



## Appendix B. Radiated Spurious Emission

Test Engineer :	Bill Chang, Ken Wu, and JC Liang	Temperature :	20~23°C
		Relative Humidity :	54~56%

### 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		2368.77	51.41	-22.59	74	52.43	26.96	6.01	33.99	125	52	P	H
		2386.14	41.33	-12.67	54	42.3	27.01	6.01	33.99	125	52	A	H
	*	2402.254	87.32	-	-	88.28	27.01	6.01	33.98	125	52	P	H
	*	2402.087	86.85	-	-	87.81	27.01	6.01	33.98	125	52	A	H
													H
													H
		2383.71	51.08	-22.92	74	52.1	26.96	6.01	33.99	141	349	P	V
		2375.7	41.37	-12.63	54	42.39	26.96	6.01	33.99	141	349	A	V
	*	2402.254	90.7	-	-	91.66	27.01	6.01	33.98	141	349	P	V
	*	2402.087	90.28	-	-	91.24	27.01	6.01	33.98	141	349	A	V
													V
													V
BLE CH 19 2440MHz		2334.75	50.45	-23.55	74	51.63	26.87	5.95	34	151	16	P	H
		2381.28	41.4	-12.6	54	42.42	26.96	6.01	33.99	151	16	A	H
	*	2440	91.94	-	-	92.71	27.16	6.04	33.97	151	16	P	H
	*	2440	91.51	-	-	92.28	27.16	6.04	33.97	151	16	A	H
		2493.08	51	-23	74	51.55	27.3	6.09	33.94	151	16	P	H
		2499.04	41.87	-12.13	54	42.42	27.3	6.09	33.94	151	16	A	H
		2382.27	50.76	-23.24	74	51.78	26.96	6.01	33.99	181	332	P	V
		2384.7	41.3	-12.7	54	42.32	26.96	6.01	33.99	181	332	A	V
	*	2440	95.2	-	-	95.97	27.16	6.04	33.97	181	332	P	V
	*	2440	94.81	-	-	95.58	27.16	6.04	33.97	181	332	A	V
		2493.08	50.61	-23.39	74	51.16	27.3	6.09	33.94	181	332	P	V
		2490.08	41.9	-12.1	54	42.46	27.3	6.09	33.95	181	332	A	V



<b>BLE CH 39 2480MHz</b>	*	2479.742	93.91	-	-	94.54	27.25	6.07	33.95	304	7	P	H
	*	2479.993	93.46	-	-	94.09	27.25	6.07	33.95	304	7	A	H
		2485.84	51.41	-22.59	74	52.02	27.25	6.09	33.95	304	7	P	H
		2497.48	42.08	-11.92	54	42.63	27.3	6.09	33.94	304	7	A	H
													H
													H
	*	2479.742	93.45	-	-	94.08	27.25	6.07	33.95	173	212	P	V
	*	2479.993	92.96	-	-	93.59	27.25	6.07	33.95	173	212	A	V
		2487.84	51.45	-22.55	74	52.01	27.3	6.09	33.95	173	212	P	V
		2490.72	42.11	-11.89	54	42.67	27.3	6.09	33.95	173	212	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		4804	34.57	-39.43	74	59.91	31.1	8.65	65.09	100	0	P	H
													H
													H
													H
		4804	42.32	-31.68	74	67.66	31.1	8.65	65.09	100	0	P	V
													V
													V
													V
BLE CH 19 2440MHz		4880	35.52	-38.48	74	60.64	31.21	8.69	65.02	100	0	P	H
		7320	37.98	-36.02	74	56.54	36.12	10.39	65.07	100	0	P	H
													H
													H
		4880	46.33	-27.67	74	71.45	31.21	8.69	65.02	100	0	P	V
		7320	38.58	-35.42	74	57.14	36.12	10.39	65.07	100	0	P	V
													V
													V
BLE CH 39 2480MHz		4962	37.37	-36.63	74	62.13	31.34	8.83	64.93	100	0	P	H
		7440	40.46	-33.54	74	58.64	36.39	10.52	65.09	100	0	P	H
													H
													H
		4962	46.51	-27.49	74	71.27	31.34	8.83	64.93	100	0	P	V
		7440	40.16	-33.84	74	58.34	36.39	10.52	65.09	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 @ 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 )
2.4GHz BLE LF		66.72	26.47	-13.53	40	52.28	4.94	1.04	31.79	100	222	P	H
		105.87	26.57	-16.93	43.5	46.1	10.97	1.28	31.78			P	H
		217.65	31.21	-14.79	46	53.13	8.07	1.79	31.78			P	H
		323.1	22.93	-23.07	46	39.06	13.53	2.11	31.77			P	H
		663.3	20.62	-25.38	46	30.67	18.97	3.02	32.04			P	H
		951.7	23.46	-22.54	46	30.23	20.57	3.68	31.02			P	H
													H
													H
													H
													H
													H
													H
		43.5	32.53	-7.47	40	53	10.67	0.67	31.81	188	64	P	V
		92.91	24.98	-18.52	43.5	46.5	8.98	1.28	31.78			P	V
		195.78	25.96	-17.54	43.5	47.58	8.52	1.64	31.78			P	V
		313.3	21.7	-24.3	46	37.93	13.43	2.11	31.77			P	V
		722.1	25.94	-20.06	46	35.25	19.56	3.14	32.01			P	V
		902.7	28.54	-17.46	46	36.3	20.1	3.55	31.41			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>P</b> eak or <b>A</b> verage
H/V	<b>H</b> orizontal or <b>V</b> 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”.