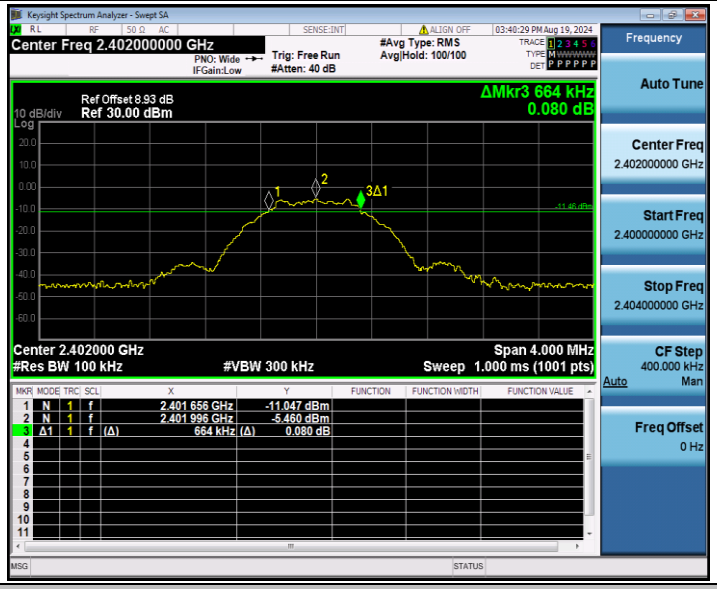
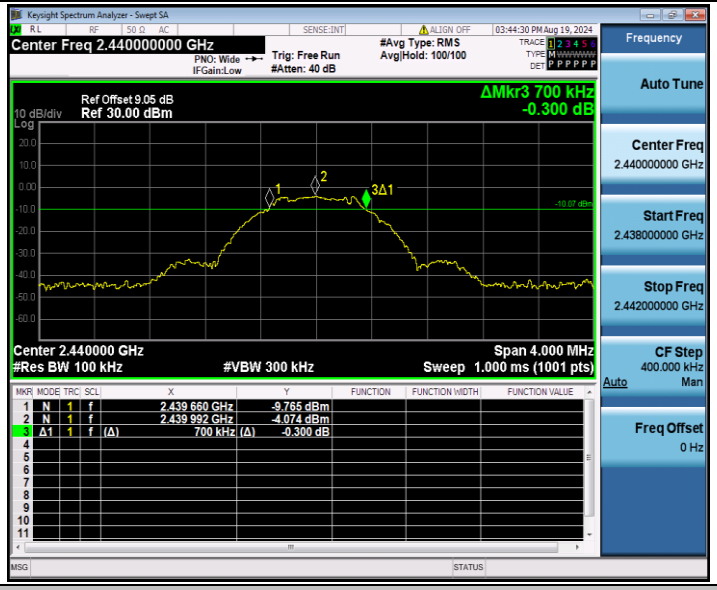
Case No. : CTA24081600201	
Ambient Condition: 22 ℃, 53 %RH	
According Standard: ■Part15C	
Test Date: 2024.08.19	**Test Engineer:** Lushan Kong

