Appendix Test Data

Report No.:	18220WC30235001	Test Sample No.:	1-2-2
Start Test Date:	2023.11.10	Finish Test Date:	2023.11.13
Test Engineer:	Hayman Chen	Auditor:	Rick Luo
Temperature:	26.1℃	Relative Humidity:	43%
Pressure:	101kPa		

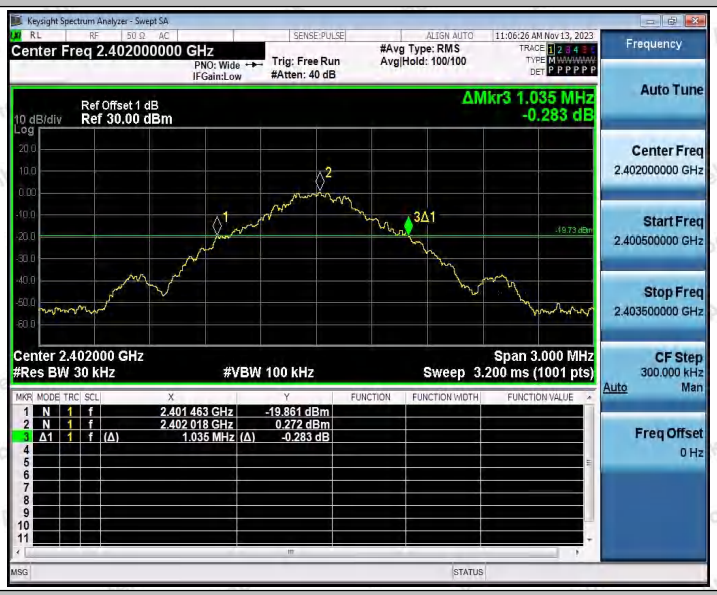
Appendix A: 20dB Emission Bandwidth

Test Result

Test Mode	Antenna	Frequency[MHz]	20db EBW[MHz]	FL[MHz]	FH[MHz]
DH5	Ant1	2402	1.035	2401.463	2402.498
		2441	1.044	2440.460	2441.504
		2480	0.969	2479.523	2480.492
2DH5	Ant1	2402	1.335	2401.331	2402.666
		2441	1.332	2440.334	2441.666
		2480	1.341	2479.328	2480.669
3DH5	Ant1	2402	1.320	2401.343	2402.663
		2441	1.293	2440.352	2441.645
		2480	1.320	2479.343	2480.663

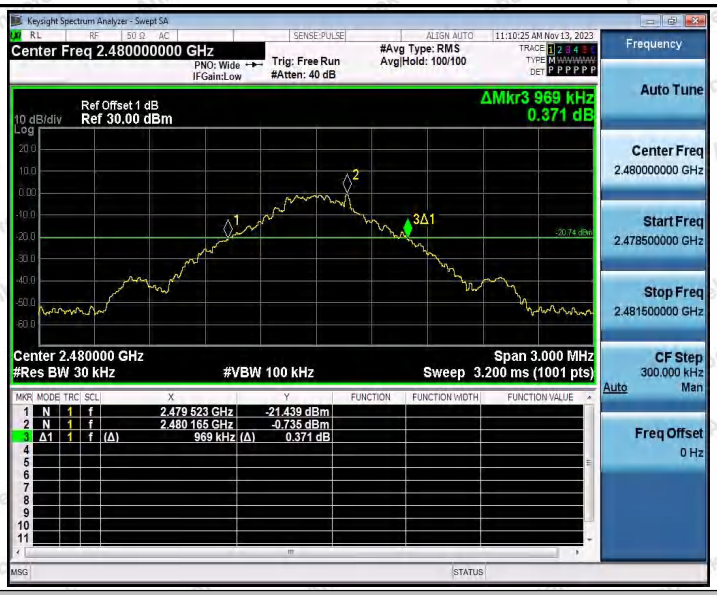
Test Graphs

DH5_Ant1_2402

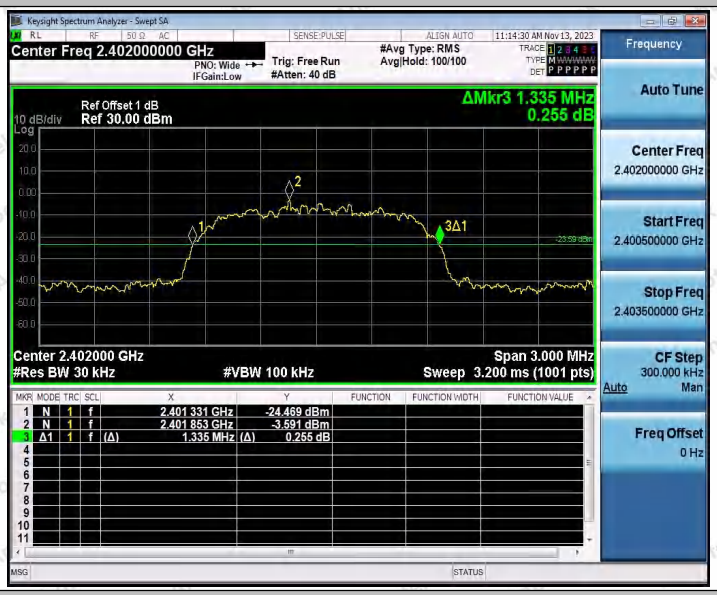


DH5_Ant1_2441

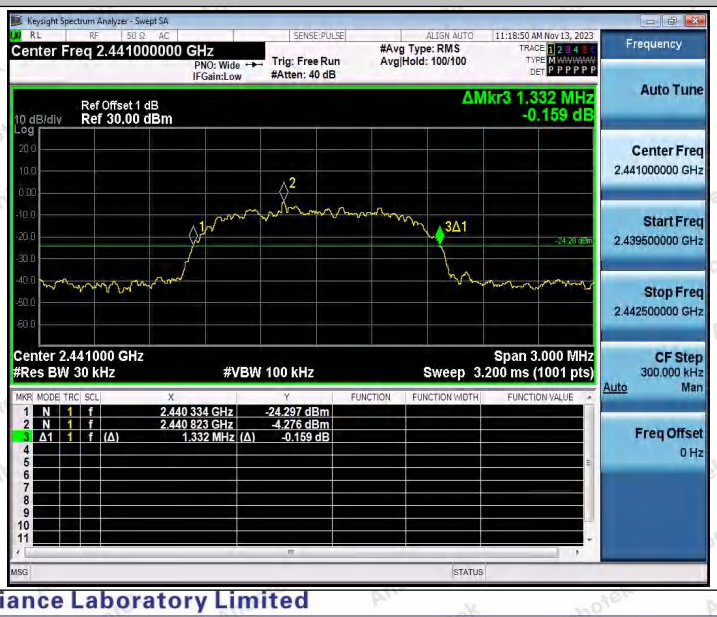
DH5_Ant1_2480



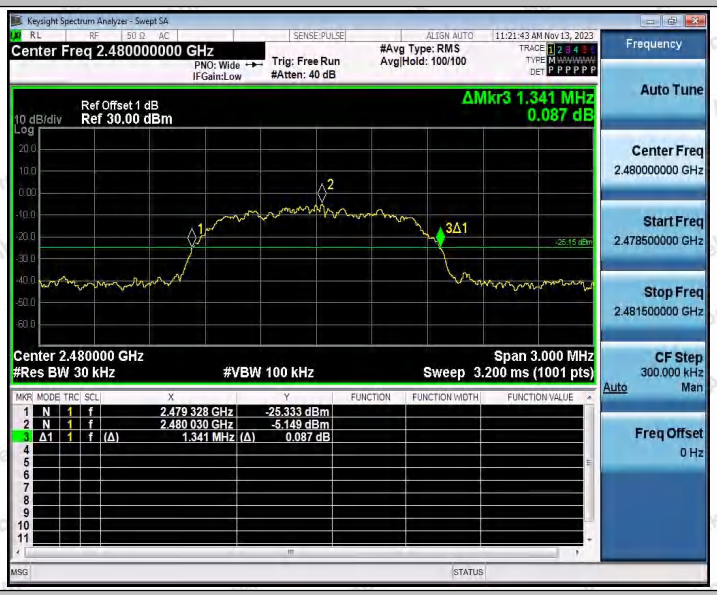
2DH5_Ant1_2402



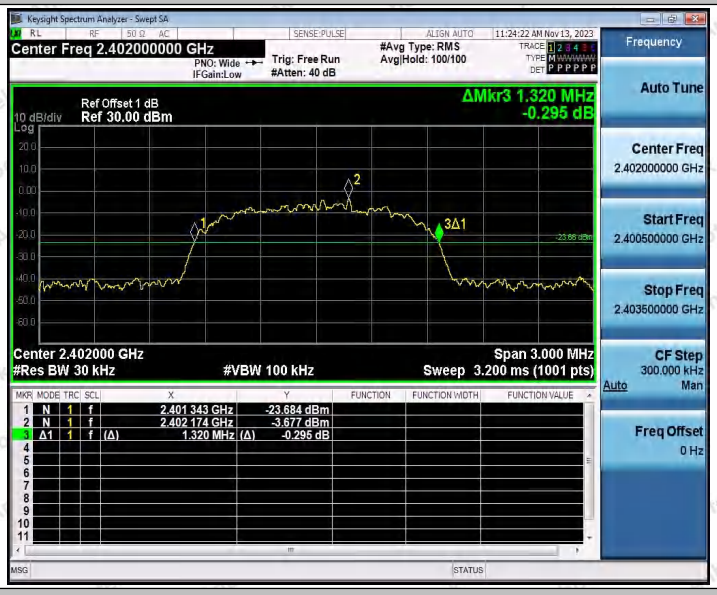
2DH5_Ant1_2441



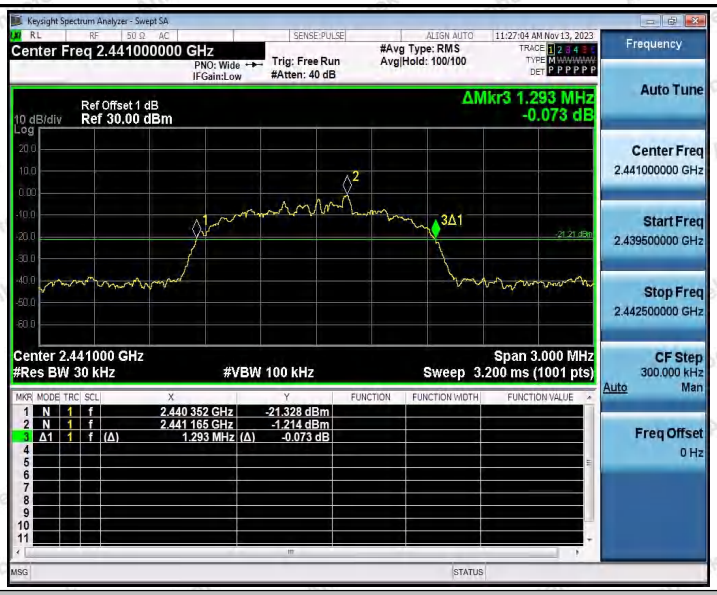
2DH5_Ant1_2480



3DH5_Ant1_2402



3DH5_Ant1_2441



3DH5_Ant1_2480

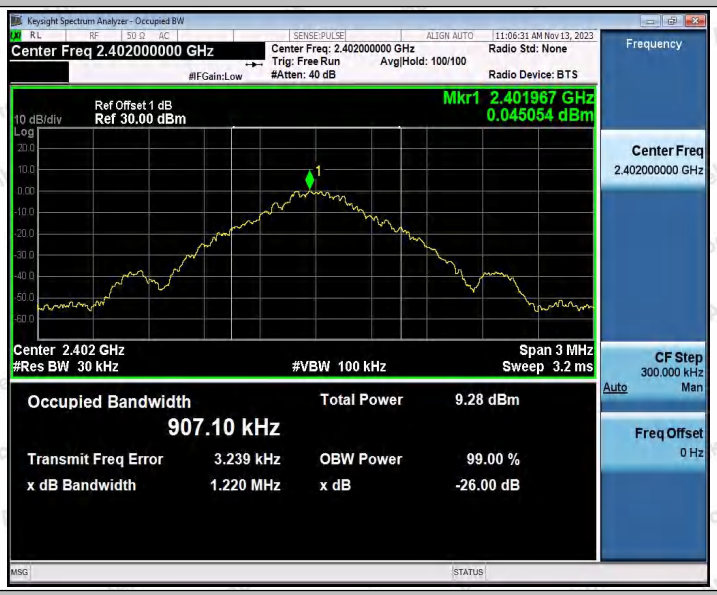
Appendix B: Occupied Channel Bandwidth

Test Result

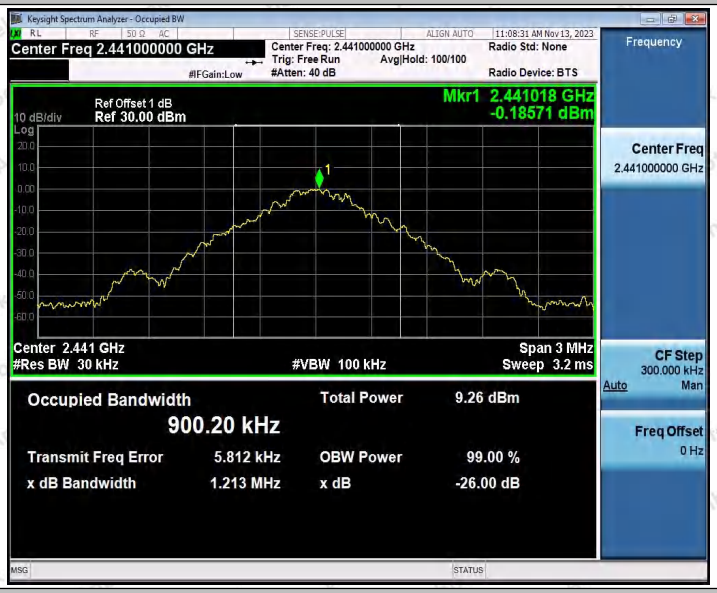
Test Mode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]
DH5	Ant1	2402	0.90710	2401.5497	2402.4568
		2441	0.90020	2440.5557	2441.4559
		2480	0.89462	2479.5579	2480.4525
2DH5	Ant1	2402	1.1937	2401.4077	2402.6014
		2441	1.2020	2440.3996	2441.6016
		2480	1.1922	2479.4038	2480.5960
3DH5	Ant1	2402	1.1914	2401.4061	2402.5975
		2441	1.2020	2440.3966	2441.5986
		2480	1.2005	2479.4008	2480.6013

