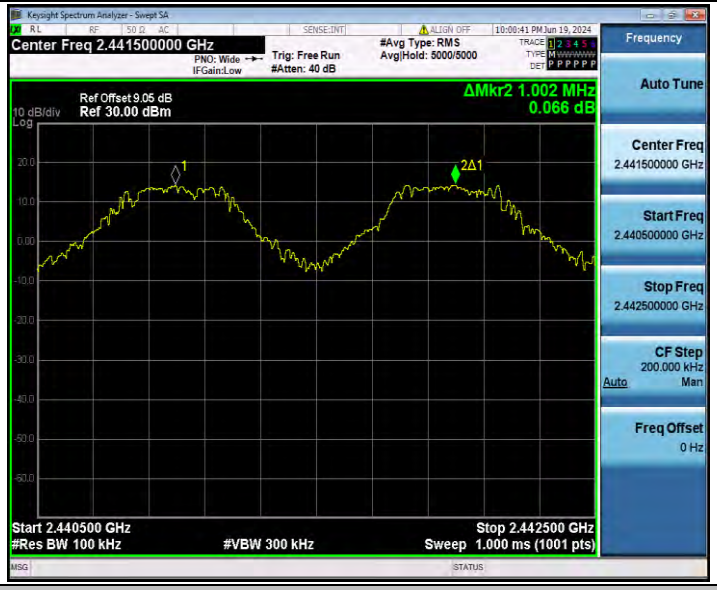
TestMode	Antenna	Freq(MHz)	Result[MHz]	Limit[MHz]	Verdict
DH1	Ant1	Hop_2402	0.988	≥0.822	PASS
		Hop_2441	1.002	≥0.822	PASS
		Hop_2480	1.004	≥0.822	PASS
2DH1	Ant1	Hop_2402	0.992	≥0.842	PASS
		Hop_2441	0.994	≥0.842	PASS
		Hop_2480	0.994	≥0.842	PASS
3DH1	Ant1	Hop_2402	1.17	≥0.818	PASS
		Hop_2441	1.01	≥0.818	PASS
		Hop_2480	0.992	≥0.818	PASS

Test Graphs

DH1_Ant1_Hop_2402



DH1_Ant1_Hop_2441



DH1_Ant1_Hop_2480

2DH1_Ant1_Hop_2402

2DH1_Ant1_Hop_2441

2DH1_Ant1_Hop_2480

3DH1_Ant1_Hop_2402

3DH1_Ant1_Hop_2441

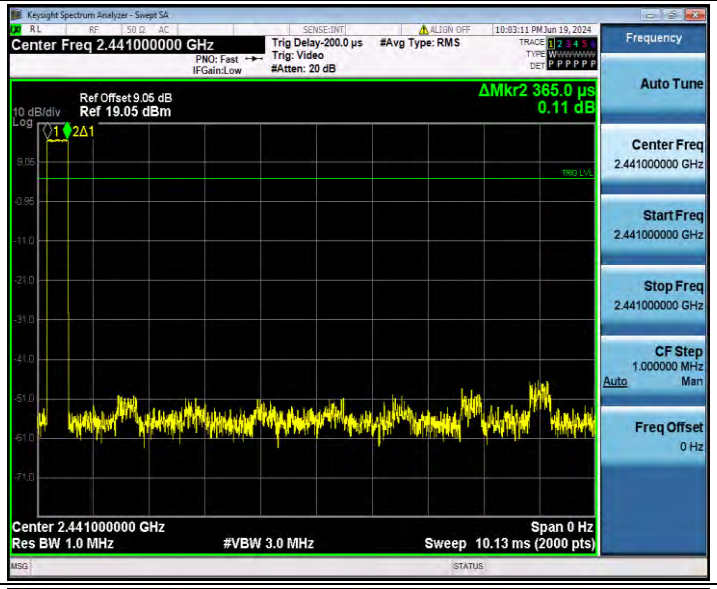
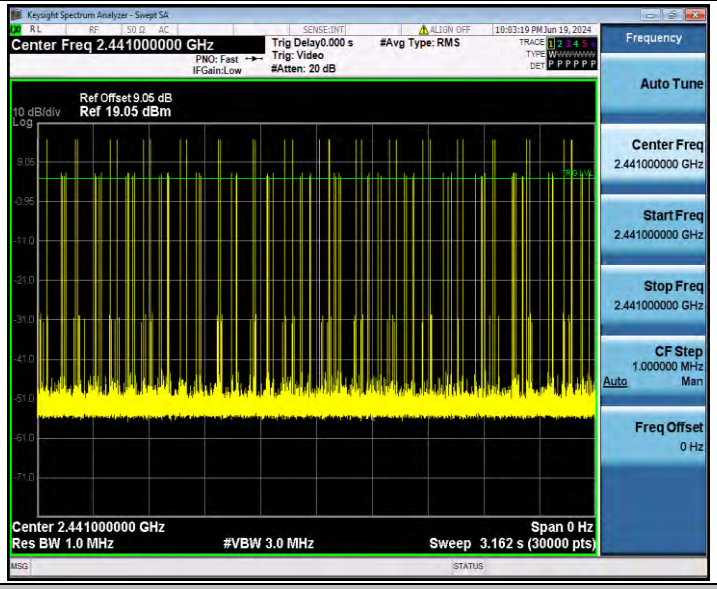
3DH1_Ant1_Hop_2480

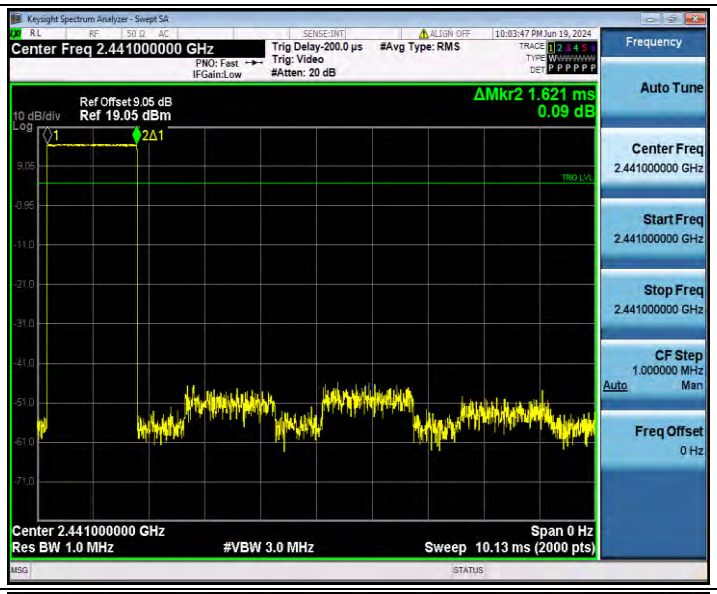
Appendix A.5: Time of occupancy

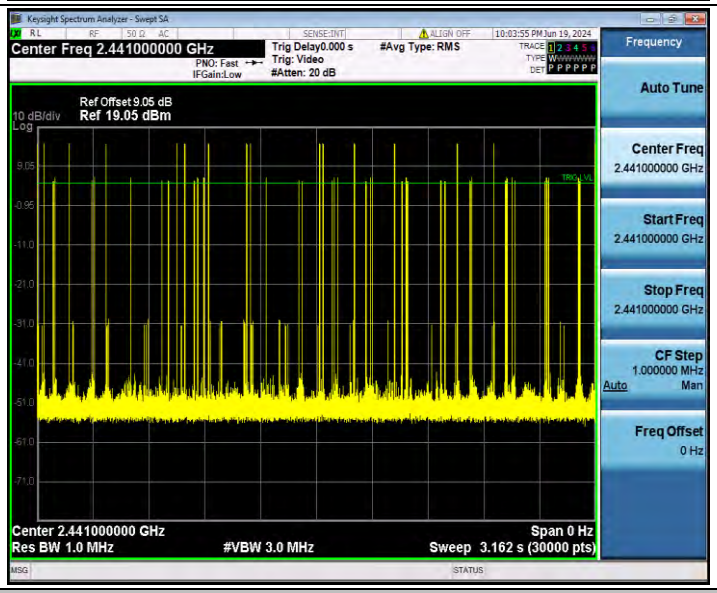
Test Result

TestMode	Antenna	Freq(MHz)	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH1	Ant1	Hop	0.365	320	0.117	≤0.4	PASS
DH3	Ant1	Hop	1.621	160	0.259	≤0.4	PASS
DH5	Ant1	Hop	2.873	80	0.23	≤0.4	PASS
2DH1	Ant1	Hop	0.375	330	0.124	≤0.4	PASS
2DH3	Ant1	Hop	1.626	180	0.293	≤0.4	PASS
2DH5	Ant1	Hop	2.873	110	0.316	≤0.4	PASS
3DH1	Ant1	Hop	0.370	330	0.122	≤0.4	PASS
3DH3	Ant1	Hop	1.626	180	0.293	≤0.4	PASS
3DH5	Ant1	Hop	2.878	120	0.345	≤0.4	PASS

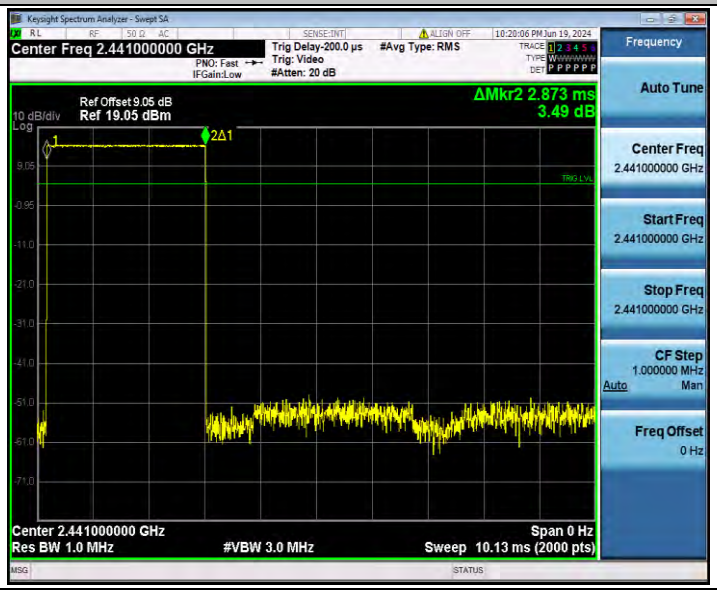
Test Graphs

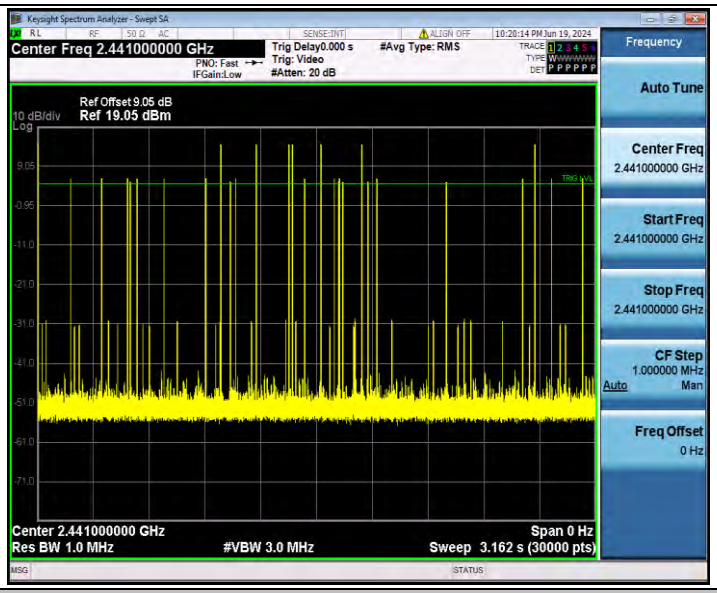
DH1_Ant1_Hop


DH3_Ant1_Hop


Keysight Spectrum Analyzer - Swept SA
Center Freq 2.441000000 GHz
PNO: Fast
IFGain:Low
Trig Delay-200.0 µs
Trig: Video
#Atten: 20 dB
#Avg Type: RMS
10:03:47 PM Jun 19, 2024
Ref Offset 9.05 dB
10 dB/div
Ref 19.05 dBm
ΔMkr2 1.621 ms
0.09 dB
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 10.13 ms (2000 pts)
Frequency
Auto Tune
Center Freq
2.441000000 GHz
Start Freq
2.441000000 GHz
Stop Freq
2.441000000 GHz
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz

