



Appendix A. Radiated Spurious Emission

Test Engineer :	Derreck Chen and Jesse Wang	Temperature :	22~23°C
		Relative Humidity :	45~47%

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		2386.14	45.85	-28.15	74	46.7	27.13	7.32	35.3	186	229	P	H
		2389.47	35.08	-18.92	54	35.93	27.13	7.32	35.3	186	229	A	H
	*	2402	98.3	-	-	99.15	27.13	7.32	35.3	186	229	P	H
	*	2402	97.7	-	-	98.55	27.13	7.32	35.3	186	229	A	H
													H
													H
		2379.57	45.89	-28.11	74	46.78	27.09	7.32	35.3	340	105	P	V
		2378.22	34.37	-19.63	54	35.26	27.09	7.32	35.3	340	105	A	V
	*	2402	96.73	-	-	97.58	27.13	7.32	35.3	340	105	P	V
	*	2402	96.02	-	-	96.87	27.13	7.32	35.3	340	105	A	V
													V
													V
BLE CH 19 2440MHz		2378.94	46.23	-27.77	74	47.12	27.09	7.32	35.3	235	231	P	H
		2380.83	34.67	-19.33	54	35.56	27.09	7.32	35.3	235	231	A	H
	*	2440	99.6	-	-	100.28	27.27	7.36	35.31	235	231	P	H
	*	2440	99.07	-	-	99.75	27.27	7.36	35.31	235	231	A	H
		2496.76	46.73	-27.27	74	47.21	27.4	7.45	35.33	235	231	P	H
		2485.76	35.32	-18.68	54	35.87	27.36	7.41	35.32	235	231	A	H
		2356.08	45.32	-28.68	74	46.31	27.04	7.26	35.29	129	35	P	V
		2383.44	34.51	-19.49	54	35.4	27.09	7.32	35.3	129	35	A	V
	*	2440	98.64	-	-	99.32	27.27	7.36	35.31	129	35	P	V
	*	2440	97.94	-	-	98.62	27.27	7.36	35.31	129	35	A	V
		2488.92	46.46	-27.54	74	46.93	27.4	7.45	35.32	129	35	P	V
		2485.24	35	-19	54	35.55	27.36	7.41	35.32	129	35	A	V

BLE CH 39 2480MHz	*	2480	99.69	-	-	100.24	27.36	7.41	35.32	199	229	P	H
	*	2480	99.09	-	-	99.64	27.36	7.41	35.32	199	229	A	H
		2483.52	56.99	-17.01	74	57.54	27.36	7.41	35.32	199	229	P	H
		2483.52	53.07	-0.93	54	53.62	27.36	7.41	35.32	199	229	A	H
													H
													H
	*	2480	99.62	-	-	100.17	27.36	7.41	35.32	287	115	P	V
	*	2480	99.03	-	-	99.58	27.36	7.41	35.32	287	115	A	V
		2483.52	57.03	-16.97	74	57.58	27.36	7.41	35.32	287	115	P	V
		2483.52	52.88	-1.12	54	53.43	27.36	7.41	35.32	287	115	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	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE CH 00 2402MHz		4803	47.05	-26.95	74	40.58	31.3	10.56	35.39	100	0	P	H
													H
													H
													H
		4803	48.22	-25.78	74	41.75	31.3	10.56	35.39	100	0	P	V
													V
													V
													V
BLE CH 19 2440MHz		4881	47.49	-26.51	74	40.73	31.41	10.72	35.37	100	0	P	H
		7320	49.97	-24.03	74	35.39	36.26	14.11	35.79	100	0	P	H
													H
													H
		4881	47.81	-26.19	74	41.05	31.41	10.72	35.37	100	0	P	V
		7320	48.83	-25.17	74	34.25	36.26	14.11	35.79	100	0	P	V
													V
													V
BLE CH 39 2480MHz		4959	48.78	-25.22	74	41.73	31.54	10.87	35.36	100	0	P	H
		7440	49.68	-24.32	74	35.03	36.5	13.97	35.82	100	0	P	H
													H
													H
		4959	48.22	-25.78	74	41.17	31.54	10.87	35.36	100	0	P	V
		7440	49.4	-24.6	74	34.75	36.5	13.97	35.82	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	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz BLE LF		57.27	31.64	-8.36	40	55.69	6.52	1.29	31.86	151	26	P	H
		119.91	22.67	-20.83	43.5	40.7	12.2	1.58	31.81	-	-	P	H
		203.88	23.67	-19.83	43.5	43.25	10.15	2.05	31.78	-	-	P	H
		390.3	32.4	-13.6	46	45.1	16.18	2.87	31.75	-	-	P	H
		503.7	29.75	-16.25	46	40.09	18.32	3.2	31.86	-	-	P	H
		717.9	24.24	-21.76	46	31.4	20.95	3.85	31.96	-	-	P	H
													H
													H
													H
													H
													H
													H
		119.91	31.04	-12.46	43.5	49.07	12.2	1.58	31.81	-	-	P	V
		167.97	35.57	-7.93	43.5	54.91	10.62	1.83	31.79	124	210	P	V
		243.84	32.6	-13.4	46	50.01	12.16	2.17	31.74	-	-	P	V
		407.8	30.57	-15.43	46	42.93	16.54	2.87	31.77	-	-	P	V
		664.7	25.37	-20.63	46	33.36	20.32	3.67	31.98	-	-	P	V
		910.4	26.35	-19.65	46	30.1	23.17	4.36	31.28	-	-	P	V
													V
													V
													V
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													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 Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		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”.