Appendix B

RF Test Data for BT LE V5.0(DTS) (Conducted Measurement)

Product Name: Portable FM Radio with Wireless Connection

Trade Mark: i-box

Test Model: WJ-198FM

Environmental Conditions

Temperature:	21.1℃
Relative Humidity:	52.2%
ATM Pressure:	100.0 kPa
Test Engineer:	Jay Li
Supervised by:	Li Huan

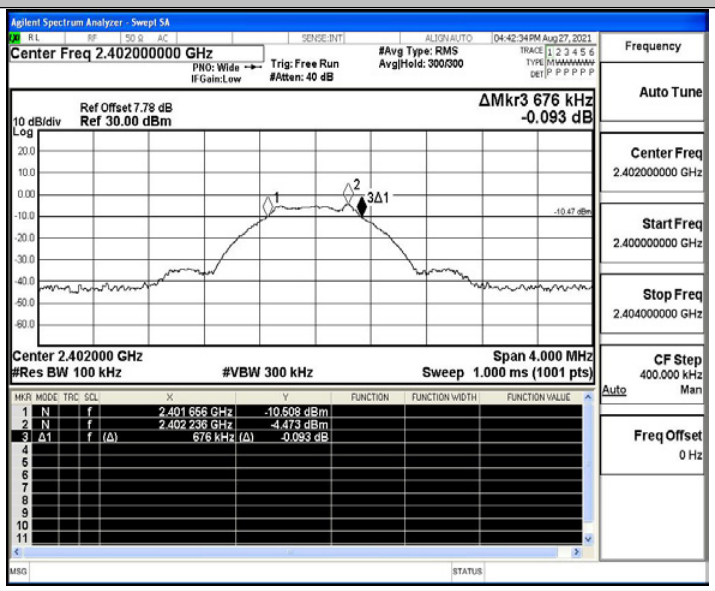
B.1 DTS Bandwidth

Test Result

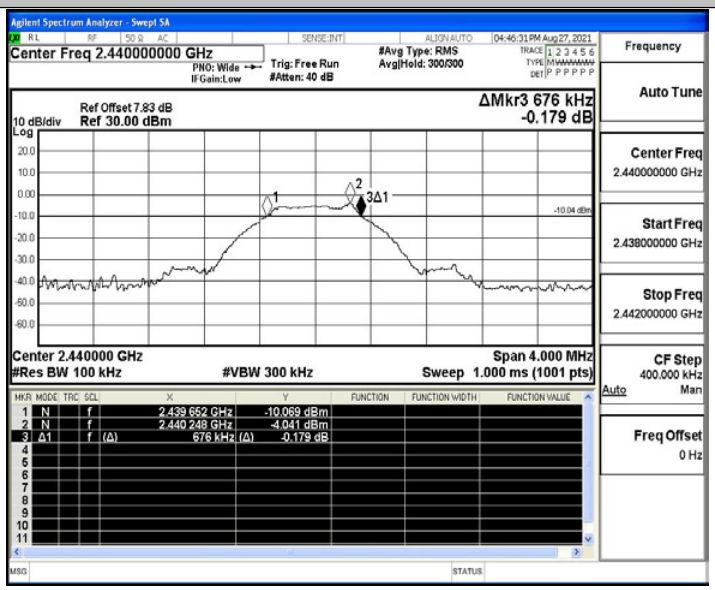
TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.676	2401.656	2402.332	≥0.5	PASS
		2440	0.676	2439.652	2440.328	≥0.5	PASS
		2480	0.724	2479.628	2480.352	≥0.5	PASS
BLE_2M	Ant1	2402	1.148	2401.428	2402.576	≥0.5	PASS
		2440	1.244	2439.344	2440.588	≥0.5	PASS
		2480	1.168	2479.404	2480.572	≥0.5	PASS