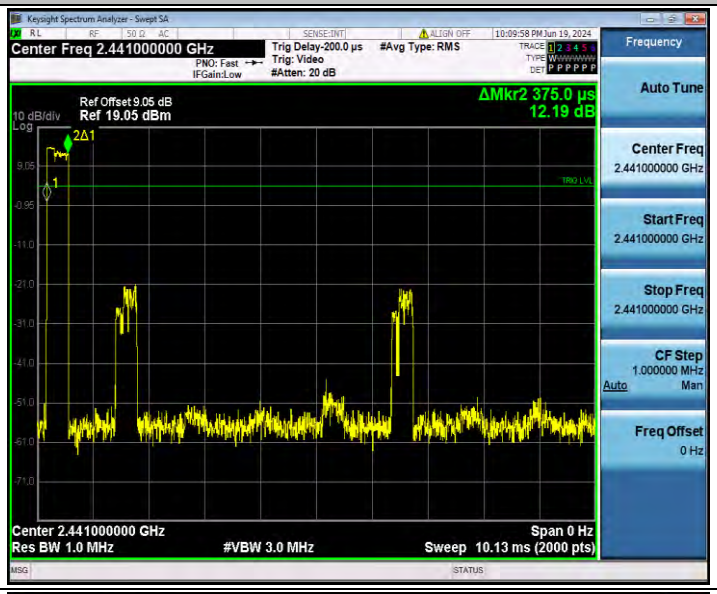

Keysight Spectrum Analyzer - Swept SA
Center Freq 2.441000000 GHz
PNO: Fast
IFGain:Low
Trig Delay0.000 s
Trig: Video
#Atten: 20 dB
#Avg Type: RMS
10:03:55 PM Jun 19, 2024
Ref Offset 9.05 dB
10 dB/div
Ref 19.05 dBm
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 3.162 s (30000 pts)
Frequency
Auto Tune
Center Freq
2.441000000 GHz
Start Freq
2.441000000 GHz
Stop Freq
2.441000000 GHz
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz

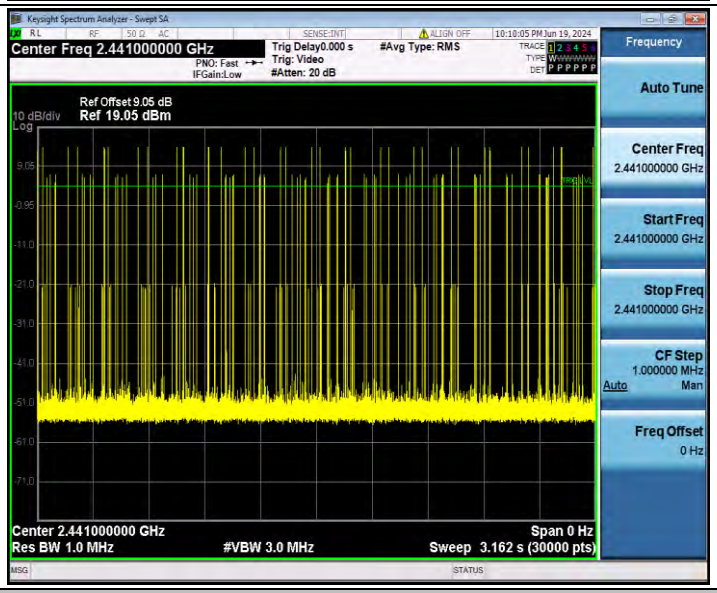
DH5_Ant1_Hop


Keysight Spectrum Analyzer - Swept SA
Center Freq 2.441000000 GHz
PNO: Fast
IFGain:Low
Trig Delay-200.0 µs
Trig: Video
#Atten: 20 dB
#Avg Type: RMS
10:20:06 PM Jun 19, 2024
Ref Offset 9.05 dB
10 dB/div
Ref 19.05 dBm
ΔMkr2 2.873 ms
3.49 dB
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 10.13 ms (2000 pts)
Frequency
Auto Tune
Center Freq
2.441000000 GHz
Start Freq
2.441000000 GHz
Stop Freq
2.441000000 GHz
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz

