



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.	
		(MHz)	(dBμV/m)	(dB)	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
					(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	



BLE CH 39 2480MHz	*	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
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		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
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
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
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.	
		(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	
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

- 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”.