Appendix Test Data

Report No.:	18220WC30160601	Test Sample No.:	1-2-2
Start Test Date:	2023.08.01	Finish Test Date:	2023.08.03
Test Engineer:	Hayman Chen	Auditor:	Rick Luo
Temperature:	25.3℃	Relative Humidity:	48%
Pressure:	1012 hPa		

Appendix A: 20dB Emission Bandwidth

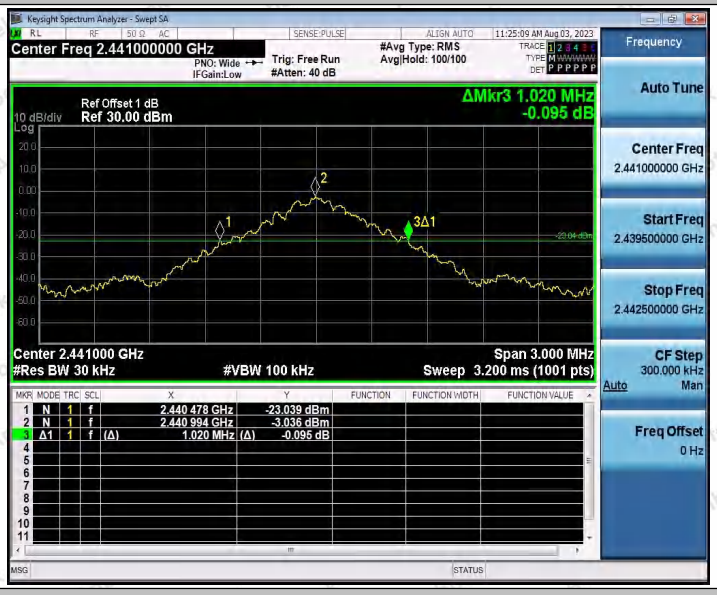
Test Result

Test Mode	Antenna	Frequency[MHz]	20db EBW[MHz]	FL[MHz]	FH[MHz]
DH5	Ant1	2402	0.984	2401.517	2402.501
		2441	1.020	2440.478	2441.498
		2480	0.975	2479.520	2480.495
2DH5	Ant1	2402	1.323	2401.355	2402.678
		2441	1.293	2440.367	2441.660
		2480	1.290	2479.370	2480.660
3DH5	Ant1	2402	1.302	2401.355	2402.657
		2441	1.290	2440.358	2441.648
		2480	1.290	2479.355	2480.645

Test Graphs

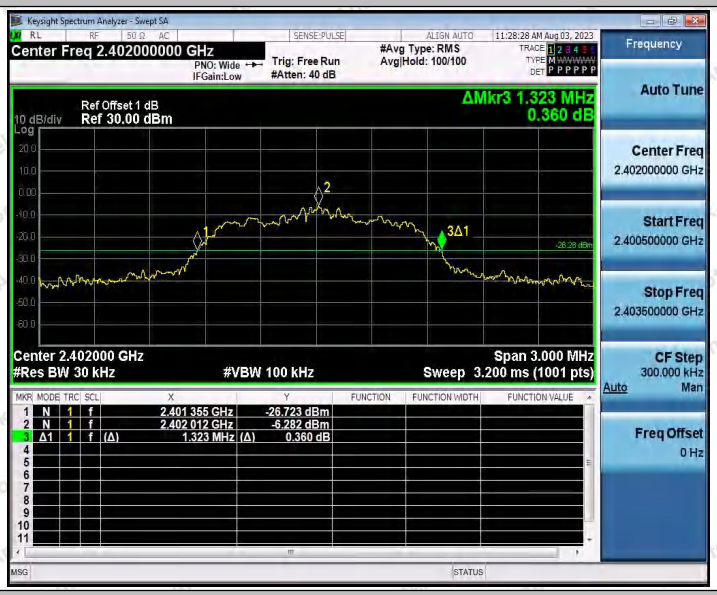
DH5_Ant1_2402

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

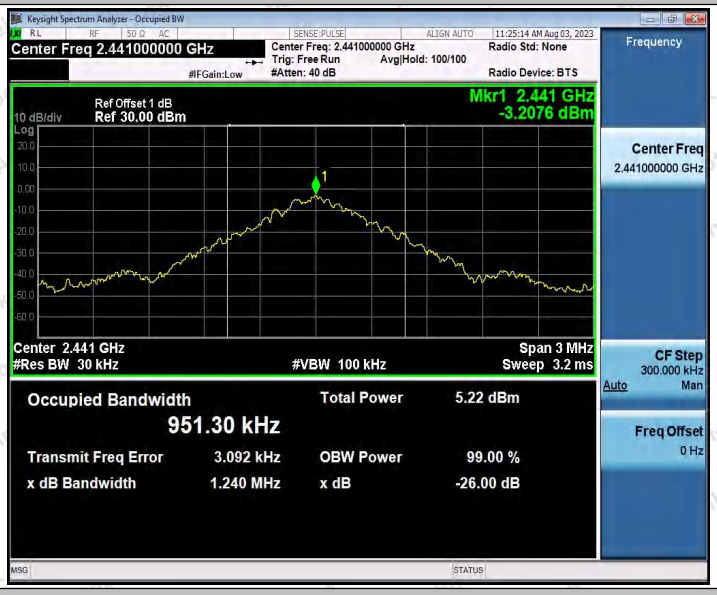
Test Result

Test Mode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]
DH5	Ant1	2402	0.95957	2401.5239	2402.4835
		2441	0.95130	2440.5274	2441.4787
		2480	0.95701	2479.5226	2480.4796
2DH5	Ant1	2402	1.1964	2401.4039	2402.6003
		2441	1.2044	2440.4046	2441.6090
		2480	1.1917	2479.4117	2480.6034
3DH5	Ant1	2402	1.2036	2401.4038	2402.6074
		2441	1.2070	2440.4039	2441.6109
		2480	1.1991	2479.4121	2480.6112

Test Graphs

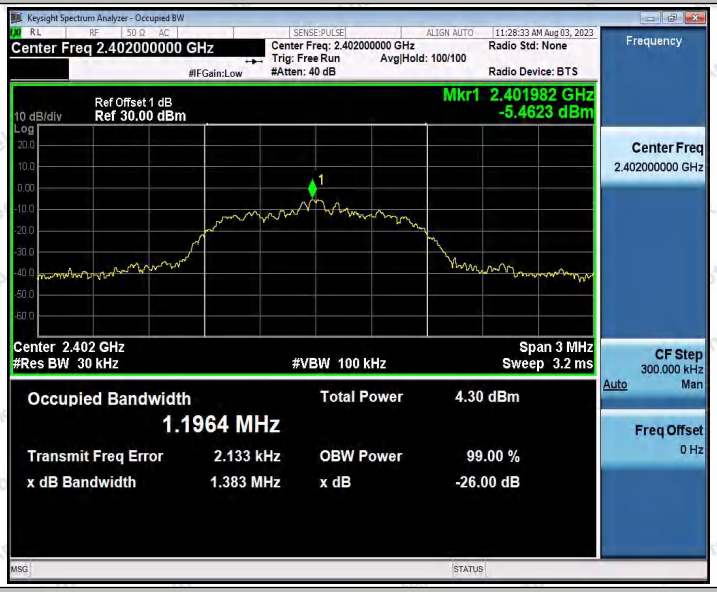
DH5_Ant1_2402

DH5_Ant1_2441

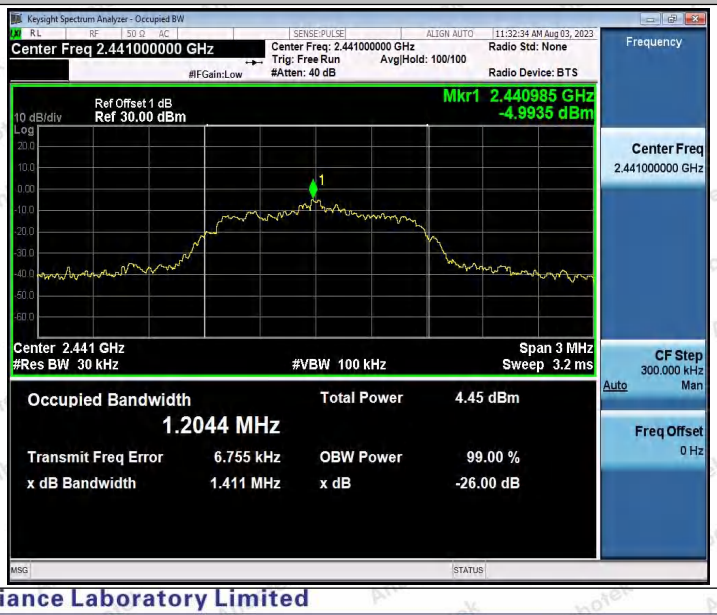


DH5_Ant1_2480

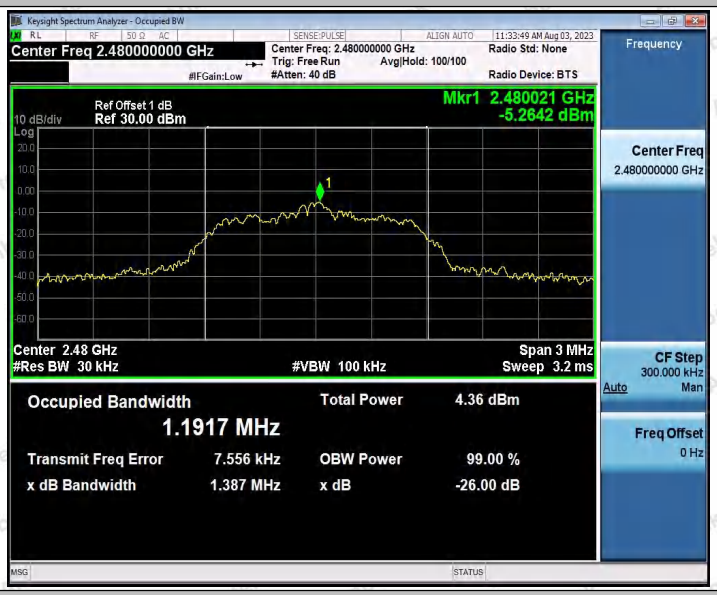
2DH5_Ant1_2402



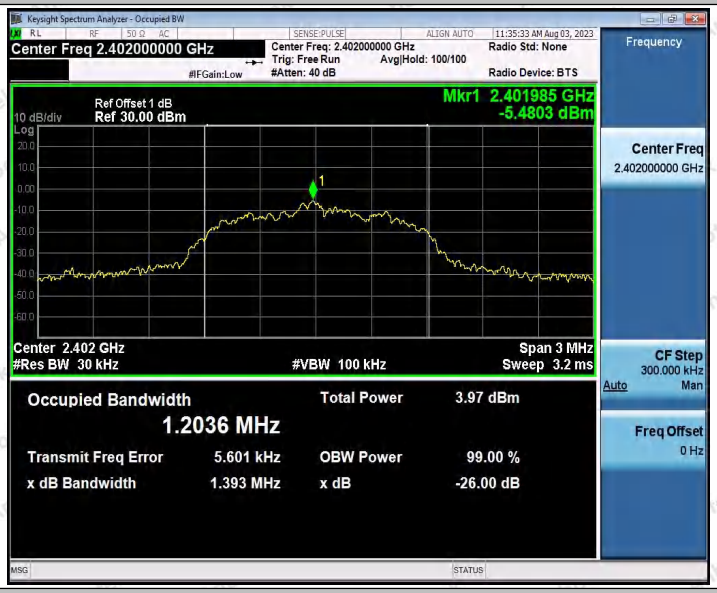
2DH5_Ant1_2441



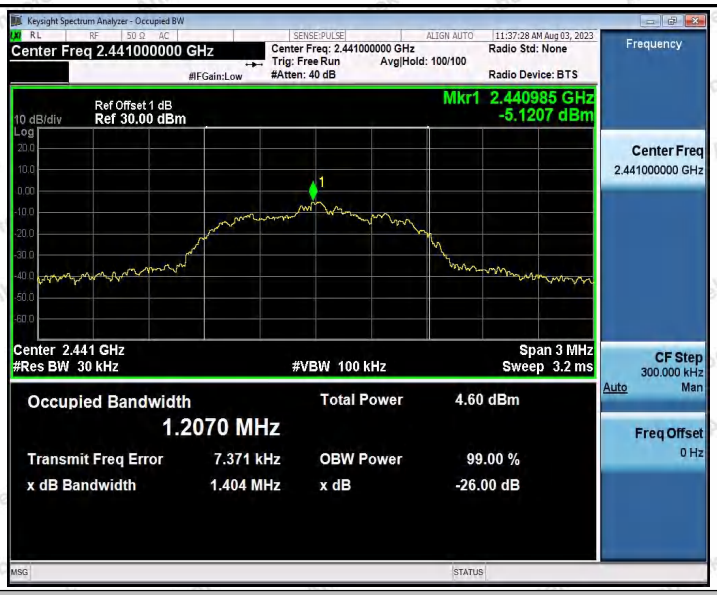
2DH5_Ant1_2480



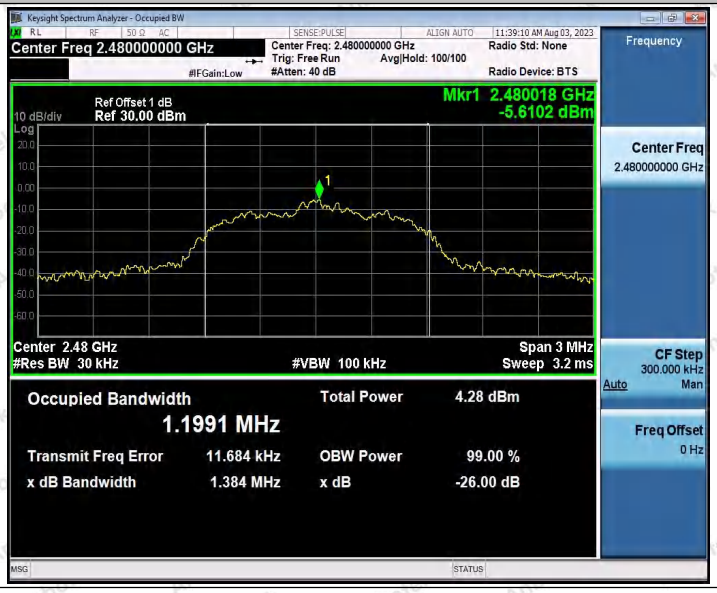
3DH5_Ant1_2402



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	-0.68	≤20.97	PASS
		2441	-0.33	≤20.97	PASS
		2480	-0.75	≤20.97	PASS
2DH5	Ant1	2402	-0.04	≤20.97	PASS
		2441	**0.42**	≤20.97	PASS
		2480	0.21	≤20.97	PASS
3DH5	Ant1	2402	-0.34	≤20.97	PASS
		2441	0.16	≤20.97	PASS
		2480	-0.04	≤20.97	PASS

