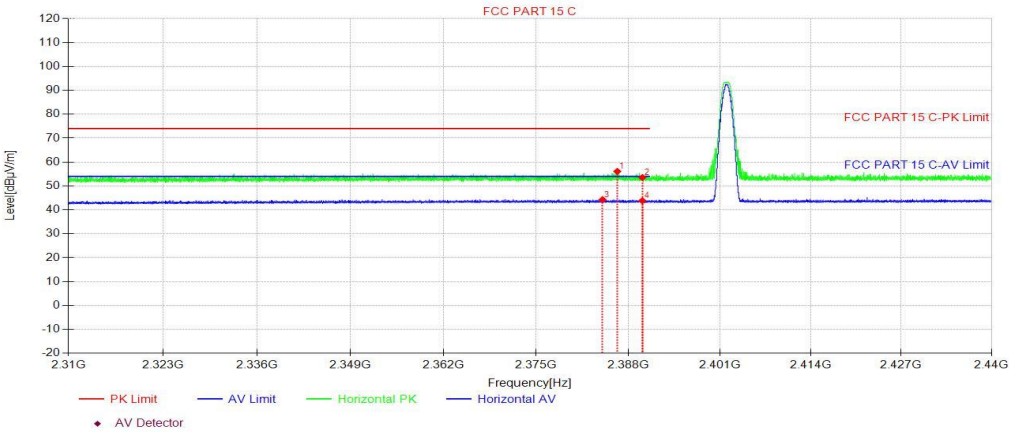
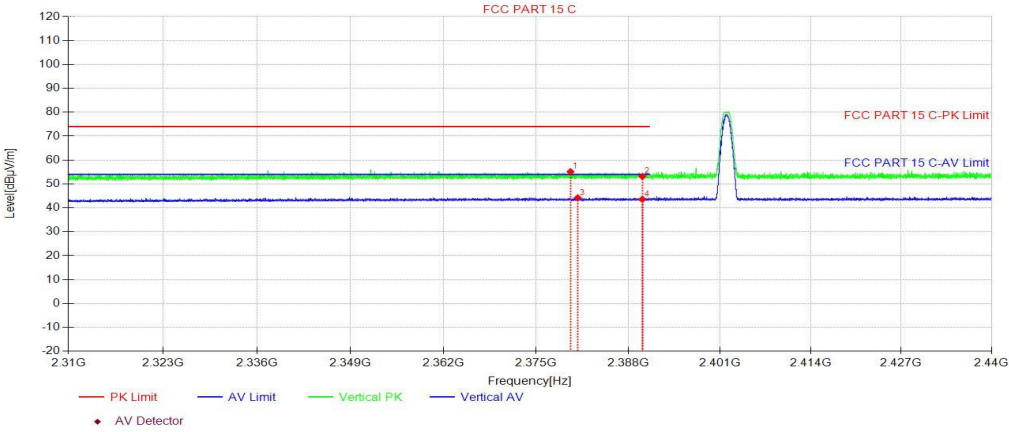




Test Date
BLE 1M 2402MHz



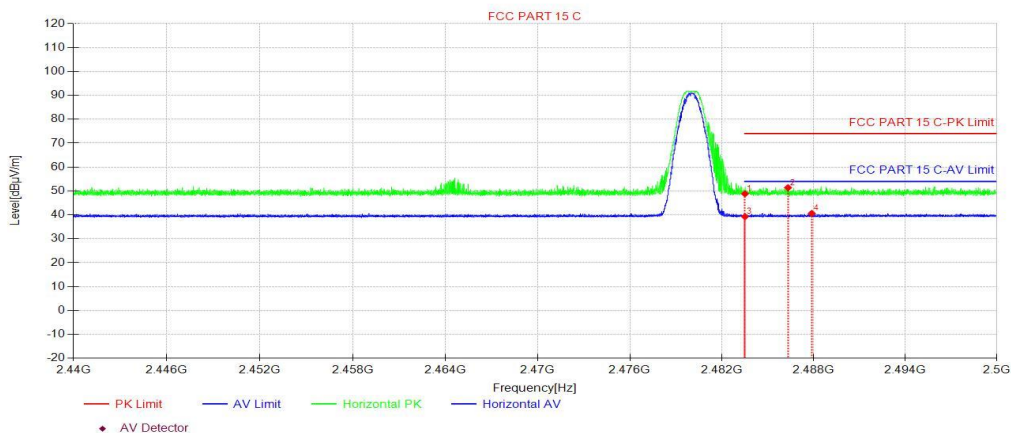
NO.	Freq. [MHz]	Reading Level [dBμV]	Correct Factor [dB/m]	Result Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	2370.05	57.07	-0.86	56.21	74.00	17.79	150	4	PK	H
2	2390.01	53.73	-0.80	52.93	74.00	21.07	150	159	PK	H
3	2370.21	46.61	-0.86	45.75	54.00	8.25	150	138	AV	H
4	2390.01	44.79	-0.80	43.99	54.00	10.01	150	314	AV	H