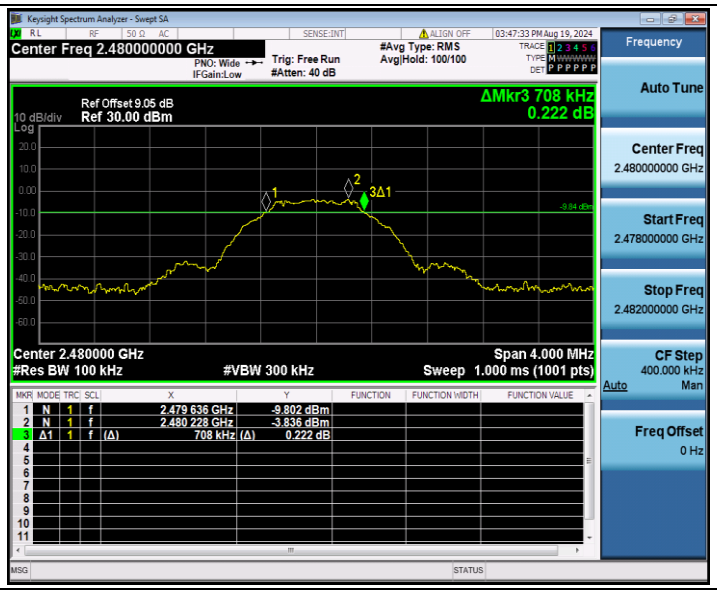
Appendix A.1: DTS Bandwidth

Test Result

TestMode	Antenna	Freq(MHz)	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE	Ant1	2402	0.664	2401.656	2402.320	0.5	PASS
		2440	0.700	2439.660	2440.360	0.5	PASS
		2480	0.708	2479.636	2480.344	0.5	PASS

Test Graphs

BLE_Ant1_2402

BLE_Ant1_2440

BLE_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
03:47:33 PM Aug 19, 2024
Ref Offset 9.05 dB
10 dB/div
Ref 30.00 dBm
ΔMkr3 708 kHz
0.222 dB
Center 2.480000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 4.000 MHz
Sweep 1.000 ms (1001 pts)
1 N 1 f 2.479 636 GHz -9.802 dBm
2 N 1 f 2.480 228 GHz -3.836 dBm
3 Δ1 1 f (Δ) 708 kHz (Δ) 0.222 dB
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.478000000 GHz
Stop Freq
2.482000000 GHz
CF Step
400.000 kHz
Auto
Man
Freq Offset
0 Hz

Appendix A.2: Occupied Channel Bandwidth

Test Result

TestMode	Antenna	Freq(MHz)	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE	Ant1	2402	1.0408	2401.4797	2402.5205	---	---
		2440	1.0495	2439.4766	2440.5261	---	---
		2480	1.0380	2479.4783	2480.5163	---	---

Test Graphs

BLE_Ant1_2402

BLE_Ant1_2440

BLE_Ant1_2480


Keysight Spectrum Analyzer - Occupied BW
RL
RF
50 Ω AC
SENSE:INT
ALIGN OFF
03:47:40 PM Aug 19, 2024
Center Freq 2.480000000 GHz
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold: 100/100
#IFGain:Low
#Atten: 40 dB
Radio Std: None
Radio Device: BTS
Frequency
Ref Offset 9.05 dB
10 dB/div
Ref 30.00 dBm
Log
Mkr1 2.479984 GHz
-5.3420 dBm
Center 2.48 GHz
#Res BW 43 kHz
#VBW 130 kHz
Span 4 MHz
Sweep 2.067 ms
Occupied Bandwidth
1.0380 MHz
Total Power
3.97 dBm
Transmit Freq Error
-2.737 kHz
% of OBW Power
99.00 %
x dB Bandwidth
1.274 MHz
x dB
-26.00 dB
Center Freq
2.480000000 GHz
CF Step
400.000 kHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

Appendix A.3: Maximum conducted output power

Test Result Peak

TestMode	Antenna	Freq(MHz)	Conducted Peak Powert[dBm]	Conducted Limit[dBm]	Verdict
BLE	Ant1	2402	-4.46	≤30	PASS
		2440	-2.49	≤30	PASS
		2480	-2.46	≤30	PASS