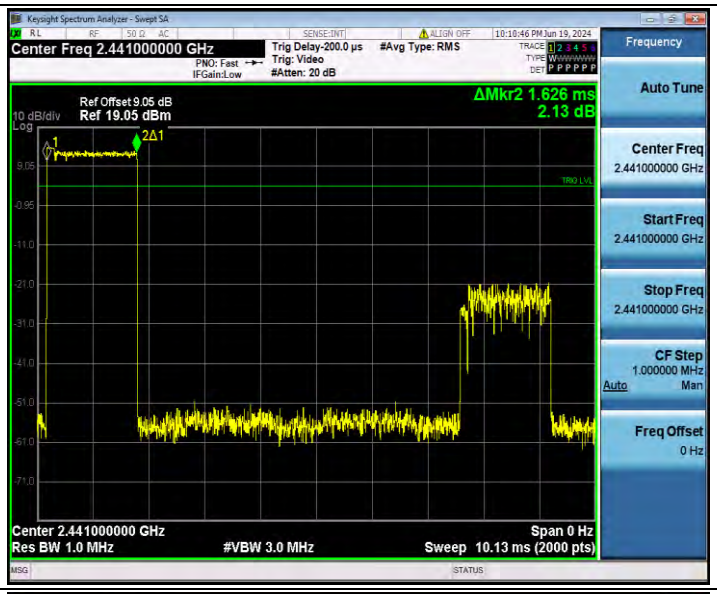


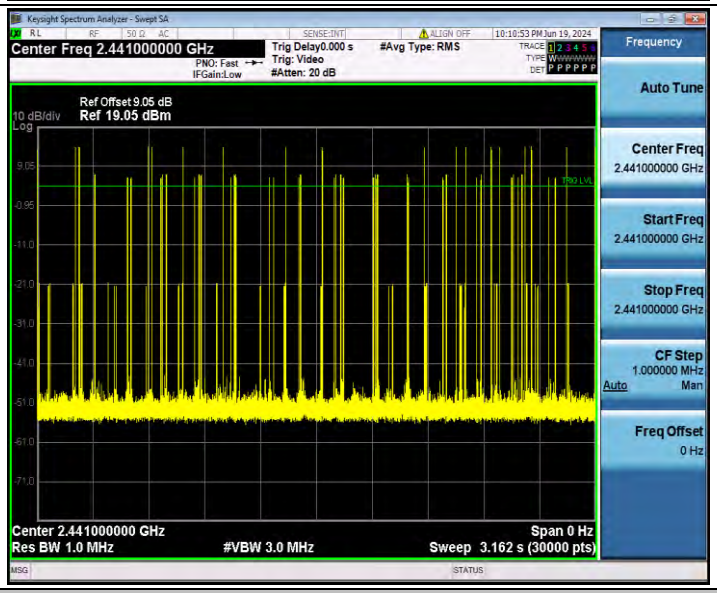
2DH1_Ant1_Hop



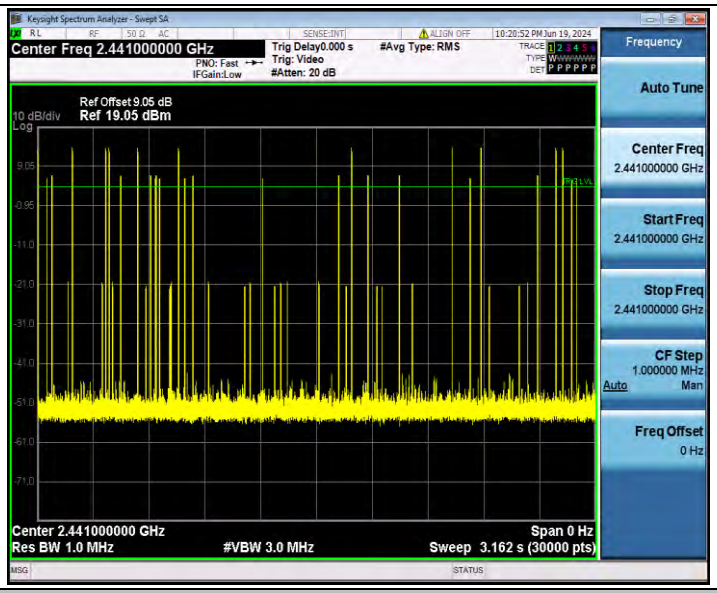


2DH3_Ant1_Hop

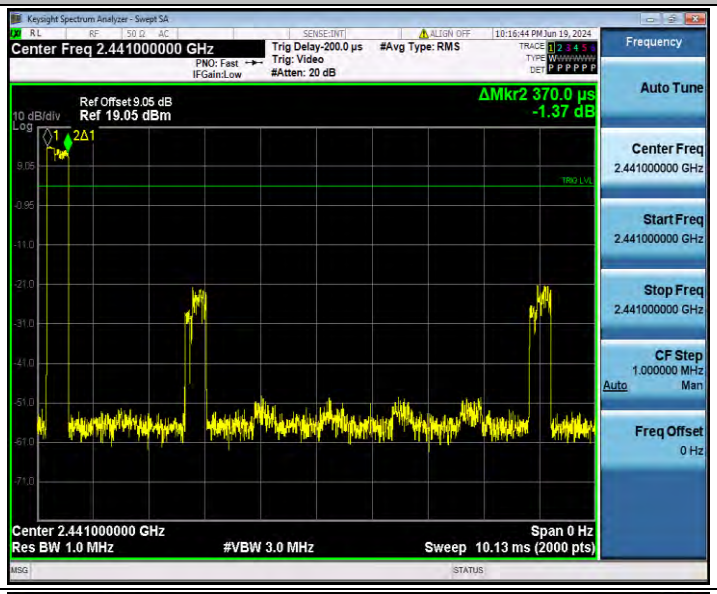


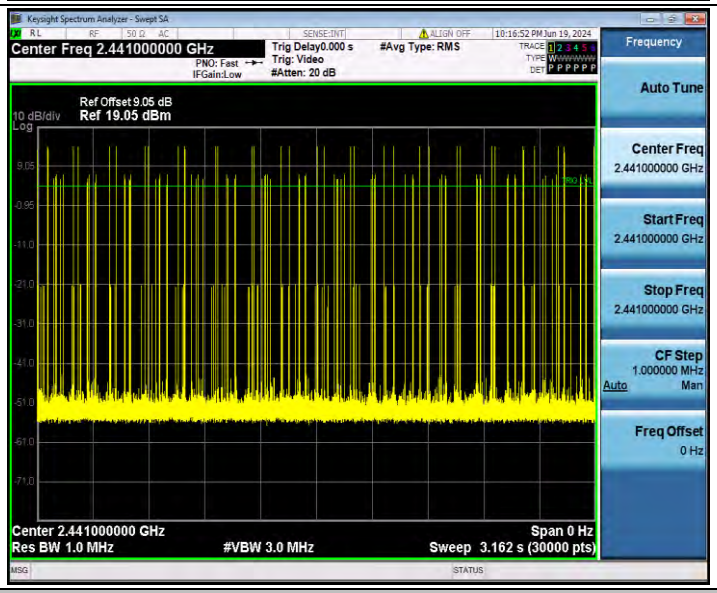


2DH5_Ant1_Hop

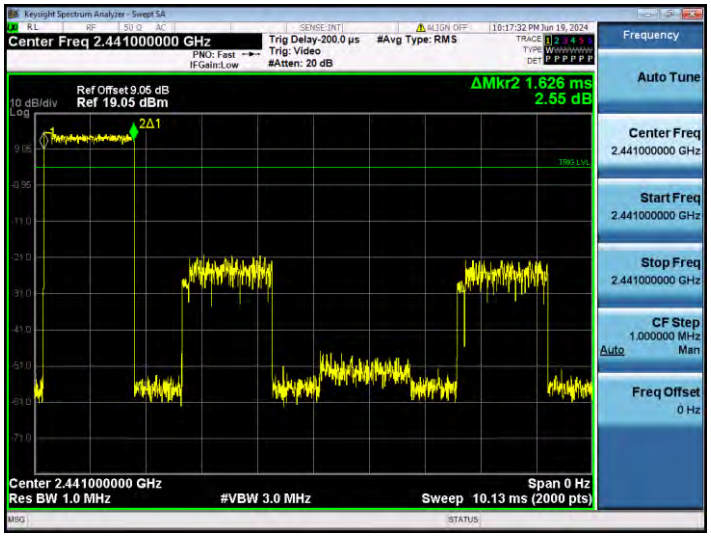


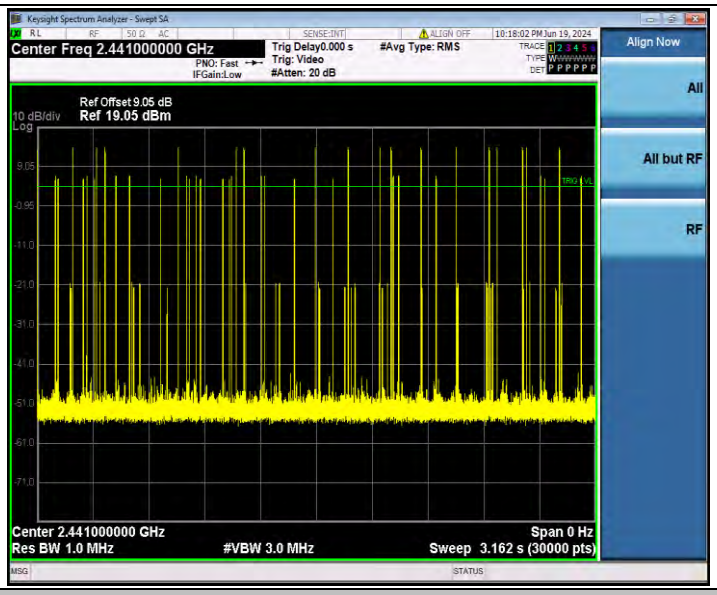
3DH1_Ant1_Hop



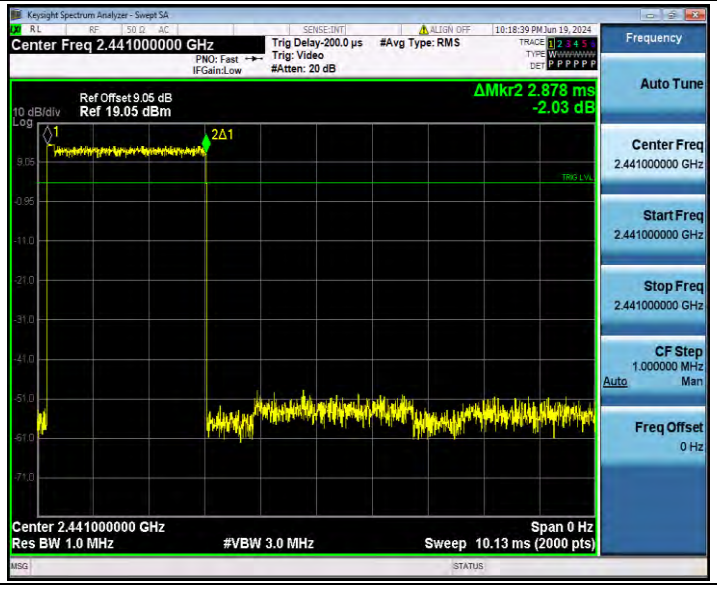


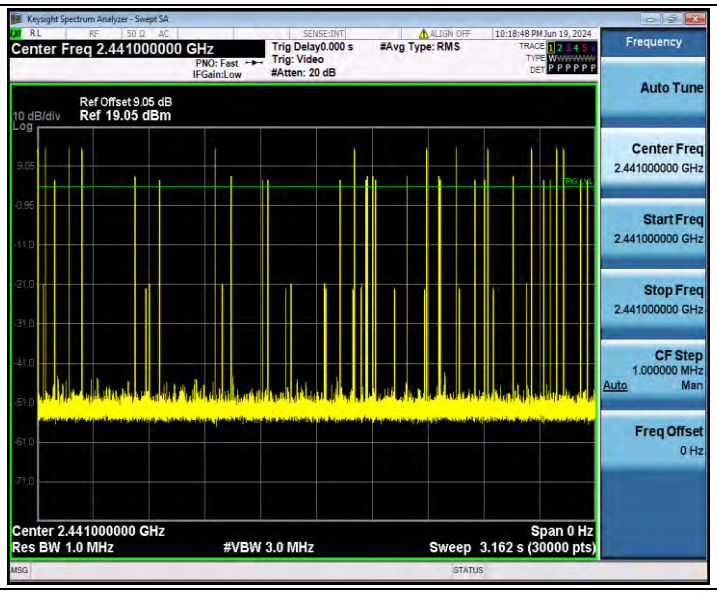
3DH3_Ant1_Hop





3DH5_Ant1_Hop



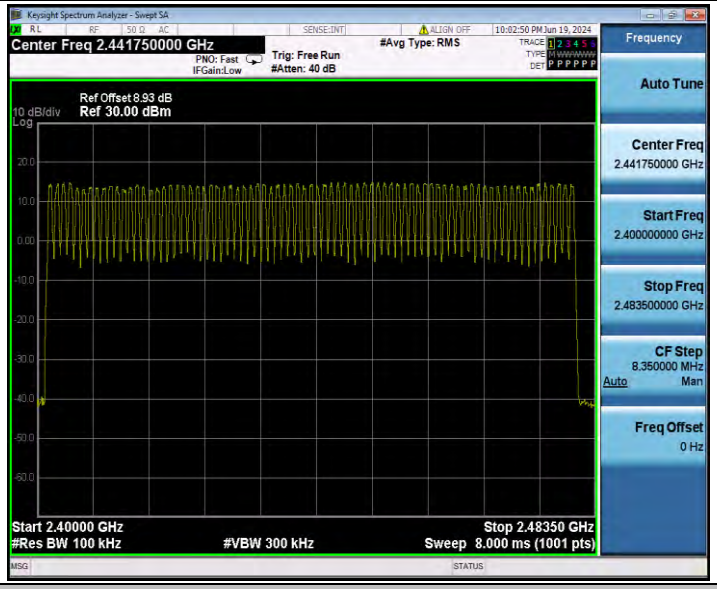
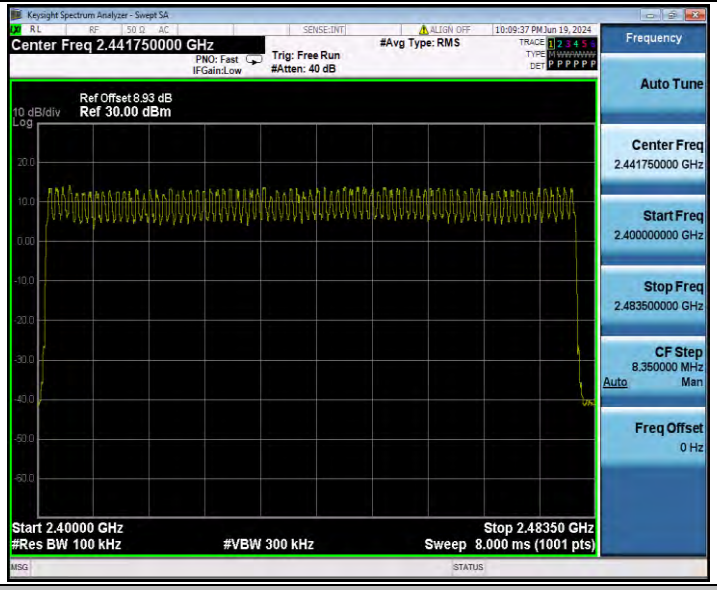

Keysight Spectrum Analyzer - Swept SA
Center Freq 2.441000000 GHz
PNO: Fast
IFGain:Low
Trig Delay0.000 s
Trig: Video
#Atten: 20 dB
#Avg Type: RMS
10:18:48 PM Jun 19, 2024
Frequency
Auto Tune
Ref Offset 9.05 dB
10 dB/div
Log
Ref 19.05 dBm
9.05
-0.95
-11.0
-21.0
-31.0
-41.0
-51.0
-61.0
-71.0
Center Freq
2.441000000 GHz
Start Freq
2.441000000 GHz
Stop Freq
2.441000000 GHz
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 3.162 s (30000 pts)
MSG
STATUS

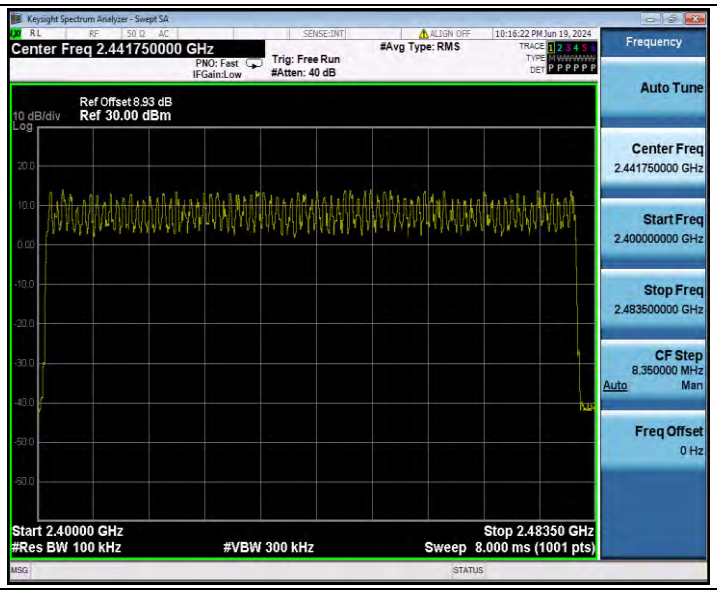
Appendix A.6: Number of hopping channels

Test Result

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

Test Graphs

DH1_Ant1_Hop

2DH1_Ant1_Hop

3DH1_Ant1_Hop

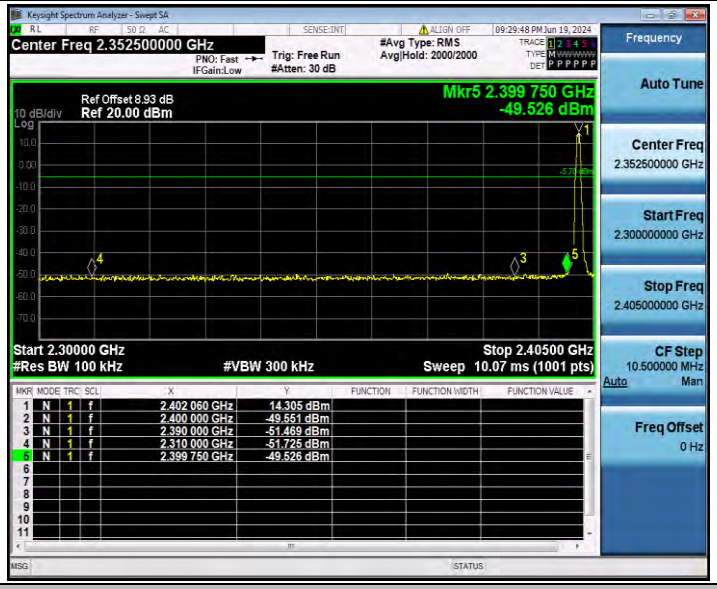
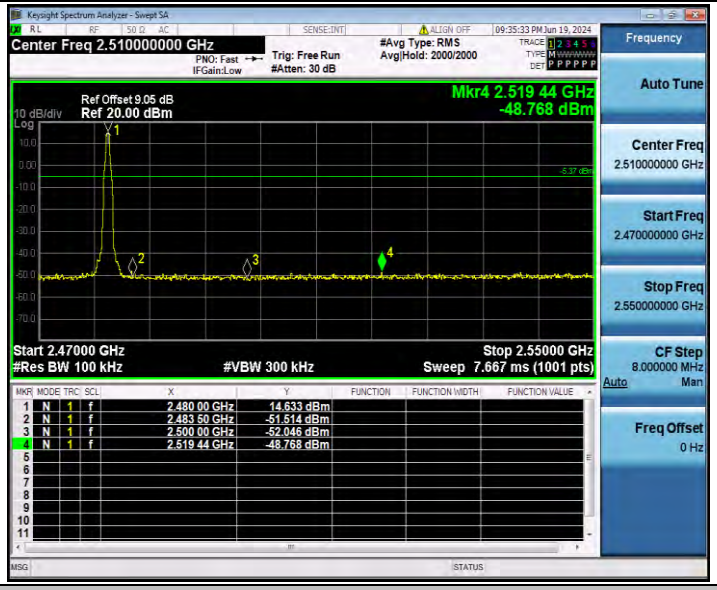

Keysight Spectrum Analyzer - Swept SA
Center Freq 2.441750000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
#Avg Type: RMS
10:16:22 PM Jun 19, 2024
Frequency
Auto Tune
Ref Offset 8.93 dB
10 dB/div
Ref 30.00 dBm
Log
20.0
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
Center Freq
2.441750000 GHz
Start Freq
2.400000000 GHz
Stop Freq
2.483500000 GHz
CF Step
8.350000 MHz
Auto
Man
Freq Offset
0 Hz
Start 2.40000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.48350 GHz
Sweep 8.000 ms (1001 pts)
MSG
STATUS

