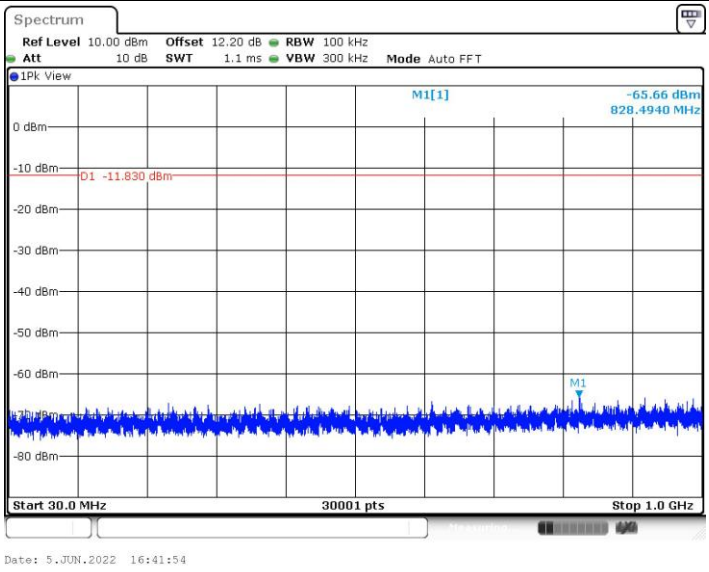
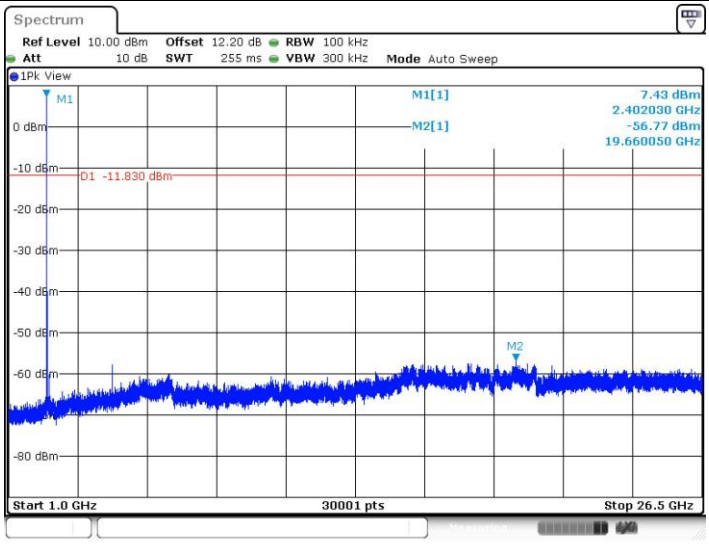
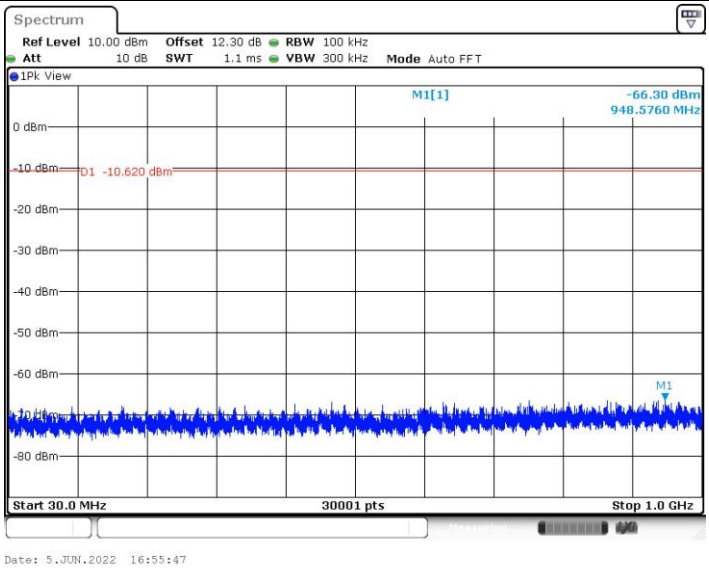
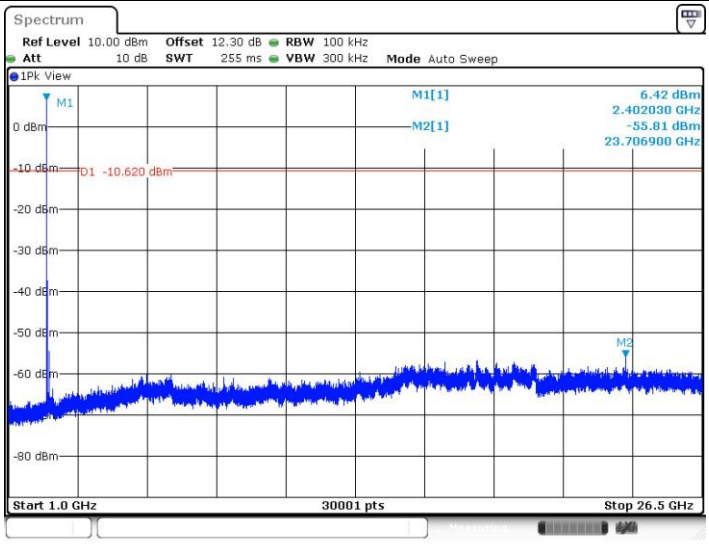
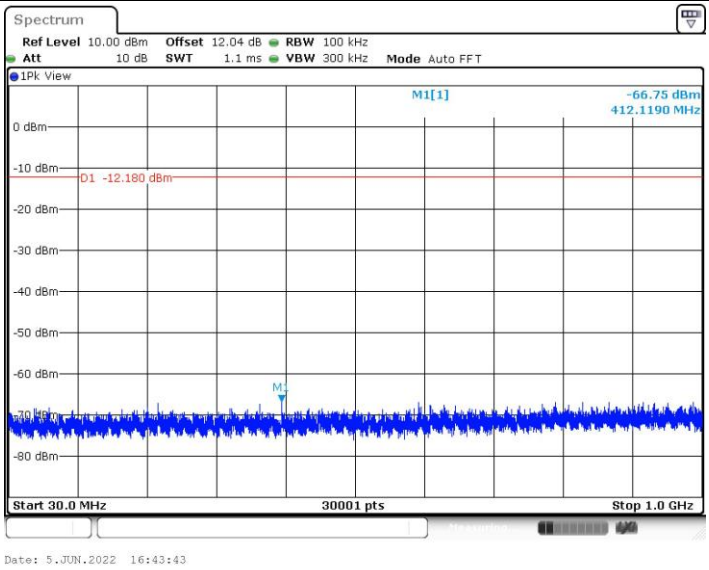
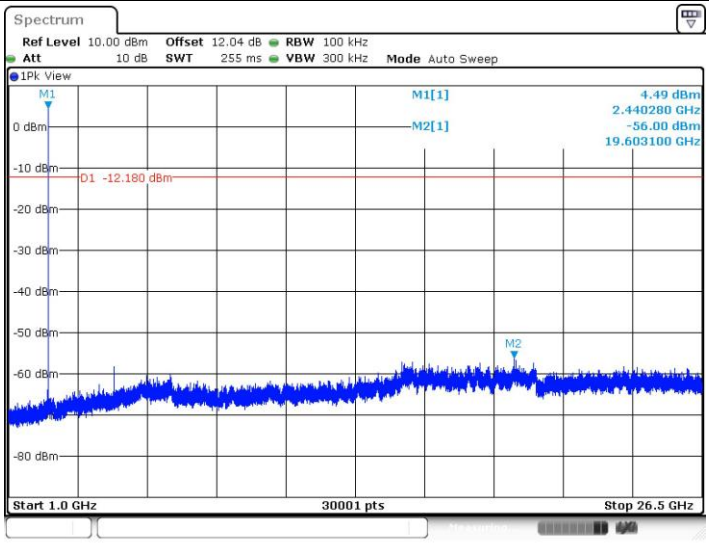
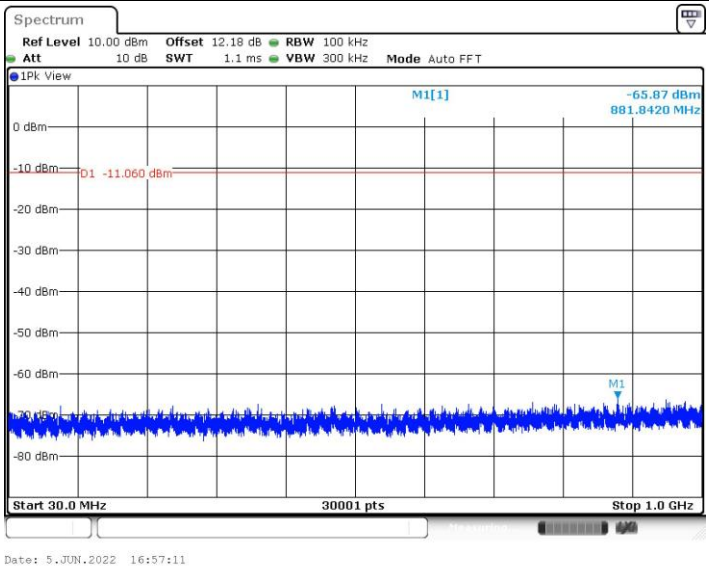
BLE_2M_Ant1_2402_30~1000