Test Graphs

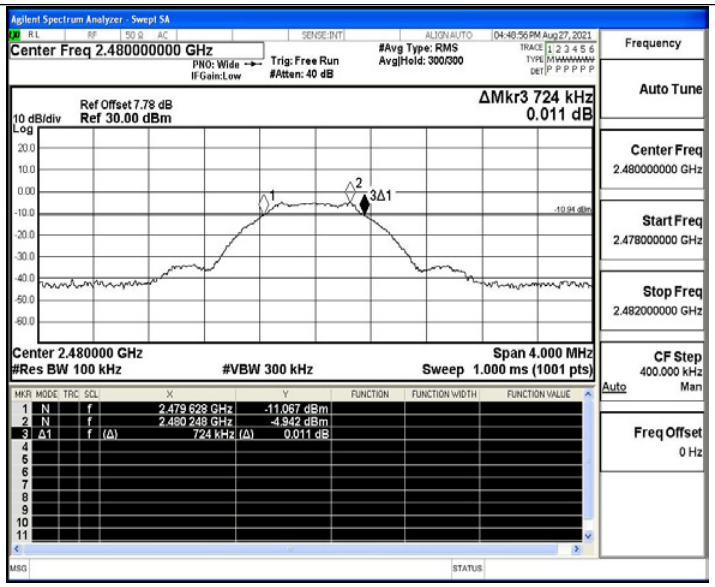
BLE_1M_Ant1_2402



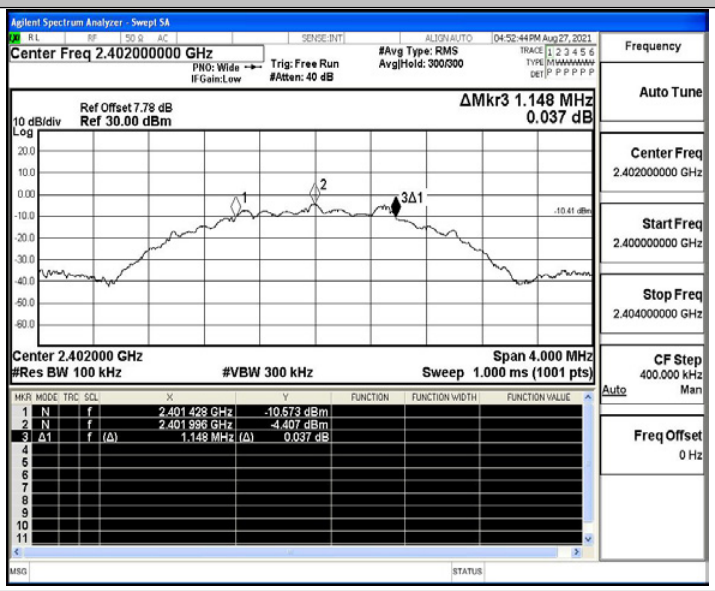
BLE_1M_Ant1_2440



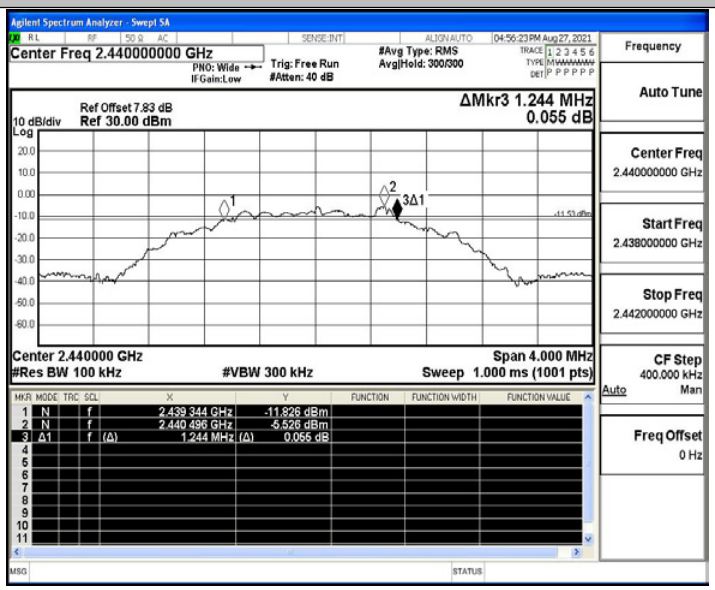
BLE_1M_Ant1_2480



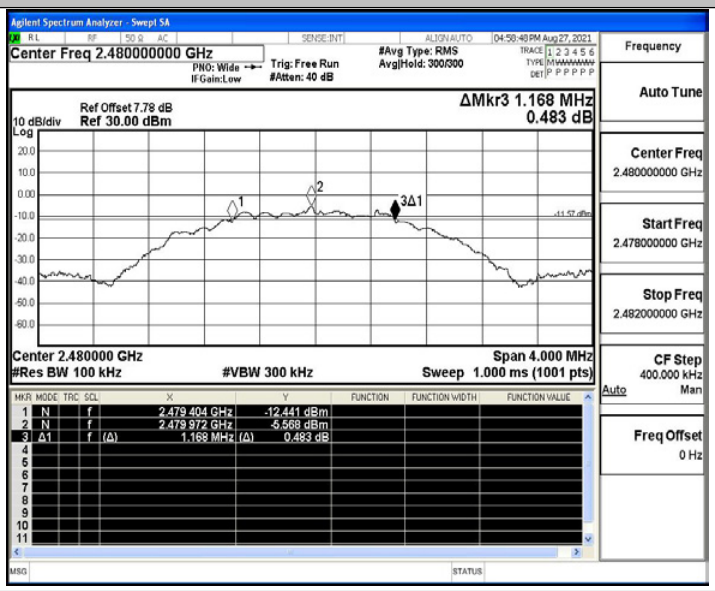
BLE_2M_Ant1_2402



BLE_2M_Ant1_2440



BLE_2M_Ant1_2480



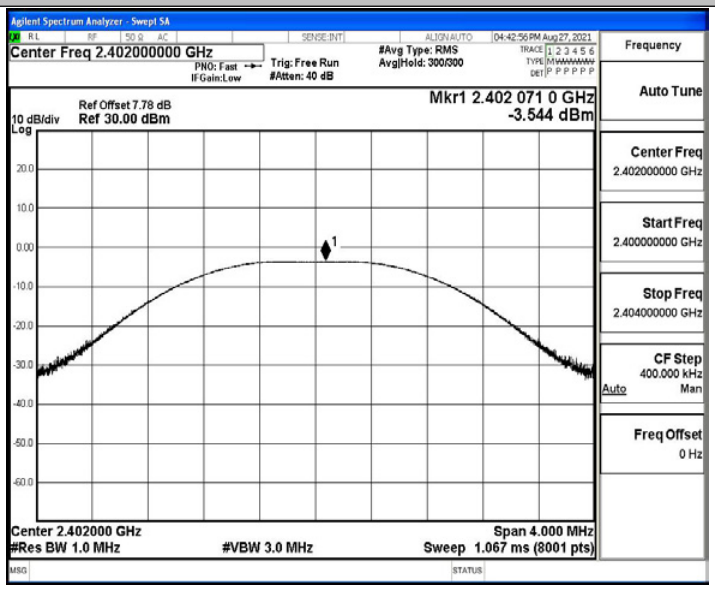
B.2 Maximum peak conducted output power

Test Result

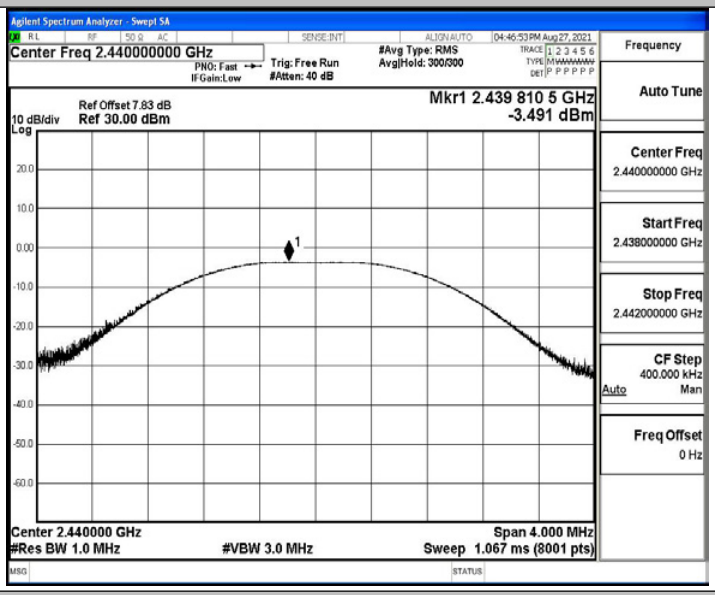
TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	-3.54	≤30	PASS
		2440	-3.49	≤30	PASS
		2480	-3.76	≤30	PASS
BLE_2M	Ant1	2402	-3.83	≤30	PASS
		2440	-3.8	≤30	PASS
		2480	-3.54	≤30	PASS

Test Graphs

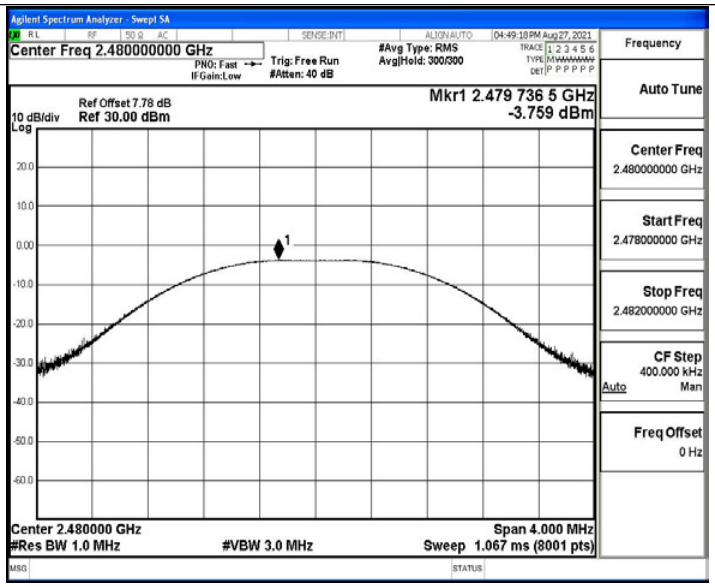
BLE_1M_Ant1_2402



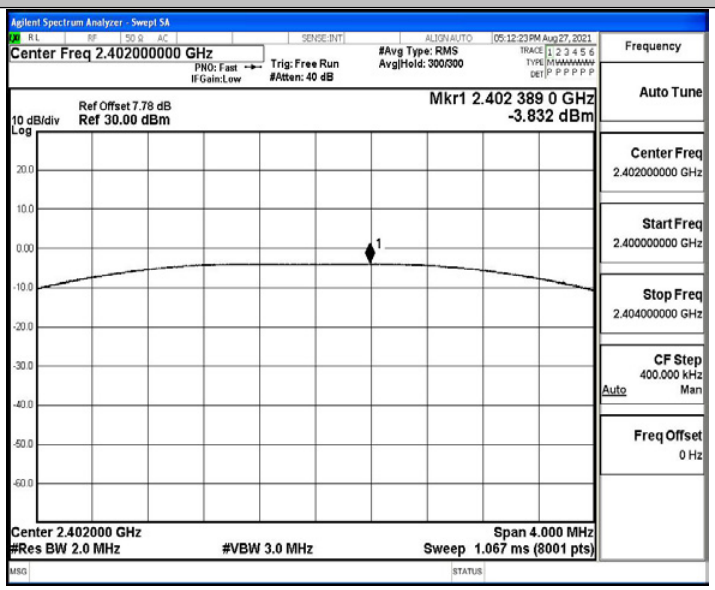
BLE_1M_Ant1_2440



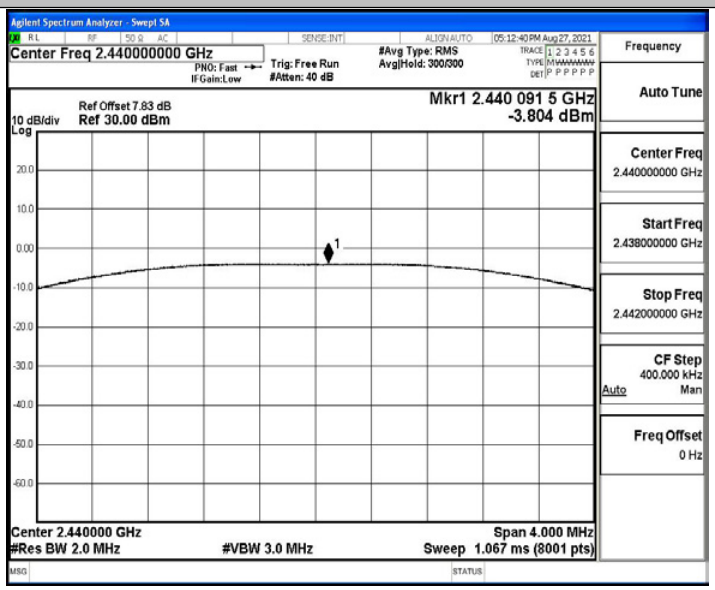
BLE_1M_Ant1_2480



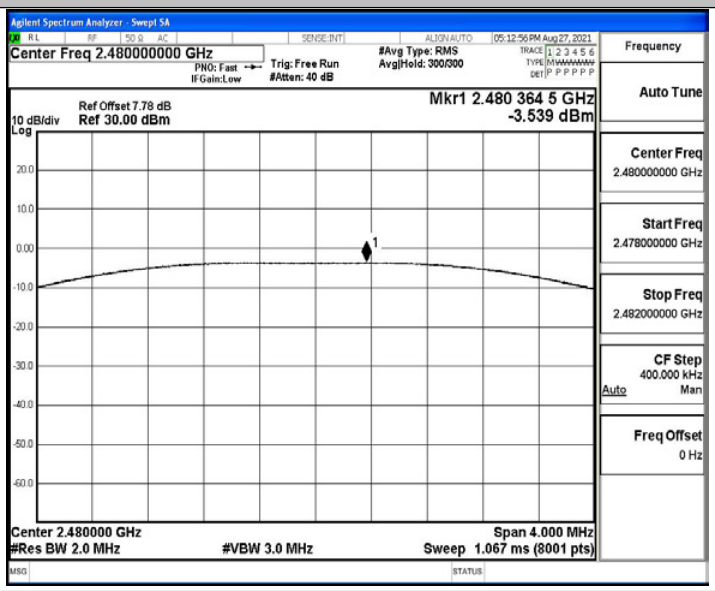
BLE_2M_Ant1_2402



BLE_2M_Ant1_2440



BLE_2M_Ant1_2480



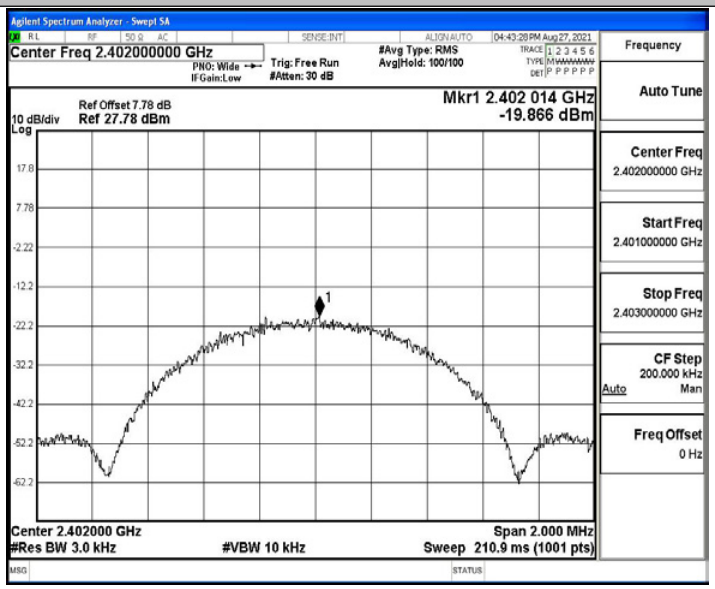
B.3 Maximum power spectral density

Test Result

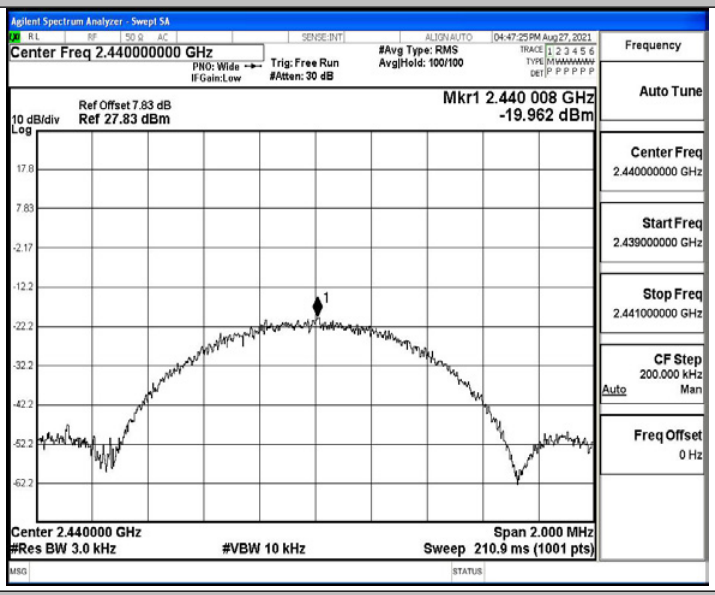
TestMode	Antenna	Channel	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-19.87	≤8	PASS
		2440	-19.96	≤8	PASS
		2480	-20.2	≤8	PASS
BLE_2M	Ant1	2402	-22.4	≤8	PASS
		2440	-22.43	≤8	PASS
		2480	-22.6	≤8	PASS