Test Graphs

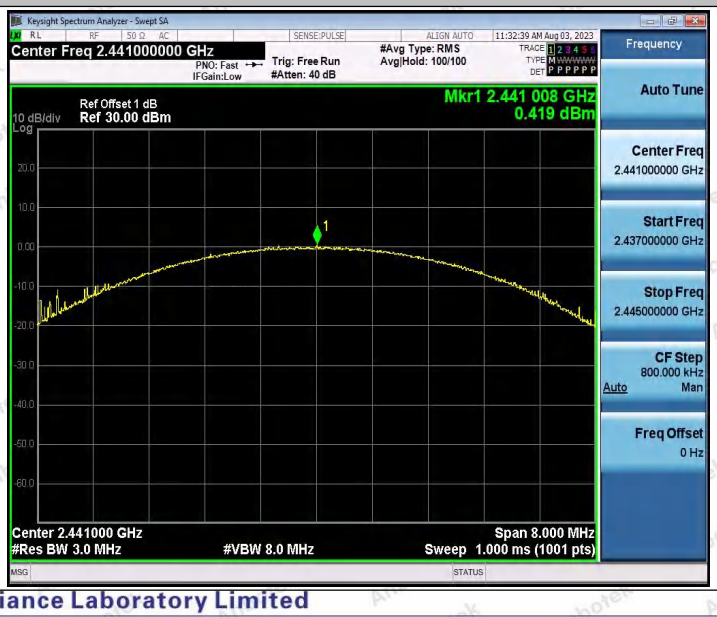
DH5_Ant1_2402

DH5_Ant1_2441

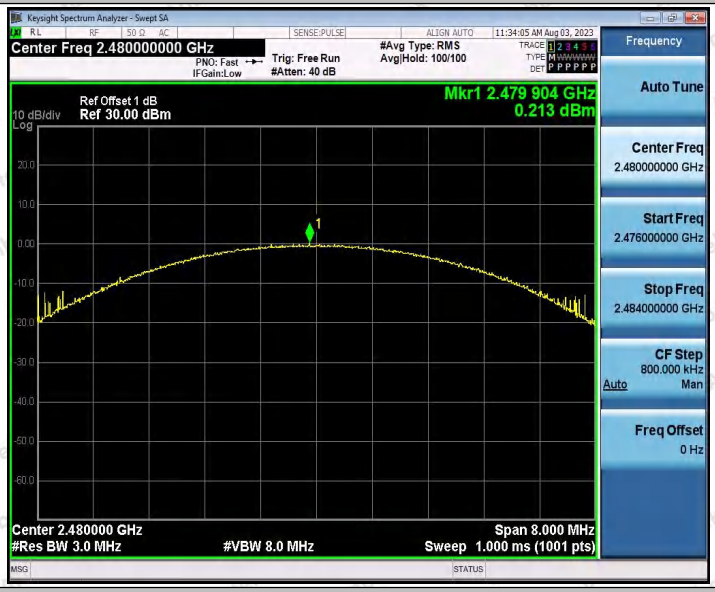
DH5_Ant1_2480

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	≥0.680	PASS
2DH5	Ant1	Hop	1.020	≥0.882	PASS
3DH5	Ant1	Hop	0.998	≥0.868	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
01:31:16 PM Aug 03, 2023
Ref Offset 1 dB
10 dB/div
Ref 30.00 dBm
ΔMkr2 998 kHz
-0.008 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

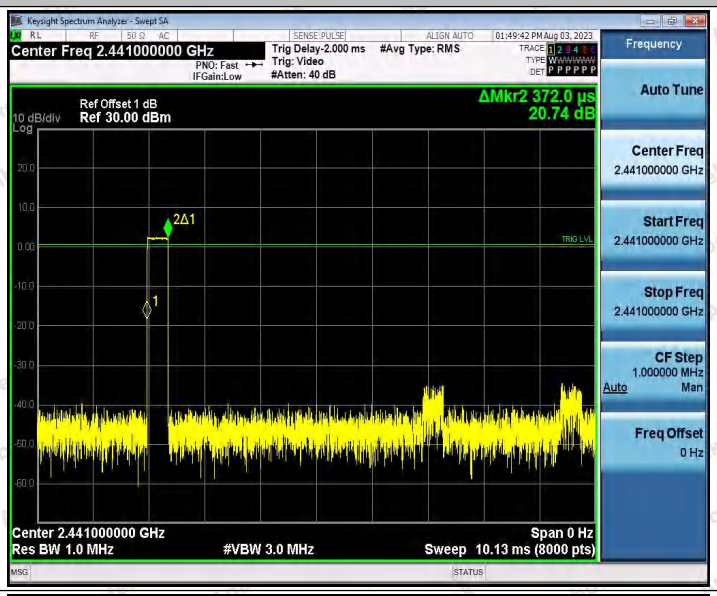
Appendix E: Time of occupancy

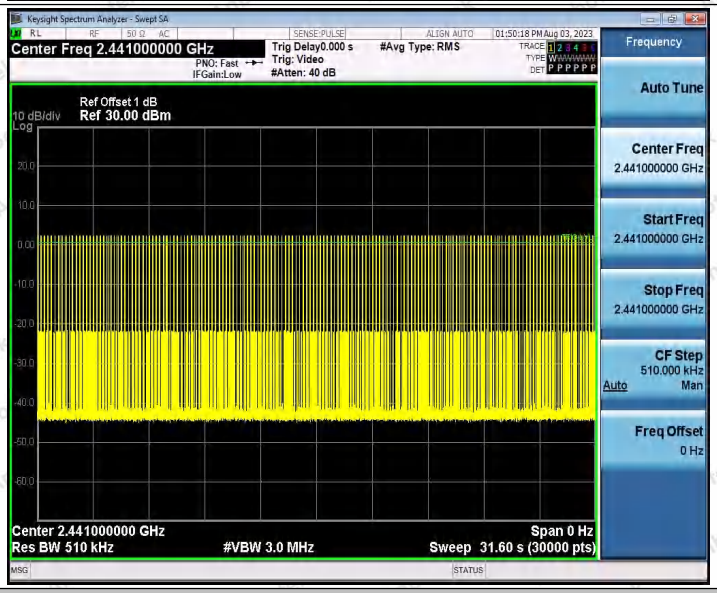
Test Result

TestMode	Antenna	Frequency[MHz]	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH1	Ant1	Hop	0.372	312	0.116	≤0.4	PASS
DH3	Ant1	Hop	1.629	156	0.254	≤0.4	PASS
DH5	Ant1	Hop	2.877	106	0.305	≤0.4	PASS
2DH1	Ant1	Hop	0.380	314	0.119	≤0.4	PASS
2DH3	Ant1	Hop	1.631	158	0.258	≤0.4	PASS
2DH5	Ant1	Hop	2.880	103	0.297	≤0.4	PASS
3DH1	Ant1	Hop	0.381	313	0.119	≤0.4	PASS
3DH3	Ant1	Hop	1.631	159	0.259	≤0.4	PASS
3DH5	Ant1	Hop	2.882	115	0.331	≤0.4	PASS

Test Graphs

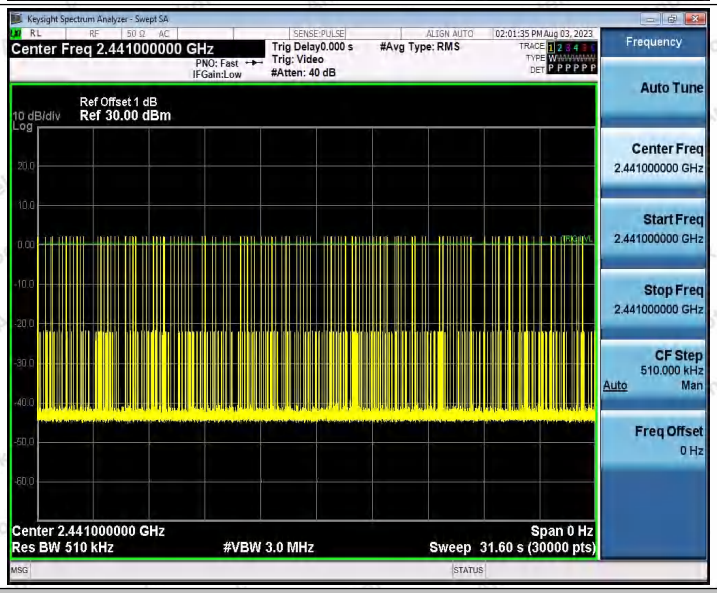
DH1_Ant1_Hop





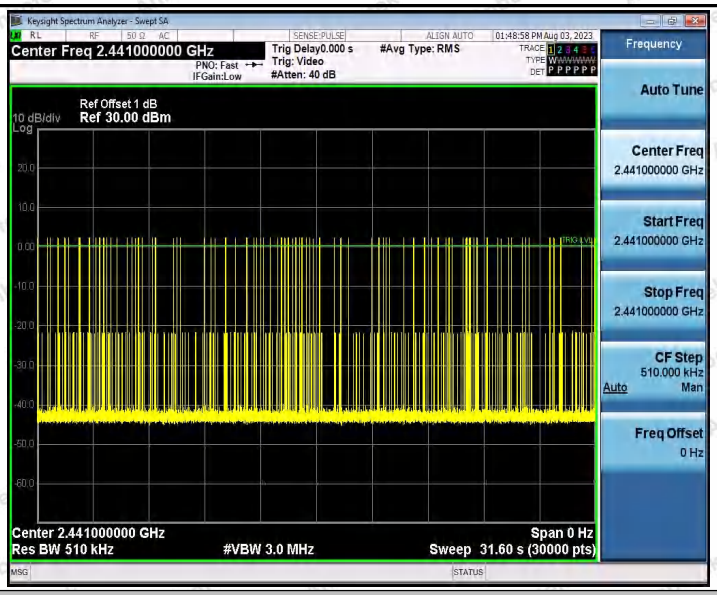
DH3_Ant1_Hop

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
7.28 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

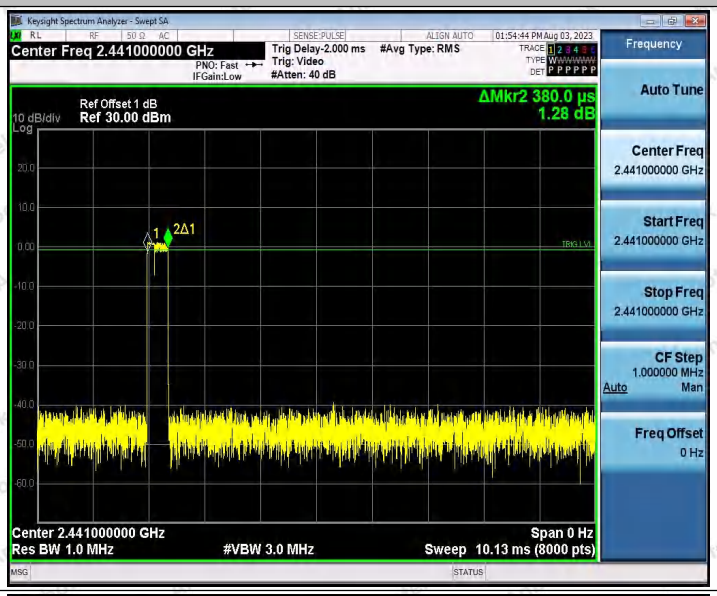

Keysight Spectrum Analyzer - Swept SA
Center Freq 2.441000000 GHz
Trig Delay0.000 s
#Avg Type: RMS
Trig: Video
#Atten: 40 dB
PNO: Fast
IFGain:Low
Ref Offset 1 dB
10 dB/div
Ref 30.00 dBm
Center 2.441000000 GHz
Span 0 Hz
Res BW 510 kHz
#VBW 3.0 MHz
Sweep 31.60 s (30000 pts)
Frequency
Auto Tune
Center Freq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

