Appendix A

RF Test Data for BLE (Conducted Measurement)

Product Name: Human Presence Sensor

Test Model: SWR07

Environmental Conditions

Temperature:	23.8° C
Relative Humidity:	52.1%
ATM Pressure:	100.0 kPa
Test Engineer:	Taylor Hu
Supervised by:	Nick Peng

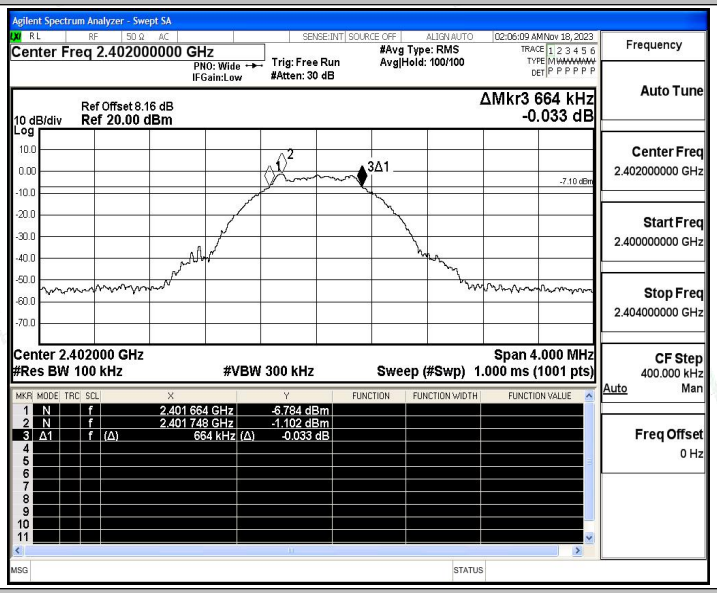
A.1 DTS Bandwidth

Test Result

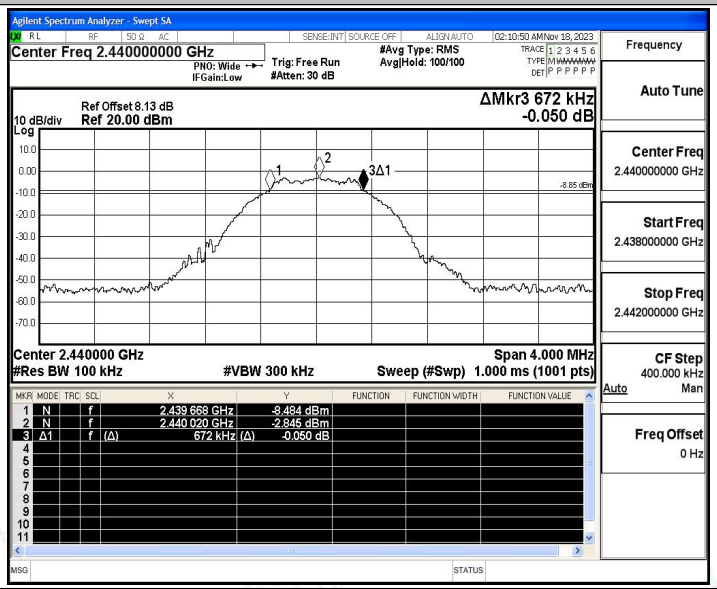
TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.664	2401.664	2402.328	0.5	PASS
		2440	0.672	2439.668	2440.340	0.5	PASS
		2480	0.664	2479.672	2480.336	0.5	PASS

Test Graphs

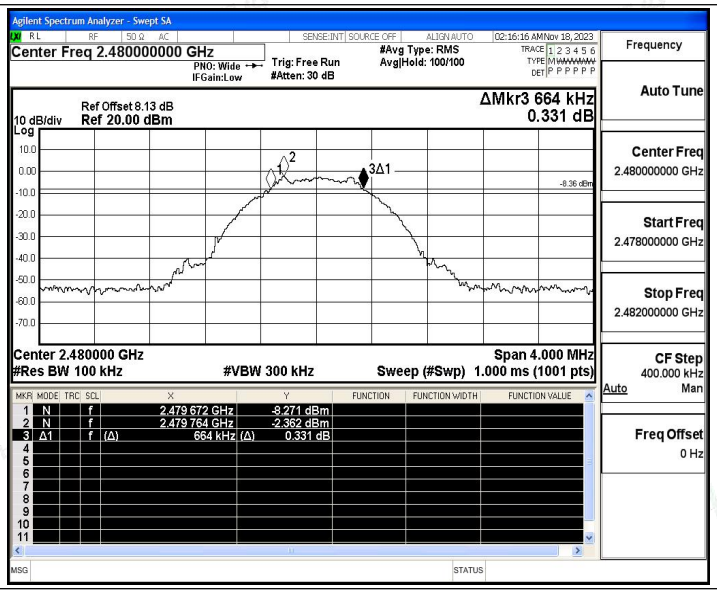
BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480


