Appendix Test Data

Report No.:	18220WC30160902	Test Sample No.:	1-2-2
Start Test Date:	2023.08.08	Finish Test Date:	2023.08.14
Test Engineer:	Hayman Chen	Auditor:	Rick Luo
Temperature:	25.4℃	Relative Humidity:	48%
Pressure:	1012 hPa		

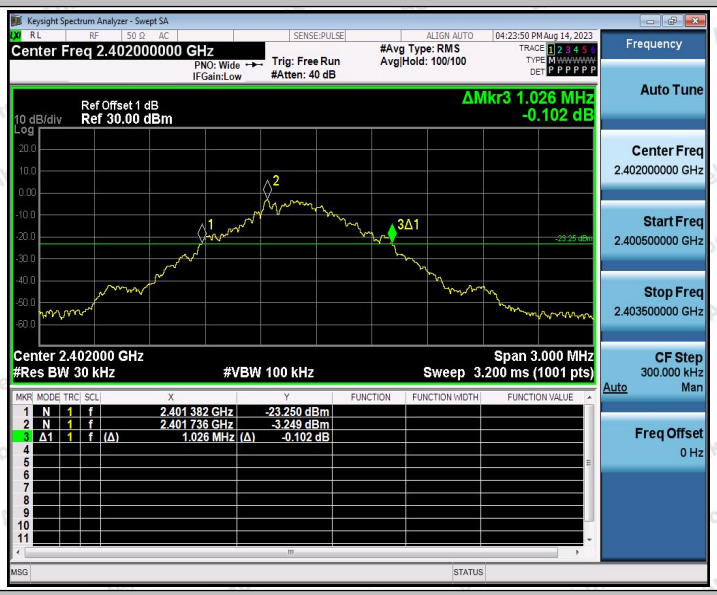
Appendix A: 20dB Emission Bandwidth

Test Result

TestMode	Antenna	Frequency[MHz]	20db EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
2.4G	Ant1	2402	1.026	2401.382	2402.408	---	---
		2441	1.056	2440.361	2441.417	---	---
		2480	1.053	2479.364	2480.417	---	---

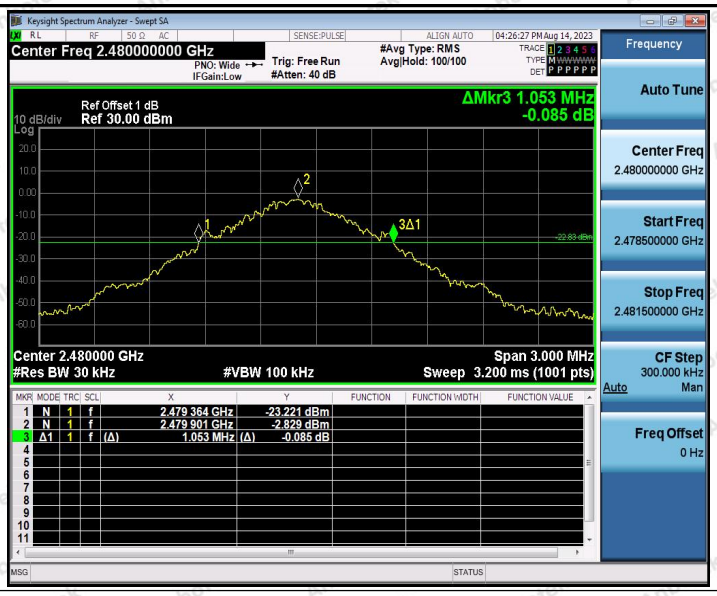
Test Graphs

2.4G_Ant1_2402



2.4G_Ant1_2441

2.4G_Ant1_2480


Keysight Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 40 dB
#Avg Type: RMS
Avg|Hold: 100/100
04:26:27 PM Aug 14, 2023
Ref Offset 1 dB
10 dB/div
Ref 30.00 dBm
ΔMkr3 1.053 MHz
-0.085 dB
Center 2.480000 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 3.000 MHz
Sweep 3.200 ms (1001 pts)
1 N 1 f 2.479 364 GHz -23.221 dBm
2 N 1 f 2.479 901 GHz -2.829 dBm
3 Δ1 1 f (Δ) 1.053 MHz (Δ) -0.085 dB
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.478500000 GHz
Stop Freq
2.481500000 GHz
CF Step
300.000 kHz
Auto Man
Freq Offset
0 Hz

Appendix B: Occupied Channel Bandwidth

Test Result

TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
2.4G	Ant1	2402	0.94569	2401.4201	2402.3658	---	---
		2441	0.96586	2440.4077	2441.3736	---	---
		2480	0.97481	2479.4019	2480.3767	---	---

