Appendix B. Radiated Spurious Emission

Test Engineer :	Jacky Hung	Temperature :	20~23°C
		Relative Humidity :	50~55%

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable 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		2388.225	52.9	-21.1	74	53.17	27.01	6.71	33.99	156	10	P	H
		2380.035	42.41	-11.59	54	42.73	26.96	6.71	33.99	156	10	A	H
	*	2402	98.82	-	-	99.08	27.01	6.71	33.98	156	10	P	H
	*	2402	91.74	-	-	92	27.01	6.71	33.98	156	10	A	H
													H
													H
		2328.69	52.34	-21.66	74	52.94	26.82	6.58	34	120	330	P	V
		2348.85	42.24	-11.76	54	42.71	26.87	6.65	33.99	120	330	A	V
	*	2402	92.84	-	-	93.1	27.01	6.71	33.98	120	330	P	V
	*	2402	91.07	-	-	91.33	27.01	6.71	33.98	120	330	A	V
													V
													V
BLE CH 19 2440MHz		2361.66	51.47	-22.53	74	51.9	26.91	6.65	33.99	176	10	P	H
		2389.8	43.16	-10.84	54	43.42	27.01	6.71	33.98	176	10	A	H
	*	2440	99.72	-	-	99.79	27.16	6.74	33.97	176	10	P	H
	*	2440	91.89	-	-	91.96	27.16	6.74	33.97	176	10	A	H
		2493.63	51.52	-22.48	74	51.39	27.3	6.77	33.94	176	10	P	H
		2487.82	43.13	-10.87	54	43.01	27.3	6.77	33.95	176	10	A	H
		2386.16	51.43	-22.57	74	51.7	27.01	6.71	33.99	113	339	P	V
		2375.8	42.34	-11.66	54	42.72	26.96	6.65	33.99	113	339	A	V
	*	2440	93.14	-	-	93.21	27.16	6.74	33.97	113	339	P	V
	*	2440	90.22	-	-	90.29	27.16	6.74	33.97	113	339	A	V
		2499.16	51.77	-22.23	74	51.64	27.3	6.77	33.94	113	339	P	V
		2498.25	42.94	-11.06	54	42.81	27.3	6.77	33.94	113	339	A	V

BLE CH 39 2480MHz	*	2480	98.82	-	-	98.75	27.25	6.77	33.95	176	10	P	H
	*	2480	96.9	-	-	96.83	27.25	6.77	33.95	176	10	A	H
		2483.64	62.72	-11.28	74	62.65	27.25	6.77	33.95	176	10	P	H
		2483.56	46.86	-7.14	54	46.79	27.25	6.77	33.95	176	10	A	H
													H
													H
	*	2480	93.98	-	-	93.91	27.25	6.77	33.95	100	336	P	V
	*	2480	91.82	-	-	91.75	27.25	6.77	33.95	100	336	A	V
		2483.8	58.18	-15.82	74	58.11	27.25	6.77	33.95	100	336	P	V
		2483.64	43.69	-10.31	54	43.62	27.25	6.77	33.95	100	336	A	V
													V
													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 (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
BLE CH 00 2402MHz		4804	42.27	-31.73	74	51.58	31.1	10.68	51.09	100	0	P	H
													H
													H
													H
		4804	42.92	-31.08	74	52.23	31.1	10.68	51.09	100	0	P	V
													V
													V
													V
BLE CH 19 2440MHz		4880	41.58	-32.42	74	50.95	31.21	10.48	51.06	100	0	P	H
		7320	38.14	-35.86	74	40.25	36.12	12.28	50.51	100	0	P	H
													H
													H
		4880	39.88	-34.12	74	49.25	31.21	10.48	51.06	100	0	P	V
		7320	38.74	-35.26	74	40.85	36.12	12.28	50.51	100	0	P	V
													V
													V
BLE CH 39 2480MHz		4960	37.2	-36.8	74	46.6	31.34	10.29	51.03	100	0	P	H
		7440	38.62	-35.38	74	40.19	36.39	12.55	50.51	100	0	P	H
													H
													H
		4960	38.97	-35.03	74	48.37	31.34	10.29	51.03	100	0	P	V
		7440	39.1	-34.9	74	40.67	36.39	12.55	50.51	100	0	P	V
													V
													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	Over	Limit	Read	Antenna	Cable	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)
2.4GHz BLE LF		30.81	24.35	-15.65	40	30.07	25.18	0.93	31.83	-	-	P	H
		52.68	17.48	-22.52	40	34.05	14.3	0.93	31.8	-	-	P	H
		141.24	17.95	-25.55	43.5	30.24	17.81	1.68	31.78	-	-	P	H
		587	26.34	-19.66	46	29.74	25.46	3.16	32.02	-	-	P	H
		729.8	29.41	-16.59	46	30.58	27.29	3.54	32	-	-	P	H
		889.4	31.72	-14.28	46	30.22	29.14	3.84	31.48	188	311	P	H
													H
													H
													H
													H
													H
													H
		40.8	28.8	-11.2	40	39.95	19.74	0.93	31.82	152	236	P	V
		81.84	18.15	-21.85	40	34.95	13.82	1.17	31.79	-	-	P	V
		98.31	19.74	-23.76	43.5	34.49	15.86	1.17	31.78	-	-	P	V
		475.7	28.82	-17.18	46	34.13	23.7	2.86	31.87	-	-	P	V
		624.8	28.69	-17.31	46	31.42	25.95	3.36	32.04	-	-	P	V
		847.4	31.21	-14.79	46	30.25	28.88	3.77	31.69	-	-	P	V
													V
													V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

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 **over limit** 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:

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		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. Level(dBµV/m) =

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

2. Over Limit(dB) = Level(dBµV/m) – Limit Line(dBµV/m)

For Peak Limit @ 2390MHz:

1. Level(dBµV/m)

= Antenna Factor(dB/m) + Cable 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. Over Limit(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) + Cable 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. Over Limit(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”.