Appendix A. Radiated Spurious Emission

Test Engineer :	Derreck Chen, Nick Yu and Ken Wu	Temperature :	23~25°C
		Relative Humidity :	46~49%

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		2389.11	47.28	-26.72	74	41.62	32.18	7.75	34.27	100	38	P	H
		2353.56	35.24	-18.76	54	29.68	32.13	7.68	34.25	100	38	A	H
	*	2401.753	94.56	-	-	88.93	32.18	7.75	34.3	100	38	P	H
	*	2402.004	93.88	-	-	88.25	32.18	7.75	34.3	100	38	A	H
													H
													H
		2384.34	48.17	-25.83	74	42.53	32.16	7.75	34.27	103	27	P	V
		2376.51	35.37	-18.63	54	29.8	32.16	7.68	34.27	103	27	A	V
	*	2402.171	92.61	-	-	86.98	32.18	7.75	34.3	103	27	P	V
	*	2401.92	91.95	-	-	86.32	32.18	7.75	34.3	103	27	A	V
													V
													V
BLE CH 19 2440MHz		2364.27	47.18	-26.82	74	41.64	32.13	7.68	34.27	100	28	P	H
		2364.63	35.22	-18.78	54	29.68	32.13	7.68	34.27	100	28	A	H
	*	2440.247	97.3	-	-	91.58	32.24	7.83	34.35	100	28	P	H
	*	2439.997	96.63	-	-	90.91	32.24	7.83	34.35	100	28	P	H
		2496.44	47.83	-26.17	74	42.1	32.3	7.91	34.48	100	28	P	H
		2489.6	35.3	-18.7	54	29.52	32.3	7.91	34.43	100	28	A	H
		2336.91	47.23	-26.77	74	41.74	32.11	7.6	34.22	105	24	P	V
		2318.55	35.23	-18.77	54	29.76	32.09	7.6	34.22	105	24	A	V
	*	2440.164	93.38	-	-	87.66	32.24	7.83	34.35	105	24	P	V
	*	2439.997	92.69	-	-	86.97	32.24	7.83	34.35	105	24	P	V
		2492.48	48.8	-25.2	74	43.07	32.3	7.91	34.48	105	24	P	V
		2499.2	35.21	-18.79	54	29.48	32.3	7.91	34.48	105	24	A	V

BLE CH 39 2480MHz	*	2479.909	96.17	-	-	90.41	32.28	7.91	34.43	114	32	P	H
	*	2480.076	95.47	-	-	89.71	32.28	7.91	34.43	114	32	A	H
		2484.44	47.86	-26.14	74	42.1	32.28	7.91	34.43	114	32	P	H
		2484.12	36.56	-17.44	54	30.8	32.28	7.91	34.43	114	32	A	H
													H
													H
	*	2479.826	93.27	-	-	87.51	32.28	7.91	34.43	100	27	P	V
	*	2480.076	92.56	-	-	86.8	32.28	7.91	34.43	100	27	A	V
		2492.12	48.1	-25.9	74	42.37	32.3	7.91	34.48	100	27	P	V
		2486.32	35.54	-18.46	54	29.78	32.28	7.91	34.43	100	27	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	41.98	-32.02	74	565.72	-500	11.11	34.85	100	0	P	H
													H
													H
													H
		4806	41.9	-32.1	74	565.64	-500	11.11	34.85	100	0	P	V
													V
													V
													V
BLE CH 19 2440MHz		4878	42.33	-31.67	74	565.97	-500	11.21	34.85	100	0	P	H
		7320	43.78	-30.22	74	564.43	-500	15.08	35.73	100	0	P	H
													H
													H
		4878	41.64	-32.36	74	565.28	-500	11.21	34.85	100	0	P	V
		7320	43.7	-30.3	74	564.35	-500	15.08	35.73	100	0	P	V
													V
													V
BLE CH 39 2480MHz		4960	41.81	-32.19	74	54.78	34.37	11.32	58.66	100	0	P	H
		7440	43.28	-30.72	74	50.4	35.6	15.13	57.85	100	0	P	H
													H
													H
		4959	41.66	-32.34	74	54.63	34.37	11.32	58.66	100	0	P	V
		7440	43.12	-30.88	74	50.24	35.6	15.13	57.85	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		77.79	27.12	-12.88	40	49.36	6.9	2.06	31.2			P	H
		181.2	26.95	-16.55	43.5	46.3	8.88	2.69	30.92			P	H
		228.45	35.74	-10.26	46	53.76	10.02	2.96	31	162	35	P	H
		399.4	29.56	-16.44	46	41.04	15.9	3.52	30.9			P	H
		799.1	30.94	-15.06	46	34.63	21.99	4.62	30.3			P	H
		960.1	39.21	-14.79	54	39.93	24.7	4.94	30.36			P	H
													H
													H
													H
													H
													H
													H
		78.06	26.2	-13.8	40	48.41	6.93	2.06	31.2			P	V
		167.7	30.96	-12.54	43.5	49.74	9.74	2.61	31.13	201	54	P	V
		229.53	27.18	-18.82	46	45.12	10.1	2.96	31			P	V
		400.8	25.11	-20.89	46	36.56	15.93	3.52	30.9			P	V
		599.6	30.84	-15.16	46	37.77	19.59	4.08	30.6			P	V
		840.4	28.12	-17.88	46	30.6	23.2	4.7	30.38			P	V
													V
													V
													V
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													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".