Appendix Test Data

Report No.:	18220WC30011301	Test Sample No.:	1-2-2
Start Test Date:	2022.2.3	Finish Test Date:	2022.2.7
Test Engineer:	Tony.He	Auditor:	Edward.Pan
Temperature:	27.3℃	Relative Humidity:	47 %
Pressure:	1012 hPa		

Appendix A: 20dB Emission Bandwidth

Test Result

Test Mode	Antenna	Frequency[MHz]	20db EBW[MHz]	FL[MHz]	FH[MHz]
2.4G	Ant1	2403	2.195	2401.895	2404.090
		2441	2.155	2439.930	2442.085
		2480	2.150	2478.950	2481.100

Test Graphs

2.4G_Ant1_2403

2.4G_Ant1_2441

2.4G_Ant1_2480

Keysight Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:PULSE
ALIGN AUTO
11:47:42 AM Feb 07, 2023
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 40 dB
#Avg Type: RMS
Avg|Hold:>100/100
Ref Offset 1 dB
10 dB/div
Ref 30.00 dBm
Log
ΔMkr3 2.150 MHz
2.383 dB
-20.25 dBm
Center 2.480000 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 5.000 MHz
Sweep 5.333 ms (1001 pts)
MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE
1 N 1 f 2.478 950 GHz -22.793 dBm
2 N 1 f 2.479 980 GHz -0.250 dBm
3 Δ1 1 f (Δ) 2.150 MHz (Δ) 2.383 dB
Span
Span
5.00000000 MHz
Full Span
Zero Span
Last Span
Signal Track
(Span Zoom)
On Off
MSG
STATUS

Appendix B: Occupied Channel Bandwidth

Test Result

Test Mode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]
2.4G	Ant1	2403	2.1868	2401.9011	2404.0878
		2441	2.1641	2439.9027	2442.0681
		2480	2.1795	2478.9052	2481.0844

Test Graphs

2.4G_Ant1_2403

2.4G_Ant1_2441

2.4G_Ant1_2480

Keysight Spectrum Analyzer - Occupied BW
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 2.47998 GHz
-0.25231 dBm
Center 2.48 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 5 MHz
Sweep 5.333 ms
Occupied Bandwidth
2.1795 MHz
Total Power 7.01 dBm
Transmit Freq Error -5.315 kHz
OBW Power 99.00 %
x dB Bandwidth 2.394 MHz
x dB -26.00 dB
Span
Span
5.0000 MHz
Full Span
Last Span

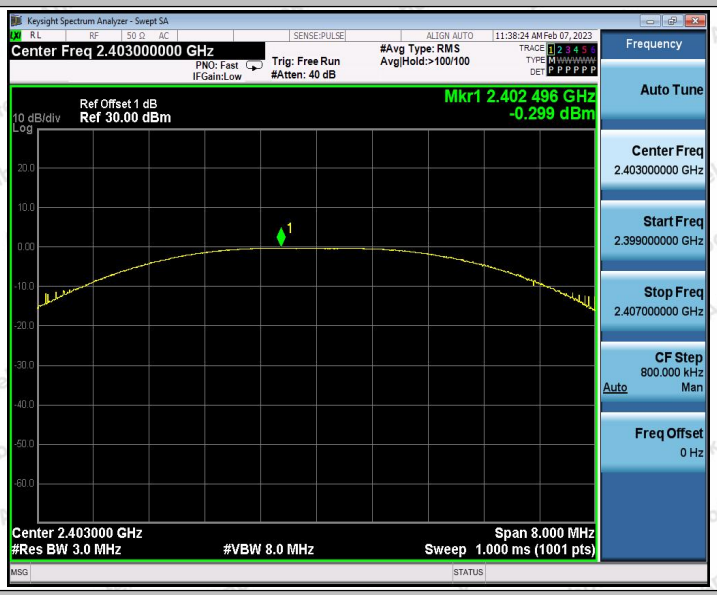
Appendix C: Maximum conducted output power