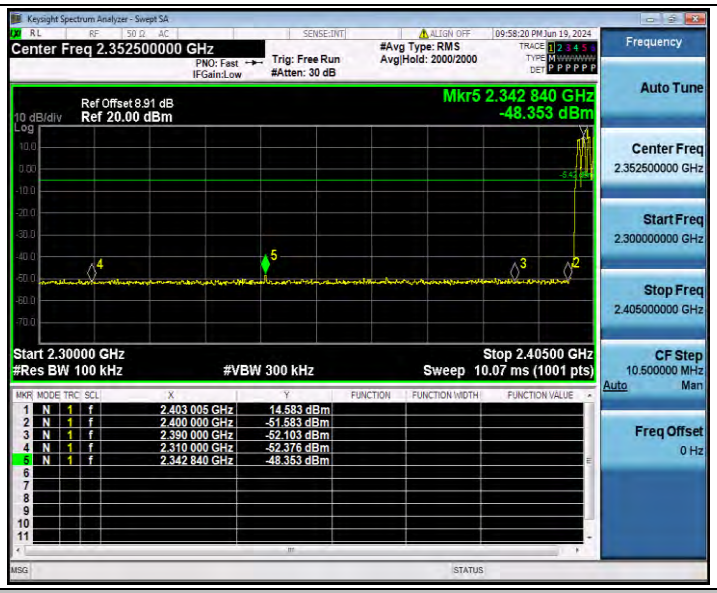
Appendix A.7: Band edge measurements

Test Result

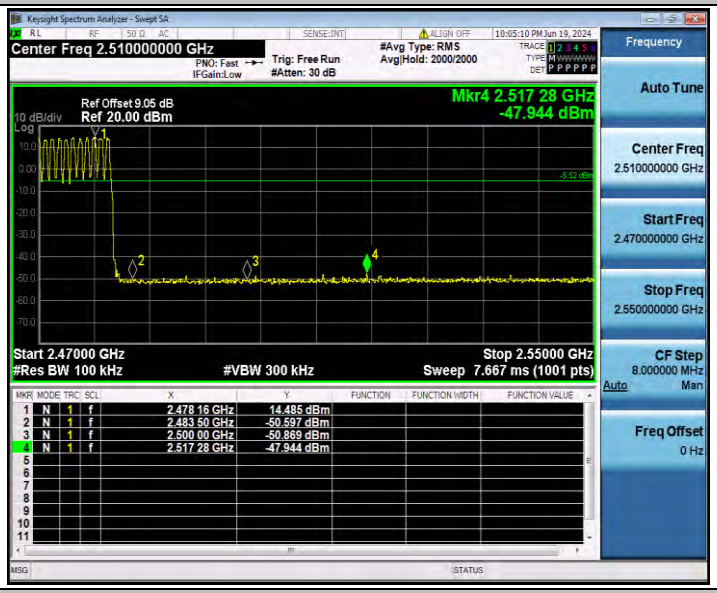
TestMode	Antenna	ChName	Freq(MHz)	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH1	Ant1	Low	2402	14.31	-49.53	≤-5.7	PASS
		High	2480	14.63	-48.77	≤-5.37	PASS
		Low	Hop_2402	14.58	-48.35	≤-5.42	PASS
		High	Hop_2480	14.49	-47.94	≤-5.52	PASS
2DH1	Ant1	Low	2402	13.54	-48.76	≤-6.46	PASS
		High	2480	13.88	-48.54	≤-6.12	PASS
		Low	Hop_2402	13.84	-48.95	≤-6.16	PASS
		High	Hop_2480	11.21	-48.58	≤-8.79	PASS
3DH1	Ant1	Low	2402	13.49	-48.86	≤-6.51	PASS
		High	2480	12.30	-47.94	≤-7.7	PASS
		Low	Hop_2402	11.35	-48.93	≤-8.66	PASS
		High	Hop_2480	13.22	-46.28	≤-6.79	PASS

Test Graphs

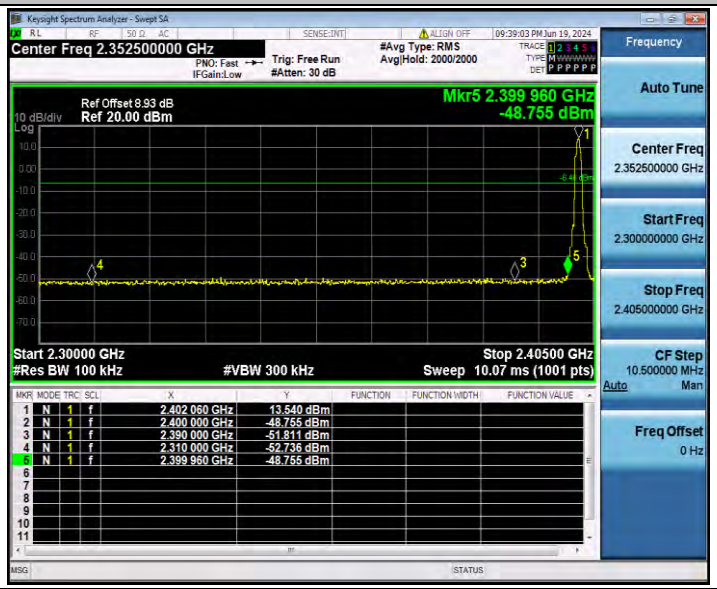
DH1_Ant1_Low_2402

DH1_Ant1_High_2480

DH1_Ant1_Low_Hop_2402

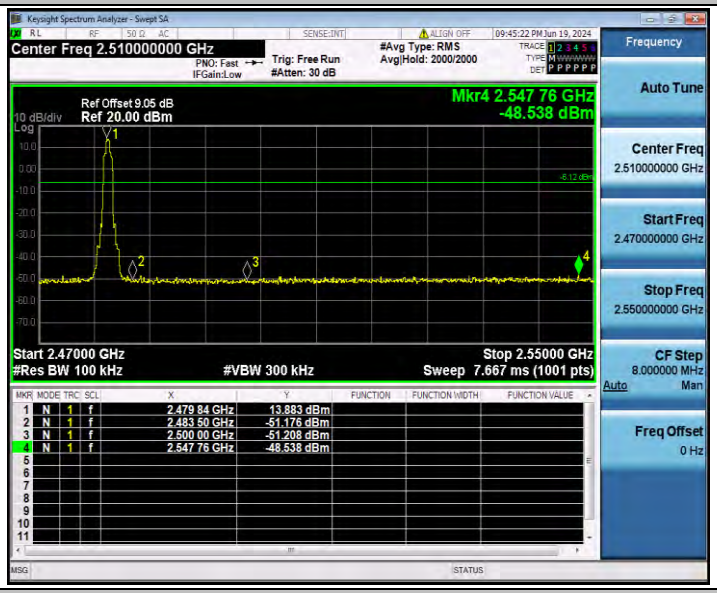
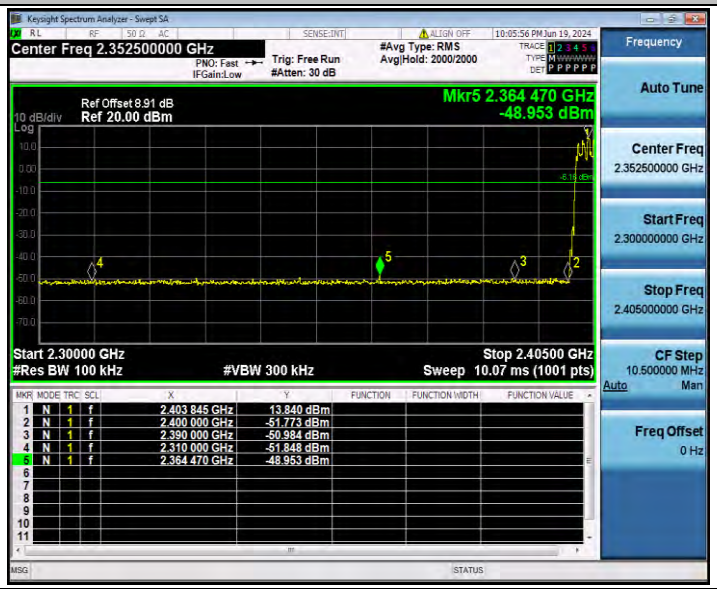