Test Graphs

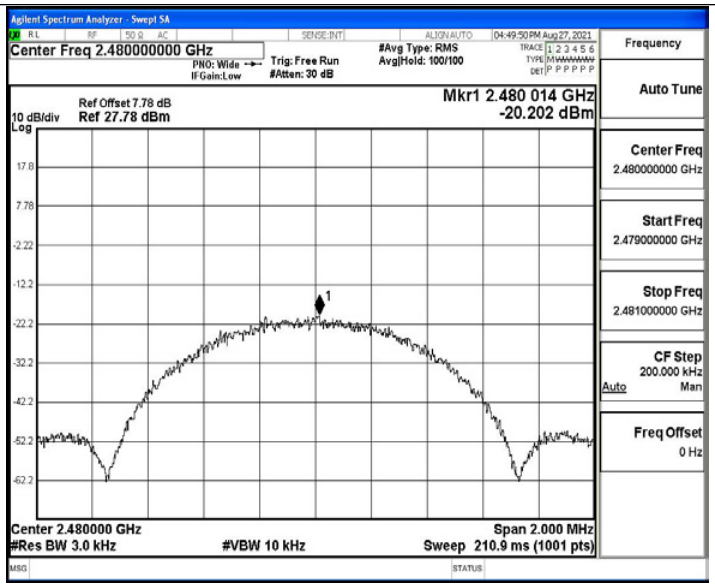
BLE_1M_Ant1_2402



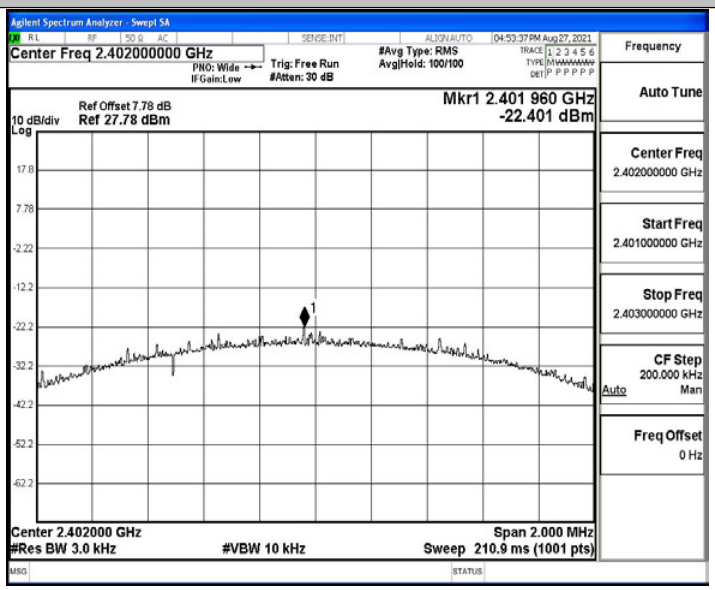
BLE_1M_Ant1_2440



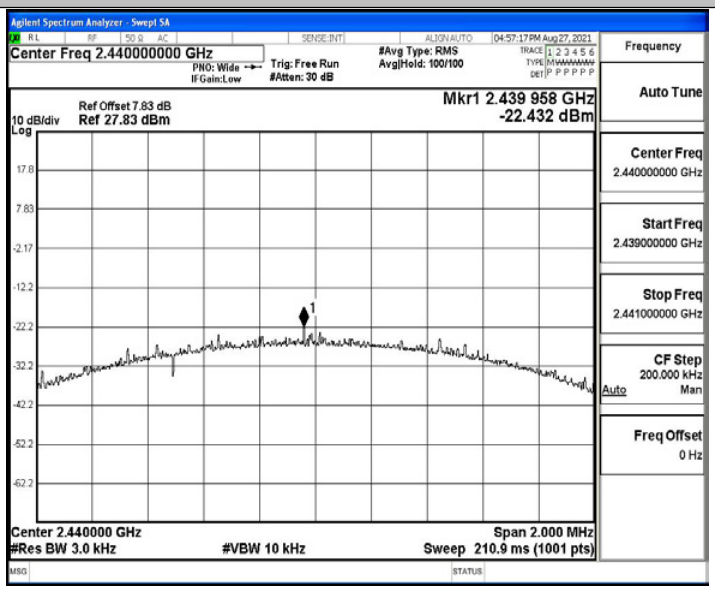
BLE_1M_Ant1_2480



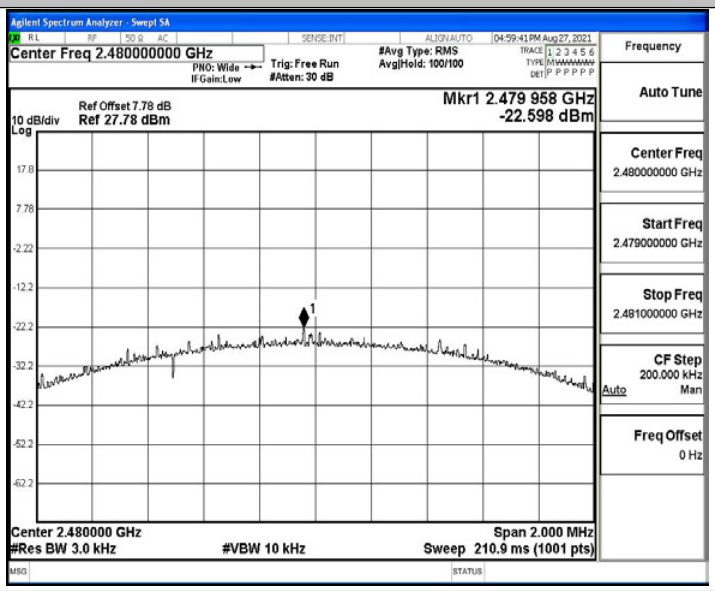
BLE_2M_Ant1_2402



BLE_2M_Ant1_2440



BLE_2M_Ant1_2480



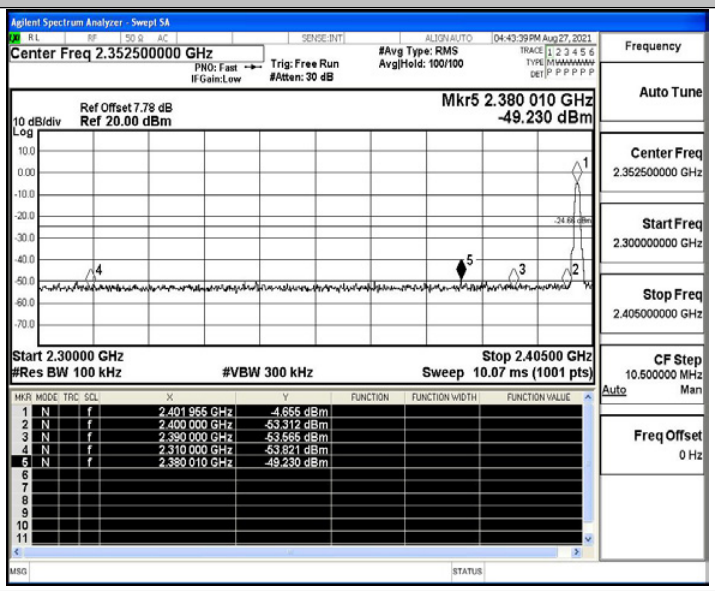
B.4 Band edge measurements

Test Result

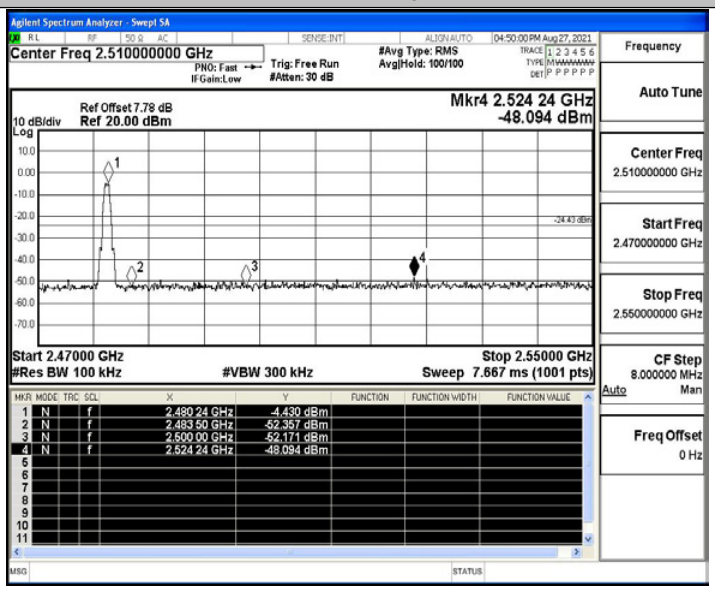
TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	-4.66	-49.23	≤-24.66	PASS
		High	2480	-4.43	-48.09	≤-24.43	PASS
BLE_2M	Ant1	Low	2402	-4.48	-39.25	≤-24.48	PASS
		High	2480	-4.58	-42.93	≤-24.58	PASS