Test Result Peak

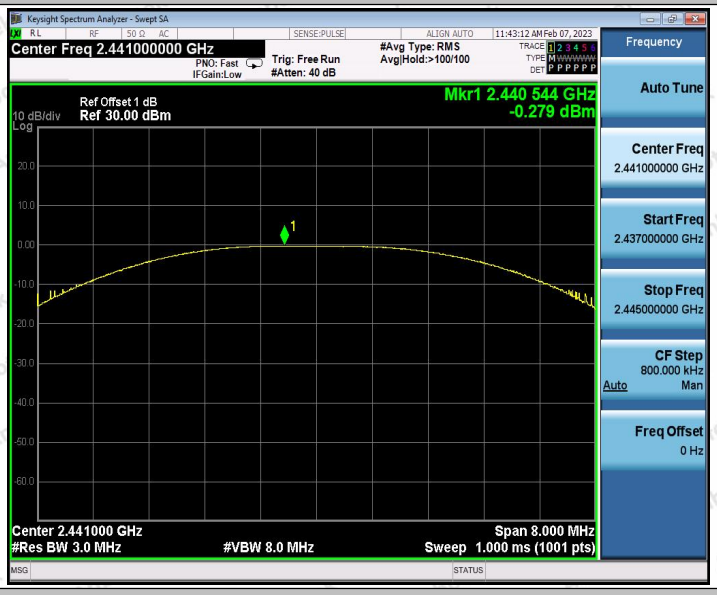
Test Mode	Antenna	Frequency[MHz]	Conducted Peak Power[dBm]	Conducted Limit[dBm]	Verdict
2.4G	Ant1	2403	-0.30	≤30	PASS
		2441	-0.28	≤30	PASS
		2480	-0.33	≤30	PASS

Test Graphs

2.4G_Ant1_2403



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
11:48:19 AM Feb 07, 2023
Ref Offset 1 dB
10 dB/div
Ref 30.00 dBm
Log
Mkr1 2.479 712 GHz
-0.332 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

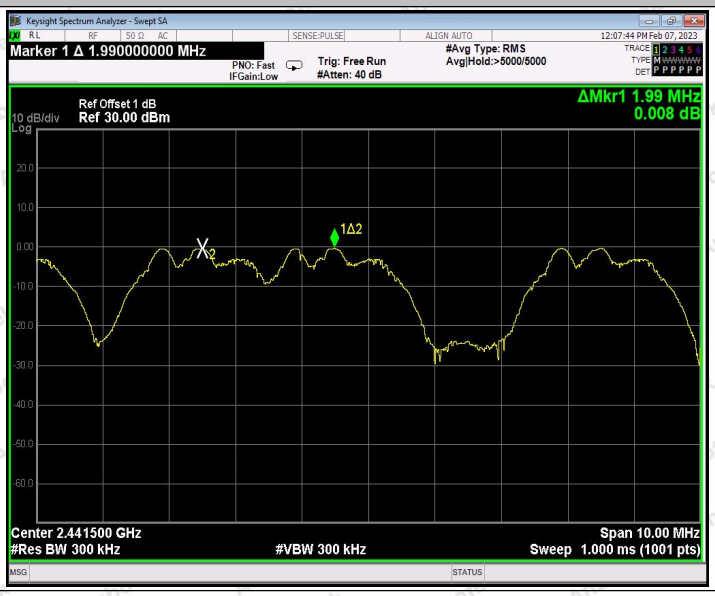
Appendix D: Carrier frequency separation

Test Result

Test Mode	Antenna	Frequency[MHz]	Result[MHz]	Limit[MHz]	Verdict
2.4G	Ant1	Hop	1.99	≥1.437	PASS

