Appendix Test Data

Report No.:	18220WC30085301	Test Sample No.:	1-2-2
Start Test Date:	2023.05.11	Finish Test Date:	2023.05.12
Test Engineer:	Rick Luo	Auditor:	Edward.Pan
Temperature:	25.9℃	Relative Humidity:	45%
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	2403.65	2.088	2402.714	2404.802	---	---
		2441.65	2.064	2440.698	2442.762	---	---
		2479.65	2.176	2478.618	2480.794	---	---

Test Graphs

2.4G_Ant1_2403.65

2.4G_Ant1_2441.65

2.4G_Ant1_2479.65

Keysight Spectrum Analyzer - Swept SA
Center Freq 2.479650000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 40 dB
#Avg Type: RMS
Avg|Hold: 800/800
04:12:54 PM May 12, 2023
Ref Offset 1 dB
10 dB/div
Ref 30.00 dBm
ΔMkr3 2.176 MHz
-0.197 dB
-24.70 dBm
Center 2.479650 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 8.000 MHz
Sweep 8.467 ms (1001 pts)
1 N 1 f 2.478 618 GHz -25.082 dBm
2 N 1 f 2.479 050 GHz -4.696 dBm
3 Δ1 1 f (Δ) 2.176 MHz (Δ) -0.197 dB
Frequency
Auto Tune
Center Freq
2.479650000 GHz
Start Freq
2.475650000 GHz
Stop Freq
2.483650000 GHz
CF Step
800.000 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	2403.65	2.6530	2402.2958	2404.9488	---	---
		2441.65	2.7648	2440.2739	2443.0387	---	---
		2479.65	2.6411	2478.3590	2481.0001	---	---

Test Graphs

2.4G_Ant1_2403.65

2.4G_Ant1_2441.65

2.4G_Ant1_2479.65

Keysight Spectrum Analyzer - Occupied BW
Center Freq 2.479650000 GHz
Center Freq: 2.479650000 GHz
Trig: Free Run
Avg|Hold: 800/800
#Atten: 40 dB
Radio Std: None
Radio Device: BTS
Frequency
Ref Offset 1 dB
10 dB/div
Ref 30.00 dBm
Mkr1 2.479042 GHz
-4.7219 dBm
Center Freq
2.479650000 GHz
Center 2.48 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 8 MHz
Sweep 8.467 ms
CF Step
800.000 kHz
Auto
Man
Occupied Bandwidth
2.6411 MHz
Total Power
2.34 dBm
Transmit Freq Error
29.500 kHz
OBW Power
99.00 %
x dB Bandwidth
2.648 MHz
x dB
-26.00 dB
Freq Offset
0 Hz
MSG
STATUS

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	2403.65	-3.94	≤30	PASS
		2441.65	-4.19	≤30	PASS
		2479.65	-4.41	≤30	PASS

Test Graphs

2.4G_Ant1_2403.65

2.4G_Ant1_2441.65

2.4G_Ant1_2479.65

Keysight Spectrum Analyzer - Swept SA
Center Freq 2.479650000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
#Avg Type: RMS
Avg|Hold: 800/800
04:13:30 PM May 12, 2023
Ref Offset 1 dB
10 dB/div
Ref 30.00 dBm
Log
Mkr1 2.479 042 GHz
-4.408 dBm
Center 2.479650 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
2.479650000 GHz
Start Freq
2.475650000 GHz
Stop Freq
2.483650000 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	2.000	≥1.451	PASS

