



Appendix B. Radiated Spurious Emission

Test Engineer :	Luke Chang, Ricky Su, and Nick Yu	Temperature :	20~24°C
		Relative Humidity :	50~54%

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		2333.58	54.73	-19.27	74	54.4	26.95	7.31	33.93	286	45	P	H
		2351.04	43.4	-10.6	54	43.03	27	7.31	33.94	286	45	A	H
	*	2402	89.53	-	-	89.02	27.13	7.38	34	286	45	P	H
	*	2402	88.97	-	-	88.46	27.13	7.38	34	286	45	A	H
													H
													H
		2363.19	54.31	-19.69	74	53.92	27.04	7.31	33.96	338	340	P	V
		2364.72	43.59	-10.41	54	43.2	27.04	7.31	33.96	338	340	A	V
	*	2402	90.28	-	-	89.77	27.13	7.38	34	338	340	P	V
	*	2402	89.81	-	-	89.3	27.13	7.38	34	338	340	A	V
													V
													V
BLE CH 19 2440MHz		2368.14	54.22	-19.78	74	53.83	27.04	7.31	33.96	275	48	P	H
		2330.43	43.57	-10.43	54	43.24	26.95	7.31	33.93	275	48	A	H
	*	2440	95.2	-	-	94.54	27.27	7.44	34.05	275	48	P	H
	*	2440	94.25	-	-	93.59	27.27	7.44	34.05	275	48	A	H
		2499.84	54.53	-19.47	74	53.67	27.4	7.56	34.1	275	48	P	H
		2495.72	43.76	-10.24	54	42.9	27.4	7.56	34.1	275	48	A	H
		2364.18	55.92	-18.08	74	55.53	27.04	7.31	33.96	106	113	P	V
		2384.43	43.52	-10.48	54	43.03	27.09	7.38	33.98	106	113	A	V
	*	2440	94.63	-	-	93.97	27.27	7.44	34.05	106	113	P	V
	*	2440	92.9	-	-	92.24	27.27	7.44	34.05	106	113	A	V
		2497.28	54.36	-19.64	74	53.5	27.4	7.56	34.1	106	113	P	V
		2496.12	43.76	-10.24	54	42.9	27.4	7.56	34.1	106	113	A	V



BLE CH 39 2480MHz	*	2480	92.89	-	-	92.11	27.36	7.5	34.08	100	40	P	H
	*	2480	92.18	-	-	91.4	27.36	7.5	34.08	100	40	A	H
		2492.64	55.06	-18.94	74	54.2	27.4	7.56	34.1	100	40	P	H
		2488.48	43.79	-10.21	54	42.93	27.4	7.56	34.1	100	40	A	H
													H
													H
	*	2480	94.13	-	-	93.35	27.36	7.5	34.08	100	94	P	V
	*	2480	93.13	-	-	92.35	27.36	7.5	34.08	100	94	A	V
		2495.56	54.19	-19.81	74	53.33	27.4	7.56	34.1	100	94	P	V
		2486.6	43.62	-10.38	54	42.84	27.36	7.5	34.08	100	94	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

BLE	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
BLE CH 00 2402MHz		4806	46.01	-27.99	74	59.63	31.23	10.63	55.48	100	0	P	H
													H
													H
													H
		4806	44.95	-29.05	74	58.57	31.23	10.63	55.48	100	0	P	V
													V
													V
													V
BLE CH 19 2440MHz		4878	46.16	-27.84	74	59.67	31.33	10.68	55.52	100	0	P	H
		7320	50.92	-23.08	74	57.56	36.12	13.28	56.04	100	0	P	H
													H
													H
		4878	46.55	-27.45	74	60.06	31.33	10.68	55.52	100	0	P	V
		7320	50.27	-23.73	74	56.91	36.12	13.28	56.04	100	0	P	V
													V
													V
BLE CH 39 2480MHz		4962	46.14	-27.86	74	59.54	31.45	10.73	55.58	100	0	P	H
		7440	50.07	-23.93	74	56.16	36.46	13.39	55.94	100	0	P	H
													H
													H
		4962	45.75	-28.25	74	59.15	31.45	10.73	55.58	100	0	P	V
		7440	50.81	-23.19	74	56.9	36.46	13.39	55.94	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

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		83.19	36.38	-3.62	40	57.56	7.86	1.39	30.43	102	157	P	H
		116.13	32.89	-10.61	43.5	50.33	11.31	1.64	30.39			P	H
		188.76	34.07	-9.43	43.5	53.37	8.92	2.09	30.31			P	H
		322.4	26.2	-19.8	46	40.28	13.48	2.56	30.12			P	H
		571.6	28.01	-17.99	46	34.08	19.97	3.66	29.7			P	H
		987.4	28.52	-25.48	54	28.33	24.49	4.67	28.97			P	H
													H
													H
													H
													H
													H
													H
		83.46	36.88	-3.12	40	58.06	7.86	1.39	30.43	100	215	P	V
		120.99	36.6	-6.9	43.5	53.81	11.54	1.64	30.39			P	V
		217.38	35.09	-10.91	46	53.95	9.2	2.21	30.27			P	V
		300.7	27.33	-18.67	46	41.75	13.17	2.56	30.15			P	V
		780.9	32.55	-13.45	46	35.55	22.25	4.17	29.42			P	V
		993	29.39	-24.61	54	29.35	24.31	4.67	28.94			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.
!	Test result is over limit line.
P/A	Peak or Average
H/V	Horizontal or Vertical



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”.