Agilent 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
02:16:16 AM Nov 18, 2023
Ref Offset 8.13 dB
10 dB/div
Log
Ref 20.00 dBm
ΔMkr3 664 kHz
0.331 dB
-8.36 dBm
Center 2.480000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 4.000 MHz
Sweep (#Swp) 1.000 ms (1001 pts)
1 N 1 f 2.479 672 GHz -8.271 dBm
2 N 1 f 2.479 764 GHz -2.362 dBm
3 Δ1 f (Δ) 664 kHz (Δ) 0.331 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
MSG
STATUS

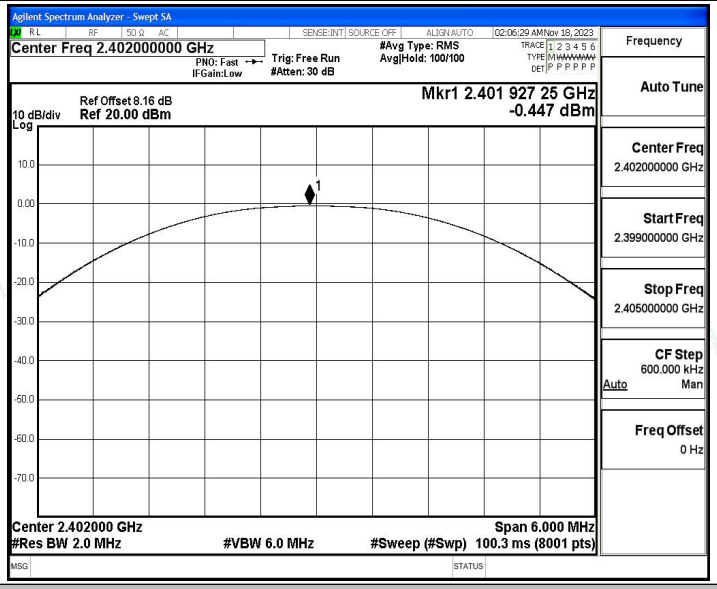
A.2 Maximum conducted output power

Test Result

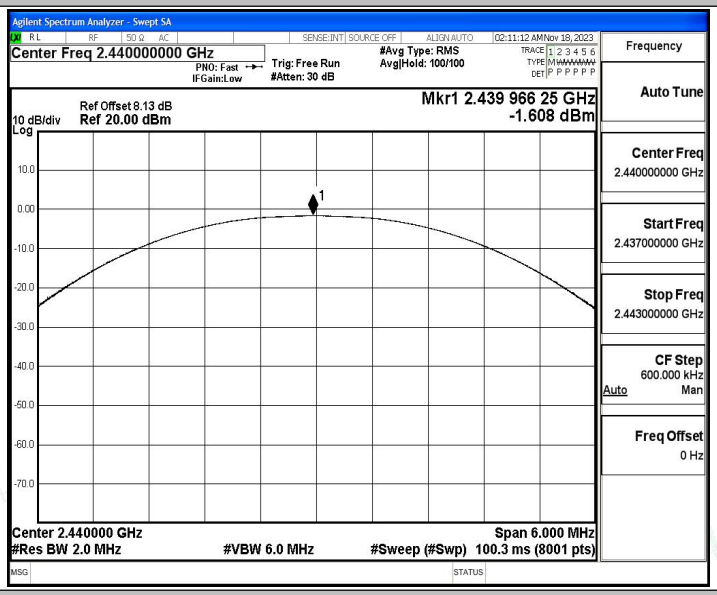
TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	-0.45	≤30	PASS
		2440	-1.61	≤30	PASS
		2480	-1.31	≤30	PASS

Test Graphs

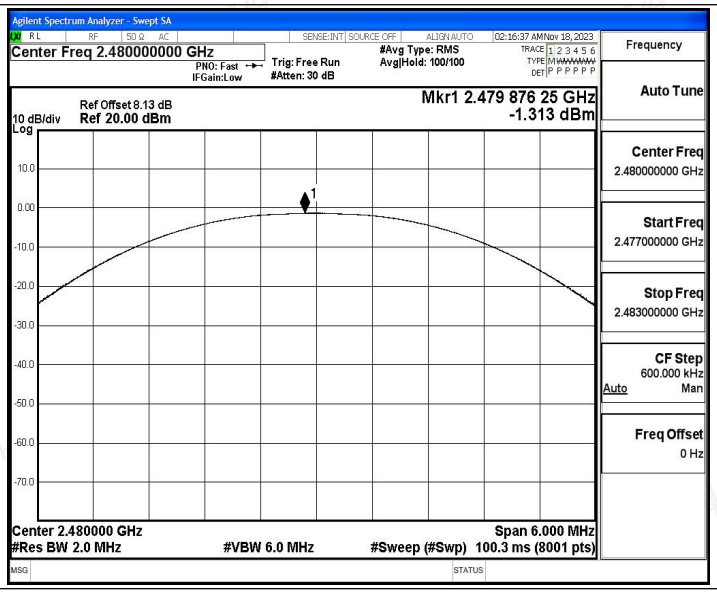
BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold: 100/100
02:16:37 AM Nov 18, 2023
Ref Offset 8.13 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr1 2.479 876 25 GHz
-1.313 dBm
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Center 2.480000 GHz
#Res BW 2.0 MHz
#VBW 6.0 MHz
Span 6.000 MHz
#Sweep (#Swp) 100.3 ms (8001 pts)
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.477000000 GHz
Stop Freq
2.483000000 GHz
CF Step
600.000 kHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

