



Appendix A. Radiated Spurious Emission

Test Engineer :	Elvis Chen and Stan Hsieh	Temperature :	22~24°C
		Relative Humidity :	46~48%

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

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)
BLE CH 00 2402MHz		2352.12	51.19	-22.81	74	51.97	27.14	5.33	33.25	117	6	P	H
		2387.04	41.81	-12.19	54	42.43	27.23	5.39	33.24	117	6	A	H
	*	2401.84	80.92	-	-	81.52	27.23	5.39	33.22	117	6	P	H
	*	2402.09	80.31	-	-	80.91	27.23	5.39	33.22	117	6	A	H
													H
													H
		2387.4	51.27	-22.73	74	51.89	27.23	5.39	33.24	101	275	P	V
		2382.9	41.82	-12.18	54	42.48	27.19	5.39	33.24	101	275	A	V
	*	2401.84	88.02	-	-	88.62	27.23	5.39	33.22	101	275	P	V
	*	2402.09	87.5	-	-	88.1	27.23	5.39	33.22	101	275	A	V
													V
													V
BLE CH 19 2440MHz		2334.3	51.12	-22.88	74	52	27.05	5.33	33.26	134	356	P	H
		2357.97	41.78	-12.22	54	42.56	27.14	5.33	33.25	134	356	A	H
	*	2439.83	80.82	-	-	81.24	27.37	5.42	33.21	134	356	P	H
	*	2440.08	80.19	-	-	80.61	27.37	5.42	33.21	134	356	A	H
		2485.08	52.13	-21.87	74	52.39	27.46	5.46	33.18	134	356	P	H
		2484.08	42.28	-11.72	54	42.54	27.46	5.46	33.18	134	356	A	H
		2388.66	51.57	-22.43	74	52.19	27.23	5.39	33.24	125	276	P	V
		2365.89	41.72	-12.28	54	42.43	27.14	5.39	33.24	125	276	A	V
	*	2440.33	86.75	-	-	87.17	27.37	5.42	33.21	125	276	P	V
	*	2440.08	86.2	-	-	86.62	27.37	5.42	33.21	125	276	A	V
		2497.2	51.1	-22.9	74	51.31	27.5	5.46	33.17	125	276	P	V
		2486.12	42.13	-11.87	54	42.39	27.46	5.46	33.18	125	276	A	V



BLE CH 39 2480MHz	*	2480.33	80.16	-	-	80.44	27.46	5.44	33.18	104	10	P	H
	*	2480.08	79.3	-	-	79.58	27.46	5.44	33.18	104	10	A	H
		2497.96	51.88	-22.12	74	52.09	27.5	5.46	33.17	104	10	P	H
		2484.52	42.65	-11.35	54	42.91	27.46	5.46	33.18	104	10	A	H
													H
													H
	*	2479.83	87.2	-	-	87.48	27.46	5.44	33.18	115	328	P	V
	*	2480.08	86.52	-	-	86.8	27.46	5.44	33.18	115	328	A	V
		2484.64	54.53	-19.47	74	54.79	27.46	5.46	33.18	115	328	P	V
		2484.16	43.45	-10.55	54	43.71	27.46	5.46	33.18	115	328	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	52.93	-21.07	74	74.57	31.42	7.58	60.64	100	249	P	H
		4806	47.81	-6.19	54	69.45	31.42	7.58	60.64	100	249	A	H
													H
													H
		4806	49.35	-24.65	74	70.99	31.42	7.58	60.64	100	0	P	V
													V
													V
													V
BLE CH 19 2440MHz		4878	49.1	-24.9	74	70.36	31.56	7.7	60.52	100	0	P	H
		7320	47.33	-26.67	74	62.6	36.22	9.49	60.98	100	0	P	H
													H
													H
		4878	49.35	-24.65	74	70.61	31.56	7.7	60.52	100	0	P	V
		7320	52.21	-21.79	74	67.48	36.22	9.49	60.98	100	272	P	V
		7320	49.3	-4.7	54	64.57	36.22	9.49	60.98	100	272	A	V
													V
BLE CH 39 2480MHz		4962	51.72	-22.28	74	72.3	31.73	8.05	60.36	100	20	P	H
		4962	49.94	-4.06	54	70.52	31.73	8.05	60.36	100	20	A	H
		7440	46.93	-27.07	74	62.17	36.49	9.61	61.34	100	0	P	H
													H
		4962	54.5	-19.5	74	75.08	31.73	8.05	60.36	306	190	P	V
		4962	53.27	-0.73	54	73.85	31.73	8.05	60.36	306	190	A	V
		7440	48.99	-25.01	74	64.23	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		34.05	13.52	-26.48	40	27.84	17.84	0.65	32.81	-	-	P	H
		147.45	10.53	-32.97	43.5	30.2	11.68	1.33	32.68	-	-	P	H
		269.49	15.29	-30.71	46	32.76	13.5	1.76	32.73	-	-	P	H
		424.6	16.05	-29.95	46	29.85	16.9	2.16	32.86	-	-	P	H
		790	22.69	-23.31	46	30.61	22	2.97	32.89	-	-	P	H
		947.5	25.49	-20.51	46	29.73	24.26	3.29	31.79	111	152	P	H
													H
													H
													H
													H
													H
													H
		41.07	20.1	-19.9	40	38.31	13.94	0.65	32.8	153	64	P	V
		162.03	10.08	-33.42	43.5	30.54	10.9	1.33	32.69	-	-	P	V
		269.49	14.15	-31.85	46	31.62	13.5	1.76	32.73	-	-	P	V
		412.7	15.47	-30.53	46	29.44	16.72	2.16	32.85	-	-	P	V
		731.9	22.4	-23.6	46	31.19	21.25	2.91	32.95	-	-	P	V
		872.6	25.09	-20.91	46	31.57	22.82	3.16	32.46	-	-	P	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	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”.