Appendix B. Radiated Spurious Emission

Test Engineer :	Jesse Wang and James Chiu	Temperature :	22~23°C
		Relative Humidity :	45~52%

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		2357.46	55.41	-18.59	74	50.72	31.84	7.24	34.39	250	0	P	H
		2355.99	45.48	-8.52	54	40.79	31.84	7.24	34.39	250	0	A	H
	*	2402	97.96	-	-	93.03	31.93	7.31	34.31	250	0	P	H
	*	2402	97.54	-	-	92.61	31.93	7.31	34.31	250	0	A	H
													H
													H
		2346.96	54.33	-19.67	74	49.69	31.8	7.24	34.4	338	314	P	V
		2354.835	45.63	-8.37	54	40.94	31.84	7.24	34.39	338	314	A	V
	*	2402	92.73	-	-	87.8	31.93	7.31	34.31	338	314	P	V
	*	2402	92.09	-	-	87.16	31.93	7.31	34.31	338	314	A	V
													V
													V
BLE CH 19 2440MHz		2332.12	54.92	-19.08	74	50.42	31.75	7.18	34.43	245	360	P	H
		2373.56	45.39	-8.61	54	40.62	31.89	7.24	34.36	245	360	A	H
	*	2440	96.29	-	-	91.11	32.07	7.36	34.25	245	360	P	H
	*	2440	95.67	-	-	90.49	32.07	7.36	34.25	245	360	A	H
		2498.39	55.53	-18.47	74	50.08	32.2	7.4	34.15	245	360	P	H
		2494.96	45.36	-8.64	54	39.92	32.2	7.4	34.16	245	360	A	H
		2376.08	55.16	-18.84	74	50.39	31.89	7.24	34.36	302	306	P	V
		2367.4	45.43	-8.57	54	40.72	31.84	7.24	34.37	302	306	A	V
	*	2440	92.94	-	-	87.76	32.07	7.36	34.25	302	306	P	V
	*	2440	92.35	-	-	87.17	32.07	7.36	34.25	302	306	A	V
		2490.34	55.19	-18.81	74	49.76	32.2	7.4	34.17	302	306	P	V
		2498.46	45.41	-8.59	54	39.96	32.2	7.4	34.15	302	306	A	V

BLE CH 39 2480MHz	*	2480	97.7	-	-	92.32	32.16	7.4	34.18	214	178	P	H
	*	2480	97.14	-	-	91.76	32.16	7.4	34.18	214	178	A	H
		2491.72	55.8	-18.2	74	50.36	32.2	7.4	34.16	214	178	P	H
		2484.36	46.12	-7.88	54	40.74	32.16	7.4	34.18	214	178	A	H
													H
													H
	*	2480	92.91	-	-	87.53	32.16	7.4	34.18	330	288	P	V
	*	2480	92.33	-	-	86.95	32.16	7.4	34.18	330	288	A	V
		2490.44	55.65	-18.35	74	50.22	32.2	7.4	34.17	330	288	P	V
		2493.4	46.16	-7.84	54	40.72	32.2	7.4	34.16	330	288	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		4806	48.43	-25.57	74	61.49	34.19	11.83	59.08	100	0	P	H
													H
													H
													H
		4806	42.4	-31.6	74	55.46	34.19	11.83	59.08	100	0	P	V
													V
													V
													V
BLE CH 19 2440MHz		4878	45.81	-28.19	74	58.99	34.23	11.53	58.94	100	0	P	H
		7320	49.87	-24.13	74	58.42	35.6	13.81	57.96	100	0	P	H
													H
													H
		4878	42.13	-31.87	74	55.31	34.23	11.53	58.94	100	0	P	V
		7320	43.61	-30.39	74	52.16	35.6	13.81	57.96	100	0	P	V
													V
													V
BLE CH 39 2480MHz		4962	45.48	-28.52	74	58.75	34.28	11.22	58.77	100	0	P	H
		7440	49.19	-24.81	74	57.67	35.6	14.05	58.13	100	0	P	H
													H
													H
		4962	42.58	-31.42	74	55.85	34.28	11.22	58.77	100	0	P	V
		7440	43.3	-30.7	74	51.78	35.6	14.05	58.13	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	27.03	-12.97	40	31.31	26	1.07	31.35	100	0	P	H
		132.33	20.09	-23.41	43.5	31.81	18.24	1.55	31.51	-	-	P	H
		258.69	21.95	-24.05	46	31.34	19.9	2.07	31.36	-	-	P	H
		496	25.82	-20.18	46	29.72	24.09	3.04	31.03	-	-	P	H
		685	29.23	-16.77	46	30.06	26.25	3.65	30.73	-	-	P	H
		974.8	33.51	-20.49	54	29.71	30.25	4.07	30.52	-	-	P	H
													H
													H
													H
													H
													H
													H
		30	27.79	-12.21	40	32.07	26	1.07	31.35	-	-	P	V
		114.78	19.53	-23.97	43.5	31.92	17.57	1.55	31.51	-	-	P	V
		261.12	22.03	-23.97	46	31.12	19.94	2.32	31.35	-	-	P	V
		409.2	24.97	-21.03	46	30.93	22.53	2.67	31.16	-	-	P	V
		589.1	29.2	-16.8	46	31.46	25.22	3.36	30.84	-	-	P	V
		903.4	36.56	-9.44	46	33.91	29.07	4.12	30.54	100	0	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".