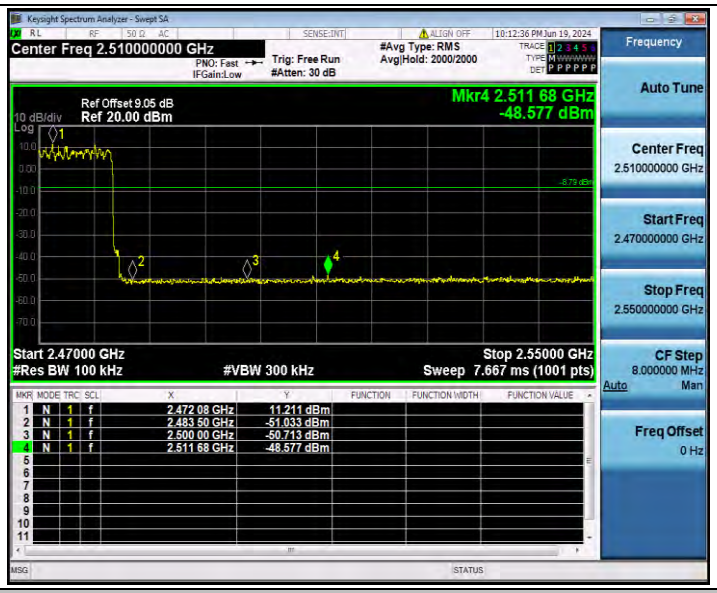
DH1_Ant1_High_Hop_2480



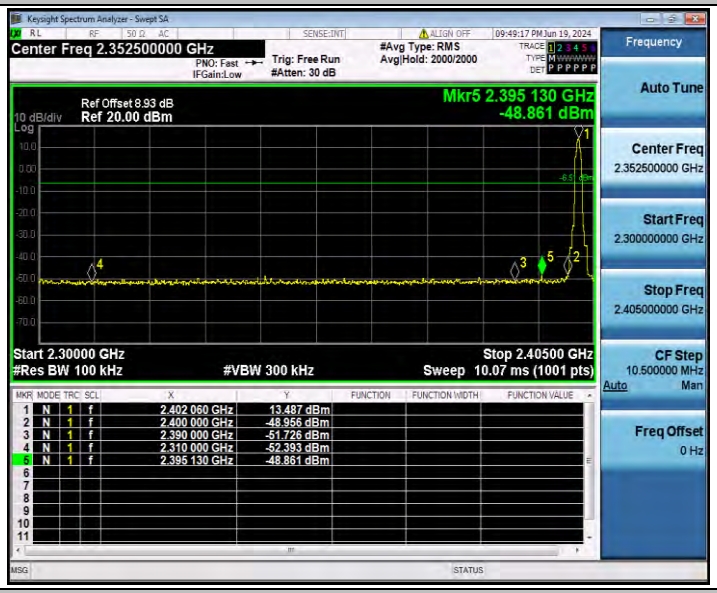
2DH1_Ant1_Low_2402



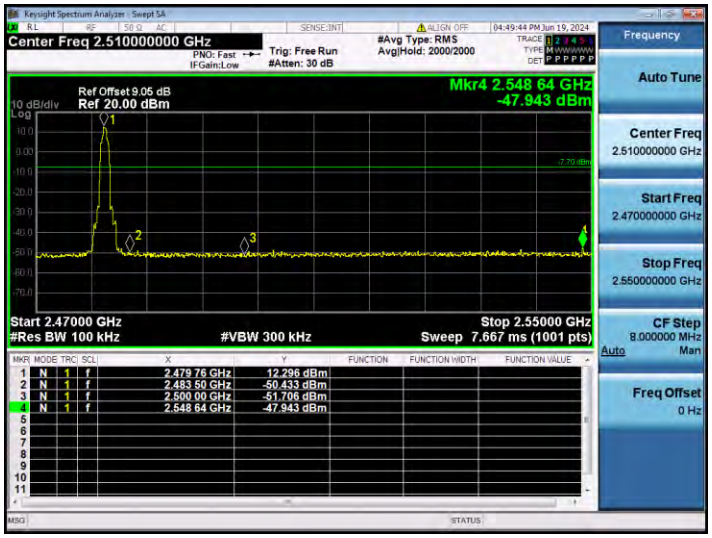
2DH1_Ant1_High_2480

2DH1_Ant1_Low_Hop_2402

2DH1_Ant1_High_Hop_2480



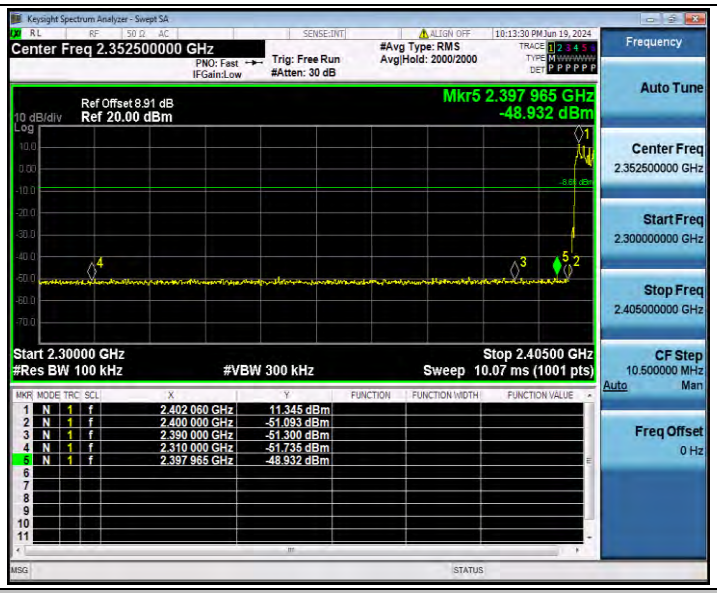
3DH1_Ant1_Low_2402



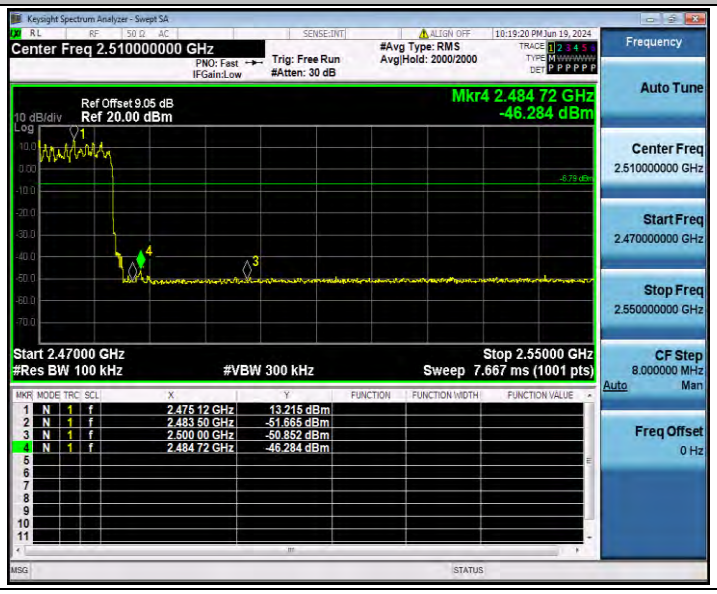
3DH1_Ant1_High_2480



3DH1_Ant1_Low_Hop_2402



3DH1_Ant1_High_Hop_2480

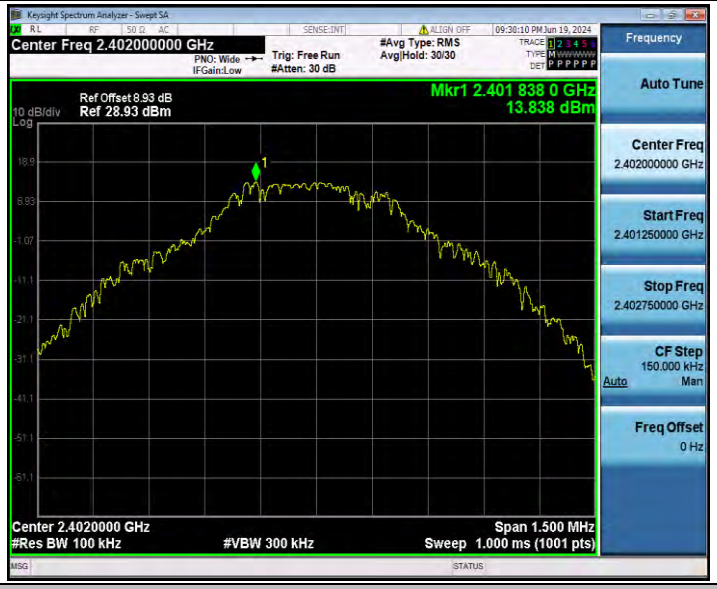
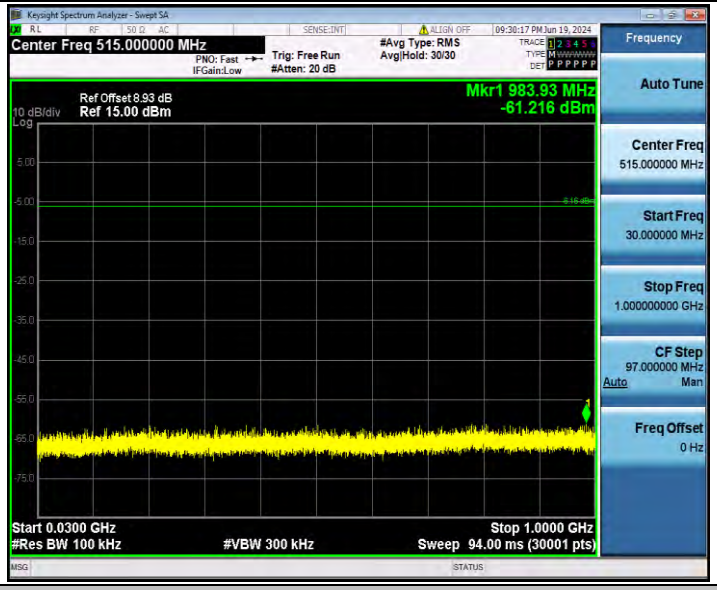


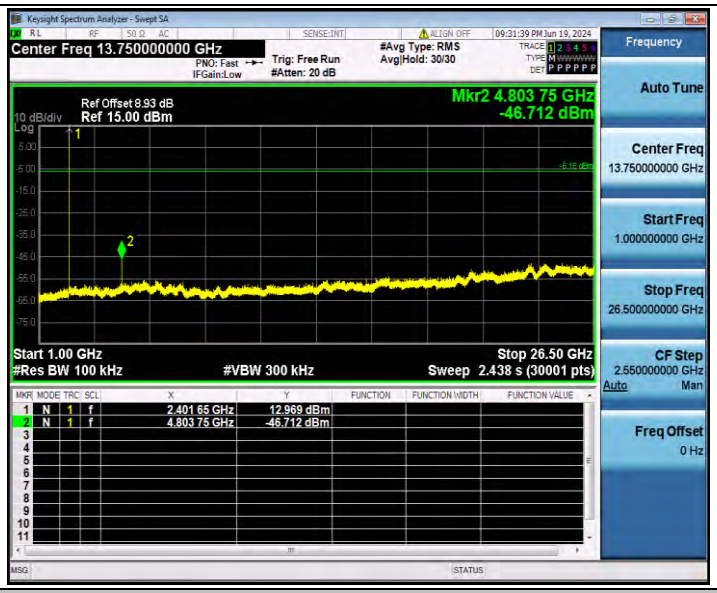
Appendix A.8: Conducted Spurious Emission

Test Result

TestMode	Antenna	Freq(MHz)	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH1	Ant1	2402	Reference	13.84	13.84	---	PASS
			30~1000	13.84	-61.22	≤-6.16	PASS
			1000~26500	13.84	-46.71	≤-6.16	PASS
		2441	Reference	13.97	13.97	---	PASS
			30~1000	13.97	-59.91	≤-6.03	PASS
			1000~26500	13.97	-47.6	≤-6.03	PASS
		2480	Reference	14.28	14.28	---	PASS
			30~1000	14.28	-59.81	≤-5.72	PASS
			1000~26500	14.28	-47.59	≤-5.72	PASS
2DH1	Ant1	2402	Reference	13.25	13.25	---	PASS
			30~1000	13.25	-60.83	≤-6.75	PASS
			1000~26500	13.25	-47.58	≤-6.75	PASS
		2441	Reference	13.14	13.14	---	PASS
			30~1000	13.14	-60.74	≤-6.86	PASS
			1000~26500	13.14	-47.3	≤-6.86	PASS
		2480	Reference	13.66	13.66	---	PASS
			30~1000	13.66	-60.52	≤-6.34	PASS
			1000~26500	13.66	-47.35	≤-6.34	PASS
3DH1	Ant1	2402	Reference	12.78	12.78	---	PASS
			30~1000	12.78	-59.9	≤-7.22	PASS
			1000~26500	12.78	-47.75	≤-7.22	PASS
		2441	Reference	13.02	13.02	---	PASS
			30~1000	13.02	-59.9	≤-6.98	PASS
			1000~26500	13.02	-47.58	≤-6.98	PASS
		2480	Reference	12.53	12.53	---	PASS
			30~1000	12.53	-60.76	≤-7.47	PASS
			1000~26500	12.53	-47.46	≤-7.47	PASS

