Appendix Test Data

Report No.:	18220WC20288101	Test Sample No.:	1-2-2
Start Test Date:	2022.12.19	Finish Test Date:	2022.12.24
Test Engineer:	Tony.He	Auditor:	Edward.Pan
Temperature:	23.3℃	Relative Humidity:	35 %
Pressure:	1012 hPa		

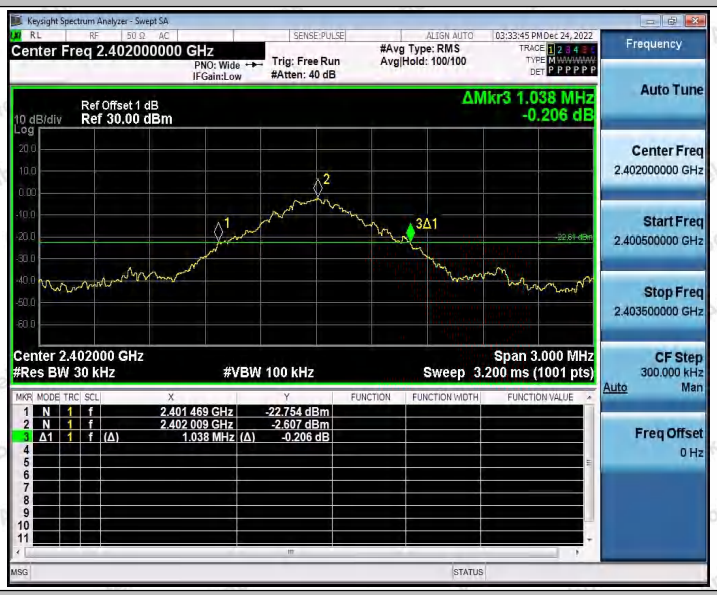
Appendix A: 20dB Emission Bandwidth

Test Result

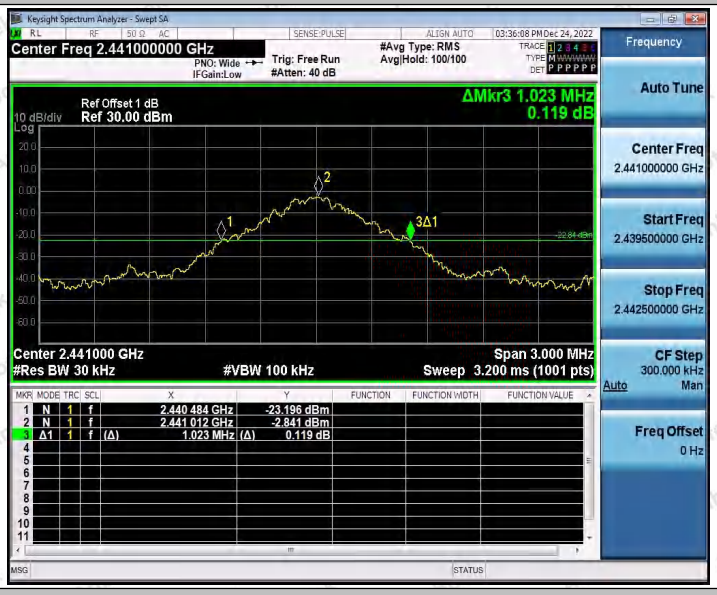
Test Mode	Antenna	Frequency[MHz]	20db EBW[MHz]	FL[MHz]	FH[MHz]
DH5	Ant1	2402	1.038	2401.469	2402.507
		2441	1.023	2440.484	2441.507
		2480	1.032	2479.472	2480.504
2DH5	Ant1	2402	1.320	2401.328	2402.648
		2441	1.314	2440.340	2441.654
		2480	1.326	2479.325	2480.651
3DH5	Ant1	2402	1.305	2401.337	2402.642
		2441	1.335	2440.322	2441.657
		2480	1.311	2479.343	2480.654

Test Graphs

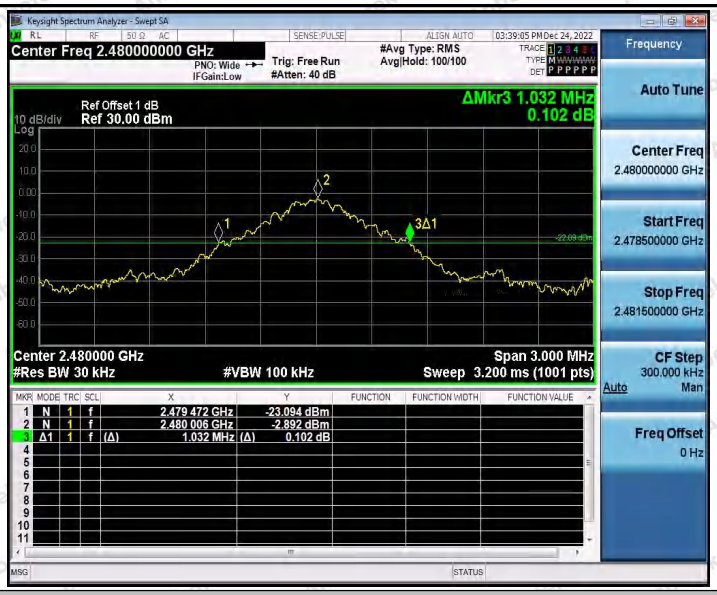
DH5_Ant1_2402



DH5_Ant1_2441

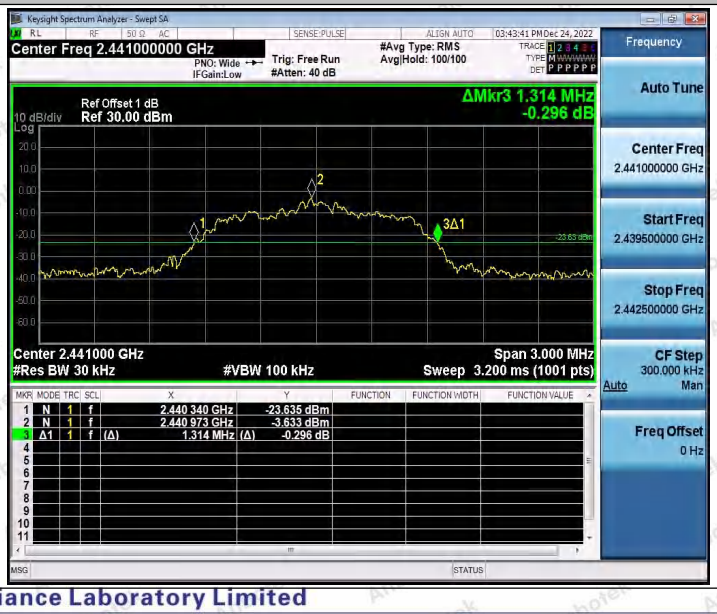


DH5_Ant1_2480



2DH5_Ant1_2402

2DH5_Ant1_2441



2DH5_Ant1_2480

3DH5_Ant1_2402

3DH5_Ant1_2441

3DH5_Ant1_2480

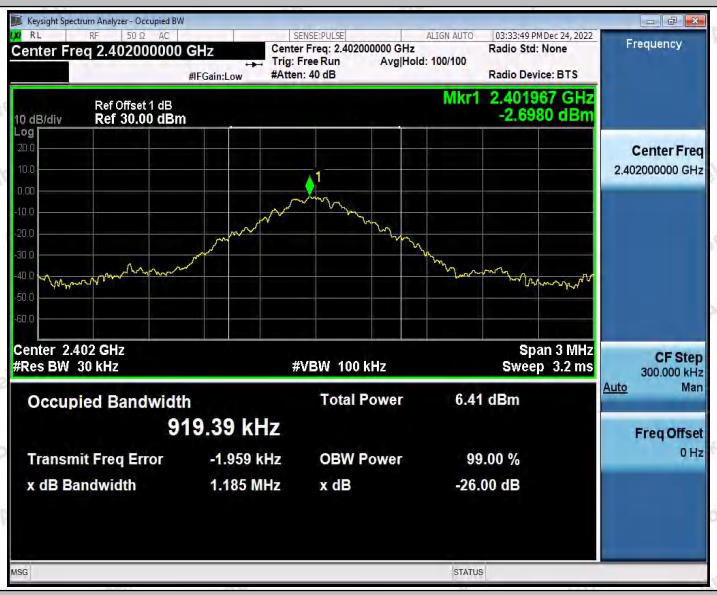
Appendix B: Occupied Channel Bandwidth

Test Result

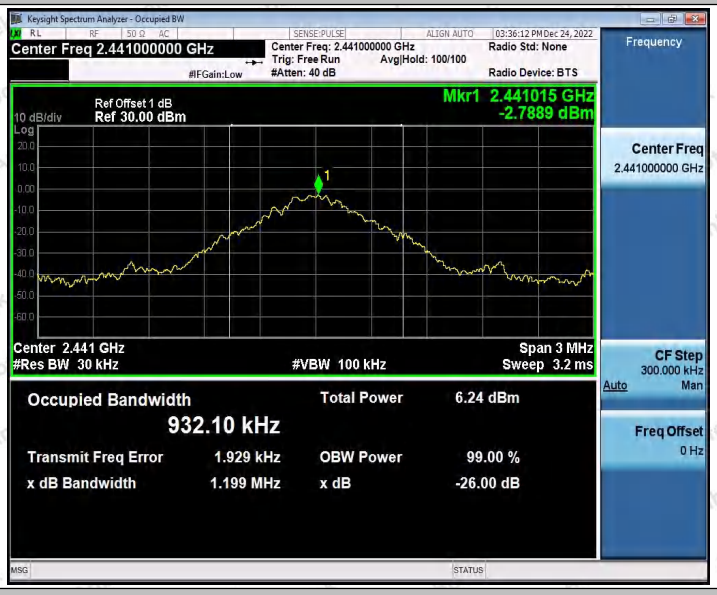
Test Mode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]
DH5	Ant1	2402	0.91939	2401.5383	2402.4577
		2441	0.93210	2440.5359	2441.4680
		2480	0.93203	2479.5313	2480.4633
2DH5	Ant1	2402	1.2131	2401.3865	2402.5996
		2441	1.2080	2440.3900	2441.5980
		2480	1.2180	2479.3864	2480.6044
3DH5	Ant1	2402	1.2267	2401.3788	2402.6055
		2441	1.2292	2440.3770	2441.6062
		2480	1.2359	2479.3728	2480.6087