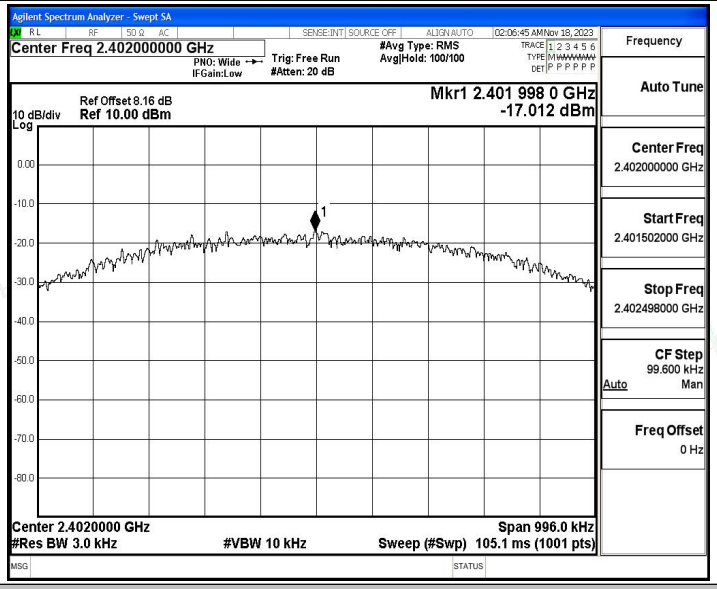
A.3 Maximum power spectral density

Test Result

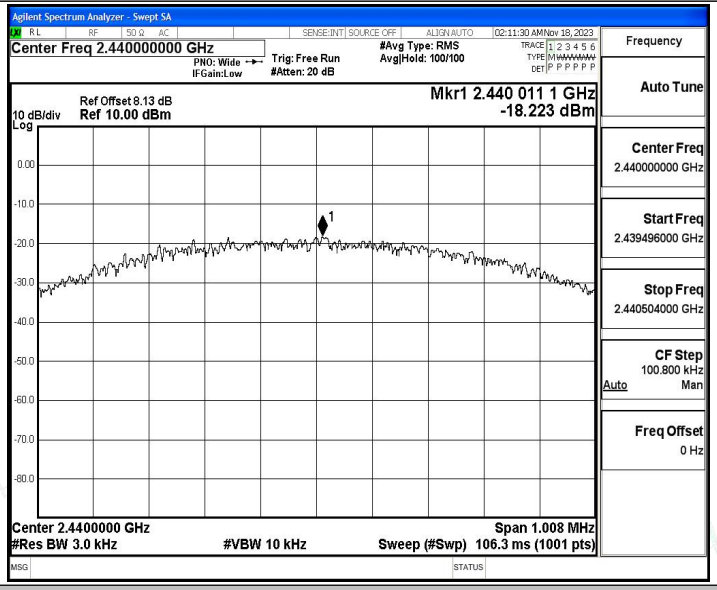
TestMode	Antenna	Channel	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-17.01	≤8.00	PASS
		2440	-18.22	≤8.00	PASS
		2480	-17.8	≤8.00	PASS

Test Graphs

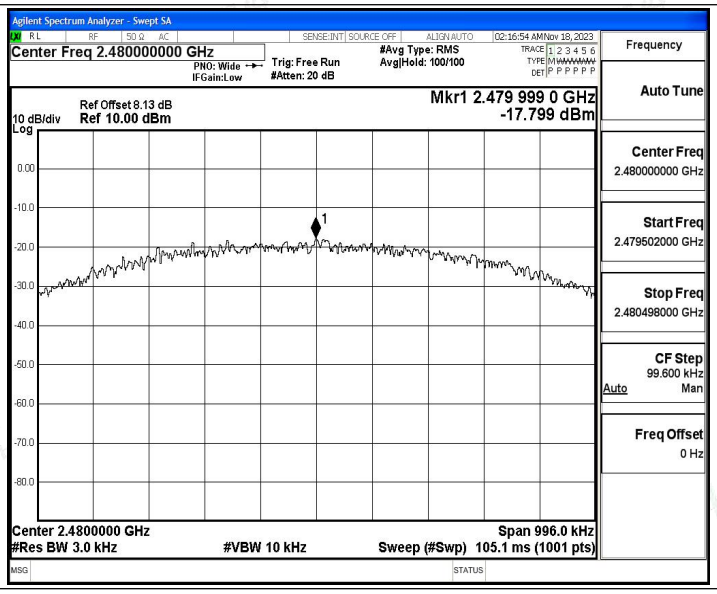
BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 20 dB
#Avg Type: RMS
Avg|Hold: 100/100
02:16:54 AM Nov 18, 2023
Ref Offset 8.13 dB
10 dB/div Ref 10.00 dBm
Log
Mkr1 2.479 999 0 GHz
-17.799 dBm
Center 2.4800000 GHz
#Res BW 3.0 kHz
#VBW 10 kHz
Span 996.0 kHz
Sweep (#Swp) 105.1 ms (1001 pts)
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.479502000 GHz
Stop Freq
2.480498000 GHz
CF Step
99.600 kHz
Auto
Man
Freq Offset
0 Hz

