Appendix Test Data

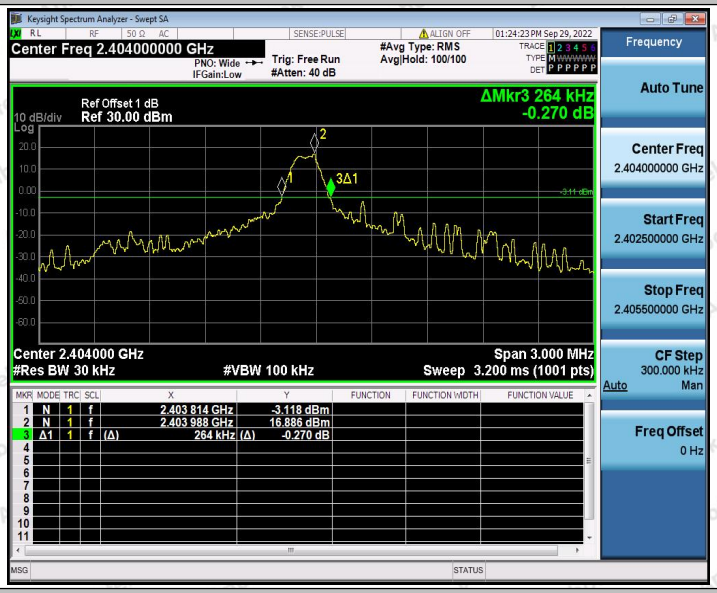
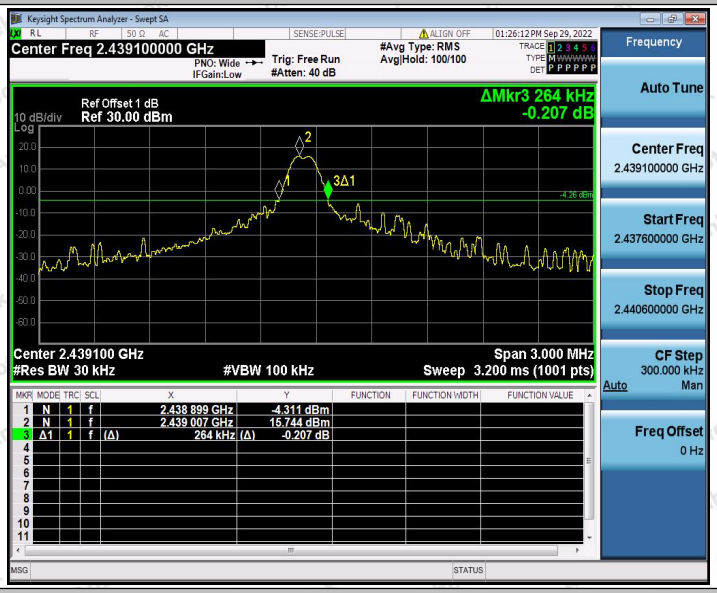
Report No.:	18220WC20229501	Test Sample No.:	1-2-2
Start Test Date:	2022.9.27	Finish Test Date:	2022.10.28
Test Engineer:	Tony.He	Auditor:	Edward.Pan
Temperature:	27.3℃	Relative Humidity:	47 %
Pressure:	1012 hPa		

Appendix A: 20dB Emission Bandwidth

Test Result

TestMode	Antenna	Frequency[MHz]	20db EBW[MHz]	FL[MHz]	FH[MHz]
2.4G	Ant1	2404	0.264	2403.814	2404.078
		2439.1	0.264	2438.899	2439.163
		2474.2	0.279	2473.987	2474.266

Test Graphs

2.4G_Ant1_2404

2.4G_Ant1_2439.1

2.4G_Ant1_2474.2

Keysight Spectrum Analyzer - Swept SA
Center Freq 2.474200000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 40 dB
#Avg Type: RMS
Avg|Hold: 100/100
01:31:39 PM Sep 29, 2022
Ref Offset 1 dB
10 dB/div
Ref 30.00 dBm
ΔMkr3 279 kHz
-1.121 dB
Center 2.474200 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 3.000 MHz
Sweep 3.200 ms (1001 pts)
1 N 1 f 2.473 987 GHz -4.318 dBm
2 N 1 f 2.474 149 GHz 15.740 dBm
3 Δ1 1 f (Δ) 279 kHz (Δ) -1.121 dB
Frequency
Auto Tune
Center Freq
2.474200000 GHz
Start Freq
2.472700000 GHz
Stop Freq
2.475700000 GHz
CF Step
300.000 kHz
Auto
Man
Freq Offset
0 Hz