Test Graphs

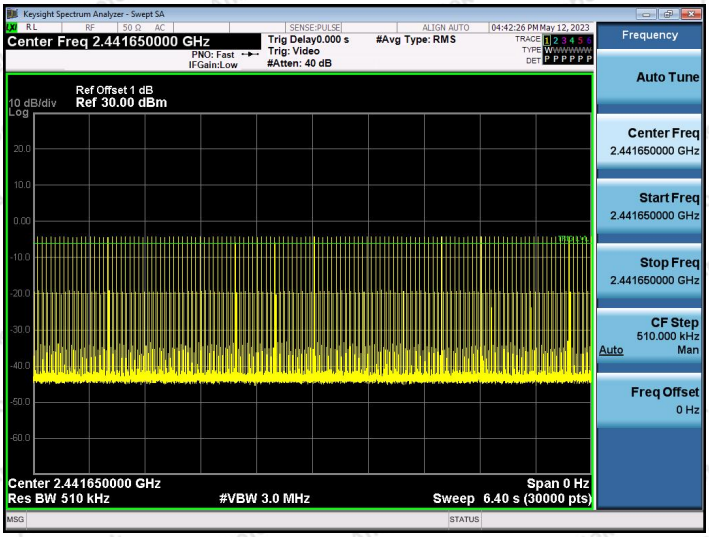
2.4G_Ant1_Hop

Appendix E: Time of occupancy

Test Result

TestMode	Antenna	Frequency[MHz]	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
2.4G	Ant1	Hop	0.122	245	0.03	≤0.4	PASS

Test Graphs

2.4G_Ant1_Hop


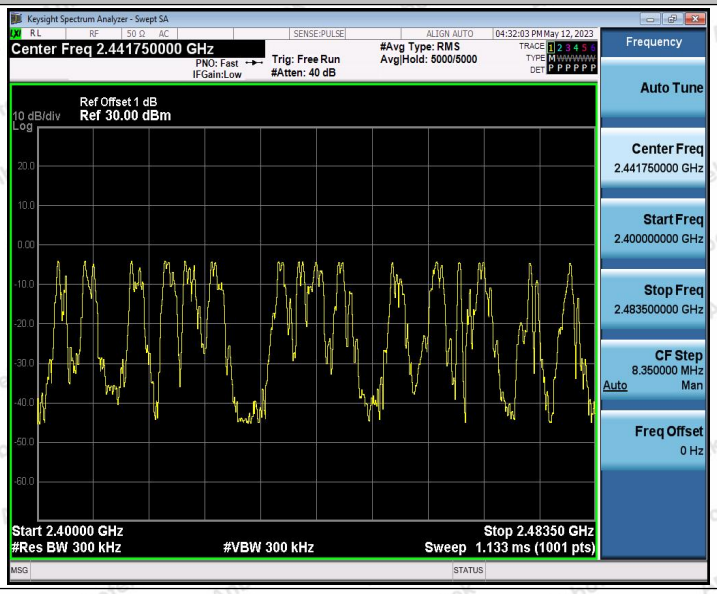
Appendix F: Number of hopping channels

Test Result

TestMode	Antenna	Frequency[MHz]	Result[Num]	Limit[Num]	Verdict
2.4G	Ant1	Hop	16	≥15	PASS