Test Graphs

DH5_Ant1_2402

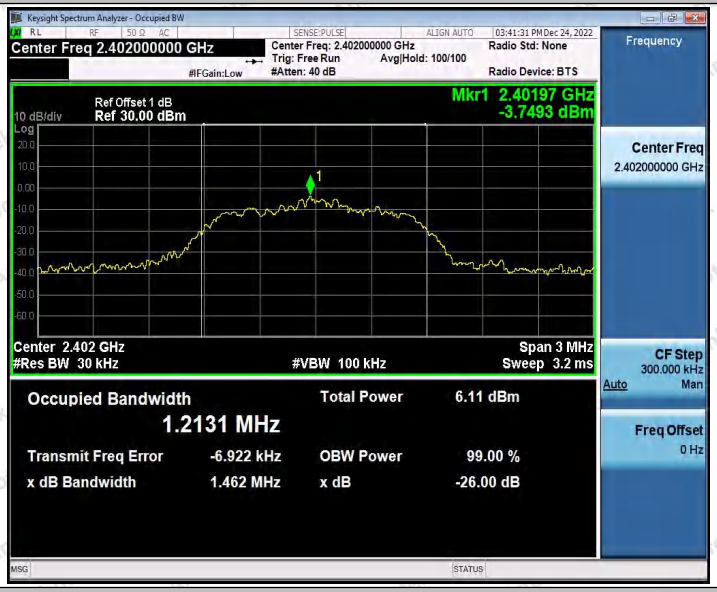


DH5_Ant1_2441

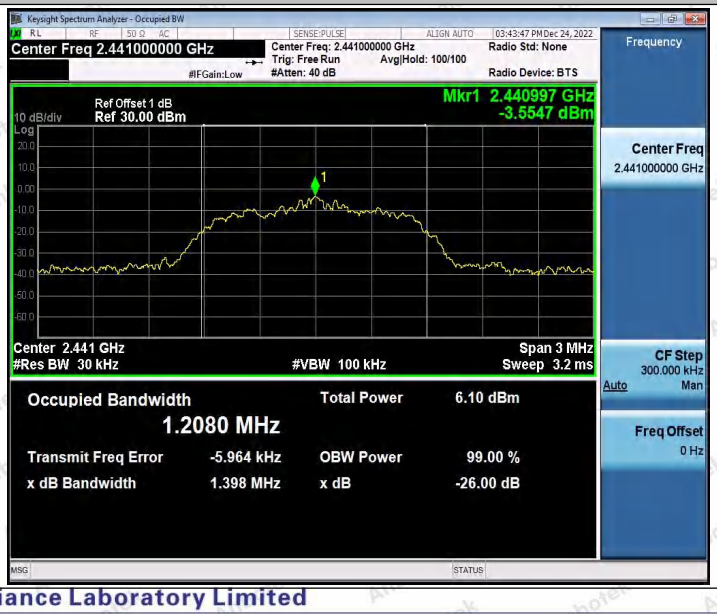


DH5_Ant1_2480

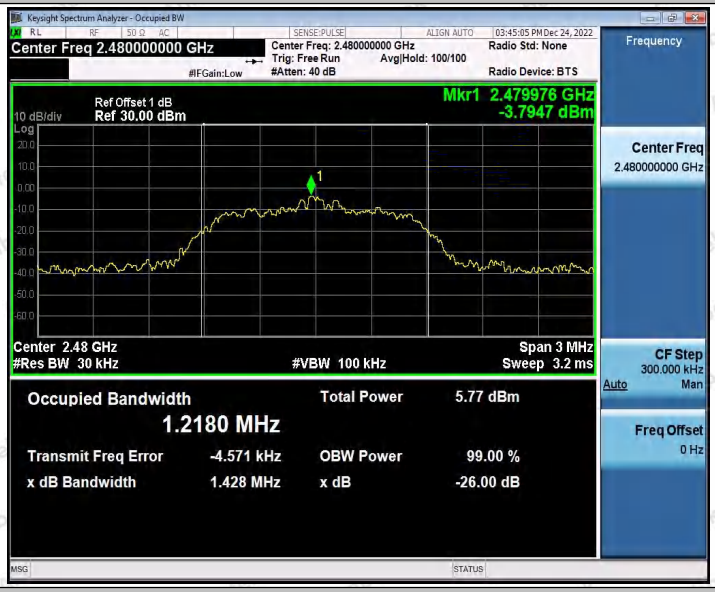
2DH5_Ant1_2402



2DH5_Ant1_2441

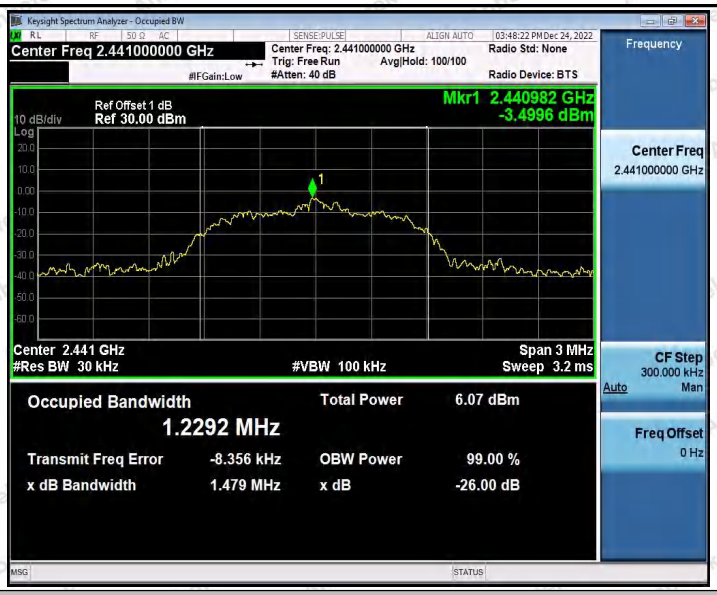


2DH5_Ant1_2480



3DH5_Ant1_2402

3DH5_Ant1_2441



3DH5_Ant1_2480

Appendix C: Maximum conducted output power

Test Result Peak

Test Mode	Antenna	Frequency[MHz]	Conducted Peak Power[dBm]	Conducted Limit[dBm]	Verdict
DH5	Ant1	2402	0.73	≤20.97	PASS
		2441	0.69	≤20.97	PASS
		2480	0.39	≤20.97	PASS
2DH5	Ant1	2402	1.04	≤20.97	PASS
		2441	0.97	≤20.97	PASS
		2480	0.65	≤20.97	PASS
3DH5	Ant1	2402	0.96	≤20.97	PASS
		2441	0.9	≤20.97	PASS
		2480	0.64	≤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

Appendix D: Carrier frequency separation

Test Result

Test Mode	Antenna	Frequency[MHz]	Result[MHz]	Limit[MHz]	Verdict
DH5	Ant1	Hop	1.002	≥0.692	PASS
2DH5	Ant1	Hop	0.98	≥0.884	PASS
3DH5	Ant1	Hop	1.056	≥0.890	PASS

Test Graphs

DH5_Ant1_Hop

2DH5_Ant1_Hop

3DH5_Ant1_Hop

Keysight Spectrum Analyzer - Swept SA
Center Freq 2.441500000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
#Avg Type: RMS
Avg|Hold: 5000/5000
04:07:11 PM Dec 24, 2022
Ref Offset 1 dB
10 dB/div
Ref 30.00 dBm
ΔMkr2 1.056 MHz
-0.121 dB
Start 2.440500 GHz
#Res BW 300 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

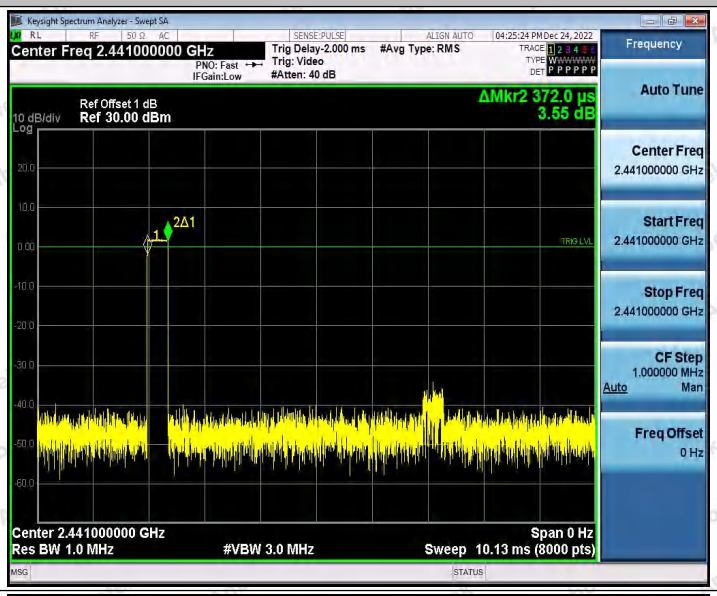
Appendix E: Time of occupancy

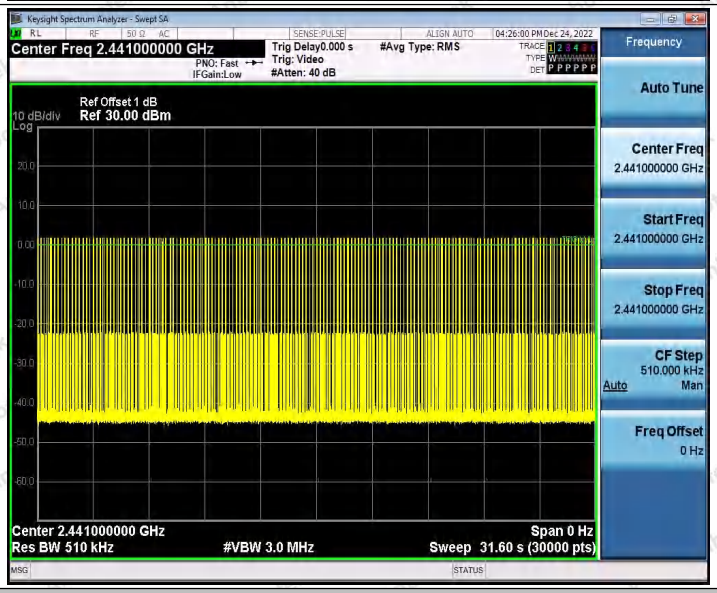
Test Result

TestMode	Antenna	Frequency[MHz]	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH1	Ant1	Hop	0.372	313	0.116	≤0.4	PASS
DH3	Ant1	Hop	1.629	160	0.261	≤0.4	PASS
DH5	Ant1	Hop	2.877	107	0.308	≤0.4	PASS
2DH1	Ant1	Hop	0.380	313	0.119	≤0.4	PASS
2DH3	Ant1	Hop	1.633	159	0.26	≤0.4	PASS
2DH5	Ant1	Hop	2.880	115	0.331	≤0.4	PASS
3DH1	Ant1	Hop	0.381	313	0.119	≤0.4	PASS
3DH3	Ant1	Hop	1.630	159	0.259	≤0.4	PASS
3DH5	Ant1	Hop	2.883	112	0.323	≤0.4	PASS

Test Graphs

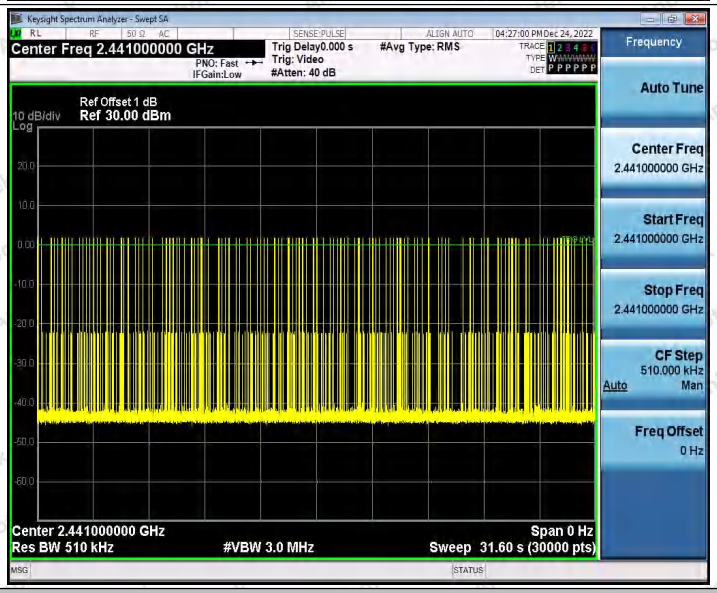
DH1_Ant1_Hop





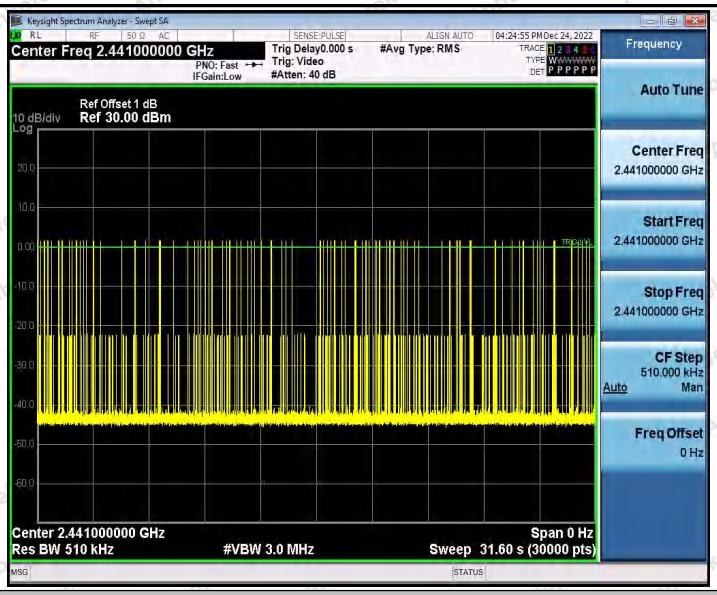
DH3_Ant1_Hop

Keysight Spectrum Analyzer - Swept SA
Center Freq 2.441000000 GHz
Trig Delay-2.000 ms
#Avg Type: RMS
Trig: Video
#Atten: 40 dB
PNO: Fast
IFGain:Low
Ref Offset 1 dB
10 dB/div
Ref 30.00 dBm
ΔMkr2 1.629 ms
12.14 dB
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

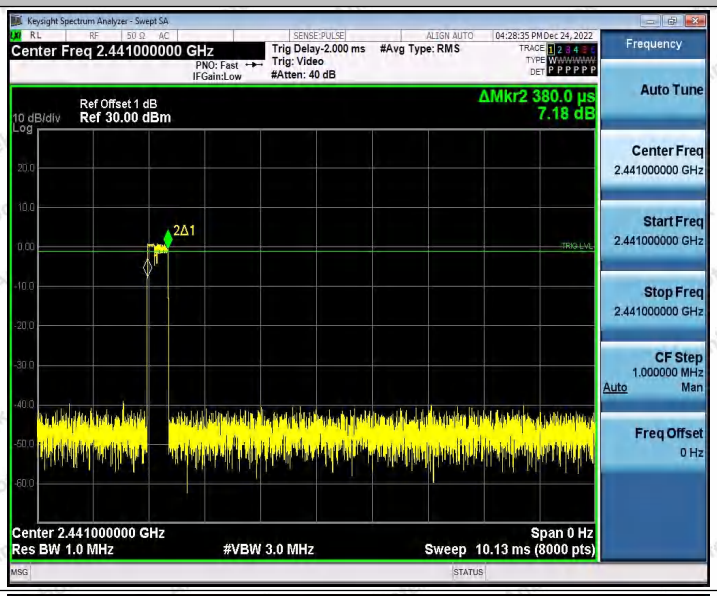

Keysight Spectrum Analyzer - Swept SA
Center Freq 2.441000000 GHz
Trig Delay0.000 s
#Avg Type: RMS
Trig: Video
#Atten: 40 dB
PNO: Fast
IFGain:Low
Ref Offset 1 dB
10 dB/div
Ref 30.00 dBm
Center 2.441000000 GHz
Res BW 510 kHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 31.60 s (30000 pts)
Frequency
Auto Tune
Center Freq
2.441000000 GHz
Start Freq
2.441000000 GHz
Stop Freq
2.441000000 GHz
CF Step
510.000 kHz
Auto
Man
Freq Offset
0 Hz