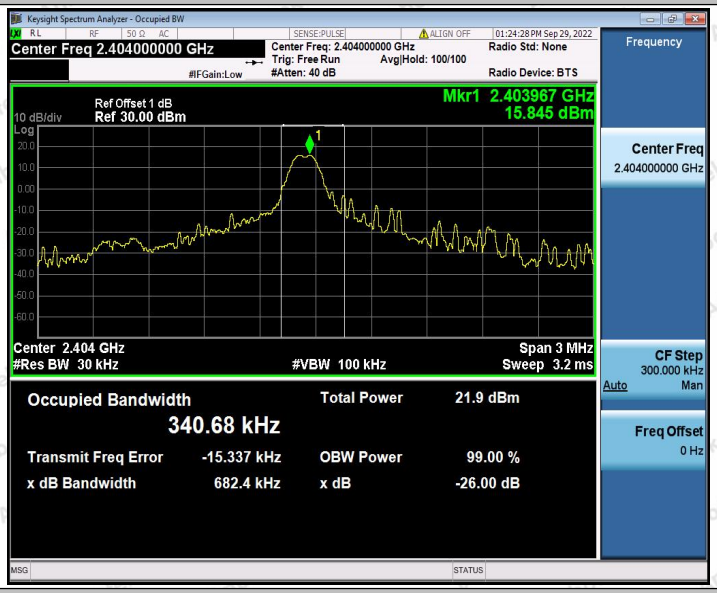
Appendix B: Occupied Channel Bandwidth

Test Result

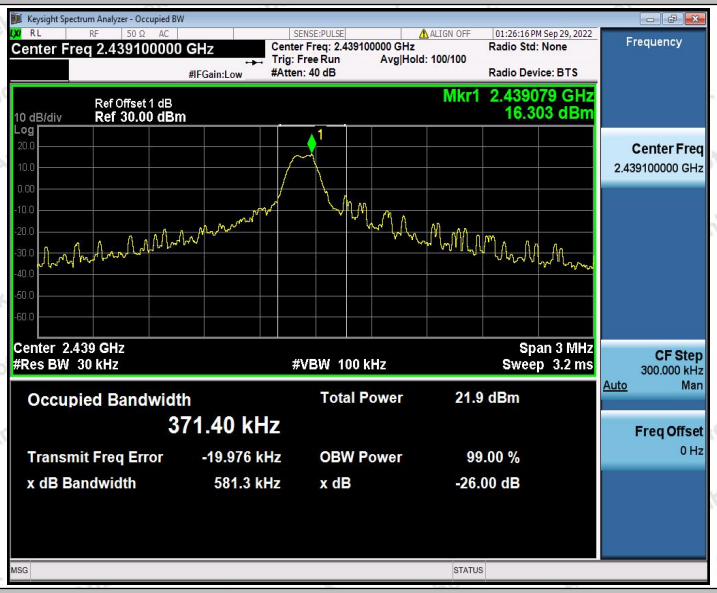
TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]
2.4G	Ant1	2404	0.34068	2403.8143	2404.1550
		2439.1	0.37140	2438.8943	2439.2657
		2474.2	0.28098	2473.9890	2474.2699

Test Graphs

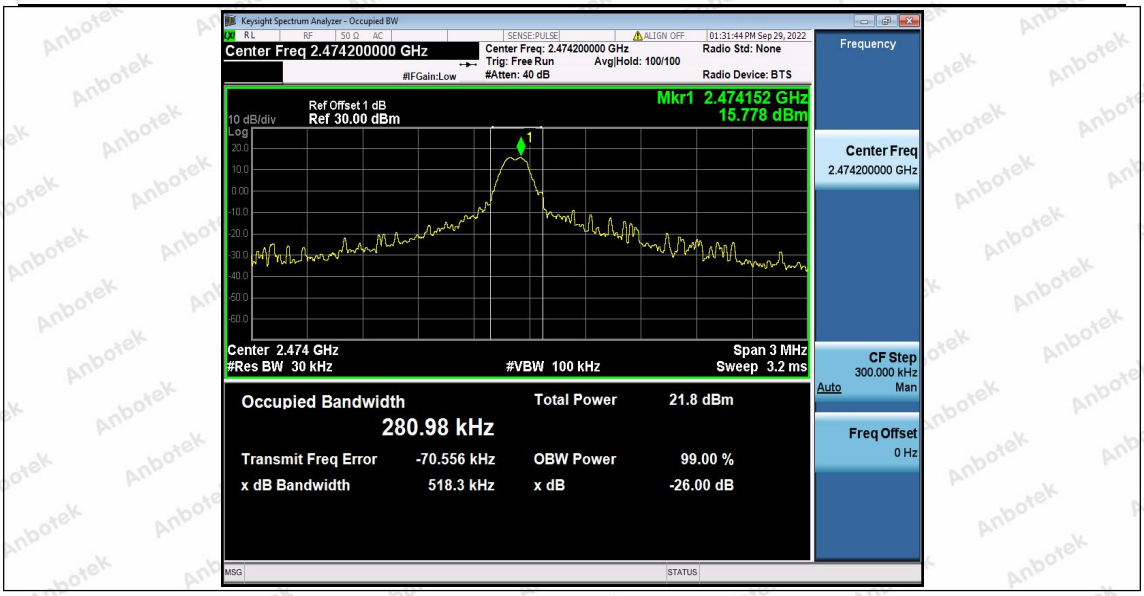
2.4G_Ant1_2404



2.4G_Ant1_2439.1



2.4G_Ant1_2474.2


Keysight Spectrum Analyzer - Occupied BW
Center Freq 2.474200000 GHz
Center Freq: 2.474200000 GHz
Trig: Free Run
Avg|Hold: 100/100
#IFGain:Low
#Atten: 40 dB
Radio Std: None
Radio Device: BTS
01:31:44 PM Sep 29, 2022
Frequency
Ref Offset 1 dB
10 dB/div
Ref 30.00 dBm
Log
Mkr1 2.474152 GHz
15.778 dBm
Center Freq
2.474200000 GHz
Center 2.474 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 3 MHz
Sweep 3.2 ms
CF Step
300.000 kHz
Auto
Man
Occupied Bandwidth
280.98 kHz
Total Power
21.8 dBm
Transmit Freq Error
-70.556 kHz
OBW Power
99.00 %
x dB Bandwidth
518.3 kHz
x dB
-26.00 dB
Freq Offset
0 Hz
MSG
STATUS