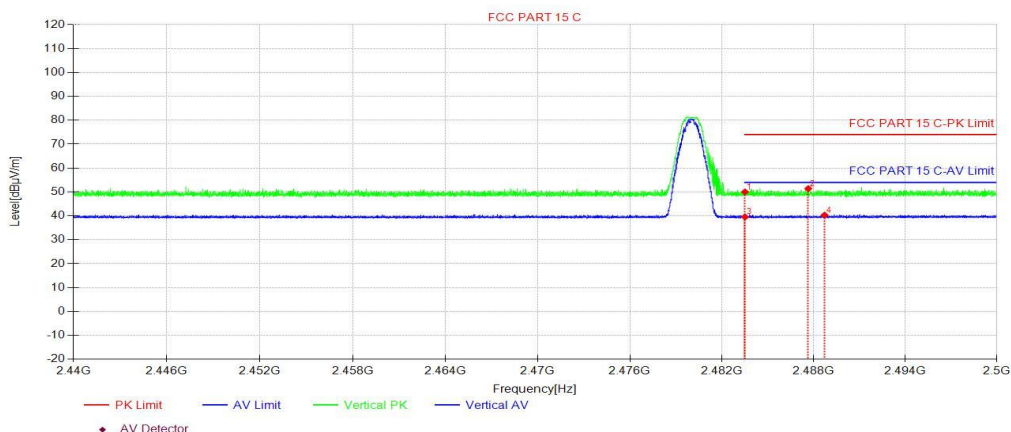
NO.	Freq. [MHz]	Reading Level [dBμV]	Correct Factor [dB/m]	Result Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	2379.84	55.96	-0.83	55.13	74.00	18.87	150	269	PK	V
2	2390.01	53.98	-0.80	53.18	74.00	20.82	150	236	PK	V
3	2380.87	45.04	-0.83	44.21	54.00	9.79	150	269	AV	V
4	2390.01	44.39	-0.80	43.59	54.00	10.41	150	92	AV	V



BLE 1M 2480MHz



NO.	Freq. [MHz]	Reading Level [dBμV]	Correct Factor [dB/m]	Result Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	2483.52	49.09	-0.29	48.80	74.00	25.20	150	257	PK	H
2	2486.33	51.62	-0.26	51.36	74.00	22.64	150	146	PK	H
3	2483.52	39.54	-0.29	39.25	54.00	14.75	150	90	AV	H
4	2487.88	40.89	-0.26	40.63	54.00	13.37	150	214	AV	H



NO.	Freq. [MHz]	Reading Level [dBμV]	Correct Factor [dB/m]	Result Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	2483.52	50.29	-0.29	50.00	74.00	24.00	150	187	PK	V
2	2487.66	51.63	-0.26	51.37	74.00	22.63	150	254	PK	V
3	2483.52	39.83	-0.29	39.54	54.00	14.46	150	122	AV	V
4	2488.72	40.55	-0.25	40.30	54.00	13.70	150	166	AV	V

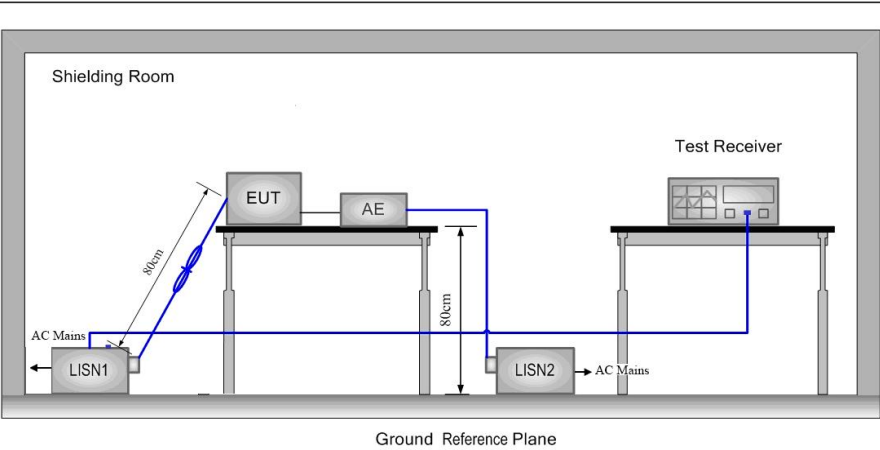
Note:

1. All channels had been pre-test, BLE_1M is the worst case, only the worst case was reported
2. The Measurement (Result Level) is calculated by Reading Level adding the Correct Factor(maybe including Ant.Factor and the Cable Factor etc.), The basic equation is as follows:

Result Level= Reading Level + Correct Factor(including Ant.Factor ,Cable Factor etc.)