Test Graphs

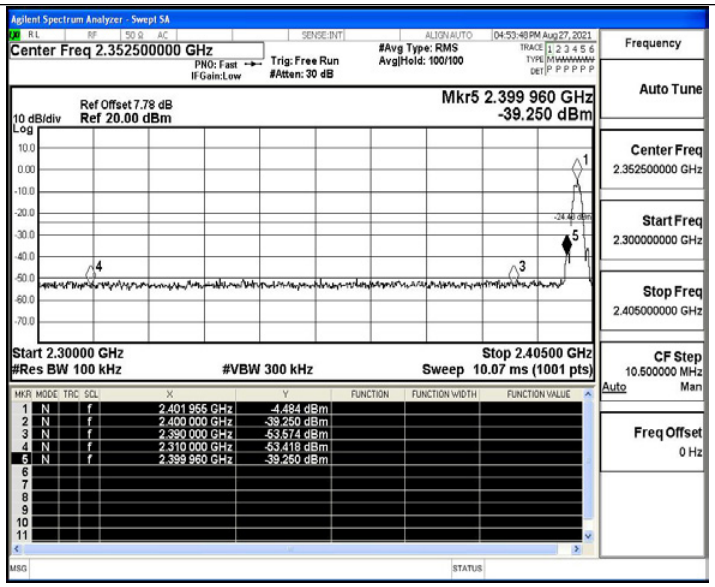
BLE_1M_Ant1_Low_2402



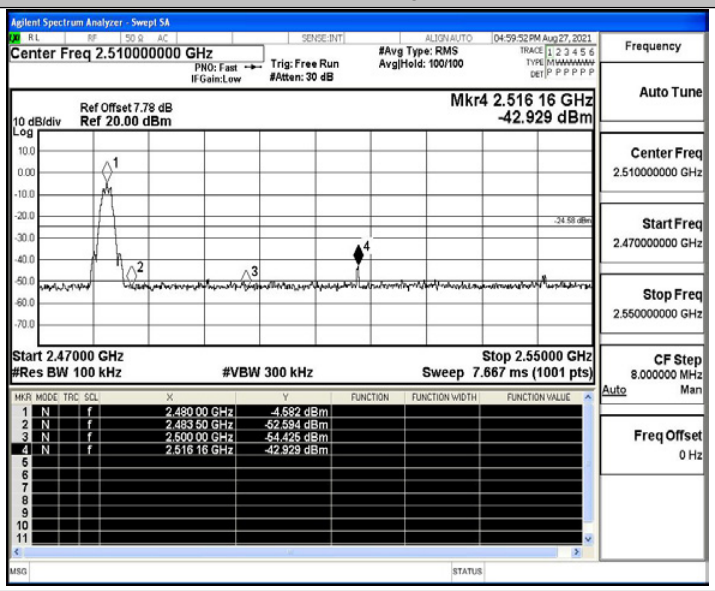
BLE_1M_Ant1_High_2480



BLE_2M_Ant1_Low_2402



BLE_2M_Ant1_High_2480



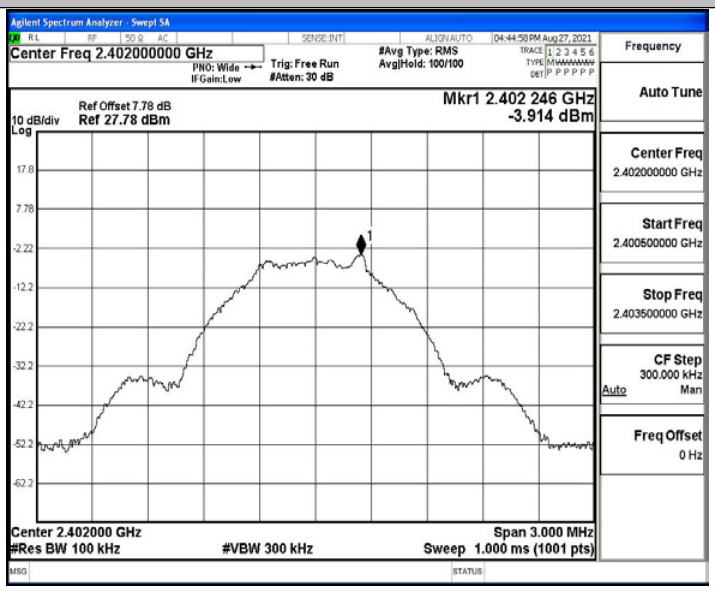
B.5 Conducted Spurious Emission

Test Result

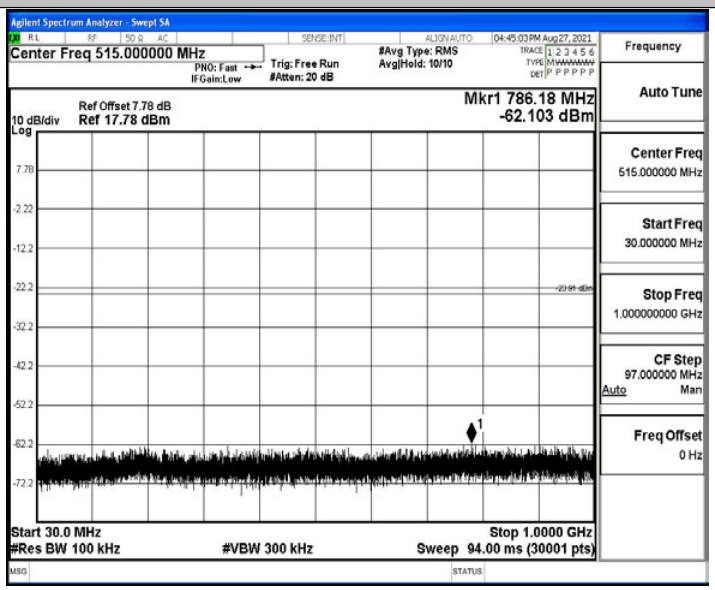
TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	-3.91	-3.91	---	PASS
			30~1000	-3.91	-62.1	≤-23.91	PASS
			1000~26500	-3.91	-48.02	≤-23.91	PASS
		2440	Reference	-4.16	-4.16	---	PASS
			30~1000	-4.16	-61.22	≤-24.16	PASS
			1000~26500	-4.16	-47.51	≤-24.16	PASS
		2480	Reference	-4.10	-4.10	---	PASS
			30~1000	-4.10	-60.97	≤-24.1	PASS
			1000~26500	-4.10	-47.18	≤-24.1	PASS
BLE_2M	Ant1	2402	Reference	-6.95	-6.95	---	PASS
			30~1000	-6.95	-62	≤-26.95	PASS
			1000~26500	-6.95	-47.06	≤-26.95	PASS
		2440	Reference	-4.46	-4.46	---	PASS
			30~1000	-4.46	-62.13	≤-24.46	PASS
			1000~26500	-4.46	-46.97	≤-24.46	PASS
		2480	Reference	-4.71	-4.71	---	PASS
			30~1000	-4.71	-61.6	≤-24.71	PASS
			1000~26500	-4.71	-47.23	≤-24.71	PASS