BLE_2M_Ant1_2402_1000~26500


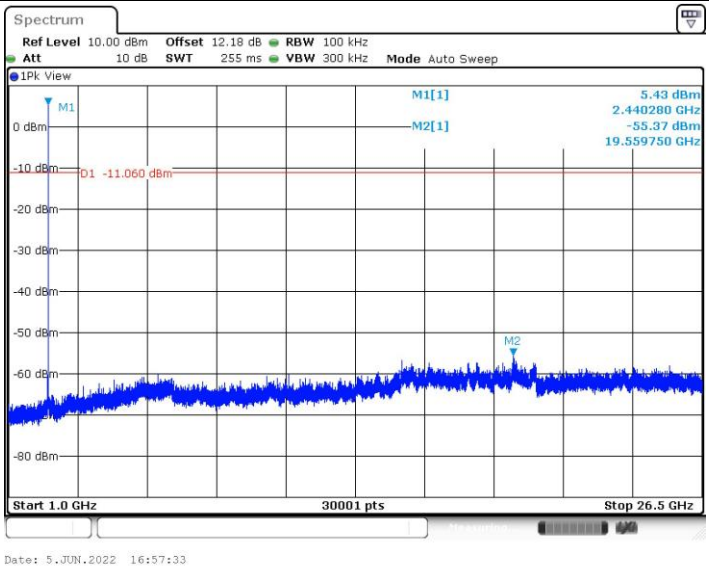
BLE_2M_Ant2_2402_30~1000

BLE_2M_Ant2_2402_1000~26500


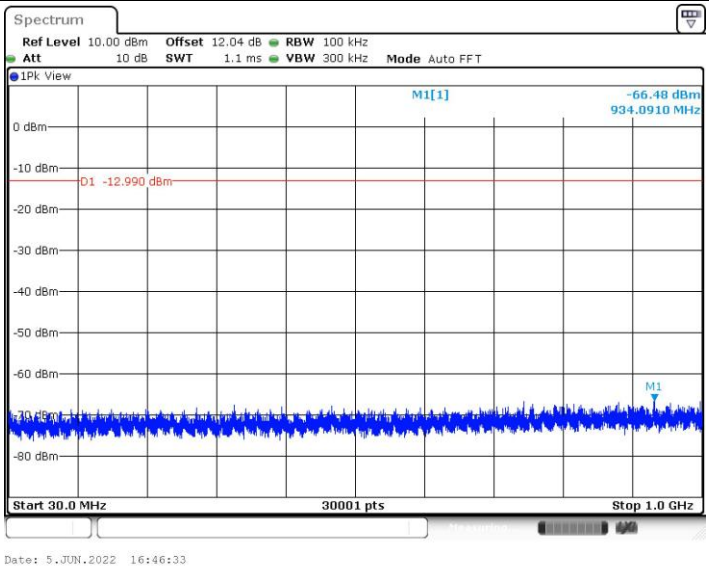
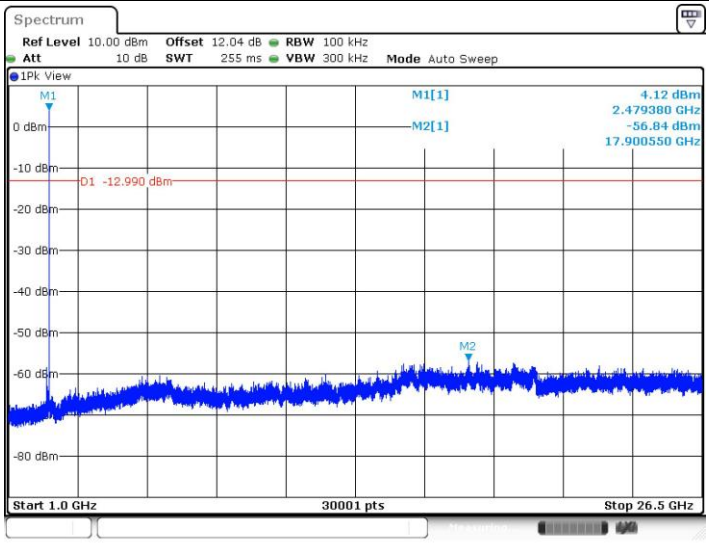
BLE_2M_Ant1_2440_30~1000

