



Appendix B. Radiated Spurious Emission

Test Engineer :	Jesse Wang and Ken Wu	Temperature :	21~24°C
		Relative Humidity :	50~54%

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		2325.54	56.76	-17.24	74	51.51	31.98	7.18	33.91	200	40	P	H
		2374.155	47.7	-6.3	54	42.29	32.14	7.24	33.97	200	40	A	H
	*	2402	91.77	-	-	86.26	32.19	7.31	33.99	200	40	P	H
	*	2402	91.21	-	-	85.7	32.19	7.31	33.99	200	40	A	H
													H
													H
		2363.13	57.39	-16.61	74	52	32.09	7.24	33.94	380	304	P	V
		2363.13	47.83	-6.17	54	42.44	32.09	7.24	33.94	380	304	A	V
	*	2402	89.22	-	-	83.71	32.19	7.31	33.99	380	304	P	V
	*	2402	88.42	-	-	82.91	32.19	7.31	33.99	380	304	A	V
													V
													V
BLE CH 19 2440MHz		2343.04	56.84	-17.16	74	51.51	32.03	7.24	33.94	304	54	P	H
		2343.88	47.87	-6.13	54	42.54	32.03	7.24	33.94	304	54	A	H
	*	2440	94.29	-	-	88.61	32.34	7.36	34.02	304	54	P	H
	*	2440	93.75	-	-	88.07	32.34	7.36	34.02	304	54	A	H
		2493.07	56.72	-17.28	74	50.92	32.5	7.4	34.1	304	54	P	H
		2494.33	47.92	-6.08	54	42.12	32.5	7.4	34.1	304	54	A	H
		2333.8	57.48	-16.52	74	52.23	31.98	7.18	33.91	297	290	P	V
		2382.66	47.69	-6.31	54	42.21	32.14	7.31	33.97	297	290	A	V
	*	2440	93.57	-	-	87.89	32.34	7.36	34.02	297	290	P	V
	*	2440	92.89	-	-	87.21	32.34	7.36	34.02	297	290	A	V
		2497.55	57.89	-16.11	74	52.09	32.5	7.4	34.1	297	290	P	V
		2494.26	47.94	-6.06	54	42.14	32.5	7.4	34.1	297	290	A	V



BLE CH 39 2480MHz	*	2480	96.9	-	-	91.12	32.45	7.4	34.07	301	209	P	H
	*	2480	96.22	-	-	90.44	32.45	7.4	34.07	301	209	A	H
		2483.64	58.46	-15.54	74	52.68	32.45	7.4	34.07	301	209	P	H
		2483.52	50.53	-3.47	54	44.75	32.45	7.4	34.07	301	209	A	H
													H
													H
	*	2480	93.57	-	-	87.79	32.45	7.4	34.07	375	132	P	V
	*	2480	92.79	-	-	87.01	32.45	7.4	34.07	375	132	A	V
		2483.52	57.8	-16.2	74	52.02	32.45	7.4	34.07	375	132	P	V
		2483.52	48.96	-5.04	54	43.18	32.45	7.4	34.07	375	132	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		4804	47.09	-26.91	74	60.66	33.68	11.83	59.08	100	0	P	H
													H
													H
													H
		4804	44.16	-29.84	74	57.73	33.68	11.83	59.08	100	0	P	V
													V
													V
													V
BLE CH 19 2440MHz		4878	44.21	-29.79	74	58.08	33.54	11.53	58.94	100	0	P	H
		7320	40.62	-33.38	74	50.12	34.65	13.81	57.96	100	0	P	H
													H
													H
		4880	43.55	-30.45	74	57.42	33.54	11.53	58.94	100	0	P	V
		7320	39.81	-34.19	74	49.31	34.65	13.81	57.96	100	0	P	V
													V
													V
BLE CH 39 2480MHz		4962	39.02	-34.98	74	53.2	33.37	11.22	58.77	100	0	P	H
		7440	41.04	-32.96	74	50.79	34.33	14.05	58.13	100	0	P	H
													H
													H
		4960	40.02	-33.98	74	54.2	33.37	11.22	58.77	100	0	P	V
		7440	41.82	-32.18	74	51.57	34.33	14.05	58.13	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		30.81	27.53	-12.47	40	32.36	25.46	1.07	31.36	100	0	P	H
		82.92	16.67	-23.33	40	32.68	14.26	1.28	31.55			P	H
		275.97	22.97	-23.03	46	32.63	19.34	2.32	31.32			P	H
		712.3	29.76	-16.24	46	30.13	26.59	3.74	30.7			P	H
		838.3	31.72	-14.28	46	29.73	28.46	4.1	30.57			P	H
		952.4	33.34	-12.66	46	29.59	30.21	4.07	30.53			P	H
													H
													H
													H
													H
													H
													H
		30.81	28.88	-11.12	40	33.71	25.46	1.07	31.36	100	0	P	V
		75.63	16.67	-23.33	40	33.6	13.35	1.28	31.56			P	V
		128.01	19	-24.5	43.5	30.74	18.22	1.55	31.51			P	V
		414.8	25.53	-20.47	46	31.39	22.62	2.67	31.15			P	V
		734.7	29.52	-16.48	46	29.5	26.95	3.74	30.67			P	V
		891.5	33.04	-12.96	46	30.46	28.95	4.17	30.54			P	V
													V
													V
													V
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													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”.