



Appendix B. Radiated Spurious Emission

Test Engineer :	Nick Yu	Temperature :	22~24°C
		Relative Humidity :	53~56%

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 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		2329.98	51.65	-22.35	74	52.53	27.05	5.33	33.26	324	63	P	H
		2381.19	42.2	-11.8	54	42.86	27.19	5.39	33.24	324	63	A	H
	*	2402.254	103.66	-	-	104.26	27.23	5.39	33.22	324	63	P	H
	*	2402.087	103.08	-	-	103.68	27.23	5.39	33.22	324	63	A	H
													H
													H
		2385.87	51.49	-22.51	74	52.11	27.23	5.39	33.24	100	80	P	V
		2389.65	41.97	-12.03	54	42.59	27.23	5.39	33.24	100	80	A	V
	*	2402.254	99.79	-	-	100.39	27.23	5.39	33.22	100	80	P	V
	*	2402.087	98.98	-	-	99.58	27.23	5.39	33.22	100	80	A	V
													V
													V
BLE CH 19 2440MHz		2354.37	51.46	-22.54	74	52.24	27.14	5.33	33.25	318	62	P	H
		2385.15	41.72	-12.28	54	42.38	27.19	5.39	33.24	318	62	A	H
	*	2440.247	103.3	-	-	103.72	27.37	5.42	33.21	318	62	P	H
	*	2440.08	102.8	-	-	103.22	27.37	5.42	33.21	318	62	A	H
		2486.08	51.96	-22.04	74	52.22	27.46	5.46	33.18	318	62	P	H
		2484.36	42.31	-11.69	54	42.57	27.46	5.46	33.18	318	62	A	H
		2325.57	51.17	-22.83	74	52.05	27.05	5.33	33.26	100	59	P	V
		2382.9	41.59	-12.41	54	42.25	27.19	5.39	33.24	100	59	A	V
	*	2439.746	99.82	-	-	100.24	27.37	5.42	33.21	100	59	P	V
	*	2440.08	99.35	-	-	99.77	27.37	5.42	33.21	100	59	A	V
		2488.92	51.67	-22.33	74	51.89	27.5	5.46	33.18	100	59	P	V
		2487.36	41.97	-12.03	54	42.23	27.46	5.46	33.18	100	59	A	V



BLE CH 39 2480MHz	*	2479.742	101.85	-	-	102.13	27.46	5.44	33.18	306	69	P	H
	*	2480.076	101.34	-	-	101.62	27.46	5.44	33.18	306	69	A	H
		2483.56	52.14	-21.86	74	52.4	27.46	5.46	33.18	306	69	P	H
		2484.08	42.83	-11.17	54	43.09	27.46	5.46	33.18	306	69	A	H
													H
													H
	*	2479.742	99.73	-	-	100.01	27.46	5.44	33.18	112	60	P	V
	*	2480.076	99.2	-	-	99.48	27.46	5.44	33.18	112	60	A	V
		2487.84	52.26	-21.74	74	52.48	27.5	5.46	33.18	112	60	P	V
		2486.48	42.98	-11.02	54	43.24	27.46	5.46	33.18	112	60	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		4803	39.91	-34.09	74	61.55	31.42	7.58	60.64	100	0	P	H
													H
													H
													H
		4803	40.38	-33.62	74	62.02	31.42	7.58	60.64	100	0	P	V
													V
													V
													V
BLE CH 19 2440MHz		4878	46.3	-27.7	74	67.56	31.56	7.7	60.52	100	0	P	H
		7320	44.82	-29.18	74	60.09	36.22	9.49	60.98	100	0	P	H
													H
													H
		4878	46.61	-27.39	74	67.87	31.56	7.7	60.52	100	0	P	V
		7320	45.37	-28.63	74	60.64	36.22	9.49	60.98	100	0	P	V
													V
													V
BLE CH 39 2480MHz		4962	52.03	-21.97	74	72.61	31.73	8.05	60.36	228	315	P	H
		4962	50.21	-3.79	54	70.79	31.73	8.05	60.36	228	315	A	H
		7440	43.28	-30.72	74	58.52	36.49	9.61	61.34	100	0	P	H
													H
		4962	51.79	-22.21	74	72.37	31.73	8.05	60.36	100	297	P	V
		4962	49.17	-4.83	54	69.75	31.73	8.05	60.36	100	297	A	V
		7440	42.9	-31.1	74	58.14	36.49	9.61	61.34	100	0	P	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		31.08	16.26	-23.74	40	28.97	19.46	0.65	32.82	-	-	P	H
		200.64	16.92	-26.58	43.5	38.04	10.13	1.48	32.73	-	-	P	H
		269.49	20.04	-25.96	46	37.51	13.5	1.76	32.73	-	-	P	H
		413.4	19.19	-26.81	46	33.16	16.72	2.16	32.85	-	-	P	H
		674.5	22.17	-23.83	46	32.11	20.39	2.67	33	-	-	P	H
		949.6	27.69	-18.31	46	31.86	24.3	3.29	31.76	100	136	P	H
													H
													H
													H
													H
													H
													H
													H
		48.09	20.16	-19.84	40	41.98	10.03	0.93	32.78	-	-	P	V
		54.84	20.96	-19.04	40	45.14	7.65	0.93	32.76	129	56	P	V
		81.3	18.76	-21.24	40	42.4	8.12	0.93	32.69	-	-	P	V
		451.2	17.46	-28.54	46	30.72	17.32	2.3	32.88	-	-	P	V
		764.1	23.21	-22.79	46	31.48	21.74	2.91	32.92	-	-	P	V
		930.7	25.93	-20.07	46	30.72	23.89	3.29	31.97	-	-	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”.