Test Graphs

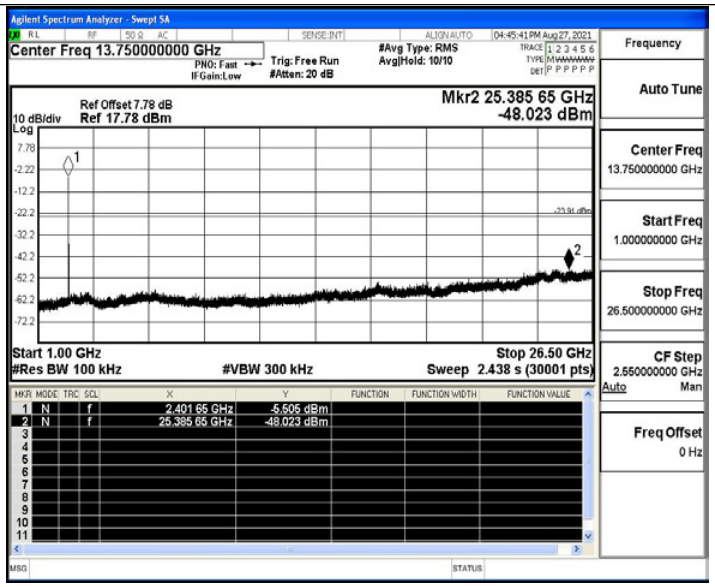
BLE_1M_Ant1_2402_0~Reference



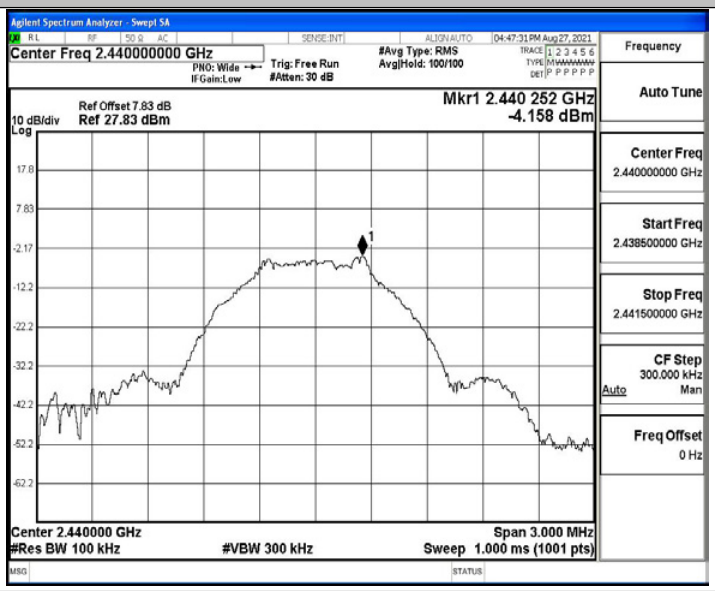
BLE_1M_Ant1_2402_30~1000



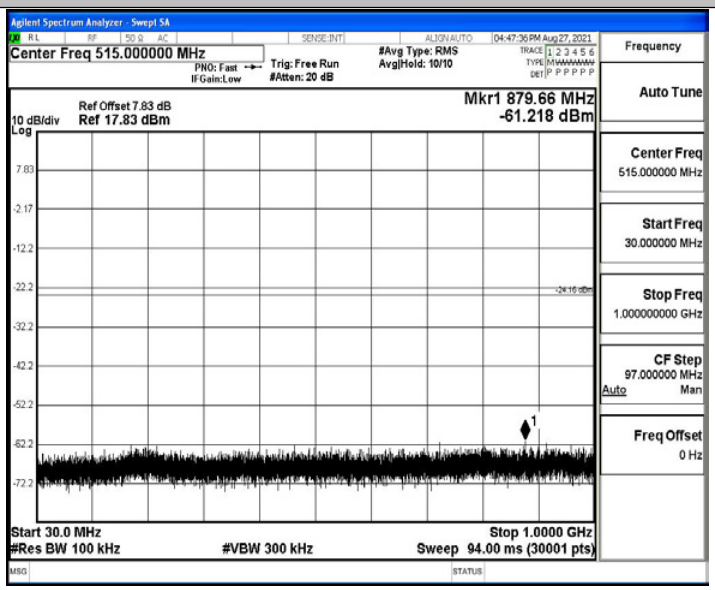
BLE_1M_Ant1_2402_1000~26500



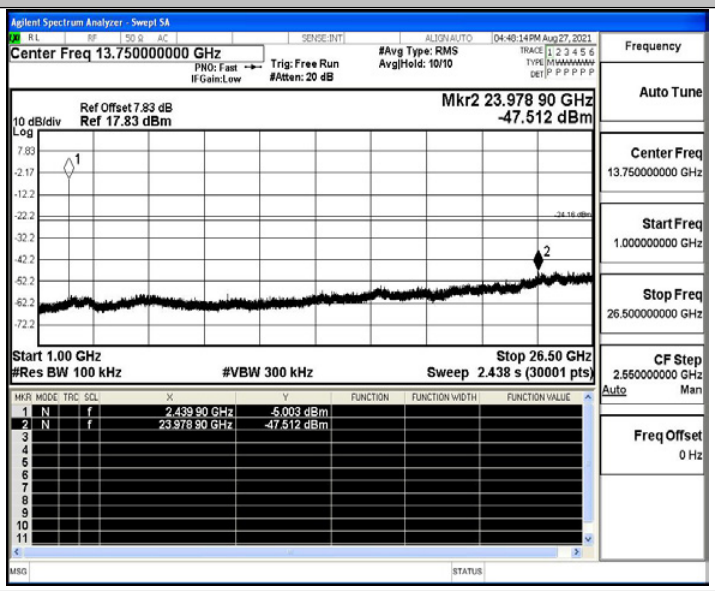
BLE_1M_Ant1_2440_0~Reference



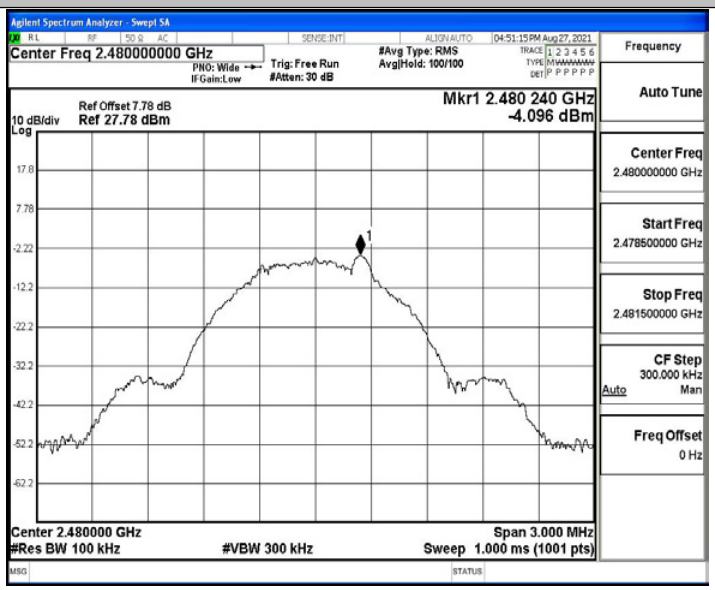
BLE_1M_Ant1_2440_30~1000



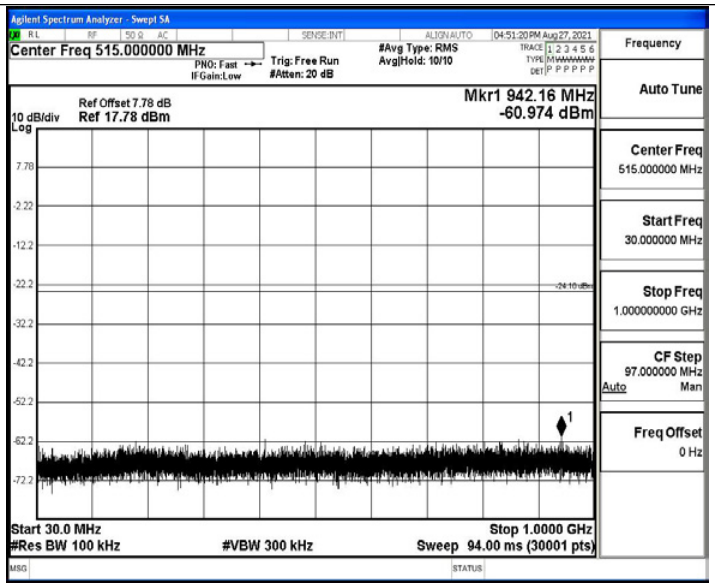
BLE_1M_Ant1_2440_1000~26500



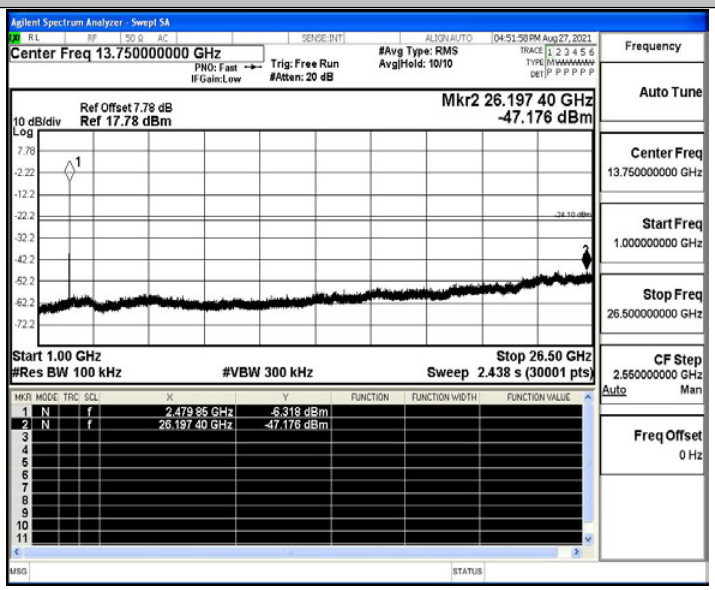
BLE_1M_Ant1_2480_0~Reference



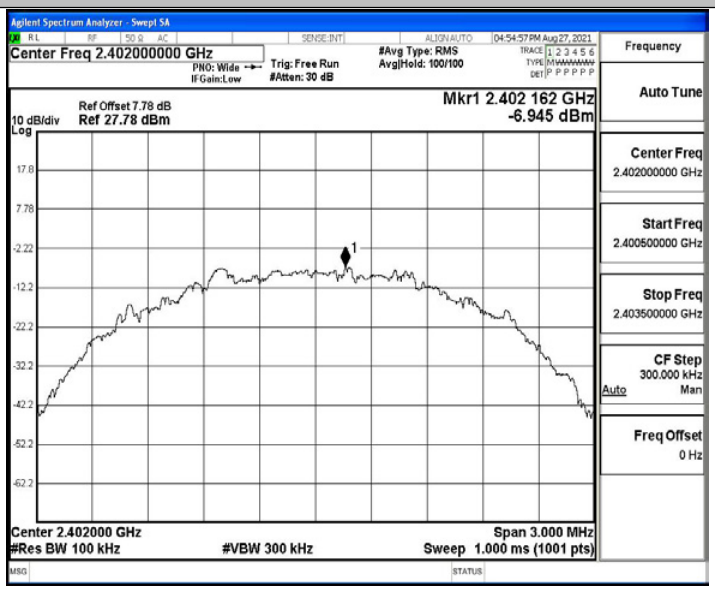
BLE_1M_Ant1_2480_30~1000



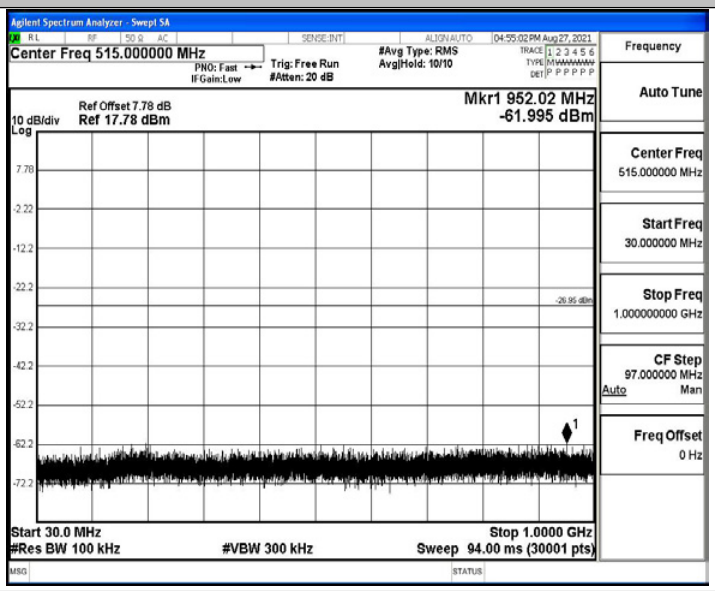
BLE_1M_Ant1_2480_1000~26500



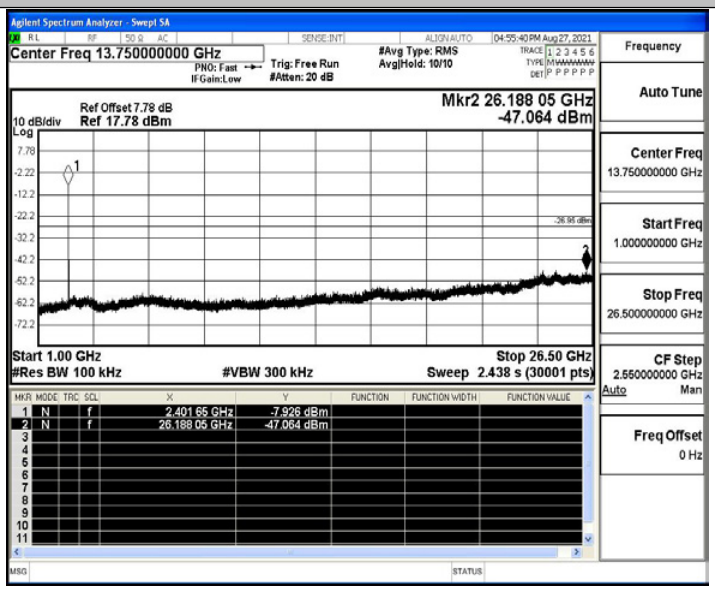
BLE_2M_Ant1_2402_0~Reference



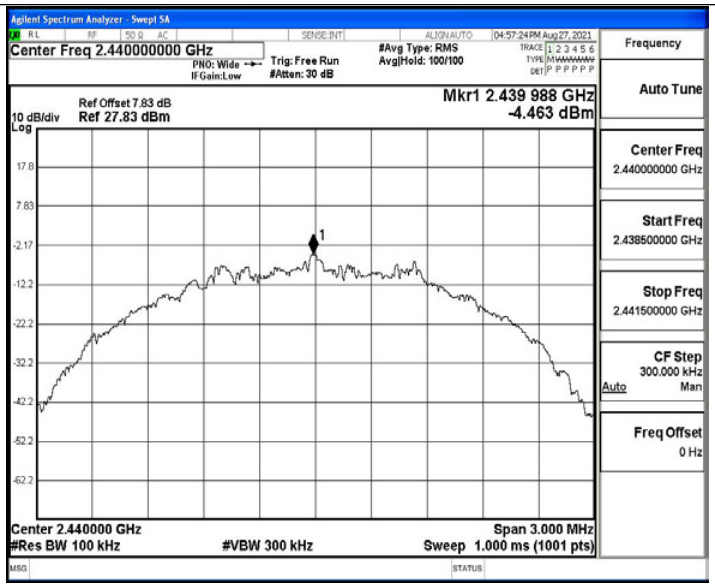
BLE_2M_Ant1_2402_30~1000



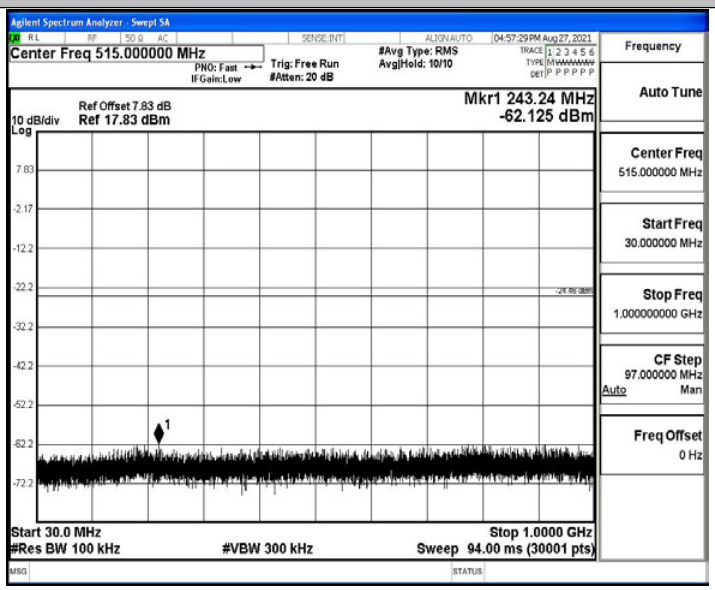
BLE_2M_Ant1_2402_1000~26500



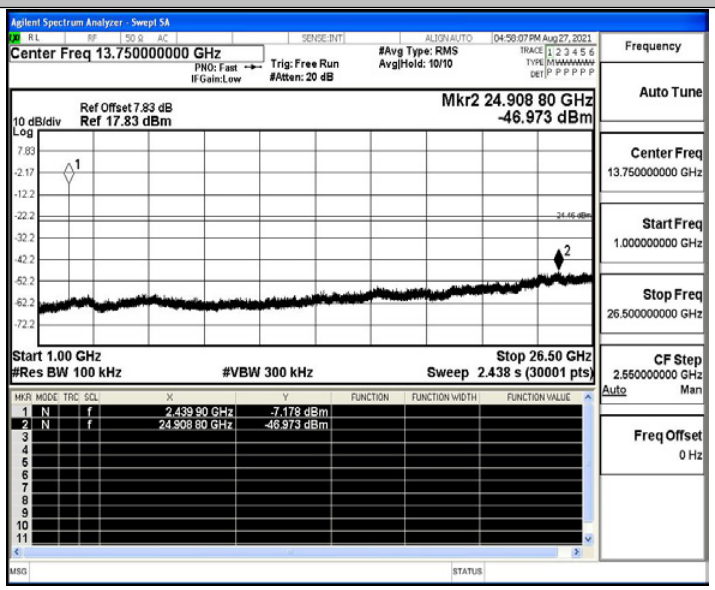
BLE_2M_Ant1_2440_0~Reference



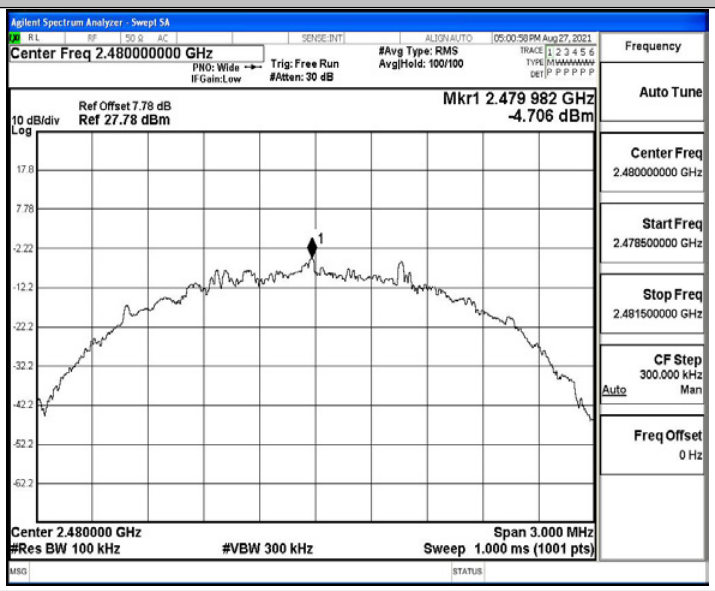
BLE_2M_Ant1_2440_30~1000



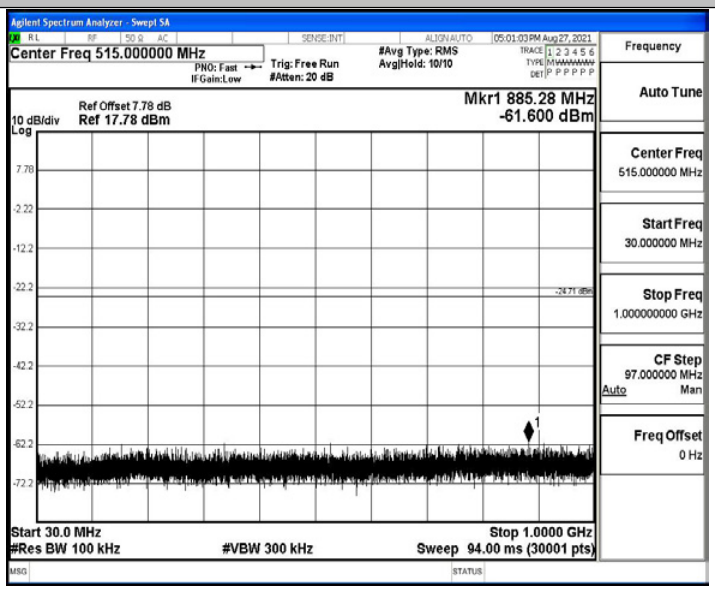
BLE_2M_Ant1_2440_1000~26500



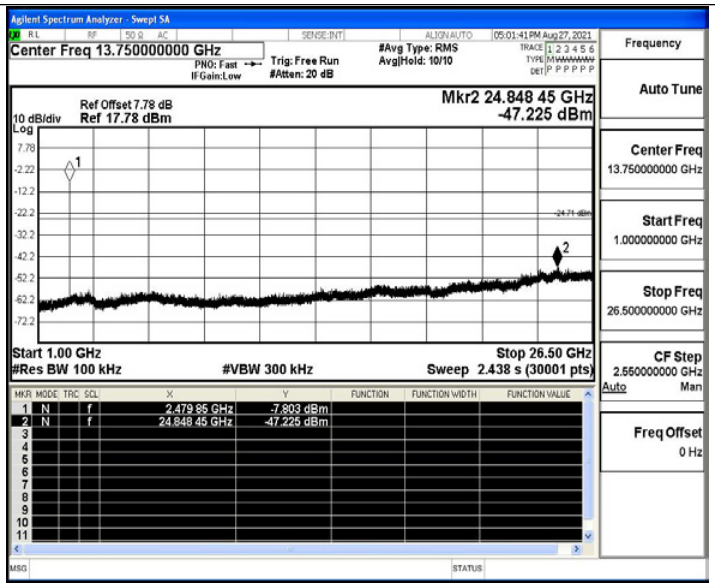