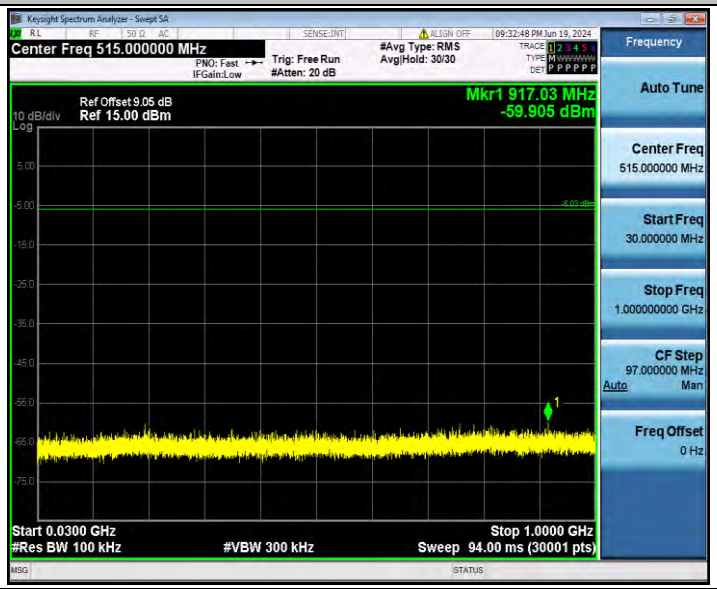
Test Graphs

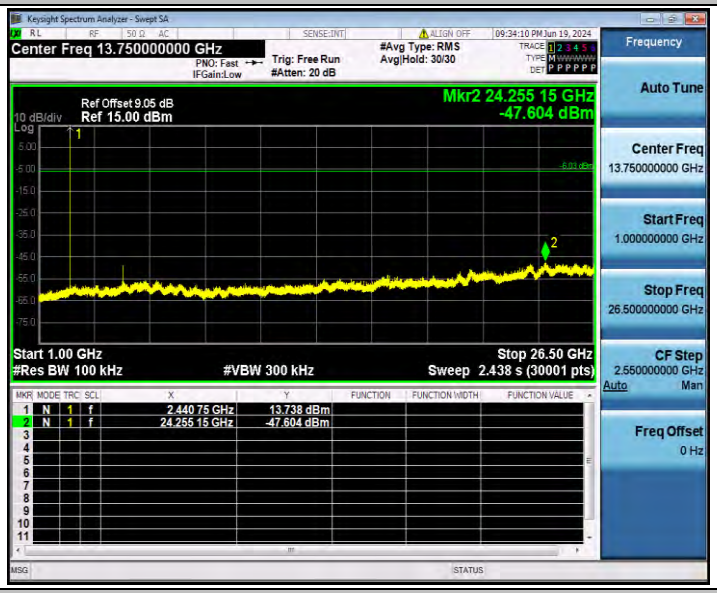
DH1_Ant1_2402_0~Reference

DH1_Ant1_2402_30~1000

DH1_Ant1_2402_1000~26500



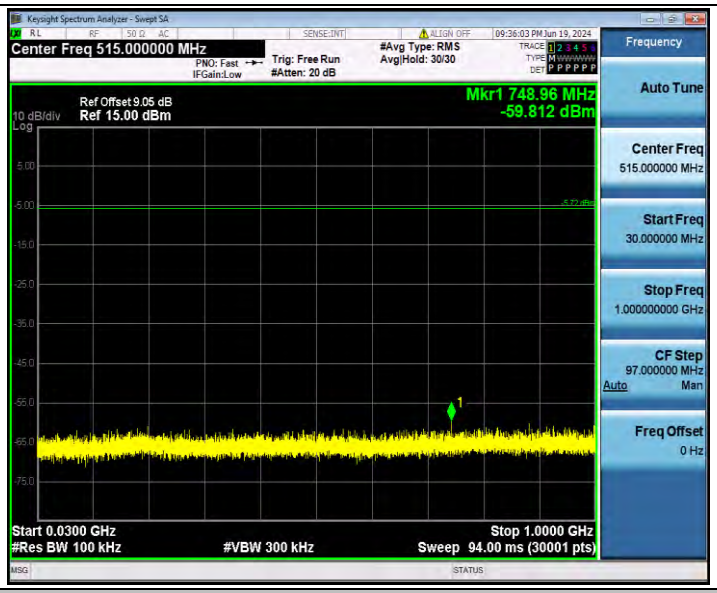
DH1_Ant1_2441_0~Reference

DH1_Ant1_2441_30~1000

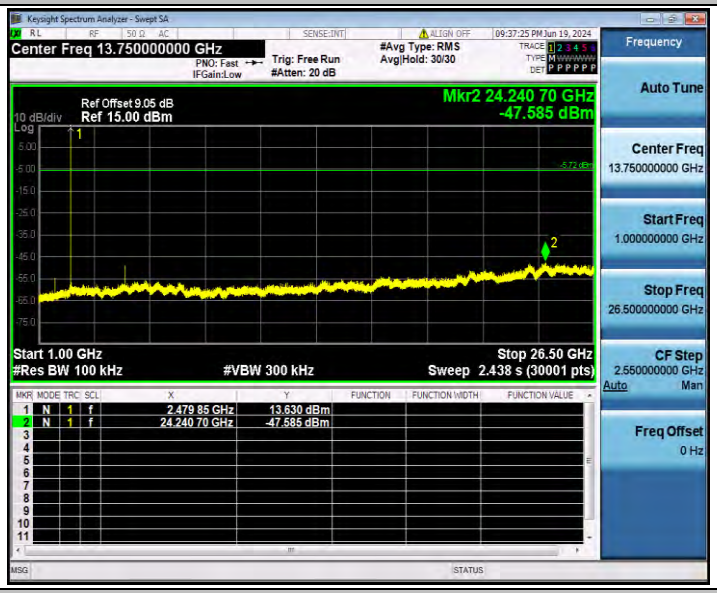


DH1_Ant1_2441_1000~26500

DH1_Ant1_2480_0~Reference

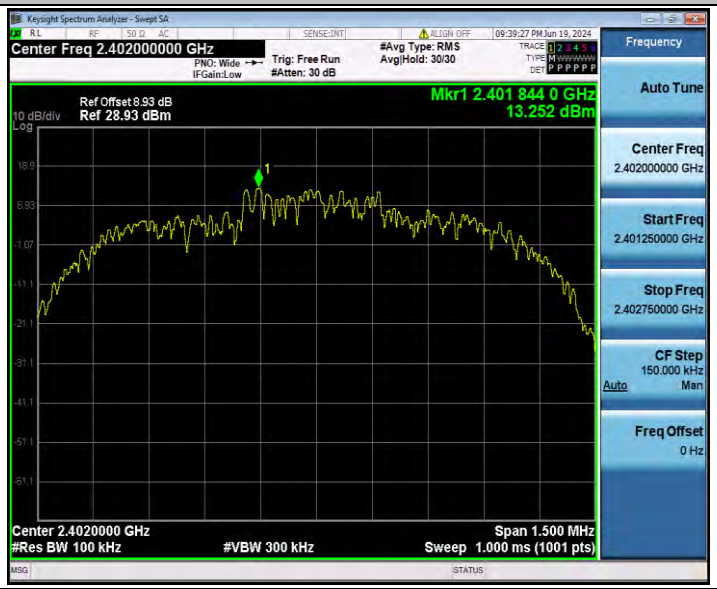
DH1_Ant1_2480_30~1000

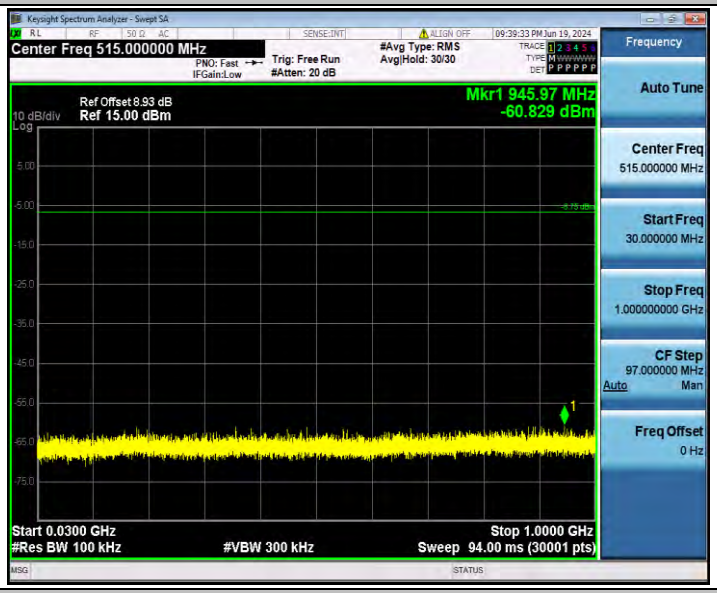


DH1_Ant1_2480_1000~26500



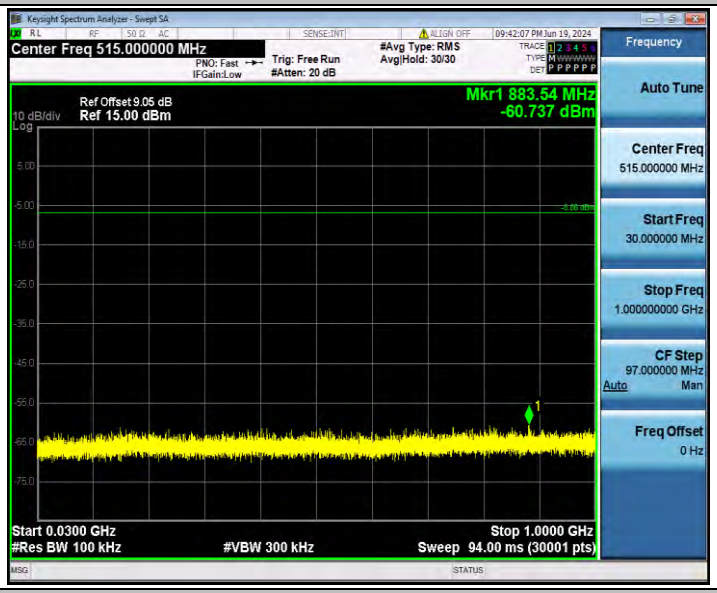
2DH1_Ant1_2402_0~Reference



2DH1_Ant1_2402_30~1000

2DH1_Ant1_2402_1000~26500

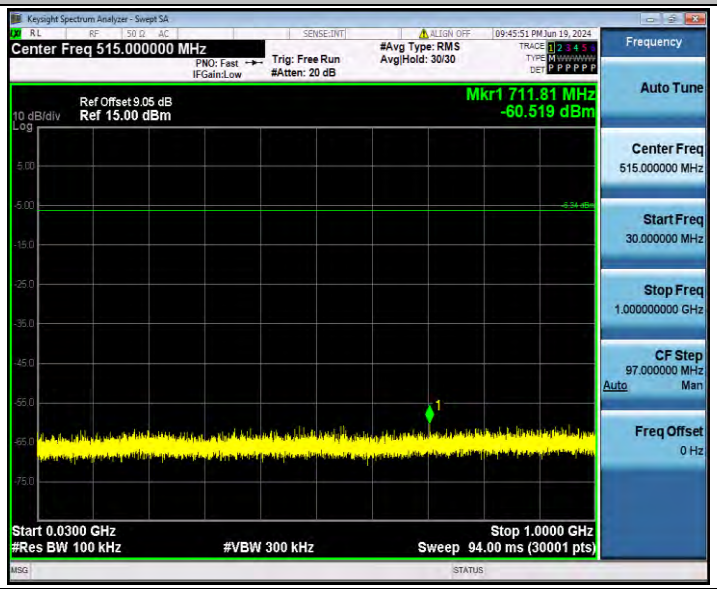
2DH1_Ant1_2441_0~Reference

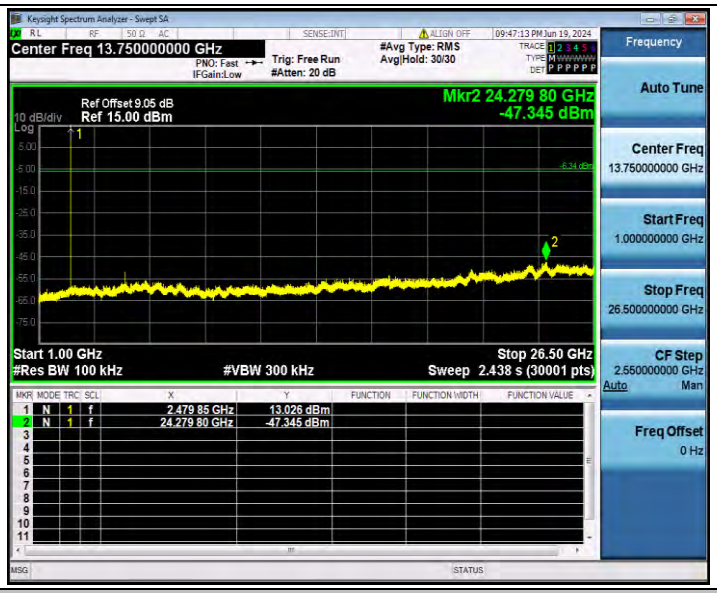
2DH1_Ant1_2441_30~1000



2DH1_Ant1_2441_1000~26500

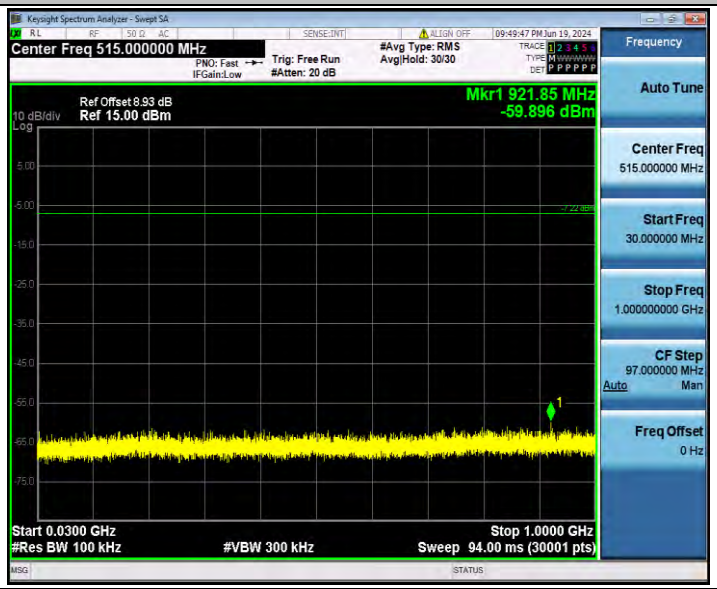
2DH1_Ant1_2480_0~Reference

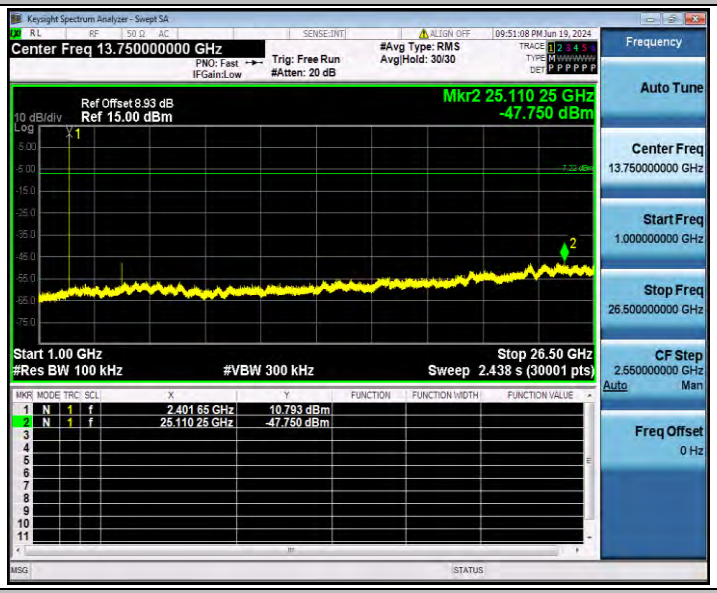
2DH1_Ant1_2480_30~1000

2DH1_Ant1_2480_1000~26500



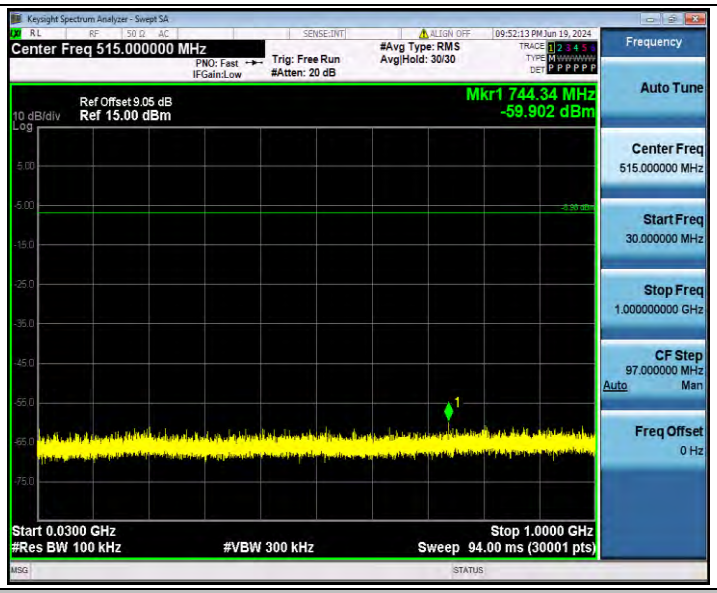
3DH1_Ant1_2402_0~Reference

3DH1_Ant1_2402_30~1000

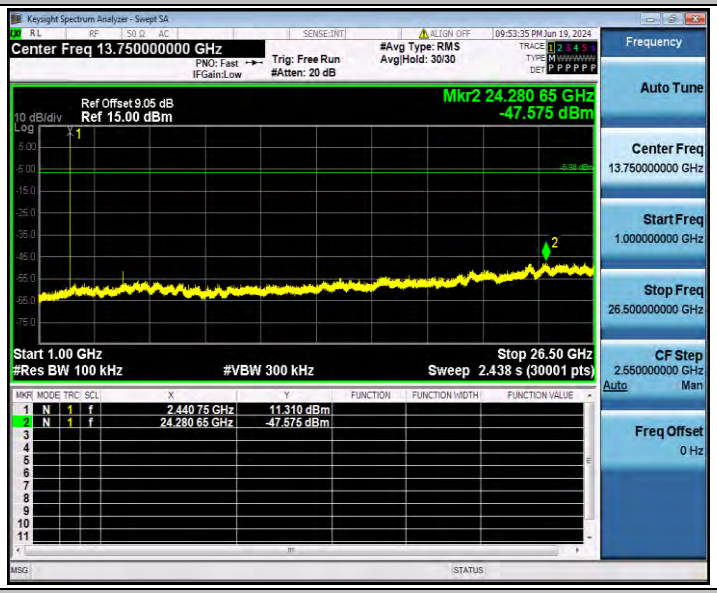


3DH1_Ant1_2402_1000~26500

3DH1_Ant1_2441_0~Reference

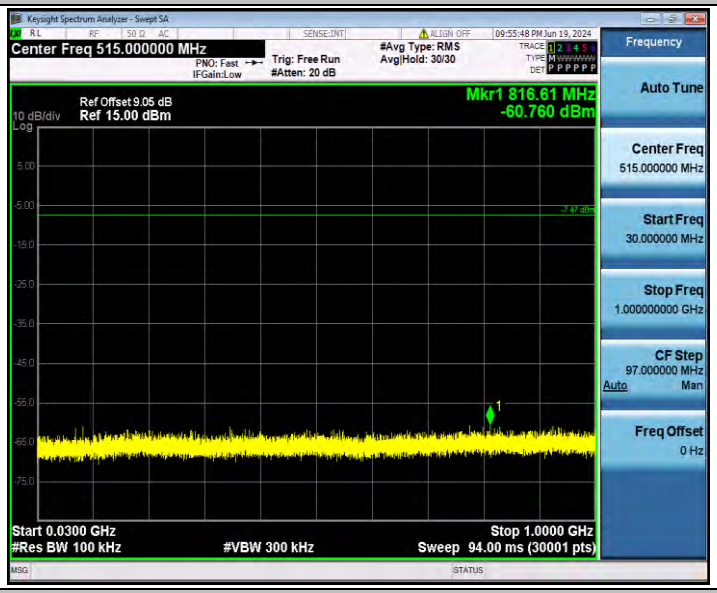
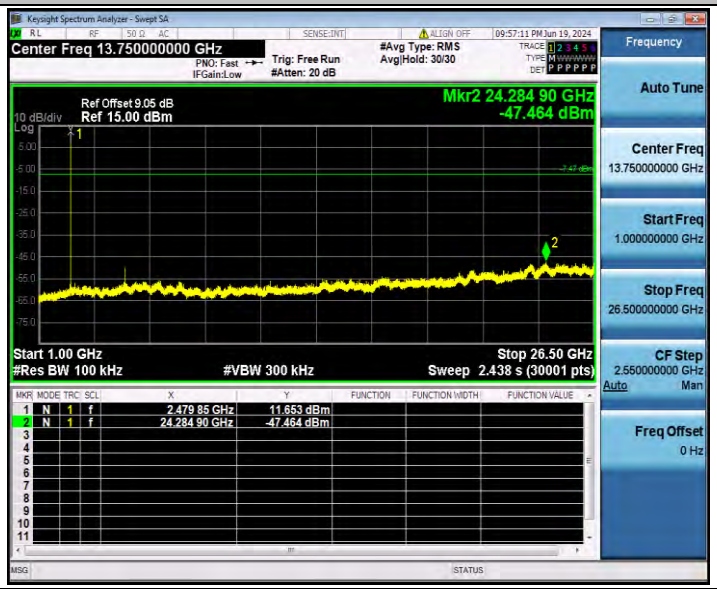
3DH1_Ant1_2441_30~1000



3DH1_Ant1_2441_1000~26500



3DH1_Ant1_2480_0~Reference

3DH1_Ant1_2480_30~1000

3DH1_Ant1_2480_1000~26500


Appendix A.9: Emissions in Restricted Bands

Test Result

TestMode	Antenna	ChName	Freq(MHz)	Detector	Freq [MHz]	Result [dBm]	Limit [dBm]	Result [dBuV/m]	Limit [dBuV/m]	Verdict
DH1	Ant1	Low	2402	AV	2310.000	-49.37	≤-41.20	45.83	≤54	PASS
				AV	2389.670	-48.79	≤-41.20	46.41	≤54	PASS
				AV	2390.000	-48.83	≤-41.20	46.37	≤54	PASS
				Peak	2310.000	-41.63	≤-21.20	53.57	≤74	PASS
				Peak	2389.250	-38.1	≤-21.20	57.10	≤74	PASS