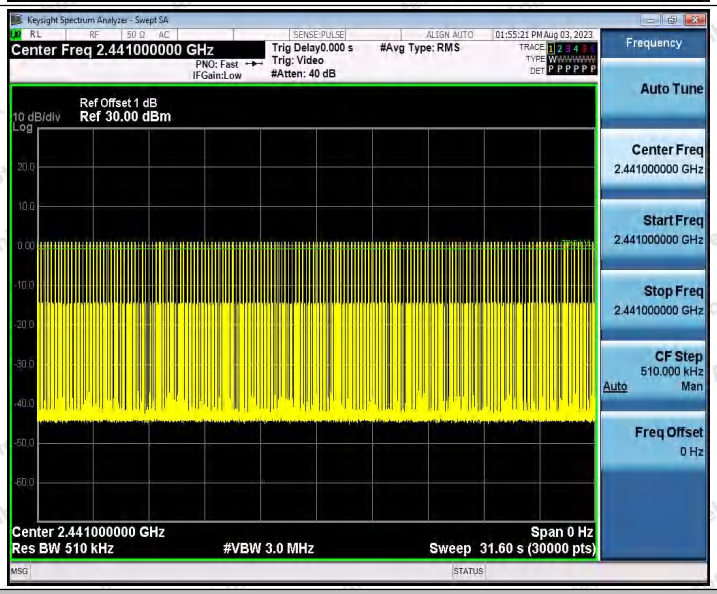
DH5_Ant1_Hop

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 2.877 ms
17.85 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

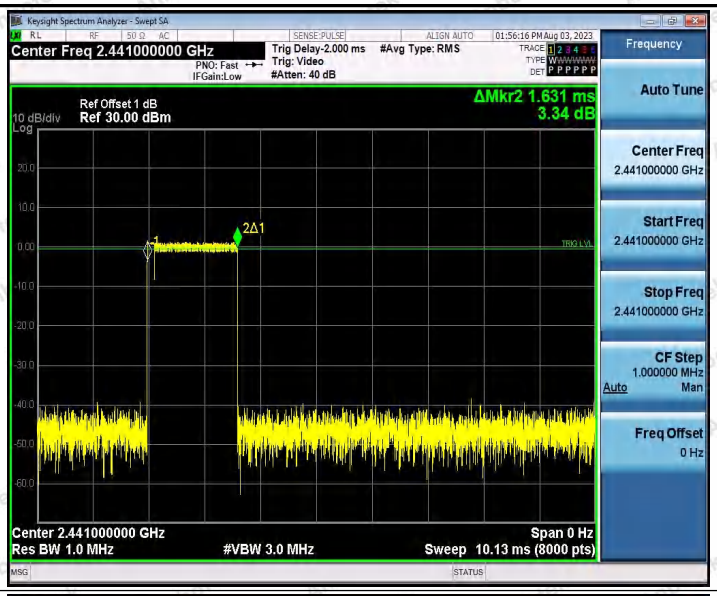


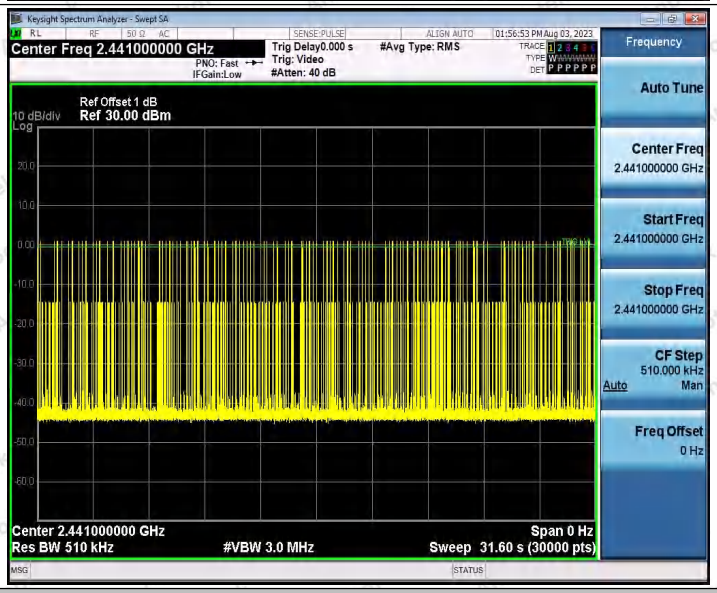
2DH1_Ant1_Hop



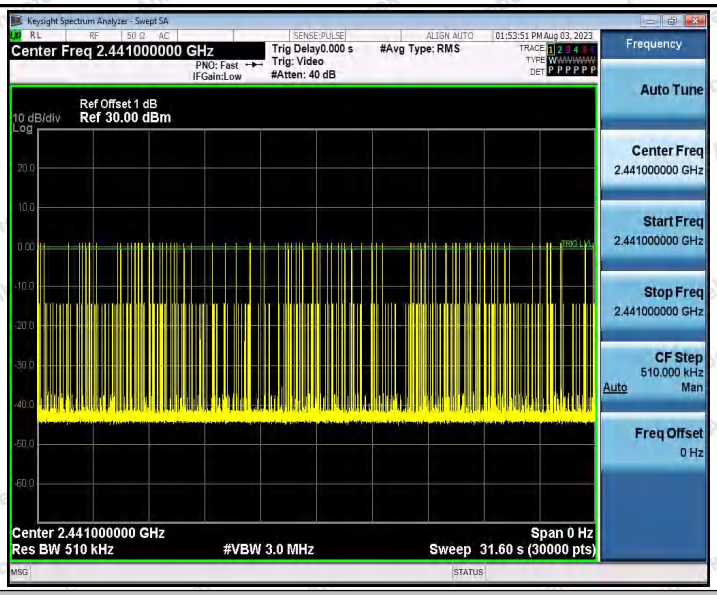


2DH3_Ant1_Hop

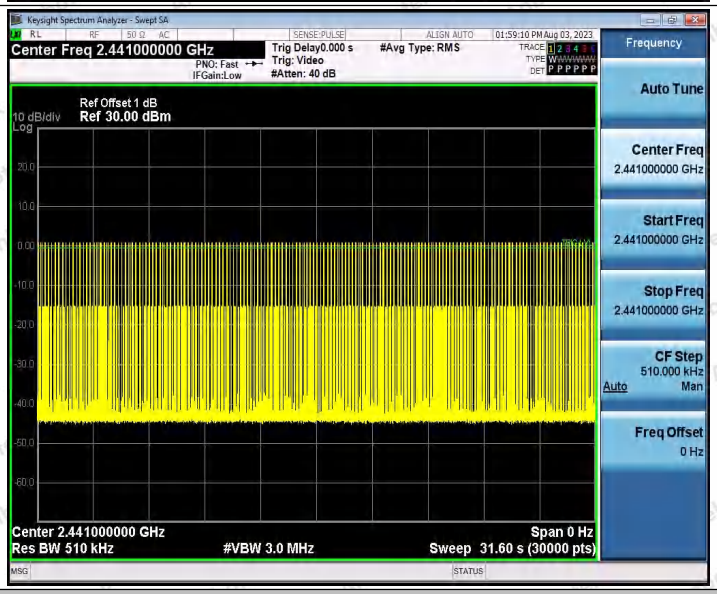




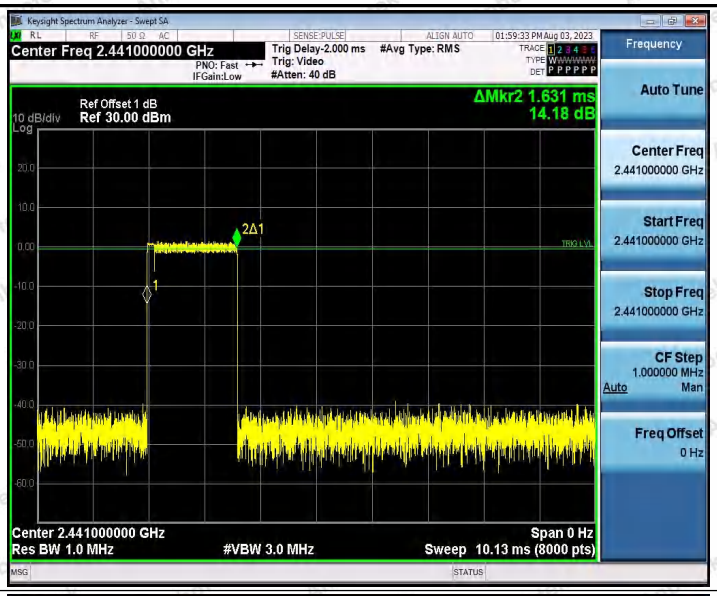
2DH5_Ant1_Hop

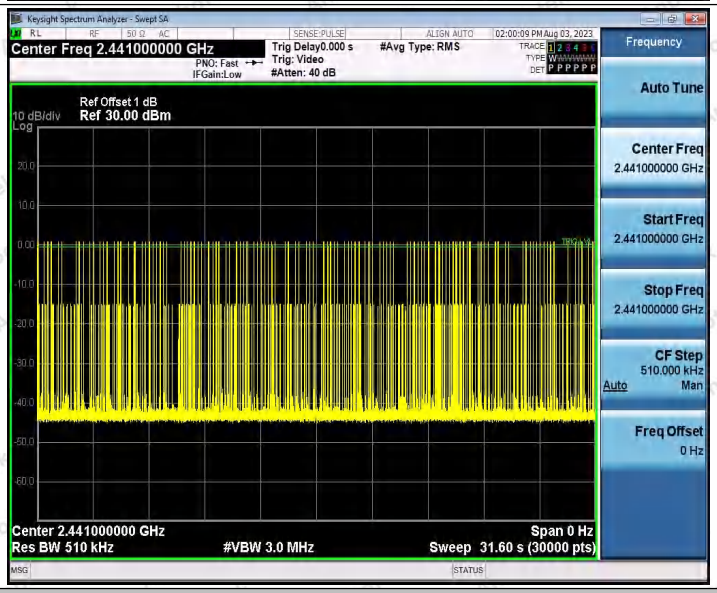


3DH1_Ant1_Hop

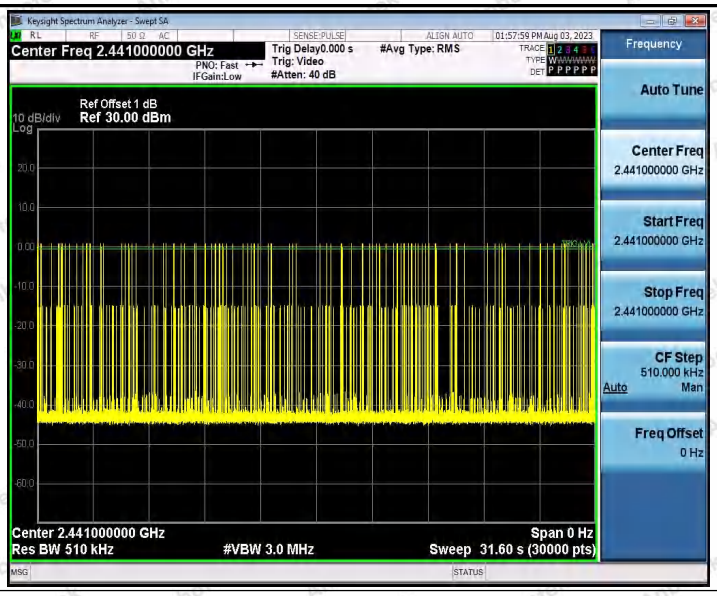


3DH3_Ant1_Hop





3DH5_Ant1_Hop


Keysight Spectrum Analyzer - Swept SA
Center Freq 2.441000000 GHz
PNO: Fast
IFGain:Low
Trig Delay0.000 s
Trig: Video
#Atten: 40 dB
#Avg Type: RMS
01:57:59 PM Aug 03, 2023
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

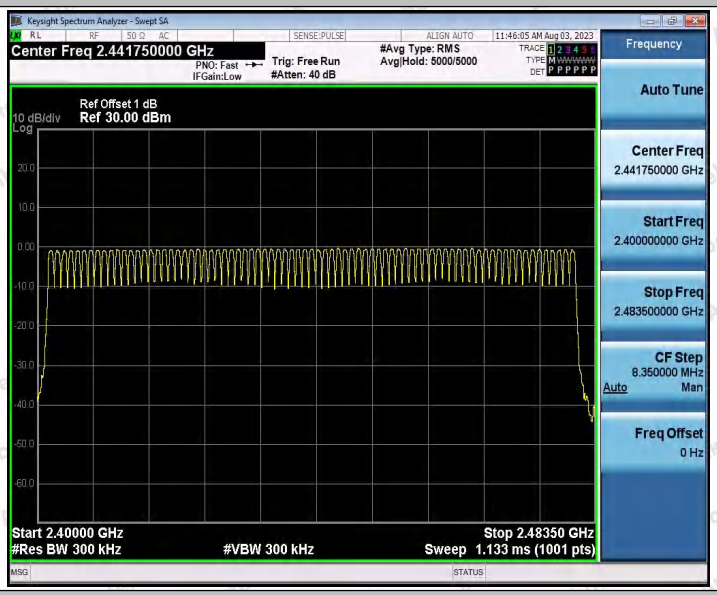
Appendix F: Number of hopping channels

Test Result

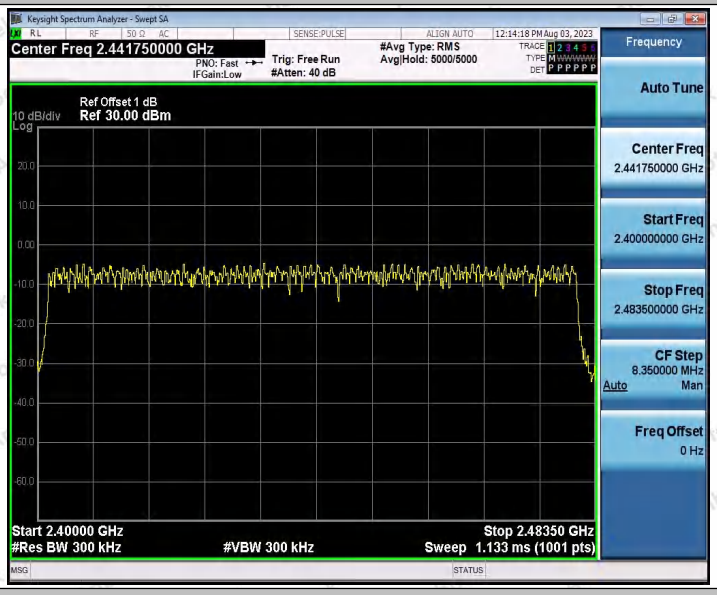
Test Mode	Antenna	Frequency[MHz]	Result[Num]	Limit[Num]	Verdict
DH5	Ant1	Hop	79	≥15	PASS
2DH5	Ant1	Hop	79	≥15	PASS
3DH5	Ant1	Hop	79	≥15	PASS