Test Graphs

DH5_Ant1_2402

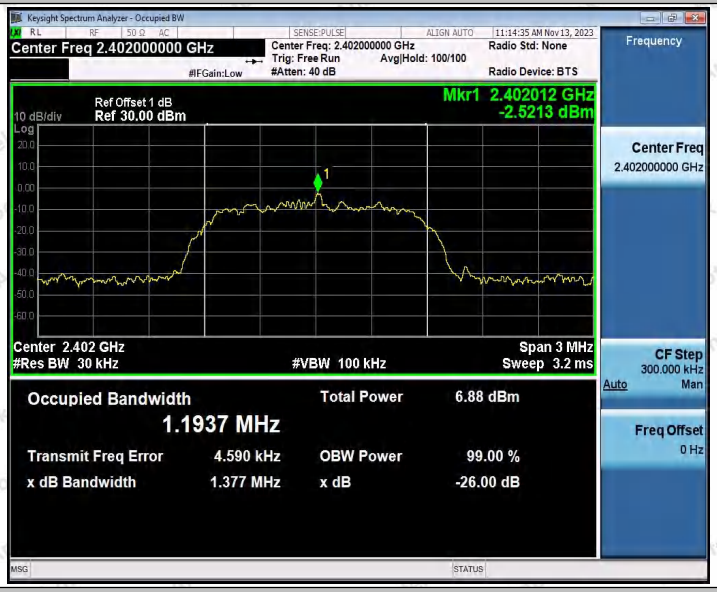


DH5_Ant1_2441

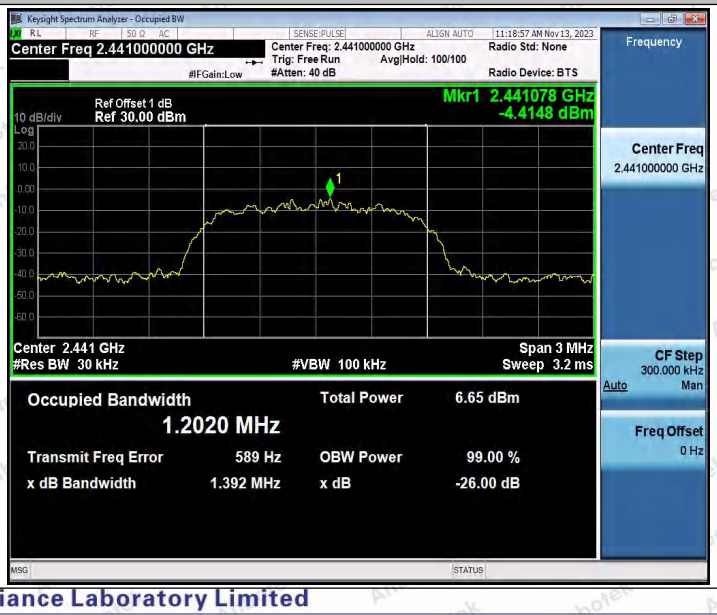


DH5_Ant1_2480

2DH5_Ant1_2402

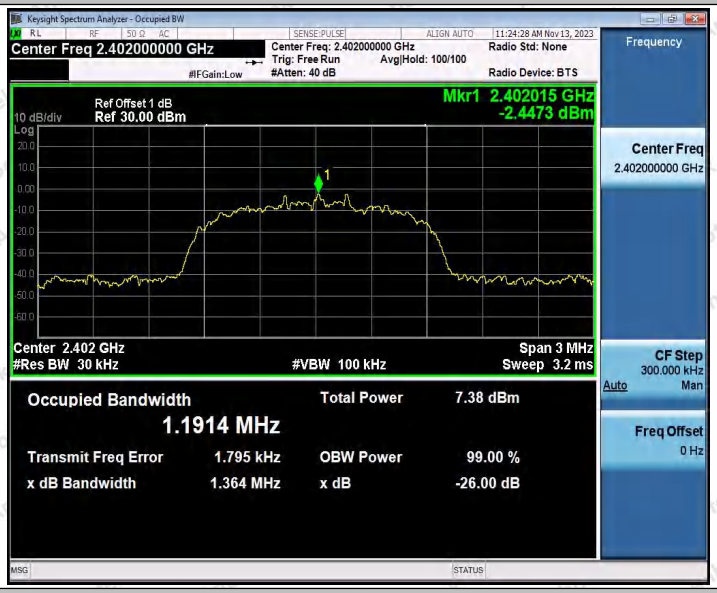


2DH5_Ant1_2441

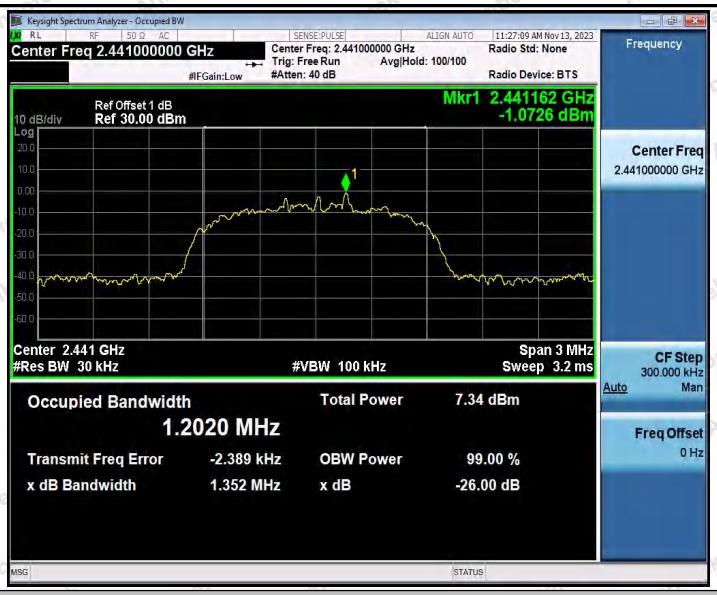


2DH5_Ant1_2480

3DH5_Ant1_2402



3DH5_Ant1_2441



3DH5_Ant1_2480

Appendix C: Maximum conducted output power

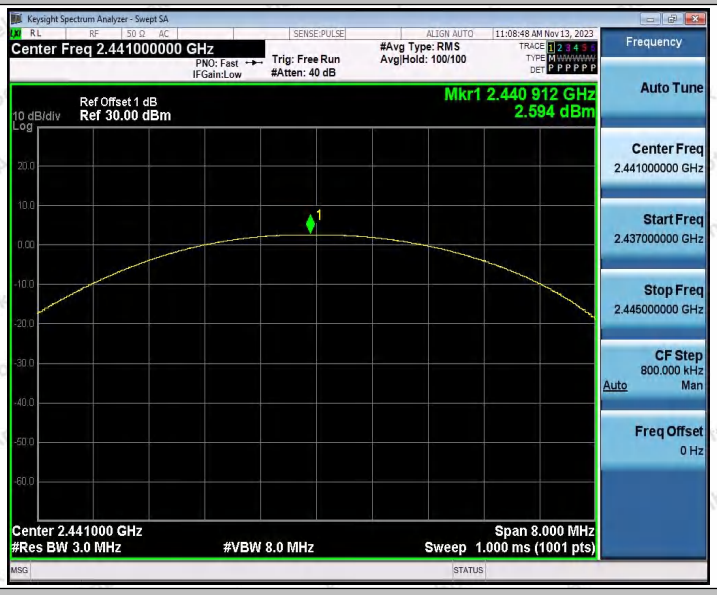
Test Result Peak

Test Mode	Antenna	Frequency[MHz]	Conducted Peak Power[dBm]	Conducted Limit[dBm]	Verdict
DH5	Ant1	2402	**2.95**	≤20.97	PASS
		2441	2.59	≤20.97	PASS
		2480	1.82	≤20.97	PASS
2DH5	Ant1	2402	2.22	≤20.97	PASS
		2441	1.94	≤20.97	PASS
		2480	1.20	≤20.97	PASS
3DH5	Ant1	2402	2.32	≤20.97	PASS
		2441	2.32	≤20.97	PASS
		2480	1.27	≤20.97	PASS

Test Graphs

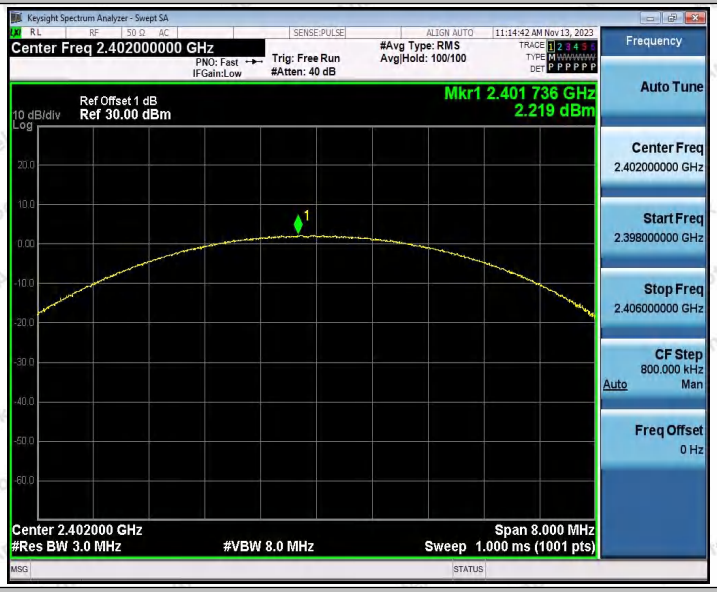
DH5_Ant1_2402

DH5_Ant1_2441

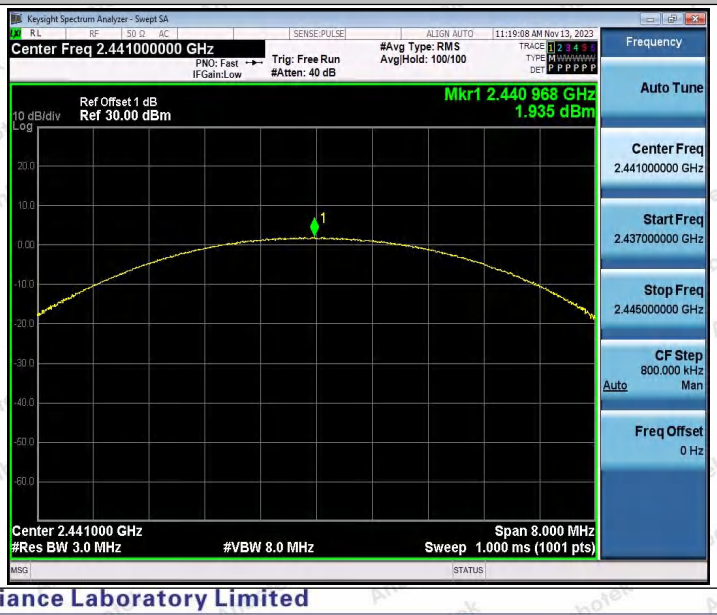


DH5_Ant1_2480

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	1.010	≥0.696	PASS
2DH5	Ant1	Hop	0.992	≥0.894	PASS
3DH5	Ant1	Hop	1.010	≥0.880	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
11:56:57 AM Nov 13, 2023
Ref Offset 1 dB
10 dB/div
Ref 30.00 dBm
ΔMkr2 1.010 MHz
-0.004 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

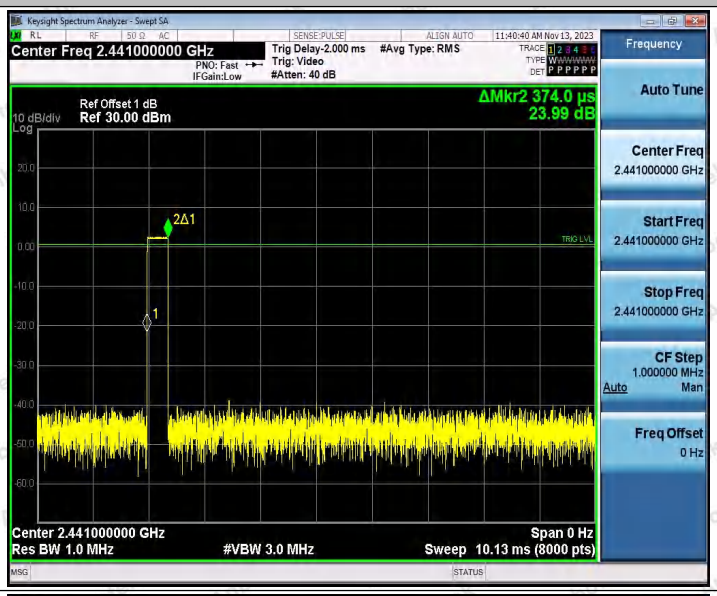
Appendix E: Time of occupancy

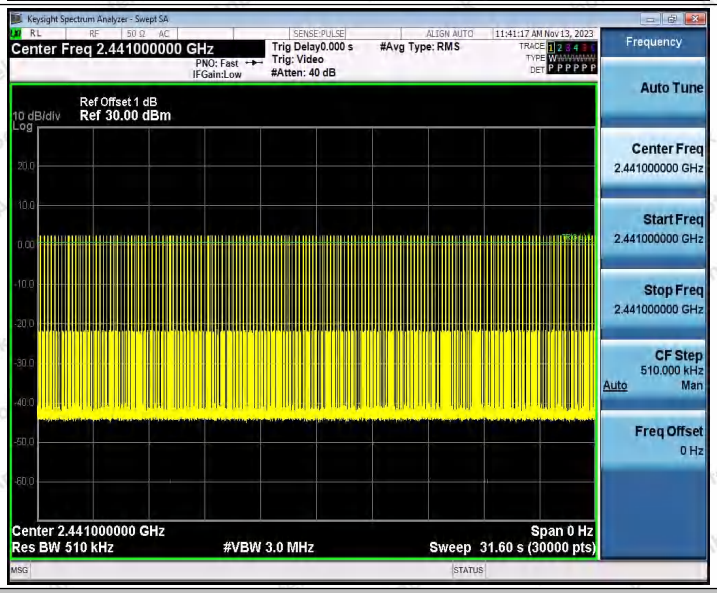
Test Result

TestMode	Antenna	Frequency[MHz]	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH1	Ant1	Hop	0.374	314	0.117	≤0.4	PASS
DH3	Ant1	Hop	1.629	158	0.257	≤0.4	PASS
DH5	Ant1	Hop	2.875	110	0.316	≤0.4	PASS
2DH1	Ant1	Hop	0.380	313	0.119	≤0.4	PASS
2DH3	Ant1	Hop	1.631	158	0.258	≤0.4	PASS
2DH5	Ant1	Hop	2.880	100	0.288	≤0.4	PASS
3DH1	Ant1	Hop	0.581	156	0.091	≤0.4	PASS
3DH3	Ant1	Hop	1.631	159	0.259	≤0.4	PASS
3DH5	Ant1	Hop	2.883	112	0.323	≤0.4	PASS