Test Graphs

2.4G_Ant1_Hop



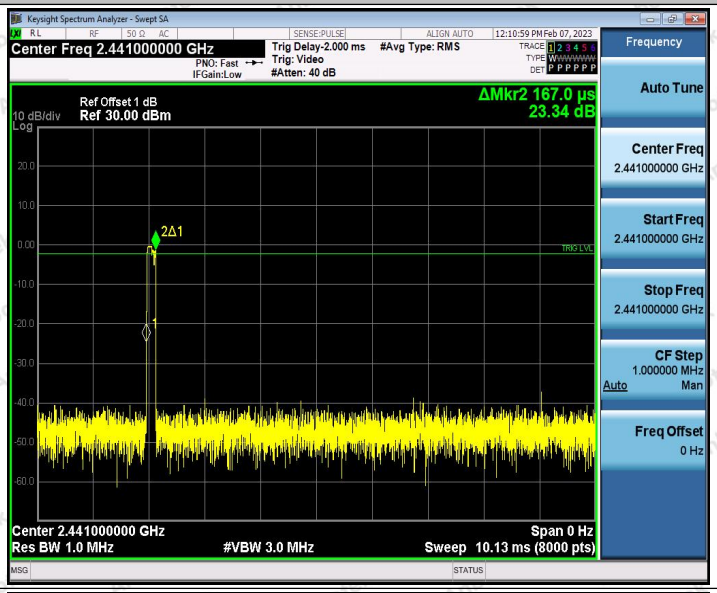
Appendix E: Time of occupancy

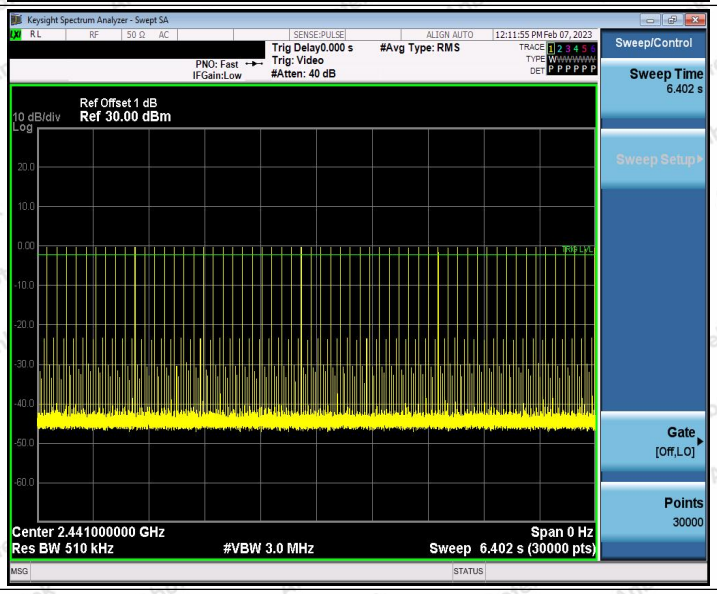
Test Result

TestMode	Antenna	Frequency[MHz]	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
2.4G	Ant1	Hop	0.167	57	0.01	≤0.4	PASS