Test Graphs

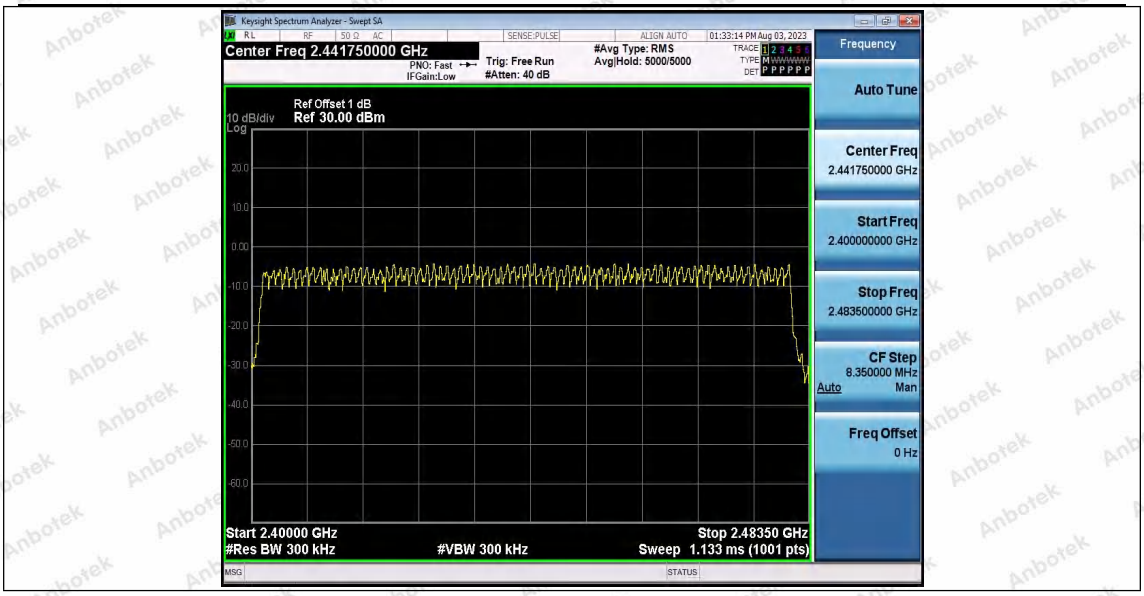
DH5_Ant1_Hop



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
01:33:14 PM Aug 03, 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

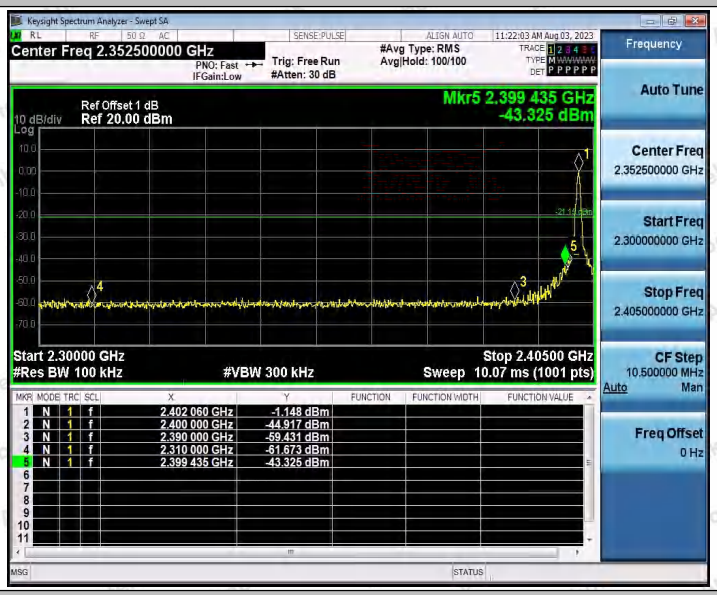
Appendix G: Band edge measurements

Test Result

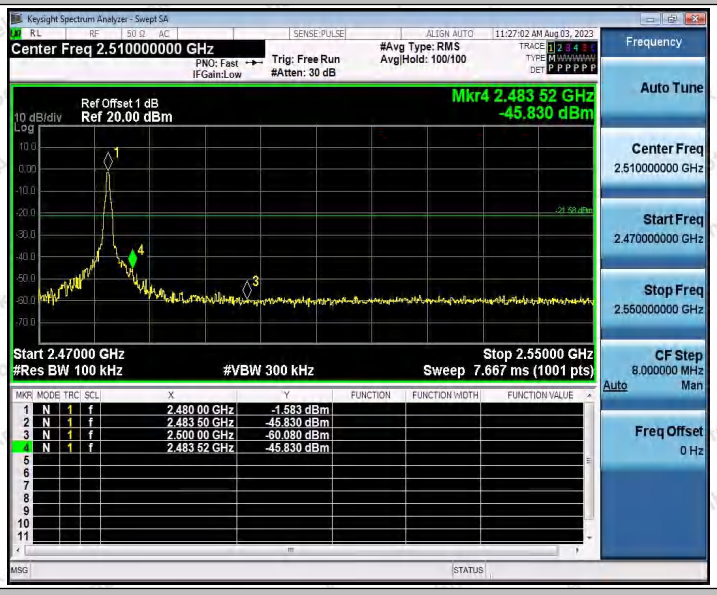
TestMode	Antenna	ChName	Frequency[MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	Low	2402	-1.15	-43.33	≤-21.15	PASS
		High	2480	-1.58	-45.83	≤-21.58	PASS
		Low	Hop_2402	-1.46	-57.43	≤-21.46	PASS
		High	Hop_2480	-1.16	-53.52	≤-21.16	PASS
2DH5	Ant1	Low	2402	-2.49	-40.06	≤-22.49	PASS
		High	2480	-1.50	-41.81	≤-21.5	PASS
		Low	Hop_2402	-10.80	-50.71	≤-30.8	PASS
		High	Hop_2480	-9.37	-50.74	≤-29.37	PASS
3DH5	Ant1	Low	2402	-3.16	-39.27	≤-23.16	PASS
		High	2480	-1.73	-42.49	≤-21.73	PASS
		Low	Hop_2402	-9.82	-49.49	≤-29.82	PASS
		High	Hop_2480	-9.51	-50.45	≤-29.51	PASS