Test Graphs

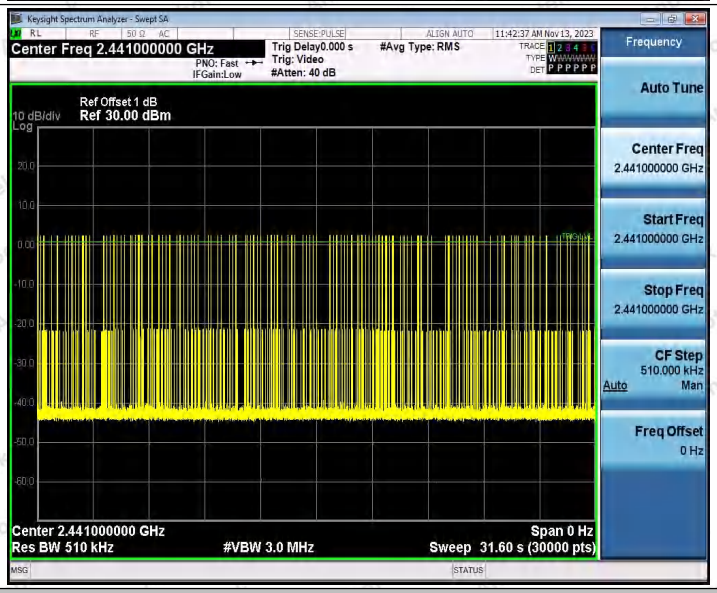
DH1_Ant1_Hop





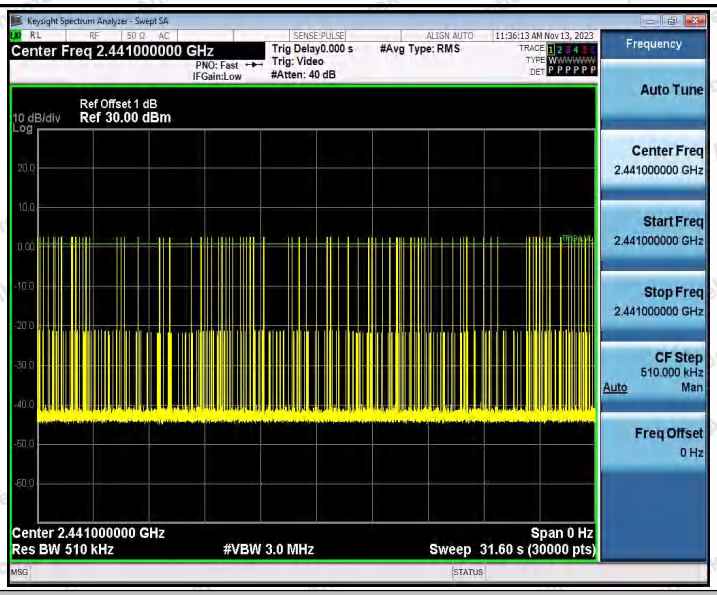
DH3_Ant1_Hop

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
7.26 dB
Center 2.441000000 GHz
Span 0 Hz
Res BW 1.0 MHz
#VBW 3.0 MHz
Sweep 10.13 ms (8000 pts)
Frequency
Auto Tune
Center Freq
2.441000000 GHz
Start Freq
2.441000000 GHz
Stop Freq
2.441000000 GHz
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz

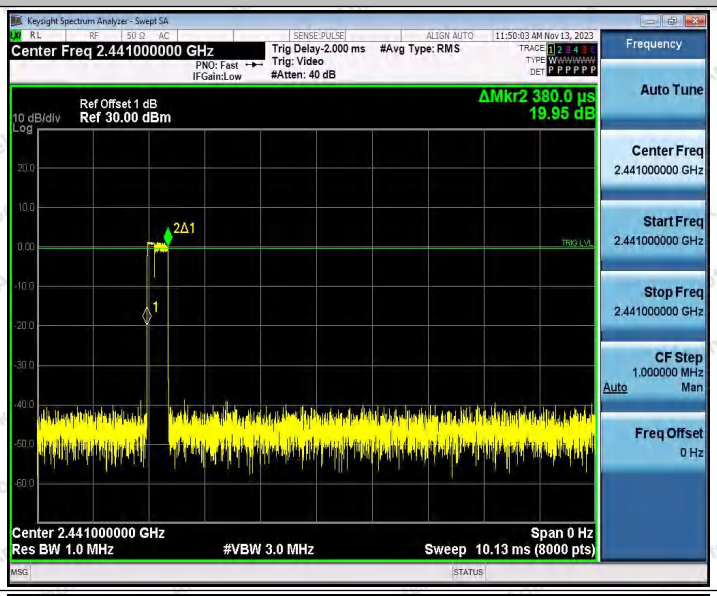

Keysight Spectrum Analyzer - Swept SA
Center Freq 2.441000000 GHz
Trig Delay0.000 s
#Avg Type: RMS
Trig: Video
#Atten: 40 dB
PNO: Fast
IFGain:Low
Ref Offset 1 dB
10 dB/div
Ref 30.00 dBm
Center 2.441000000 GHz
Span 0 Hz
Res BW 510 kHz
#VBW 3.0 MHz
Sweep 31.60 s (30000 pts)
Frequency
Auto Tune
Center Freq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

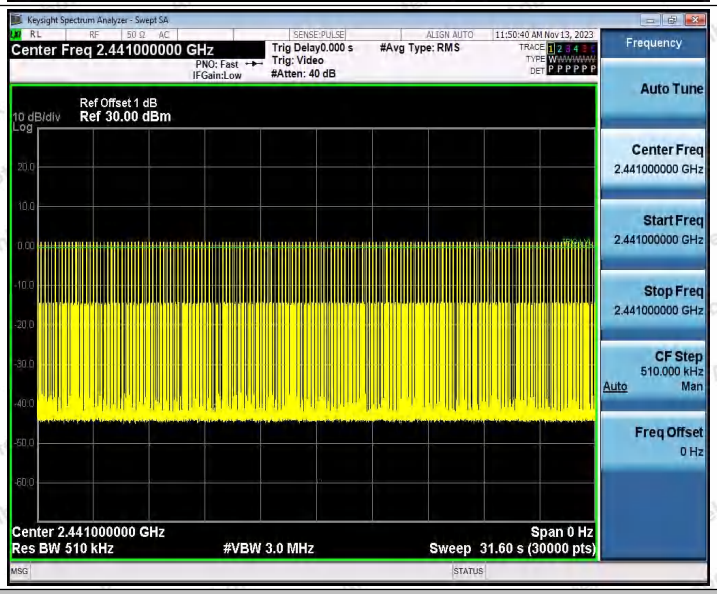
DH5_Ant1_Hop

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 2.875 ms
3.36 dB
Center 2.441000000 GHz
Span 0 Hz
Res BW 1.0 MHz
#VBW 3.0 MHz
Sweep 10.13 ms (8000 pts)
Frequency
Auto Tune
Center Freq
2.441000000 GHz
Start Freq
2.441000000 GHz
Stop Freq
2.441000000 GHz
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz