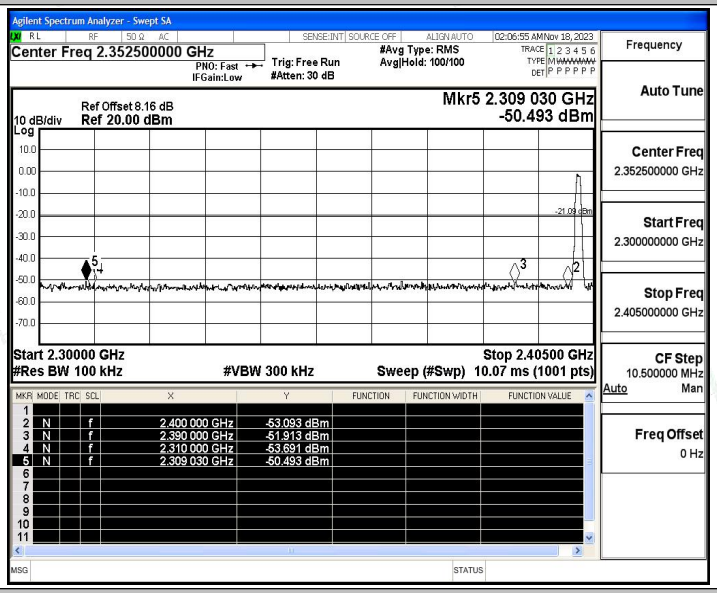
A.4 Band edge measurements

Test Result

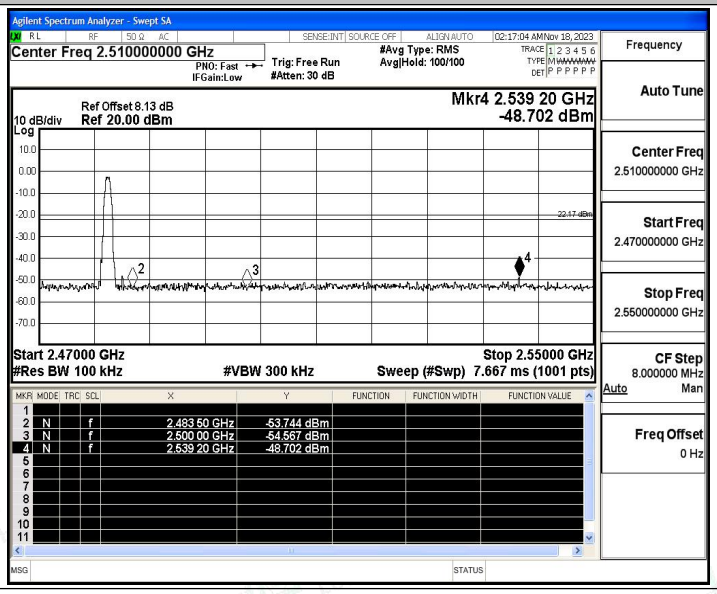
TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	-1.09	-50.49	≤-21.09	PASS
		High	2480	-2.17	-48.7	≤-22.17	PASS