Test Graphs

2.4G_Ant1_Hop



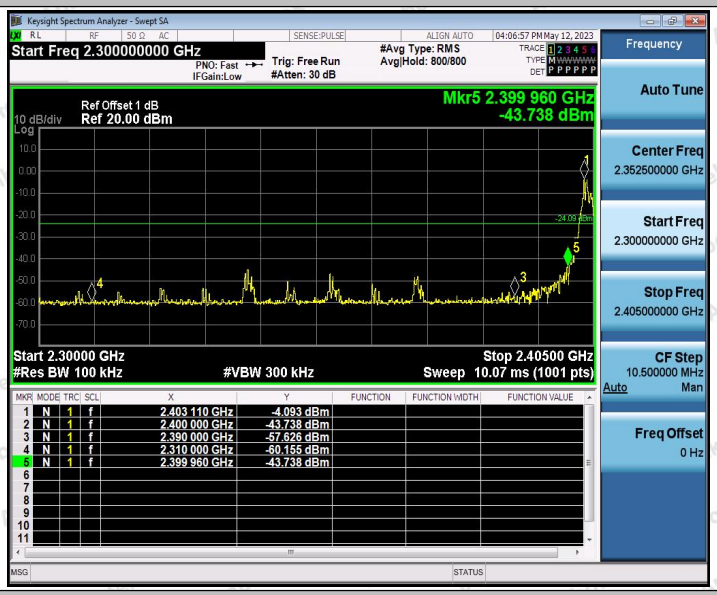
Appendix G: Band edge measurements

Test Result

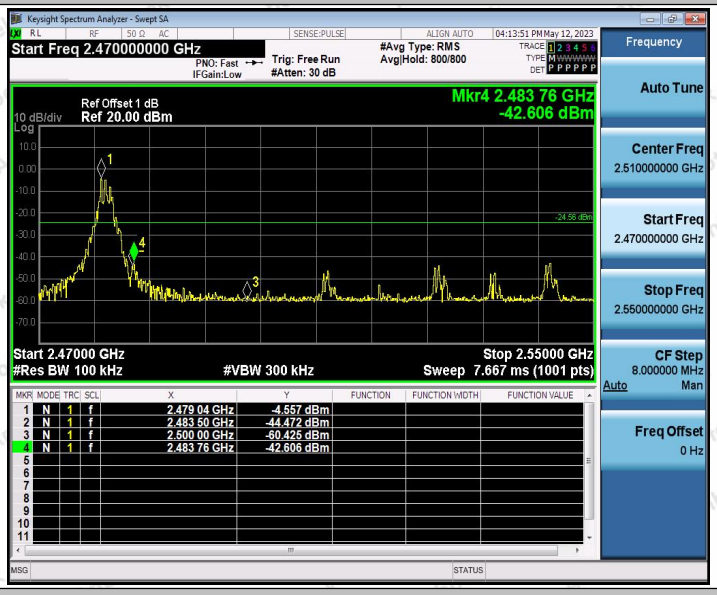
TestMode	Antenna	ChName	Frequency[MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
2.4G	Ant1	Low	2403.65	-4.09	-43.74	≤-24.09	PASS
		High	2479.65	-4.56	-42.61	≤-24.56	PASS
		Low	Hop_2403.65	-3.95	-43.86	≤-23.95	PASS
		High	Hop_2479.65	-4.45	-43.2	≤-24.45	PASS