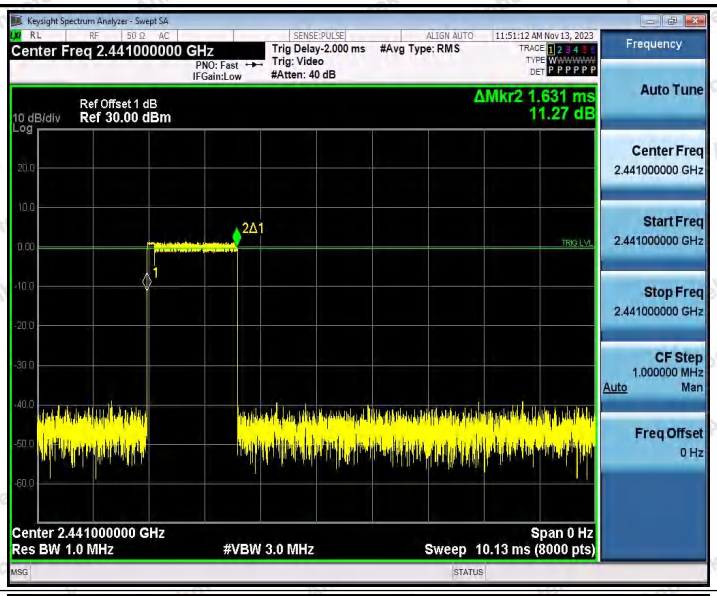


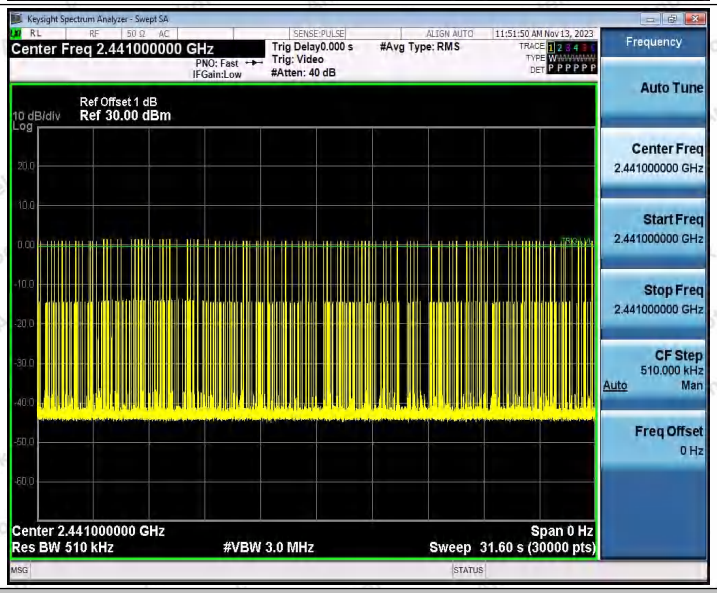
2DH1_Ant1_Hop



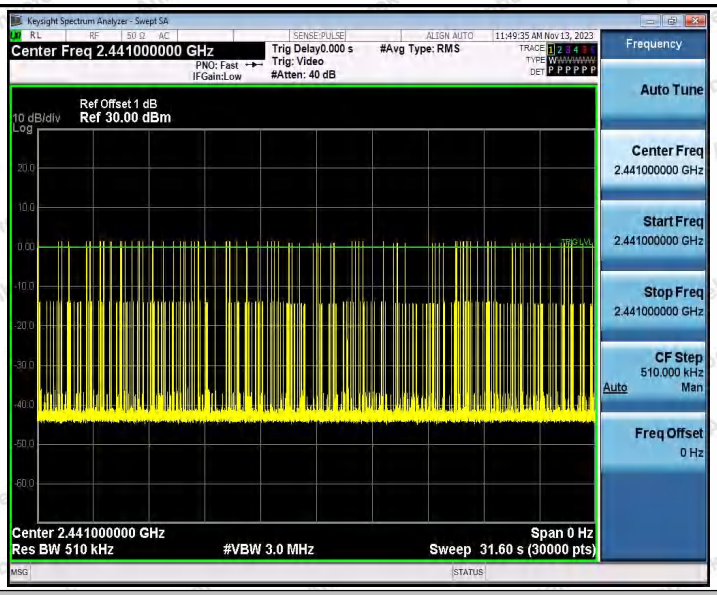


2DH3_Ant1_Hop

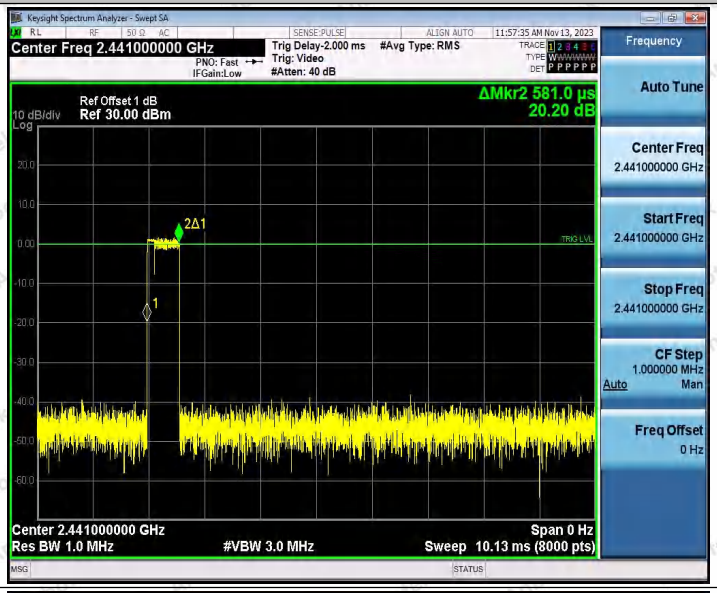


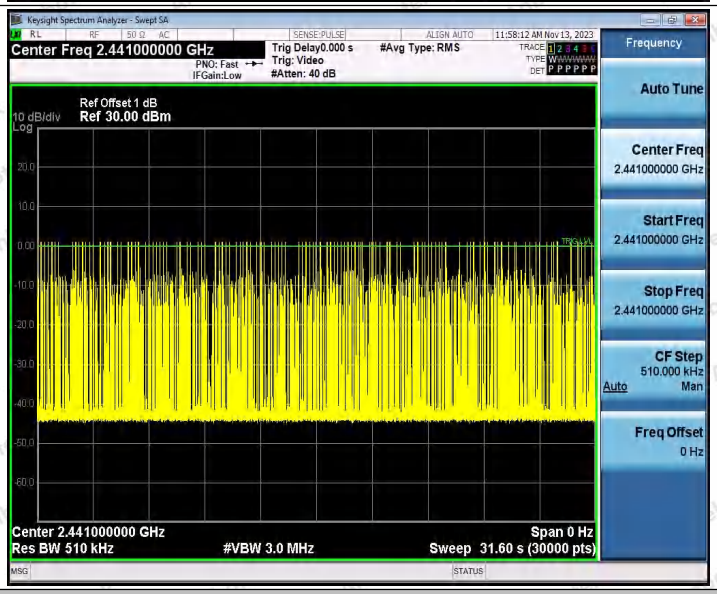


2DH5_Ant1_Hop

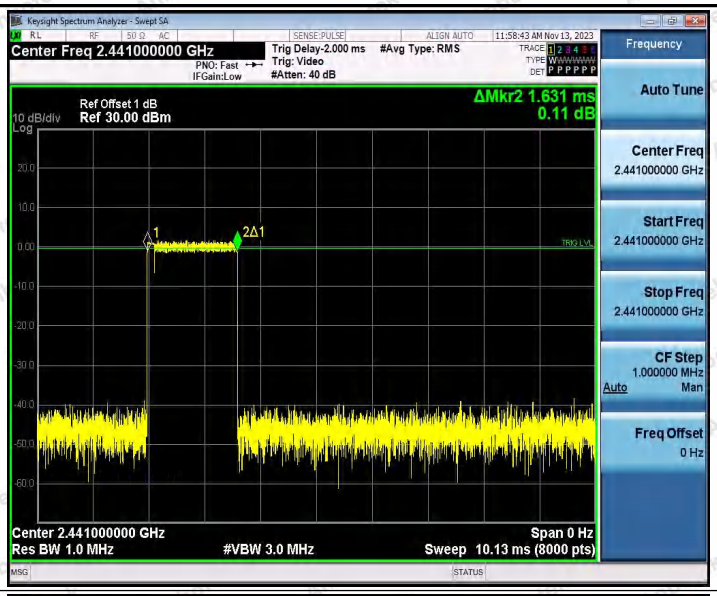


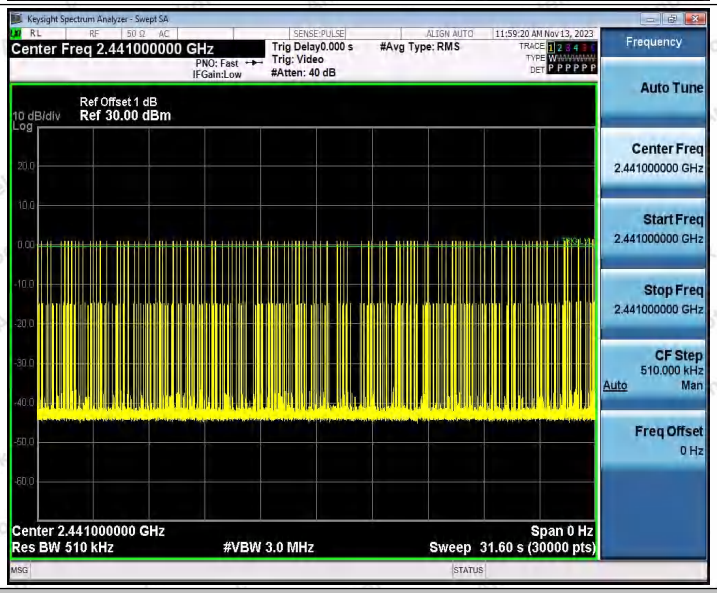
3DH1_Ant1_Hop



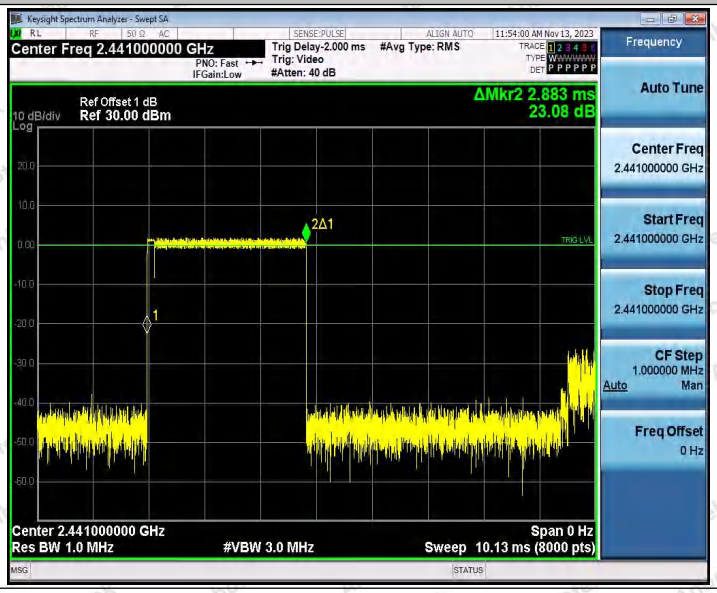


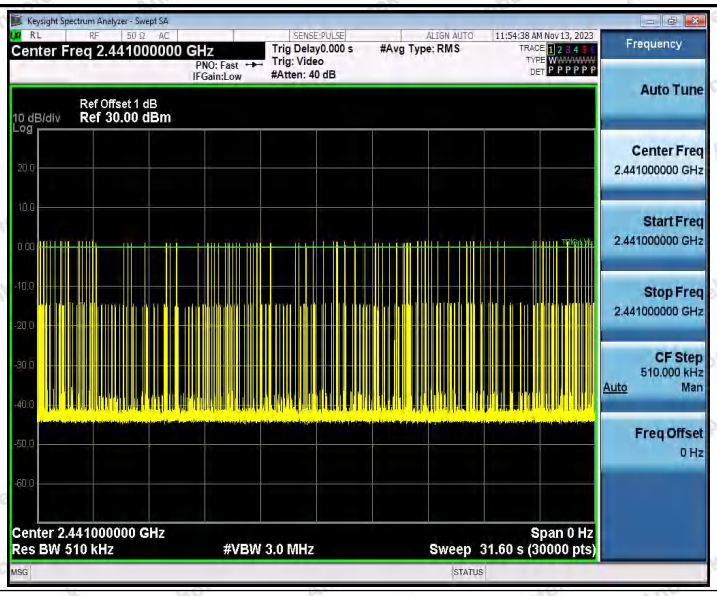
3DH3_Ant1_Hop





3DH5_Ant1_Hop




Keysight Spectrum Analyzer - Swept SA
Center Freq 2.441000000 GHz
Trig Delay0.000 s
Trig: Video
#Atten: 40 dB
#Avg Type: RMS
11:54:38 AM Nov 13, 2023
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)
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

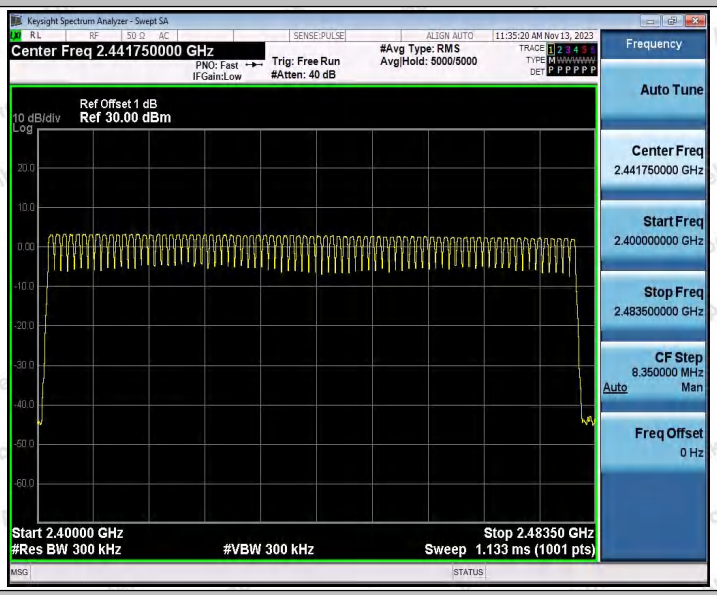
Appendix F: Number of hopping channels

Test Result

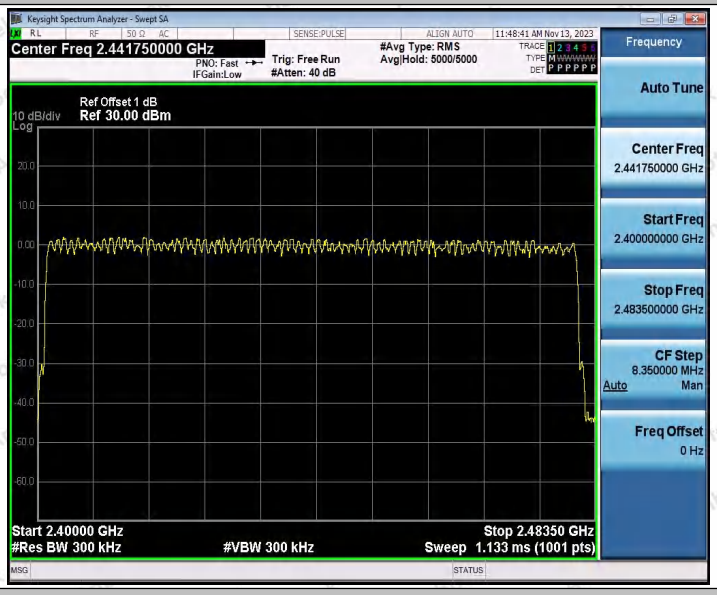
Test Mode	Antenna	Frequency[MHz]	Result[Num]	Limit[Num]	Verdict
DH5	Ant1	Hop	79	≥15	PASS
2DH5	Ant1	Hop	79	≥15	PASS
3DH5	Ant1	Hop	79	≥15	PASS

Test Graphs

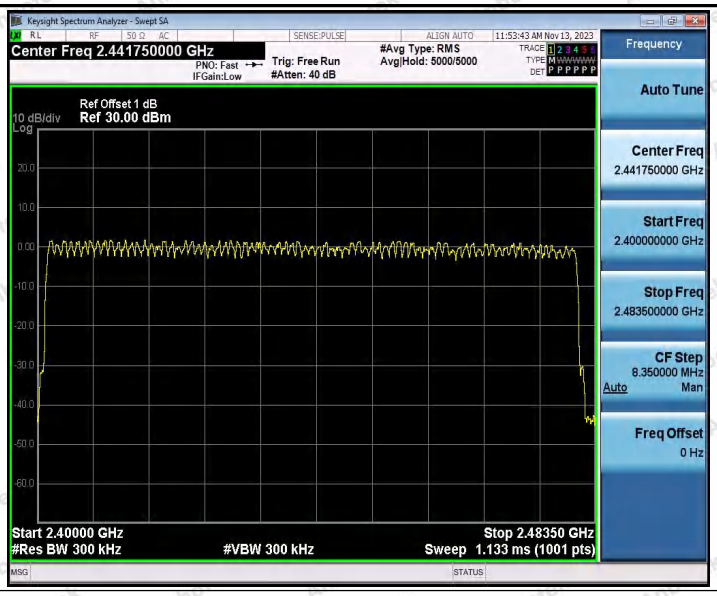
DH5_Ant1_Hop



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
11:53:43 AM Nov 13, 2023
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

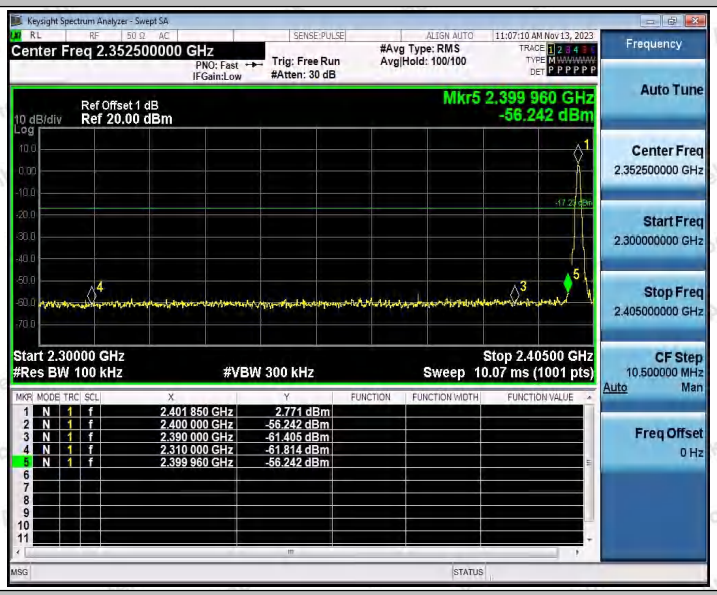
Appendix G: Band edge measurements

Test Result

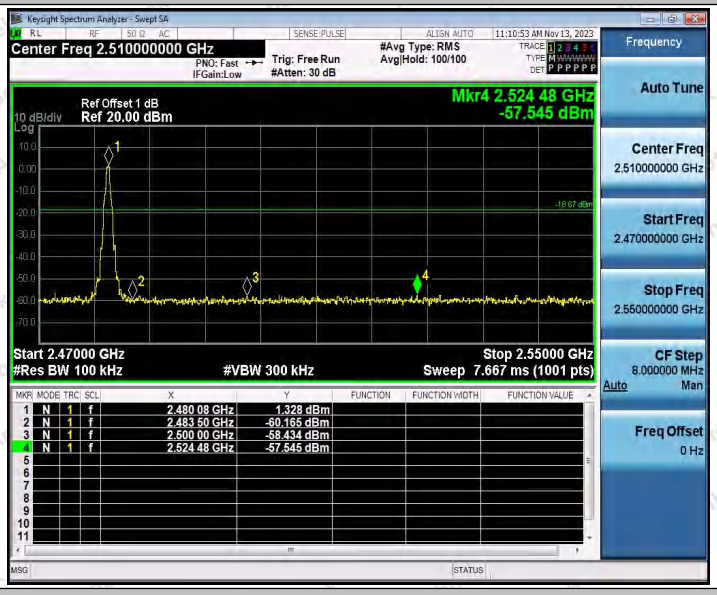
Test Mode	Antenna	Ch Name	Frequency[MHz]	Ref Level [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	Low	2402	2.77	-56.24	≤-17.23	PASS
		High	2480	1.33	-57.55	≤-18.67	PASS
		Low	Hop_2402	2.64	-57.26	≤-17.36	PASS
		High	Hop_2480	1.65	-57.04	≤-18.35	PASS
2DH5	Ant1	Low	2402	1.31	-55.49	≤-18.69	PASS
		High	2480	0.27	-56.59	≤-19.73	PASS
		Low	Hop_2402	-2.20	-56.64	≤-22.2	PASS
		High	Hop_2480	0.35	-56.71	≤-19.65	PASS
3DH5	Ant1	Low	2402	-1.88	-54.86	≤-21.88	PASS
		High	2480	-1.44	-57.09	≤-21.44	PASS
		Low	Hop_2402	0.50	-57.19	≤-19.5	PASS
		High	Hop_2480	0.86	-56.59	≤-19.14	PASS