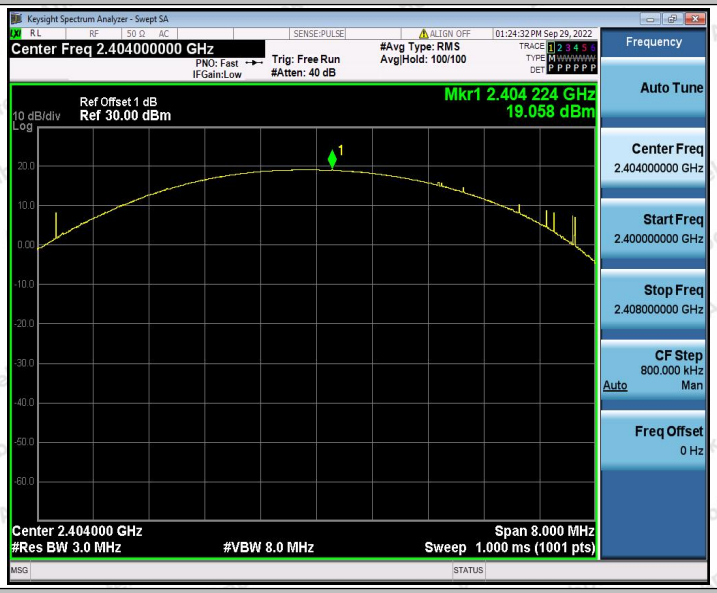
Appendix C: Maximum conducted output power

Test Result Peak

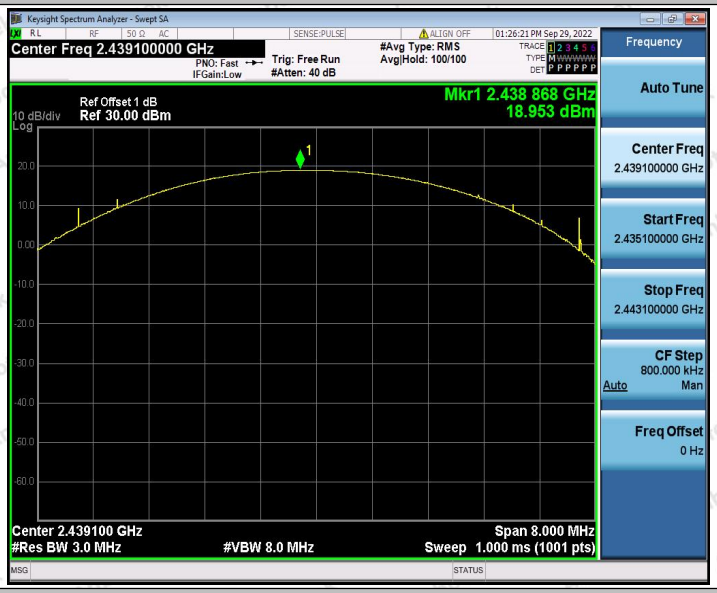
Test Mode	Antenna	Frequency[MHz]	Conducted Peak Power[dBm]	Conducted Limit[dBm]	Verdict
2.4G	Ant1	2404	19.06	≤30	PASS
		2439.1	18.95	≤30	PASS
		2474.2	18.84	≤30	PASS

Test Graphs

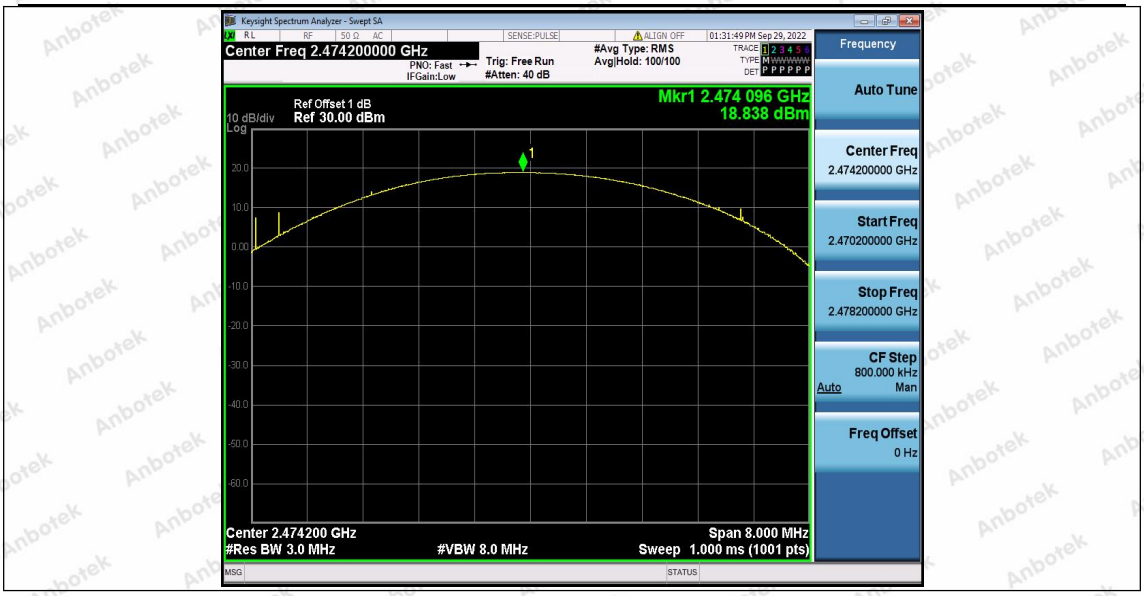
2.4G_Ant1_2404



2.4G_Ant1_2439.1



2.4G_Ant1_2474.2


Keysight Spectrum Analyzer - Swept SA
Center Freq 2.474200000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
#Avg Type: RMS
Avg|Hold: 100/100
01:31:49 PM Sep 29, 2022
Ref Offset 1 dB
10 dB/div
Ref 30.00 dBm
Log
Mkr1 2.474 096 GHz
18.838 dBm
Center 2.474200 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
2.474200000 GHz
Start Freq
2.470200000 GHz
Stop Freq
2.478200000 GHz
CF Step
800.000 kHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

