



## Appendix B. Radiated Spurious Emission

Test Engineer :	Tsung Lee	Temperature :	23~24°C
		Relative Humidity :	47~49%

### 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		2375.94	50.53	-23.47	74	51.19	27.19	5.39	33.24	117	89	P	H
		2387.595	39.93	-14.07	54	40.55	27.23	5.39	33.24	117	89	A	H
	*	2402	94.61	-	-	95.21	27.23	5.39	33.22	117	89	P	H
	*	2402	94.42	-	-	95.02	27.23	5.39	33.22	117	89	A	H
													H
													H
		2361.135	51.44	-22.56	74	52.22	27.14	5.33	33.25	378	38	P	V
		2387.49	39.9	-14.1	54	40.52	27.23	5.39	33.24	378	38	A	V
	*	2402	89.16	-	-	89.76	27.23	5.39	33.22	378	38	P	V
	*	2402	89.05	-	-	89.65	27.23	5.39	33.22	378	38	A	V
													V
													V
BLE CH 19 2440MHz		2376.5	51.91	-22.09	74	52.57	27.19	5.39	33.24	139	88	P	H
		2384.9	39.89	-14.11	54	40.55	27.19	5.39	33.24	139	88	A	H
	*	2440	94.79	-	-	95.21	27.37	5.42	33.21	139	88	P	H
	*	2440	94.4	-	-	94.82	27.37	5.42	33.21	139	88	A	H
		2493.77	50.96	-23.04	74	51.17	27.5	5.46	33.17	139	88	P	H
		2483.83	40.29	-13.71	54	40.55	27.46	5.46	33.18	139	88	A	H
		2333.38	50.76	-23.24	74	51.64	27.05	5.33	33.26	373	35	P	V
		2389.38	39.89	-14.11	54	40.51	27.23	5.39	33.24	373	35	A	V
	*	2440	89.73	-	-	90.15	27.37	5.42	33.21	373	35	P	V
	*	2440	89.64	-	-	90.06	27.37	5.42	33.21	373	35	A	V
		2483.76	50.78	-23.22	74	51.04	27.46	5.46	33.18	373	35	P	V
		2485.72	40.34	-13.66	54	40.6	27.46	5.46	33.18	373	35	A	V



<b>BLE CH 39 2480MHz</b>	*	2480	94.78	-	-	95.06	27.46	5.44	33.18	100	94	P	H
	*	2480	94.64	-	-	94.92	27.46	5.44	33.18	100	94	A	H
		2487.56	51	-23	74	51.22	27.5	5.46	33.18	100	94	P	H
		2483.52	40.73	-13.27	54	40.99	27.46	5.46	33.18	100	94	A	H
													H
													H
	*	2480	88.5	-	-	88.78	27.46	5.44	33.18	363	182	P	V
	*	2480	87.95	-	-	88.23	27.46	5.44	33.18	363	182	A	V
		2487.88	51.66	-22.34	74	51.88	27.5	5.46	33.18	363	182	P	V
		2483.56	40.39	-13.61	54	40.65	27.46	5.46	33.18	363	182	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		4804	45.03	-28.97	74	38.62	31.42	7.58	32.59	100	0	P	H
													H
													H
													H
		4804	44.39	-29.61	74	37.98	31.42	7.58	32.59	100	0	P	V
													V
													V
													V
BLE CH 19 2440MHz		4880	44.65	-29.35	74	37.97	31.56	7.7	32.58	100	0	P	H
		7320	50.4	-23.6	74	38.19	36.22	9.49	33.5	100	0	P	H
													H
													H
		4880	45.49	-28.51	74	38.81	31.56	7.7	32.58	100	0	P	V
		7320	50.35	-23.65	74	38.14	36.22	9.49	33.5	100	0	P	V
													V
													V
BLE CH 39 2480MHz		4960	45.76	-28.24	74	38.68	31.73	7.93	32.58	100	0	P	H
		7440	50.41	-23.59	74	37.87	36.49	9.61	33.56	100	0	P	H
													H
													H
		4960	44.85	-29.15	74	37.77	31.73	7.93	32.58	100	0	P	V
		7440	50.24	-23.76	74	37.7	36.49	9.61	33.56	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		30	23.01	-16.99	40	29.08	26.1	0.65	32.82			P	H
		123.42	17.31	-26.19	43.5	30.96	17.86	1.14	32.65			P	H
		192	19.13	-24.37	43.5	34.69	15.68	1.48	32.72			P	H
		637.4	26.68	-19.32	46	31.21	25.87	2.62	33.02			P	H
		765.5	29.02	-16.98	46	31.35	27.62	2.97	32.92			P	H
		948.2	31.66	-14.34	46	30.18	29.97	3.29	31.78	100	57	P	H
													H
													H
													H
													H
													H
													H
		54.3	26.69	-13.31	40	44.61	13.92	0.93	32.77	100	87	P	V
		72.12	21.62	-18.38	40	40.56	12.84	0.93	32.71			P	V
		131.52	20.75	-22.75	43.5	34.08	18	1.33	32.66			P	V
		633.9	26.33	-19.67	46	30.89	25.84	2.62	33.02			P	V
		752.9	28.88	-17.12	46	31.38	27.52	2.91	32.93			P	V
		948.9	31.16	-14.84	46	29.67	29.97	3.29	31.77			P	V
													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”.**