Test Graphs

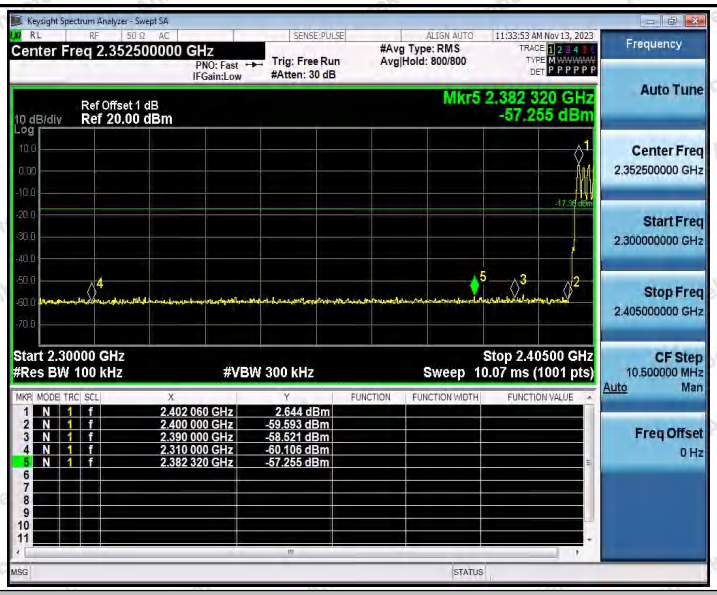
DH5_Ant1_Low_2402



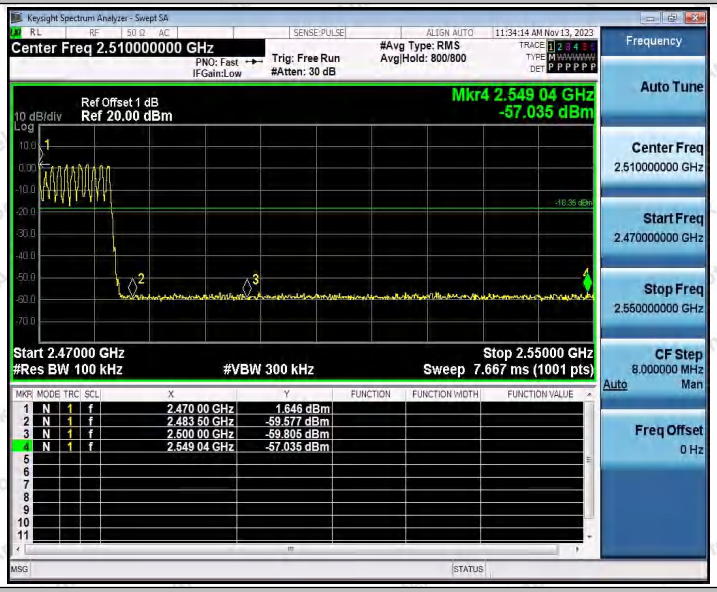
DH5_Ant1_High_2480



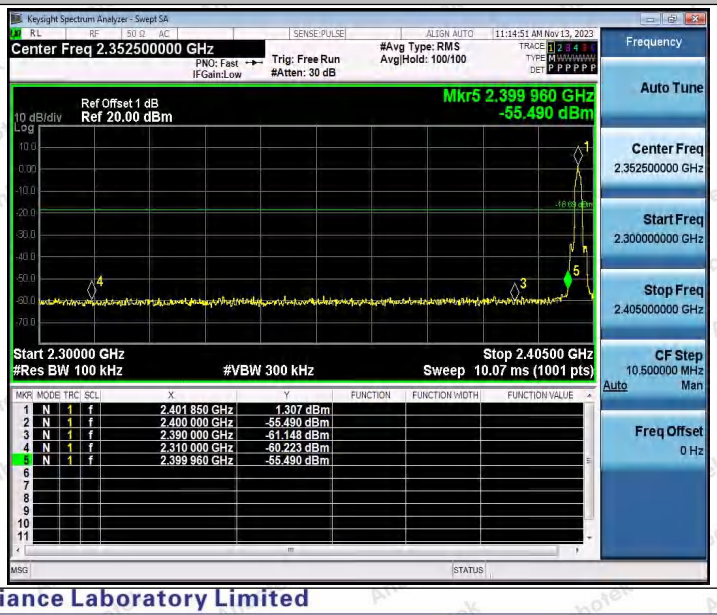
DH5_Ant1_Low_Hop_2402



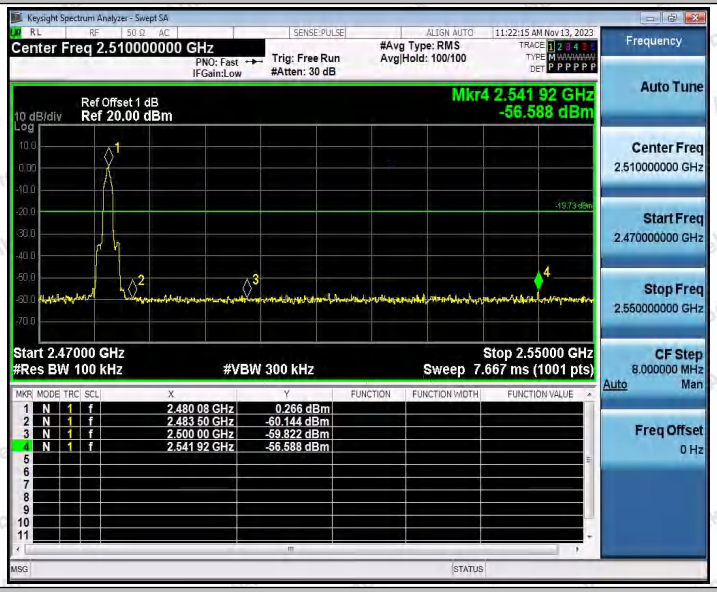
DH5_Ant1_High_Hop_2480



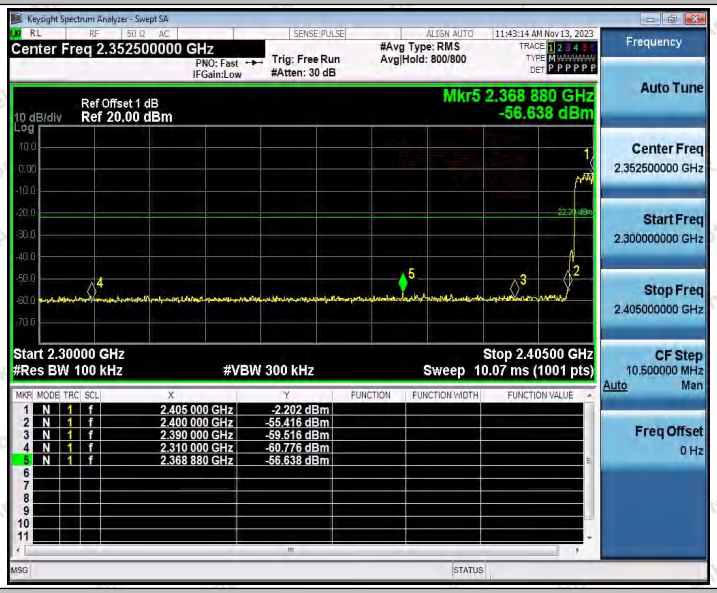
2DH5_Ant1_Low_2402



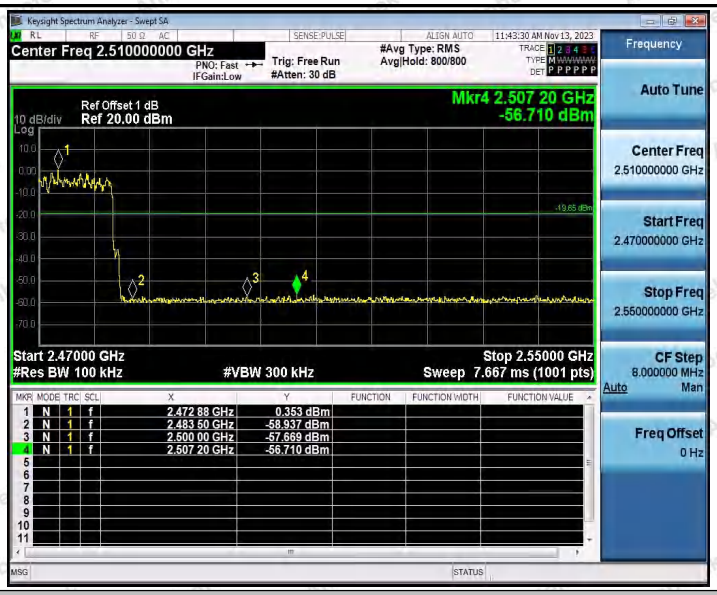
2DH5_Ant1_High_2480



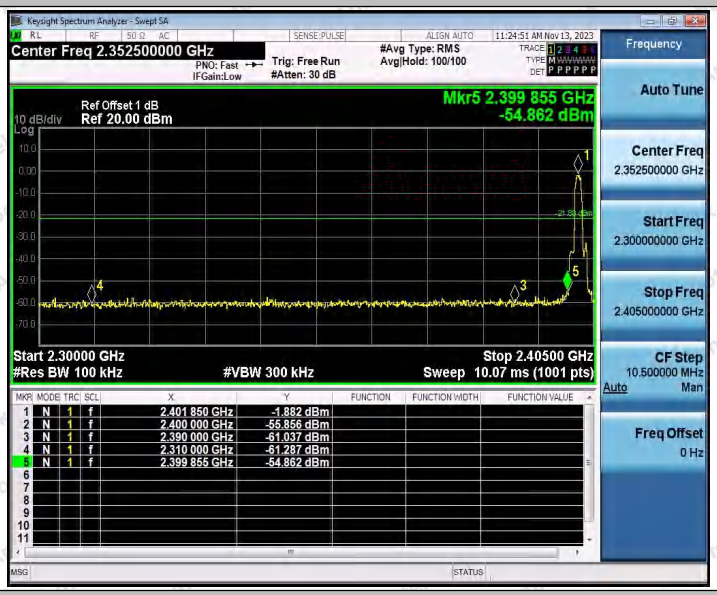
2DH5_Ant1_Low_Hop_2402



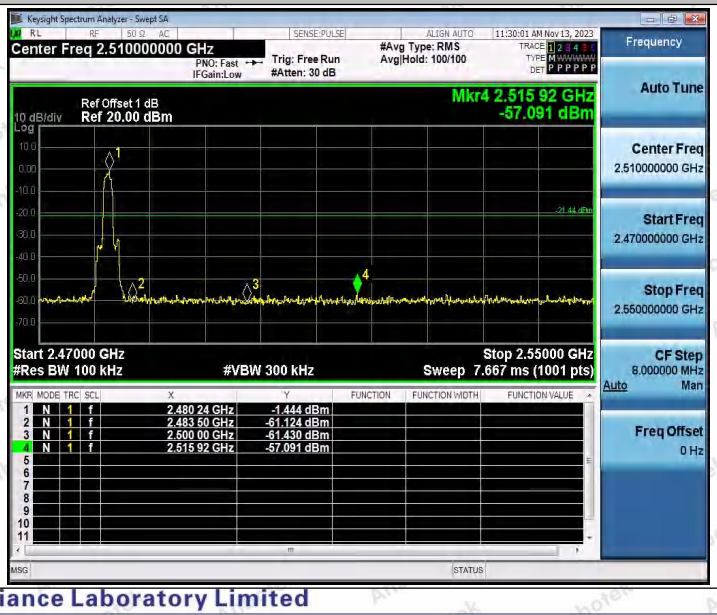
2DH5_Ant1_High_Hop_2480



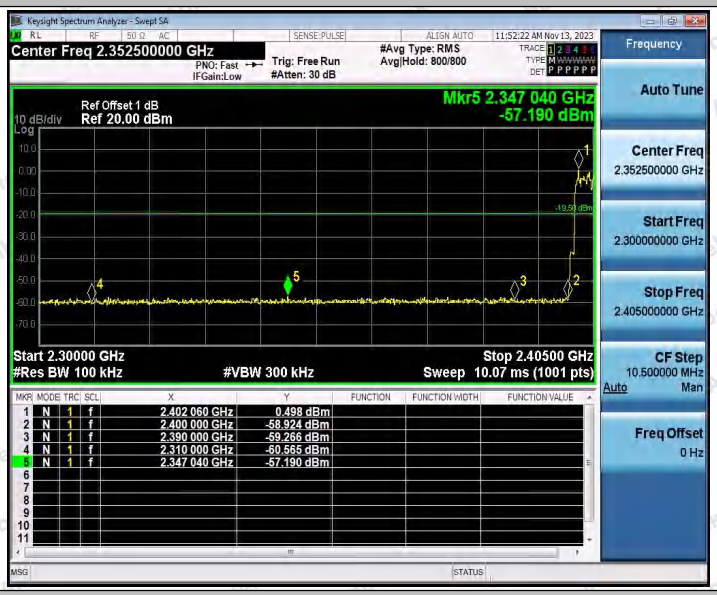
3DH5_Ant1_Low_2402



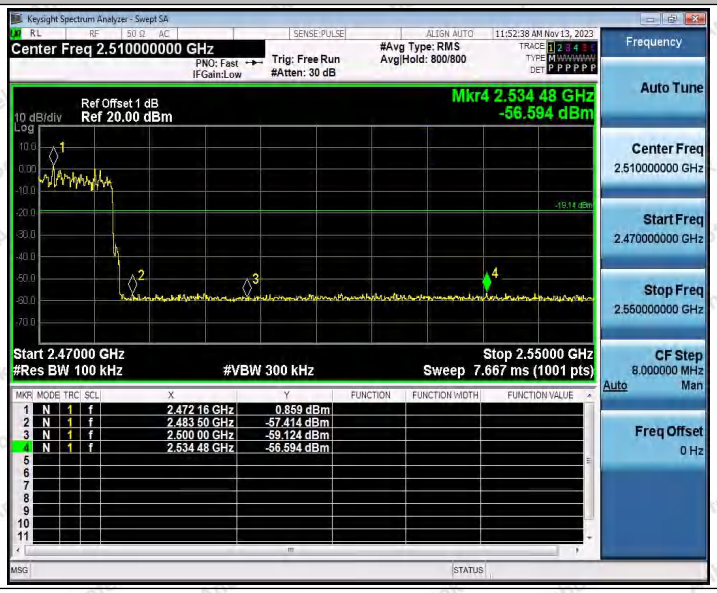
3DH5_Ant1_High_2480



3DH5_Ant1_Low_Hop_2402



3DH5_Ant1_High_Hop_2480



Appendix H: Conducted Spurious Emission

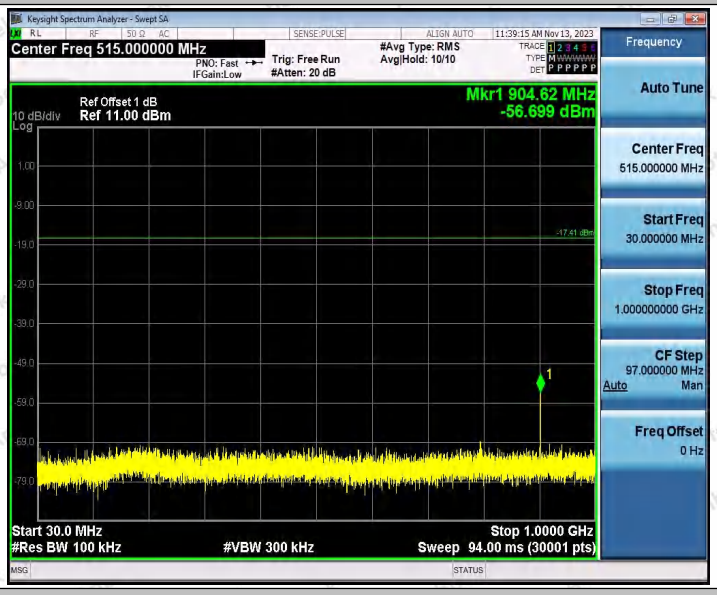
Test Result

Test Mode	Antenna	Frequency[MHz]	Freq Range [MHz]	Ref Level [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	2402	Reference	2.59	2.59	---	PASS
			30~1000	2.59	-56.7	≤-17.41	PASS
			1000~26500	2.59	-53.65	≤-17.41	PASS
		2441	Reference	2.31	2.31	---	PASS
			30~1000	2.31	-69.35	≤-17.69	PASS
			1000~26500	2.31	-53.71	≤-17.69	PASS
		2480	Reference	1.57	1.57	---	PASS
			30~1000	1.57	-69.13	≤-18.43	PASS
			1000~26500	1.57	-53.2	≤-18.43	PASS
2DH5	Ant1	2402	Reference	1.26	1.26	---	PASS
			30~1000	1.26	-68.76	≤-18.74	PASS
			1000~26500	1.26	-53.67	≤-18.74	PASS
		2441	Reference	1.31	1.31	---	PASS
			30~1000	1.31	-68.56	≤-18.69	PASS
			1000~26500	1.31	-53.84	≤-18.69	PASS
		2480	Reference	0.40	0.40	---	PASS
			30~1000	0.40	-69.44	≤-19.6	PASS
			1000~26500	0.40	-53.9	≤-19.6	PASS
3DH5	Ant1	2402	Reference	1.25	1.25	---	PASS
			30~1000	1.25	-68.73	≤-18.75	PASS
			1000~26500	1.25	-53.1	≤-18.75	PASS
		2441	Reference	1.37	1.37	---	PASS
			30~1000	1.37	-68.84	≤-18.63	PASS
			1000~26500	1.37	-53.23	≤-18.63	PASS
		2480	Reference	0.40	0.40	---	PASS
			30~1000	0.40	-68.81	≤-19.6	PASS
			1000~26500	0.40	-53.72	≤-19.6	PASS