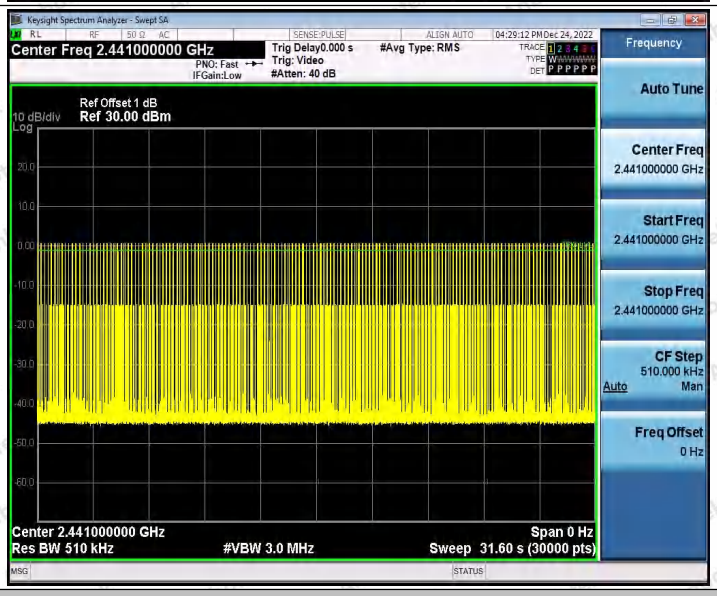
DH5_Ant1_Hop

Keysight Spectrum Analyzer - Swept SA
Center Freq 2.441000000 GHz
Trig Delay-2.000 ms
#Avg Type: RMS
Trig: Video
#Atten: 40 dB
PNO: Fast
IFGain:Low
Ref Offset 1 dB
10 dB/div
Ref 30.00 dBm
ΔMkr2 2.877 ms
16.91 dB
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

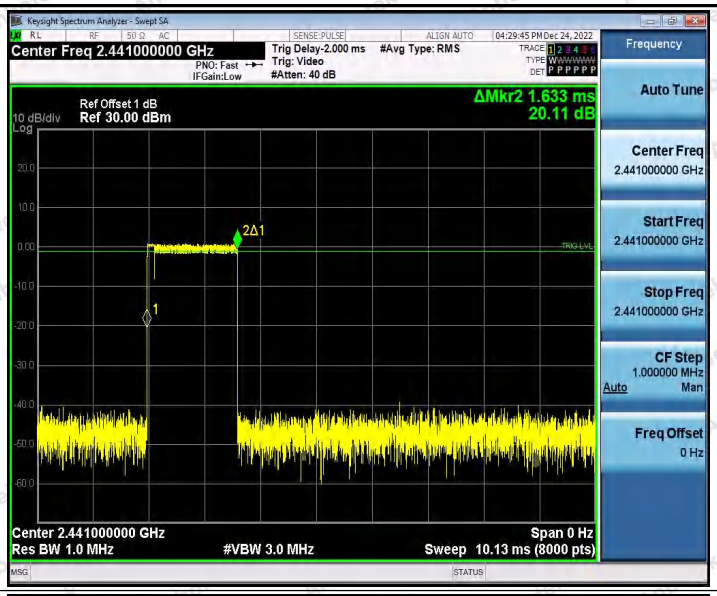


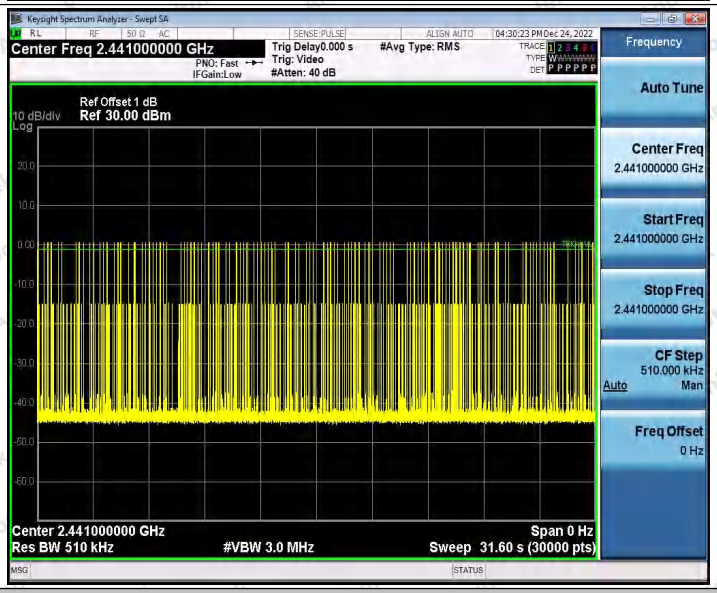
2DH1_Ant1_Hop



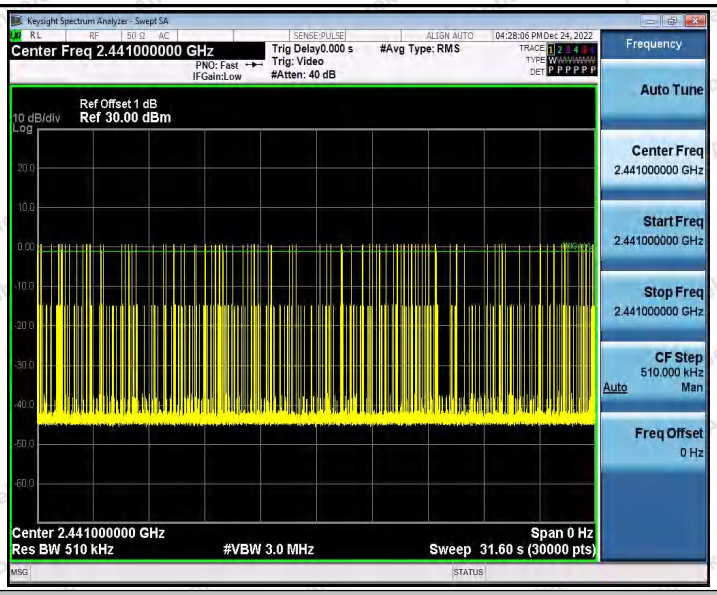


2DH3_Ant1_Hop

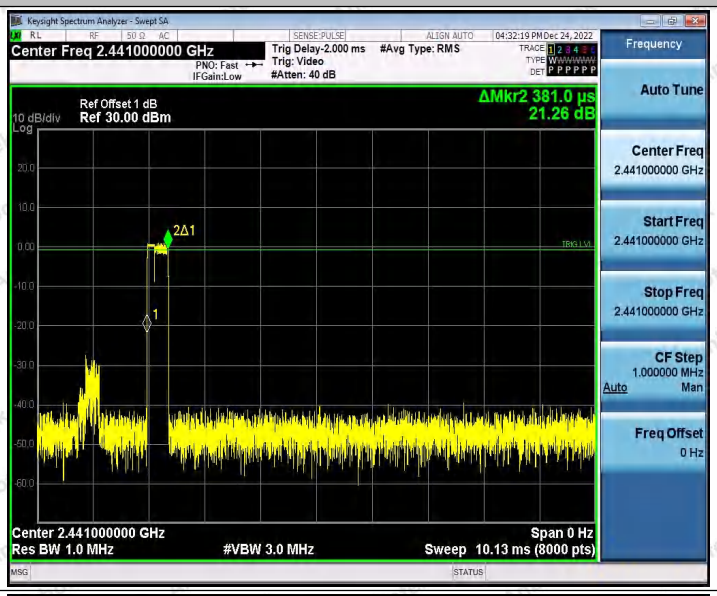


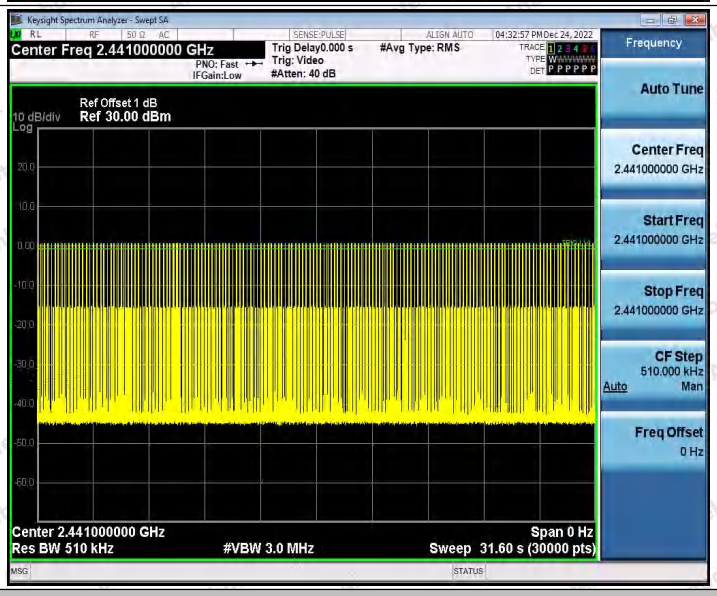


2DH5_Ant1_Hop

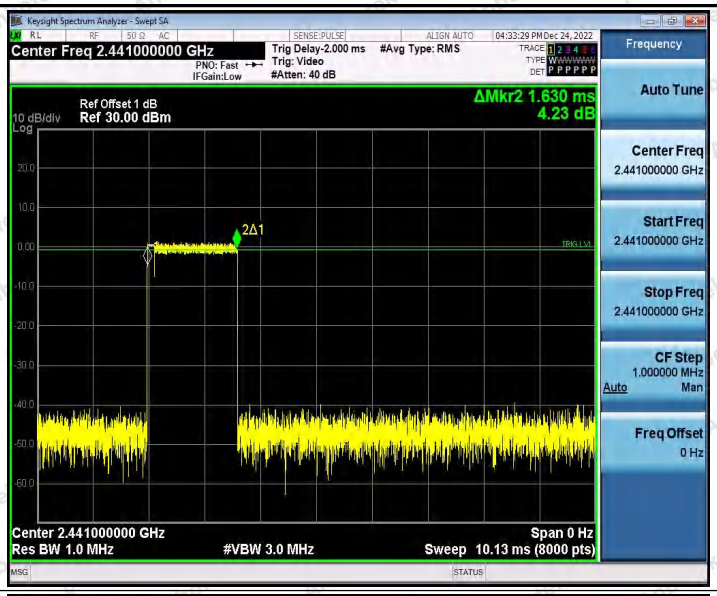


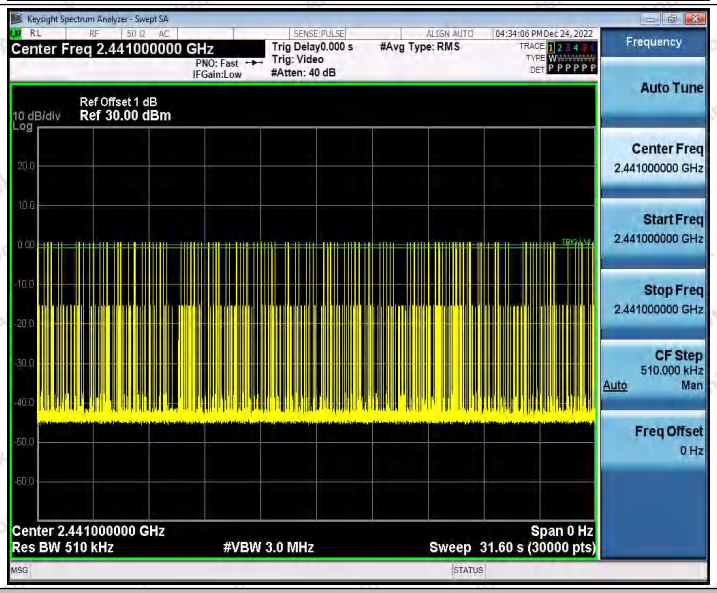
3DH1_Ant1_Hop



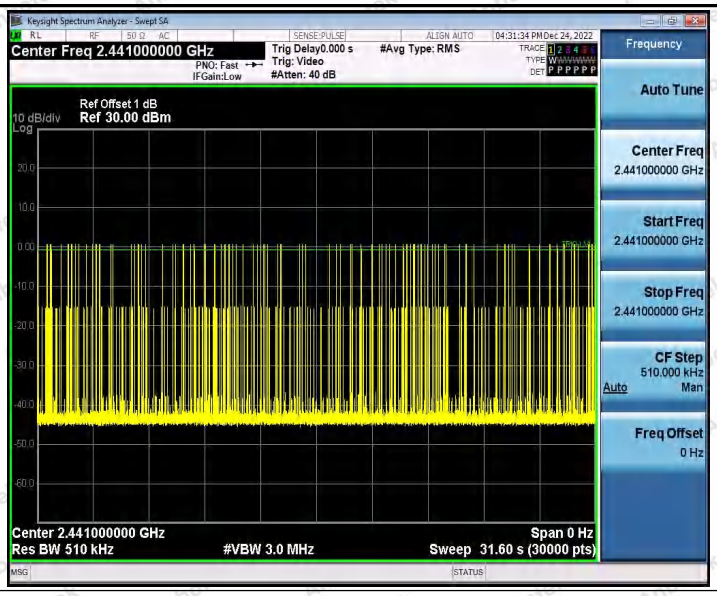


3DH3_Ant1_Hop





3DH5_Ant1_Hop


Keysight Spectrum Analyzer - Swept SA
Center Freq 2.441000000 GHz
PNO: Fast
IFGain:Low
Trig Delay0.000 s
Trig: Video
#Atten: 40 dB
#Avg Type: RMS
04:31:34 PM Dec 24, 2022
Frequency
Auto Tune
Center Freq
2.441000000 GHz
Start Freq
2.441000000 GHz
Stop Freq
2.441000000 GHz
CF Step
510.000 kHz
Auto
Man
Freq Offset
0 Hz
Ref Offset 1 dB
10 dB/div
Ref 30.00 dBm
Log
Center 2.441000000 GHz
Res BW 510 kHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 31.60 s (30000 pts)
MSG
STATUS