Appendix A.4: Maximum power spectral density

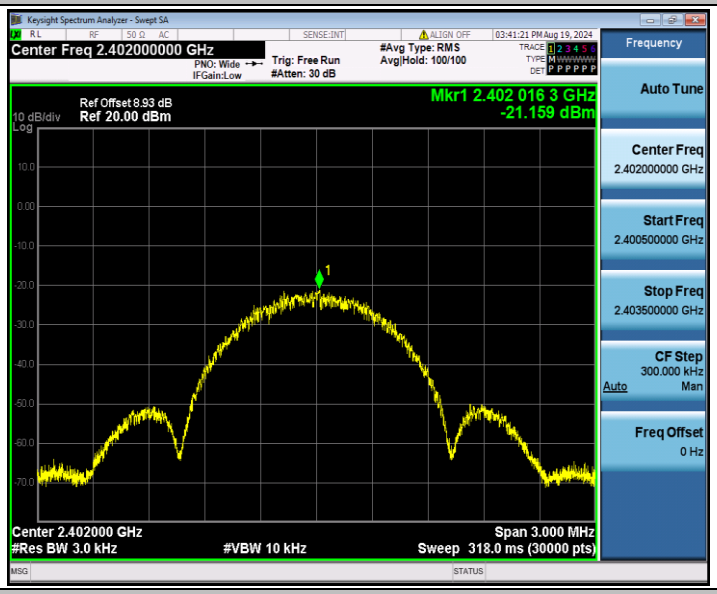
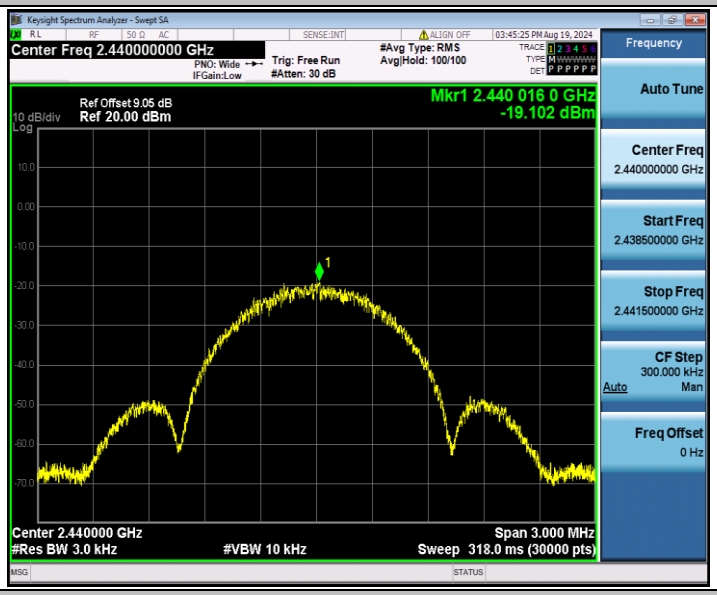
Test Result

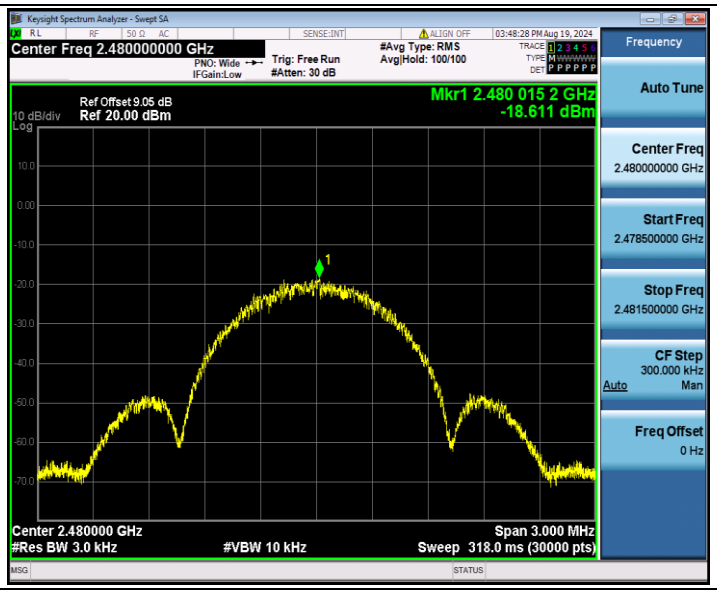
TestMode	Antenna	Freq(MHz)	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE	Ant1	2402	-21.16	≤8.00	PASS
		2440	-19.10	≤8.00	PASS
		2480	-18.61	≤8.00	PASS