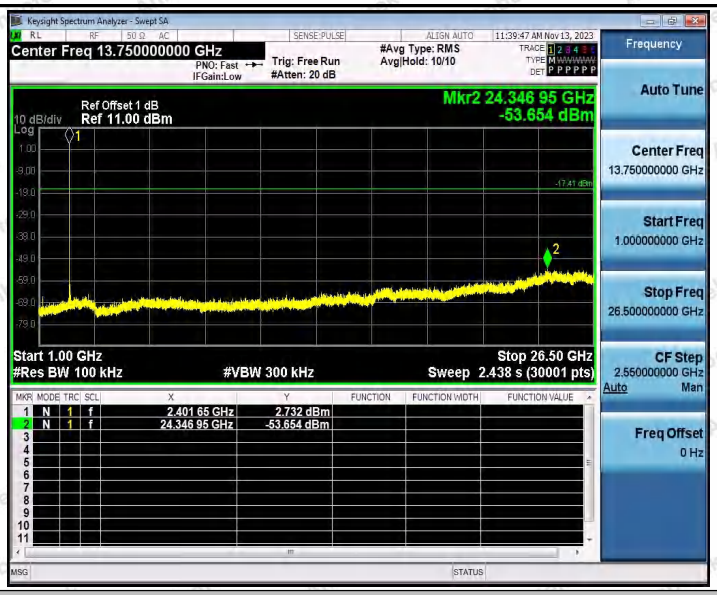
Test Graphs

DH5_Ant1_2402_0~Reference

DH5_Ant1_2402_30~1000

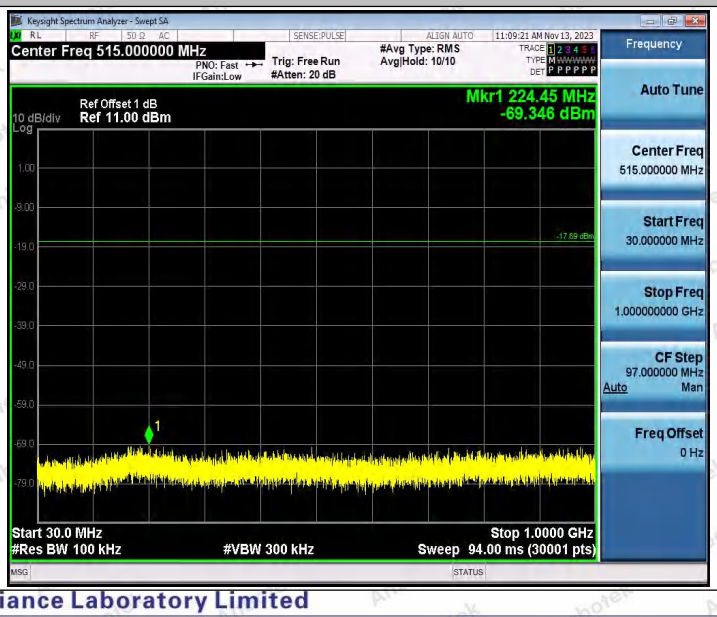


DH5_Ant1_2402_1000~26500

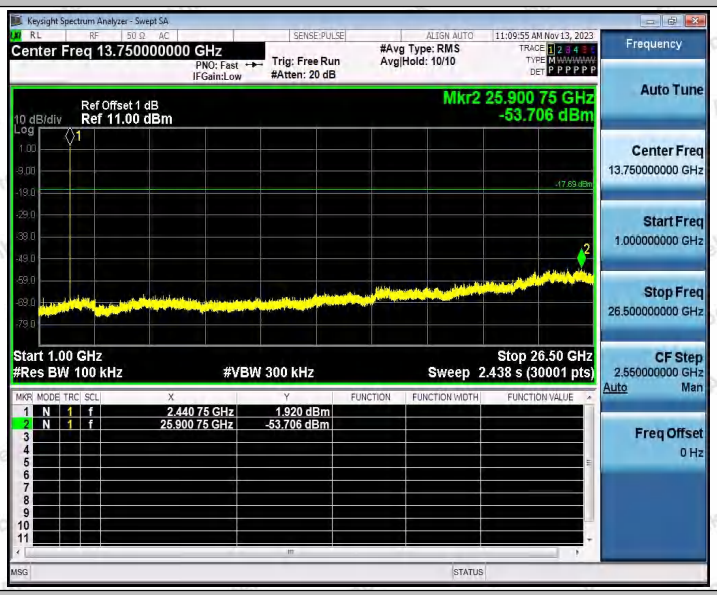


DH5_Ant1_2441_0~Reference

DH5_Ant1_2441_30~1000

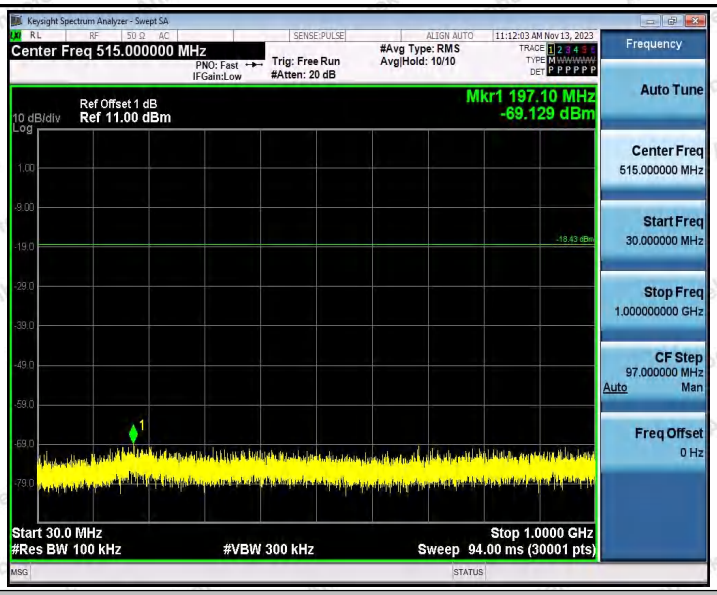


DH5_Ant1_2441_1000~26500

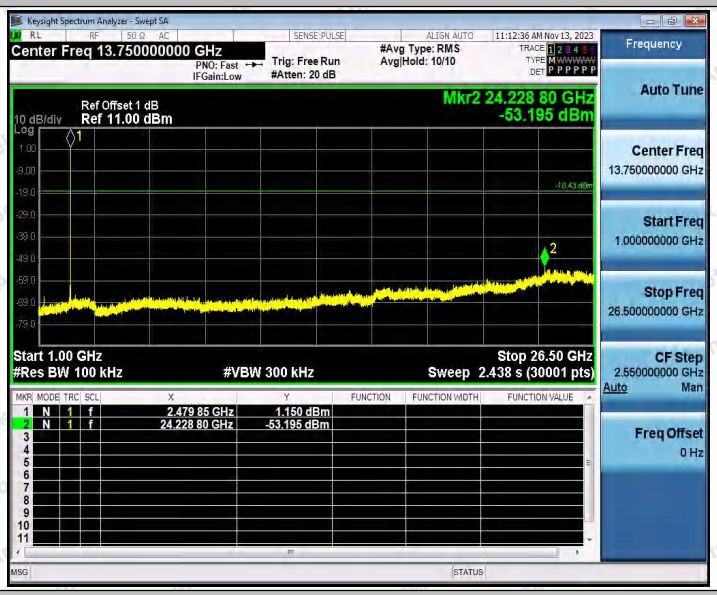


DH5_Ant1_2480_0~Reference

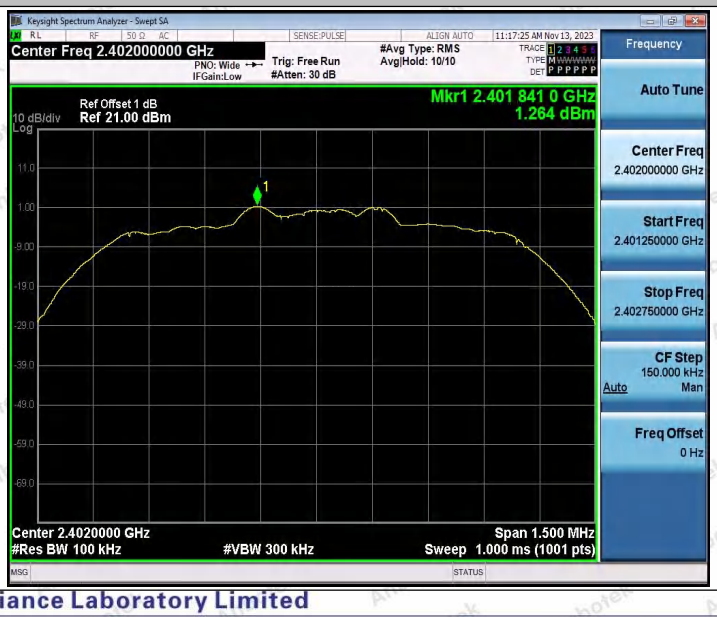
DH5_Ant1_2480_30~1000



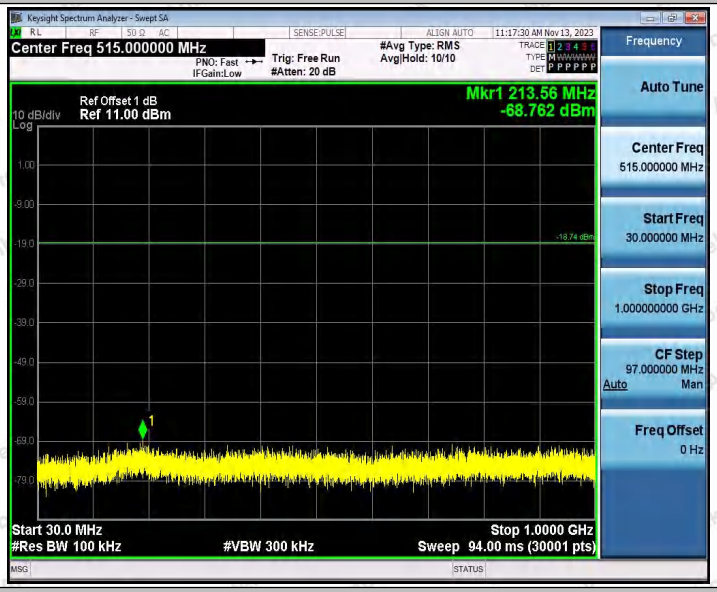
DH5_Ant1_2480_1000~26500



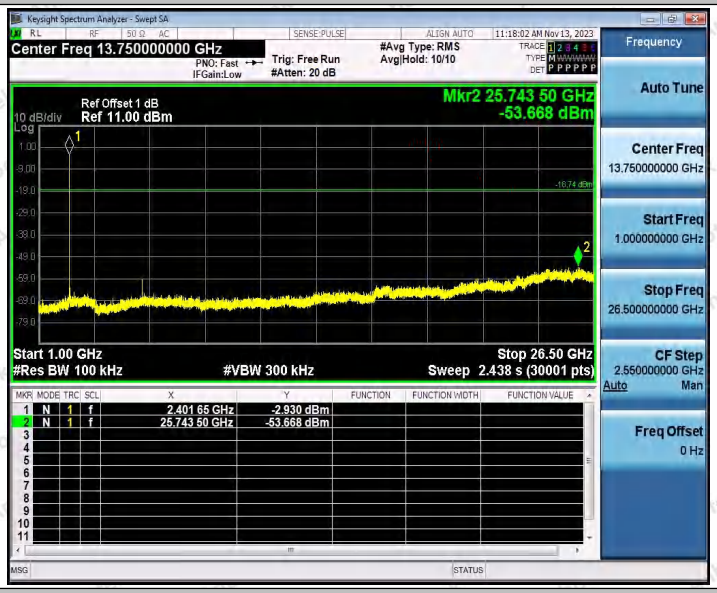
2DH5_Ant1_2402_0~Reference



2DH5_Ant1_2402_30~1000

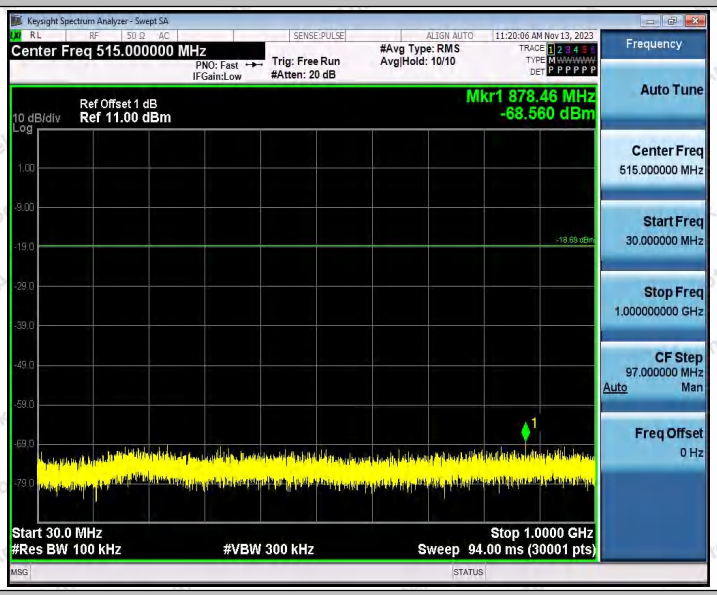


2DH5_Ant1_2402_1000~26500

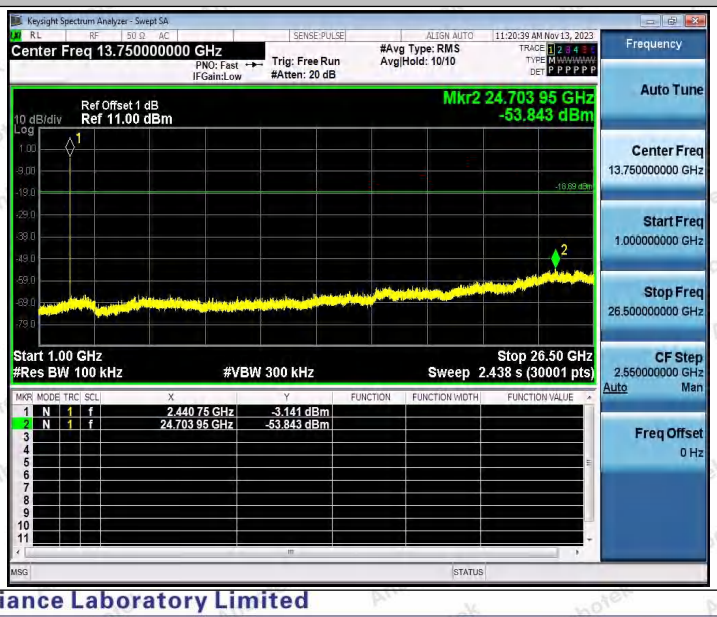


2DH5_Ant1_2441_0~Reference

2DH5_Ant1_2441_30~1000



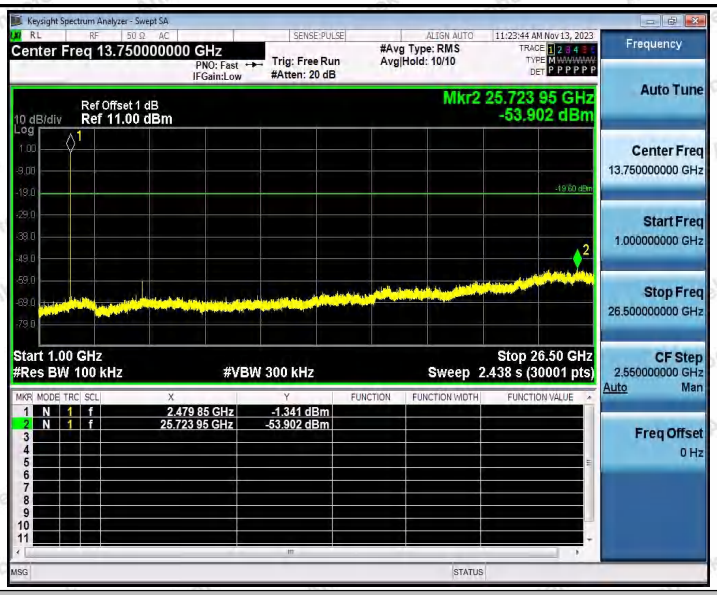