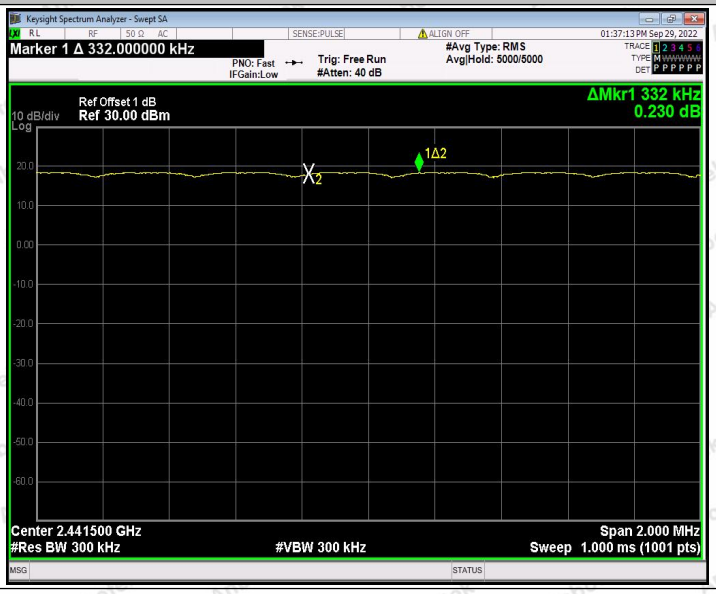
Appendix D: Carrier frequency separation

Test Result

TestMode	Antenna	Frequency[MHz]	Result[MHz]	Limit[MHz]	Verdict
2.4G	Ant1	Hop	0.332	≥0.186	PASS

Test Graphs

2.4G_Ant1_Hop

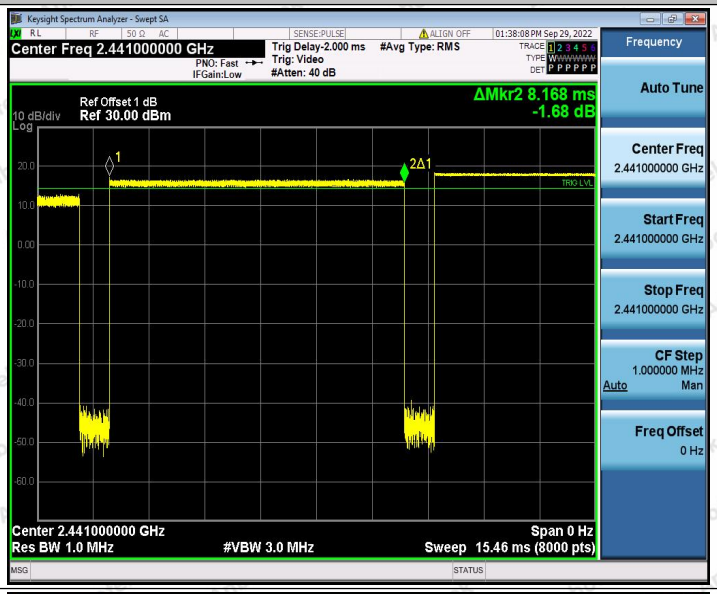
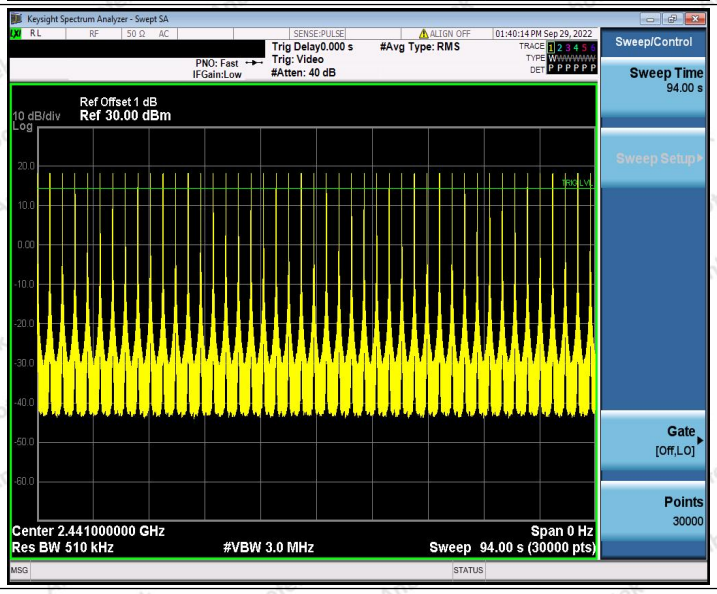


Appendix E: Time of occupancy

Test Result

TestMode	Antenna	Frequency[MHz]	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
2.4G	Ant1	Hop	8.168	45	0.368	≤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	235	≥15	PASS

