Appendix A. Radiated Spurious Emission

Test Engineer :	Ken Wu, Jesse Wang, and James Chiu	Temperature :	21~24°C
		Relative Humidity :	50~54%

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 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		2311.26	55.16	-18.84	74	51	31.93	7.18	34.95	100	295	P	H
		2369.22	45.61	-8.39	54	41.2	32.14	7.24	34.97	100	295	A	H
	*	2402	100.14	-	-	95.62	32.19	7.31	34.98	100	295	P	H
	*	2402	99.52	-	-	95	32.19	7.31	34.98	100	295	A	H
													H
													H
		2318.505	54.53	-19.47	74	50.33	31.98	7.18	34.96	344	262	P	V
		2382.345	45.42	-8.58	54	40.94	32.14	7.31	34.97	344	262	A	V
	*	2402	97.83	-	-	93.31	32.19	7.31	34.98	344	262	P	V
	*	2402	97.4	-	-	92.88	32.19	7.31	34.98	344	262	A	V
													V
													V
BLE CH 19 2440MHz		2376.92	55.02	-18.98	74	50.61	32.14	7.24	34.97	100	295	P	H
		2379.72	45.39	-8.61	54	40.98	32.14	7.24	34.97	100	295	A	H
	*	2440	100.16	-	-	95.45	32.34	7.36	34.99	100	295	P	H
	*	2440	99.54	-	-	94.83	32.34	7.36	34.99	100	295	A	H
		2498.32	54.7	-19.3	74	49.81	32.5	7.4	35.01	100	295	P	H
		2486.21	45.75	-8.25	54	40.9	32.45	7.4	35	100	295	A	H
		2389.94	55.02	-18.98	74	50.5	32.19	7.31	34.98	365	260	P	V
		2385.88	45.31	-8.69	54	40.78	32.19	7.31	34.97	365	260	A	V
	*	2440	97.47	-	-	92.76	32.34	7.36	34.99	365	260	P	V
	*	2440	97.03	-	-	92.32	32.34	7.36	34.99	365	260	A	V
		2487.82	55.07	-18.93	74	50.17	32.5	7.4	35	365	260	P	V
		2495.94	45.86	-8.14	54	40.97	32.5	7.4	35.01	365	260	A	V

BLE CH 39 2480MHz	*	2480	98.4	-	-	93.55	32.45	7.4	35	100	295	P	H
	*	2480	97.89	-	-	93.04	32.45	7.4	35	100	295	A	H
		2495.16	54.96	-19.04	74	50.07	32.5	7.4	35.01	100	295	P	H
		2489.84	46.11	-7.89	54	41.21	32.5	7.4	35	100	295	A	H
													H
													H
	*	2480	96.67	-	-	91.82	32.45	7.4	35	335	260	P	V
	*	2480	96.18	-	-	91.33	32.45	7.4	35	335	260	A	V
		2492.44	55.27	-18.73	74	50.38	32.5	7.4	35.01	335	260	P	V
		2489.72	45.91	-8.09	54	41.01	32.5	7.4	35	335	260	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	39.03	-34.97	74	52.6	33.68	11.83	59.08	100	0	P	H
													H
													H
													H
		4804	39.42	-34.58	74	52.99	33.68	11.83	59.08	100	0	P	V
													V
													V
													V
BLE CH 19 2440MHz		4880	37.79	-36.21	74	51.66	33.54	11.53	58.94	100	0	P	H
		7320	37.65	-36.35	74	47.15	34.65	13.81	57.96	100	0	P	H
													H
													H
		4880	37.2	-36.8	74	51.07	33.54	11.53	58.94	100	0	P	V
		7320	38.31	-35.69	74	47.81	34.65	13.81	57.96	100	0	P	V
													V
													V
BLE CH 39 2480MHz		4960	38.18	-35.82	74	52.36	33.37	11.22	58.77	100	0	P	H
		7440	38.34	-35.66	74	48.09	34.33	14.05	58.13	100	0	P	H
													H
													H
		4960	37.33	-36.67	74	51.51	33.37	11.22	58.77	100	0	P	V
		7440	37.82	-36.18	74	47.57	34.33	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		30.81	27.79	-12.21	40	32.62	25.46	1.07	31.36	-	-	P	H
		81.84	24.9	-15.1	40	41.15	14.02	1.28	31.55	-	-	P	H
		181.2	32.43	-11.07	43.5	46.64	15.41	1.87	31.49	200	71	P	H
		339.9	25.11	-20.89	46	33.03	20.9	2.41	31.23	-	-	P	H
		634.6	28.88	-17.12	46	30.36	25.74	3.57	30.79	-	-	P	H
		949.6	32.86	-13.14	46	29.12	30.2	4.07	30.53	-	-	P	H
													H
													H
													H
													H
													H
													H
		35.4	34.33	-5.67	40	41.97	22.72	1.07	31.43	100	85	P	V
		61.86	27.57	-12.43	40	45.73	12.14	1.28	31.58	-	-	P	V
		79.95	23.6	-16.4	40	40.08	13.79	1.28	31.55	-	-	P	V
		427.4	24.91	-21.09	46	30.36	22.79	2.89	31.13	-	-	P	V
		633.9	28.23	-17.77	46	29.71	25.74	3.57	30.79	-	-	P	V
		951	33.4	-12.6	46	29.66	30.2	4.07	30.53	-	-	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".