2DH5_Ant1_2441_1000~26500



2DH5_Ant1_2480_0~Reference

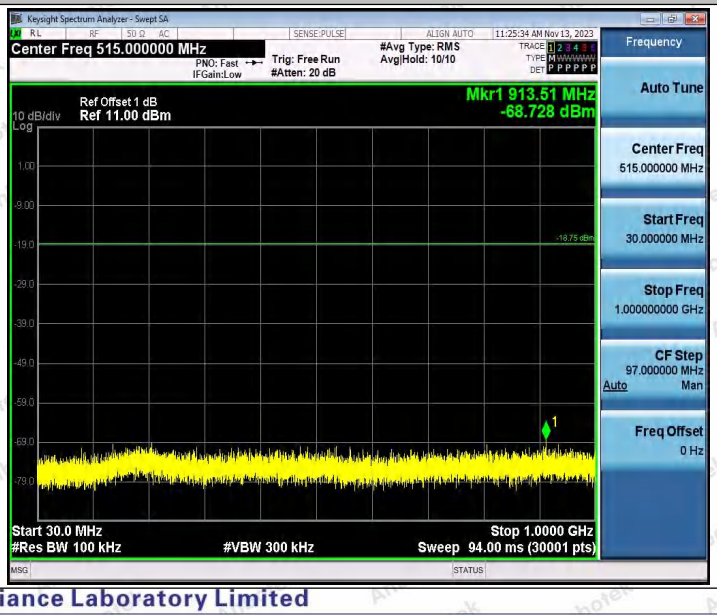
2DH5_Ant1_2480_30~1000

2DH5_Ant1_2480_1000~26500

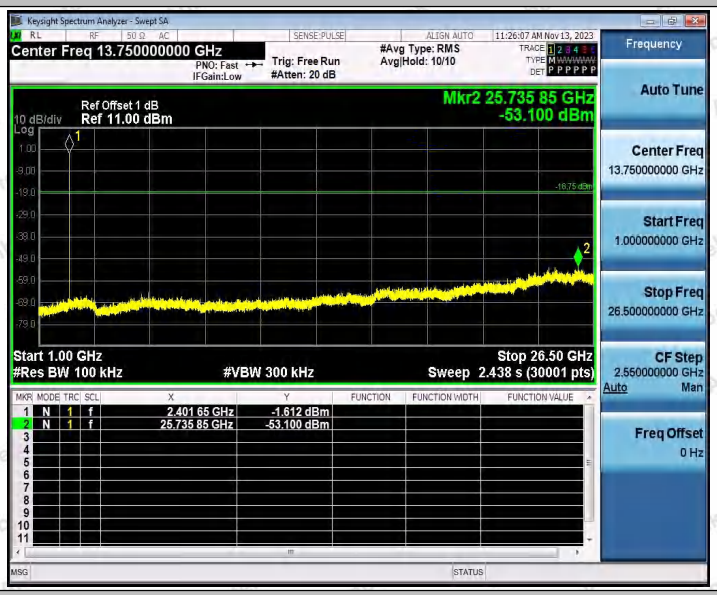


3DH5_Ant1_2402_0~Reference

3DH5_Ant1_2402_30~1000

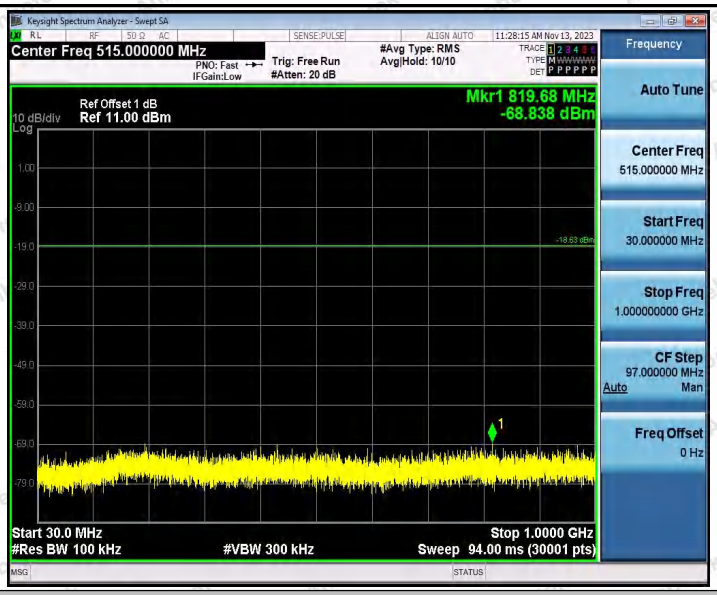


3DH5_Ant1_2402_1000~26500

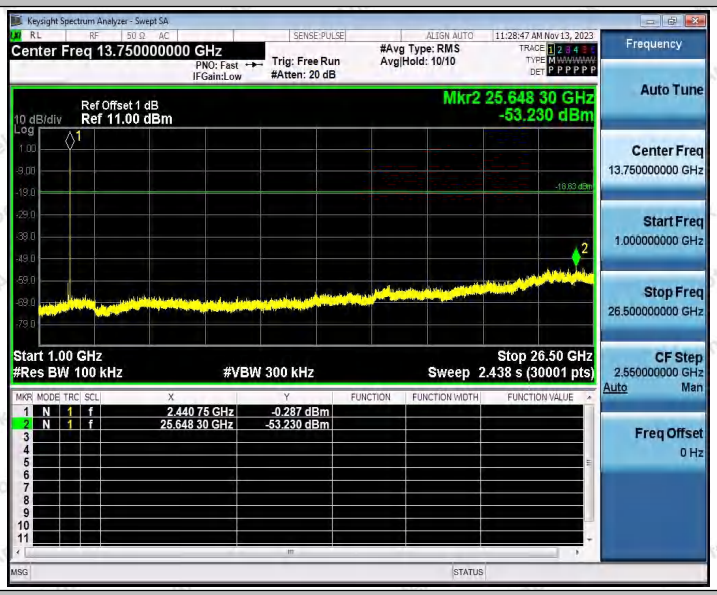


3DH5_Ant1_2441_0~Reference

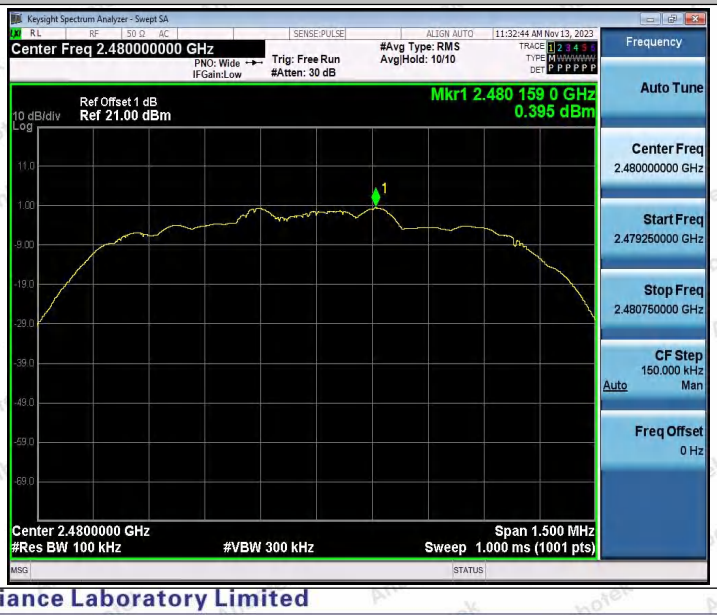
3DH5_Ant1_2441_30~1000



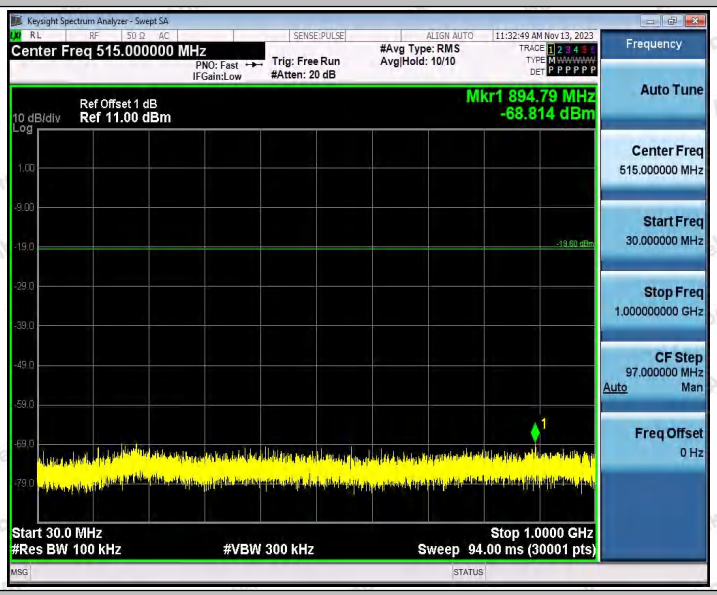
3DH5_Ant1_2441_1000~26500



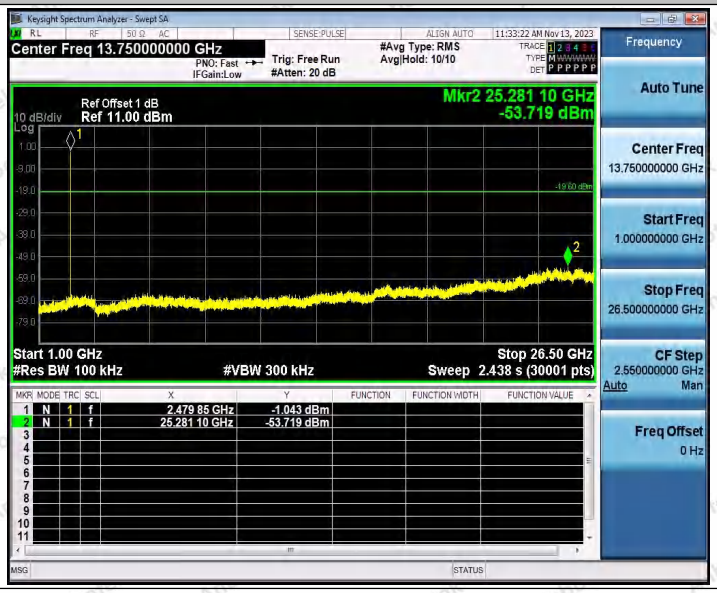
3DH5_Ant1_2480_0~Reference



3DH5_Ant1_2480_30~1000



3DH5_Ant1_2480_1000~26500



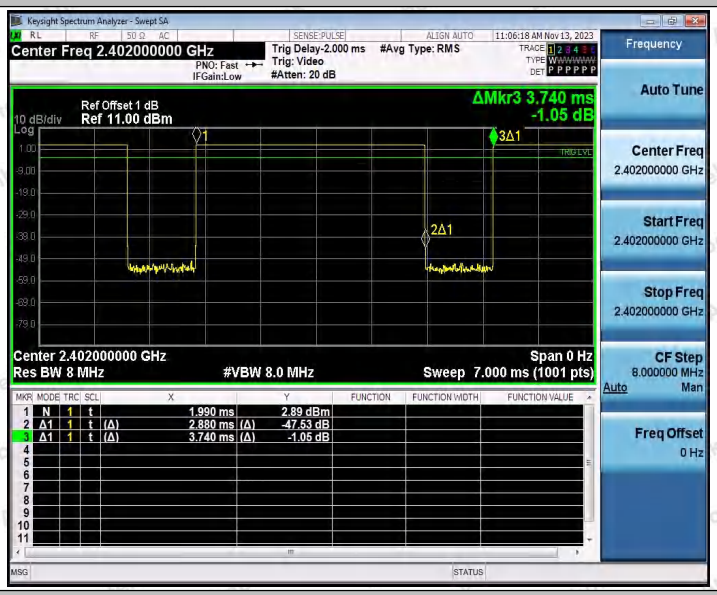
Appendix I: Duty Cycle

Test Result

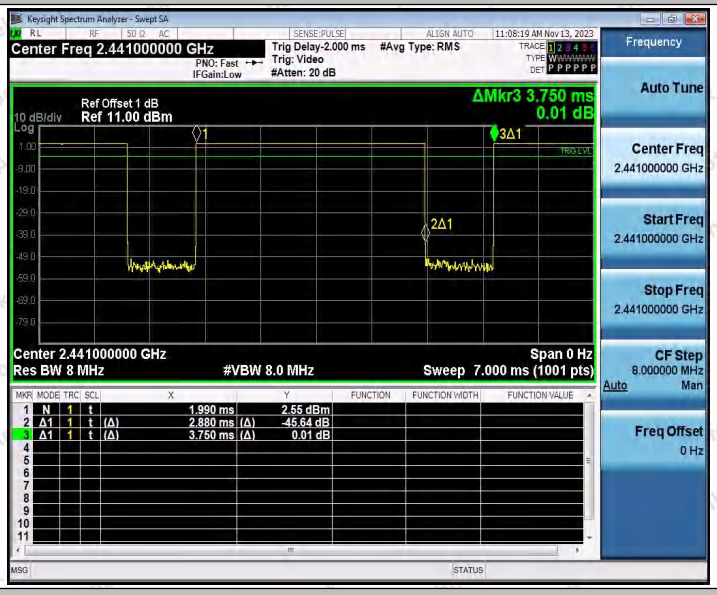
Test Mode	Antenna	Frequency[MHz]	ON Time [ms]	Period [ms]	Duty Cycle [%]	Duty Cycle Factor[dB]