Test Graphs

2.4G_Ant1_Hop





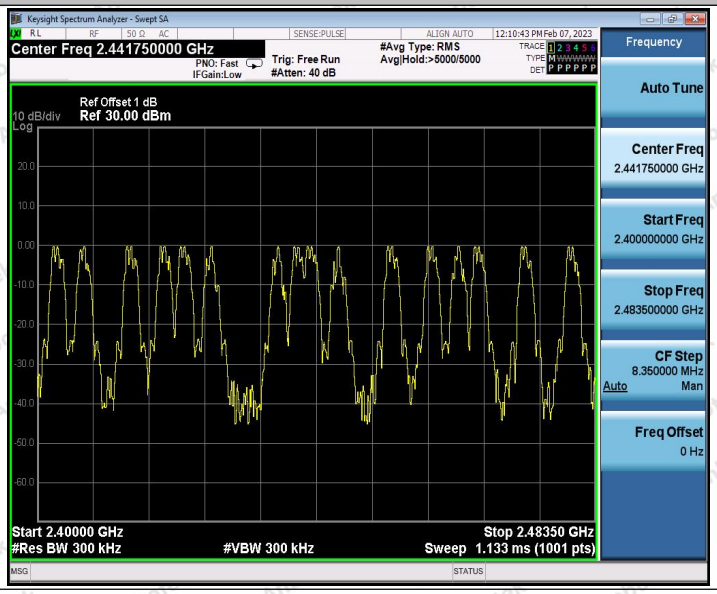
Appendix F: Number of hopping channels

Test Result

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

Test Graphs

2.4G_Ant1_Hop



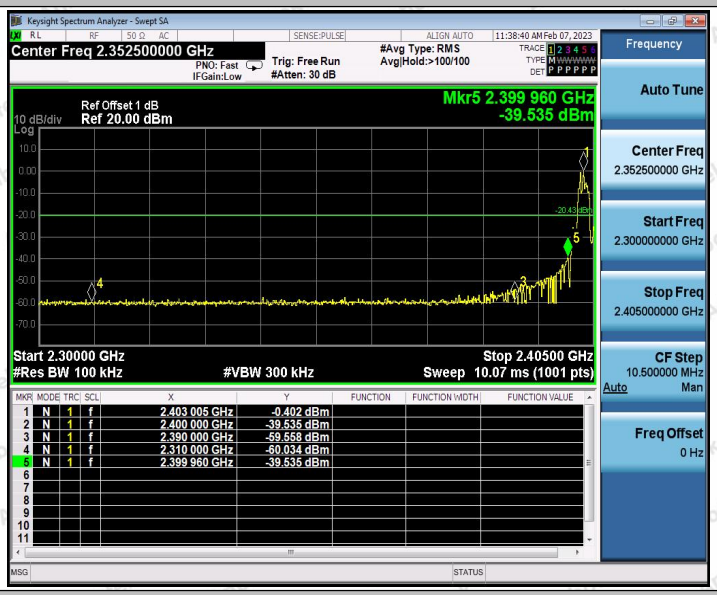
Appendix G: Band edge measurements

Test Result

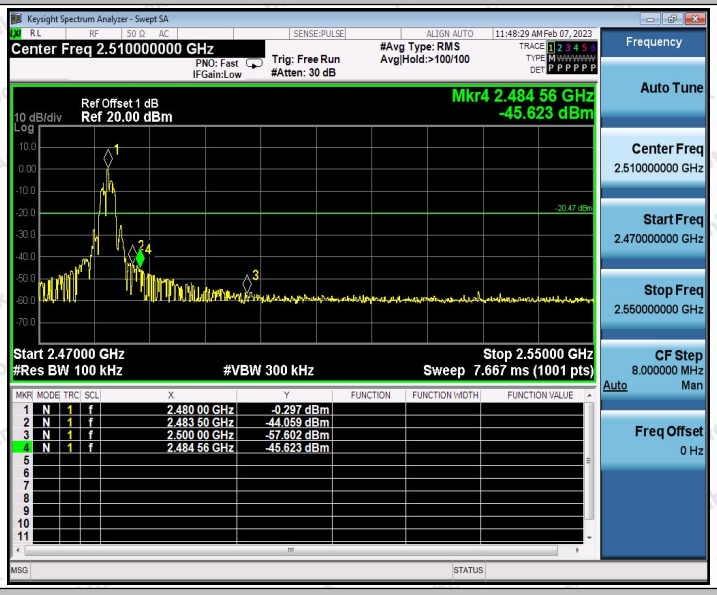
TestMode	Antenna	ChName	Frequency[MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
2.4G	Ant1	Low	2403	-0.43	-39.54	≤-20.43	PASS
		High	2480	-0.47	-45.62	≤-20.47	PASS
		Low	Hop_2402	-0.56	-53.94	≤-20.56	PASS
		High	Hop_2480	-0.33	-49.5	≤-20.33	PASS