Note：

1. The Duty Cycle Factor and RBW Factor is compensated in the graph.

Test Graphs

BLE_Ant1_2402

BLE_Ant1_2440

BLE_Ant1_2480


Keysight Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold: 100/100
03:48:28 PM Aug 19, 2024
Ref Offset 9.05 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.480 015 2 GHz
-18.611 dBm
Center 2.480000 GHz
#Res BW 3.0 kHz
#VBW 10 kHz
Span 3.000 MHz
Sweep 318.0 ms (30000 pts)
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

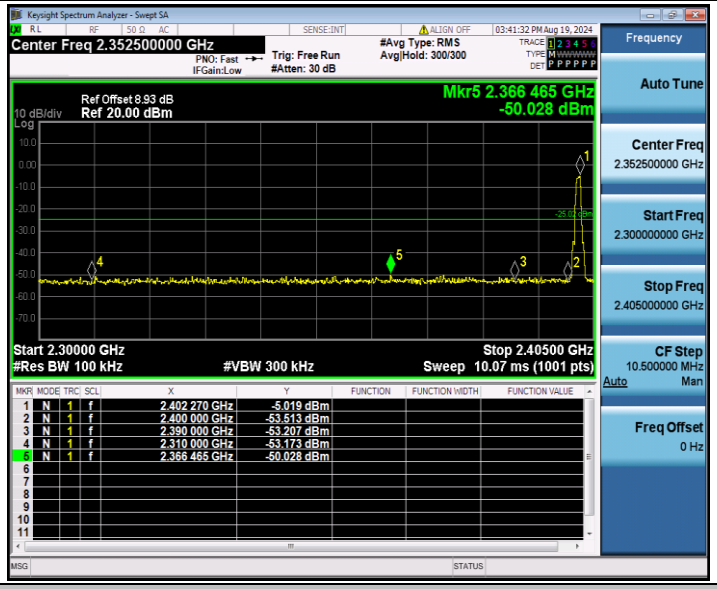
Appendix A.5: Band edge measurements

Test Result

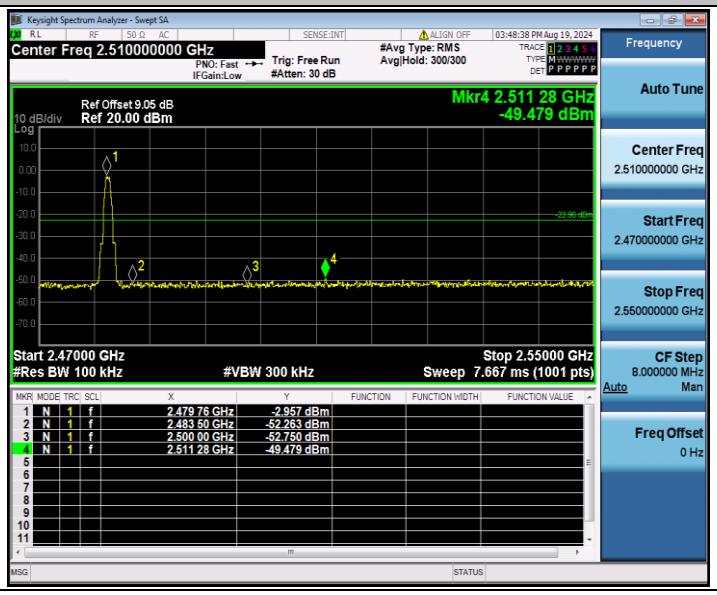
TestMode	Antenna	ChName	Freq(MHz)	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE	Ant1	Low	2402	-5.02	-50.03	≤-25.02	PASS
		High	2480	-2.96	-49.48	≤-22.96	PASS