DH5	Ant1	2402	2.88	3.74	77.01	1.13
		2441	2.88	3.75	76.80	1.15
		2480	2.88	3.75	76.80	1.15
2DH5	Ant1	2402	2.88	3.75	76.80	1.15
		2441	2.88	3.75	76.80	1.15
		2480	2.88	3.75	76.80	1.15
3DH5	Ant1	2402	2.88	3.74	77.01	1.13
		2441	2.89	3.75	77.07	1.13
		2480	2.88	3.74	77.01	1.13

Test Graphs

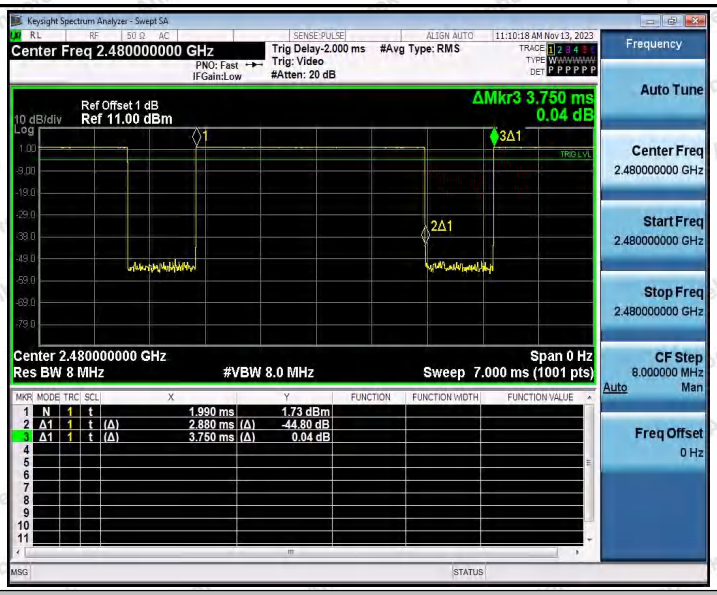
DH5_Ant1_2402



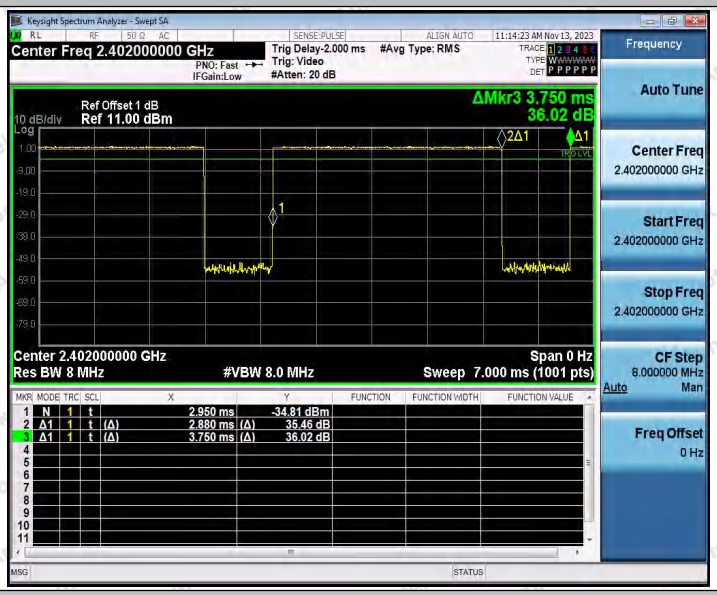
DH5_Ant1_2441



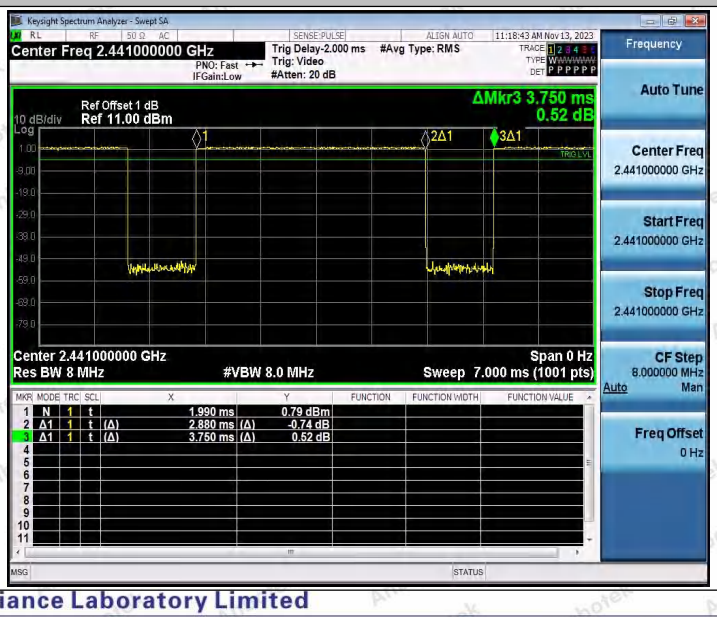
DH5_Ant1_2480



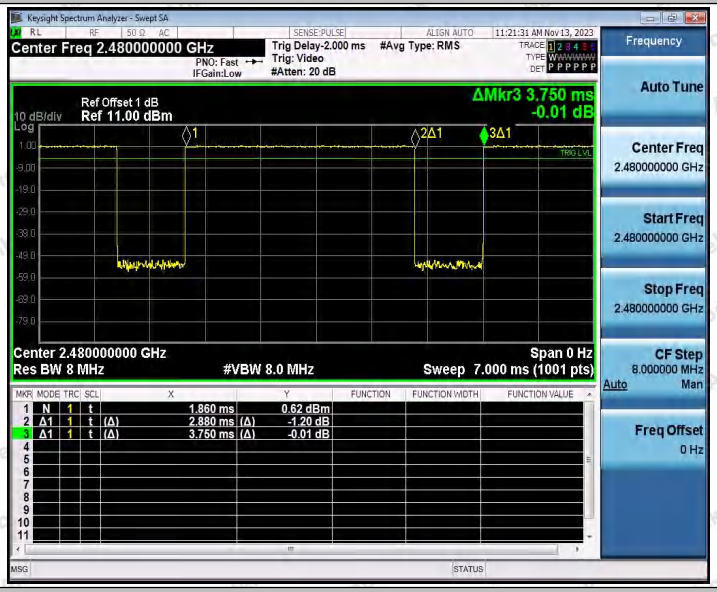
2DH5_Ant1_2402



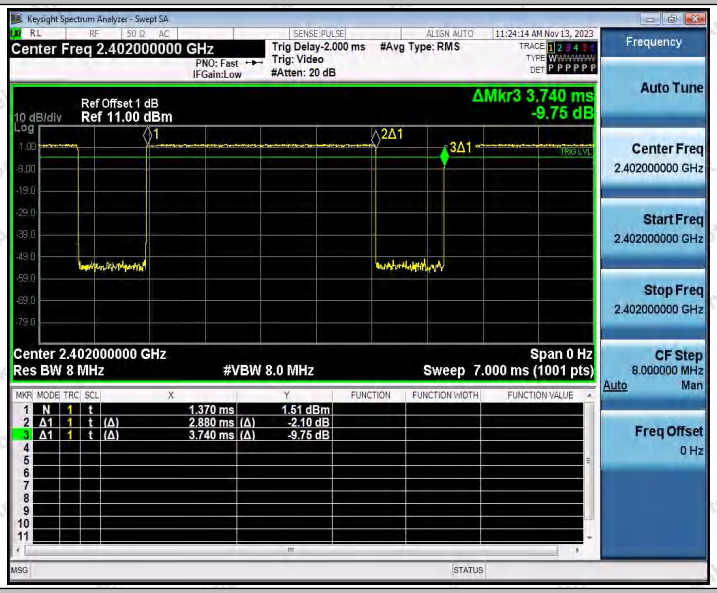
2DH5_Ant1_2441



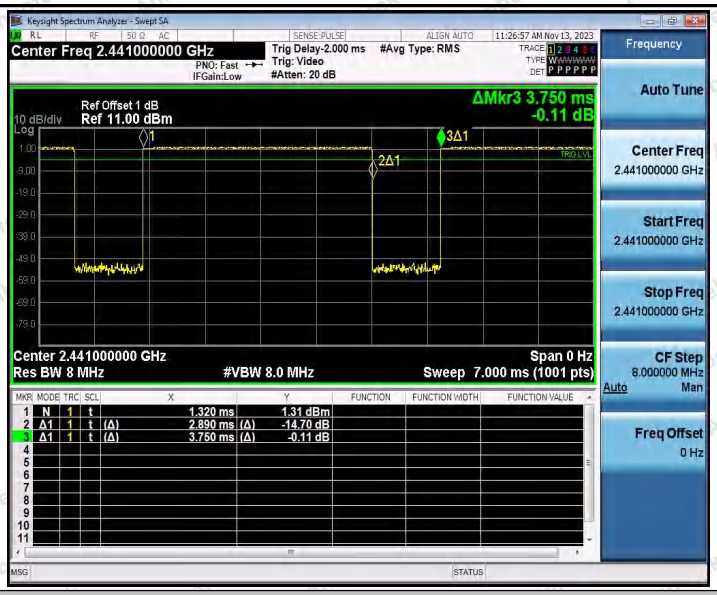
2DH5_Ant1_2480



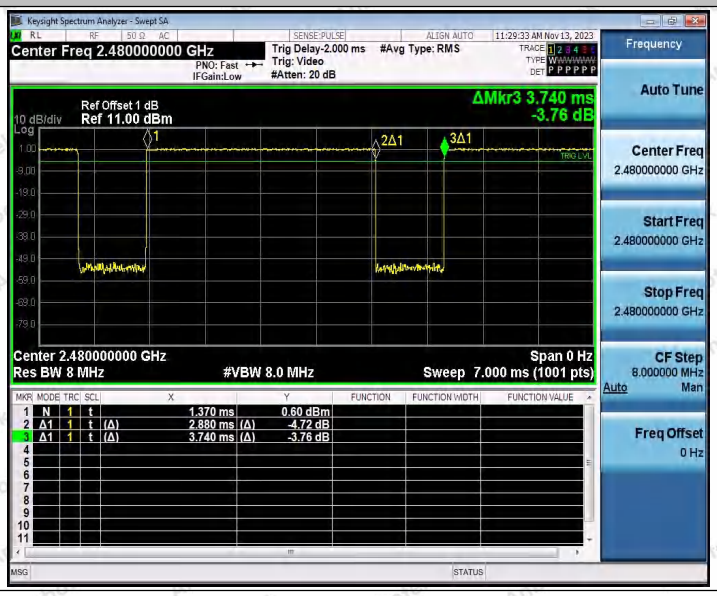
3DH5_Ant1_2402



3DH5_Ant1_2441



3DH5_Ant1_2480



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