Test Graphs

2.4G_Ant1_2402

2.4G_Ant1_2441

2.4G_Ant1_2480

Keysight Spectrum Analyzer - Occupied BW
Center Freq 2.480000000 GHz
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold: 100/100
#Atten: 40 dB
Radio Std: None
Radio Device: BTS
Ref Offset 1 dB
10 dB/div
Ref 30.00 dBm
Mkr1 2.479922 GHz
-2.6019 dBm
Center 2.48 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 3 MHz
Sweep 3.2 ms
Occupied Bandwidth
974.81 kHz
Total Power 6.71 dBm
Transmit Freq Error -110.73 kHz
OBW Power 99.00 %
x dB Bandwidth 1.267 MHz
x dB -26.00 dB
Frequency
Center Freq
2.480000000 GHz
CF Step
300.000 kHz
Auto Man
Freq Offset
0 Hz

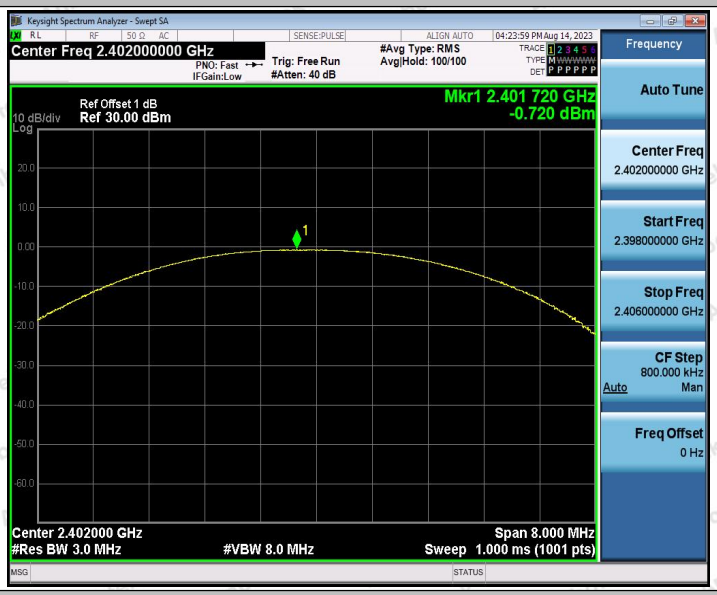
Appendix C: Maximum conducted output power

Test Result Peak

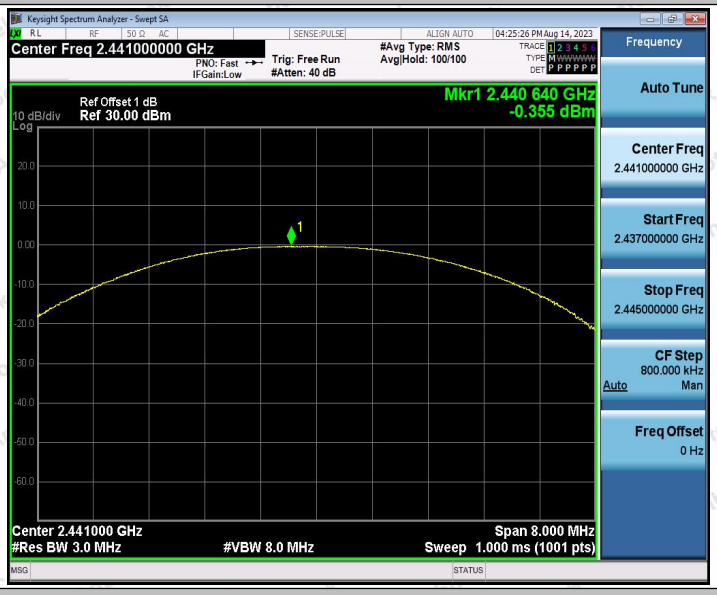
Test Mode	Antenna	Frequency[MHz]	Conducted Peak Power[dBm]	Conducted Limit[dBm]	Verdict
2.4G	Ant1	2402	-0.72	≤30	PASS
		2441	-0.36	≤30	PASS
		2480	0.10	≤30	PASS