BLE_2M_Ant1_2440_1000~26500


BLE_2M_Ant2_2440_30~1000

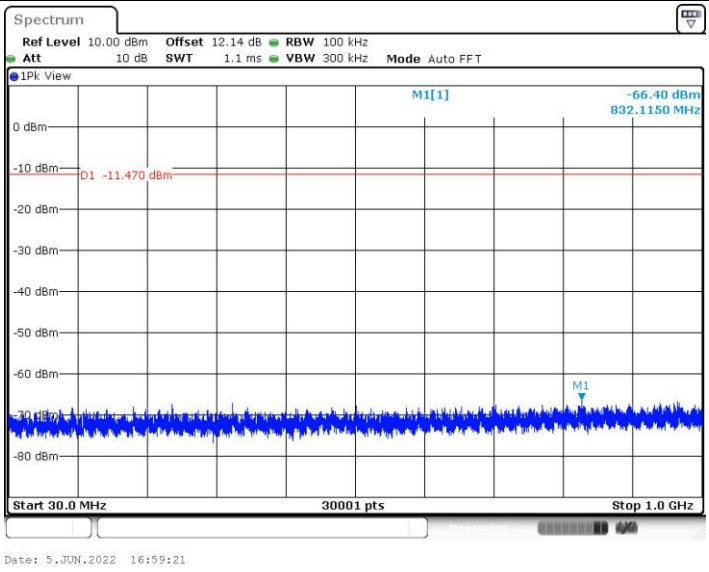


BLE_2M_Ant2_2440_1000~26500

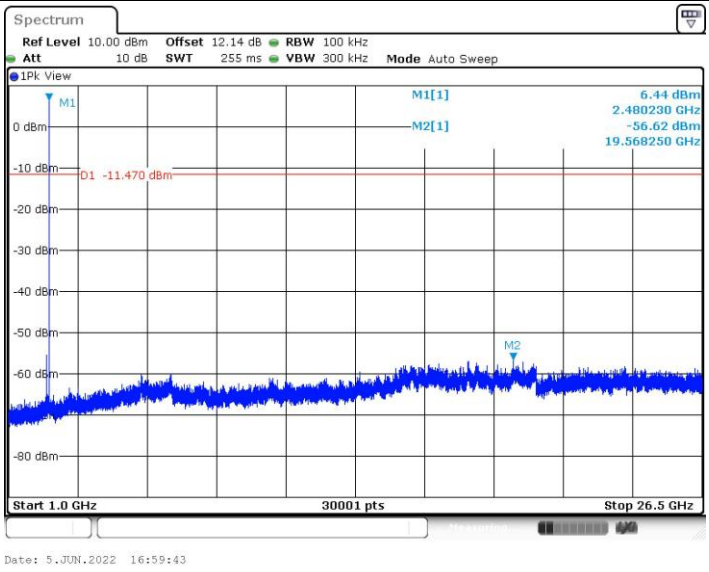


BLE_2M_Ant1_2480_30~1000

BLE_2M_Ant1_2480_1000~26500


BLE_2M_Ant2_2480_30~1000



BLE_2M_Ant2_2480_1000~26500



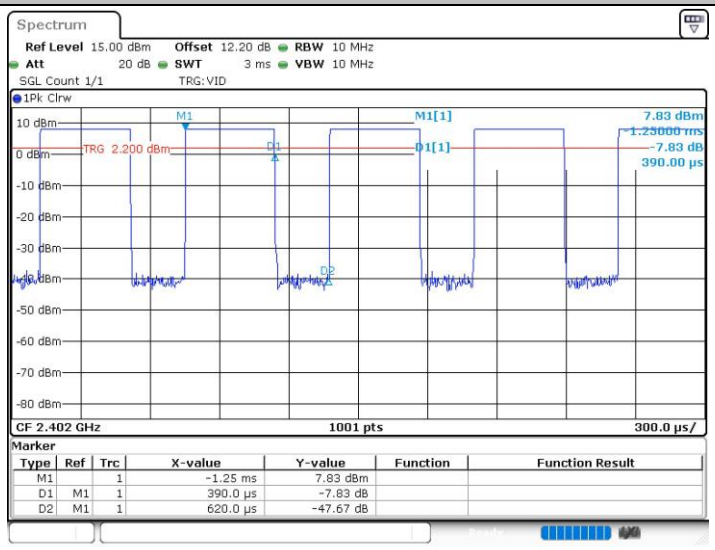
Duty Cycle

Test Result

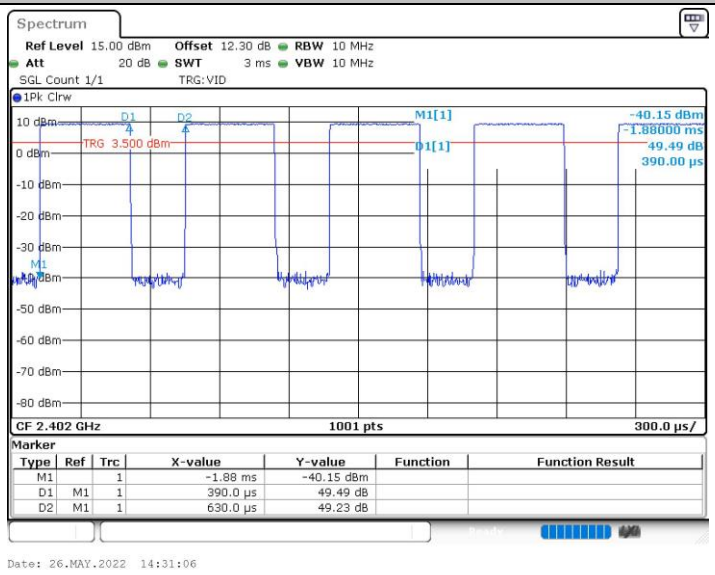
TestMode	Antenna	Freq(MHz)	ON Time [ms]	Period [ms]	DC [%]	xFactor	Limit	Verdict
BLE_1M	Ant1	2402	0.39	0.62	62.90	2.01	---	---
	Ant2	2402	0.39	0.63	61.90	2.08	---	---
BLE_2M	Ant1	2402	0.21	0.63	33.33	4.77	---	---
	Ant2	2402	0.21	0.63	33.33	4.77	---	---