				Peak	2390.000	-40.58	≤-21.20	54.62	≤74	PASS
		High	2480	AV	2483.500	-45.64	≤-41.20	49.56	≤54	PASS
				AV	2483.520	-45.64	≤-41.20	49.56	≤54	PASS
				AV	2500.000	-48.68	≤-41.20	46.52	≤54	PASS
				Peak	2483.500	-39.81	≤-21.20	55.39	≤74	PASS
				Peak	2486.800	-38.57	≤-21.20	56.63	≤74	PASS
				Peak	2500.000	-39.33	≤-21.20	55.87	≤74	PASS
2DH1	Ant1	Low	2402	AV	2310.000	-49.29	≤-41.20	45.91	≤54	PASS
				AV	2389.985	-48.83	≤-41.20	46.37	≤54	PASS
				AV	2390.000	-48.83	≤-41.20	46.37	≤54	PASS
				Peak	2310.000	-42.11	≤-21.20	53.09	≤74	PASS
				Peak	2350.190	-38.15	≤-21.20	57.05	≤74	PASS
				Peak	2390.000	-41.93	≤-21.20	53.27	≤74	PASS
		High	2480	AV	2483.500	-45.76	≤-41.20	49.44	≤54	PASS
				AV	2483.520	-45.76	≤-41.20	49.44	≤54	PASS
				AV	2500.000	-48.59	≤-41.20	46.61	≤54	PASS
				Peak	2483.500	-42.06	≤-21.20	53.14	≤74	PASS
				Peak	2487.920	-38.22	≤-21.20	56.98	≤74	PASS
				Peak	2500.000	-39.68	≤-21.20	55.52	≤74	PASS
3DH1	Ant1	Low	2402	AV	2310.000	-49.3	≤-41.20	45.90	≤54	PASS
				AV	2387.990	-48.86	≤-41.20	46.34	≤54	PASS
				AV	2390.000	-48.91	≤-41.20	46.29	≤54	PASS
				Peak	2310.000	-40.86	≤-21.20	54.34	≤74	PASS
				Peak	2356.805	-39.14	≤-21.20	56.06	≤74	PASS
				Peak	2390.000	-40.69	≤-21.20	54.51	≤74	PASS
		High	2480	AV	2483.500	-45.8	≤-41.20	49.40	≤54	PASS
				AV	2483.520	-45.8	≤-41.20	49.40	≤54	PASS
				AV	2500.000	-48.61	≤-41.20	46.59	≤54	PASS
				Peak	2483.500	-40.19	≤-21.20	55.01	≤74	PASS
				Peak	2491.920	-38.42	≤-21.20	56.78	≤74	PASS

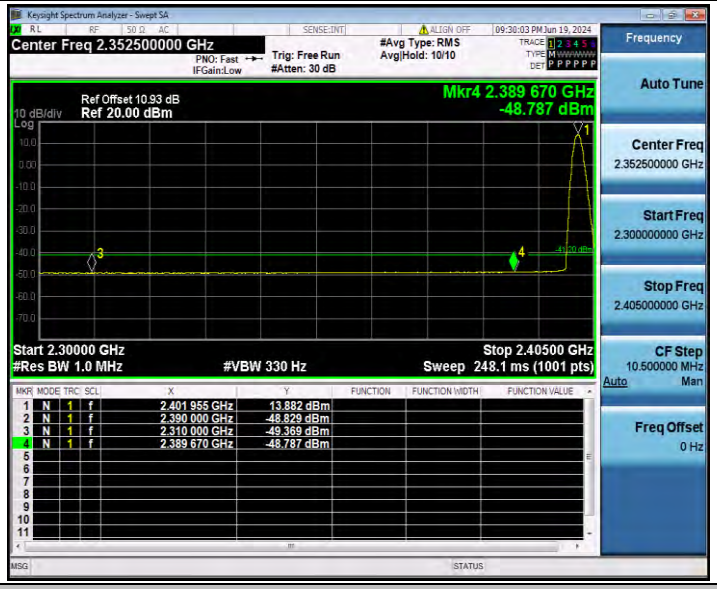
				Peak	2500.000	-41.72	≤-21.20	53.48	≤74	PASS

Note：

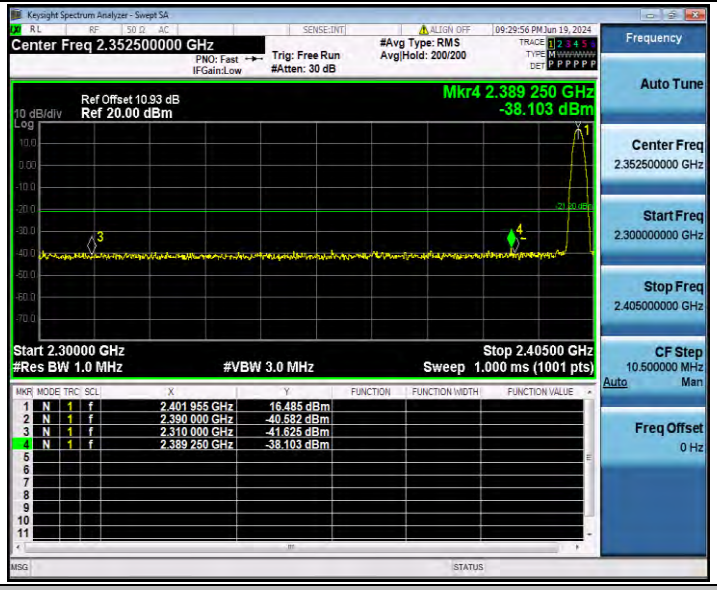
1. The Antenna Gain is compensated in the graph.
2. The Duty Cycle Factor and RBW Factor is compensated in the graph.
3. The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