Test Graphs

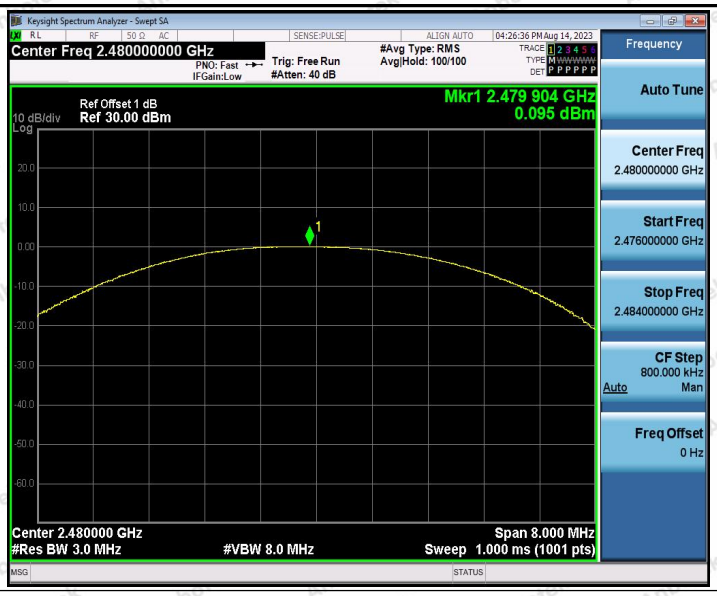
2.4G_Ant1_2402



2.4G_Ant1_2441



2.4G_Ant1_2480


Keysight Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
#Avg Type: RMS
Avg|Hold: 100/100
04:26:36 PM Aug 14, 2023
Ref Offset 1 dB
10 dB/div
Ref 30.00 dBm
Log
Mkr1 2.479 904 GHz
0.095 dBm
Center 2.480000 GHz
#Res BW 3.0 MHz
#VBW 8.0 MHz
Span 8.000 MHz
Sweep 1.000 ms (1001 pts)
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.476000000 GHz
Stop Freq
2.484000000 GHz
CF Step
800.000 kHz
Auto
Man
Freq Offset
0 Hz

Appendix D: Carrier frequency separation

Test Result

TestMode	Antenna	Frequency[MHz]	Result[MHz]	Limit[MHz]	Verdict
2.4G	Ant1	Hop	1.076	≥1.056	PASS

Test Graphs

2.4G_Ant1_Hop

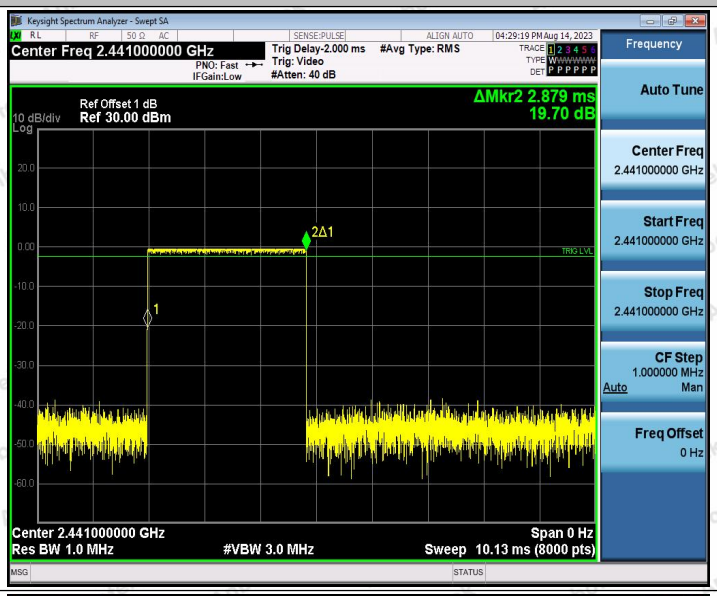
Appendix E: Time of occupancy

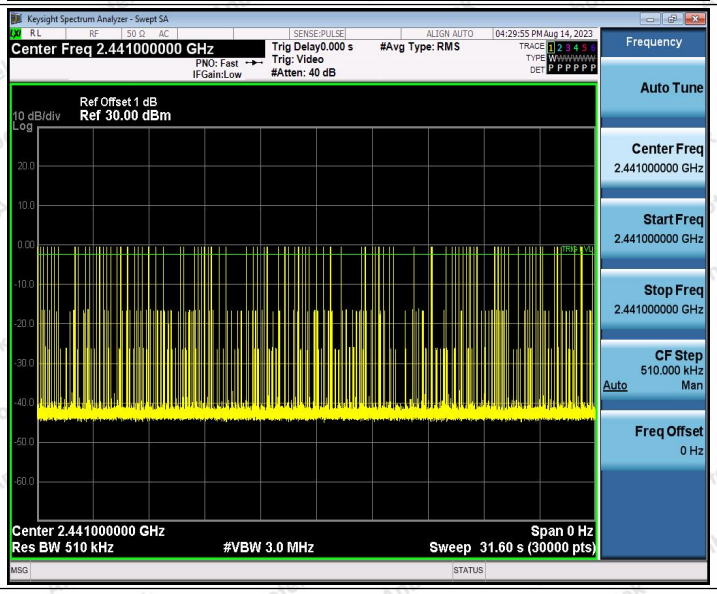
Test Result

TestMode	Antenna	Frequency[MHz]	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
2.4G	Ant1	Hop	2.879	111	0.32	≤0.4	PASS