Appendix F: Number of hopping channels

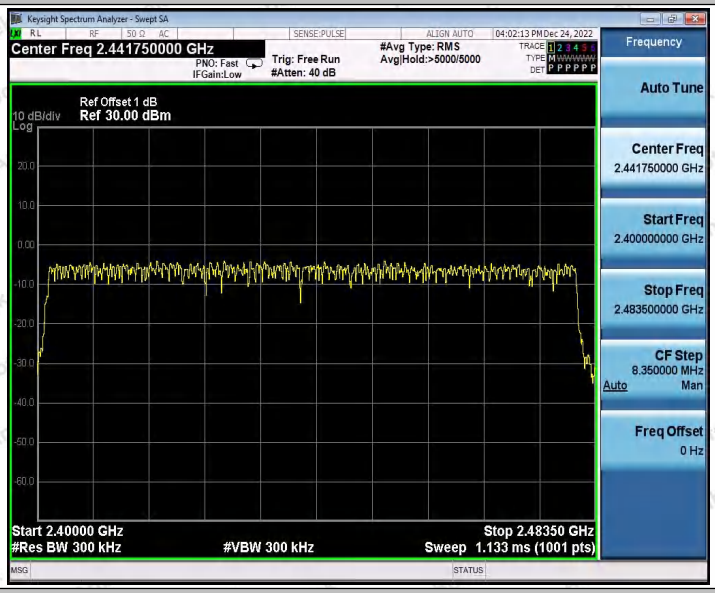
Test Result

Test Mode	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

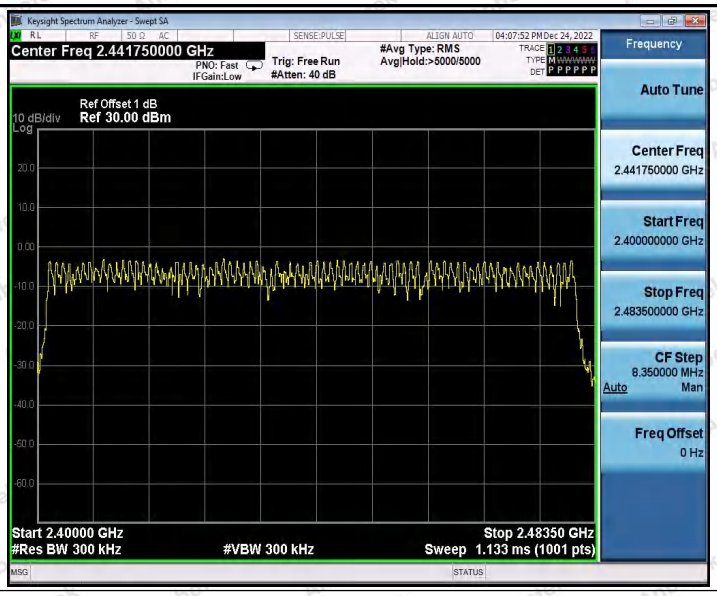
Test Graphs

DH5_Ant1_Hop

2DH5_Ant1_Hop



3DH5_Ant1_Hop


Keysight 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
04:07:52 PM Dec 24, 2022
Ref Offset 1 dB
10 dB/div
Ref 30.00 dBm
Log
Start 2.40000 GHz
#Res BW 300 kHz
#VBW 300 kHz
Stop 2.48350 GHz
Sweep 1.133 ms (1001 pts)
Frequency
Auto Tune
Center Freq
2.441750000 GHz
Start Freq
2.400000000 GHz
Stop Freq
2.483500000 GHz
CF Step
8.350000 MHz
Auto
Man
Freq Offset
0 Hz

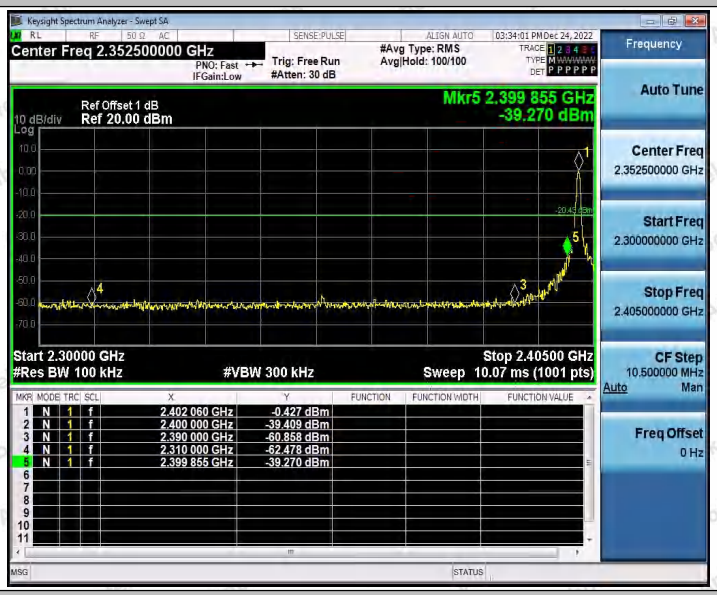
Appendix G: Band edge measurements

Test Result

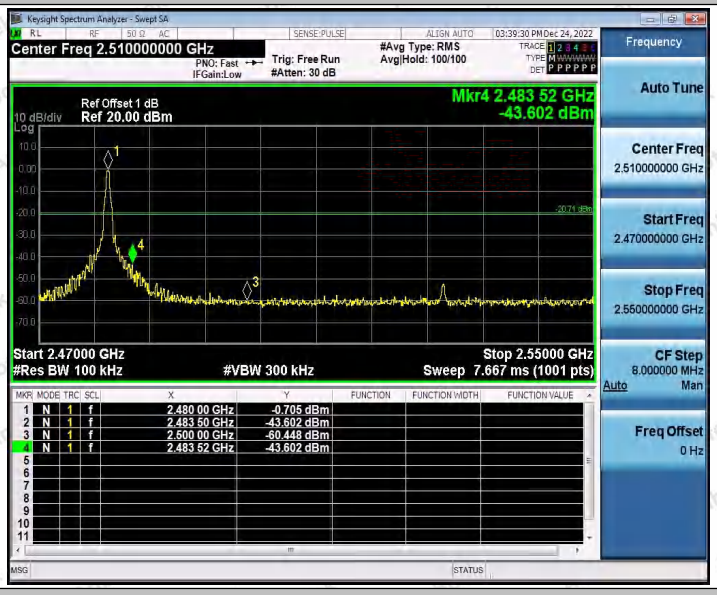
TestMode	Antenna	ChName	Frequency[MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	Low	2402	-0.43	-39.27	≤-20.43	PASS
		High	2480	-0.71	-43.6	≤-20.71	PASS
		Low	Hop_2402	-0.41	-55.63	≤-20.41	PASS
		High	Hop_2480	-0.64	-51.27	≤-20.64	PASS
2DH5	Ant1	Low	2402	-0.76	-35.7	≤-20.76	PASS
		High	2480	-1.16	-43.32	≤-21.16	PASS
		Low	Hop_2402	-9.64	-51.6	≤-29.64	PASS
		High	Hop_2480	-8.63	-49.99	≤-28.63	PASS
3DH5	Ant1	Low	2402	-0.58	-38.01	≤-20.58	PASS
		High	2480	-1.23	-43.78	≤-21.23	PASS
		Low	Hop_2402	-8.28	-51.04	≤-28.28	PASS
		High	Hop_2480	-8.29	-49.51	≤-28.29	PASS

