Appendix A. Radiated Spurious Emission

Test Engineer :	Kyle Jhuang, Citta Ke, and Karl Hou	Temperature :	25~26°C
		Relative Humidity :	50~51%

15C 2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

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 00 2402MHz		2366.52	52.03	-21.97	74	48.41	32.7	4.6	33.68	108	54	P	H
		2367.87	40.22	-13.78	54	36.6	32.7	4.6	33.68	108	54	A	H
	*	2402	98.02	-	-	94.28	32.77	4.62	33.65	108	54	P	H
	*	2402	97.26	-	-	93.52	32.77	4.62	33.65	108	54	A	H
													H
													H
		2381.55	51.42	-22.58	74	47.73	32.73	4.62	33.66	100	282	P	V
		2341.95	40.33	-13.67	54	36.79	32.66	4.57	33.69	100	282	A	V
	*	2402	92.63	-	-	88.89	32.77	4.62	33.65	100	282	P	V
	*	2402	91.84	-	-	88.1	32.77	4.62	33.65	100	282	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

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 19 2440MHz		2365.35	51.51	-22.49	74	47.89	32.7	4.6	33.68	107	56	P	H
		2360.04	40.81	-13.19	54	37.19	32.7	4.6	33.68	107	56	A	H
	*	2440	100.21	-	-	96.24	32.89	4.68	33.6	107	56	P	H
	*	2440	99.36	-	-	95.39	32.89	4.68	33.6	107	56	A	H
		2487.48	51.64	-22.36	74	47.52	32.96	4.73	33.57	107	56	P	H
		2499.92	42.65	-11.35	54	38.48	33	4.73	33.56	107	56	A	H
		2372.28	51.49	-22.51	74	47.82	32.73	4.6	33.66	100	287	P	V
		2379.84	40.49	-13.51	54	36.82	32.73	4.6	33.66	100	287	A	V
	*	2440	96.93	-	-	92.96	32.89	4.68	33.6	100	287	P	V
	*	2440	96.03	-	-	92.06	32.89	4.68	33.6	100	287	A	V
		2487.56	51.44	-22.56	74	47.27	33	4.73	33.56	100	287	P	V
		2499.88	41.36	-12.64	54	37.19	33	4.73	33.56	100	287	A	V
BLE CH 39 2480MHz	*	2480	101.17	-	-	97.05	32.96	4.73	33.57	100	57	P	H
	*	2480	100.36	-	-	96.24	32.96	4.73	33.57	100	57	A	H
		2485.16	56.62	-17.38	74	52.5	32.96	4.73	33.57	100	57	P	H
		2484.92	46.13	-7.87	54	42.01	32.96	4.73	33.57	100	57	A	H
													H
													H
	*	2480	96.68	-	-	92.56	32.96	4.73	33.57	100	284	P	V
	*	2480	95.88	-	-	91.76	32.96	4.73	33.57	100	284	A	V
		2485.08	52.6	-21.4	74	48.48	32.96	4.73	33.57	100	284	P	V
		2484.96	43.21	-10.79	54	39.09	32.96	4.73	33.57	100	284	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	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 00 2402MHz		4803	40.68	-33.32	74	57.76	35.04	6.52	58.64	100	0	P	H
													H
													H
													H
		4803	41.34	-32.66	74	58.42	35.04	6.52	58.64	100	0	P	V
													V
													V
													V
BLE CH 19 2440MHz		4881	41.28	-32.72	74	58.2	35.02	6.58	58.52	100	0	P	H
		7320	42.52	-31.48	74	56.07	36.4	8.24	58.19	100	0	P	H
													H
													H
		4881	41.24	-32.76	74	58.16	35.02	6.58	58.52	100	0	P	V
		7320	42.63	-31.37	74	56.18	36.4	8.24	58.19	100	0	P	V
													V
													V
BLE CH 39 2480MHz		4960	40.84	-33.16	74	57.58	35.01	6.61	58.36	100	0	P	H
		7440	42.52	-31.48	74	56.1	36.47	8.36	58.41	100	0	P	H
													H
													H
		4960	41.41	-32.59	74	58.15	35.01	6.61	58.36	100	0	P	V
		7440	42.13	-31.87	74	55.71	36.47	8.36	58.41	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		101.82	30.54	-12.96	43.5	50.73	10.48	1.11	31.78	-	-	P	H
		192	32.43	-11.07	43.5	53.96	8.8	1.45	31.78	-	-	P	H
		212.25	36.31	-7.19	43.5	57.35	9.22	1.52	31.78	171	19	P	H
		558.3	31.97	-14.03	46	41.55	20.06	2.34	31.98	-	-	P	H
		747.3	25.57	-20.43	46	32.61	22.2	2.74	31.98	-	-	P	H
		801.9	28.88	-17.12	46	35.89	22.06	2.84	31.91	-	-	P	H
													H
													H
													H
													H
													H
													H
		101.28	31.58	-11.92	43.5	51.82	10.44	1.1	31.78	125	92	P	V
		192	27.79	-15.71	43.5	49.32	8.8	1.45	31.78	-	-	P	V
		272.46	27.27	-18.73	46	44.46	12.87	1.71	31.77	-	-	P	V
		346.9	22.03	-23.97	46	37.61	14.31	1.89	31.78	-	-	P	V
		558.3	26.33	-19.67	46	35.91	20.06	2.34	31.98	-	-	P	V
		918.8	28.88	-17.12	46	33.3	23.83	3.03	31.28	-	-	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".