Test Graphs

BLE_1M_Ant1_Low_2402



BLE_1M_Ant1_High_2480



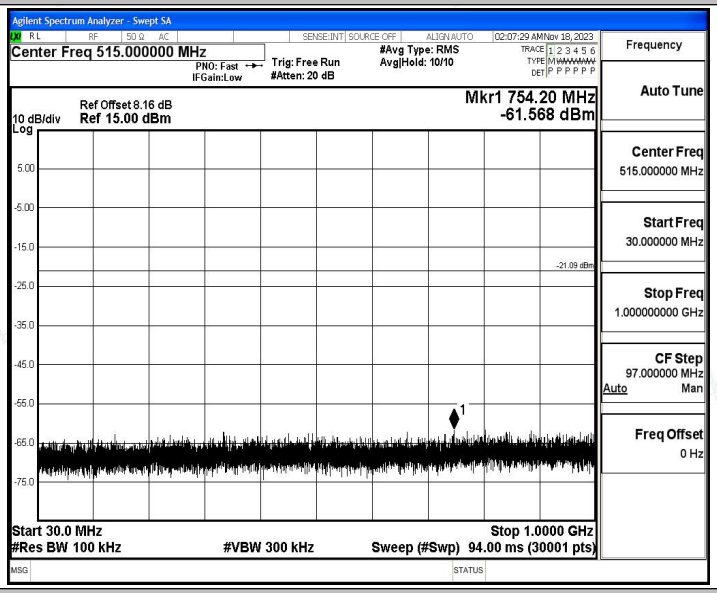
A.5 Conducted Spurious Emission

Test Result

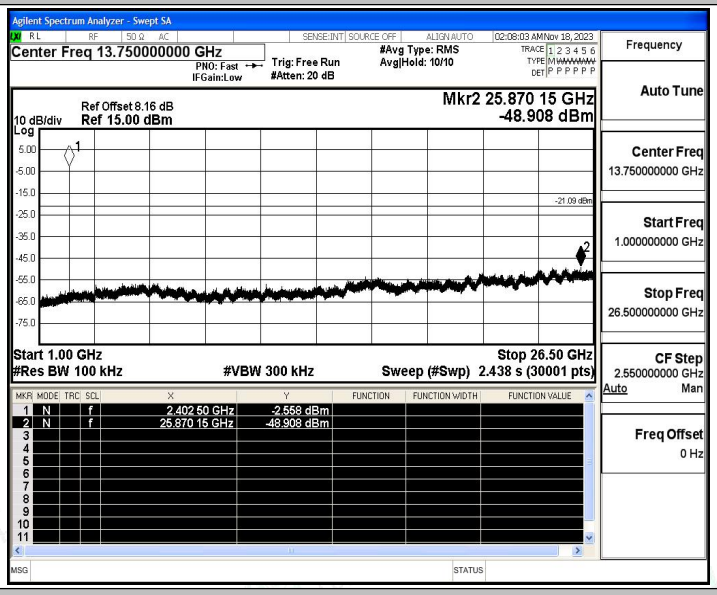
TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	30~1000	-1.09	-61.57	≤-21.09	PASS
			1000~26500	-1.09	-48.91	≤-21.09	PASS
		2440	30~1000	-2.20	-61.66	≤-22.2	PASS
			1000~26500	-2.20	-47.31	≤-22.2	PASS
		2480	30~1000	-2.17	-61.68	≤-22.17	PASS
			1000~26500	-2.17	-36.81	≤-22.17	PASS