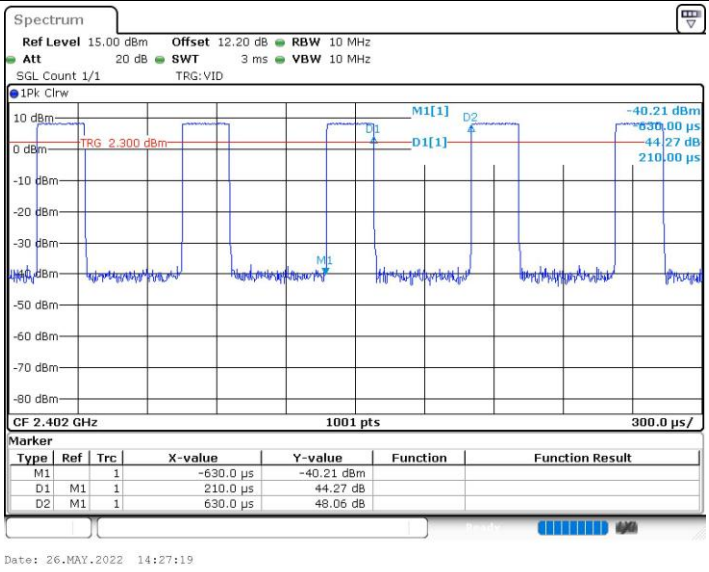
Test Graphs

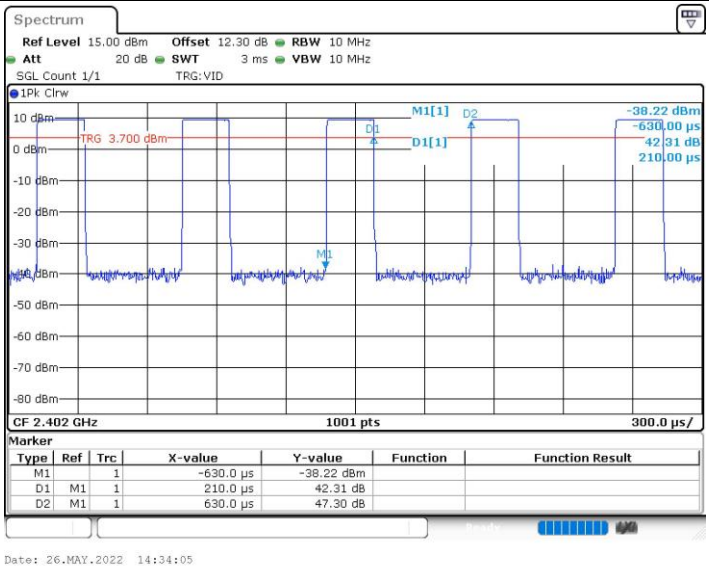
BLE_1M_Ant1_2402



BLE_1M_Ant2_2402

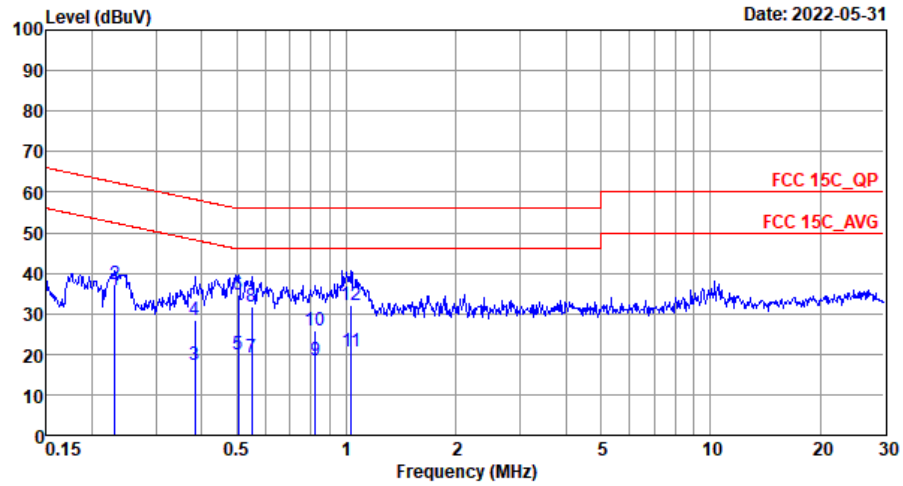


BLE_2M_Ant1_2402


BLE_2M_Ant2_2402


Appendix B. AC Conducted Emission Test Results

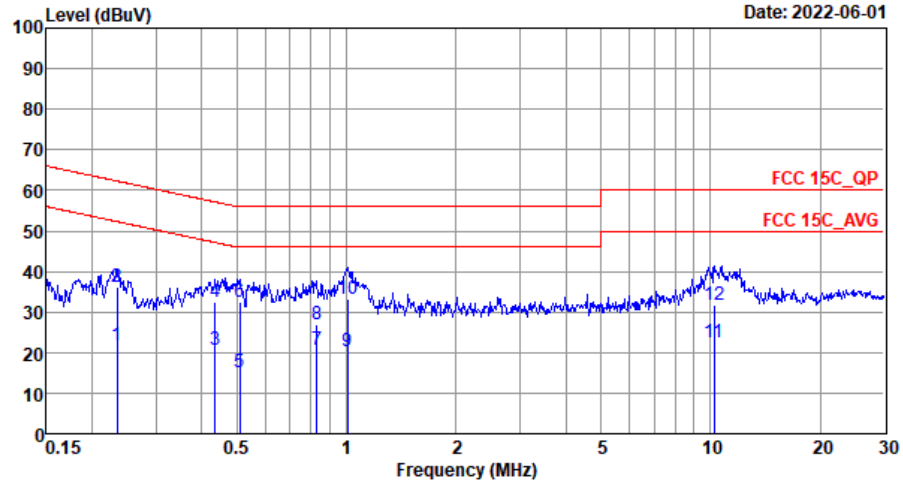
Test Engineer :	Lily	**Temperature :**	22~25℃
		Relative Humidity :	50~55%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-SZ
Condition: FCC 15C_QP LISN_20210901_L LINE

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	*	0.23	35.91	-16.48	52.39	15.30	10.19	10.42	Average
2		0.23	37.21	-25.18	62.39	16.60	10.19	10.42	QP
3		0.38	17.35	-30.86	48.21	-4.10	10.09	11.36	Average
4		0.38	28.25	-29.96	58.21	6.80	10.09	11.36	QP
5		0.50	19.86	-26.14	46.00	-2.10	10.12	11.84	Average
6		0.50	34.66	-21.34	56.00	12.70	10.12	11.84	QP
7		0.55	19.34	-26.66	46.00	-2.40	10.11	11.63	Average
8		0.55	31.84	-24.16	56.00	10.10	10.11	11.63	QP
9		0.82	18.51	-27.49	46.00	-2.30	10.11	10.70	Average
10		0.82	25.81	-30.19	56.00	5.00	10.11	10.70	QP
11		1.03	20.55	-25.45	46.00	0.20	10.12	10.23	Average
12		1.03	31.95	-24.05	56.00	11.60	10.12	10.23	QP

Test Engineer :	Lily	**Temperature :**	22~25℃
		Relative Humidity :	50~55%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-SZ
Condition: FCC 15C_QP LISN_20210901_N NEUTRAL

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.23	21.91	-30.39	52.30	1.20	10.26	10.45	Average
2		0.23	36.01	-26.29	62.30	15.30	10.26	10.45	QP
3		0.44	20.79	-26.36	47.15	-1.00	10.19	11.60	Average
4		0.44	32.49	-24.66	57.15	10.70	10.19	11.60	QP
5		0.51	15.10	-30.90	46.00	-6.90	10.20	11.80	Average
6		0.51	32.50	-23.50	56.00	10.50	10.20	11.80	QP
7		0.83	20.49	-25.51	46.00	-0.40	10.22	10.67	Average
8		0.83	26.79	-29.21	56.00	5.90	10.22	10.67	QP
9		1.00	20.25	-25.75	46.00	-0.20	10.22	10.23	Average
10	*	1.00	33.15	-22.85	56.00	12.70	10.22	10.23	QP
11		10.23	22.49	-27.51	50.00	2.20	9.99	10.30	Average
12		10.23	31.69	-28.31	60.00	11.40	9.99	10.30	QP

