



Appendix A. Radiated Spurious Emission

Test Engineer :	Derreck Chen, Ken Wu and Nick Yu	Temperature :	23~25°C
		Relative Humidity :	48~51%

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		2330.88	46	-28	74	40.53	32.09	7.6	34.22	121	360	P	H
		2363.37	34.03	-19.97	54	28.47	32.13	7.68	34.25	121	360	A	H
	*	2402.254	97.74	-	-	92.11	32.18	7.75	34.3	121	360	P	H
	*	2401.92	96.83	-	-	91.2	32.18	7.75	34.3	121	360	A	H
													H
													H
		2336.28	46.22	-27.78	74	40.73	32.11	7.6	34.22	118	6	P	V
		2347.62	33.99	-20.01	54	28.45	32.11	7.68	34.25	118	6	A	V
	*	2402.254	95.91	-	-	90.28	32.18	7.75	34.3	118	6	P	V
	*	2402.004	94.96	-	-	89.33	32.18	7.75	34.3	118	6	A	V
													V
													V
BLE CH 19 2440MHz		2324.76	45.98	-28.02	74	40.51	32.09	7.6	34.22	100	358	P	H
		2352.3	33.96	-20.04	54	28.4	32.13	7.68	34.25	100	358	A	H
	*	2440.247	97.69	-	-	91.97	32.24	7.83	34.35	100	358	P	H
	*	2439.997	96.84	-	-	91.12	32.24	7.83	34.35	100	358	A	H
		2496.36	46.1	-27.9	74	40.37	32.3	7.91	34.48	100	358	P	H
		2488.2	34.09	-19.91	54	28.31	32.3	7.91	34.43	100	358	A	H
		2320.89	46.05	-27.95	74	40.58	32.09	7.6	34.22	143	103	P	V
		2356.8	33.87	-20.13	54	28.31	32.13	7.68	34.25	143	103	A	V
	*	2440.331	97.06	-	-	91.34	32.24	7.83	34.35	143	103	P	V
	*	2439.997	96.2	-	-	90.48	32.24	7.83	34.35	143	103	A	V
		2496.44	46.74	-27.26	74	41.01	32.3	7.91	34.48	143	103	P	V
		2488.36	34.18	-19.82	54	28.4	32.3	7.91	34.43	143	103	A	V



BLE CH 39 2480MHz	*	2479.826	97.49	-	-	91.73	32.28	7.91	34.43	120	359	P	H
	*	2480.076	96.63	-	-	90.87	32.28	7.91	34.43	120	359	A	H
		2487	47.15	-26.85	74	41.39	32.28	7.91	34.43	120	359	P	H
		2483.72	34.67	-19.33	54	28.91	32.28	7.91	34.43	120	359	A	H
													H
													H
	*	2480.327	96.9	-	-	91.14	32.28	7.91	34.43	302	119	P	V
	*	2480.076	96.04	-	-	90.28	32.28	7.91	34.43	302	119	A	V
		2483.52	46.67	-27.33	74	40.91	32.28	7.91	34.43	302	119	P	V
		2483.52	34.53	-19.47	54	28.77	32.28	7.91	34.43	302	119	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		4806	47.03	-26.97	74	60.63	34.25	11.11	58.96	100	0	P	H
													H
													H
													H
		4806	45.81	-28.19	74	59.41	34.25	11.11	58.96	100	0	P	V
													V
													V
													V
BLE CH 19 2440MHz		4878	44.14	-29.86	74	57.46	34.3	11.21	58.83	100	0	P	H
		7320	45.09	-28.91	74	52.15	35.6	15.08	57.74	100	0	P	H
													H
													H
		4878	42.15	-31.85	74	55.47	34.3	11.21	58.83	100	0	P	V
		7320	47.28	-26.72	74	54.34	35.6	15.08	57.74	100	0	P	V
													V
													V
BLE CH 39 2480MHz		4962	42.15	-31.85	74	55.12	34.37	11.32	58.66	100	0	P	H
		7440	42.9	-31.1	74	50.02	35.6	15.13	57.85	100	0	P	H
													H
													H
		4962	40.85	-33.15	74	53.82	34.37	11.32	58.66	100	0	P	V
		7440	43.25	-30.75	74	50.37	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)

[illegible]

**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		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01													
2412MHz		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”.