Test Graphs

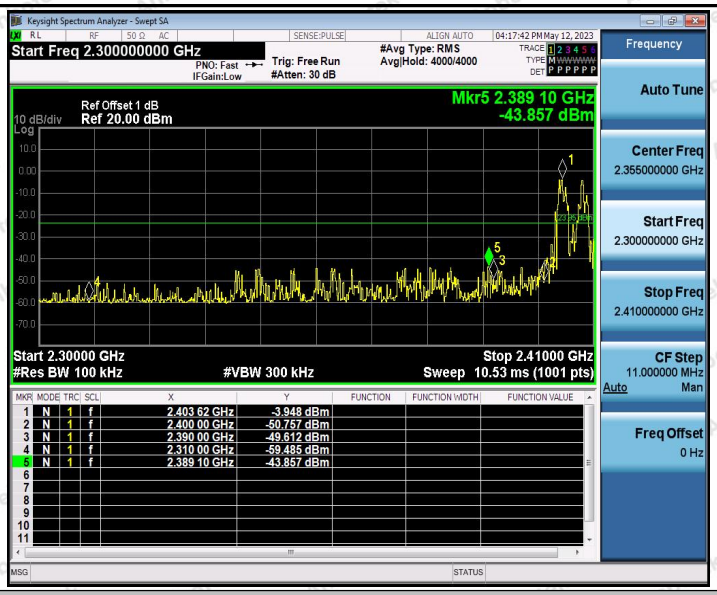
2.4G_Ant1_Low_2403.65



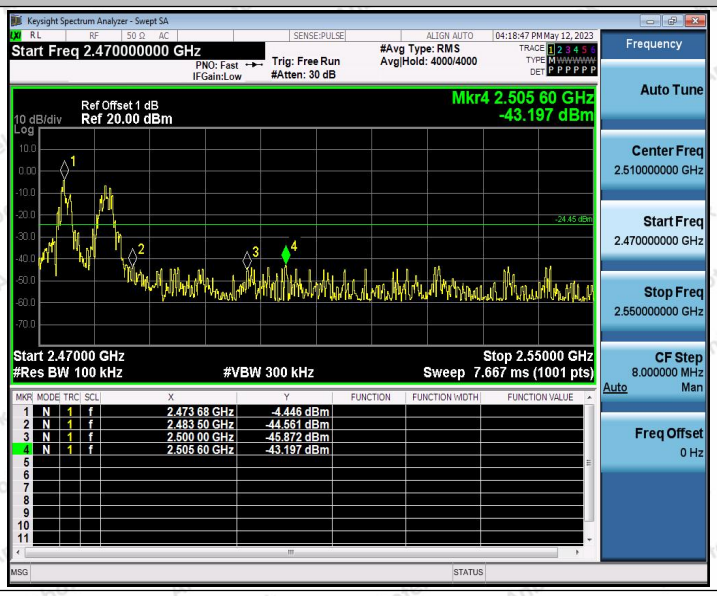
2.4G_Ant1_High_2479.65



2.4G_Ant1_Low_Hop_2403.65



2.4G_Ant1_High_Hop_2479.65



Appendix H: Conducted Spurious Emission

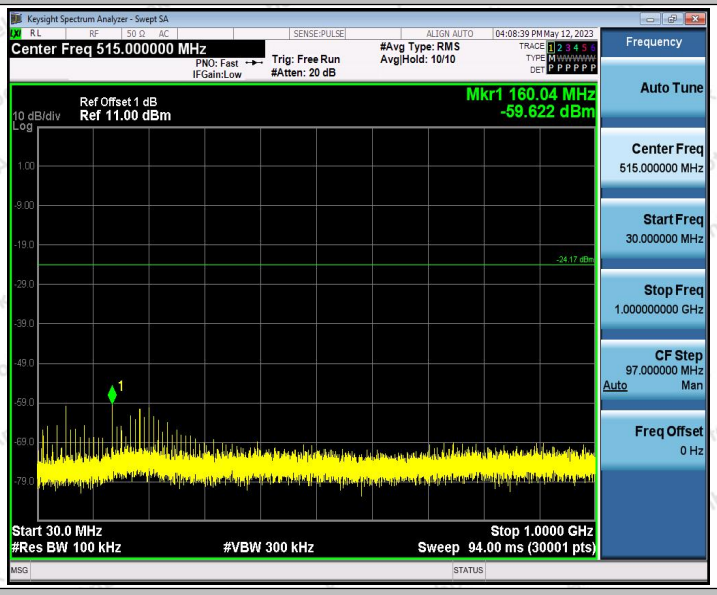
Test Result

TestMode	Antenna	Frequency[MHz]	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
2.4G	Ant1	2403.65	Reference	-4.17	-4.17	---	PASS
			30~1000	-4.17	-59.62	≤-24.17	PASS
			1000~26500	-4.17	-36.9	≤-24.17	PASS
		2441.65	Reference	-4.36	-4.36	---	PASS
			30~1000	-4.36	-60.72	≤-24.36	PASS
			1000~26500	-4.36	-49.25	≤-24.36	PASS
		2479.65	Reference	-4.59	-4.59	---	PASS
			30~1000	-4.59	-51.9	≤-24.59	PASS
			1000~26500	-4.59	-47.36	≤-24.59	PASS