Test Graphs

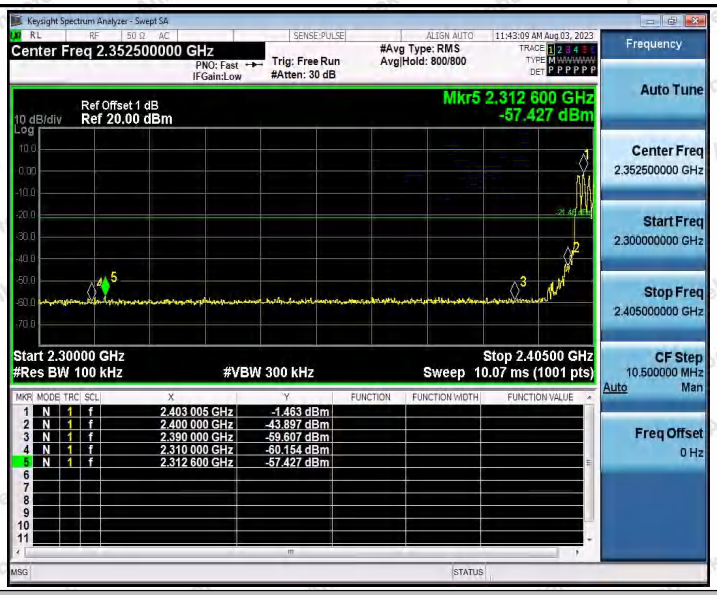
DH5_Ant1_Low_2402



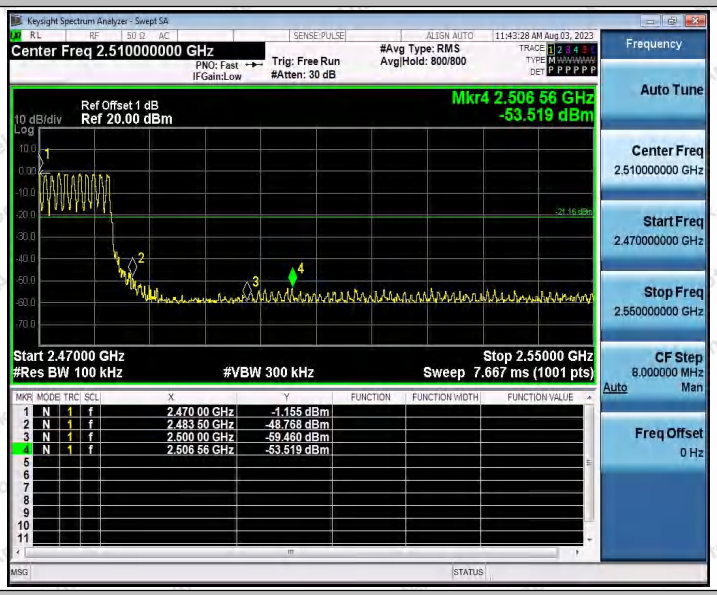
DH5_Ant1_High_2480



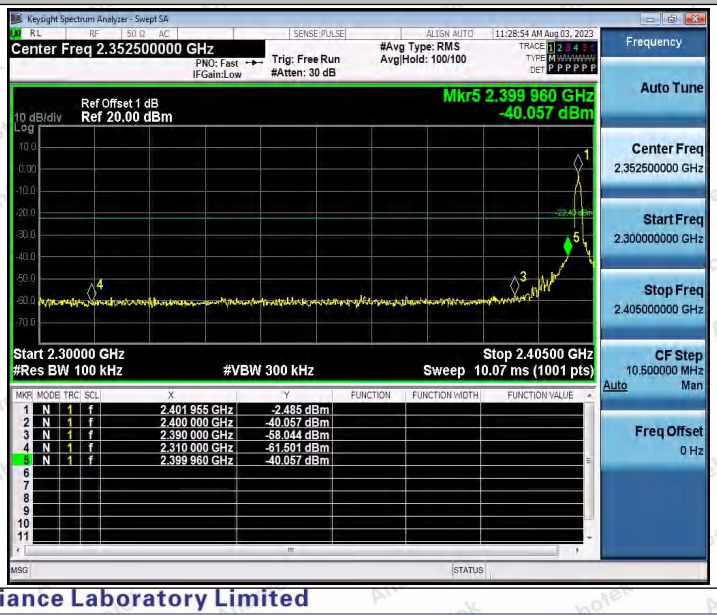
DH5_Ant1_Low_Hop_2402



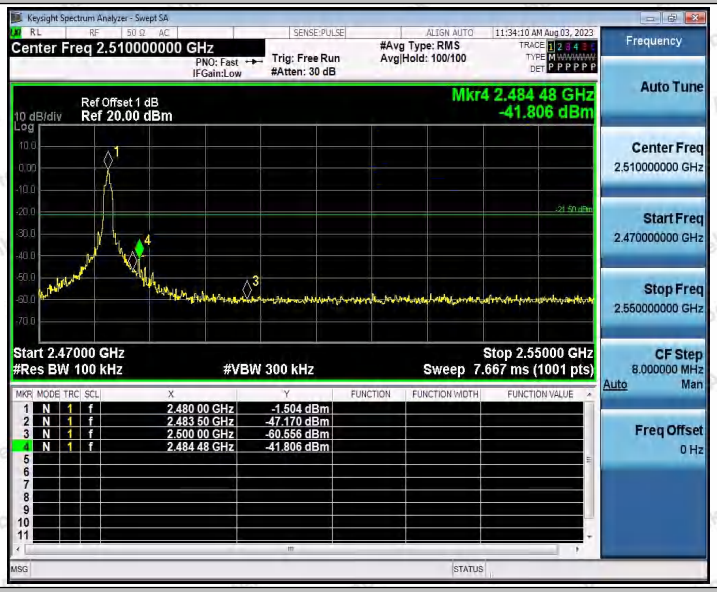
DH5_Ant1_High_Hop_2480



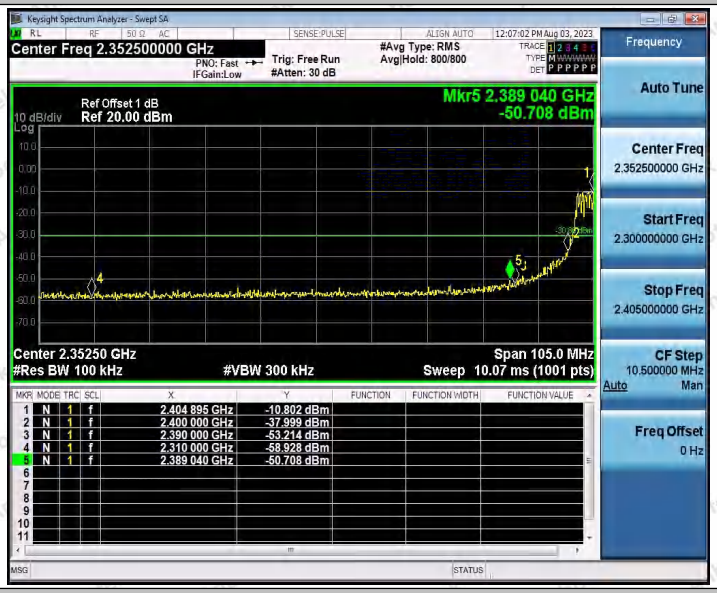
2DH5_Ant1_Low_2402



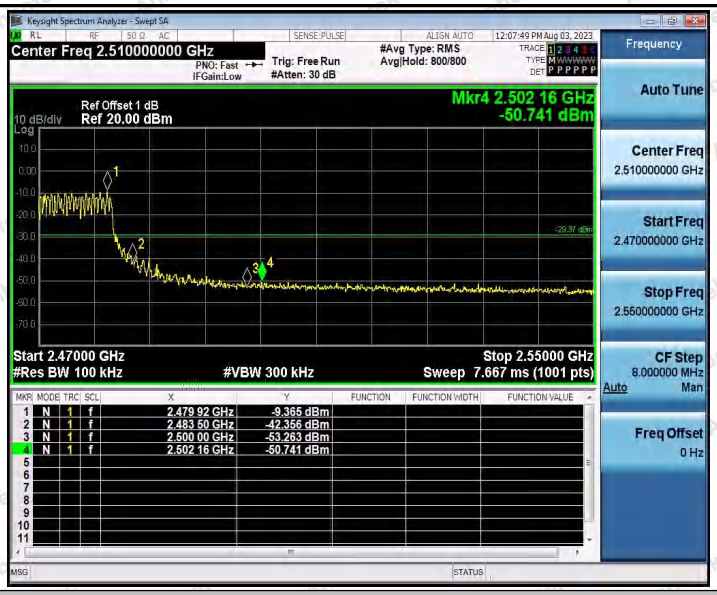
2DH5_Ant1_High_2480



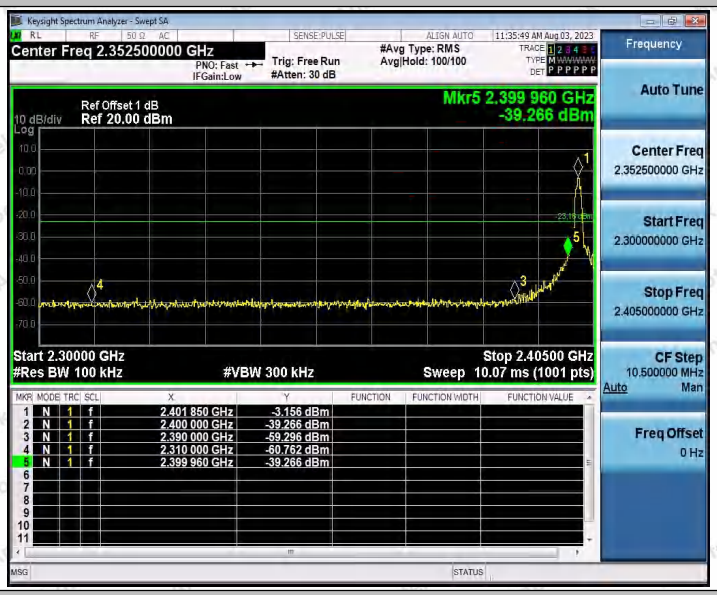
2DH5_Ant1_Low_Hop_2402



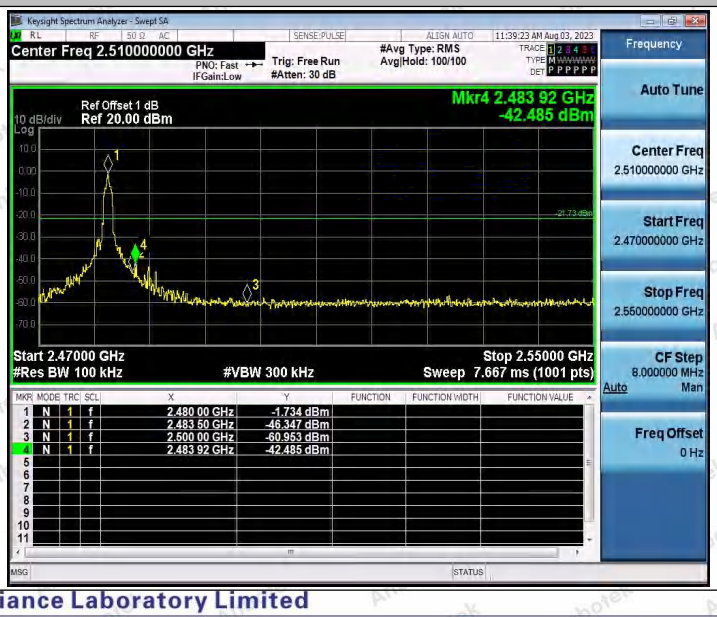
2DH5_Ant1_High_Hop_2480



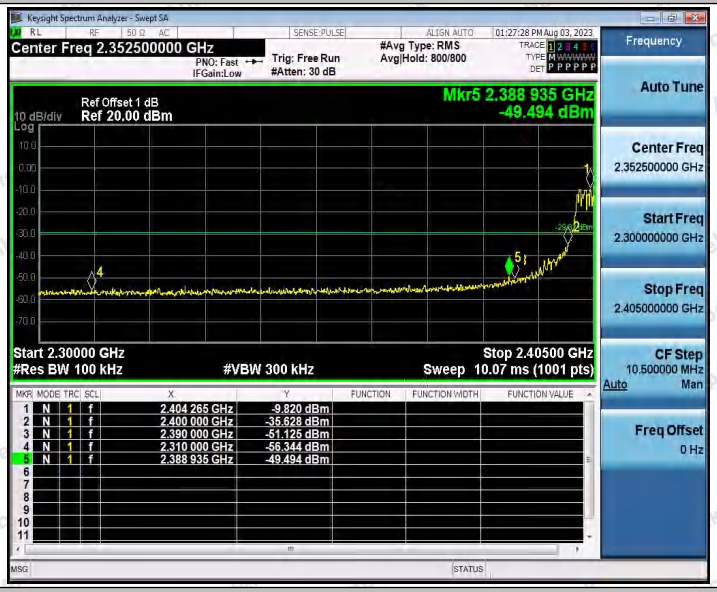
3DH5_Ant1_Low_2402



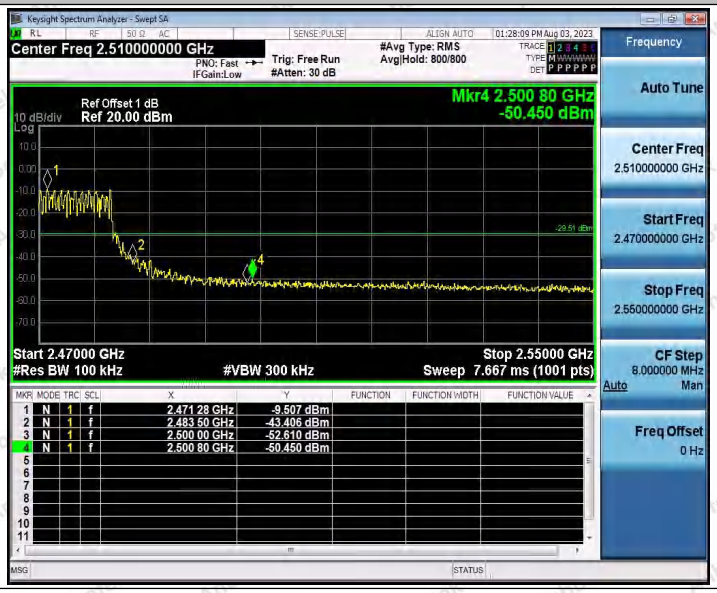
3DH5_Ant1_High_2480



3DH5_Ant1_Low_Hop_2402



3DH5_Ant1_High_Hop_2480



Appendix H: Conducted Spurious Emission

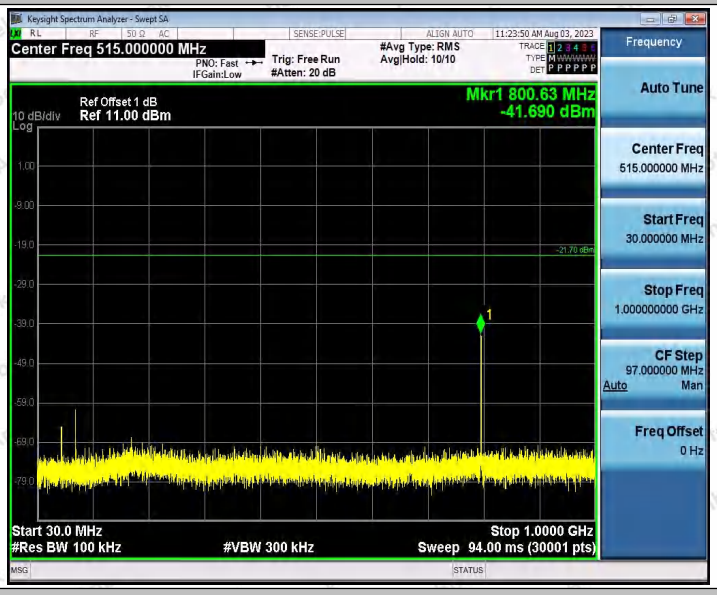
Test Result

TestMode	Antenna	Frequency[MHz]	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	2402	Reference	-1.70	-1.70	---	PASS
			30~1000	-1.70	-41.69	≤-21.7	PASS
			1000~26500	-1.70	-39.71	≤-21.7	PASS
		2441	Reference	-1.69	-1.69	---	PASS
			30~1000	-1.69	-42.46	≤-21.69	PASS
			1000~26500	-1.69	-40.81	≤-21.69	PASS
		2480	Reference	-1.70	-1.70	---	PASS
			30~1000	-1.70	-41.85	≤-21.7	PASS
			1000~26500	-1.70	-41.98	≤-21.7	PASS
2DH5	Ant1	2402	Reference	-2.89	-2.89	---	PASS
			30~1000	-2.89	-46.14	≤-22.89	PASS
			1000~26500	-2.89	-39.98	≤-22.89	PASS
		2441	Reference	-3.41	-3.41	---	PASS
			30~1000	-3.41	-43.14	≤-23.41	PASS
			1000~26500	-3.41	-41.75	≤-23.41	PASS
		2480	Reference	-2.87	-2.87	---	PASS
			30~1000	-2.87	-45.01	≤-22.87	PASS
			1000~26500	-2.87	-42.42	≤-22.87	PASS
3DH5	Ant1	2402	Reference	-2.10	-2.10	---	PASS
			30~1000	-2.10	-42.42	≤-22.1	PASS
			1000~26500	-2.10	-40.37	≤-22.1	PASS
		2441	Reference	-3.47	-3.47	---	PASS
			30~1000	-3.47	-42.63	≤-23.47	PASS
			1000~26500	-3.47	-41.71	≤-23.47	PASS
		2480	Reference	-2.21	-2.21	---	PASS
			30~1000	-2.21	-42.22	≤-22.21	PASS
			1000~26500	-2.21	-42.21	≤-22.21	PASS

