Appendix A. Radiated Spurious Emission

Test Engineer :	Eric Shih, Stan Hsieh and Derreck Chen	Temperature :	20~22°C
		Relative Humidity :	46~48%

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		2383.8	50.68	-23.32	74	51.52	27.19	6.01	34.04	100	220	P	H
		2371.29	41.62	-12.38	54	42.46	27.19	6.01	34.04	100	220	A	H
	*	2402.254	97.15	-	-	97.95	27.23	6.01	34.04	100	220	P	H
	*	2402.087	96.59	-	-	97.39	27.23	6.01	34.04	100	220	A	H
													H
													H
		2322.06	50.78	-23.22	74	51.9	27.05	5.89	34.06	191	179	P	V
		2356.44	41.84	-12.16	54	42.8	27.14	5.95	34.05	191	179	A	V
	*	2402.254	96.49	-	-	97.29	27.23	6.01	34.04	191	179	P	V
	*	2402.004	95.9	-	-	96.7	27.23	6.01	34.04	191	179	A	V
													V
													V
BLE CH 19 2440MHz		2382.09	51.19	-22.81	74	52.03	27.19	6.01	34.04	138	219	P	H
		2343.66	41.63	-12.37	54	42.63	27.1	5.95	34.05	138	219	A	H
	*	2439.746	99.15	-	-	99.77	27.37	6.04	34.03	138	219	P	H
	*	2439.997	98.48	-	-	99.1	27.37	6.04	34.03	138	219	A	H
		2496.44	52.01	-21.99	74	52.42	27.5	6.09	34	138	219	P	H
		2486.56	41.97	-12.03	54	42.43	27.46	6.09	34.01	138	219	A	H
		2312.88	51.21	-22.79	74	52.38	27.01	5.89	34.07	167	181	P	V
		2375.16	41.66	-12.34	54	42.5	27.19	6.01	34.04	167	181	A	V
	*	2439.83	97.31	-	-	97.93	27.37	6.04	34.03	167	181	P	V
	*	2440.08	96.69	-	-	97.31	27.37	6.04	34.03	167	181	A	V
		2485.8	51.18	-22.82	74	51.64	27.46	6.09	34.01	167	181	P	V
		2496.88	41.88	-12.12	54	42.29	27.5	6.09	34	167	181	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	*	2479.826	98.73	-	-	99.21	27.46	6.07	34.01	140	222	P	H
	*	2480.076	98.09	-	-	98.57	27.46	6.07	34.01	140	222	A	H
		2491.48	50.96	-23.04	74	51.38	27.5	6.09	34.01	140	222	P	H
		2484.4	42.59	-11.41	54	43.05	27.46	6.09	34.01	140	222	A	H
													H
													H
	*	2479.742	96.5	-	-	96.98	27.46	6.07	34.01	187	157	P	V
	*	2480.076	95.85	-	-	96.33	27.46	6.07	34.01	187	157	A	V
		2485.32	51.95	-22.05	74	52.41	27.46	6.09	34.01	187	157	P	V
		2484.36	42.38	-11.62	54	42.84	27.46	6.09	34.01	187	157	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	31.55	-42.45	74	50.24	31.3	8.65	58.64	100	0	P	H
													H
													H
													H
		4804	32.63	-41.37	74	51.32	31.3	8.65	58.64	100	0	P	V
													V
													V
													V
BLE CH 19 2440MHz		4880	31.45	-42.55	74	49.87	31.41	8.69	58.52	100	0	P	H
		7320	37.48	-36.52	74	48.96	36.32	10.39	58.19	100	0	P	H
													H
													H
		4880	32.95	-41.05	74	51.37	31.41	8.69	58.52	100	0	P	V
		7320	38.84	-35.16	74	50.32	36.32	10.39	58.19	100	0	P	V
													V
													V
BLE CH 39 2480MHz		4960	33.01	-40.99	74	51	31.54	8.83	58.36	100	0	P	H
		7440	37.59	-36.41	74	48.89	36.59	10.52	58.41	100	0	P	H
													H
													H
		4960	33.08	-40.92	74	51.07	31.54	8.83	58.36	100	0	P	V
		7440	39.76	-34.24	74	51.06	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	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		48.9	25.69	-14.31	40	48.36	8.09	1.04	31.8	110	325	P	H
		95.07	26.91	-16.59	43.5	48.05	9.36	1.28	31.78			P	H
		159.33	27.3	-16.2	43.5	47.99	9.63	1.46	31.78			P	H
		571.6	30.27	-15.73	46	40.88	18.5	2.89	32			P	H
		587	29.42	-16.58	46	40.05	18.5	2.89	32.02			P	H
		681.5	24.9	-21.1	46	35.02	18.9	3.02	32.04			P	H
													H
													H
													H
													H
													H
													H
		57	21.99	-18.01	40	47.05	5.7	1.04	31.8			P	V
		96.42	24.23	-19.27	43.5	45.17	9.56	1.28	31.78			P	V
		162.03	22.52	-20.98	43.5	43.44	9.4	1.46	31.78			P	V
		371.4	17.8	-28.2	46	32.46	14.81	2.32	31.79			P	V
		587	27.68	-18.32	46	38.31	18.5	2.89	32.02			P	V
		820.1	29.24	-16.76	46	37.56	20.1	3.4	31.82	108	85	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".