3.10AC Power Line Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.207		
Test Method:	ANSI C63.10: 2020		
Test Frequency Range:	150kHz to 30MHz		
Limit:	Frequency range (MHz)	Limit (dBuV)	
		Quasi-peak	Average
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50
* Decreases with the logarithm of the frequency.			
Test Procedure:	1) The mains terminal disturbance voltage test was conducted in a shielded room. 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a $50\Omega/50\mu\text{H} + 5\Omega$ linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded. 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 2020 on conducted measurement.		
Test Setup:			



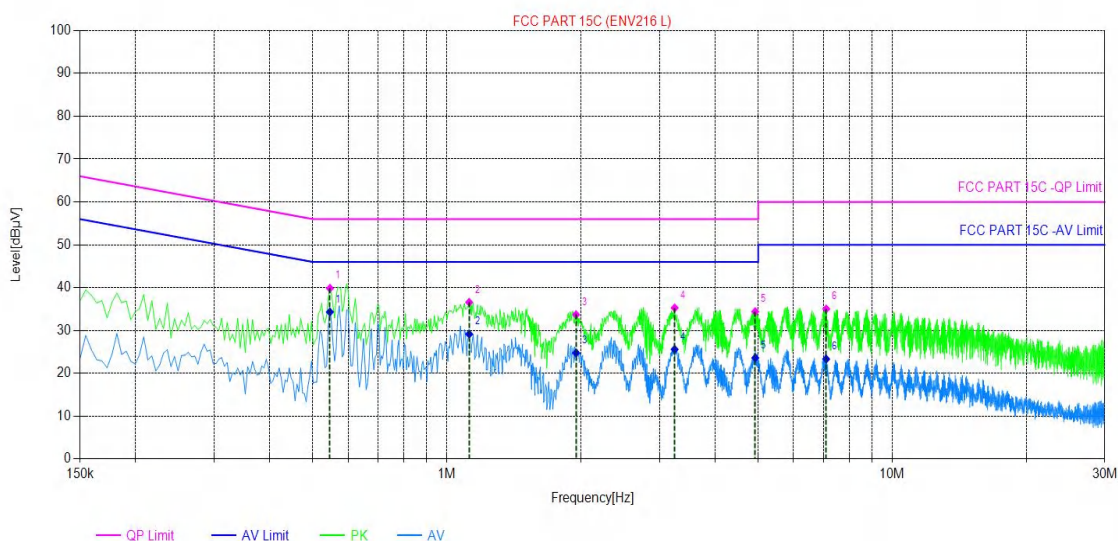
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates at lowest, middle and highest channel. Charge + Transmitting mode.
Final Test Mode:	Through Pre-scan, find the the worst case of GFSK
Instruments Used:	Refer to section 2.9 for details
Test Results:	Pass

Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

Live Line:

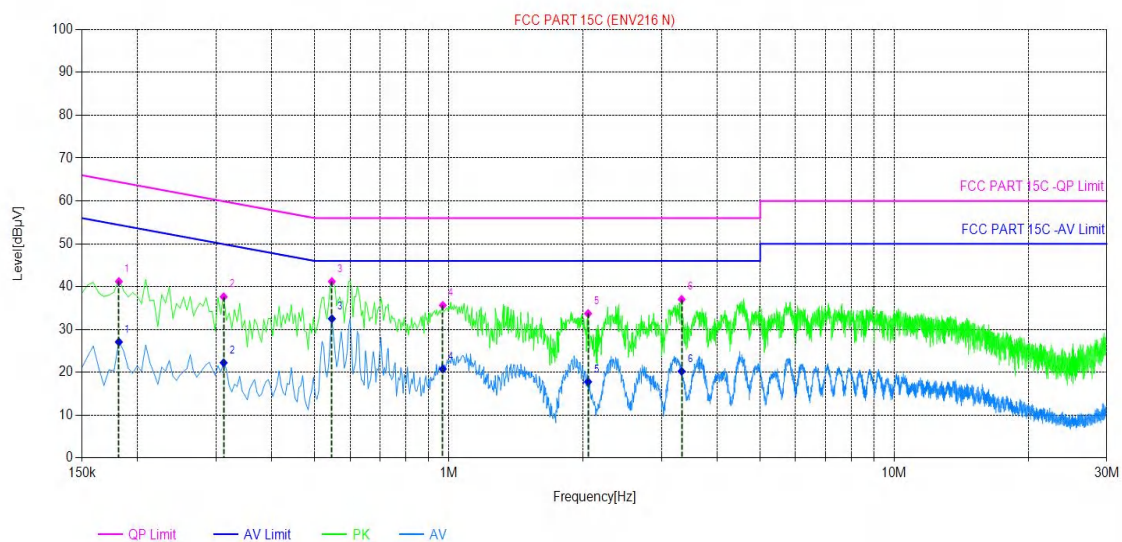


Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Verdict
1	0.546	9.85	39.85	56.00	16.15	34.32	46.00	11.68	PASS
2	1.122	9.72	36.58	56.00	19.42	29.17	46.00	16.83	PASS
3	1.95	9.73	33.70	56.00	22.30	24.76	46.00	21.24	PASS
4	3.246	9.74	35.28	56.00	20.72	25.61	46.00	20.39	PASS
5	4.9245	9.79	34.42	56.00	21.58	23.61	46.00	22.39	PASS
6	7.107	9.87	35.05	60.00	24.95	23.34	50.00	26.66	PASS



Neutral Line:



Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Verdict
1	0.1815	9.84	41.19	64.42	23.23	27.09	54.42	27.33	PASS
2	0.312	9.88	37.64	59.92	22.28	22.25	49.92	27.67	PASS
3	0.546	9.74	41.20	56.00	14.80	32.52	46.00	13.48	PASS
4	0.969	9.70	35.64	56.00	20.36	20.79	46.00	25.21	PASS
5	2.0535	9.78	33.73	56.00	22.27	17.79	46.00	28.21	PASS
6	3.3315	9.90	37.04	56.00	18.96	20.25	46.00	25.75	PASS

Remark:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
3. The Measurement (Result Level) is calculated by Reading Level adding the Correct Factor(maybe including LISN Factor and the Cable Factor etc.), The basic equation is as follows:
Result Level= Reading Level + Correct Factor(including LISN Factor, Cable Factor etc.)



4 Appendix

4.1 Appendix A: Duty Cycle

4.1.1 Test Result

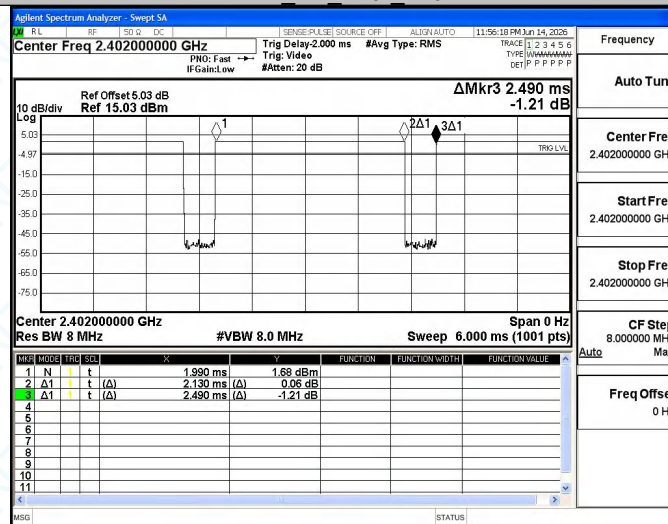
TestMode	Antenna	Freq(MHz)	ON Time [ms]	Period [ms]	X	DC [%]	xFactor	Limit	Verdict
BLE_1M	Ant1	2402	2.13	2.49	0.8554	85.54	0.68	---	---
		2440	2.13	2.49	0.8554	85.54	0.68	---	---
		2480	2.13	2.49	0.8554	85.54	0.68	---	---
BLE_2M	Ant1	2402	1.08	2.50	0.4320	43.20	3.65	---	---
		2440	1.09	2.50	0.4360	43.60	3.61	---	---
		2480	1.08	2.50	0.4320	43.20	3.65	---	---