Note:

1. Level(dBμV) = Read Level(dBμV) + LISN Factor(dB) + Cable Loss(dB)
2. Over Limit(dB) = Level(dBμV) – Limit Line(dBμV)

Appendix C. Radiated Spurious Emission

< Ant 1: Bluetooth LE 1Mbps >

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE CH 00 2402MHz		2390	52.48	-21.52	74	43.54	32	9.64	32.7	338	313	P	H
		2369.85	43.09	-10.91	54	34.15	32.03	9.61	32.7	338	313	A	H
		2402	105.04	-	-	96.09	32	9.65	32.7	338	313	P	H
		2402	104.44	-	-	95.49	32	9.65	32.7	338	313	A	H
		2322.39	52.24	-21.76	74	43.38	32	9.56	32.7	229	354	P	V
		2367.12	43.2	-10.8	54	34.22	32.07	9.61	32.7	229	354	A	V
		2402	106.41	-	-	97.46	32	9.65	32.7	229	354	P	V
		2402	105.76	-	-	96.81	32	9.65	32.7	229	354	A	V
BLE CH 19 2440MHz		2327.08	51.98	-22.02	74	43.12	32	9.56	32.7	370	313	P	H
		2367.96	42.85	-11.15	54	33.87	32.07	9.61	32.7	370	313	A	H
		2440	104.87	-	-	95.57	32.3	9.7	32.7	370	313	P	H
		2440	104.18	-	-	94.88	32.3	9.7	32.7	370	313	A	H
		2494.82	51.84	-22.16	74	42.68	32.1	9.76	32.7	370	313	P	H
		2486.28	42.67	-11.33	54	33.45	32.17	9.75	32.7	370	313	A	H
		2347.52	52.67	-21.33	74	43.68	32.1	9.59	32.7	227	296	P	V
		2387	42.88	-11.12	54	33.95	32	9.63	32.7	227	296	A	V
		2440	104.23	-	-	94.93	32.3	9.7	32.7	227	296	P	V
		2440	103.56	-	-	94.26	32.3	9.7	32.7	227	296	A	V
		2493.63	51.82	-22.18	74	42.66	32.1	9.76	32.7	227	296	P	V
		2498.67	42.86	-11.14	54	33.69	32.1	9.77	32.7	227	296	A	V

BLE CH 39 2480MHz		2480	103.93	-	-	94.71	32.17	9.75	32.7	254	317	P	H
		2480	103.09	-	-	93.87	32.17	9.75	32.7	254	317	A	H
		2490.64	51.1	-22.9	74	41.94	32.1	9.76	32.7	254	317	P	H
		2484.24	43.21	-10.79	54	33.99	32.17	9.75	32.7	254	317	A	H
		2480	103.01	-	-	93.79	32.17	9.75	32.7	400	264	P	V
		2480	102.35	-	-	93.13	32.17	9.75	32.7	400	264	A	V
		2485.44	52.2	-21.8	74	42.98	32.17	9.75	32.7	400	264	P	V
		2483.88	42.84	-11.16	54	33.62	32.17	9.75	32.7	400	264	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

BLE	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE CH 00 2402MHz		4804	44.13	-29.87	74	50.38	33.9	12	52.15	-	-	P	H
		4804	46.07	-27.93	74	52.32	33.9	12	52.15	-	-	P	V
BLE CH 19 2440MHz		4880	45.74	-28.26	74	52.06	33.73	12.05	52.1	-	-	P	H
		7320	47.59	-26.41	74	49.42	35.77	14.17	51.77	-	-	P	H
		4880	45.18	-28.82	74	51.5	33.73	12.05	52.1	-	-	P	V
		7320	47.73	-26.27	74	49.56	35.77	14.17	51.77	-	-	P	V
BLE CH 39 2480MHz		4960	46.68	-27.32	74	52.89	33.73	12.09	52.03	-	-	P	H
		7440	47.01	-26.99	74	48.63	35.79	14.24	51.65	-	-	P	H
		4960	44.7	-29.3	74	50.91	33.73	12.09	52.03	-	-	P	V
		7440	47.72	-26.28	74	49.34	35.79	14.24	51.65	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

<ANT1: Bluetooth LE 2Mbps >

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE CH 00 2402MHz		2385.18	51.78	-22.22	74	42.82	32.03	9.63	32.7	337	318	P	H
		2340.135	44.42	-9.58	54	35.44	32.1	9.58	32.7	337	318	A	H
		2402	105.22	-	-	96.27	32	9.65	32.7	337	318	P	H
		2402	103.38	-	-	94.43	32	9.65	32.7	337	318	A	H
		2389.485	52.32	-21.68	74	43.38	32	9.64	32.7	228	354	P	V
		2316.825	44.54	-9.46	54	35.79	31.9	9.55	32.7	228	354	A	V
		2402	106.47	-	-	97.52	32	9.65	32.7	228	354	P	V
		2402	104.89	-	-	95.94	32	9.65	32.7	228	354	A	V
BLE CH 19 2440MHz		2342.48	51.72	-22.28	74	42.74	32.1	9.58	32.7	369	313	P	H
		2368.52	44.61	-9.39	54	35.67	32.03	9.61	32.7	369	313	A	H
		2440	105.69	-	-	96.39	32.3	9.7	32.7	369	313	P	H
		2440	104.02	-	-	94.72	32.3	9.7	32.7	369	313	A	H
		2493.84	51.87	-22.13	74	42.71	32.1	9.76	32.7	369	313	P	H
		2484.11	44.21	-9.79	54	34.99	32.17	9.75	32.7	369	313	A	H
		2374.82	51.25	-22.75	74	42.3	32.03	9.62	32.7	225	259	P	V
		2368.38	44.27	-9.73	54	35.29	32.07	9.61	32.7	225	259	A	V
		2440	104.41	-	-	95.11	32.3	9.7	32.7	225	259	P	V
		2440	102.49	-	-	93.19	32.3	9.7	32.7	225	259	A	V
		2485.09	51.88	-22.12	74	42.66	32.17	9.75	32.7	225	259	P	V
		2484.39	44.19	-9.81	54	34.97	32.17	9.75	32.7	225	259	A	V

BLE CH 39 2480MHz		2480	104.15	-	-	94.93	32.17	9.75	32.7	255	320	P	H
		2480	102.43	-	-	93.21	32.17	9.75	32.7	255	320	A	H
		2484.28	53.11	-20.89	74	43.89	32.17	9.75	32.7	255	320	P	H
		2483.52	45.29	-8.71	54	36.07	32.17	9.75	32.7	255	320	A	H
		2480	104.81	-	-	95.59	32.17	9.75	32.7	195	297	P	V
		2480	103.11	-	-	93.89	32.17	9.75	32.7	195	297	A	V
		2483.56	52.03	-21.97	74	42.81	32.17	9.75	32.7	195	297	P	V
		2483.64	45.76	-8.24	54	36.54	32.17	9.75	32.7	195	297	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

