Appendix A. Radiated Spurious Emission

Test Engineer :	Bill Chang and Ian Liang	Temperature :	25~26°C
		Relative Humidity :	50~51%

15C 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		2353.02	43.86	-30.14	74	43.66	26.94	6.66	33.4	164	235	P	H
		2389.74	32.7	-21.3	54	32.47	27.03	6.57	33.37	164	235	A	H
	*	2401.753	98.81	-	-	98.56	27.03	6.57	33.35	164	235	P	H
	*	2402.004	98.17	-	-	97.92	27.03	6.57	33.35	164	235	A	H
													H
													H
		2388.48	41.69	-32.31	74	41.46	27.03	6.57	33.37	100	206	P	V
		2375.07	31.33	-22.67	54	31.1	26.99	6.62	33.38	100	206	A	V
	*	2402.254	94.48	-	-	94.23	27.03	6.57	33.35	100	206	P	V
	*	2402.004	93.82	-	-	93.57	27.03	6.57	33.35	100	206	A	V
													V
													V
BLE CH 19 2440MHz		2373.99	42.12	-31.88	74	41.89	26.99	6.62	33.38	131	238	P	H
		2385.87	32.25	-21.75	54	32.02	27.03	6.57	33.37	131	238	A	H
	*	2440.247	100.07	-	-	99.42	27.17	6.79	33.31	131	238	P	H
	*	2440.08	99.38	-	-	98.73	27.17	6.79	33.31	131	238	A	H
		2494.32	47.06	-26.94	74	46.01	27.3	7.01	33.26	131	238	P	H
		2489.04	34.89	-19.11	54	33.84	27.3	7.01	33.26	131	238	A	H
		2353.74	40.85	-33.15	74	40.65	26.94	6.66	33.4	121	192	P	V
		2389.56	31.16	-22.84	54	30.93	27.03	6.57	33.37	121	192	A	V
	*	2439.746	95.21	-	-	94.56	27.17	6.79	33.31	121	192	P	V
	*	2440.08	94.5	-	-	93.85	27.17	6.79	33.31	121	192	A	V
		2487.36	42.82	-31.18	74	41.81	27.26	7.01	33.26	121	192	P	V
		2486.36	32.9	-21.1	54	31.9	27.26	7.01	33.27	121	192	A	V

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)
BLE CH 39 2480MHz	*	2480.243	101.85	-	-	100.85	27.26	7.01	33.27	103	242	P	H
	*	2480.076	101.21	-	-	100.21	27.26	7.01	33.27	103	242	A	H
		2484.24	45.42	-28.58	74	44.42	27.26	7.01	33.27	103	242	P	H
		2483.56	36.32	-17.68	54	35.32	27.26	7.01	33.27	103	242	A	H
													H
													H
	*	2480.243	98.03	-	-	97.03	27.26	7.01	33.27	117	197	P	V
	*	2479.993	97.34	-	-	96.34	27.26	7.01	33.27	117	197	A	V
		2483.76	43.69	-30.31	74	42.69	27.26	7.01	33.27	117	197	P	V
		2483.68	34.25	-19.75	54	33.25	27.26	7.01	33.27	117	197	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15C 2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 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		4804	42.92	-31.08	74	56.74	31.03	10.53	55.38	100	0	P	H
													H
													H
													H
		4804	45.35	-28.65	74	59.17	31.03	10.53	55.38	100	0	P	V
													V
													V
													V
BLE CH 19 2440MHz		4880	44.84	-29.16	74	58.46	31.13	10.67	55.42	100	0	P	H
		7320	49.81	-24.19	74	55.6	36.15	13.63	55.57	100	0	P	H
													H
													H
		4880	43.55	-30.45	74	57.17	31.13	10.67	55.42	100	0	P	V
		7320	50.89	-23.11	74	56.68	36.15	13.63	55.57	100	0	P	V
													V
													V
BLE CH 39 2480MHz		4960	44.18	-29.82	74	57.64	31.25	10.77	55.48	100	0	P	H
		7440	49.91	-24.09	74	55.19	36.47	13.7	55.45	100	0	P	H
													H
													H
		4960	43.59	-30.41	74	57.05	31.25	10.77	55.48	100	0	P	V
		7440	50.83	-23.17	74	56.11	36.47	13.7	55.45	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15C 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		48.36	22.76	-17.24	40	43.67	9.93	0.96	31.8			P	H
		103.44	26.66	-16.84	43.5	46.3	10.74	1.4	31.78	141	341	P	H
		250.05	25.65	-20.35	46	42.42	12.8	2.2	31.77			P	H
		625.5	23.85	-22.15	46	32.37	19.95	3.57	32.04			P	H
		737.5	23.99	-22.01	46	30.77	21.35	3.87	32			P	H
		957.3	27.99	-18.01	46	30.67	23.83	4.47	30.98			P	H
													H
													H
													H
													H
													H
													H
		47.28	32.58	-7.42	40	52.98	10.45	0.96	31.81	108	79	P	V
		174.99	23.34	-20.16	43.5	43.45	9.85	1.82	31.78			P	V
		271.11	23.34	-22.66	46	39.42	13.38	2.31	31.77			P	V
		555.5	21.71	-24.29	46	31.51	18.82	3.35	31.97			P	V
		713	23.21	-22.79	46	30.57	20.85	3.81	32.02			P	V
		958	28.55	-17.45	46	31.22	23.83	4.47	30.97			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 per 15.209(c).
!	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".