Appendix A. Radiated Spurious Emission

Test Engineer :	Stan Hsieh, Luke Chang, and Lewis He	Temperature :	22~23°C
		Relative Humidity :	45~47%

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		2371.11	51.25	-22.75	74	52.09	27.19	6.01	34.04	246	235	P	H
		2389.74	41.93	-12.07	54	42.73	27.23	6.01	34.04	246	235	A	H
	*	2402.254	101.13	-	-	101.93	27.23	6.01	34.04	246	235	P	H
	*	2402.087	100.48	-	-	101.28	27.23	6.01	34.04	246	235	A	H
													H
													H
		2374.44	51.03	-22.97	74	51.87	27.19	6.01	34.04	125	279	P	V
		2389.47	41.9	-12.1	54	42.7	27.23	6.01	34.04	125	279	A	V
	*	2402.254	101.15	-	-	101.95	27.23	6.01	34.04	125	279	P	V
	*	2402.004	100.51	-	-	101.31	27.23	6.01	34.04	125	279	A	V
													V
													V
BLE CH 19 2440MHz		2387.49	51.7	-22.3	74	52.5	27.23	6.01	34.04	238	226	P	H
		2371.65	41.94	-12.06	54	42.78	27.19	6.01	34.04	238	226	A	H
	*	2440.247	102.95	-	-	103.57	27.37	6.04	34.03	238	226	P	H
	*	2439.997	102.39	-	-	103.01	27.37	6.04	34.03	238	226	A	H
		2498.6	51.74	-22.26	74	52.15	27.5	6.09	34	238	226	P	H
		2492.52	42.31	-11.69	54	42.72	27.5	6.09	34	238	226	A	H
		2310.72	50.57	-23.43	74	51.74	27.01	5.89	34.07	100	44	P	V
		2377.5	41.71	-12.29	54	42.55	27.19	6.01	34.04	100	44	A	V
	*	2439.746	99.66	-	-	100.28	27.37	6.04	34.03	100	44	P	V
	*	2439.997	99.07	-	-	99.69	27.37	6.04	34.03	100	44	A	V
		2492.12	51.23	-22.77	74	51.64	27.5	6.09	34	100	44	P	V
		2499.32	42.11	-11.89	54	42.52	27.5	6.09	34	100	44	A	V

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 39 2480MHz	*	2479.742	101.33	-	-	101.81	27.46	6.07	34.01	235	234	P	H
	*	2479.993	100.74	-	-	101.22	27.46	6.07	34.01	235	234	A	H
		2492.8	51.3	-22.7	74	51.71	27.5	6.09	34	235	234	P	H
		2483.64	42.31	-11.69	54	42.77	27.46	6.09	34.01	235	234	A	H
													H
													H
	*	2479.742	100.51	-	-	100.99	27.46	6.07	34.01	117	281	P	V
	*	2479.993	99.96	-	-	100.44	27.46	6.07	34.01	117	281	A	V
		2498.08	51.17	-22.83	74	51.58	27.5	6.09	34	117	281	P	V
		2483.84	42.3	-11.7	54	42.76	27.46	6.09	34.01	117	281	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		4806	33.38	-40.62	74	52.07	31.3	8.65	58.64	100	0	P	H
													H
													H
													H
		4806	32.52	-41.48	74	51.21	31.3	8.65	58.64	100	0	P	V
													V
													V
													V
BLE CH 19 2440MHz		4878	33.46	-40.54	74	51.88	31.41	8.69	58.52	100	0	P	H
		7320	37.42	-36.58	74	48.9	36.32	10.39	58.19	100	0	P	H
													H
													H
		4878	32.95	-41.05	74	51.37	31.41	8.69	58.52	100	0	P	V
		7320	37.25	-36.75	74	48.73	36.32	10.39	58.19	100	0	P	V
													V
													V
BLE CH 39 2480MHz		4962	32.56	-41.44	74	50.55	31.54	8.83	58.36	100	0	P	H
		7440	37.94	-36.06	74	49.24	36.59	10.52	58.41	100	0	P	H
													H
													H
		4962	33.17	-40.83	74	51.16	31.54	8.83	58.36	100	0	P	V
		7440	37.87	-36.13	74	49.17	36.59	10.52	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	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)
2.4GHz BLE LF		31.62	26.61	-13.39	40	40.58	17.19	0.67	31.83			P	H
		40.53	29.39	-10.61	40	48.16	12.38	0.67	31.82	100	120	P	H
		114.51	26.29	-17.21	43.5	45.49	11.3	1.28	31.78			P	H
		432.3	24.63	-21.37	46	37.6	16.45	2.41	31.83			P	H
		540.1	28.35	-17.65	46	39.03	18.5	2.77	31.95			P	H
		647.9	24.97	-21.03	46	34.89	19.1	3.02	32.04			P	H
													H
													H
													H
													H
													H
													H
		40.53	30.15	-9.85	40	48.92	12.38	0.67	31.82	100	128	P	V
		87.24	27.22	-12.78	40	49.68	8.05	1.28	31.79			P	V
		114.51	21.95	-21.55	43.5	41.15	11.3	1.28	31.78			P	V
		540.1	25.35	-20.65	46	36.03	18.5	2.77	31.95			P	V
		647.9	24.22	-21.78	46	34.14	19.1	3.02	32.04			P	V
		903.4	30	-16	46	37.76	20.1	3.55	31.41			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”.