Test Graphs

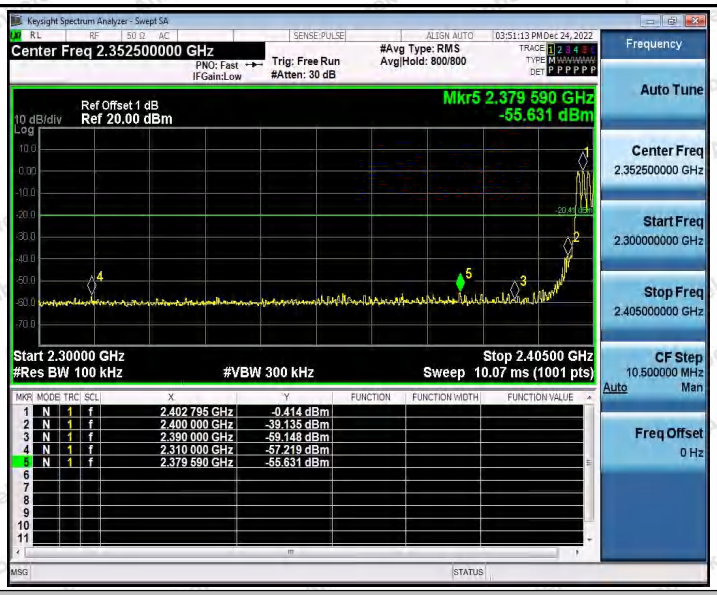
DH5_Ant1_Low_2402



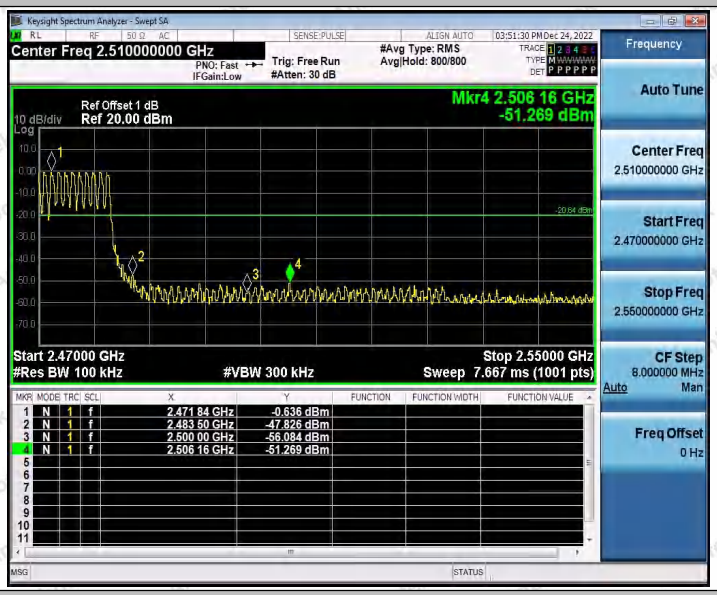
DH5_Ant1_High_2480



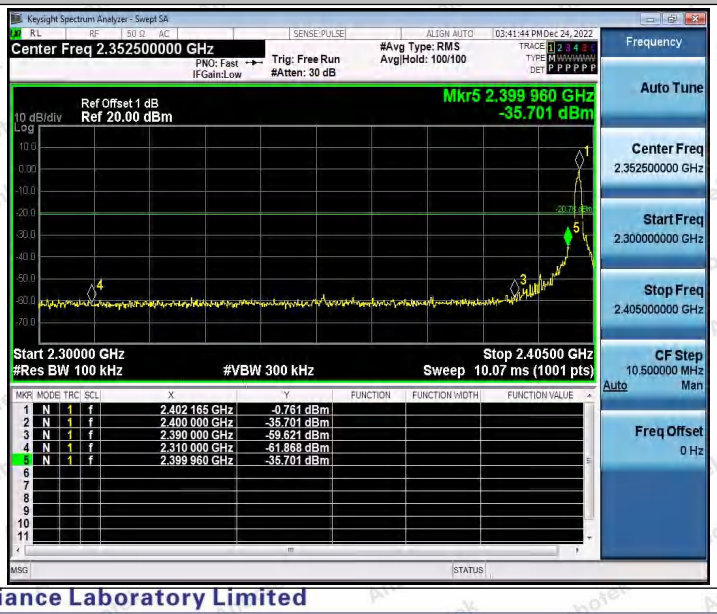
DH5_Ant1_Low_Hop_2402



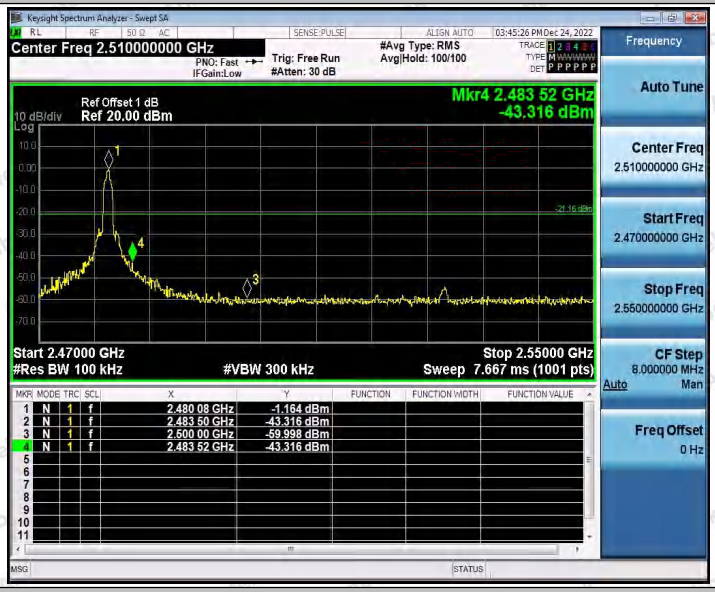
DH5_Ant1_High_Hop_2480



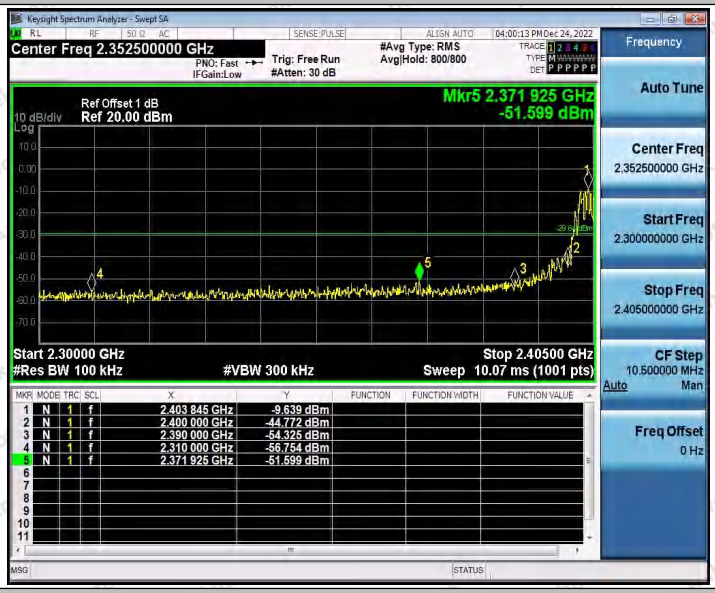
2DH5_Ant1_Low_2402



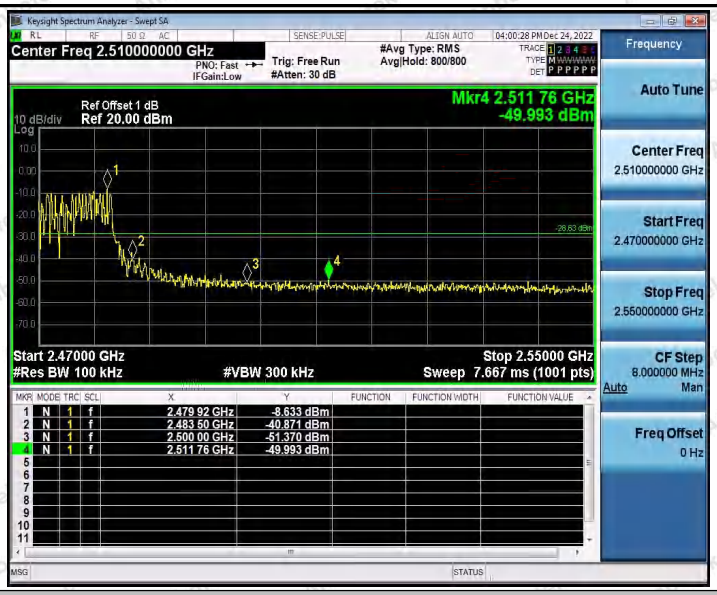
2DH5_Ant1_High_2480



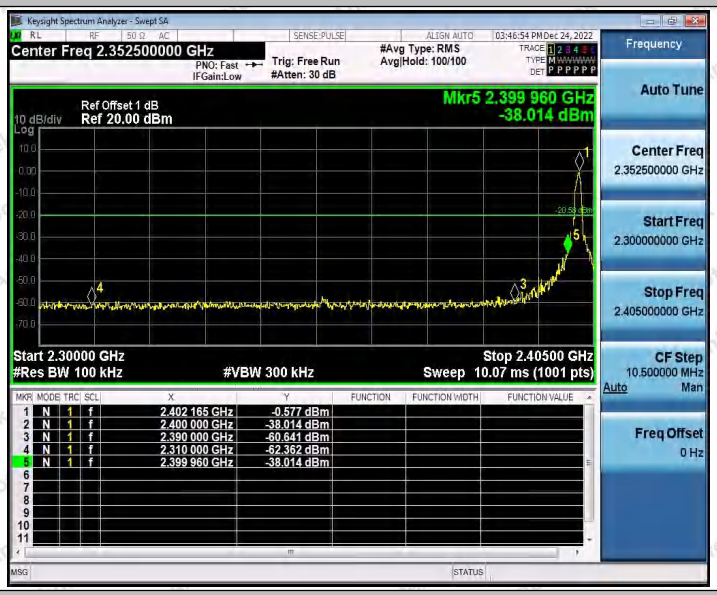
2DH5_Ant1_Low_Hop_2402



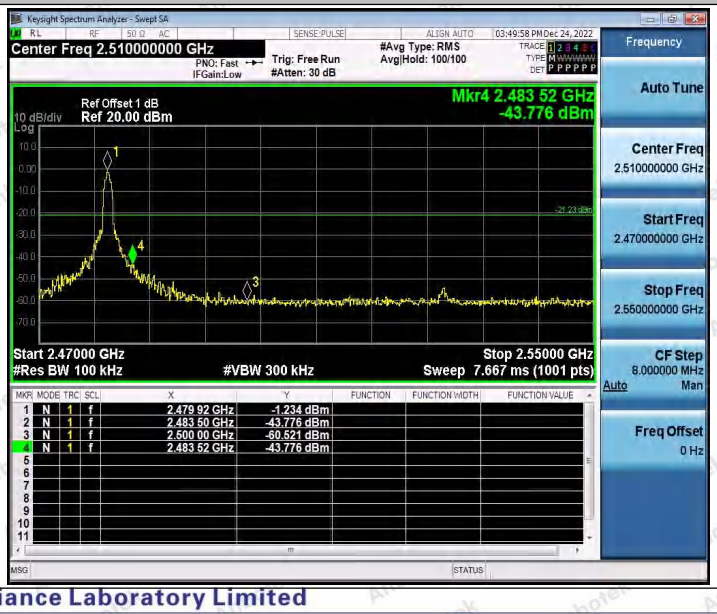
2DH5_Ant1_High_Hop_2480



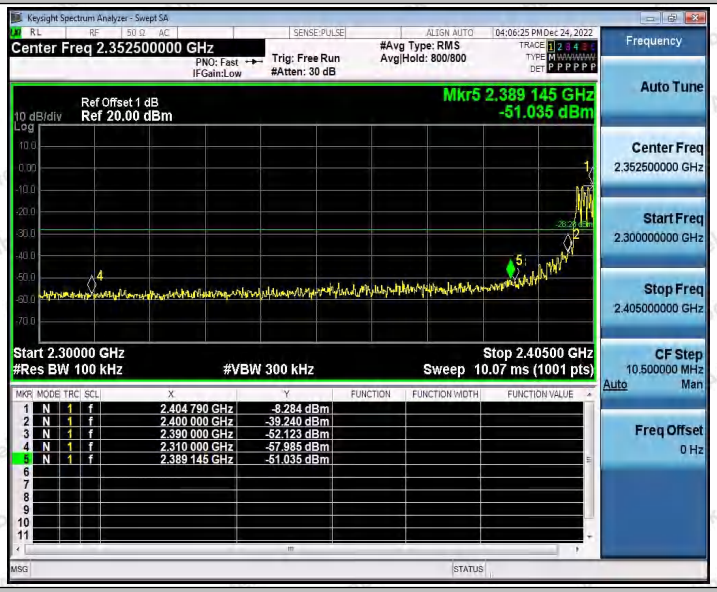
3DH5_Ant1_Low_2402



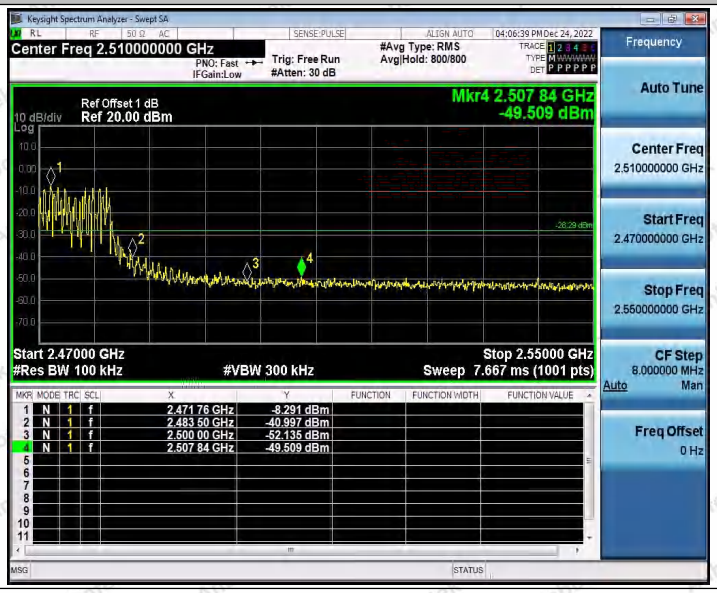
3DH5_Ant1_High_2480



3DH5_Ant1_Low_Hop_2402



3DH5_Ant1_High_Hop_2480



Appendix H: Conducted Spurious Emission

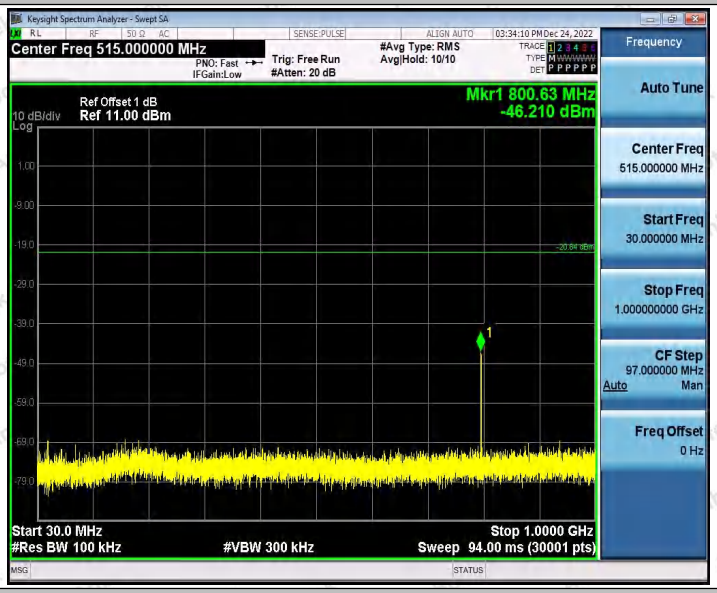
Test Result

TestMode	Antenna	Frequency[MHz]	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	2402	Reference	-0.84	-0.84	---	PASS
			30~1000	-0.84	-46.21	≤-20.84	PASS
			1000~26500	-0.84	-36.47	≤-20.84	PASS
		2441	Reference	-0.70	-0.70	---	PASS
			30~1000	-0.70	-46.68	≤-20.7	PASS
			1000~26500	-0.70	-36.38	≤-20.7	PASS
		2480	Reference	-1.02	-1.02	---	PASS
			30~1000	-1.02	-45.3	≤-21.02	PASS
			1000~26500	-1.02	-37.18	≤-21.02	PASS
2DH5	Ant1	2402	Reference	-3.35	-3.35	---	PASS
			30~1000	-3.35	-48.18	≤-23.35	PASS
			1000~26500	-3.35	-37.98	≤-23.35	PASS
		2441	Reference	-0.68	-0.68	---	PASS
			30~1000	-0.68	-48.26	≤-20.68	PASS
			1000~26500	-0.68	-36.75	≤-20.68	PASS
		2480	Reference	-2.71	-2.71	---	PASS
			30~1000	-2.71	-46.63	≤-22.71	PASS
			1000~26500	-2.71	-39.42	≤-22.71	PASS
3DH5	Ant1	2402	Reference	-0.87	-0.87	---	PASS
			30~1000	-0.87	-47.36	≤-20.87	PASS
			1000~26500	-0.87	-37.17	≤-20.87	PASS
		2441	Reference	-1.20	-1.20	---	PASS
			30~1000	-1.20	-45.71	≤-21.2	PASS
			1000~26500	-1.20	-38.8	≤-21.2	PASS
		2480	Reference	-1.70	-1.70	---	PASS
			30~1000	-1.70	-47.37	≤-21.7	PASS
			1000~26500	-1.70	-41.11	≤-21.7	PASS