Test Graphs

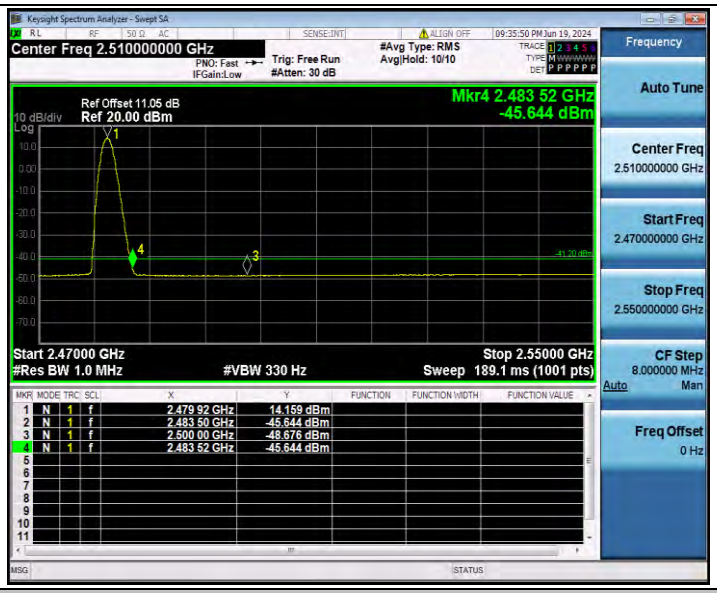
DH1_Ant1_Low_2402_AV



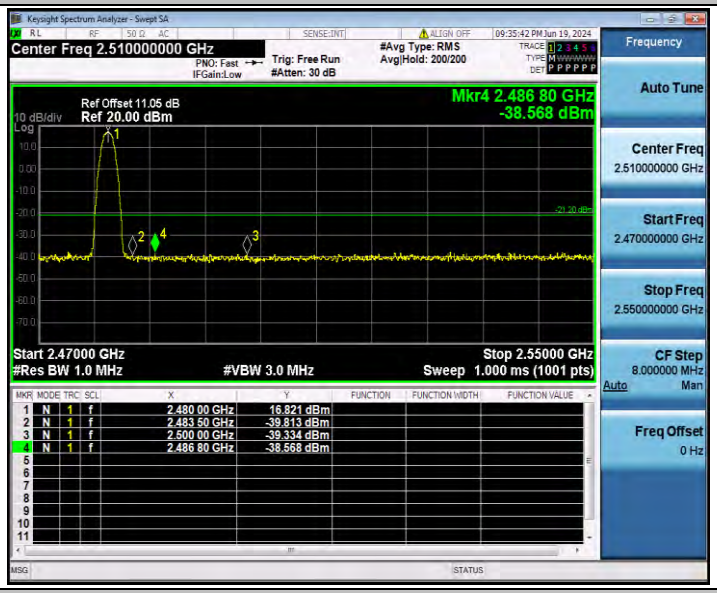
DH1_Ant1_Low_2402_Peak



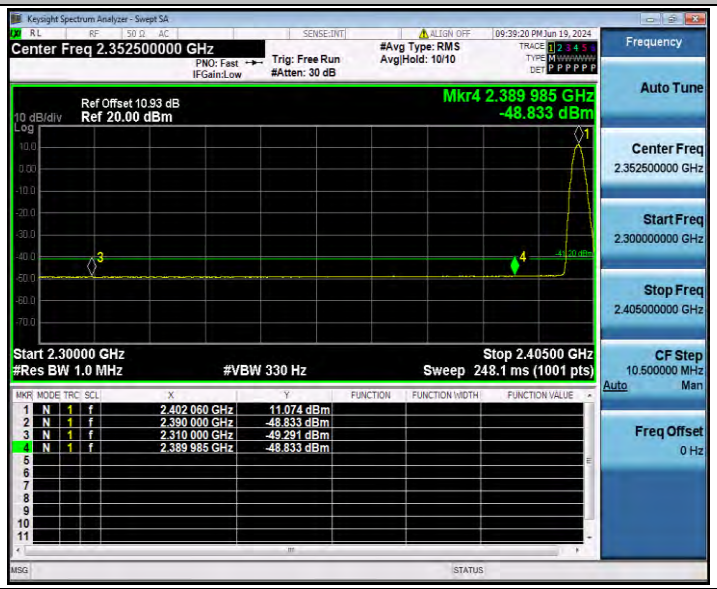
DH1_Ant1_High_2480_AV

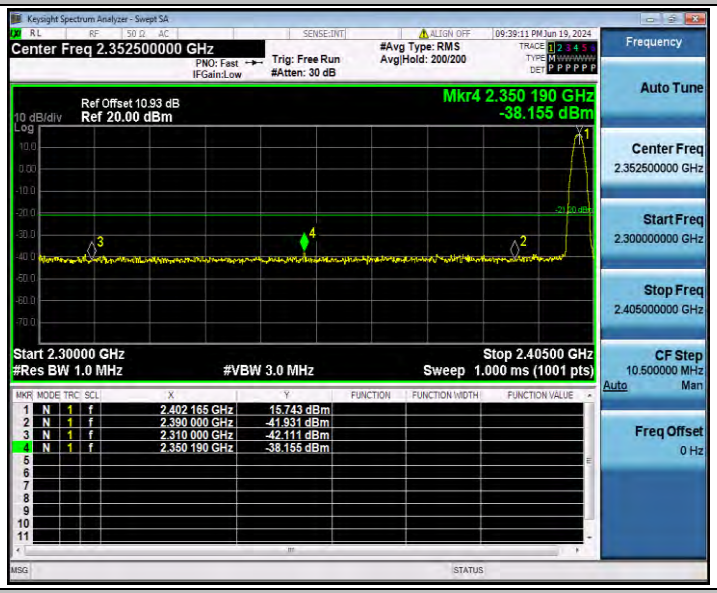
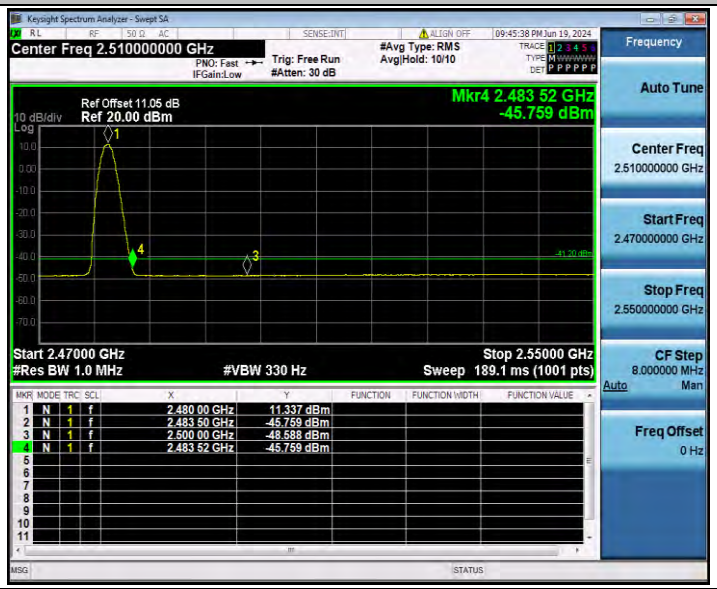


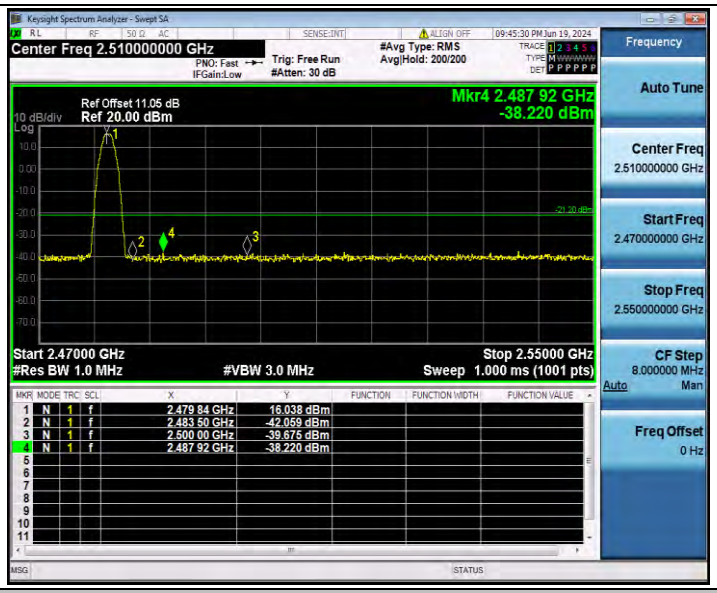
DH1_Ant1_High_2480_Peak



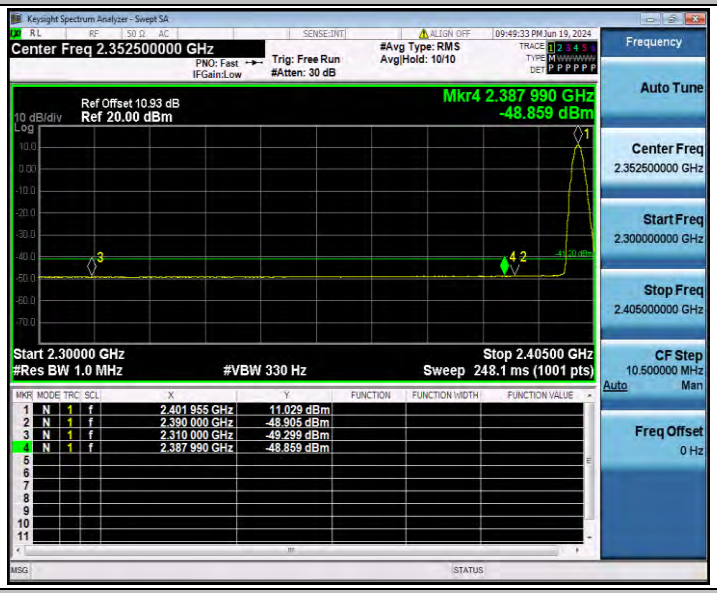
2DH1_Ant1_Low_2402_AV



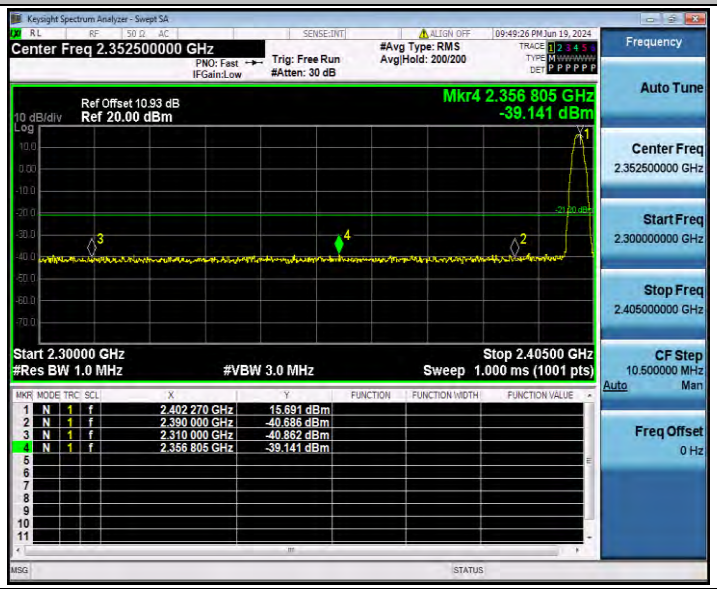
2DH1_Ant1_Low_2402_Peak

2DH1_Ant1_High_2480_AV

2DH1_Ant1_High_2480_Peak

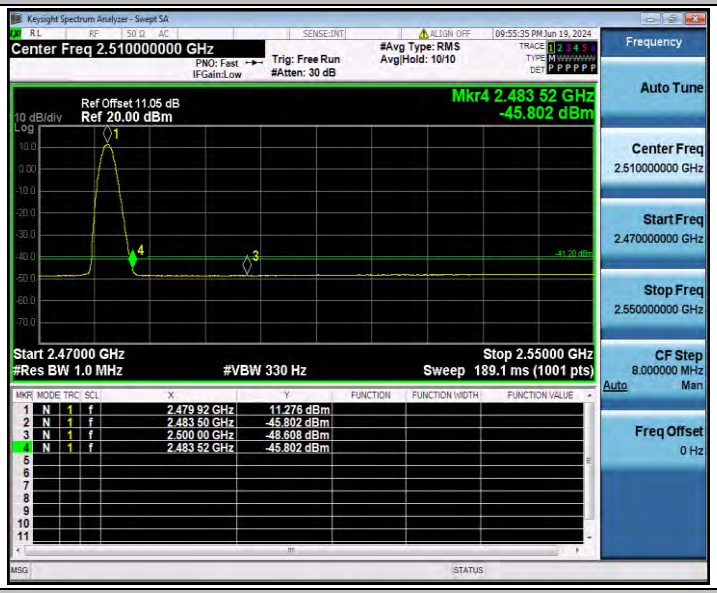


3DH1_Ant1_Low_2402_AV



3DH1_Ant1_Low_2402_Peak



3DH1_Ant1_High_2480_AV

3DH1_Ant1_High_2480_Peak