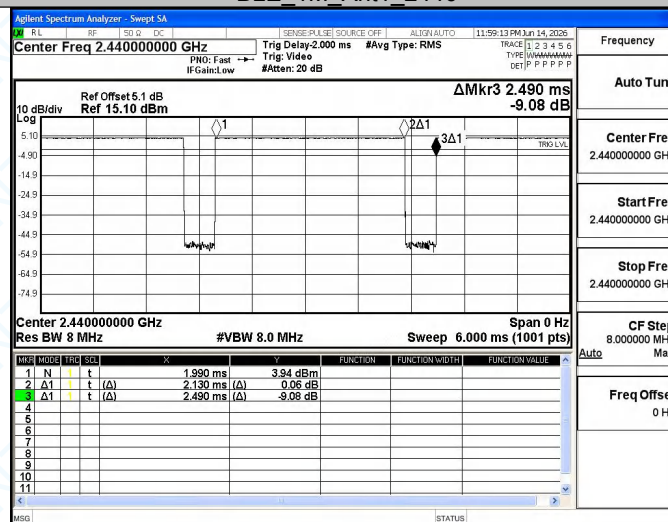
4.1.2

Test Graphs

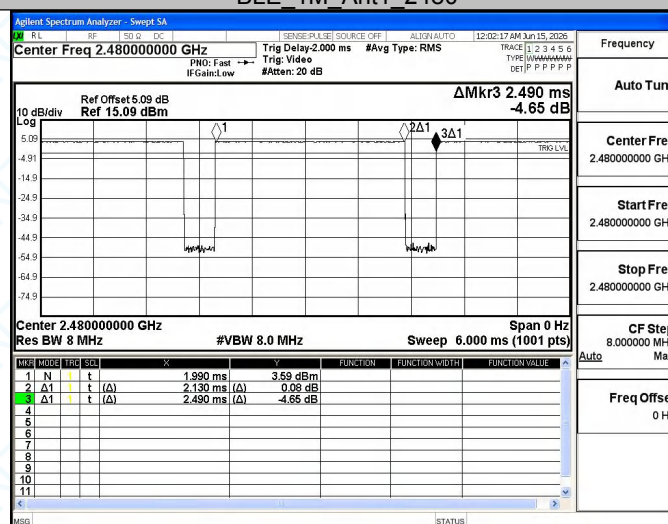
BLE_1M_Ant1_2402



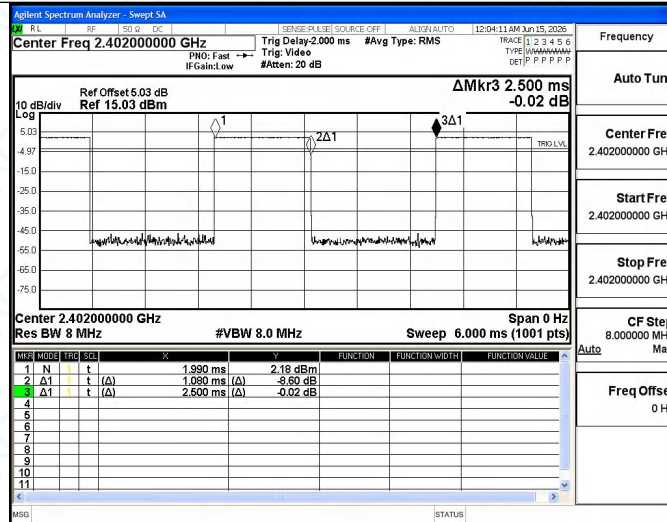
BLE_1M_Ant1_2440



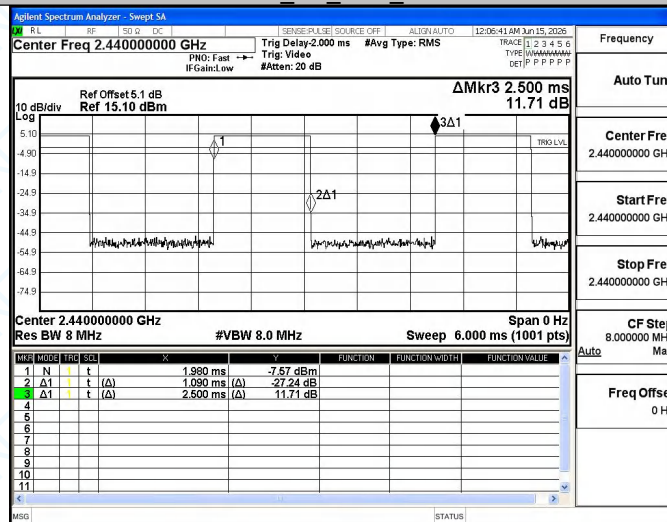
BLE_1M_Ant1_2480



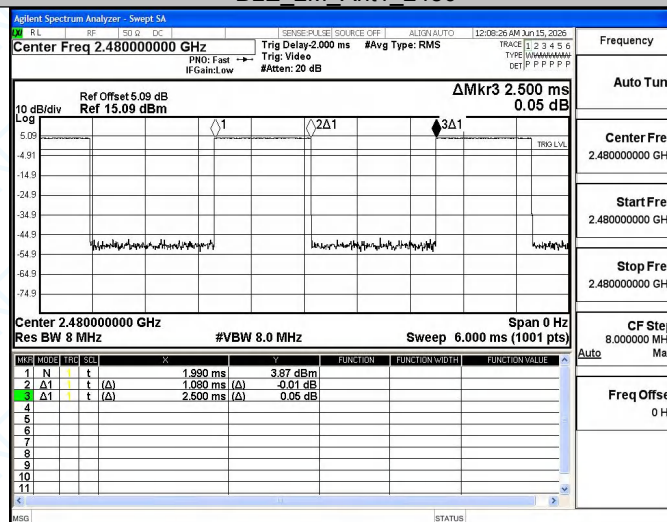
BLE_2M_Ant1_2402



BLE_2M_Ant1_2440



BLE_2M_Ant1_2480





4.2 Appendix B: DTS Bandwidth