BLE	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE CH 00 2402MHz		4804	45.82	-28.18	74	52.07	33.9	12	52.15	-	-	P	H
		4804	44.88	-29.12	74	51.13	33.9	12	52.15	-	-	P	V
BLE CH 19 2440MHz		4880	45.34	-28.66	74	51.66	33.73	12.05	52.1	-	-	P	H
		7320	47.71	-26.29	74	49.54	35.77	14.17	51.77	-	-	P	H
		4880	45.71	-28.29	74	52.03	33.73	12.05	52.1	-	-	P	V
		7320	47.1	-26.9	74	48.93	35.77	14.17	51.77	-	-	P	V
BLE CH 39 2480MHz		4960	45.04	-28.96	74	51.25	33.73	12.09	52.03	-	-	P	H
		7440	47.98	-26.02	74	49.6	35.79	14.24	51.65	-	-	P	H
		4960	44.78	-29.22	74	50.99	33.73	12.09	52.03	-	-	P	V
		7440	47.77	-26.23	74	49.39	35.79	14.24	51.65	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

2.4GHz BLE (LF)

BLE	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz BLE LF		30	25.11	-14.89	40	30.2	25.2	1.01	31.3	-	-	P	H
		38.73	24.53	-15.47	40	34.96	19.82	1.15	31.4	-	-	P	H
		54.25	23.33	-16.67	40	40	13.58	1.35	31.6	-	-	P	H
		127.97	20.34	-23.16	43.5	31.74	18.04	2.05	31.49	-	-	P	H
		301.6	24.28	-21.72	46	33.11	19.44	3.13	31.4	-	-	P	H
		638.19	30.66	-15.34	46	32.43	25.13	4.55	31.45	-	-	P	H
		38.73	31.32	-8.68	40	41.75	19.82	1.15	31.4	-	-	P	V
		53.28	28.47	-11.53	40	44.97	13.76	1.34	31.6	-	-	P	V
		133.79	19.46	-24.04	43.5	31.06	17.76	2.1	31.46	-	-	P	V
		362.71	23.39	-22.61	46	30.42	20.86	3.43	31.32	-	-	P	V
		520.82	28.58	-17.42	46	31.47	24.24	4.11	31.24	-	-	P	V
		973.81	34.57	-19.43	54	32.86	27.34	5.62	31.25	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

<ANT2: Bluetooth LE 1Mbps >

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE CH 00 2402MHz		2377.935	52.68	-21.32	74	43.73	32.03	9.62	32.7	261	232	P	H
		2385.6	43.13	-10.87	54	34.2	32	9.63	32.7	261	232	A	H
		2402	103.47	-	-	94.52	32	9.65	32.7	261	232	P	H
		2402	102.92	-	-	93.97	32	9.65	32.7	261	232	A	H
		2343.6	52.82	-21.18	74	43.84	32.1	9.58	32.7	234	297	P	V
		2375.835	42.99	-11.01	54	34.04	32.03	9.62	32.7	234	297	A	V
		2402	105.36	-	-	96.41	32	9.65	32.7	234	297	P	V
		2402	104.81	-	-	95.86	32	9.65	32.7	234	297	A	V
BLE CH 19 2440MHz		2360.4	49.13	-24.87	74	40.16	32.07	9.6	32.7	261	232	P	H
		2383.78	39.75	-14.25	54	30.79	32.03	9.63	32.7	261	232	A	H
		2440	103.65	-	-	94.35	32.3	9.7	32.7	261	232	P	H
		2440	103.05	-	-	93.75	32.3	9.7	32.7	261	232	A	H
		2487.54	48.52	-25.48	74	39.36	32.1	9.76	32.7	261	232	P	H
		2499.37	39.6	-14.4	54	30.43	32.1	9.77	32.7	261	232	A	H
		2382.94	52.29	-21.71	74	43.33	32.03	9.63	32.7	228	295	P	V
		2376.5	43.03	-10.97	54	34.08	32.03	9.62	32.7	228	295	A	V
		2440	104.58	-	-	95.28	32.3	9.7	32.7	228	295	P	V
		2440	103.97	-	-	94.67	32.3	9.7	32.7	228	295	A	V
		2343.6	52.82	-21.18	74	43.84	32.1	9.58	32.7	234	297	P	V
		2375.835	42.99	-11.01	54	34.04	32.03	9.62	32.7	234	297	A	V

BLE CH 39 2480MHz		2480	104.97	-	-	95.75	32.17	9.75	32.7	281	316	P	H
		2480	104.37	-	-	95.15	32.17	9.75	32.7	281	316	A	H
		2497.12	51.68	-22.32	74	42.51	32.1	9.77	32.7	281	316	P	H
		2485.36	42.89	-11.11	54	33.67	32.17	9.75	32.7	281	316	A	H
		2480	105.55	-	-	96.33	32.17	9.75	32.7	195	296	P	V
		2480	104.54	-	-	95.32	32.17	9.75	32.7	195	296	A	V
		2485.64	51.77	-22.23	74	42.55	32.17	9.75	32.7	195	296	P	V
		2483.68	42.98	-11.02	54	33.76	32.17	9.75	32.7	195	296	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

BLE	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE CH 00 2402MHz		4804	44.48	-29.52	74	50.73	33.9	12	52.15	-	-	P	H
		4804	45.01	-28.99	74	51.26	33.9	12	52.15	-	-	P	V
BLE CH 19 2440MHz		4880	45.55	-28.45	74	51.87	33.73	12.05	52.1	-	-	P	H
		7320	47.87	-26.13	74	49.7	35.77	14.17	51.77	-	-	P	H
		4880	44.71	-29.29	74	51.03	33.73	12.05	52.1	-	-	P	V
		7320	47.88	-26.12	74	49.71	35.77	14.17	51.77	-	-	P	V
BLE CH 39 2480MHz		4960	45.03	-28.97	74	51.24	33.73	12.09	52.03	-	-	P	H
		7440	47.16	-26.84	74	48.78	35.79	14.24	51.65	-	-	P	H
		4960	45.18	-28.82	74	51.39	33.73	12.09	52.03	-	-	P	V
		7440	47.99	-26.01	74	49.61	35.79	14.24	51.65	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