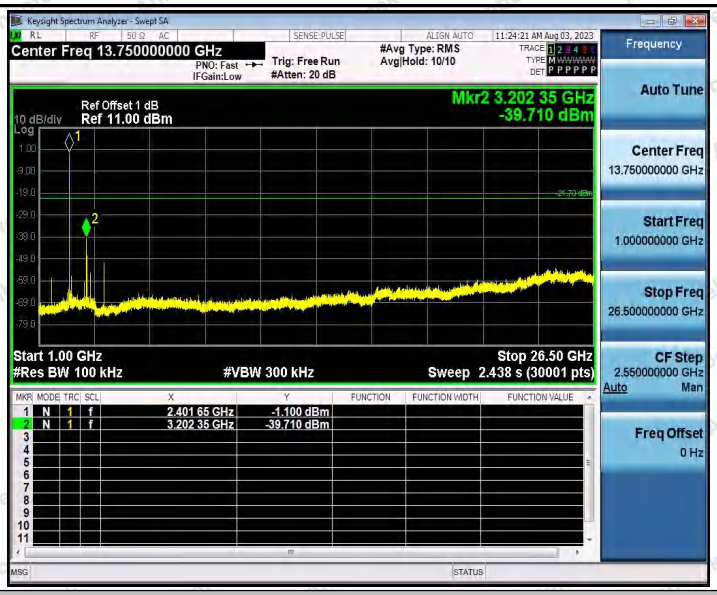
Test Graphs

DH5_Ant1_2402_0~Reference

DH5_Ant1_2402_30~1000

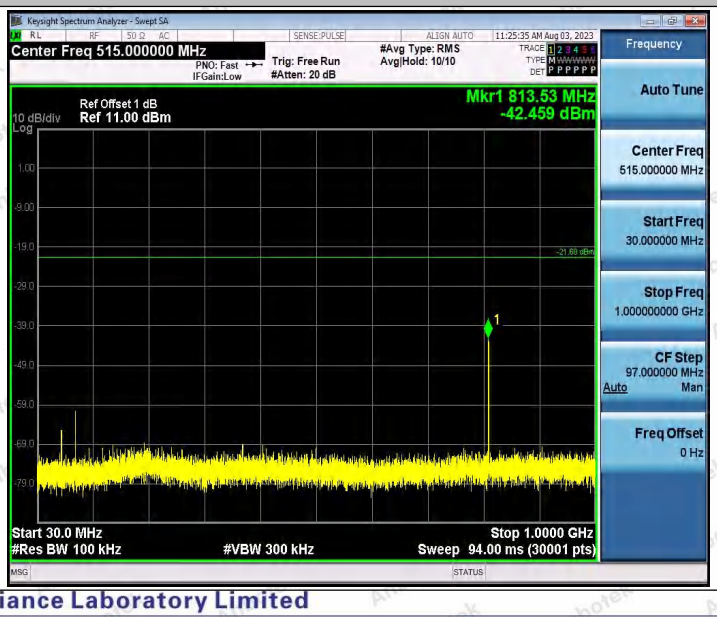


DH5_Ant1_2402_1000~26500

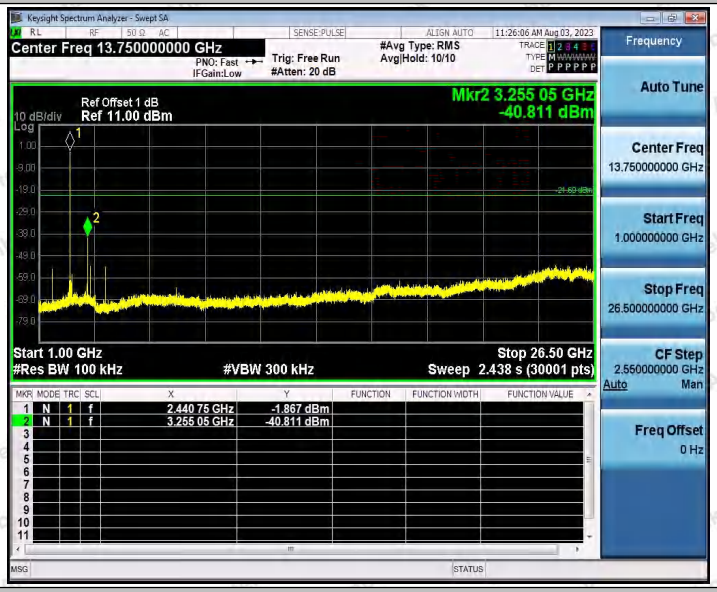


DH5_Ant1_2441_0~Reference

DH5_Ant1_2441_30~1000

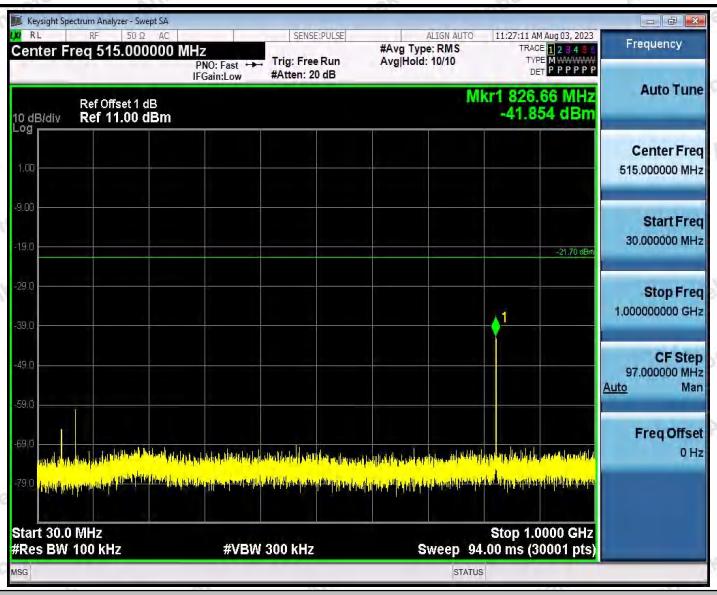


DH5_Ant1_2441_1000~26500

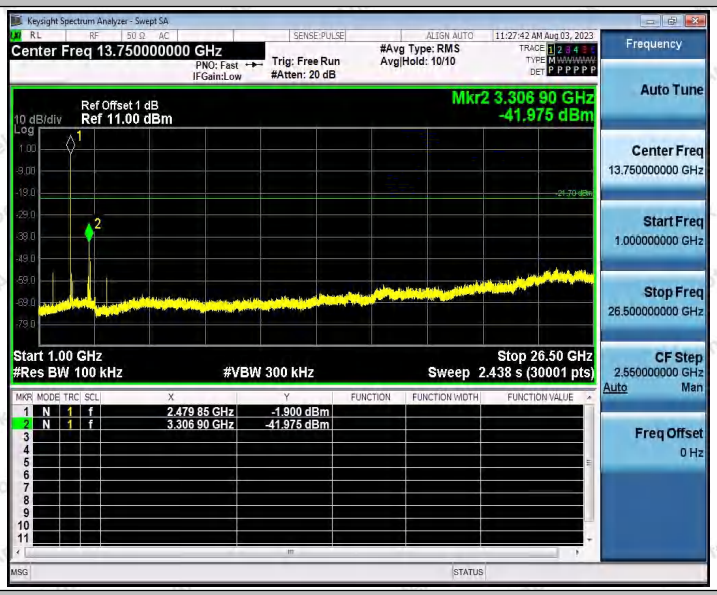


DH5_Ant1_2480_0~Reference

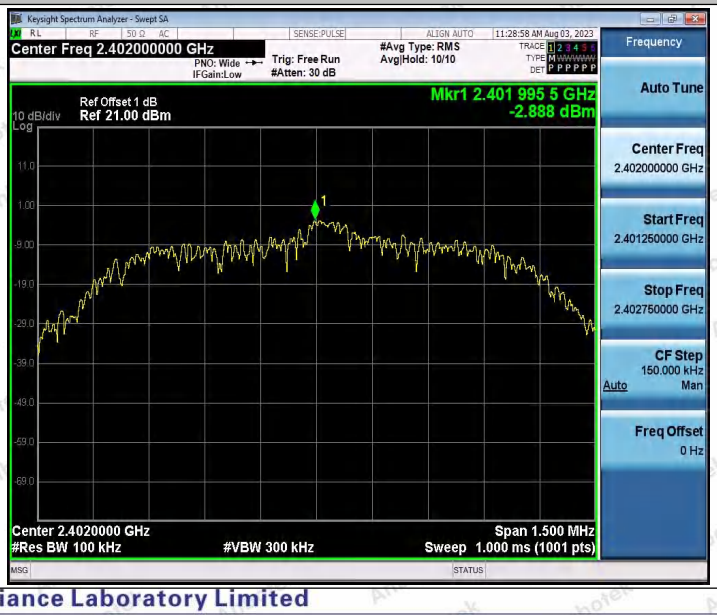
DH5_Ant1_2480_30~1000



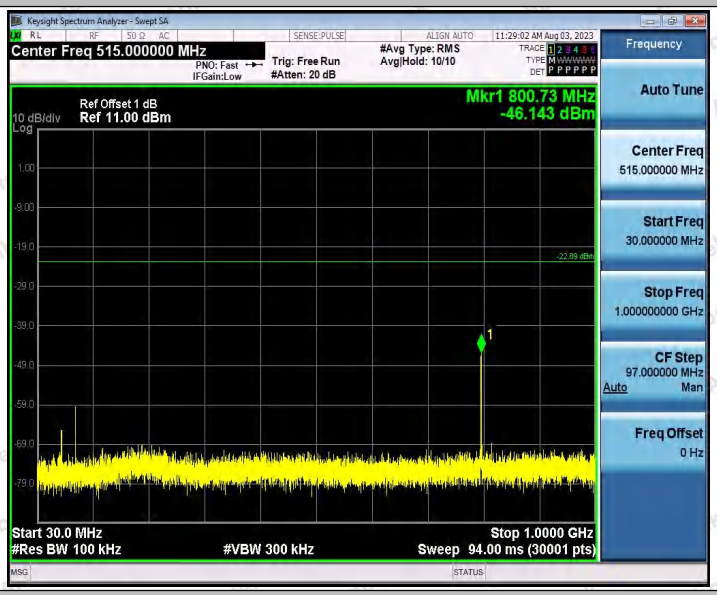
DH5_Ant1_2480_1000~26500



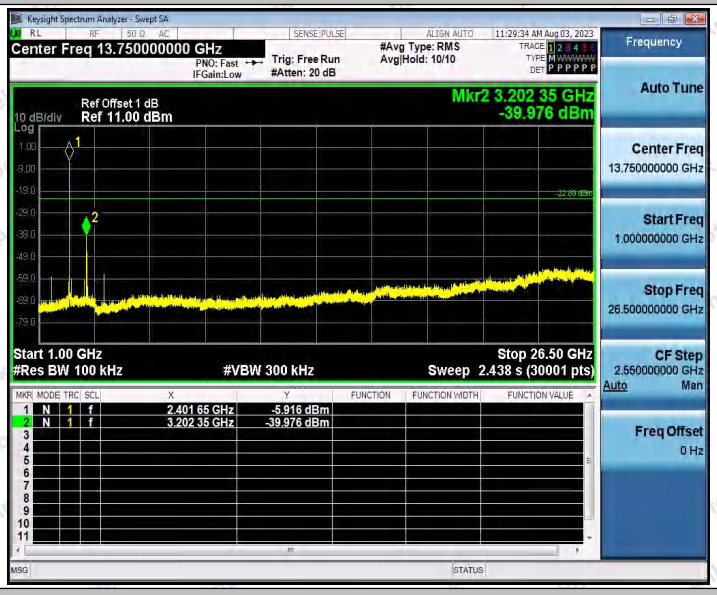
2DH5_Ant1_2402_0~Reference



2DH5_Ant1_2402_30~1000

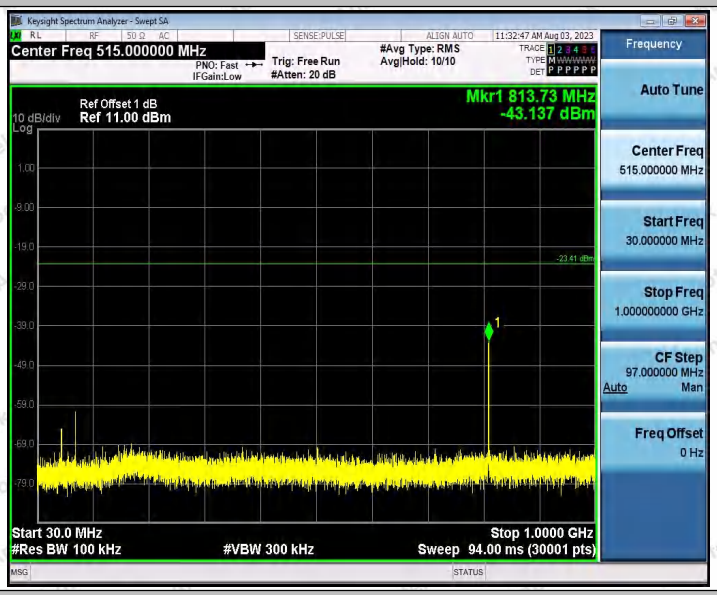


2DH5_Ant1_2402_1000~26500

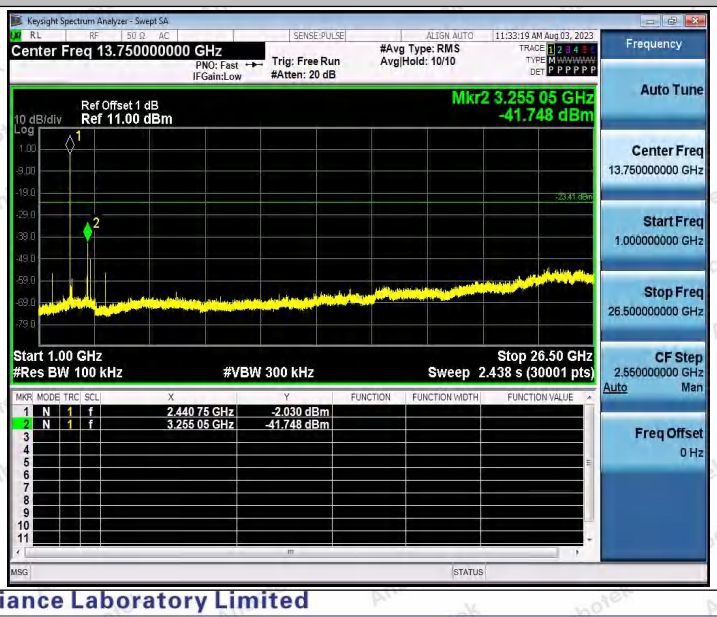


2DH5_Ant1_2441_0~Reference

2DH5_Ant1_2441_30~1000

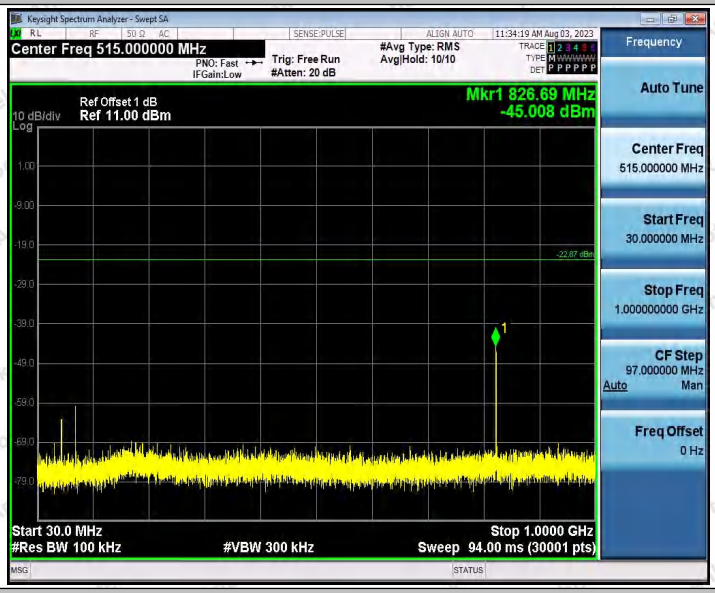