Test Graphs

BLE_Ant1_Low_2402



BLE_Ant1_High_2480



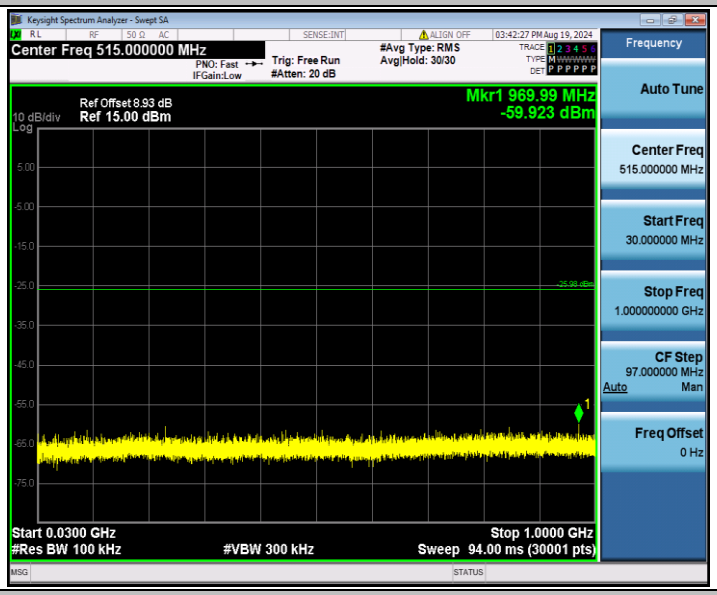
Appendix A.6: Conducted Spurious Emission

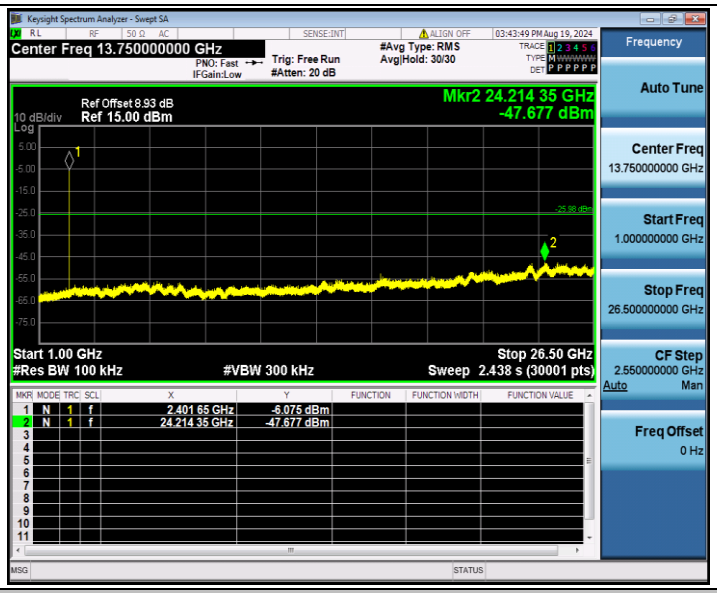
Test Result

TestMode	Antenna	Freq(MHz)	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE	Ant1	2402	Reference	-5.98	-5.98	---	PASS
			30~1000	-5.98	-59.92	≤-25.98	PASS
			1000~26500	-5.98	-47.68	≤-25.98	PASS
		2440	Reference	-3.96	-3.96	---	PASS
			30~1000	-3.96	-59.31	≤-23.96	PASS
			1000~26500	-3.96	-47.93	≤-23.96	PASS
		2480	Reference	-3.84	-3.84	---	PASS
			30~1000	-3.84	-60.39	≤-23.84	PASS
			1000~26500	-3.84	-47.8	≤-23.84	PASS