Test Graphs

2.4G_Ant1_Hop





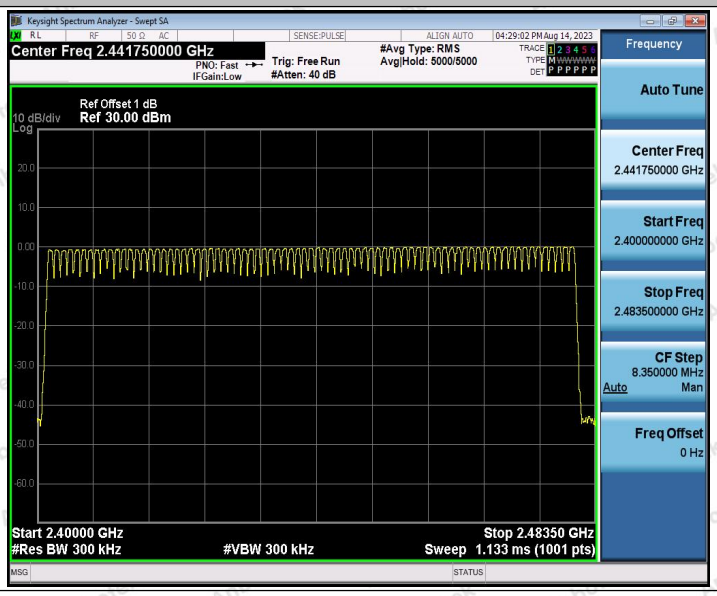
Appendix F: Number of hopping channels

Test Result

TestMode	Antenna	Frequency[MHz]	Result[Num]	Limit[Num]	Verdict
2.4G	Ant1	Hop	79	≥15	PASS

Test Graphs

2.4G_Ant1_Hop



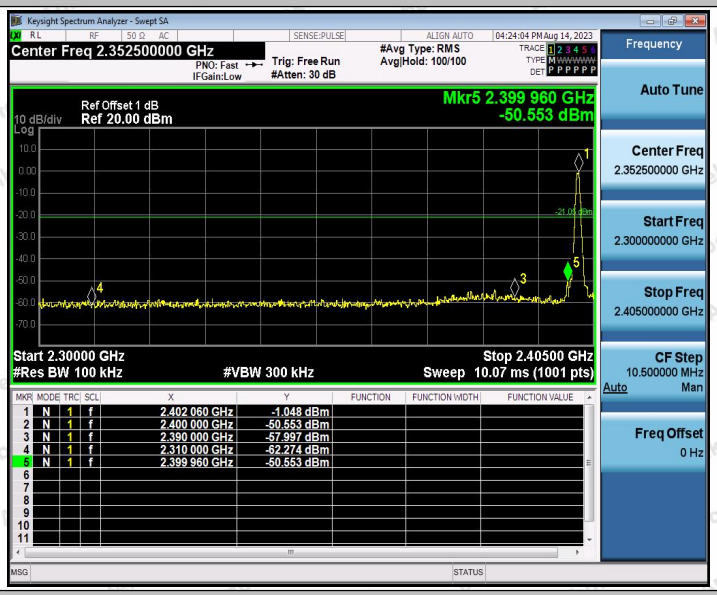
Appendix G: Band edge measurements

Test Result

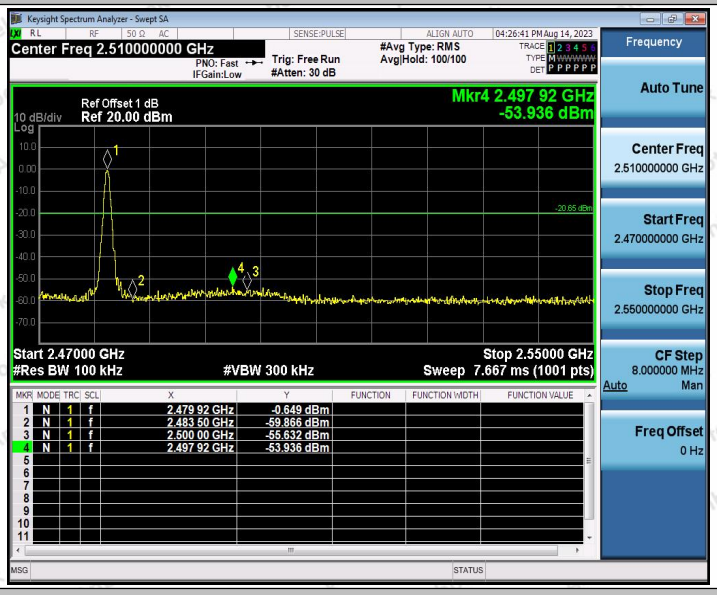
TestMode	Antenna	ChName	Frequency[MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
2.4G	Ant1	Low	2402	-1.05	-50.55	≤-21.05	PASS
		High	2480	-0.65	-53.94	≤-20.65	PASS
		Low	Hop_2402	-1.19	-55.71	≤-21.19	PASS
		High	Hop_2480	-0.48	-55.62	≤-20.48	PASS