BLE_2M_Ant1_2480_0~Reference



BLE_2M_Ant1_2480_30~1000



BLE_2M_Ant1_2480_1000~26500


Agilent Spectrum Analyzer - Swept SA
Center Freq 13.750000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
#Avg Type: RMS
Avg|Hold: 10/10
05:01:41 PM Aug 27, 2021
Ref Offset 7.78 dB
10 dB/div
Ref 17.78 dBm
Mkr2 24.848 45 GHz
-47.225 dBm
Start 1.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.50 GHz
Sweep 2.438 s (30001 pts)
1 N f 2.479 85 GHz -7.803 dBm
2 N f 24.848 45 GHz -47.225 dBm
Frequency
Auto Tune
Center Freq
13.750000000 GHz
Start Freq
1.000000000 GHz
Stop Freq
26.500000000 GHz
CF Step
2.550000000 GHz
Auto
Man
Freq Offset
0 Hz

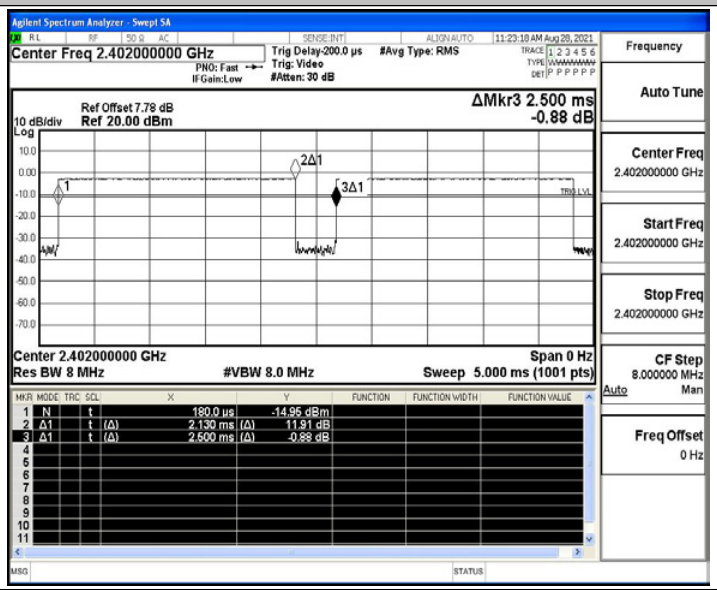
B.6 Duty Cycle

Test Result

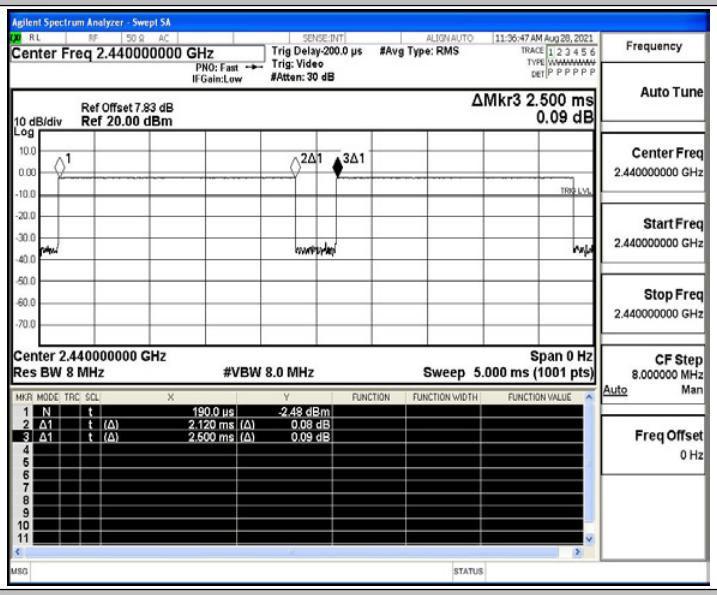
TestMode	Antenna	Channel	ON Time [ms]	Period [ms]	X	DC [%]	xFactor	Limit	Verdict
BLE_1M	Ant1	2402	2.13	2.50	0.8520	85.20	0.70	---	PASS
		2440	2.12	2.50	0.8480	84.80	0.72	---	PASS
		2480	2.12	2.50	0.8480	84.80	0.72	---	PASS
BLE_2M	Ant1	2402	1.07	1.25	0.8560	85.60	0.68	---	PASS
		2440	1.07	1.25	0.8560	85.60	0.68	---	PASS
		2480	1.07	1.25	0.8560	85.60	0.68	---	PASS