Test Graphs

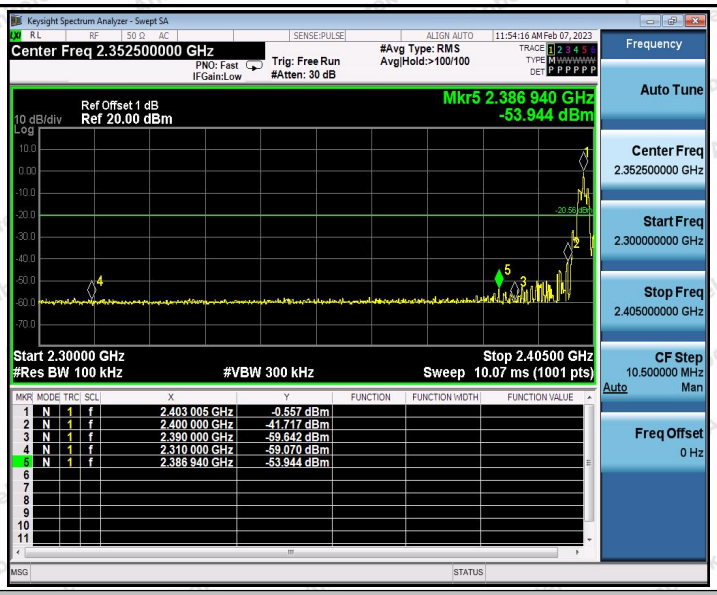
2.4G_Ant1_Low_2403



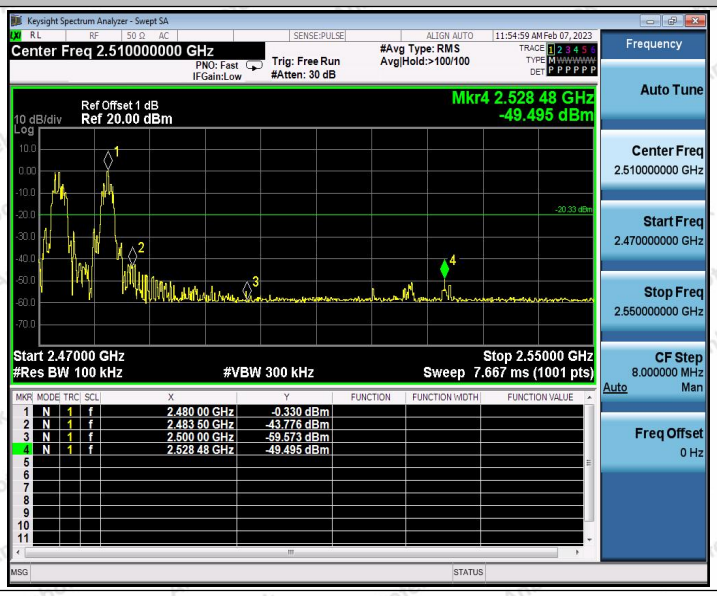
2.4G_Ant1_High_2480



2.4G_Ant1_Low_Hop_2402



2.4G_Ant1_High_Hop_2480



Appendix H: Conducted Spurious Emission

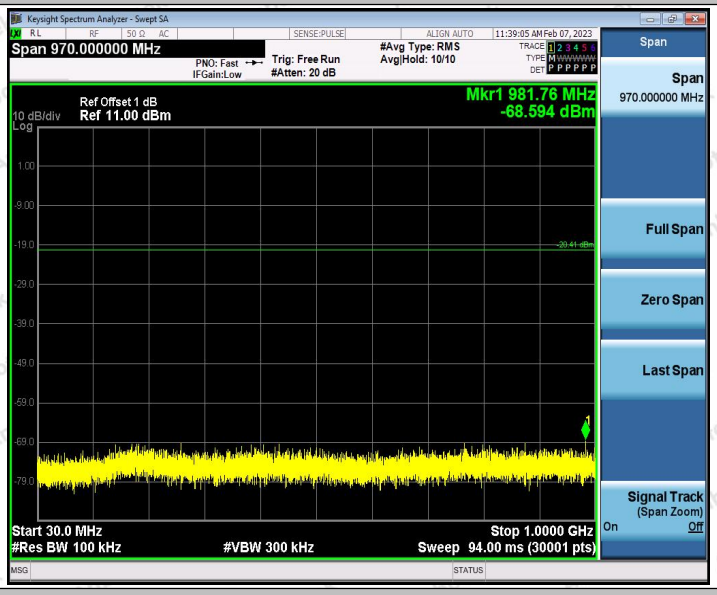
Test Result

TestMode	Antenna	Frequency[MHz]	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
2.4G	Ant1	2403	Reference	-0.41	-0.41	---	PASS
			30~1000	-0.41	-68.59	≤-20.41	PASS
			1000~26500	-0.41	-49.19	≤-20.41	PASS
		2441	Reference	-0.41	-0.41	---	PASS
			30~1000	-0.41	-68.72	≤-20.41	PASS
			1000~26500	-0.41	-52.81	≤-20.41	PASS
		2480	Reference	-0.44	-0.44	---	PASS
			30~1000	-0.44	-68.38	≤-20.44	PASS
			1000~26500	-0.44	-29.27	≤-20.44	PASS