Test Graphs

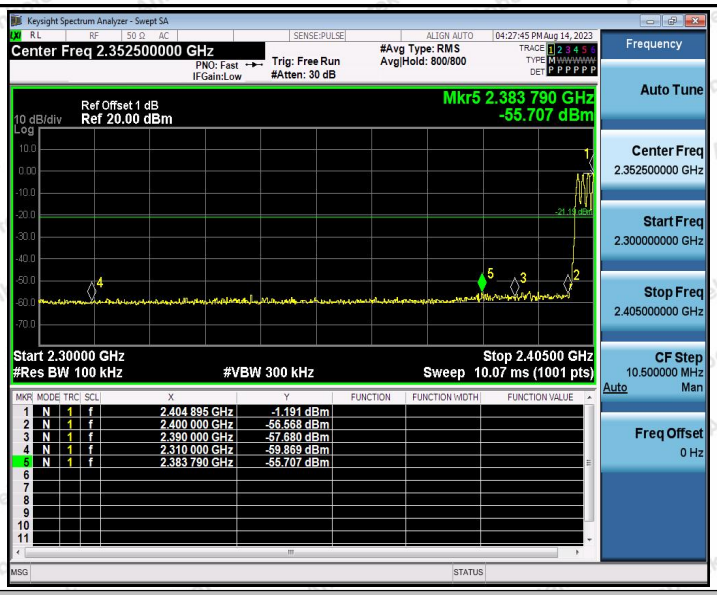
2.4G_Ant1_Low_2402



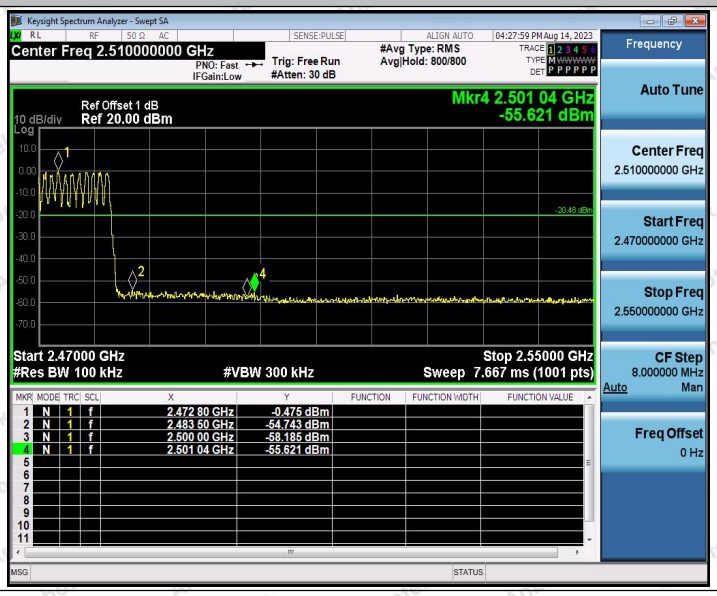
2.4G_Ant1_High_2480



2.4G_Ant1_Low_Hop_2402



2.4G_Ant1_High_Hop_2480



Appendix H: Conducted Spurious Emission

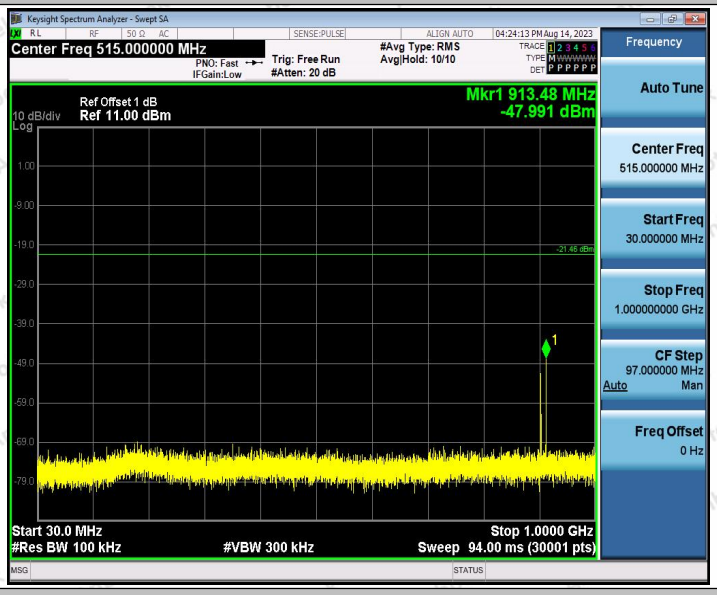
Test Result

TestMode	Antenna	Frequency[MHz]	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
2.4G	Ant1	2402	Reference	-1.46	-1.46	---	PASS
			30~1000	-1.46	-47.99	≤-21.46	PASS
			1000~26500	-1.46	-46.96	≤-21.46	PASS
		2441	Reference	-1.32	-1.32	---	PASS
			30~1000	-1.32	-68.2	≤-21.32	PASS
			1000~26500	-1.32	-48.98	≤-21.32	PASS
		2480	Reference	-0.73	-0.73	---	PASS
			30~1000	-0.73	-68.42	≤-20.73	PASS
			1000~26500	-0.73	-46.67	≤-20.73	PASS