2DH5_Ant1_2441_1000~26500

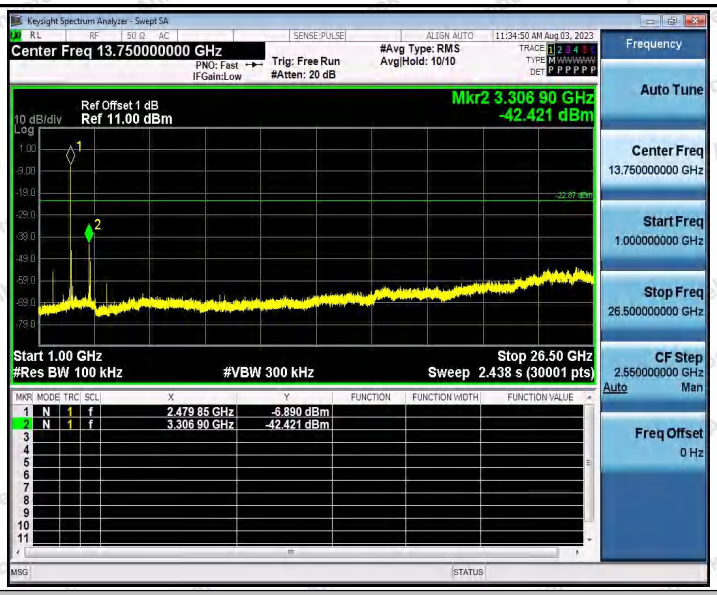


2DH5_Ant1_2480_0~Reference

2DH5_Ant1_2480_30~1000

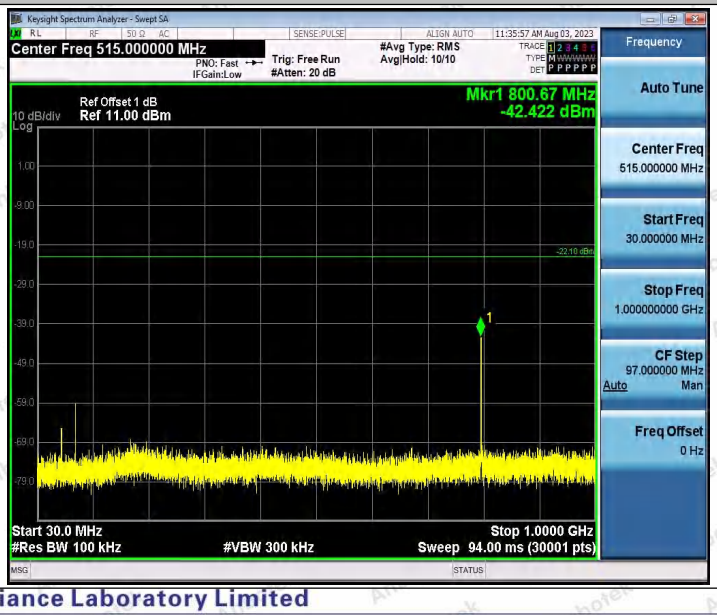


2DH5_Ant1_2480_1000~26500

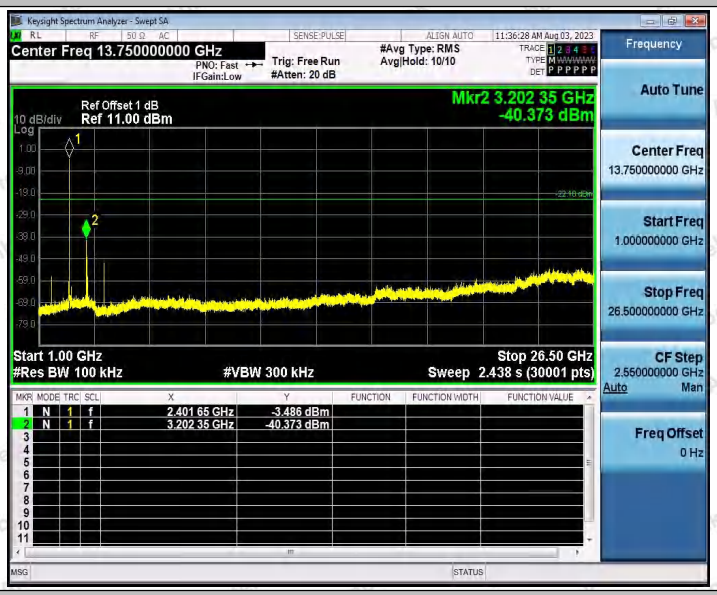


3DH5_Ant1_2402_0~Reference

3DH5_Ant1_2402_30~1000

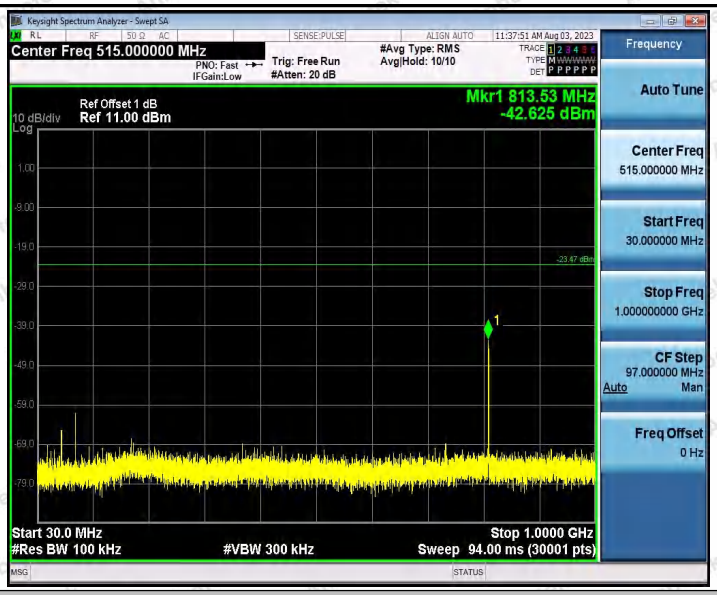


3DH5_Ant1_2402_1000~26500

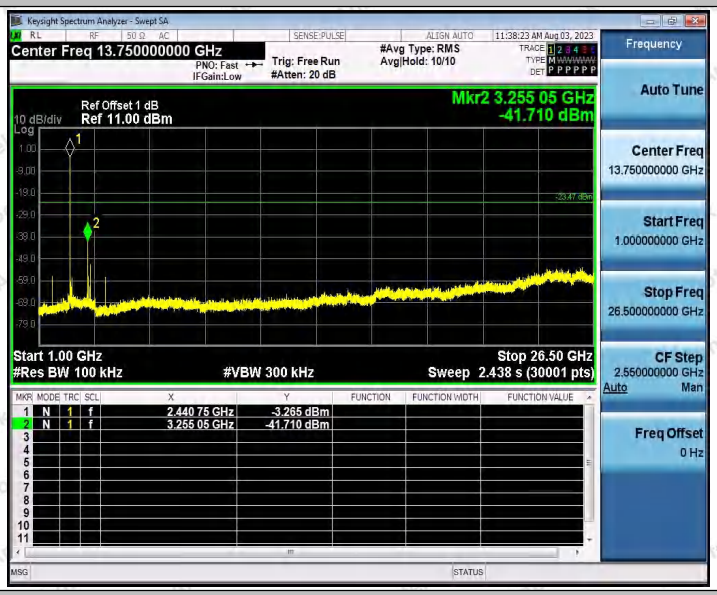


3DH5_Ant1_2441_0~Reference

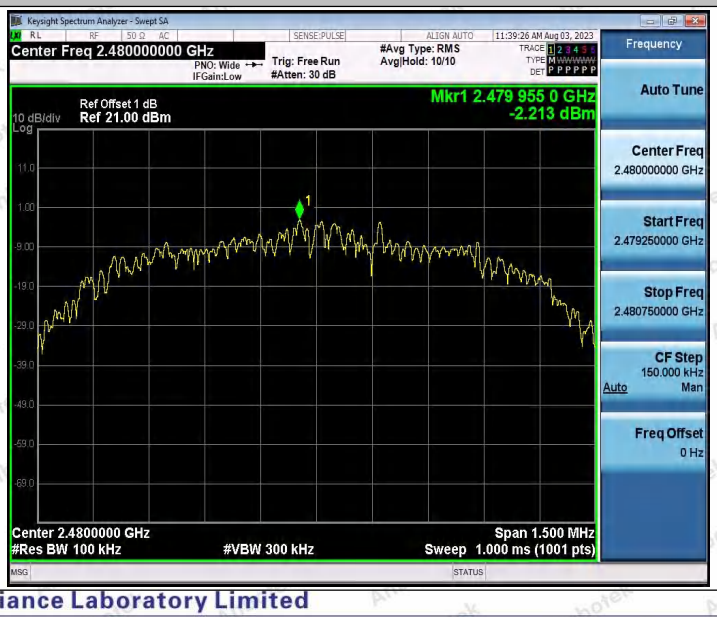
3DH5_Ant1_2441_30~1000



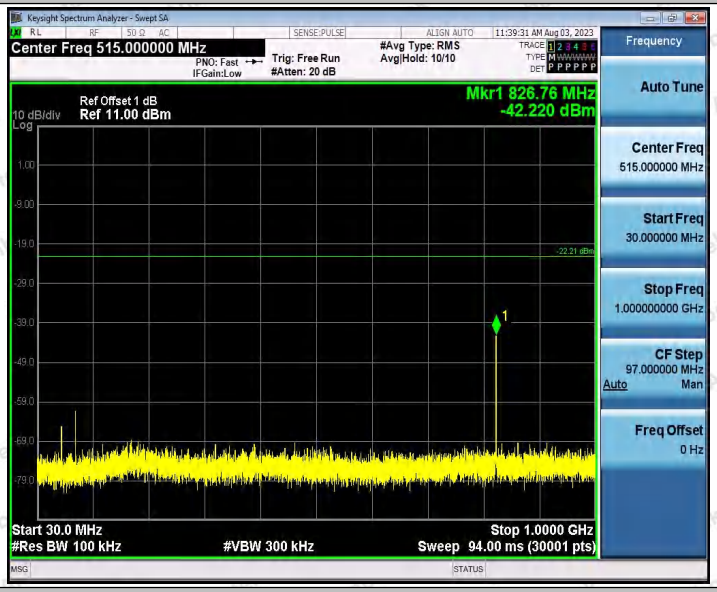
3DH5_Ant1_2441_1000~26500



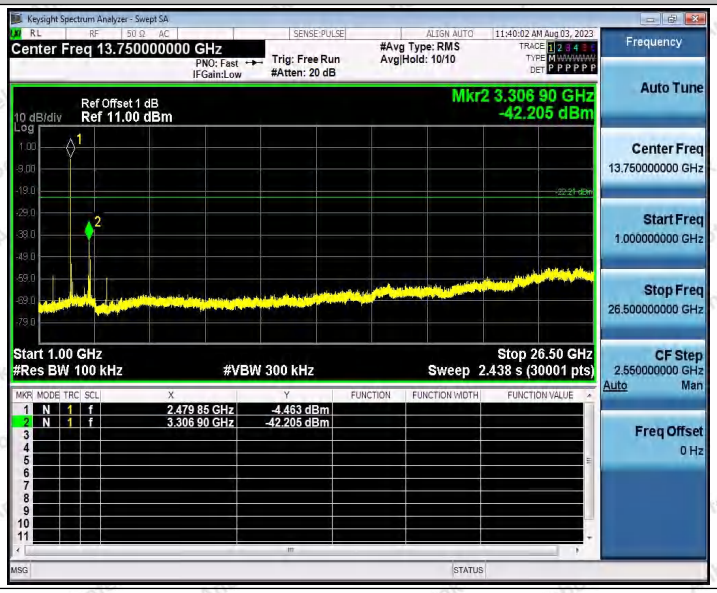
3DH5_Ant1_2480_0~Reference



3DH5_Ant1_2480_30~1000



3DH5_Ant1_2480_1000~26500



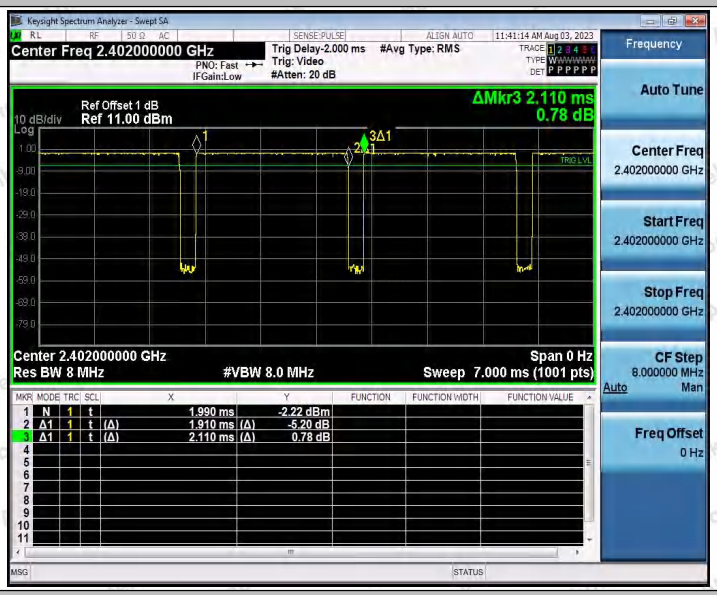
Appendix I: Duty Cycle

Test Result

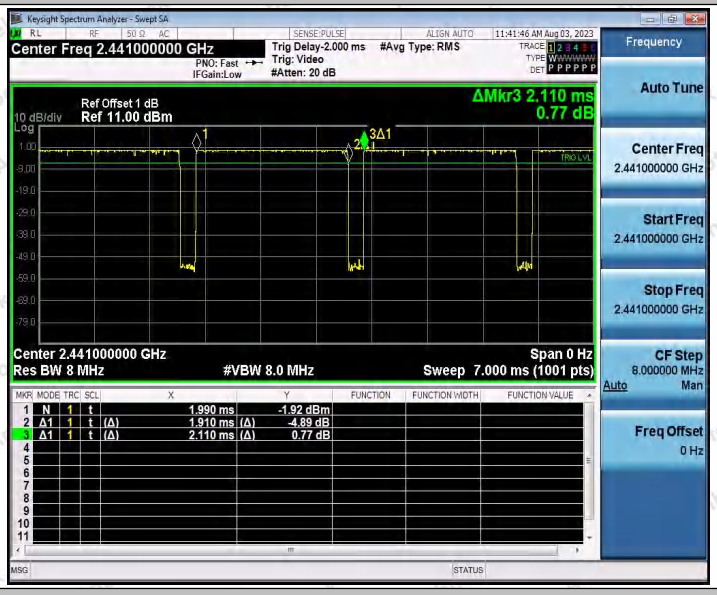