Test Graphs

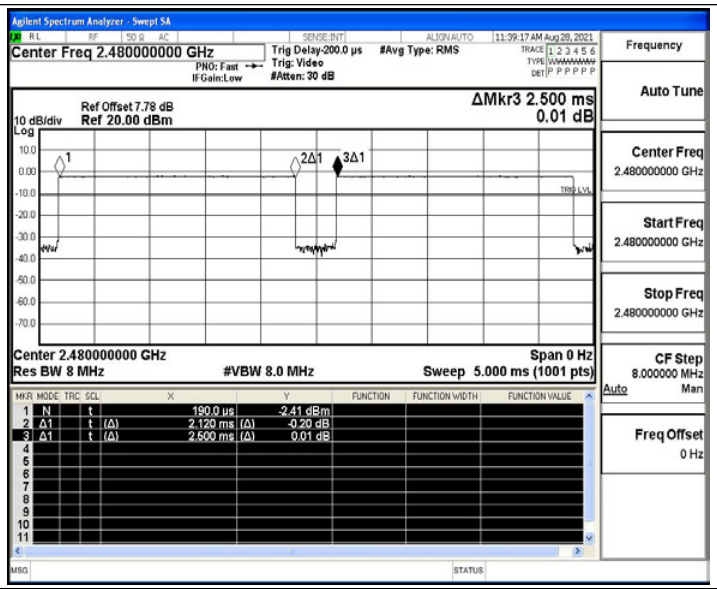
BLE_1M_Ant1_2402



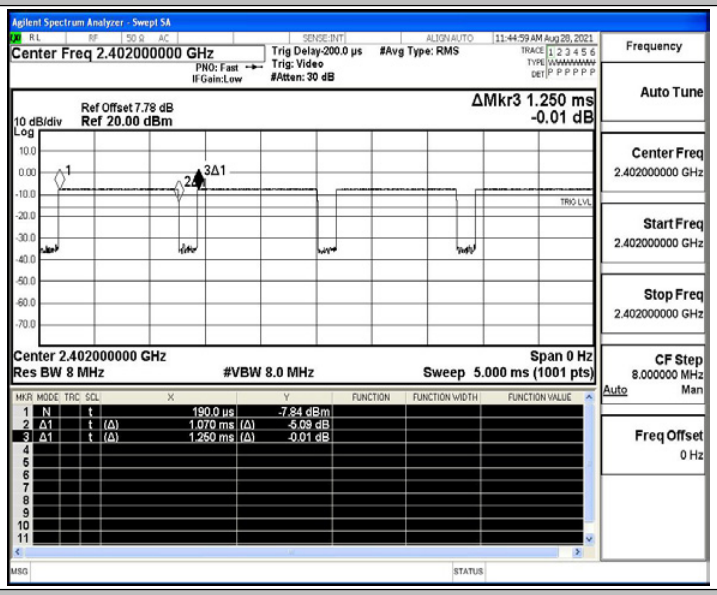
BLE_1M_Ant1_2440



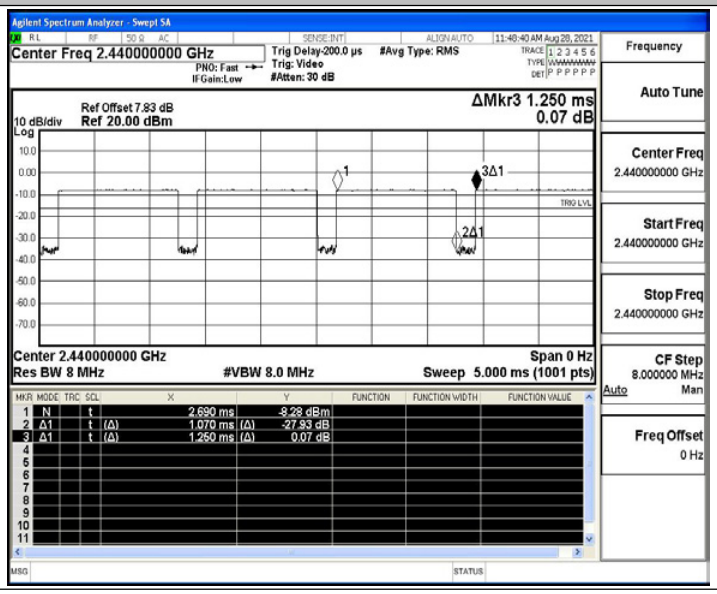
BLE_1M_Ant1_2480



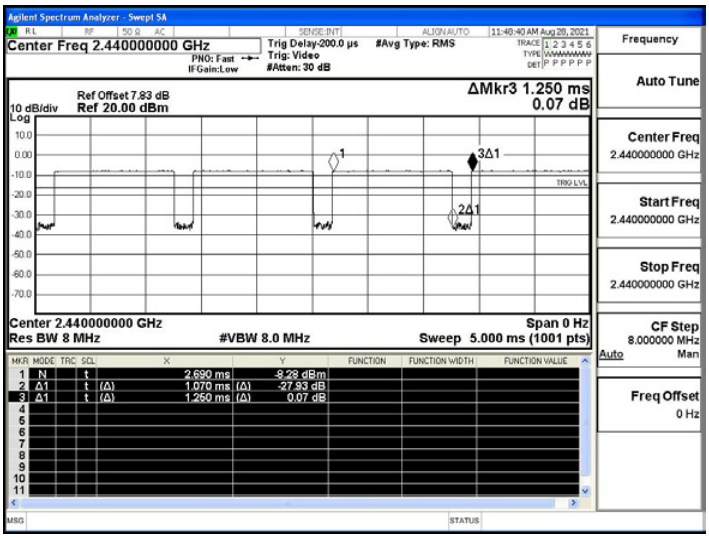
BLE_2M_Ant1_2402



BLE_2M_Ant1_2440



BLE_2M_Ant1_2480



B.7 Emissions in Restricted Bands

Test Result

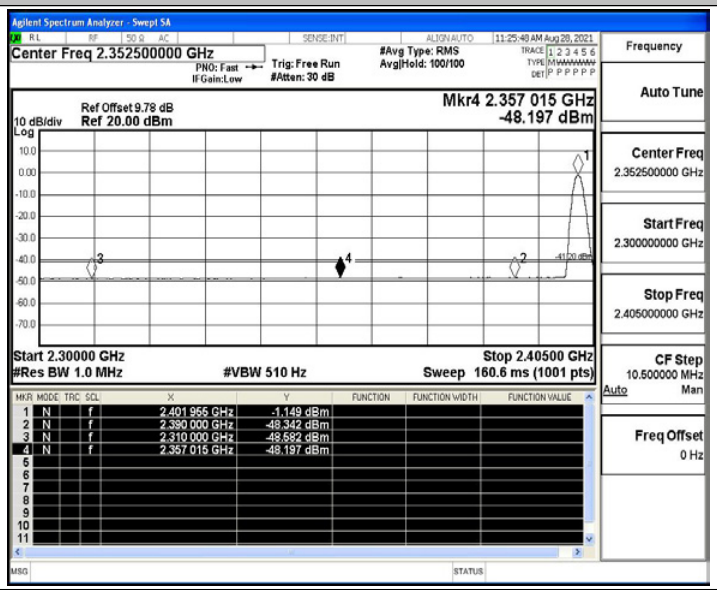
TestMode	Antenna	ChName	Channel	Detector	Freq. [MHz]	Result [dBm]	Limit [dBm]	Result [dBuV/m]	Limit [dBuV/m]	Verdict
BLE_1M	Ant1	Low	2402	AV	2310.000	-48.58	≤-41.20	46.62	≤54	PASS
				AV	2357.015	-48.2	≤-41.20	47.00	≤54	PASS
				AV	2390.000	-48.34	≤-41.20	46.86	≤54	PASS
				Peak	2310.000	-42.29	≤-21.20	52.91	≤74	PASS
				Peak	2319.635	-37.38	≤-21.20	57.82	≤74	PASS
				Peak	2390.000	-40.38	≤-21.20	54.82	≤74	PASS
		High	2480	AV	2483.500	-47.8	≤-41.20	47.40	≤54	PASS
				AV	2499.920	-47.73	≤-41.20	47.47	≤54	PASS
				AV	2500.000	-47.72	≤-41.20	47.48	≤54	PASS
				Peak	2483.500	-40.72	≤-21.20	54.48	≤74	PASS
				Peak	2497.040	-38.96	≤-21.20	56.24	≤74	PASS
				Peak	2500.000	-39.48	≤-21.20	55.72	≤74	PASS
BLE_2M	Ant1	Low	2402	AV	2310.000	-48.59	≤-41.20	46.61	≤54	PASS
				AV	2388.830	-48.02	≤-41.20	47.18	≤54	PASS
				AV	2390.000	-48.15	≤-41.20	47.05	≤54	PASS
				Peak	2310.000	-42.41	≤-21.20	52.79	≤74	PASS
				Peak	2354.180	-38.83	≤-21.20	56.37	≤74	PASS
				Peak	2390.000	-42	≤-21.20	53.20	≤74	PASS
		High	2480	AV	2483.500	-48.17	≤-41.20	47.03	≤54	PASS
				AV	2483.520	-48.17	≤-41.20	47.03	≤54	PASS
				AV	2500.000	-48.25	≤-41.20	46.95	≤54	PASS
				Peak	2483.500	-43.94	≤-21.20	51.26	≤74	PASS
				Peak	2493.600	-39.83	≤-21.20	55.37	≤74	PASS
				Peak	2500.000	-42.11	≤-21.20	53.09	≤74	PASS