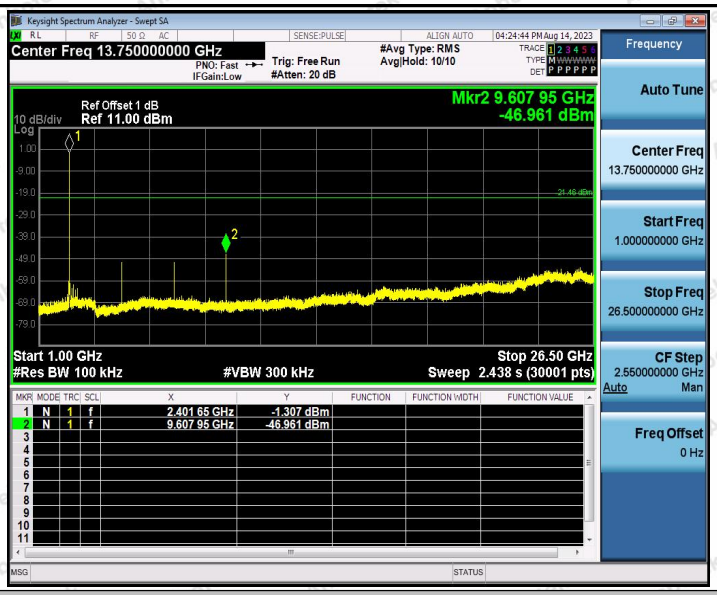
Test Graphs

2.4G_Ant1_2402_0~Reference

2.4G_Ant1_2402_30~1000

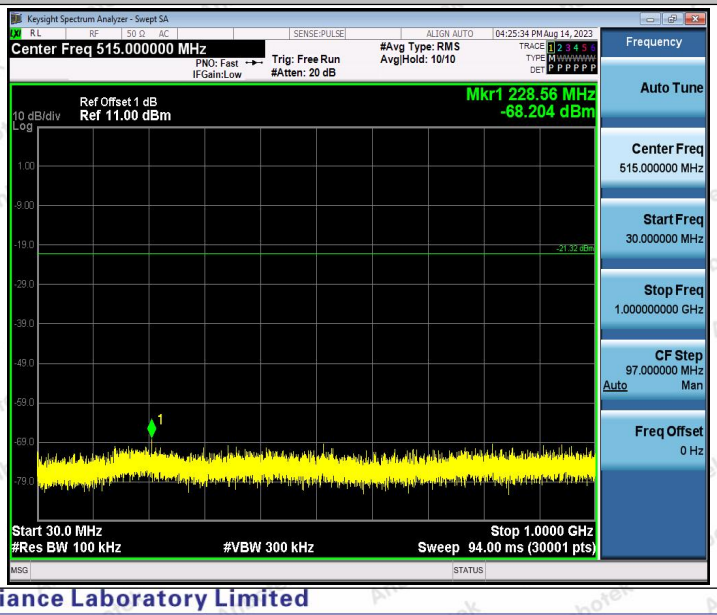


2.4G_Ant1_2402_1000~26500

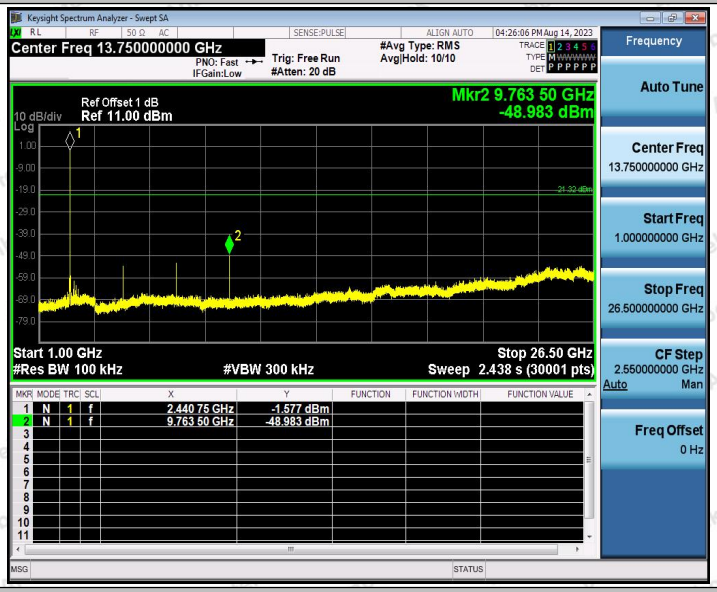


2.4G_Ant1_2441_0~Reference

2.4G_Ant1_2441_30~1000

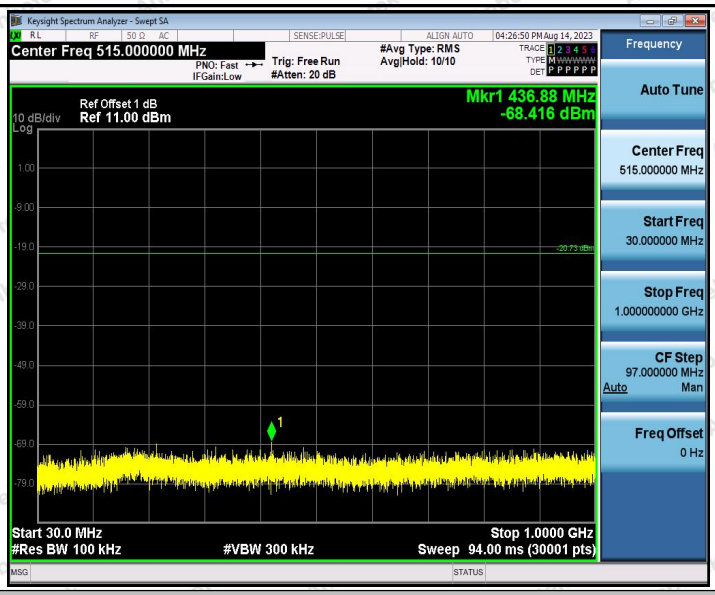


2.4G_Ant1_2441_1000~26500

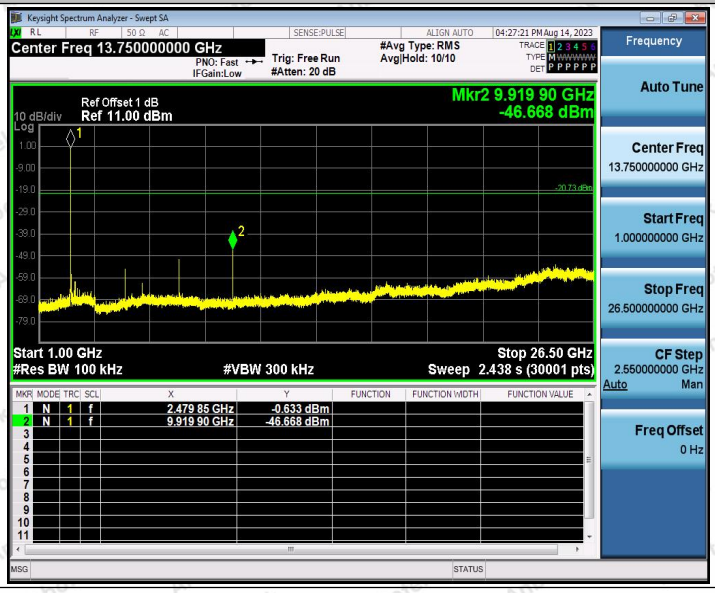


2.4G_Ant1_2480_0~Reference

2.4G_Ant1_2480_30~1000



2.4G_Ant1_2480_1000~26500