<ANT2: Bluetooth LE 2Mbps >

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE CH 00 2402MHz		2384.235	51.76	-22.24	74	42.8	32.03	9.63	32.7	304	315	P	H
		2383.395	44.66	-9.34	54	35.7	32.03	9.63	32.7	304	315	A	H
		2402	104.77	-	-	95.82	32	9.65	32.7	304	315	P	H
		2402	103.03	-	-	94.08	32	9.65	32.7	304	315	A	H
		2378.67	51.94	-22.06	74	42.99	32.03	9.62	32.7	231	298	P	V
		2371.11	44.24	-9.76	54	35.29	32.03	9.62	32.7	231	298	A	V
		2402	105.59	-	-	96.64	32	9.65	32.7	231	298	P	V
		2402	103.97	-	-	95.02	32	9.65	32.7	231	298	A	V
BLE CH 19 2440MHz		2385.04	51.89	-22.11	74	42.93	32.03	9.63	32.7	368	317	P	H
		2364.88	44.5	-9.5	54	35.52	32.07	9.61	32.7	368	317	A	H
		2440	105.33	-	-	96.03	32.3	9.7	32.7	368	317	P	H
		2440	103.42	-	-	94.12	32.3	9.7	32.7	368	317	A	H
		2493.63	51.55	-22.45	74	42.39	32.1	9.76	32.7	368	317	P	H
		2485.16	44.24	-9.76	54	35.02	32.17	9.75	32.7	368	317	A	H
		2382.8	51.36	-22.64	74	42.4	32.03	9.63	32.7	225	296	P	V
		2389.94	44.27	-9.73	54	35.33	32	9.64	32.7	225	296	A	V
		2440	104.32	-	-	95.02	32.3	9.7	32.7	225	296	P	V
		2440	102.54	-	-	93.24	32.3	9.7	32.7	225	296	A	V
		2485.86	51.48	-22.52	74	42.26	32.17	9.75	32.7	225	296	P	V
		2484.04	44.41	-9.59	54	35.19	32.17	9.75	32.7	225	296	A	V

BLE CH 39 2480MHz		2480	105.49	-	-	96.27	32.17	9.75	32.7	319	316	P	H
		2480	103.79	-	-	94.57	32.17	9.75	32.7	319	316	A	H
		2483.52	52.16	-21.84	74	42.94	32.17	9.75	32.7	319	316	P	H
		2483.52	46.22	-7.78	54	37	32.17	9.75	32.7	319	316	A	H
		2480	104.49	-	-	95.27	32.17	9.75	32.7	253	295	P	V
		2480	102.58	-	-	93.36	32.17	9.75	32.7	253	295	A	V
		2483.64	51.88	-22.12	74	42.66	32.17	9.75	32.7	253	295	P	V
		2483.52	45.88	-8.12	54	36.66	32.17	9.75	32.7	253	295	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

BLE	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE CH 00 2402MHz		4804	44.63	-29.37	74	50.88	33.9	12	52.15	-	-	P	H
		4804	44.43	-29.57	74	50.68	33.9	12	52.15	-	-	P	V
BLE CH 19 2440MHz		4880	46.1	-27.9	74	52.42	33.73	12.05	52.1	-	-	P	H
		7320	47.6	-26.4	74	49.43	35.77	14.17	51.77	-	-	P	H
		4880	44.93	-29.07	74	51.25	33.73	12.05	52.1	-	-	P	V
		7320	47	-27	74	48.83	35.77	14.17	51.77	-	-	P	V
BLE CH 39 2480MHz		4960	45.59	-28.41	74	51.8	33.73	12.09	52.03	-	-	P	H
		7440	47.01	-26.99	74	48.63	35.79	14.24	51.65	-	-	P	H
		4960	45.08	-28.92	74	51.29	33.73	12.09	52.03	-	-	P	V
		7440	47.88	-26.12	74	49.5	35.79	14.24	51.65	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

2.4GHz BLE (LF)

BLE	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz BLE LF		31.94	26.15	-13.85	40	32.67	24.04	1.04	31.6	-	-	P	H
		37.76	23.64	-16.36	40	33.47	20.44	1.13	31.4	-	-	P	H
		53.28	21.35	-18.65	40	37.85	13.76	1.34	31.6	-	-	P	H
		291.9	22.23	-23.77	46	31.28	19.32	3.08	31.45	-	-	P	H
		474.26	26.38	-19.62	46	30.46	23.34	3.92	31.34	-	-	P	H
		638.19	31.1	-14.9	46	32.87	25.13	4.55	31.45	-	-	P	H
		30.97	31.82	-8.18	40	37.47	24.62	1.03	31.3	-	-	P	V
		37.76	31.83	-8.17	40	41.66	20.44	1.13	31.4	-	-	P	V
		54.25	26.77	-13.23	40	43.44	13.58	1.35	31.6	-	-	P	V
		261.83	21.54	-24.46	46	30.21	20.04	2.92	31.63	-	-	P	V
		564.47	27.96	-18.04	46	30.1	24.97	4.28	31.39	-	-	P	V
		773.99	30.53	-15.47	46	30.74	26	5	31.21	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

<Simultaneous transmission>

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE CH 39 2480MHz +LTEB48		2480	104.11	-	-	94.89	32.17	9.75	32.7	393	307	P	H
		2480	102.44	-	-	93.22	32.17	9.75	32.7	393	307	A	H
		2483.52	53.6	-20.4	74	44.38	32.17	9.75	32.7	393	307	P	H
		2483.52	45.53	-8.47	54	36.31	32.17	9.75	32.7	393	307	A	H
		2480	106.42	-	-	97.2	32.17	9.75	32.7	105	348	P	V
		2480	104.71	-	-	95.49	32.17	9.75	32.7	105	348	A	V
		2483.84	53.41	-20.59	74	44.19	32.17	9.75	32.7	105	348	P	V
		2483.56	45.95	-8.05	54	36.73	32.17	9.75	32.7	105	348	A	V

2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

BLE	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE CH 39 2480MHz +LTEB48		4960	45.07	-28.93	74	51.28	33.73	12.09	52.03	-	-	P	H
		7302	49.18	-24.82	74	51.05	35.76	14.16	51.79	-	-	P	H
		7440	47.43	-26.57	74	49.05	35.79	14.24	51.65	-	-	P	H
		11043	56.98	-17.02	74	54.01	37.84	16.49	51.36	-	-	P	H
		14724	50.42	-23.58	74	46.09	39.31	17.36	52.34	-	-	P	H
		4960	44.21	-29.79	74	50.42	33.73	12.09	52.03	-	-	P	V
		7302	48.02	-25.98	74	49.89	35.76	14.16	51.79	-	-	P	V
		7440	47.53	-26.47	74	49.15	35.79	14.24	51.65	-	-	P	V
		11043	54.07	-19.93	74	51.1	37.84	16.49	51.36	-	-	P	V
		14724	50.22	-23.78	74	45.89	39.31	17.36	52.34	-	-	P	V

Note symbol

*	**Fundamental Frequency** which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is **Margin** line.
P/A	**P**eak or **A**verage
H/V	**H**orizontal or **V**ertical

A calculation example for radiated spurious emission is shown as below:

BLE	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE CH 00 2402MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
2. Level(dBμV/m) =

Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

3. Margin (dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)

= 55.45 (dBμV/m)

2. Margin (dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)

= 43.54 (dBμV/m)

