



## Appendix B. Radiated Spurious Emission

Test Engineer :	Karl Hou and Nick Yu and Peter Chiu	Temperature :	22~24°C
		Relative Humidity :	53~58%

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		2367.44	55.99	-18.01	74	53.14	26.97	7.37	31.49	306	64	P	H
		2386.86	45.21	-8.79	54	42.2	27.05	7.45	31.49	306	64	A	H
	*	2404	98.36	-	-	95.31	27.09	7.45	31.49	306	64	P	H
	*	2402	97.3	-	-	94.29	27.05	7.45	31.49	306	64	A	H
													H
													H
		2354.31	56.61	-17.39	74	53.77	26.97	7.37	31.5	110	102	P	V
		2374.68	45.71	-8.29	54	42.82	27.01	7.37	31.49	110	102	A	V
	*	2404	95.74	-	-	92.69	27.09	7.45	31.49	110	102	P	V
	*	2402	94.39	-	-	91.38	27.05	7.45	31.49	110	102	A	V
													V
													V
BLE CH 19 2440MHz		2389.1	56.17	-17.83	74	53.16	27.05	7.45	31.49	297	63	P	H
		2342.76	45.12	-8.88	54	42.32	26.93	7.37	31.5	297	63	A	H
	*	2442	99.36	-	-	96.16	27.18	7.49	31.47	297	63	P	H
	*	2440	98.32	-	-	95.13	27.18	7.49	31.48	297	63	A	H
		2490.97	55.63	-18.37	74	52.27	27.3	7.53	31.47	297	63	P	H
		2499.09	45.41	-8.59	54	42.04	27.3	7.53	31.46	297	63	A	H
		2373.7	56.14	-17.86	74	53.25	27.01	7.37	31.49	104	100	P	V
		2354.8	45.23	-8.77	54	42.39	26.97	7.37	31.5	104	100	A	V
	*	2442	97.61	-	-	94.41	27.18	7.49	31.47	104	100	P	V
	*	2440	96.57	-	-	93.38	27.18	7.49	31.48	104	100	A	V
		2486.28	56.19	-17.81	74	52.87	27.26	7.53	31.47	104	100	P	V
		2498.67	45.47	-8.53	54	42.1	27.3	7.53	31.46	104	100	A	V



<b>BLE CH 39 2480MHz</b>	*	2482	97.89	-	-	94.57	27.26	7.53	31.47	293	63	P	H
	*	2480	96.98	-	-	93.66	27.26	7.53	31.47	293	63	A	H
		2495.04	56.77	-17.23	74	53.4	27.3	7.53	31.46	293	63	P	H
		2484.56	45.42	-8.58	54	42.1	27.26	7.53	31.47	293	63	A	H
													H
													H
	*	2482	95.5	-	-	92.18	27.26	7.53	31.47	120	101	P	V
	*	2480	94.65	-	-	91.33	27.26	7.53	31.47	120	101	A	V
		2492.24	56.7	-17.3	74	53.33	27.3	7.53	31.46	120	101	P	V
		2488.84	45.37	-8.63	54	42.01	27.3	7.53	31.47	120	101	A	V
													V
													V
<b>Remark</b>	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	37.54	-36.46	74	53.87	31.23	10.59	58.15	100	0	P	H
													H
													H
													H
		4806	36.56	-37.44	74	52.89	31.23	10.59	58.15	100	0	P	V
													V
													V
													V
BLE CH 19 2440MHz		4878	37	-37	74	52.88	31.33	10.89	58.1	100	0	P	H
		7320	42.86	-31.14	74	51.66	36.12	14.18	59.1	100	0	P	H
													H
													H
		4880	36.76	-37.24	74	52.64	31.33	10.89	58.1	100	0	P	V
		7320	42.46	-31.54	74	51.26	36.12	14.18	59.1	100	0	P	V
													V
													V
BLE CH 39 2480MHz		4962	37.99	-36.01	74	53.38	31.45	11.19	58.03	100	0	P	H
		7440	41.46	-32.54	74	49.85	36.46	14.32	59.17	100	0	P	H
													H
													H
		4960	38.2	-35.8	74	53.59	31.45	11.19	58.03	100	0	P	V
		7440	43.07	-30.93	74	51.46	36.46	14.32	59.17	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		39.99	22.76	-17.24	40	34.14	20.3	0.78	32.46	-	-	P	H
		138	25.8	-17.7	43.5	38.95	17.84	1.43	32.42	-	-	P	H
		225.21	23.8	-22.2	46	37.98	16.35	1.83	32.36	-	-	P	H
		462.4	24.54	-21.46	46	30.52	23.33	3.08	32.39	-	-	P	H
		668.2	27.32	-18.68	46	29.76	26.15	3.82	32.41	-	-	P	H
		848.8	31.55	-14.45	46	30.58	28.58	4.28	31.89	100	0	P	H
													H
													H
													H
													H
													H
													H
		39.18	29.85	-10.15	40	40.67	20.86	0.78	32.46	100	0	P	V
		84.27	22.27	-17.73	40	39.51	14.14	1.06	32.44	-	-	P	V
		139.62	22.18	-21.32	43.5	35.37	17.8	1.43	32.42	-	-	P	V
		549.2	25.12	-20.88	46	29.73	24.49	3.3	32.4	-	-	P	V
		736.1	28.9	-17.1	46	30.07	27.27	3.89	32.33	-	-	P	V
		913.9	32.47	-13.53	46	30.04	29.28	4.6	31.45	-	-	P	V
													V
													V
												V	
												V	
												V	
												V	
												V	
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



**Note symbol**

*	<b>Fundamental Frequency</b> which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is <b>over limit</b> line.
P/A	<b>Peak</b> or <b>Average</b>
H/V	<b>Horizontal</b> or <b>Vertical</b>

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”.**