4.2.1 Test Result

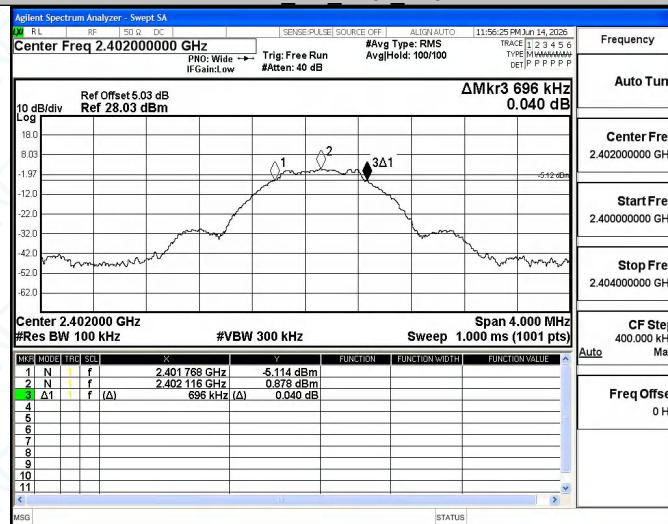
TestMode	Antenna	Freq(MHz)	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.696	2401.768	2402.464	0.5	PASS
		2440	0.656	2439.780	2440.436	0.5	PASS
		2480	0.708	2479.752	2480.460	0.5	PASS
BLE_2M	Ant1	2402	1.232	2401.408	2402.640	0.5	PASS
		2440	1.072	2439.556	2440.628	0.5	PASS
		2480	1.148	2479.512	2480.660	0.5	PASS