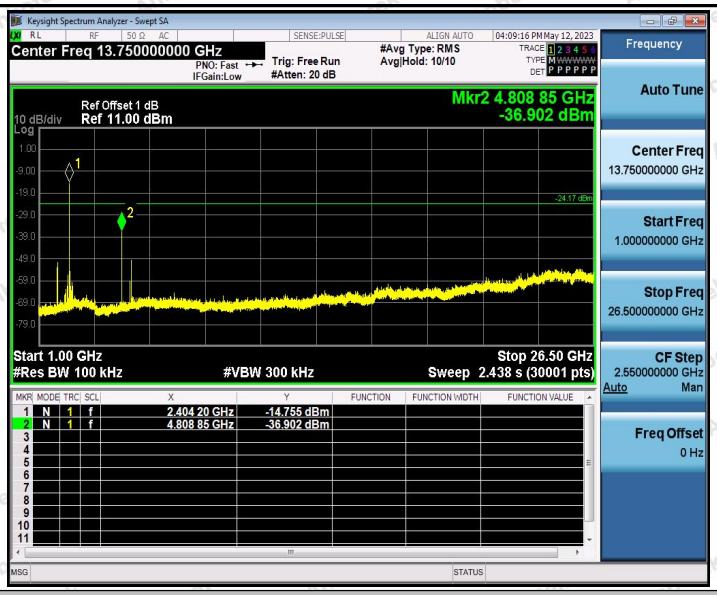
Test Graphs

2.4G_Ant1_2403.65_0~Reference

2.4G_Ant1_2403.65_30~1000

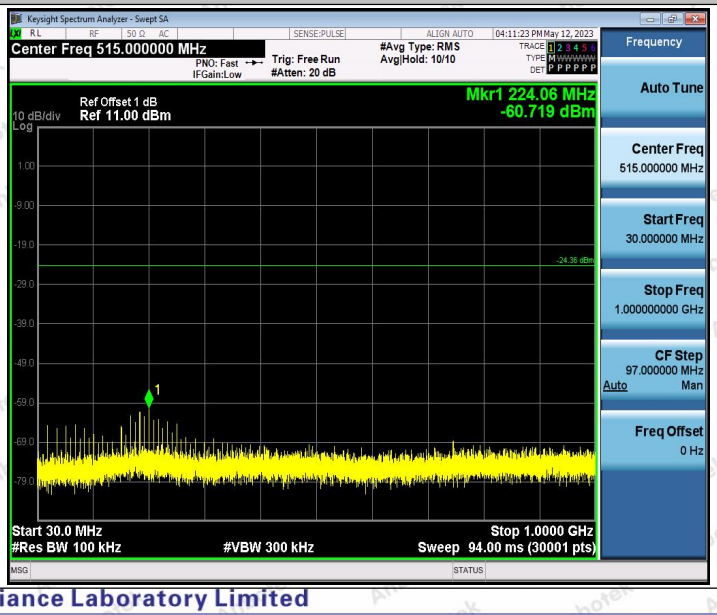


2.4G_Ant1_2403.65_1000~26500

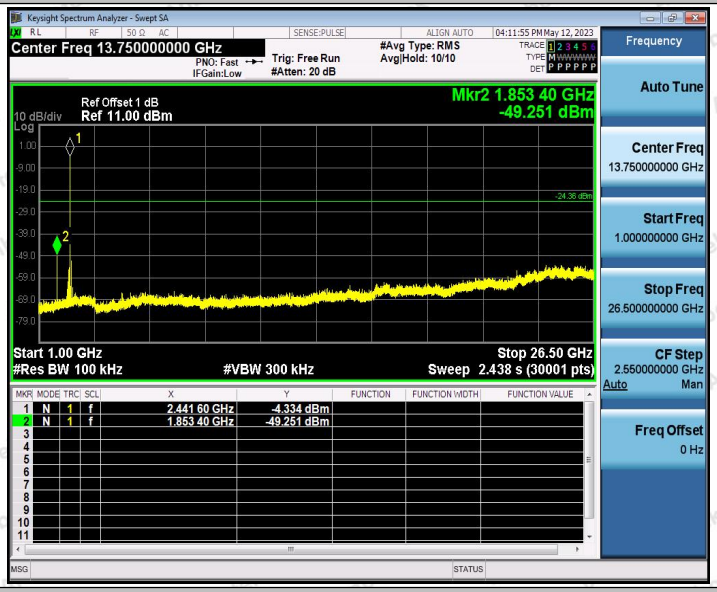


2.4G_Ant1_2441.65_0~Reference

2.4G_Ant1_2441.65_30~1000

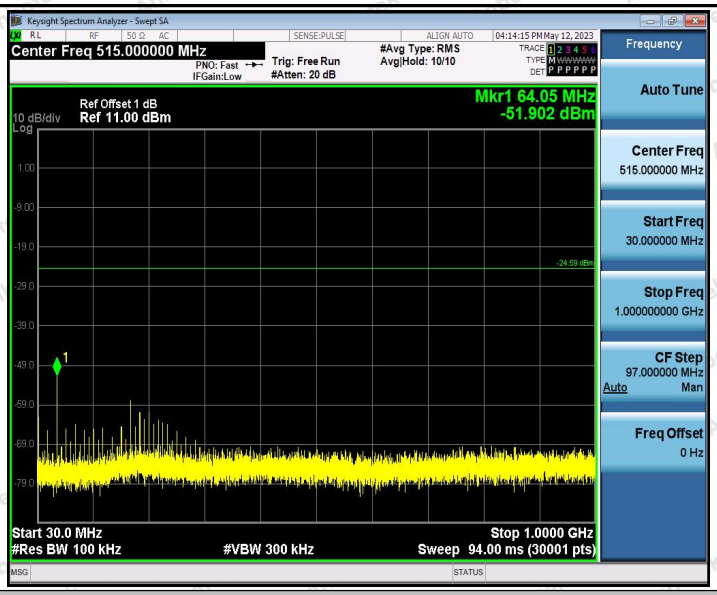


2.4G_Ant1_2441.65_1000~26500

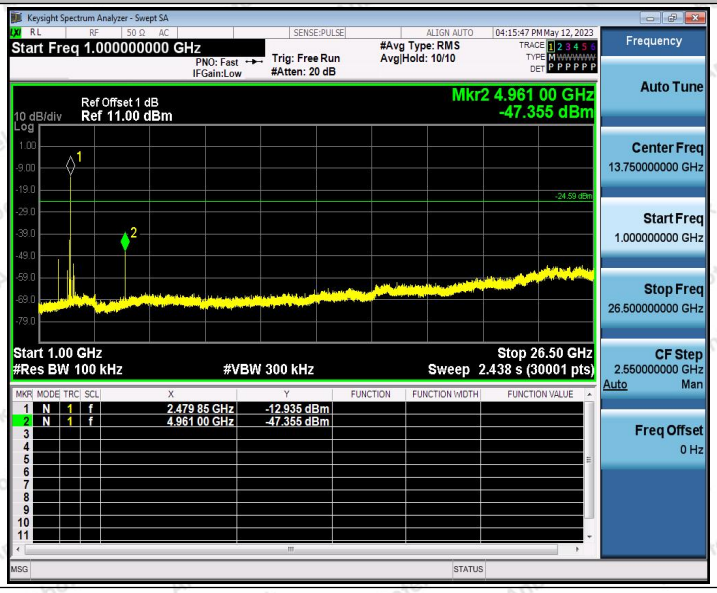