Test Graphs

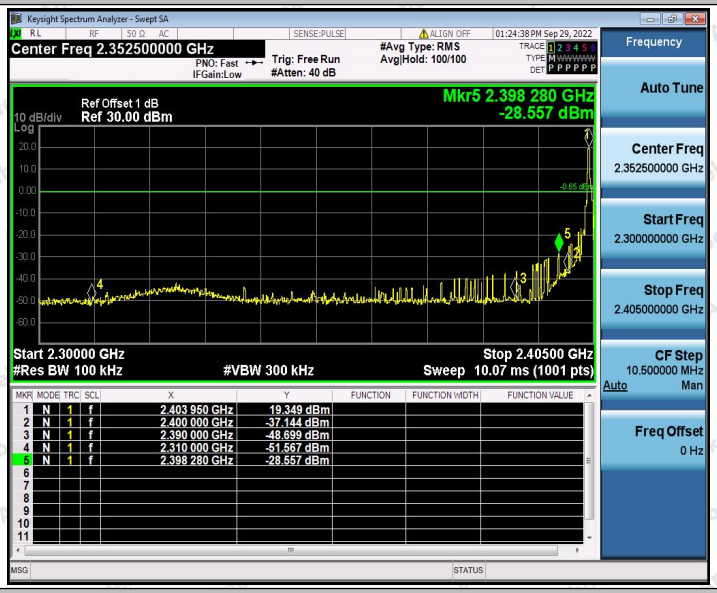
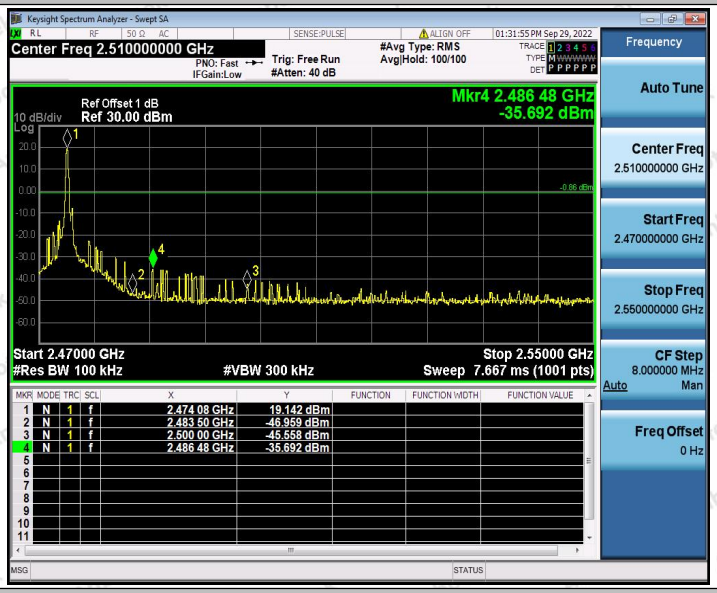
2.4G_Ant1_Hop

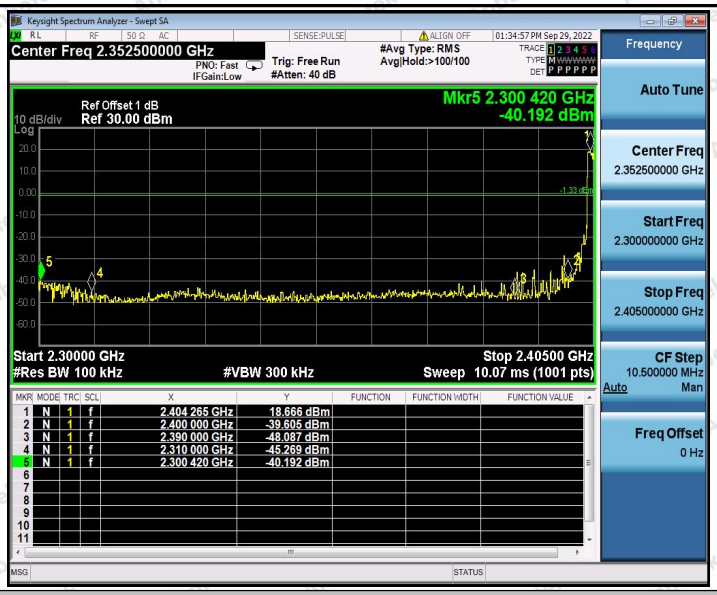
Appendix G: Band edge measurements

Test Result

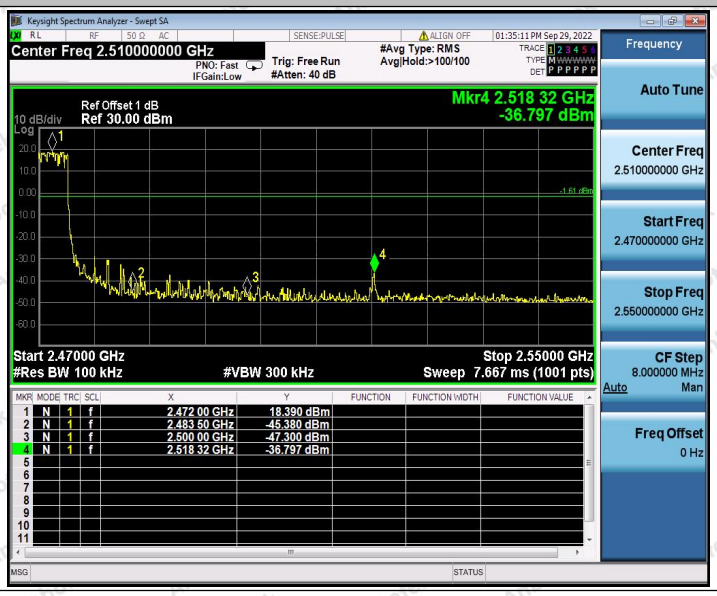
TestMode	Antenna	ChName	Frequency[MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
2.4G	Ant1	Low	2404	19.35	-28.56	≤-0.65	PASS
		High	2474.2	19.14	-35.69	≤-0.86	PASS
		Low	Hop_2402	18.67	-40.19	≤-1.33	PASS
		High	Hop_2480	18.39	-36.8	≤-1.61	PASS