Test Graphs

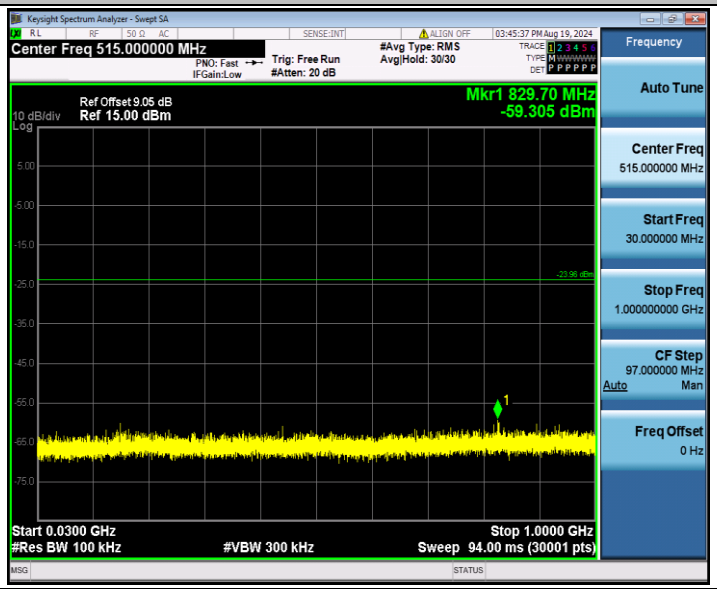
BLE_Ant1_2402_0~Reference

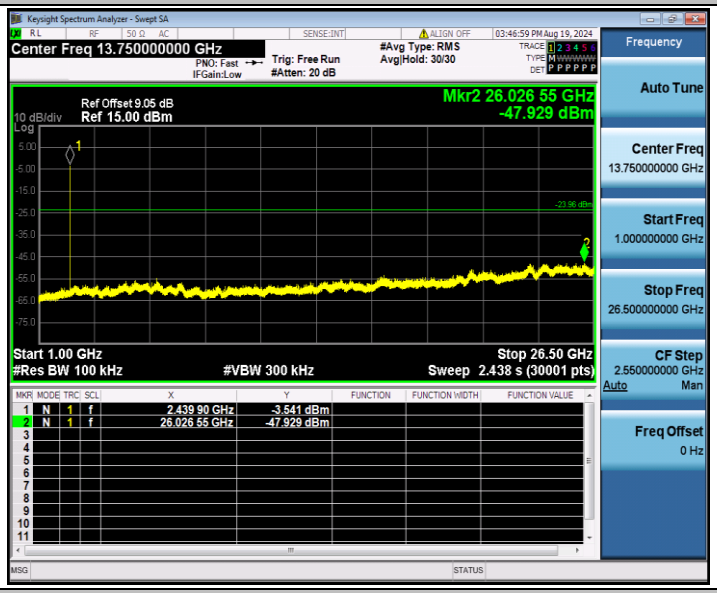
BLE_Ant1_2402_30~1000

BLE_Ant1_2402_1000~26500



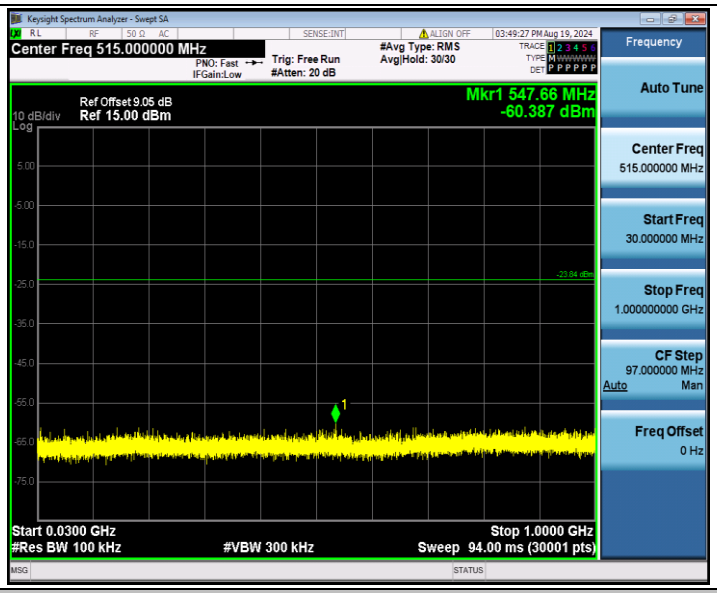
BLE_Ant1_2440_0~Reference

BLE_Ant1_2440_30~1000

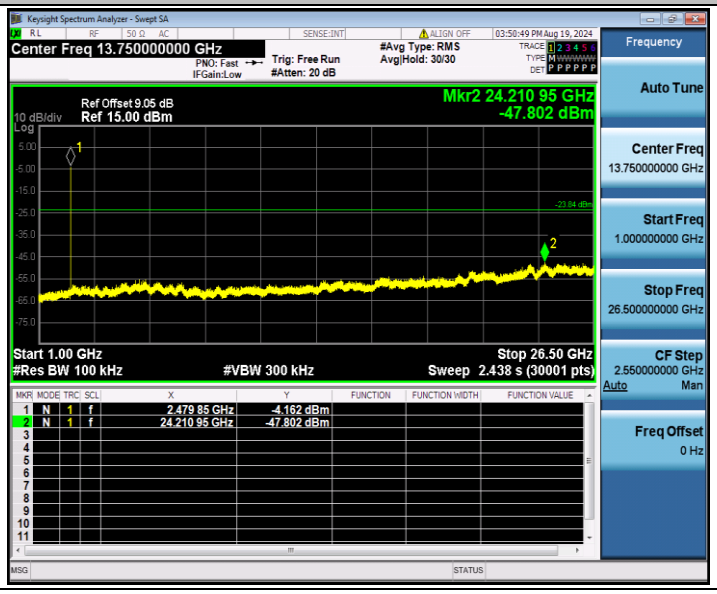


BLE_Ant1_2440_1000~26500

BLE_Ant1_2480_0~Reference

BLE_Ant1_2480_30~1000



BLE_Ant1_2480_1000~26500



Appendix A.7: Emissions in Restricted Bands

Test Result

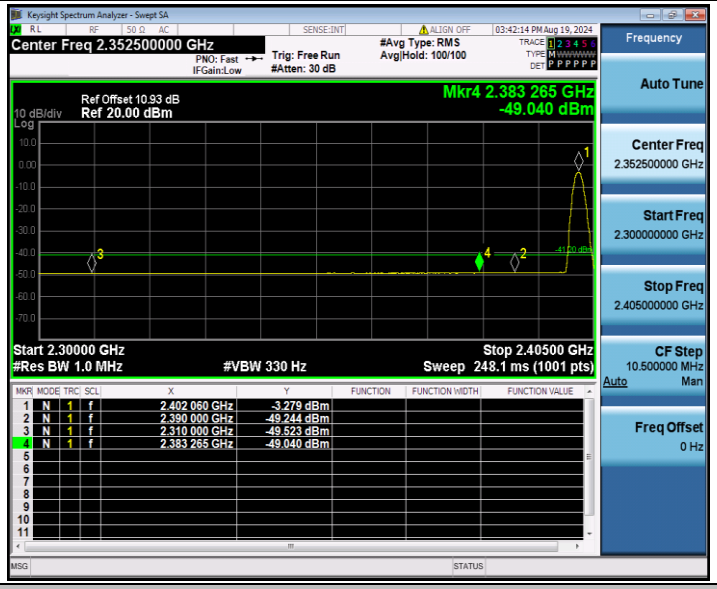
TestMode	Antenna	ChName	Freq(MHz)	Detector	Freq [MHz]	Result [dBm]	Limit [dBm]	Result [dBuV/m]	Limit [dBuV/m]	Verdict
BLE	Ant1	Low	2402	AV	2310.000	-49.52	≤-41.20	45.68	≤54	PASS
				AV	2383.265	-49.04	≤-41.20	46.16	≤54	PASS
				AV	2390.000	-49.24	≤-41.20	45.96	≤54	PASS
				Peak	2310.000	-40.24	≤-21.20	54.96	≤74	PASS
				Peak	2353.865	-39.73	≤-21.20	55.47	≤74	PASS
				Peak	2390.000	-42.55	≤-21.20	52.65	≤74	PASS
		High	2480	AV	2483.500	-48.52	≤-41.20	46.68	≤54	PASS
				AV	2498.000	-48.45	≤-41.20	46.75	≤54	PASS
				AV	2500.000	-48.55	≤-41.20	46.65	≤54	PASS
				Peak	2483.500	-41.04	≤-21.20	54.16	≤74	PASS
				Peak	2496.960	-39.02	≤-21.20	56.18	≤74	PASS
				Peak	2500.000	-41.92	≤-21.20	53.28	≤74	PASS