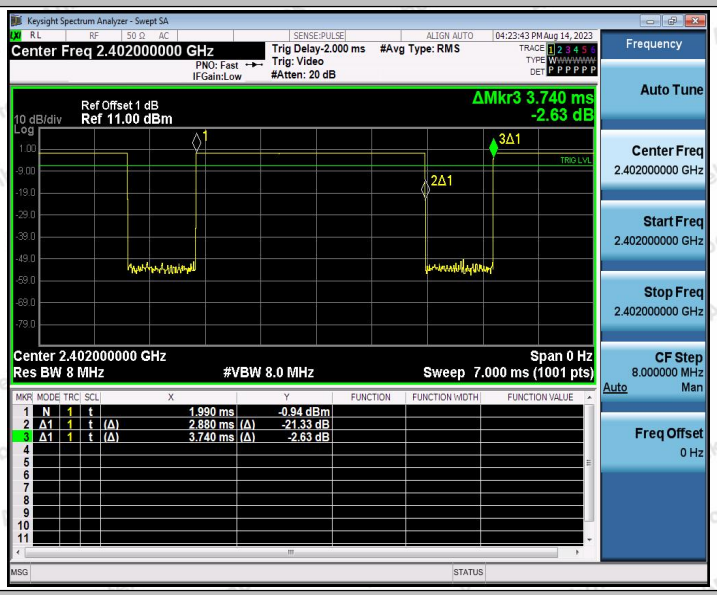
Appendix I: Duty Cycle

Test Result

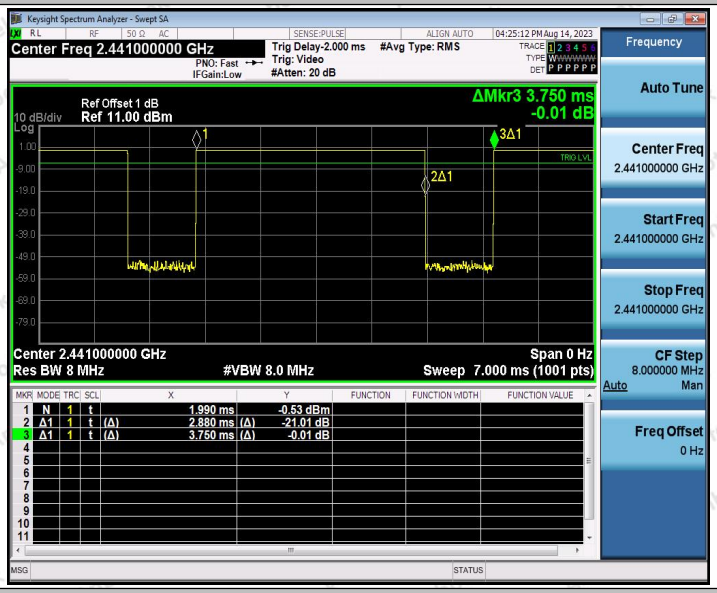
TestMode	Antenna	Frequency[MHz]	ON Time [ms]	Period [ms]	Duty Cycle [%]	Duty Cycle Factor[dB]
2.4G	Ant1	2402	2.88	3.74	77.01	1.13
		2441	2.88	3.75	76.80	1.15
		2480	2.88	3.74	77.01	1.13

Test Graphs

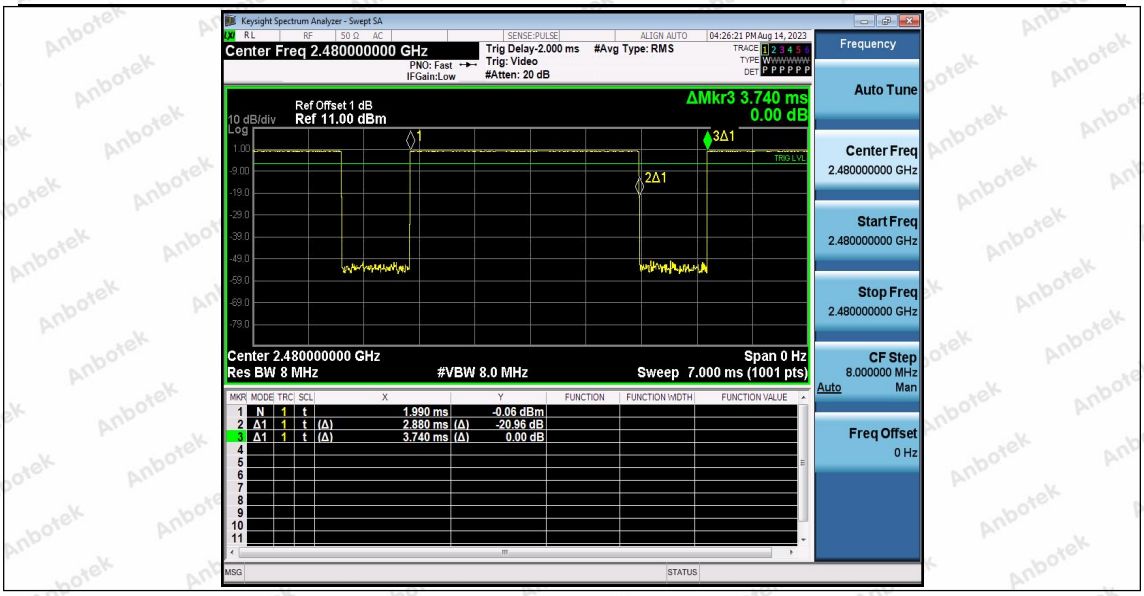
2.4G_Ant1_2402



2.4G_Ant1_2441



2.4G_Ant1_2480


Keysight Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
Trig Delay-2.000 ms
Trig: Video
#Atten: 20 dB
#Avg Type: RMS
Ref Offset 1 dB
10 dB/div Ref 11.00 dBm
ΔMkr3 3.740 ms
0.00 dB
Center 2.480000000 GHz
Res BW 8 MHz
#VBW 8.0 MHz
Span 0 Hz
Sweep 7.000 ms (1001 pts)
1 N 1 t 1.990 ms -0.06 dBm
2 Δ1 1 t (Δ) 2.880 ms (Δ) -20.96 dB
3 Δ1 1 t (Δ) 3.740 ms (Δ) 0.00 dB
Frequency
Auto Tune
Center Freq 2.480000000 GHz
Start Freq 2.480000000 GHz
Stop Freq 2.480000000 GHz
CF Step 8.000000 MHz
Auto Man
Freq Offset 0 Hz

---End---