2.4G_Ant1_2479.65_0~Reference

2.4G_Ant1_2479.65_30~1000



2.4G_Ant1_2479.65_1000~26500



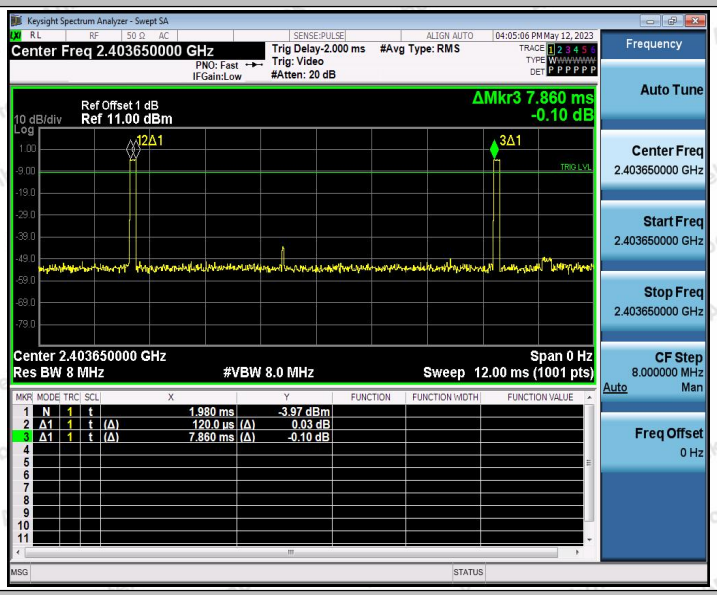
Appendix I: Duty Cycle

Test Result

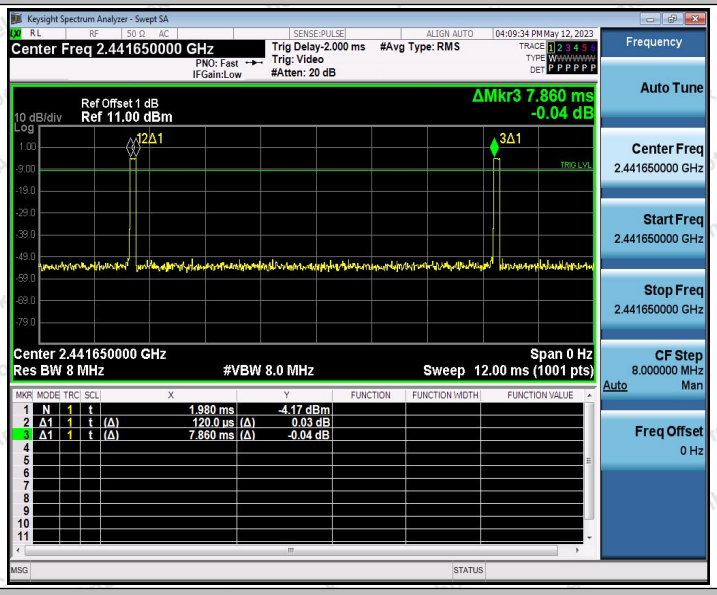
TestMode	Antenna	Frequency[MHz]	ON Time [ms]	Period [ms]	Duty Cycle [%]	Duty Cycle Factor[dB]
2.4G	Ant1	2403.65	0.12	7.86	1.53	18.15
		2441.65	0.12	7.86	1.53	18.15
		2479.65	0.12	7.86	1.53	18.15