Note：

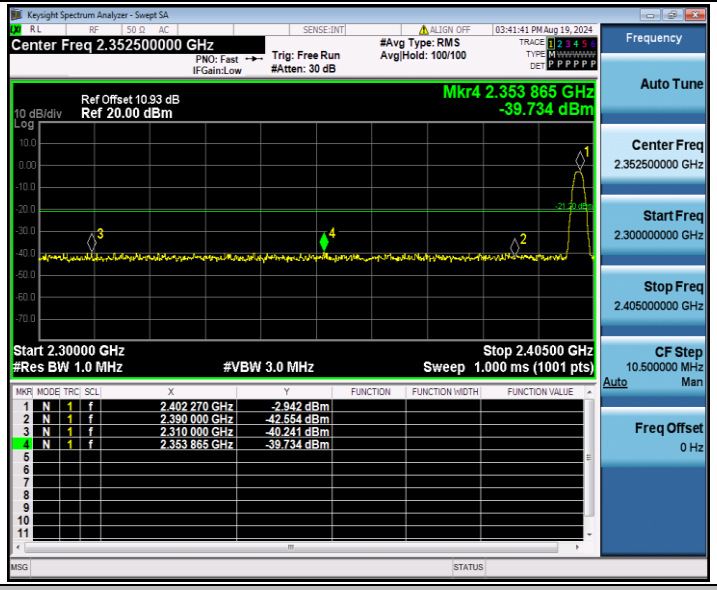
1. The Antenna Gain is compensated in the graph.
2. The Duty Cycle Factor and RBW Factor is compensated in the graph.
3. The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

Test Graphs

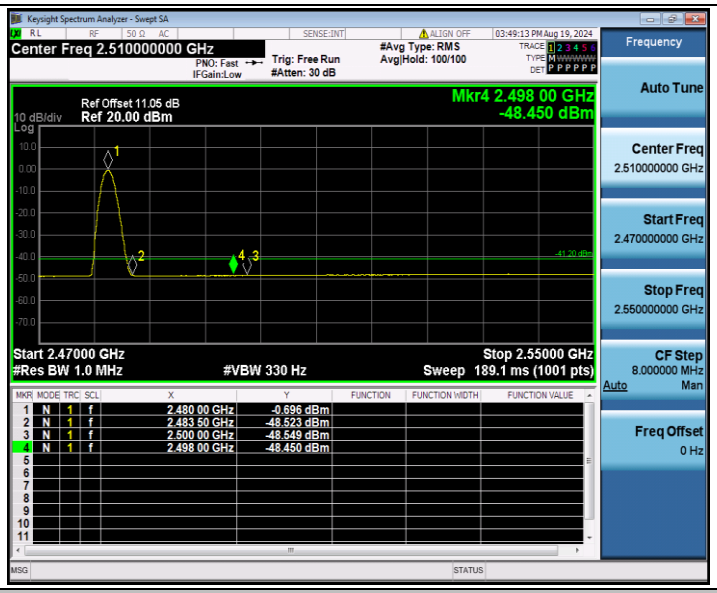
BLE_Ant1_Low_2402_AV



BLE_Ant1_Low_2402_Peak



BLE_Ant1_High_2480_AV



BLE_Ant1_High_2480_Peak