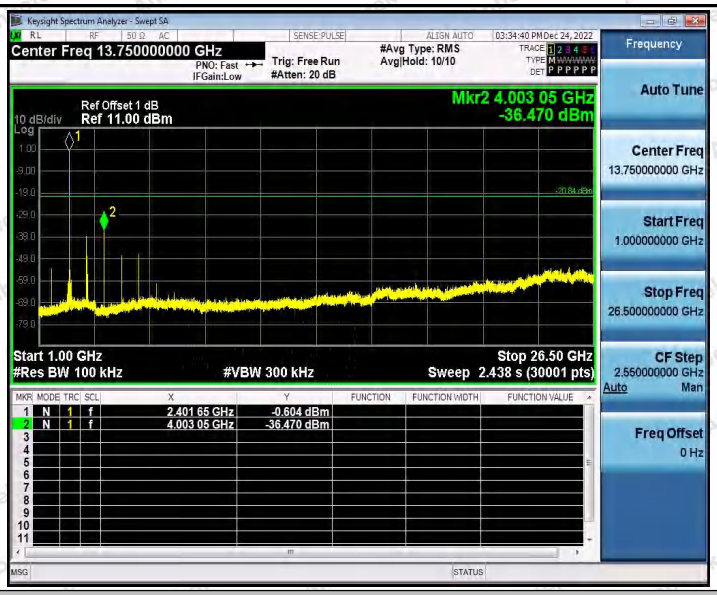
Test Graphs

DH5_Ant1_2402_0~Reference

DH5_Ant1_2402_30~1000

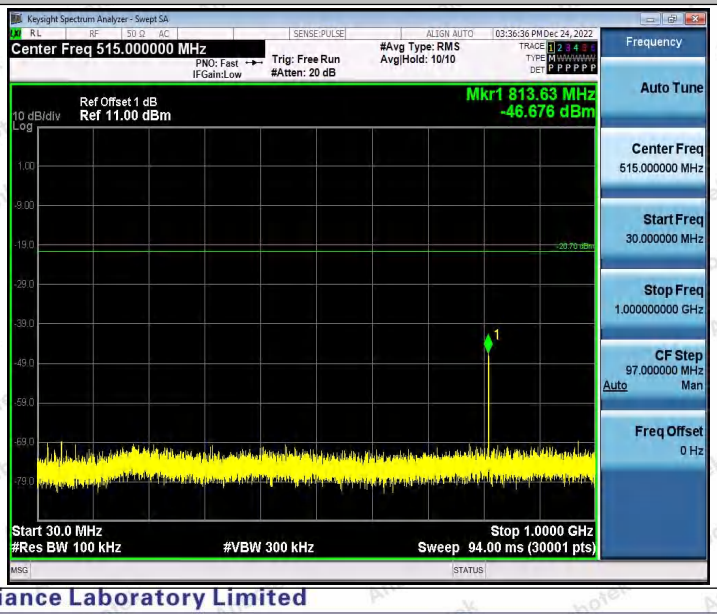


DH5_Ant1_2402_1000~26500

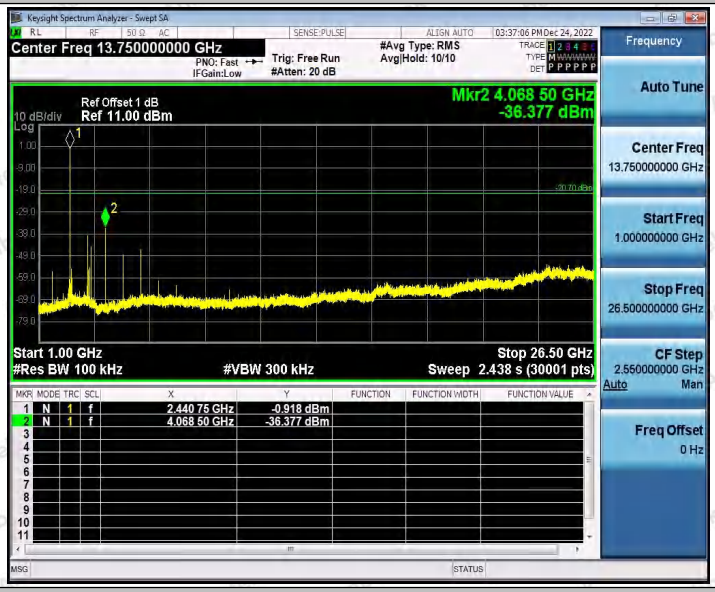


DH5_Ant1_2441_0~Reference

DH5_Ant1_2441_30~1000

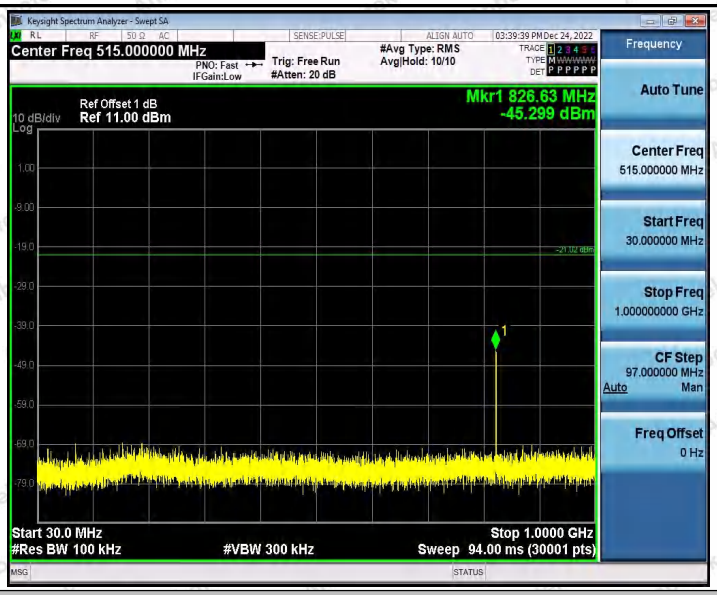


DH5_Ant1_2441_1000~26500

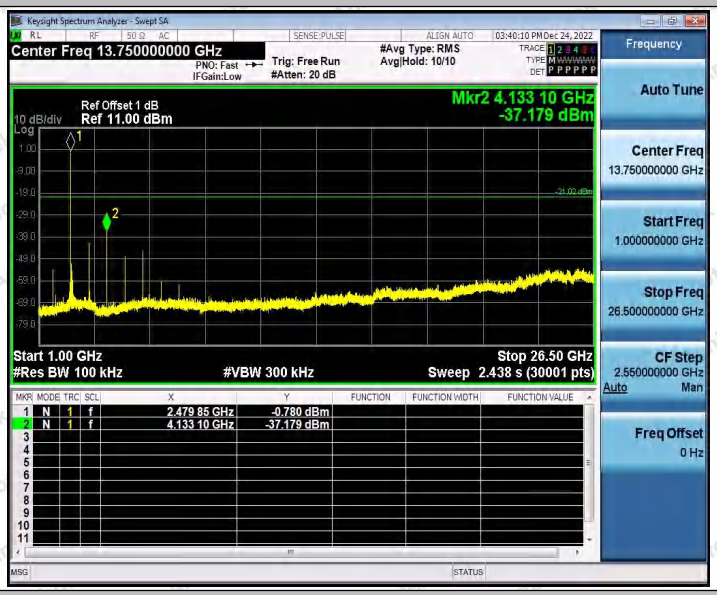


DH5_Ant1_2480_0~Reference

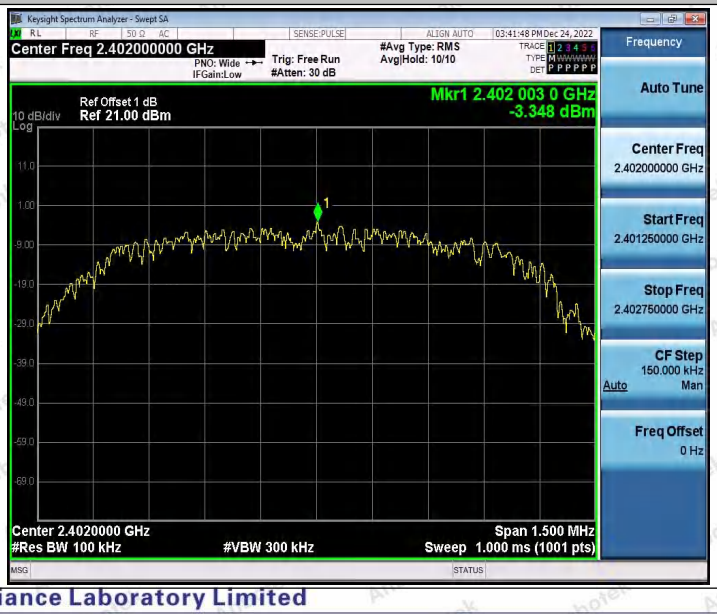
DH5_Ant1_2480_30~1000



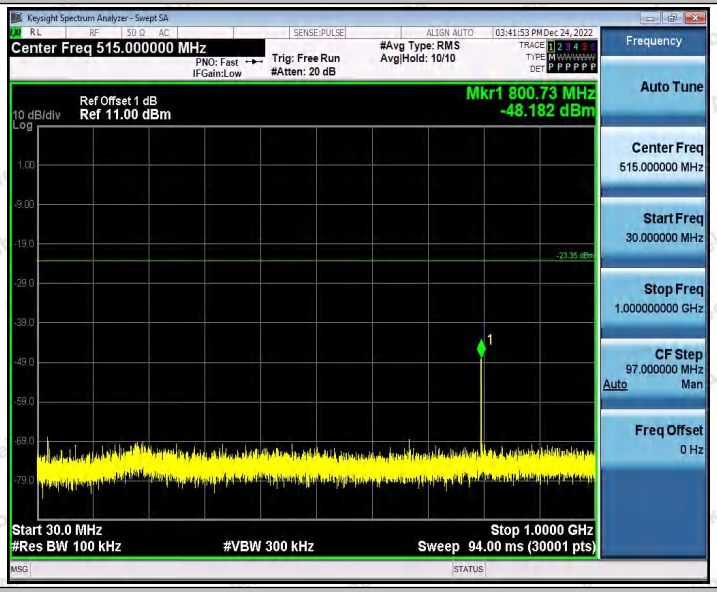
DH5_Ant1_2480_1000~26500



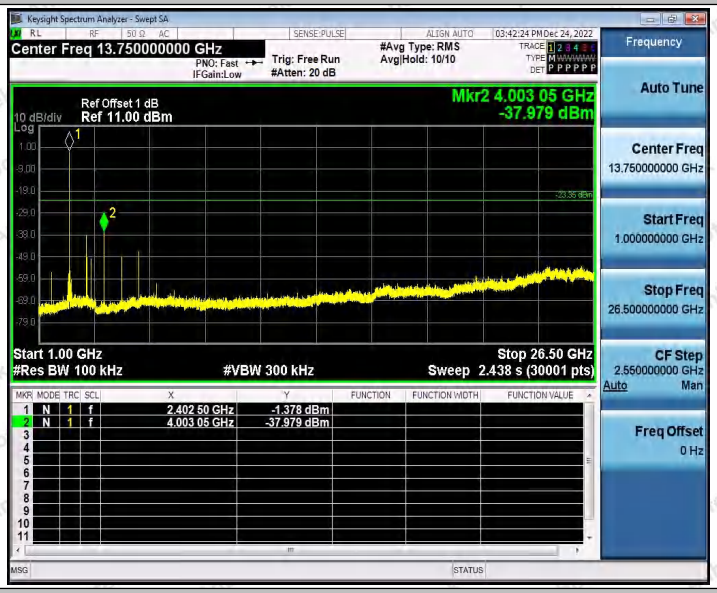
2DH5_Ant1_2402_0~Reference



2DH5_Ant1_2402_30~1000

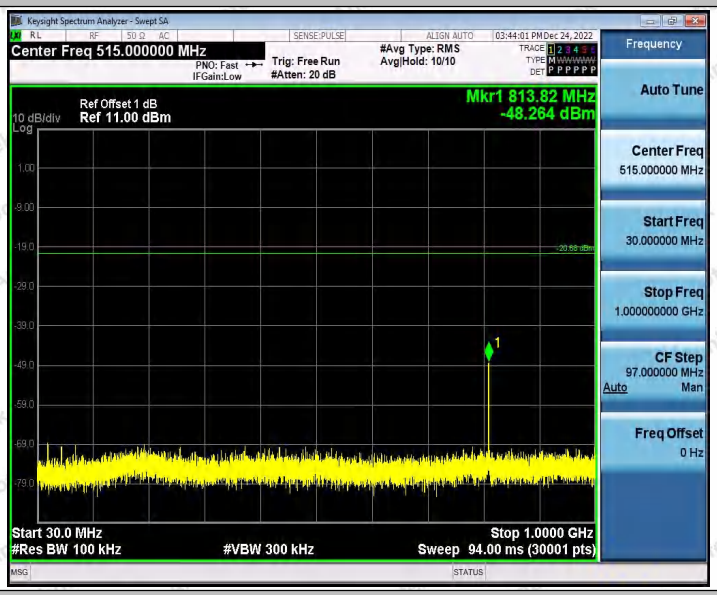


2DH5_Ant1_2402_1000~26500

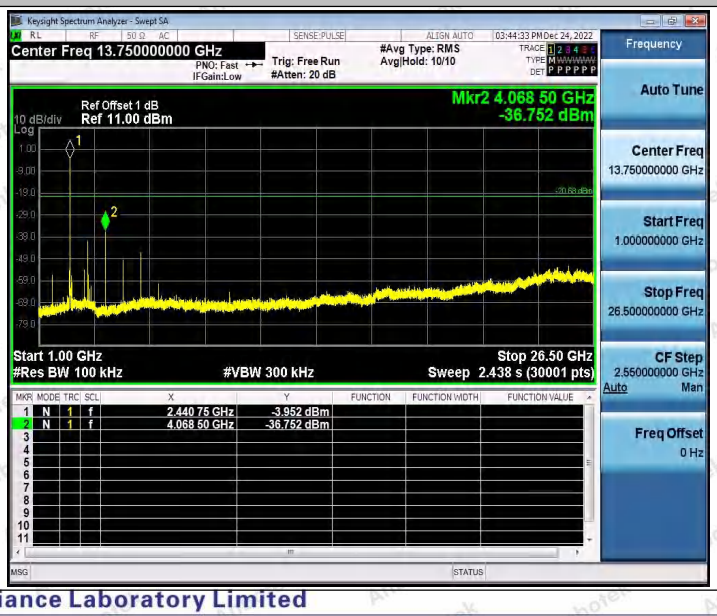


2DH5_Ant1_2441_0~Reference

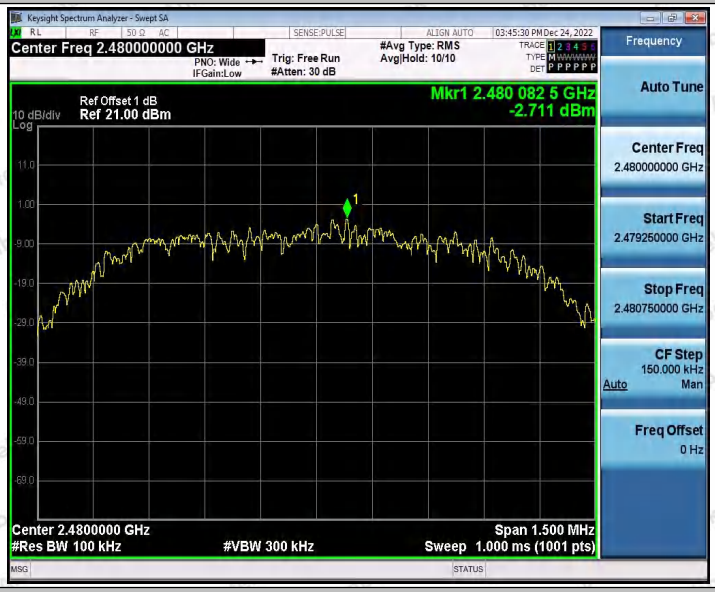
2DH5_Ant1_2441_30~1000