Test Graphs

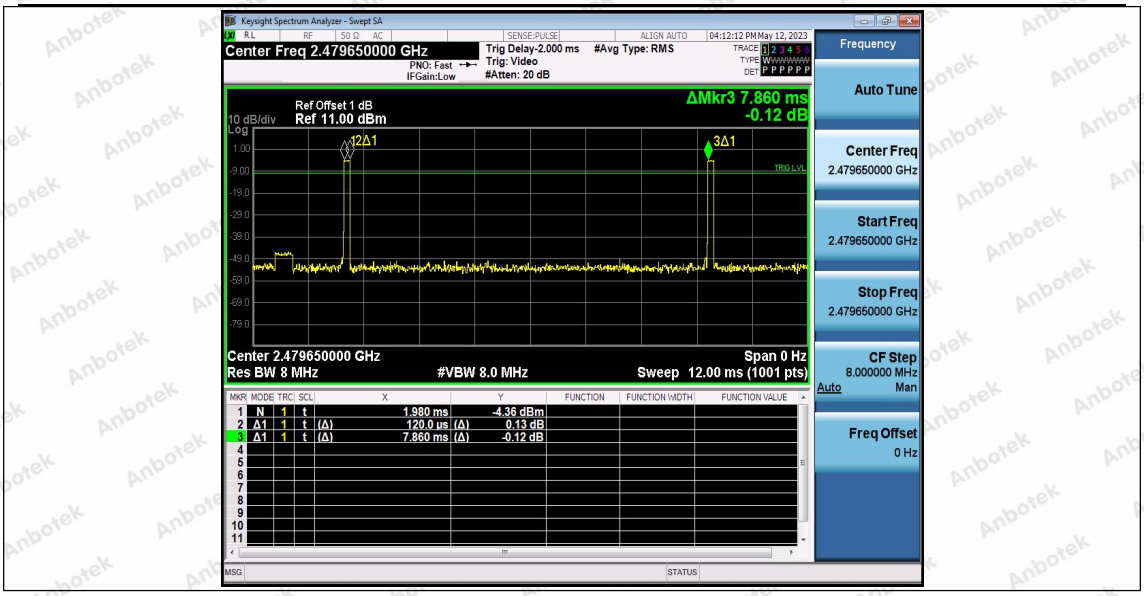
2.4G_Ant1_2403.65



2.4G_Ant1_2441.65



2.4G_Ant1_2479.65


Keysight Spectrum Analyzer - Swept SA
Center Freq 2.479650000 GHz
Trig Delay-2.000 ms
Trig: Video
#Atten: 20 dB
#Avg Type: RMS
04:12:12 PM May 12, 2023
Ref Offset 1 dB
10 dB/div Ref 11.00 dBm
ΔMkr3 7.860 ms
-0.12 dB
Center 2.479650000 GHz
Res BW 8 MHz
#VBW 8.0 MHz
Span 0 Hz
Sweep 12.00 ms (1001 pts)
1 N 1 t 1.980 ms -4.36 dBm
2 Δ1 1 t (Δ) 120.0 µs (Δ) 0.13 dB
3 Δ1 1 t (Δ) 7.860 ms (Δ) -0.12 dB
Frequency
Auto Tune
Center Freq 2.479650000 GHz
Start Freq 2.479650000 GHz
Stop Freq 2.479650000 GHz
CF Step 8.000000 MHz
Auto Man
Freq Offset 0 Hz

---End---