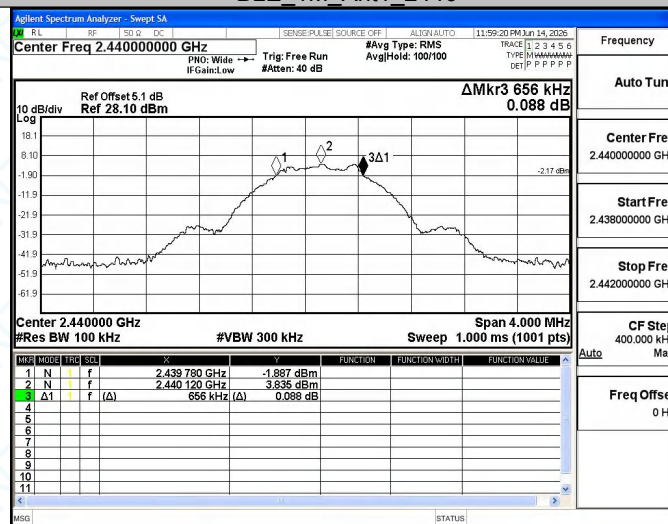
4.2.2

Test Graphs

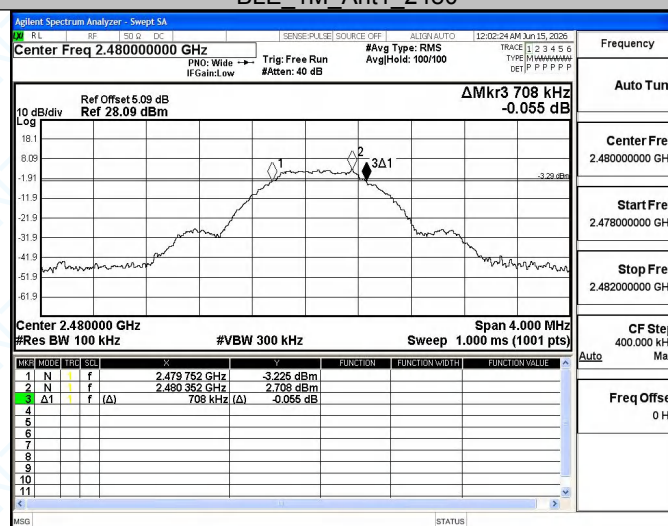
BLE_1M_Ant1_2402



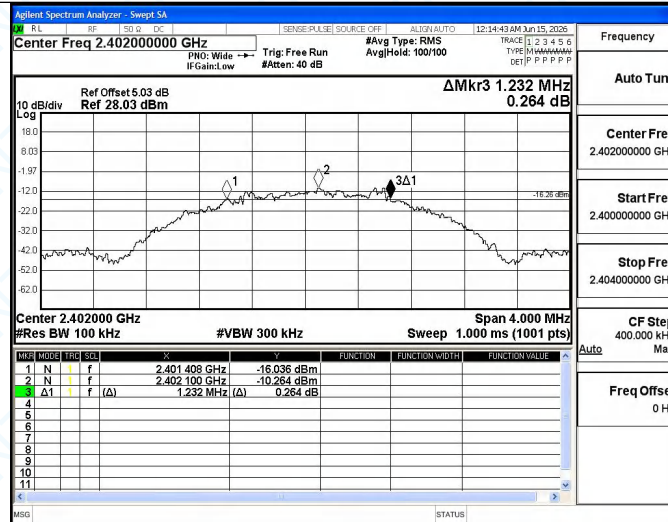
BLE_1M_Ant1_2440



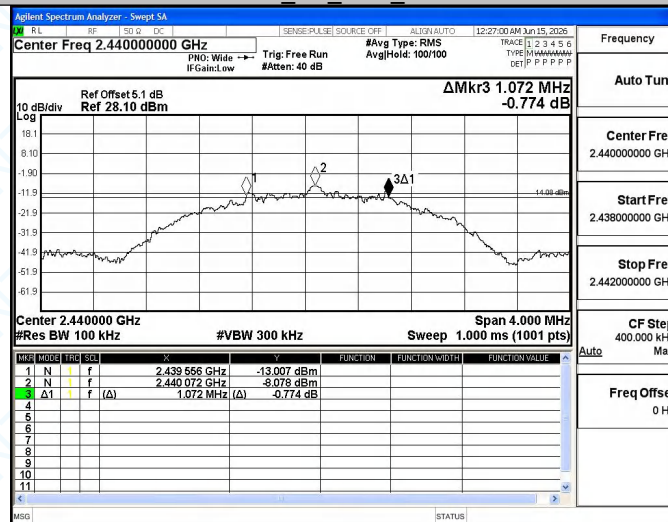
BLE_1M_Ant1_2480



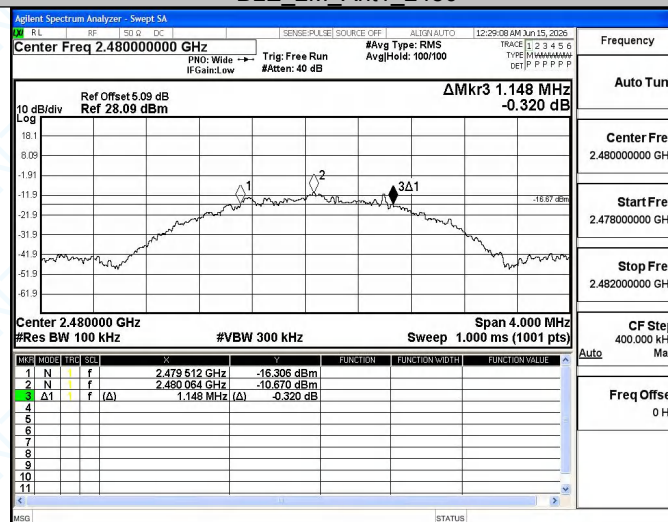
BLE_2M_Ant1_2402



BLE_2M_Ant1_2440



BLE_2M_Ant1_2480





4.3 Appendix C: Maximum conducted output power

4.3.1 Test Result

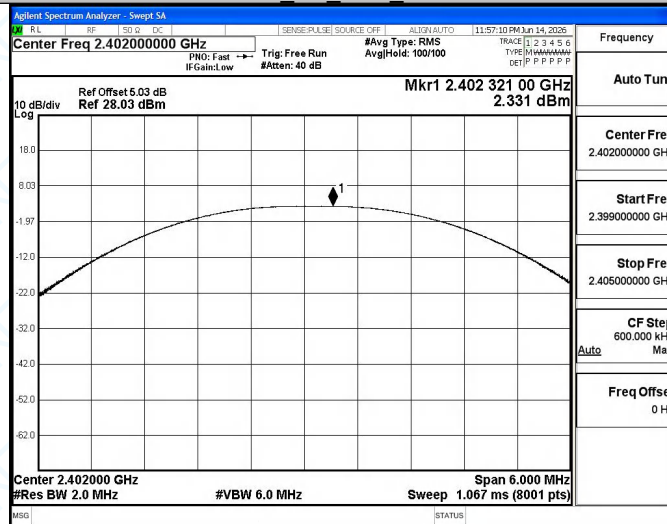
TestMode	Antenna	Freq(MHz)	Conducted Peak Power[dBm]	Conducted Limit[dBm]	Verdict
BLE_1M	Ant1	2402	2.33	≤30	PASS
		2440	4.02	≤30	PASS
		2480	3.80	≤30	PASS
BLE_2M	Ant1	2402	2.38	≤30	PASS
		2440	4.22	≤30	PASS
		2480	1.89	≤30	PASS