Note：

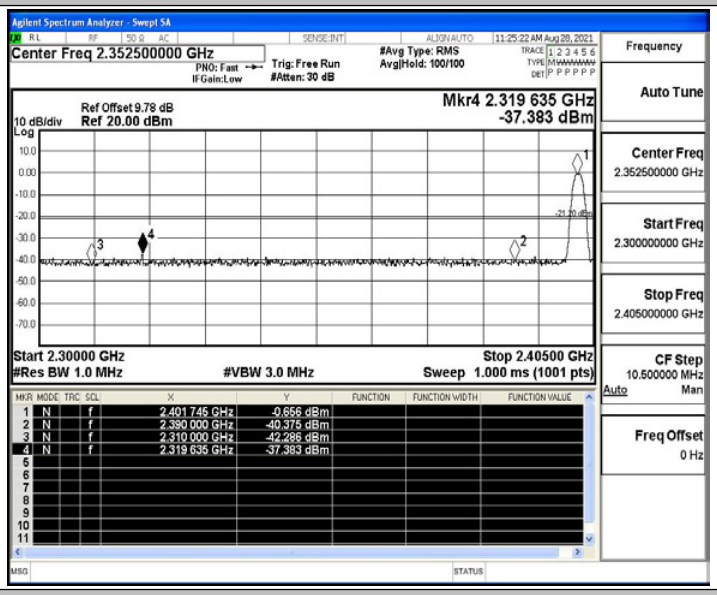
1. The Antenna Gain is compensated in the graph.
2. The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

Test Graphs

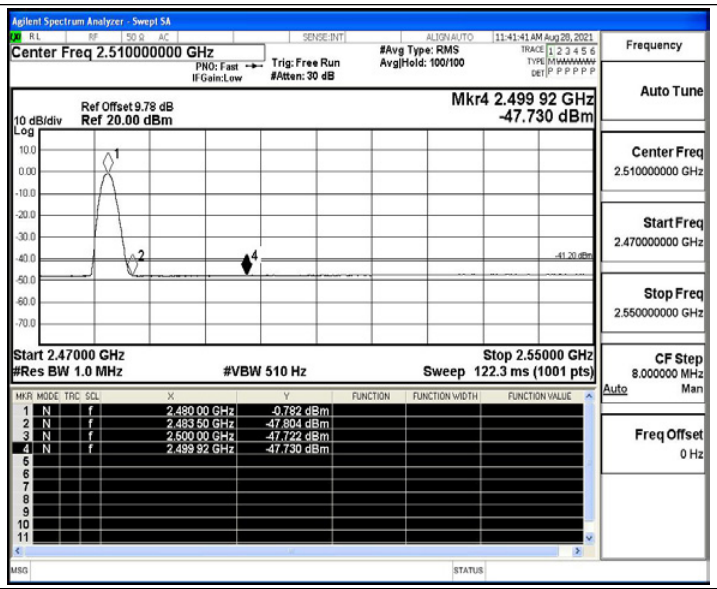
BLE_1M_Ant1_Low_2402_AV



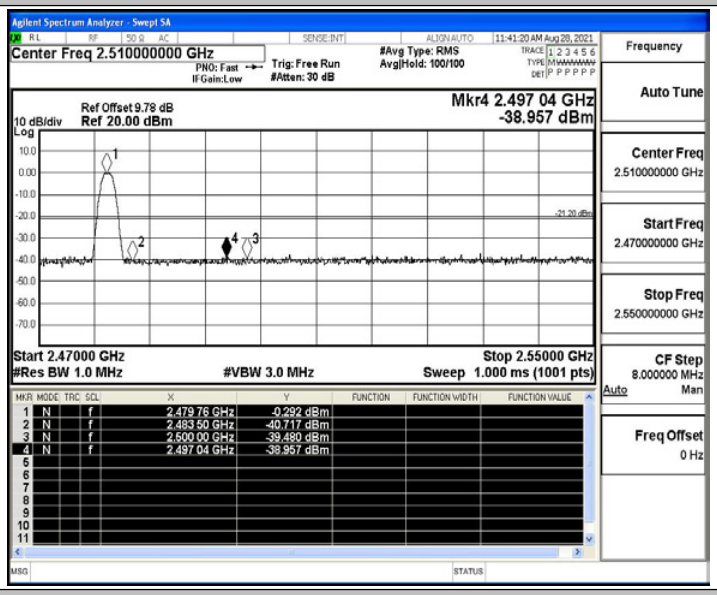
BLE_1M_Ant1_Low_2402_Peak



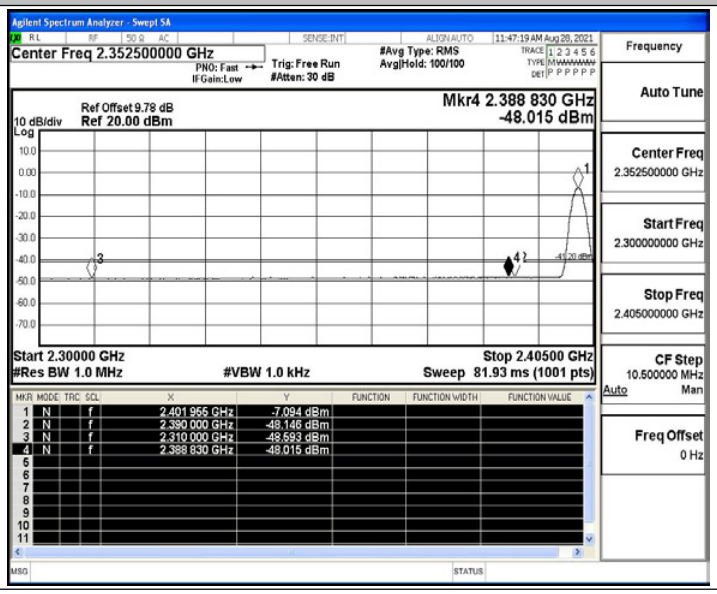
BLE_1M_Ant1_High_2480_AV



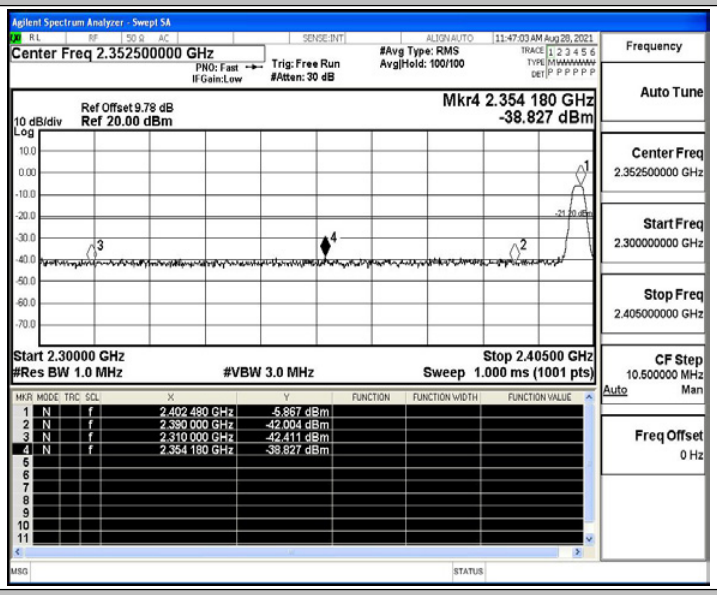
BLE_1M_Ant1_High_2480_Peak



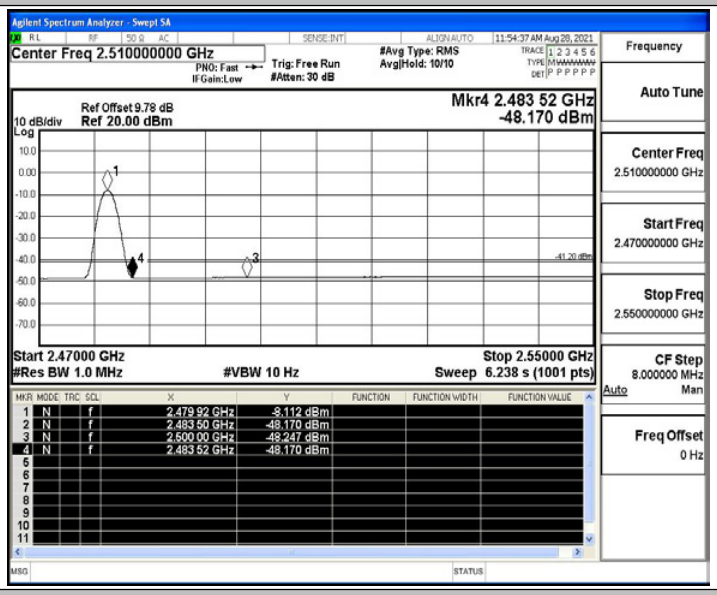
BLE_2M_Ant1_Low_2402_AV



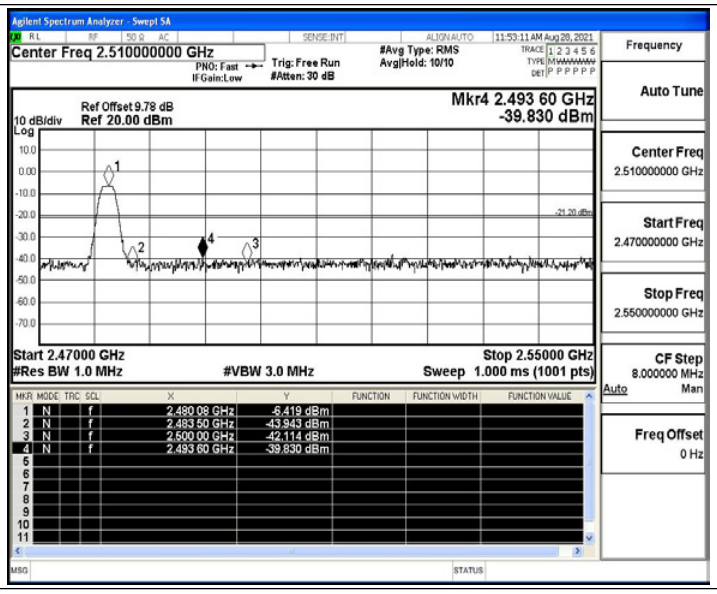
BLE_2M_Ant1_Low_2402_Peak



BLE_2M_Ant1_High_2480_AV



BLE_2M_Ant1_High_2480_Peak


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.510000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold: 10/10
11:53:11 AM Aug 28, 2021
Ref Offset 9.78 dB
10 dB/div Ref 20.00 dBm
Log
Mkr4 2.493 60 GHz
-39.830 dBm
Start 2.47000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 2.55000 GHz
Sweep 1.000 ms (1001 pts)
1 N f 2.480 08 GHz -6.419 dBm
2 N f 2.483 50 GHz -43.943 dBm
3 N f 2.500 00 GHz -42.114 dBm
4 N f 2.493 60 GHz -39.830 dBm
Frequency
Auto Tune
Center Freq
2.510000000 GHz
Start Freq
2.470000000 GHz
Stop Freq
2.550000000 GHz
CF Step
8.000000 MHz
Auto Man
Freq Offset
0 Hz