Appendix B. Radiated Spurious Emission

Test Engineer :	Karl Hou	Temperature :	21~23°C
		Relative Humidity :	55~57%

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		2376.675	60.44	-13.56	74	57.55	27.01	7.37	31.49	162	272	P	H
		2387.91	48.31	-5.69	54	45.3	27.05	7.45	31.49	162	272	A	H
	*	2402	87.62	-	-	84.61	27.05	7.45	31.49	162	272	P	H
	*	2402	86.67	-	-	83.66	27.05	7.45	31.49	162	272	A	H
													H
													H
		2388.33	61.08	-12.92	74	58.07	27.05	7.45	31.49	100	262	P	V
		2389.275	48.32	-5.68	54	45.31	27.05	7.45	31.49	100	262	A	V
	*	2404	95.49	-	-	92.44	27.09	7.45	31.49	100	262	P	V
	*	2402	94.55	-	-	91.54	27.05	7.45	31.49	100	262	P	V
													V
													V
BLE CH 19 2440MHz		2376.08	58.03	-15.97	74	55.14	27.01	7.37	31.49	100	275	P	H
		2385.88	45.49	-8.51	54	42.48	27.05	7.45	31.49	100	275	A	H
	*	2442	88.65	-	-	85.45	27.18	7.49	31.47	100	275	P	H
	*	2440	87.65	-	-	84.46	27.18	7.49	31.48	100	275	A	H
		2496.57	58.1	-15.9	74	54.73	27.3	7.53	31.46	100	275	P	H
		2499.95	45.73	-8.27	54	42.36	27.3	7.53	31.46	100	275	A	H
		2335.76	58.25	-15.75	74	55.53	26.93	7.3	31.51	100	272	P	V
		2385.6	45.44	-8.56	54	42.43	27.05	7.45	31.49	100	272	A	V
	*	2442	95.9	-	-	92.7	27.18	7.49	31.47	100	272	P	V
	*	2440	94.82	-	-	91.63	27.18	7.49	31.48	100	272	A	V
		2488.17	57.6	-16.4	74	54.24	27.3	7.53	31.47	100	272	P	V
		2499.79	45.66	-8.34	54	42.29	27.3	7.53	31.46	100	272	A	V

BLE CH 39 2480MHz	*	2482	87.91	-	-	84.59	27.26	7.53	31.47	356	13	P	H
	*	2480	86.89	-	-	83.57	27.26	7.53	31.47	356	13	A	H
		2484.2	61.72	-12.28	74	58.4	27.26	7.53	31.47	356	13	P	H
		2497.68	48.62	-5.38	54	45.25	27.3	7.53	31.46	356	13	A	H
													H
													H
	*	2482	98.77	-	-	95.45	27.26	7.53	31.47	146	182	P	V
	*	2480	97.57	-	-	94.25	27.26	7.53	31.47	146	182	A	V
		2491.32	60.91	-13.09	74	57.55	27.3	7.53	31.47	146	182	P	V
		2483.52	48.75	-5.25	54	45.43	27.26	7.53	31.47	146	182	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	47.83	-26.17	74	64.16	31.23	10.59	58.15	100	0	P	H
													H
													H
													H
		4806	45.89	-28.11	74	62.22	31.23	10.59	58.15	100	0	P	V
													V
													V
													V
BLE CH 19 2440MHz		4878	46.01	-27.99	74	61.89	31.33	10.89	58.1	100	0	P	H
		7320	56.57	-17.43	74	65.37	36.12	14.18	59.1	107	9	P	H
		7320	49.96	-4.04	54	58.76	36.12	14.18	59.1	107	9	A	H
													H
		4878	44.2	-29.8	74	60.08	31.33	10.89	58.1	100	0	P	V
		7320	57.31	-16.69	74	66.11	36.12	14.18	59.1	100	98	P	V
		7320	50.9	-3.1	54	59.7	36.12	14.18	59.1	100	98	A	V
													V
BLE CH 39 2480MHz		4962	45.84	-28.16	74	61.23	31.45	11.19	58.03	100	0	P	H
		7440	56.9	-17.1	74	65.29	36.46	14.32	59.17	100	353	P	H
		7440	50	-4	54	58.39	36.46	14.32	59.17	100	353	A	H
													H
		4962	46.63	-27.37	74	62.02	31.45	11.19	58.03	100	0	P	V
		7440	55.99	-18.01	74	64.38	36.46	14.32	59.17	100	98	P	V
		7440	49.39	-4.61	54	57.78	36.46	14.32	59.17	100	98	A	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		35.67	22.7	-17.3	40	31.84	22.54	0.78	32.46			P	H
		131.25	19.74	-23.76	43.5	32.75	17.98	1.43	32.42			P	H
		196.32	18.23	-25.27	43.5	33.34	15.6	1.7	32.41			P	H
		462.4	23.41	-22.59	46	29.39	23.33	3.08	32.39			P	H
		738.9	28.59	-17.41	46	29.69	27.34	3.89	32.33			P	H
		941.9	32.86	-13.14	46	29.23	30.08	4.75	31.2	100	0	P	H
													H
													H
													H
													H
													H
													H
		38.64	21.54	-18.46	40	32.36	20.86	0.78	32.46			P	V
		83.73	21.15	-18.85	40	38.5	14.03	1.06	32.44			P	V
		111.81	24.95	-18.55	43.5	38.76	17.19	1.43	32.43			P	V
		409.2	22.31	-23.69	46	29.63	22.37	2.68	32.37			P	V
		603.1	26.68	-19.32	46	30.14	25.44	3.5	32.4			P	V
		835.5	30.33	-15.67	46	29.67	28.36	4.28	31.98	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".