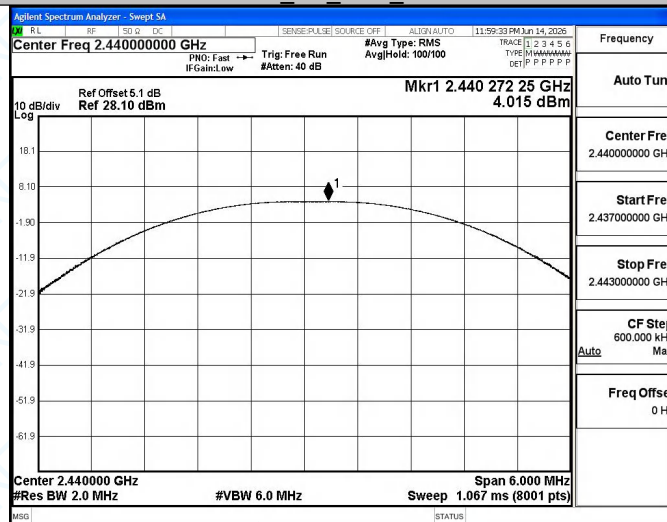
4.3.2

Test Graphs

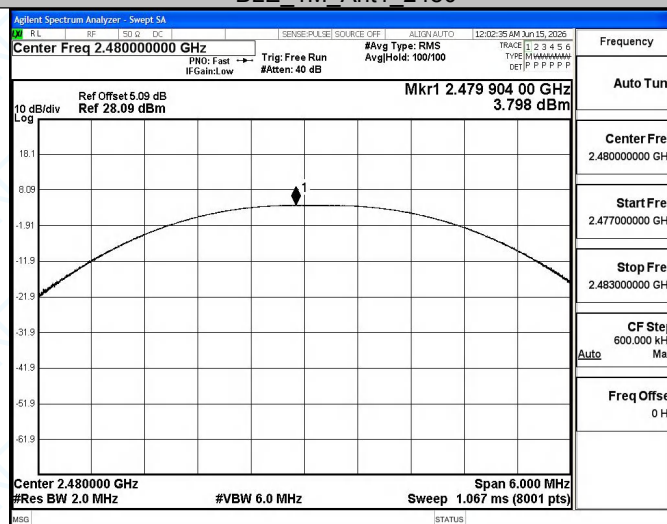
BLE_1M_Ant1_2402



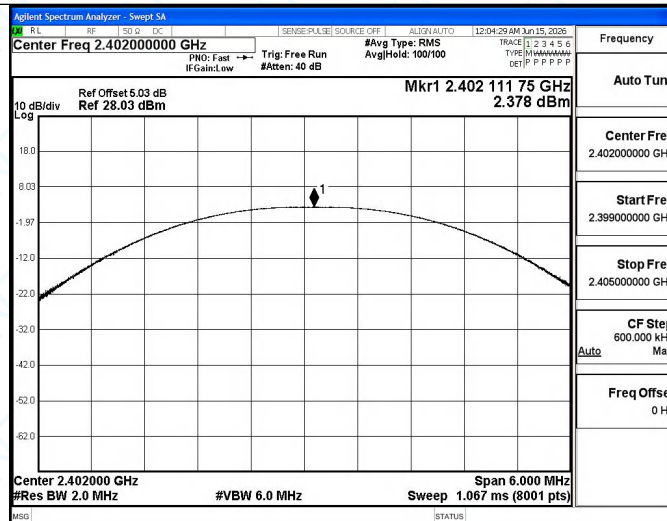
BLE_1M_Ant1_2440



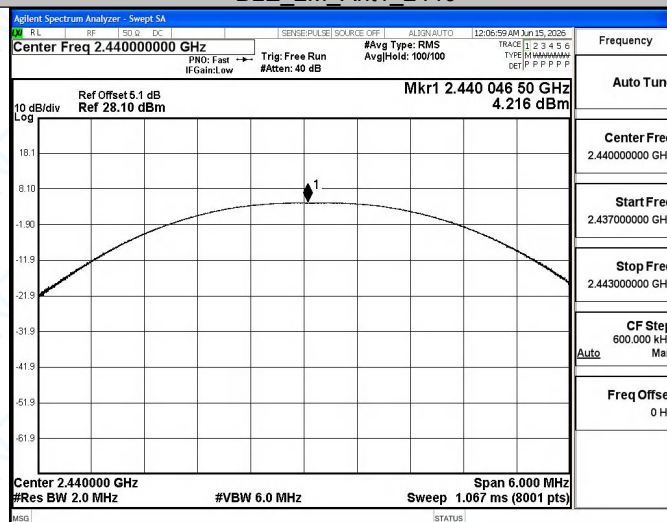
BLE_1M_Ant1_2480



BLE_2M_Ant1_2402



BLE_2M_Ant1_2440



BLE_2M_Ant1_2480