2. Margin (dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

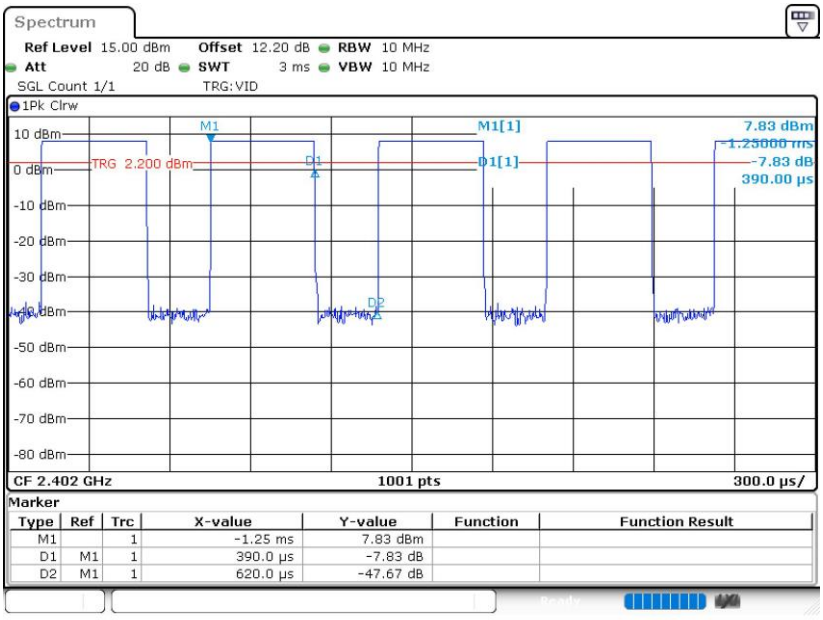
= -10.46(dB)

Both peak and average measured complies with the limit line, so test result is “PASS”.

Appendix D. Duty Cycle Plots

Ant	Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
1	Bluetooth LE 1Mbps	62.90	0.39	2.564	3KHz
1	Bluetooth LE 2Mbps	33.33	0.21	4.762	10KHZ
2	Bluetooth LE 1Mbps	61.90	0.39	2.564	3KHz
2	Bluetooth LE 2Mbps	33.33	0.21	4.762	10KHZ

Bluetooth LE 1Mbps_Ant1



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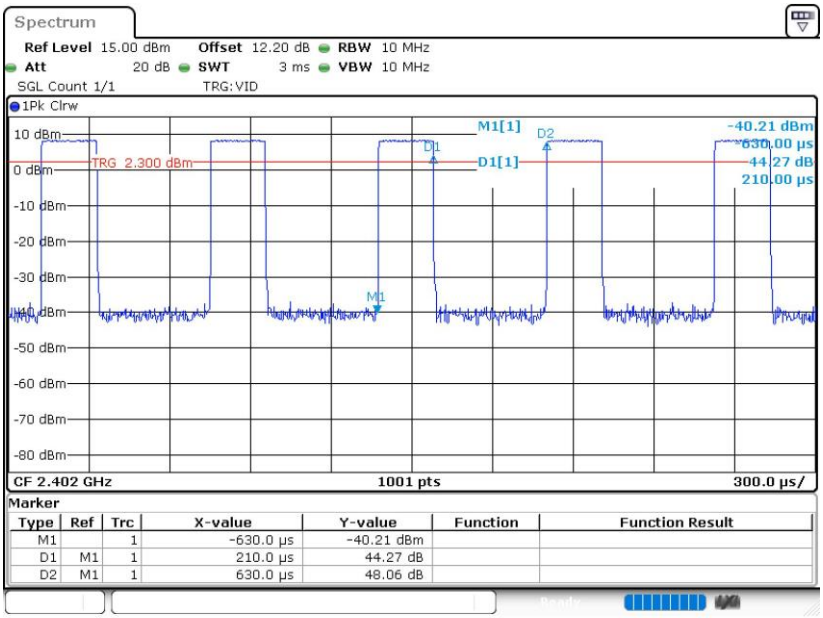
Bluetooth LE 2Mbps_Ant1



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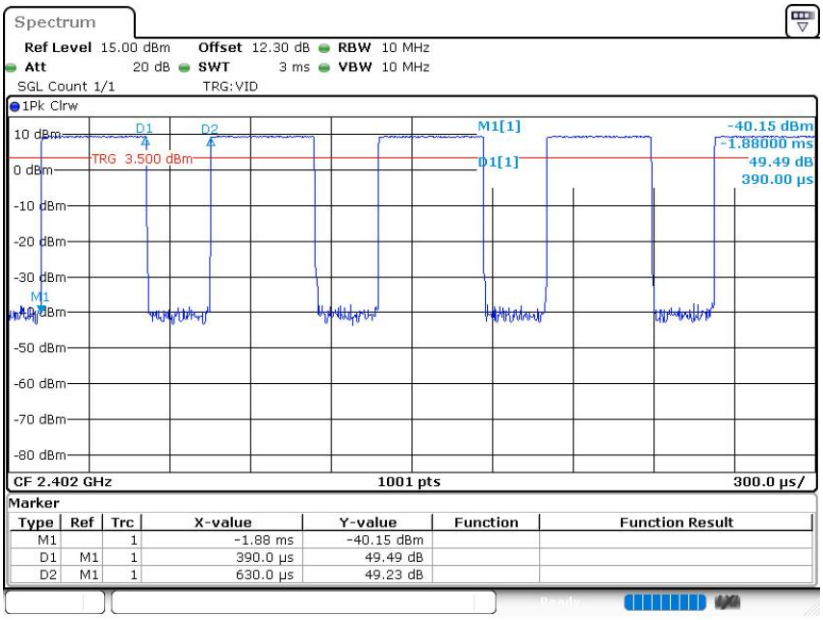
Bluetooth LE 1Mbps_Ant2



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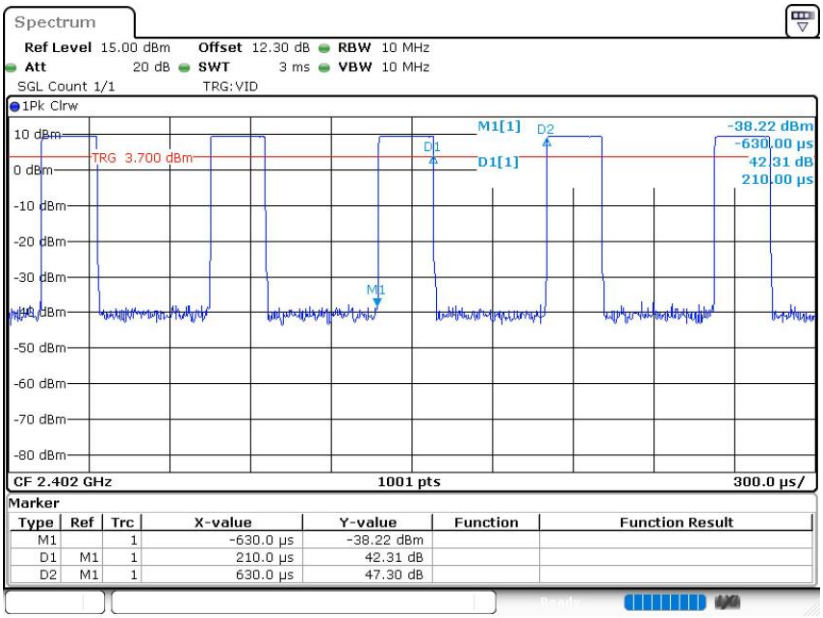

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