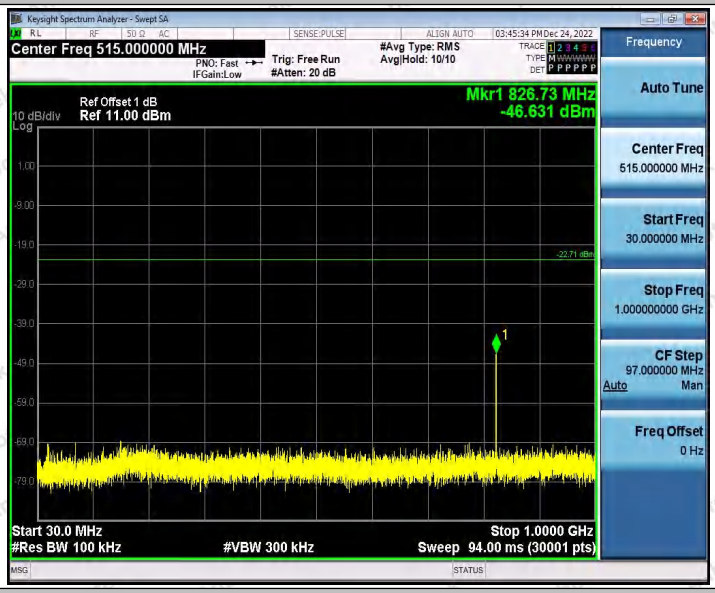
2DH5_Ant1_2441_1000~26500



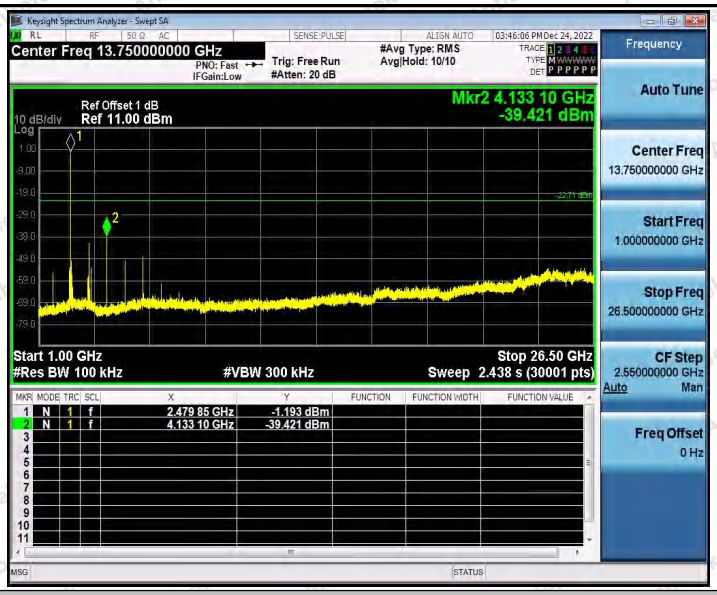
2DH5_Ant1_2480_0~Reference



2DH5_Ant1_2480_30~1000

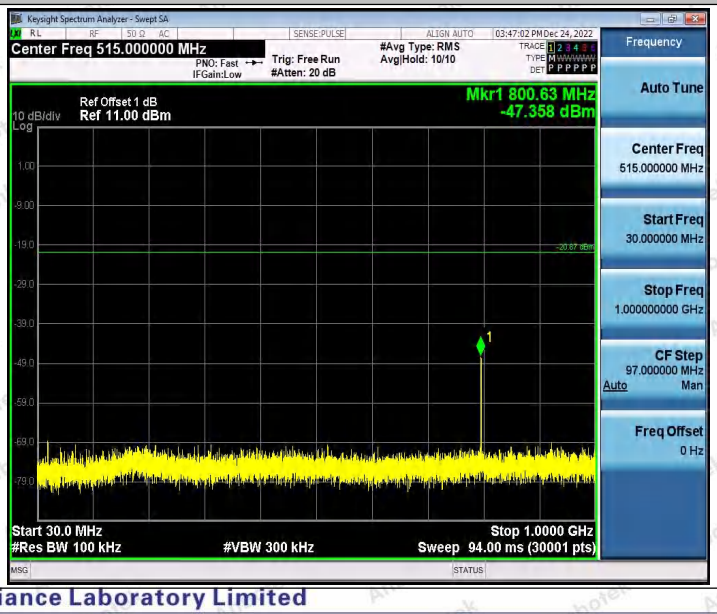


2DH5_Ant1_2480_1000~26500

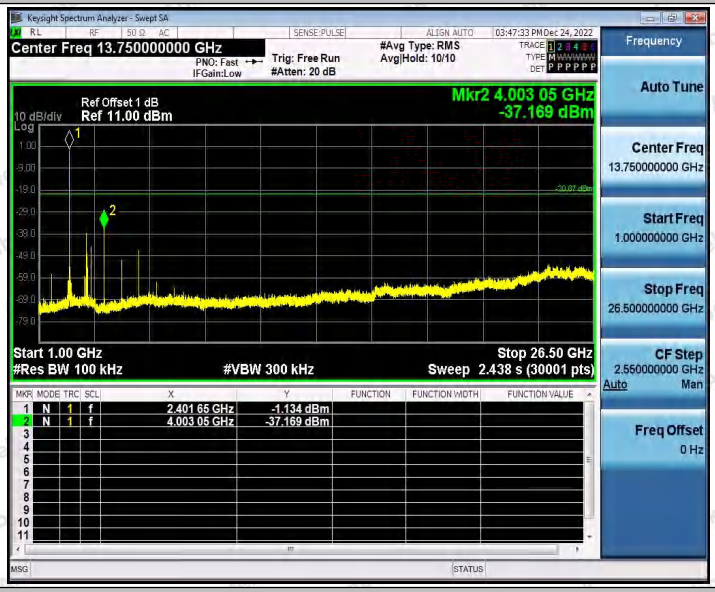


3DH5_Ant1_2402_0~Reference

3DH5_Ant1_2402_30~1000

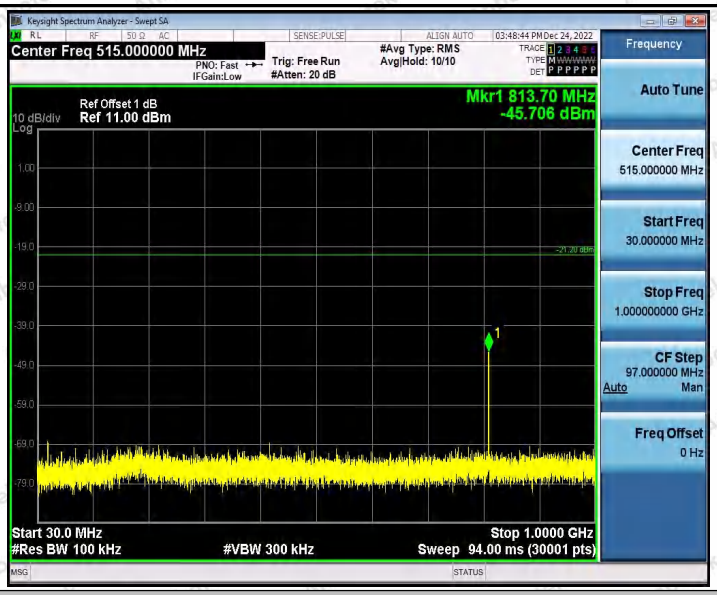


3DH5_Ant1_2402_1000~26500

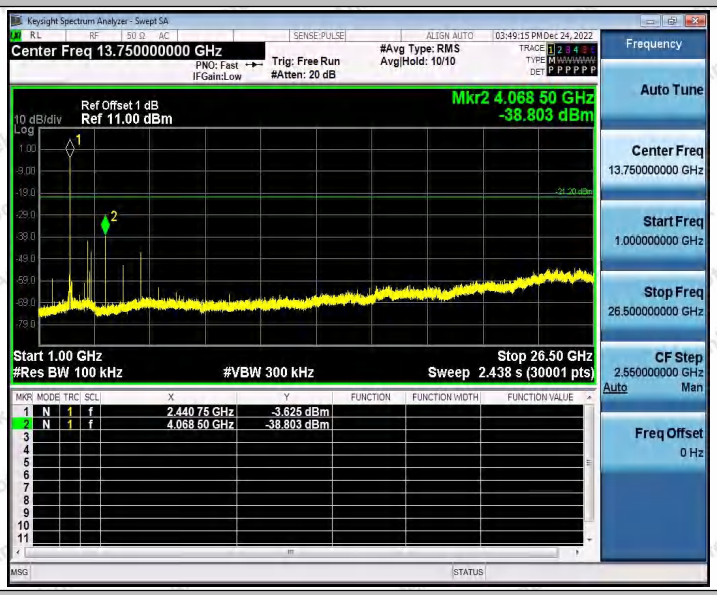


3DH5_Ant1_2441_0~Reference

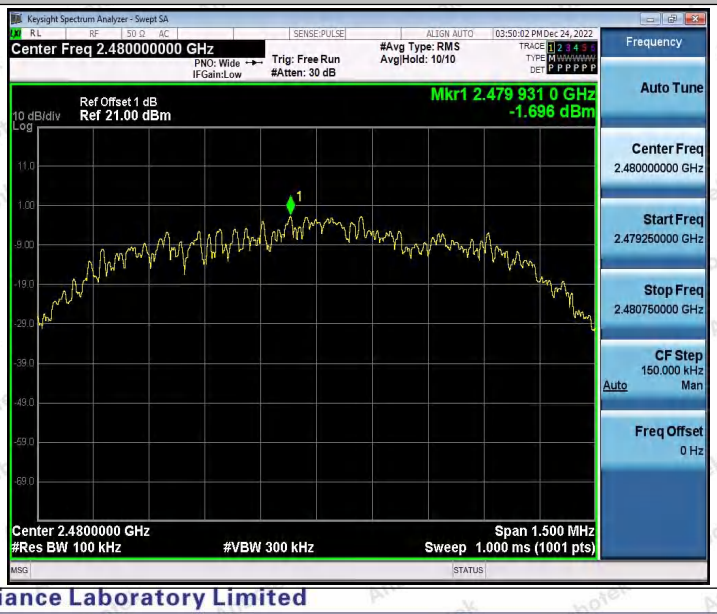
3DH5_Ant1_2441_30~1000



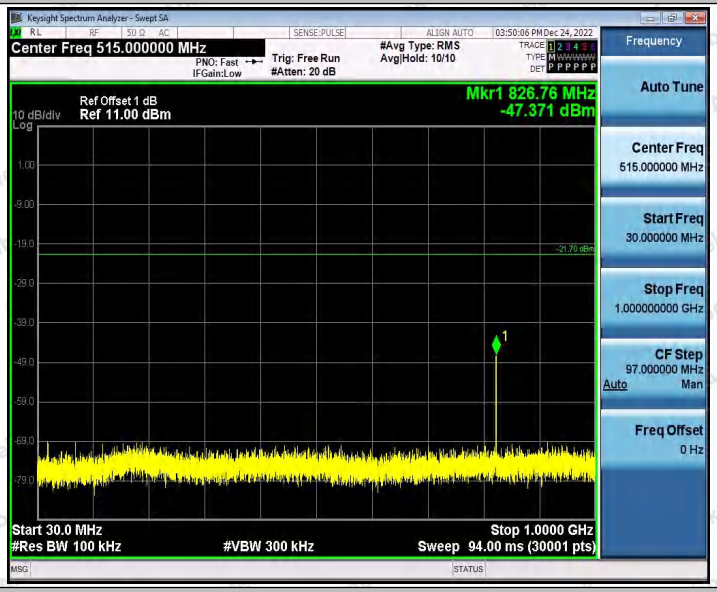
3DH5_Ant1_2441_1000~26500



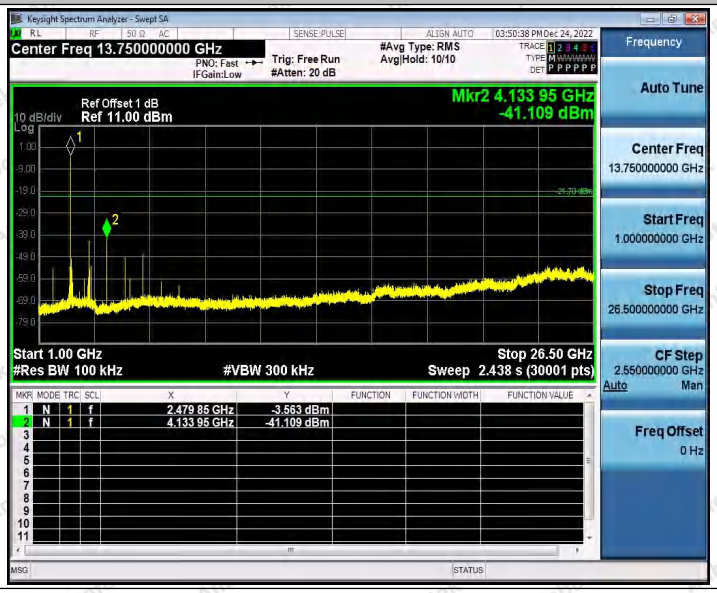
3DH5_Ant1_2480_0~Reference



3DH5_Ant1_2480_30~1000



3DH5_Ant1_2480_1000~26500



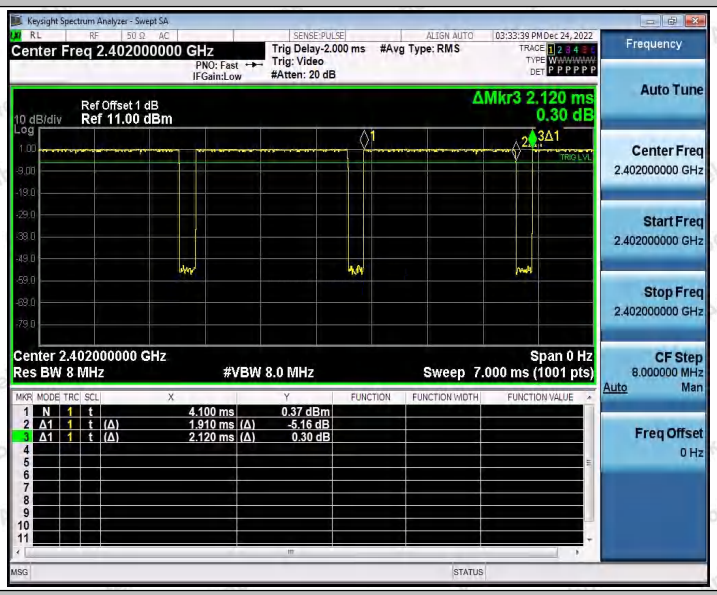
Appendix I: Duty Cycle

Test Result

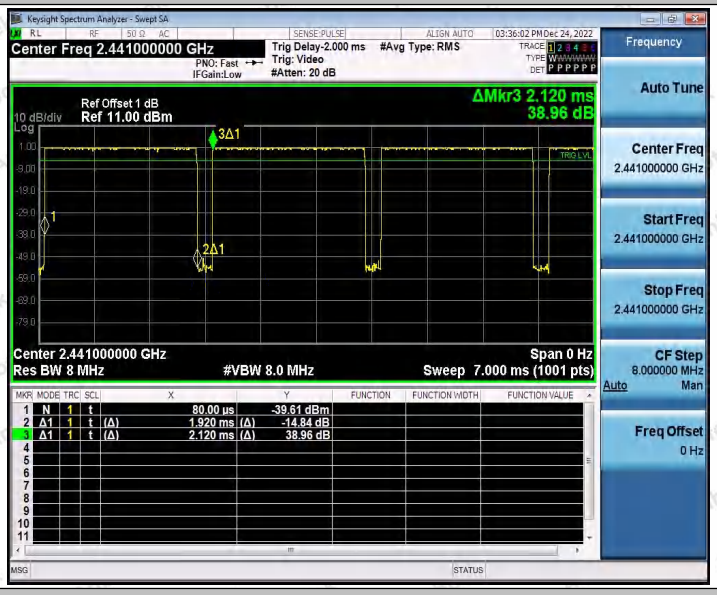