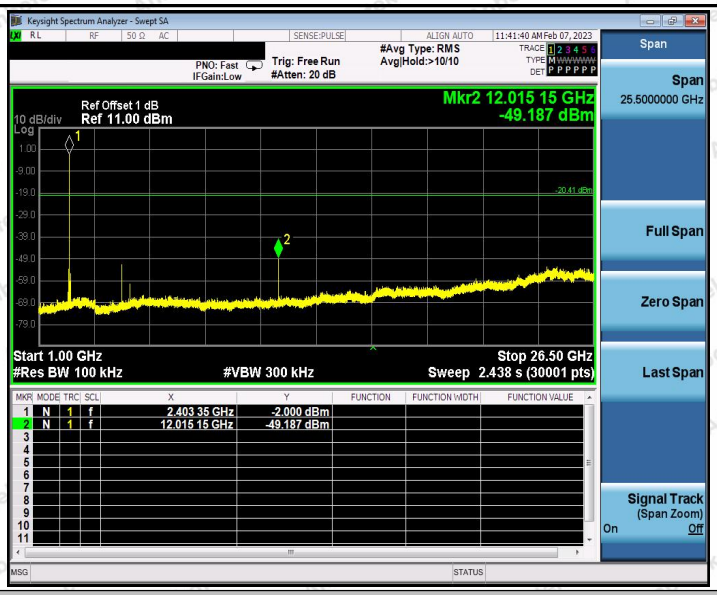
Test Graphs

2.4G_Ant1_2403_0~Reference

2.4G_Ant1_2403_30~1000

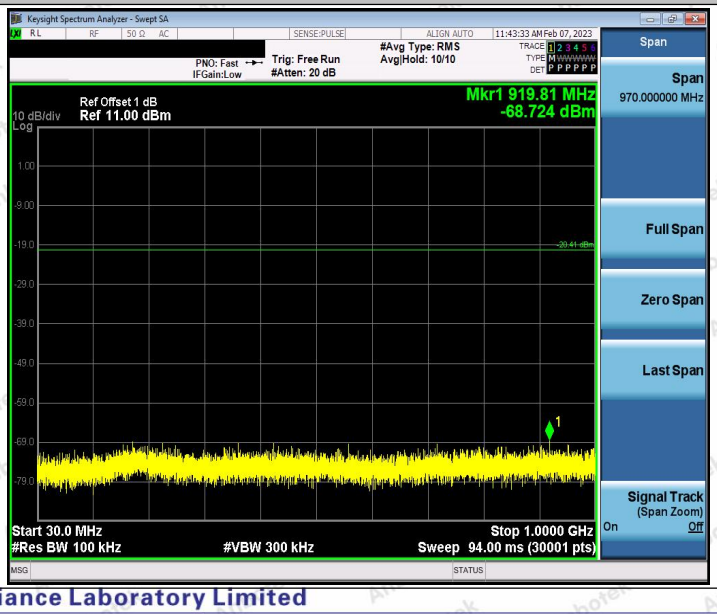


2.4G_Ant1_2403_1000~26500

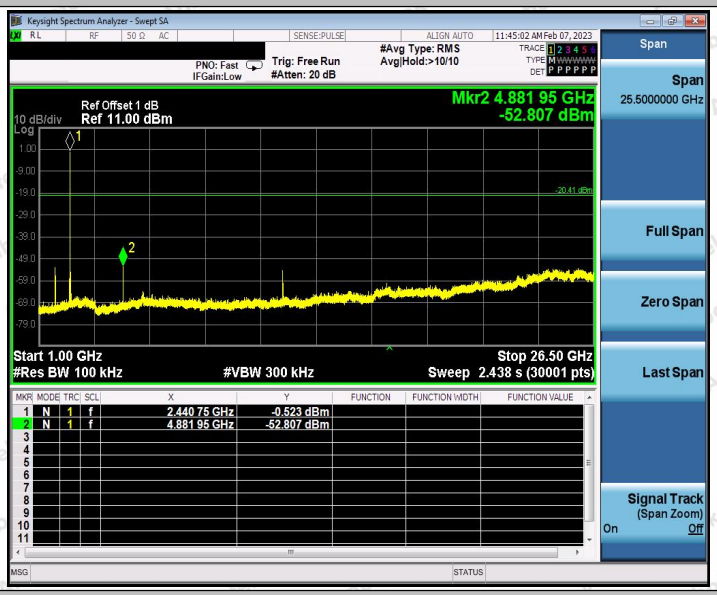


2.4G_Ant1_2441_0~Reference

2.4G_Ant1_2441_30~1000

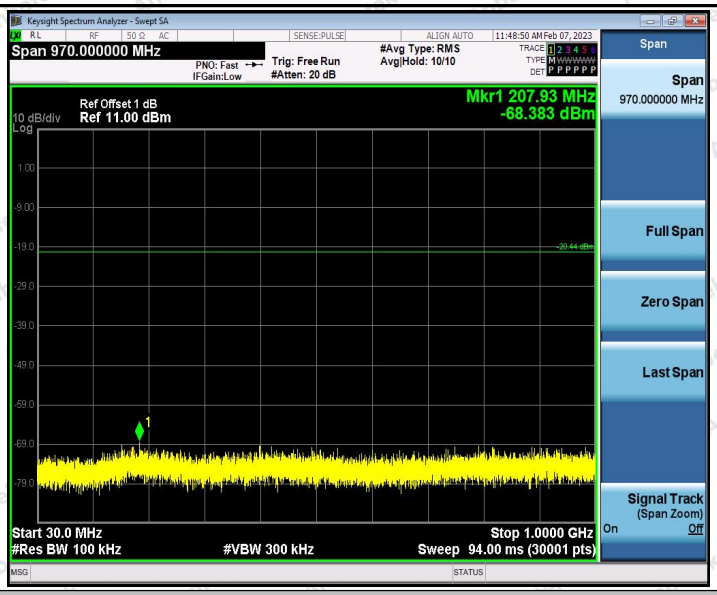


2.4G_Ant1_2441_1000~26500

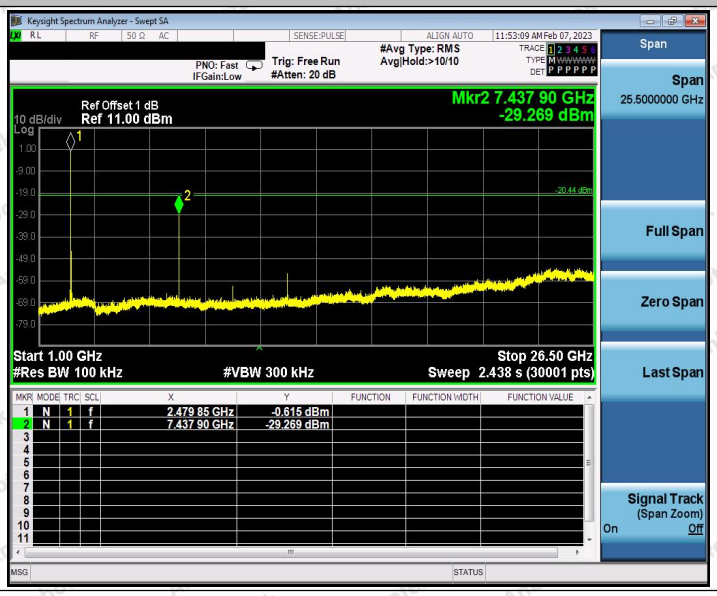


2.4G_Ant1_2480_0~Reference

2.4G_Ant1_2480_30~1000