Test Graphs

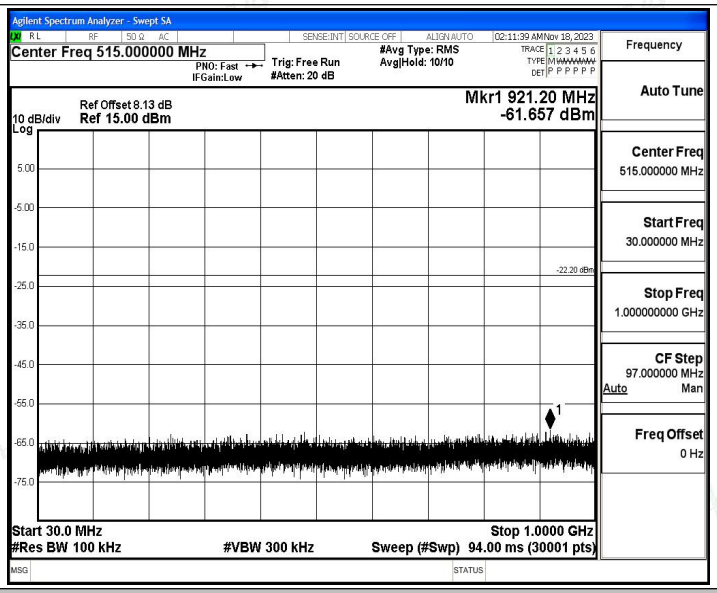
BLE_1M_Ant1_2402_30~1000



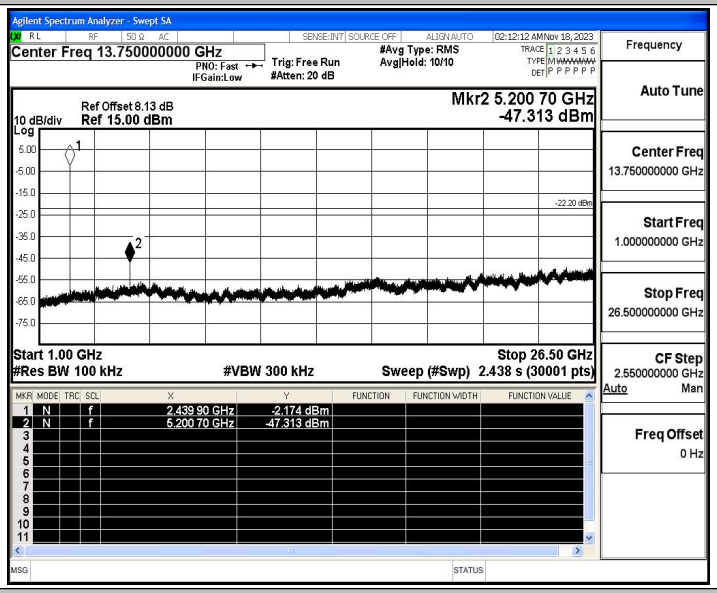
BLE_1M_Ant1_2402_1000~26500



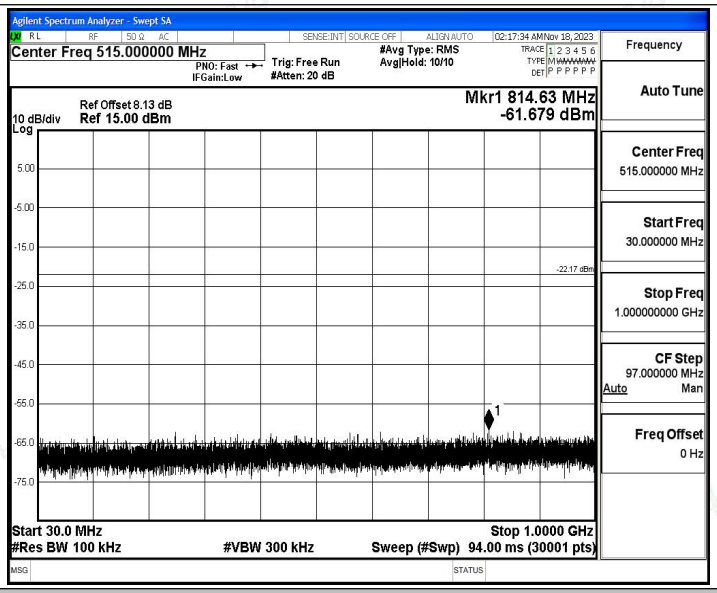
BLE_1M_Ant1_2440_30~1000



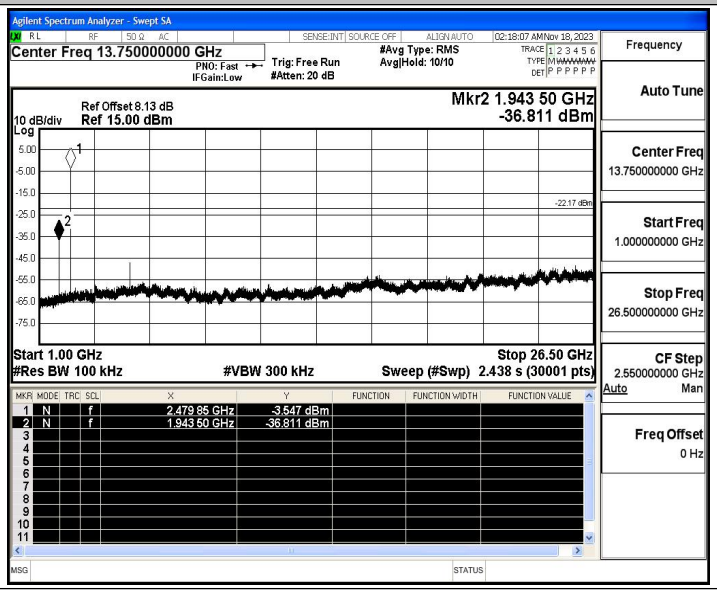
BLE_1M_Ant1_2440_1000~26500



BLE_1M_Ant1_2480_30~1000



BLE_1M_Ant1_2480_1000~26500



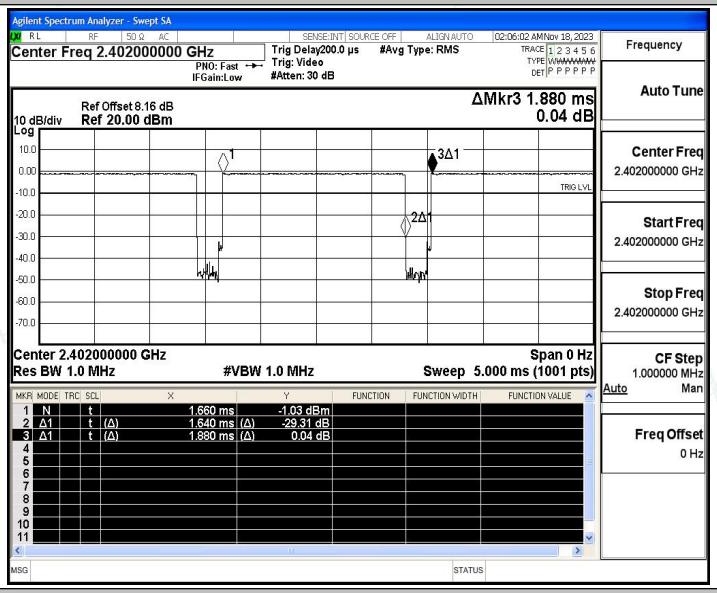
A.6 Duty Cycle

Test Result

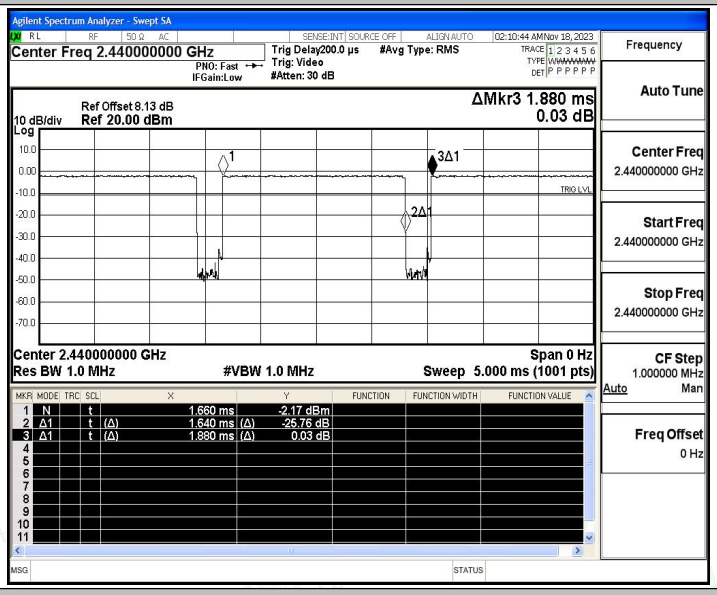
TestMode	Antenna	Channel	ON Time [ms]	Period [ms]	X	DC [%]	xFactor	1/T	Limit	Verdict
BLE_1M	Ant1	2402	1.64	1.88	0.8723	87.23	0.59	0.61	---	---
		2440	1.64	1.88	0.8723	87.23	0.59	0.61	---	---