Test Mode	Antenna	Frequency[MHz]	ON Time [ms]	Period [ms]	Duty Cycle [%]	Duty Cycle Factor[dB]
DH5	Ant1	2402	1.91	2.11	90.52	0.43
		2441	1.91	2.11	90.52	0.43
		2480	1.91	2.11	90.52	0.43
2DH5	Ant1	2402	1.03	1.24	83.06	0.81
		2441	1.03	1.24	83.06	0.81
		2480	1.03	1.23	83.74	0.77
3DH5	Ant1	2402	0.74	0.94	78.72	1.04
		2441	0.74	0.95	77.89	1.09
		2480	0.74	0.95	77.89	1.09

Test Graphs

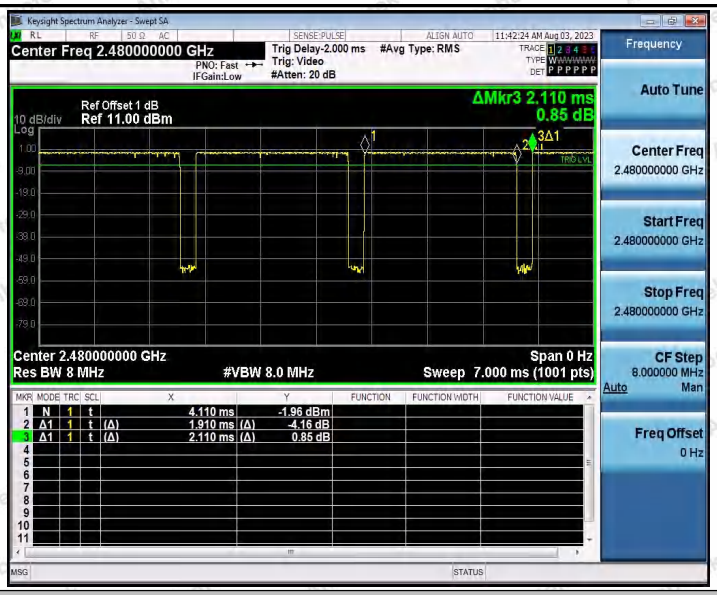
DH5_Ant1_2402



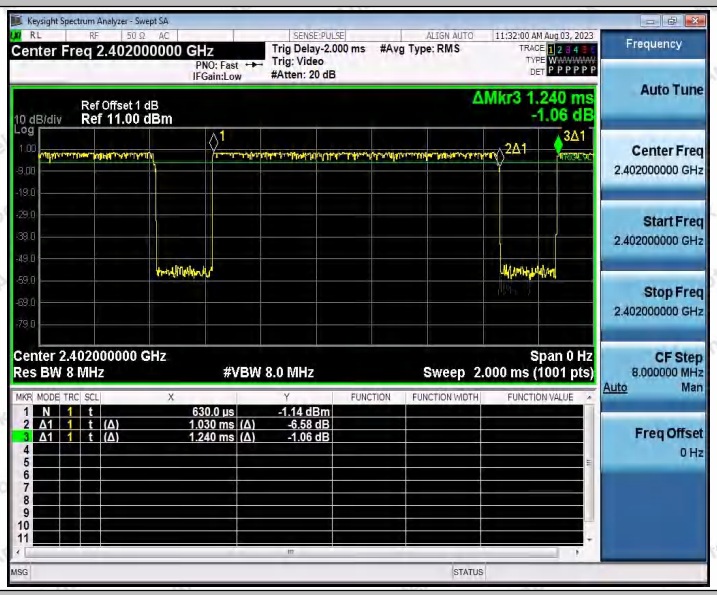
DH5_Ant1_2441



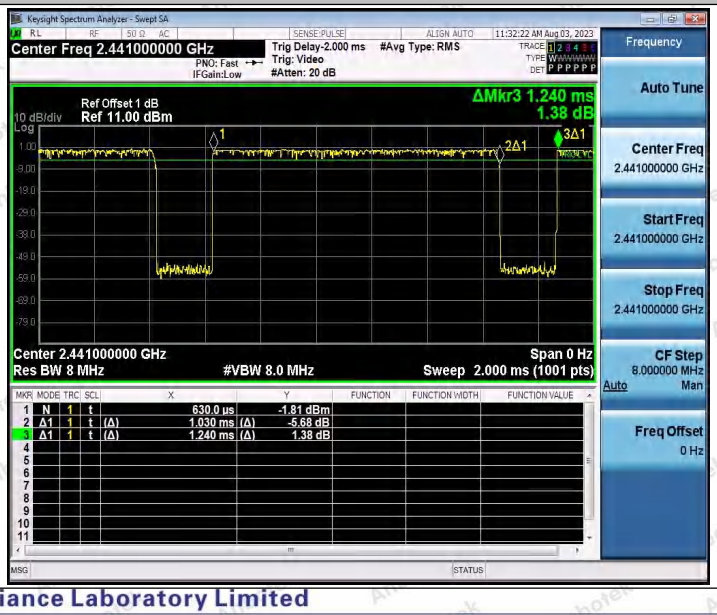
DH5_Ant1_2480



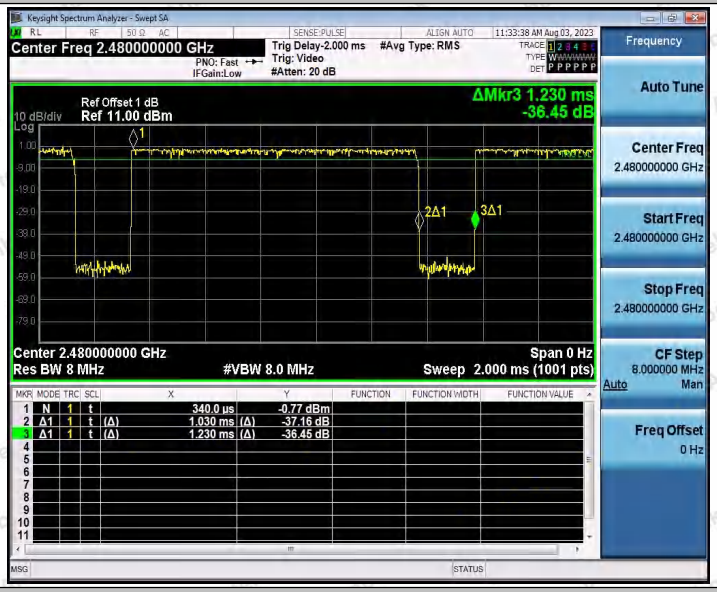
2DH5_Ant1_2402



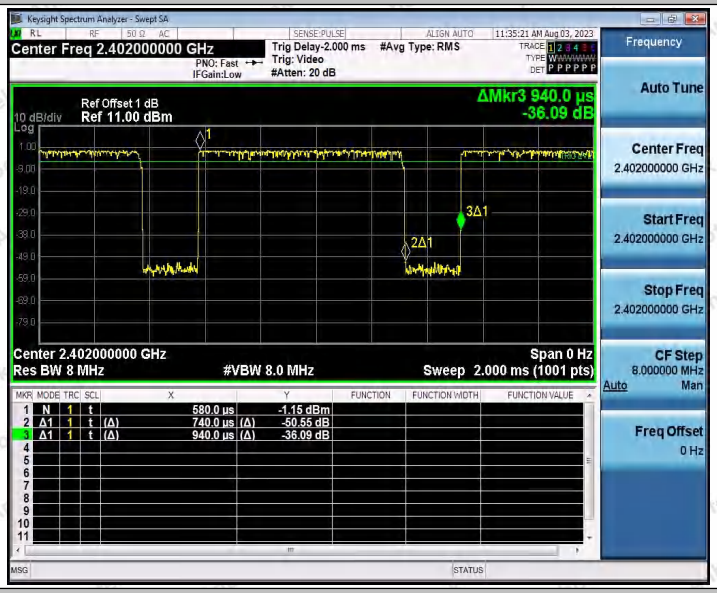
2DH5_Ant1_2441



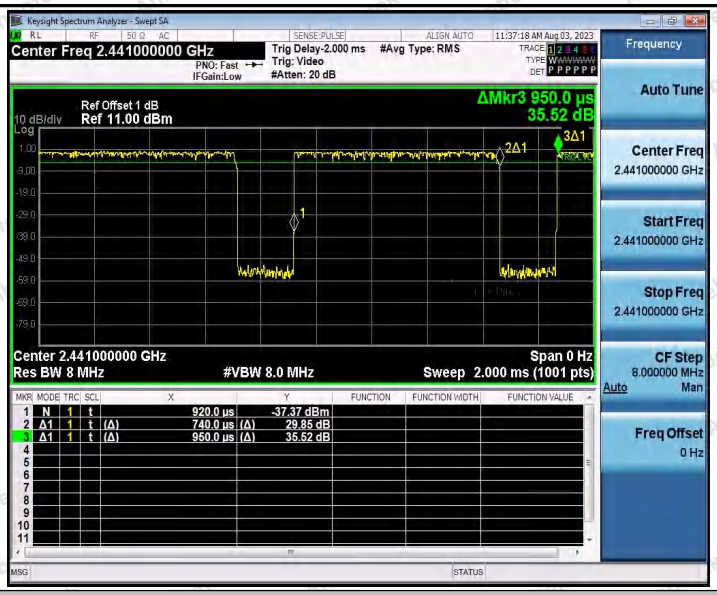
2DH5_Ant1_2480



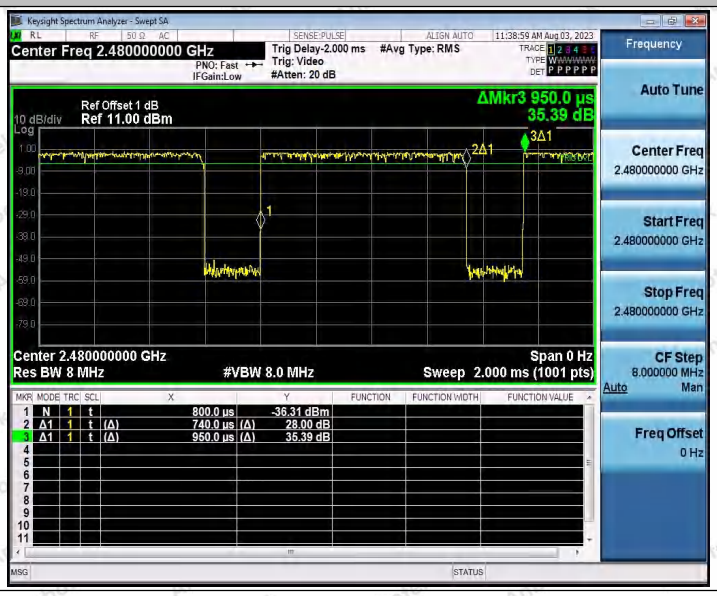
3DH5_Ant1_2402



3DH5_Ant1_2441



3DH5_Ant1_2480



---End---