Test Mode	Antenna	Frequency[MHz]	ON Time [ms]	Period [ms]	Duty Cycle [%]	Duty Cycle Factor[dB]
DH5	Ant1	2402	1.91	2.12	90.09	0.45
		2441	1.92	2.12	90.57	0.43
		2480	1.91	2.11	90.52	0.43
2DH5	Ant1	2402	1.03	1.24	83.06	0.81
		2441	1.03	1.24	83.06	0.81
		2480	1.03	1.24	83.06	0.81
3DH5	Ant1	2402	0.74	0.94	78.72	1.04
		2441	0.73	0.94	77.66	1.10
		2480	0.74	0.94	78.72	1.04

Test Graphs

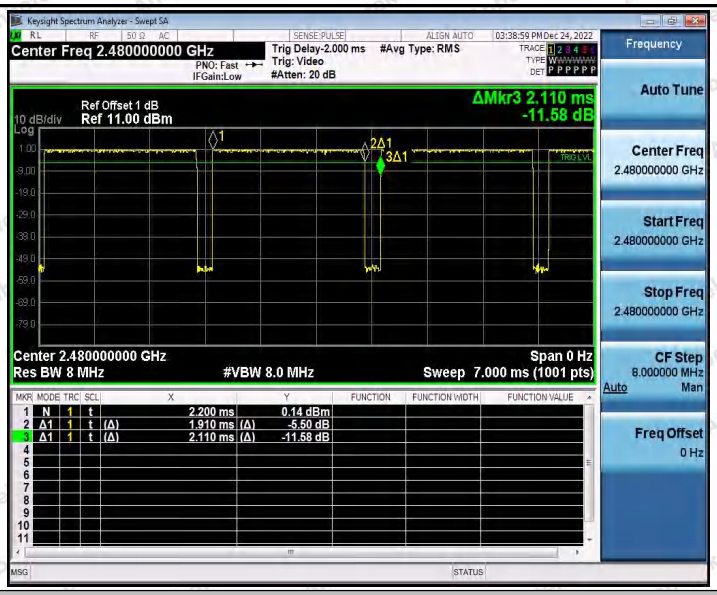
DH5_Ant1_2402



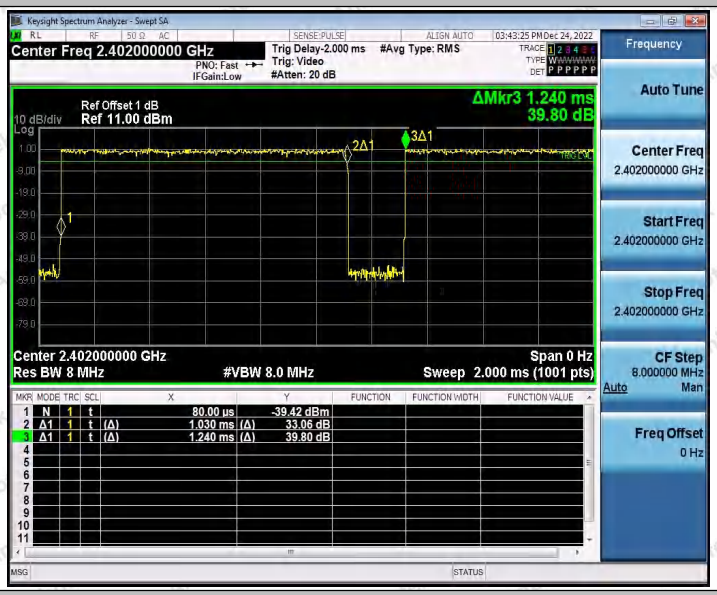
DH5_Ant1_2441



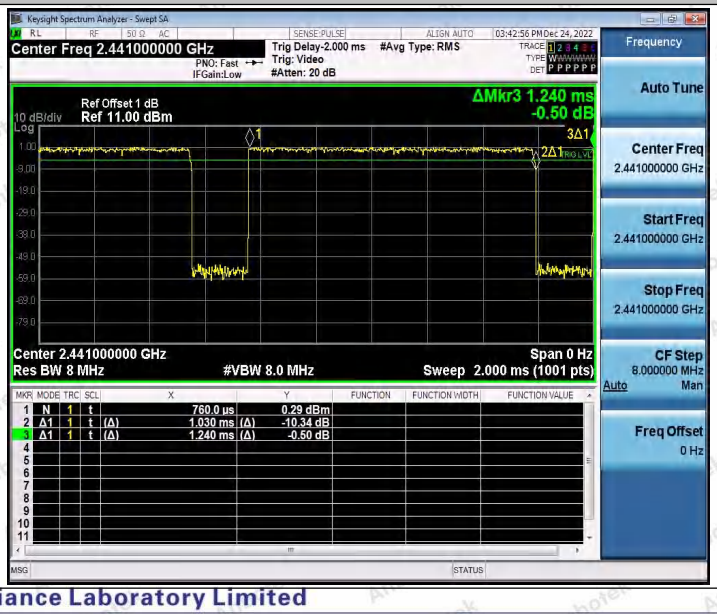
DH5_Ant1_2480



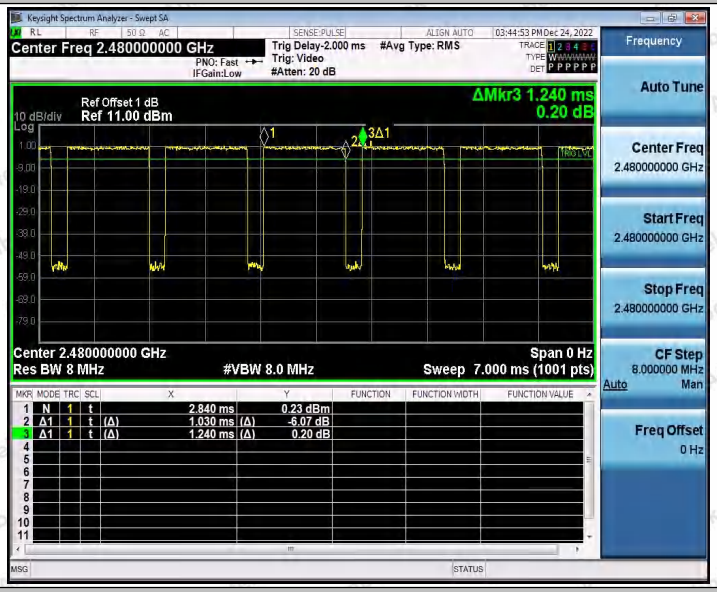
2DH5_Ant1_2402



2DH5_Ant1_2441

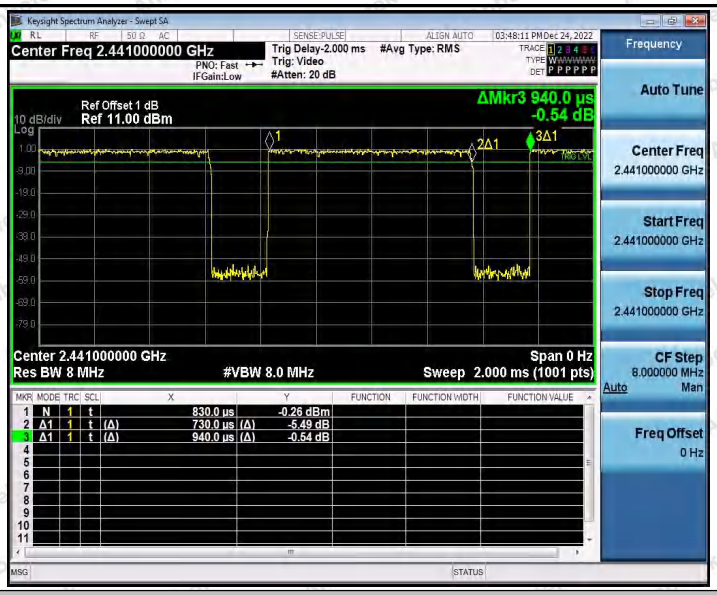


2DH5_Ant1_2480

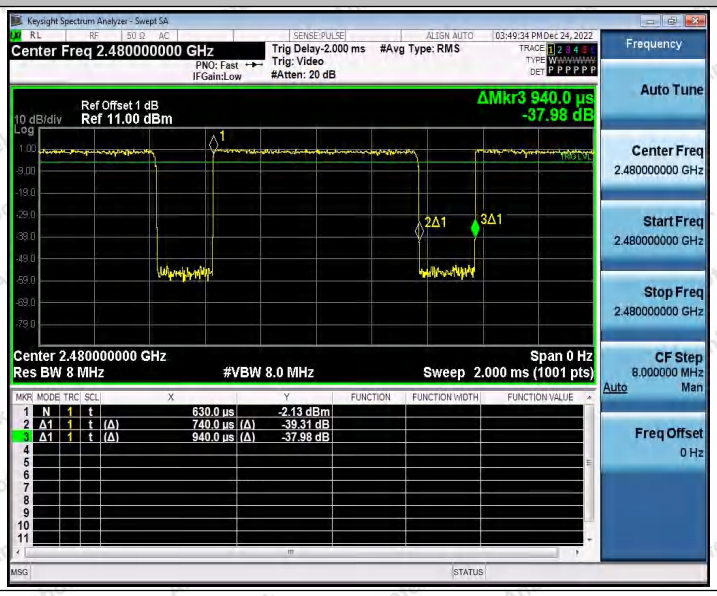


3DH5_Ant1_2402

3DH5_Ant1_2441



3DH5_Ant1_2480



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