		2480	1.64	1.88	0.8723	87.23	0.59	0.61	---	---

Test Graphs

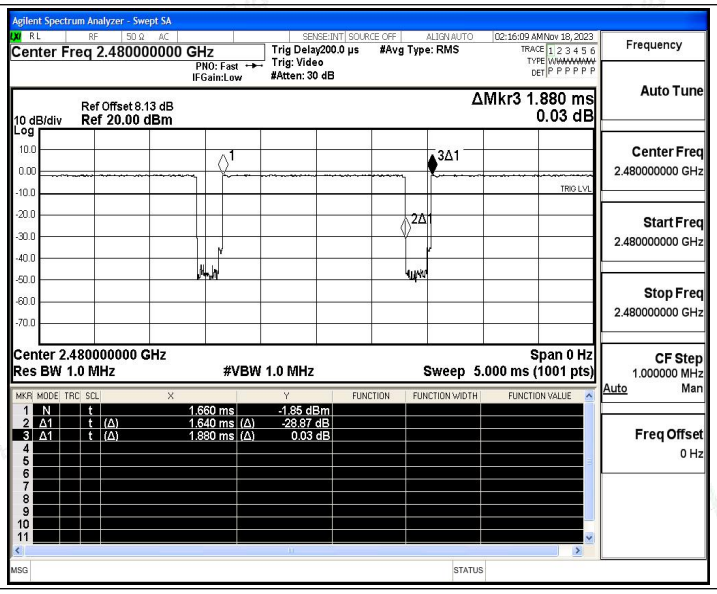
BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Fast
IFGain:Low
Trig Delay200.0 µs
Trig: Video
#Avg Type: RMS
#Atten: 30 dB
02:16:09 AM Nov 18, 2023
Ref Offset 8.13 dB
10 dB/div
Ref 20.00 dBm
ΔMkr3 1.880 ms
0.03 dB
Center 2.480000000 GHz
Res BW 1.0 MHz
#VBW 1.0 MHz
Span 0 Hz
Sweep 5.000 ms (1001 pts)
1 N 1 t 1.660 ms -1.85 dBm
2 Δ1 t (Δ) 1.640 ms (Δ) -28.87 dB
3 Δ1 t (Δ) 1.880 ms (Δ) 0.03 dB
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.480000000 GHz
Stop Freq
2.480000000 GHz
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz

A.7 Emissions in Restricted Bands

Test Result

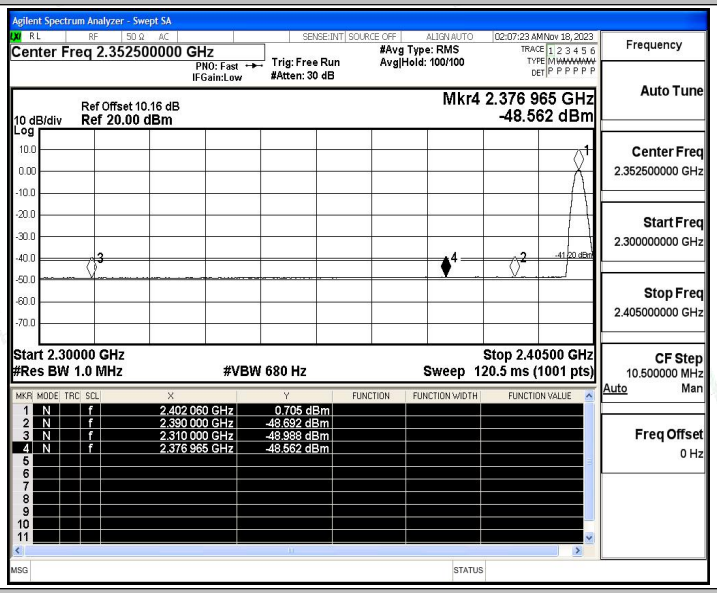
TestMode	Antenna	ChName	Channel	Detector	Freq. [MHz]	Result [dBm]	Limit [dBm]	Result [dBuV/m]	Limit [dBuV/m]	Verdict
BLE_1M	Ant1	Low	2402	AV	2310.000	-48.99	≤-41.20	46.21	≤54	PASS
				AV	2376.965	-48.56	≤-41.20	46.64	≤54	PASS
				AV	2390.000	-48.69	≤-41.20	46.51	≤54	PASS
				Peak	2310.000	-42.08	≤-21.20	53.12	≤74	PASS
				Peak	2386.730	-39.27	≤-21.20	55.93	≤74	PASS
				Peak	2390.000	-41.41	≤-21.20	53.79	≤74	PASS
		High	2480	AV	2483.500	-48.25	≤-41.20	46.95	≤54	PASS
				AV	2483.520	-48.25	≤-41.20	46.95	≤54	PASS
				AV	2500.000	-48.54	≤-41.20	46.66	≤54	PASS
				Peak	2483.500	-42.1	≤-21.20	53.10	≤74	PASS
				Peak	2490.880	-38.72	≤-21.20	56.48	≤74	PASS
				Peak	2500.000	-40.59	≤-21.20	54.61	≤74	PASS

Note：

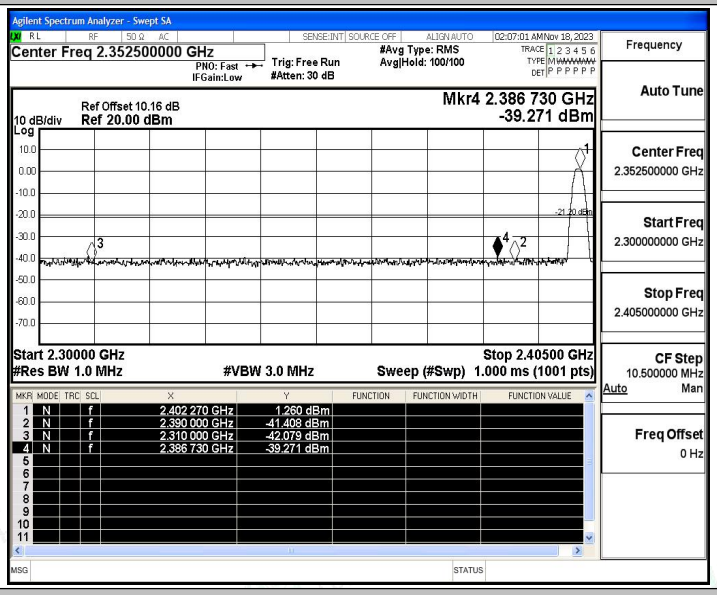
1. The Antenna Gain is compensated in the graph.
2. The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

Test Graphs

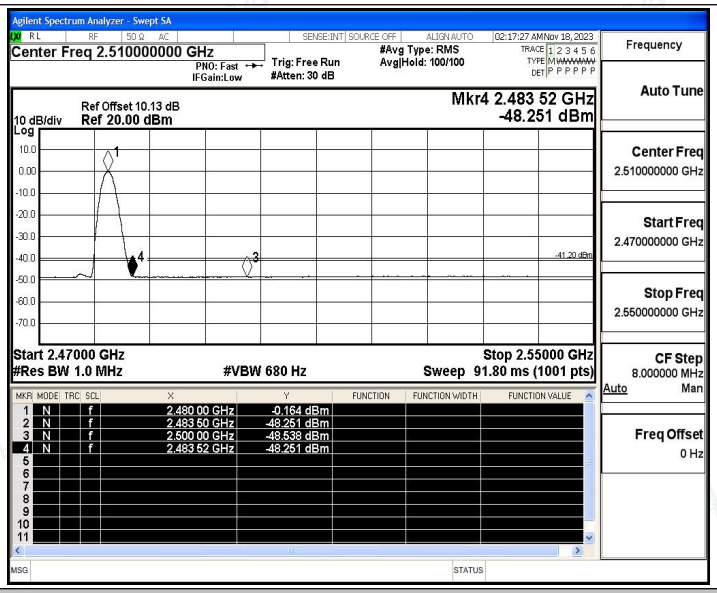
BLE_1M_Ant1_Low_2402_AV



BLE_1M_Ant1_Low_2402_Peak



BLE_1M_Ant1_High_2480_AV



BLE_1M_Ant1_High_2480_Peak