Test Graphs

2.4G_Ant1_Low_2404

2.4G_Ant1_High_2474.2

2.4G_Ant1_Low_Hop_2402



2.4G_Ant1_High_Hop_2480



Appendix H: Conducted Spurious Emission

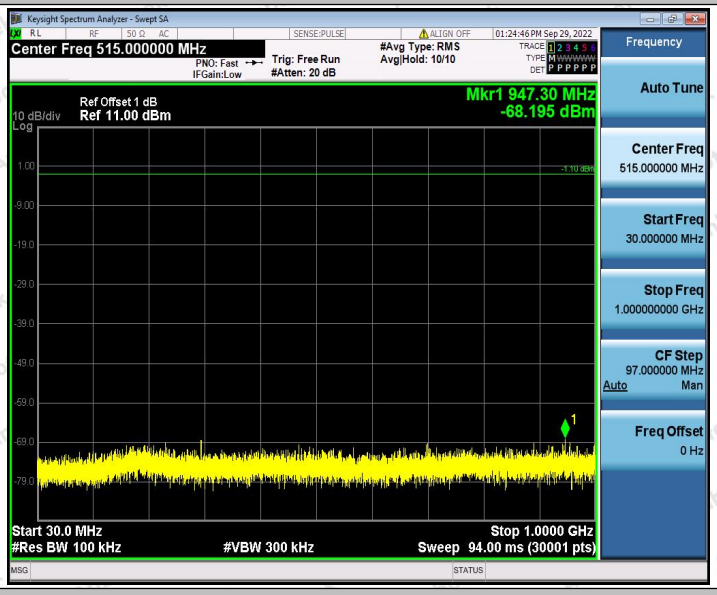
Test Result

TestMode	Antenna	Frequency[MHz]	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
2.4G	Ant1	2404	Reference	18.90	18.90	---	PASS
			30~1000	18.90	-68.2	≤-1.1	PASS
			1000~26500	18.90	-38.06	≤-1.1	PASS
		2439.1	Reference	18.76	18.76	---	PASS
			30~1000	18.76	-68.48	≤-1.24	PASS
			1000~26500	18.76	-30.16	≤-1.24	PASS
		2474.2	Reference	18.74	18.74	---	PASS
			30~1000	18.74	-69.52	≤-1.26	PASS
			1000~26500	18.74	-29.63	≤-1.26	PASS