2.4G_Ant1_2480_1000~26500



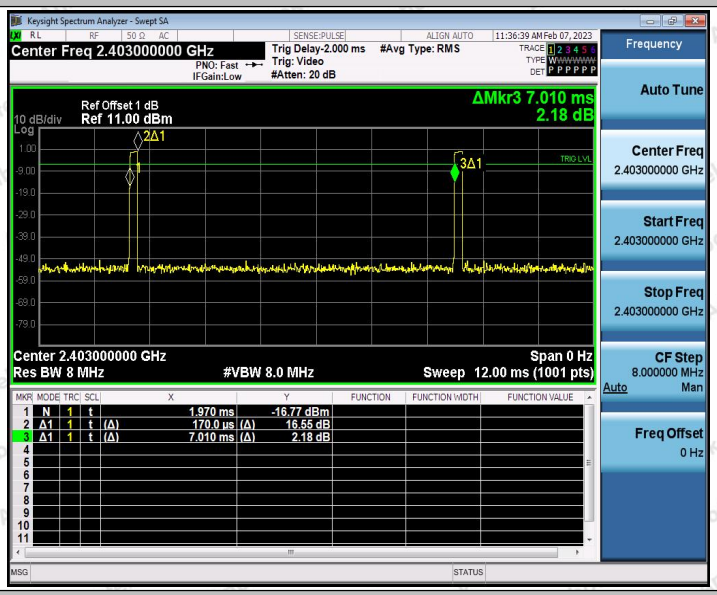
Appendix I: Duty Cycle

Test Result

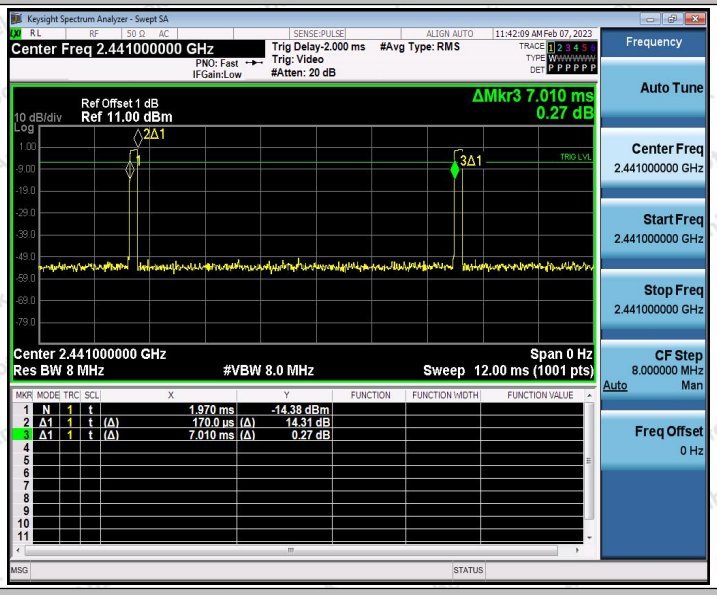
Test Mode	Antenna	Frequency[MHz]	ON Time [ms]	Period [ms]	Duty Cycle [%]	Duty Cycle Factor[dB]
2.4G	Ant1	2403	0.17	7.01	2.43	16.14
		2441	0.17	7.01	2.43	16.14
		2480	0.17	6.99	2.43	16.14

Test Graphs

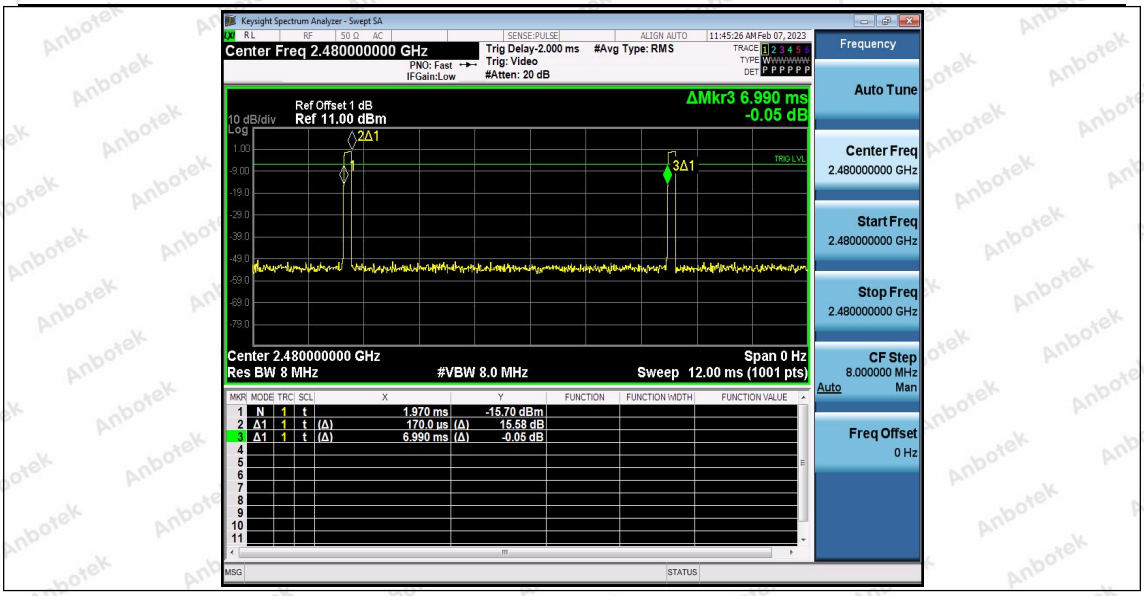
2.4G_Ant1_2403



2.4G_Ant1_2441



2.4G_Ant1_2480


Keysight Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
Trig Delay-2.000 ms
#Avg Type: RMS
Trig: Video
#Atten: 20 dB
PNO: Fast
IFGain:Low
Ref Offset 1 dB
10 dB/div Ref 11.00 dBm
ΔMkr3 6.990 ms
-0.05 dB
Center 2.480000000 GHz
Span 0 Hz
Res BW 8 MHz
#VBW 8.0 MHz
Sweep 12.00 ms (1001 pts)
1 N 1 t 1.970 ms -15.70 dBm
2 Δ1 1 t (Δ) 170.0 µs (Δ) 15.58 dB
3 Δ1 1 t (Δ) 6.990 ms (Δ) -0.05 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---