



## Appendix A. Radiated Spurious Emission

Test Engineer :	Bill Chang and Ian Liang	Temperature :	25~26°C
		Relative Humidity :	50~51%

15C 2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.	
		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )	
BLE CH 00 2402MHz		2369.85	40.91	-33.09	74	40.68	26.99	6.62	33.38	153	291	P	H	
		2322.6	31.19	-22.81	54	31.07	26.85	6.7	33.43	153	291	A	H	
	*	2402.254	90.88	-	-	90.63	27.03	6.57	33.35	153	291	P	H	
	*	2402.004	90.14	-	-	89.89	27.03	6.57	33.35	153	291	A	H	
													H	
														H
			2366.88	41.4	-32.6	74	41.23	26.94	6.62	33.39	118	64	P	V
			2354.37	31.11	-22.89	54	30.91	26.94	6.66	33.4	118	64	A	V
	*		2402.254	90.79	-	-	90.54	27.03	6.57	33.35	118	64	P	V
	*		2402.087	90.06	-	-	89.81	27.03	6.57	33.35	118	64	A	V
														V
													V	
BLE CH 19 2440MHz		2377.5	41.45	-32.55	74	41.22	26.99	6.62	33.38	100	290	P	H	
		2342.04	31.01	-22.99	54	30.87	26.9	6.66	33.42	100	290	A	H	
	*	2439.746	92.96	-	-	92.31	27.17	6.79	33.31	100	290	P	H	
	*	2440.08	92.18	-	-	91.53	27.17	6.79	33.31	100	290	A	H	
			2489.08	42.24	-31.76	74	41.19	27.3	7.01	33.26	100	290	P	H
			2498.16	32.01	-21.99	54	30.96	27.3	7.01	33.26	100	290	A	H
			2337.99	41.06	-32.94	74	40.92	26.9	6.66	33.42	119	66	P	V
			2363.1	31.07	-22.93	54	30.9	26.94	6.62	33.39	119	66	A	V
	*		2439.746	92.36	-	-	91.71	27.17	6.79	33.31	119	66	P	V
	*		2440.08	91.59	-	-	90.94	27.17	6.79	33.31	119	66	A	V
			2490.52	43.07	-30.93	74	42.02	27.3	7.01	33.26	119	66	P	V
		2495.04	31.97	-22.03	54	30.92	27.3	7.01	33.26	119	66	A	V	



BLE CH 39 2480MHz	*	2480.243	88.89	-	-	87.89	27.26	7.01	33.27	100	311	P	H
	*	2480.076	88.13	-	-	87.13	27.26	7.01	33.27	100	311	A	H
		2490.92	42.05	-31.95	74	41	27.3	7.01	33.26	100	311	P	H
		2495.92	32.28	-21.72	54	31.23	27.3	7.01	33.26	100	311	A	H
													H
													H
	*	2480.243	88.59	-	-	87.59	27.26	7.01	33.27	116	64	P	V
	*	2480.076	87.84	-	-	86.84	27.26	7.01	33.27	116	64	A	V
		2494.44	41.49	-32.51	74	40.44	27.3	7.01	33.26	116	64	P	V
		2489.84	31.93	-22.07	54	30.88	27.3	7.01	33.26	116	64	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		4803	43.88	-30.12	74	57.7	31.03	10.53	55.38	100	0	P	H	
													H	
													H	
													H	
		4803	43.24	-30.76	74	57.06	31.03	10.53	55.38	100	0	P	V	
														V
														V
														V
BLE CH 19 2440MHz		4881	44.05	-29.95	74	57.67	31.13	10.67	55.42	100	0	P	H	
		7320	47.75	-26.25	74	53.54	36.15	13.63	55.57	100	0	P	H	
													H	
													H	
		4881	42.54	-31.46	74	56.16	31.13	10.67	55.42	100	0	P	V	
		7320	48.1	-25.9	74	53.89	36.15	13.63	55.57	100	0	P	V	
														V
														V
BLE CH 39 2480MHz		4959	43.88	-30.12	74	57.34	31.25	10.77	55.48	100	0	P	H	
		7440	48.3	-25.7	74	53.58	36.47	13.7	55.45	100	0	P	H	
													H	
													H	
		4959	43.43	-30.57	74	56.89	31.25	10.77	55.48	100	0	P	V	
		7440	48.27	-25.73	74	53.55	36.47	13.7	55.45	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)

BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.	
		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )	
2.4GHz BLE LF		79.68	14.77	-25.23	40	37.28	8.06	1.22	31.79			P	H	
		112.89	21.33	-22.17	43.5	40.05	11.62	1.44	31.78			P	H	
		228.99	19.12	-26.88	46	37.77	11.02	2.1	31.77			P	H	
		472.2	18.87	-27.13	46	29.91	17.74	3.08	31.86			P	H	
		741.7	24.01	-21.99	46	30.68	21.44	3.88	31.99	114	148	P	H	
		972.7	26.81	-27.19	54	29.25	23.89	4.52	30.85			P	H	
														H
														H
														H
														H
														H
														H
			42.42	23.16	-16.84	40	40.87	13.16	0.94	31.81	185	274	P	V
			105.87	18.3	-25.2	43.5	37.71	10.96	1.41	31.78			P	V
			176.61	16.73	-26.77	43.5	37.04	9.64	1.83	31.78			P	V
			416.2	18.11	-27.89	46	30.34	16.69	2.89	31.81			P	V
			848.8	26.22	-19.78	46	31.03	22.69	4.18	31.68			P	V
			983.2	27.09	-26.91	54	29.37	23.93	4.56	30.77			P	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 per 15.209(c).
!	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

- Level(dBμV/m) =  
Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
- Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

**For Peak Limit @ 2390MHz:**

- 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)
- Over Limit(dB)  
= Level(dBμV/m) – Limit Line(dBμV/m)  
= 55.45(dBμV/m) – 74(dBμV/m)  
= -18.55(dB)

**For Average Limit @ 2390MHz:**

- 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)
- 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”.