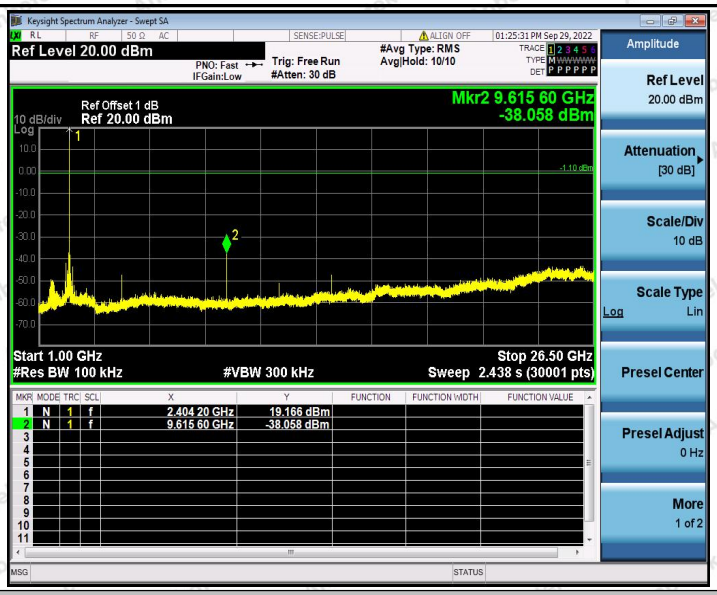
Test Graphs

2.4G_Ant1_2404_0~Reference

2.4G_Ant1_2404_30~1000

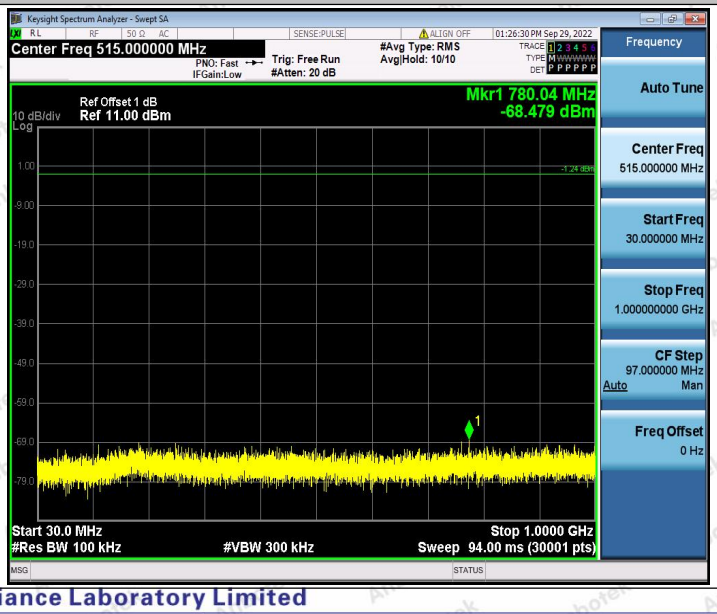


2.4G_Ant1_2404_1000~26500

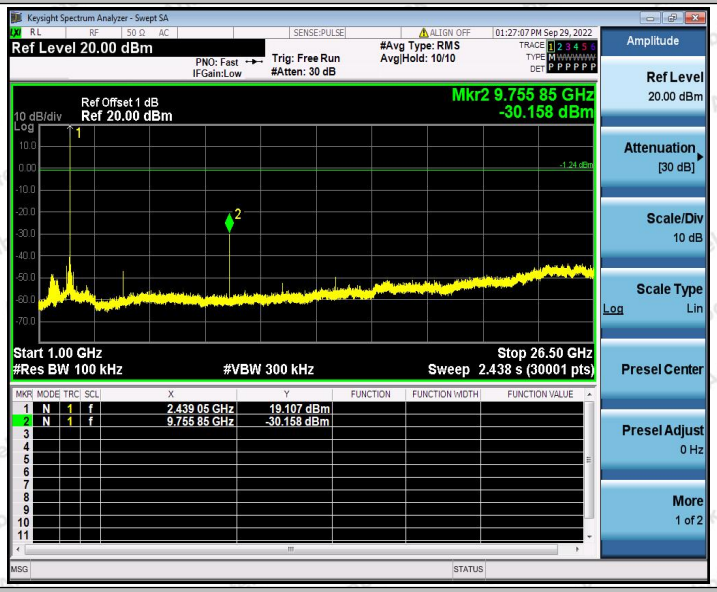


2.4G_Ant1_2439.1_0~Reference

2.4G_Ant1_2439.1_30~1000

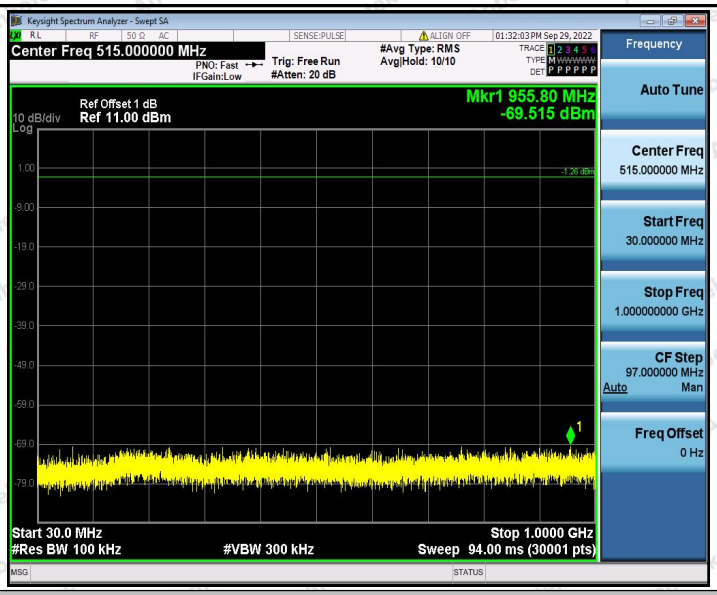


2.4G_Ant1_2439.1_1000~26500

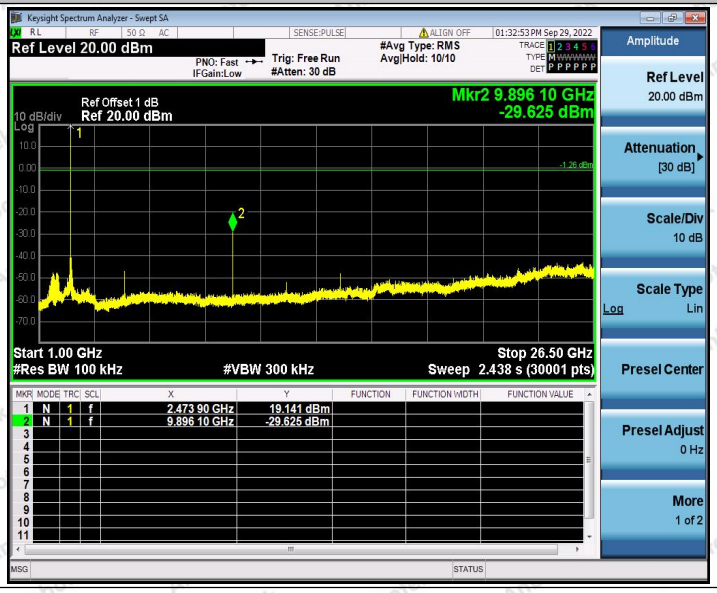


2.4G_Ant1_2474.2_0~Reference

2.4G_Ant1_2474.2_30~1000



2.4G_Ant1_2474.2_1000~26500

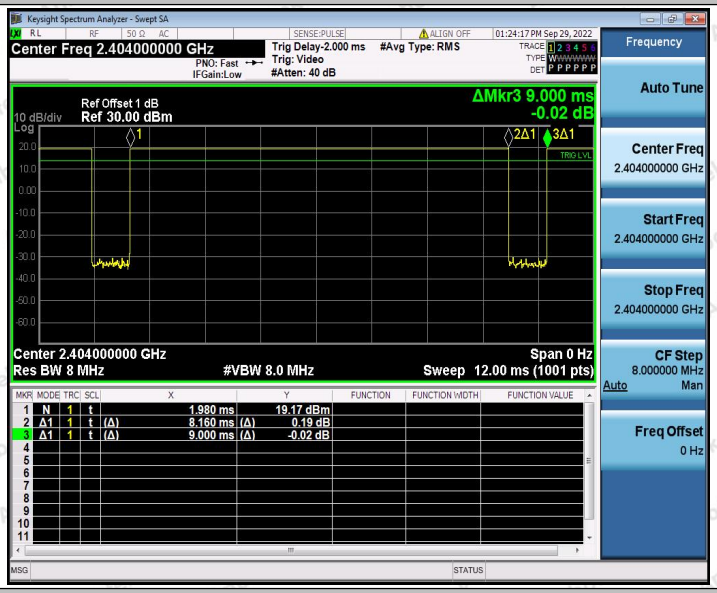
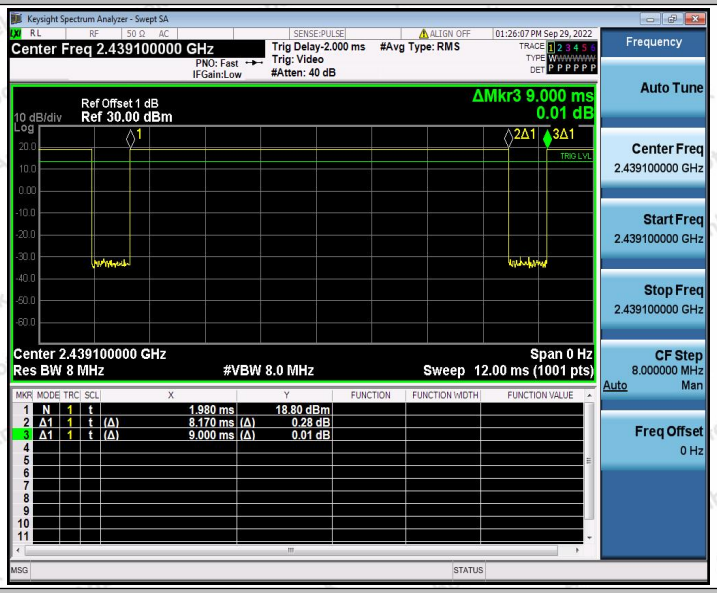


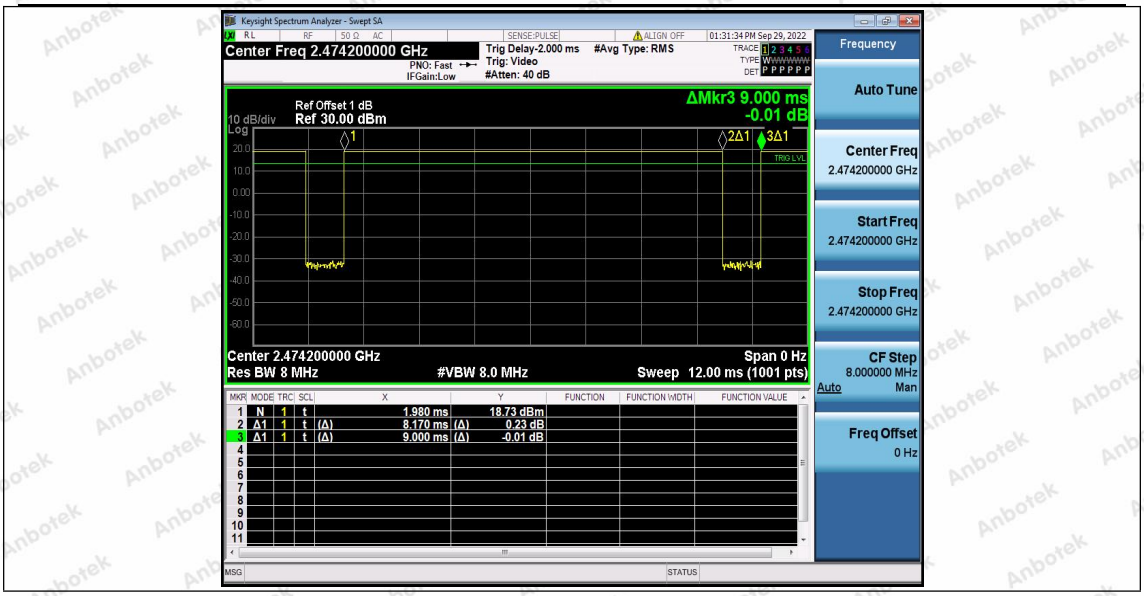
Appendix I: Duty Cycle

Test Result

TestMode	Antenna	Frequency[MHz]	ON Time [ms]	Period [ms]	Duty Cycle [%]	Duty Cycle Factor[dB]
2.4G	Ant1	2404	8.16	9.00	90.67	0.43
		2439.1	8.17	9.00	90.78	0.42
		2474.2	8.17	9.00	90.78	0.42

Test Graphs

2.4G_Ant1_2404

2.4G_Ant1_2439.1

2.4G_Ant1_2474.2


Keysight Spectrum Analyzer - Swept SA
Center Freq 2.474200000 GHz
PNO: Fast
IFGain:Low
Trig Delay-2.000 ms
Trig: Video
#Atten: 40 dB
#Avg Type: RMS
01:31:34 PM Sep 29, 2022
Frequency
Auto Tune
Ref Offset 1 dB
10 dB/div
Ref 30.00 dBm
ΔMkr3 9.000 ms
-0.01 dB
Center Freq
2.474200000 GHz
Start Freq
2.474200000 GHz
Stop Freq
2.474200000 GHz
CF Step
8.000000 MHz
Auto
Man
Freq Offset
0 Hz
Center 2.474200000 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 18.73 dBm
2 Δ1 1 t (Δ) 8.170 ms (Δ) 0.23 dB
3 Δ1 1 t (Δ) 9.000 ms (Δ) -0.01 dB

---End---