



Appendix A. Radiated Spurious Emission

Test Engineer :	Tsung Lee, Stan Hsieh, and Ray Lee	Temperature :	20~22°C
		Relative Humidity :	41~43%

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		2325.48	53.89	-20.11	74	54.77	27.05	5.33	33.26	108	293	P	H
		2325.21	47.5	-6.5	54	48.38	27.05	5.33	33.26	108	293	A	H
	*	2401.837	100.11	-	-	100.71	27.23	5.39	33.22	108	293	P	H
	*	2402.004	99.36	-	-	99.96	27.23	5.39	33.22	108	293	A	H
													H
													H
		2324.85	51.59	-22.41	74	52.47	27.05	5.33	33.26	319	273	P	V
		2325.3	44.11	-9.89	54	44.99	27.05	5.33	33.26	319	273	A	V
	*	2402.254	98.26	-	-	98.86	27.23	5.39	33.22	319	273	P	V
	*	2402.004	97.52	-	-	98.12	27.23	5.39	33.22	319	273	A	V
													V
													V
BLE CH 19 2440MHz		2363.28	54.83	-19.17	74	55.61	27.14	5.33	33.25	100	292	P	H
		2363.19	48.92	-5.08	54	49.7	27.14	5.33	33.25	100	292	A	H
	*	2440.247	100.13	-	-	100.55	27.37	5.42	33.21	100	292	P	H
	*	2439.997	99.66	-	-	100.08	27.37	5.42	33.21	100	292	A	H
		2486.52	51.9	-22.1	74	52.16	27.46	5.46	33.18	100	292	P	H
		2497.96	42.42	-11.58	54	42.63	27.5	5.46	33.17	100	292	A	H
		2363.19	52.23	-21.77	74	53.01	27.14	5.33	33.25	347	241	P	V
		2363.01	44.87	-9.13	54	45.65	27.14	5.33	33.25	347	241	A	V
	*	2439.746	98.6	-	-	99.02	27.37	5.42	33.21	347	241	P	V
	*	2439.997	98.1	-	-	98.52	27.37	5.42	33.21	347	241	A	V
		2490.64	52.12	-21.88	74	52.34	27.5	5.46	33.18	347	241	P	V
		2492.12	42.42	-11.58	54	42.63	27.5	5.46	33.17	347	241	A	V



BLE CH 39 2480MHz	*	2479.826	100.77	-	-	101.05	27.46	5.44	33.18	101	291	P	H
	*	2480.076	100.28	-	-	100.56	27.46	5.44	33.18	101	291	A	H
		2489.68	59.15	-14.85	74	59.37	27.5	5.46	33.18	101	291	P	H
		2489.52	50.33	-3.67	54	50.55	27.5	5.46	33.18	101	291	A	H
													H
													H
	*	2479.826	98.86	-	-	99.14	27.46	5.44	33.18	338	234	P	V
	*	2479.993	98.38	-	-	98.66	27.46	5.44	33.18	338	234	A	V
		2489.56	57.73	-16.27	74	57.95	27.5	5.46	33.18	338	234	P	V
		2489.48	49.8	-4.2	54	50.02	27.5	5.46	33.18	338	234	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	40.45	-33.55	74	62.09	31.42	7.58	60.64	100	0	P	H
													H
													H
													H
		4806	40.45	-33.55	74	62.09	31.42	7.58	60.64	100	0	P	V
													V
													V
													V
BLE CH 19 2440MHz		4878	40.3	-33.7	74	61.56	31.56	7.7	60.52	100	0	P	H
		7320	44	-30	74	59.27	36.22	9.49	60.98	100	0	P	H
													H
													H
		4878	43.37	-30.63	74	64.63	31.56	7.7	60.52	100	0	P	V
		7320	42.32	-31.68	74	57.59	36.22	9.49	60.98	100	0	P	V
													V
													V
BLE CH 39 2480MHz		4962	40.04	-33.96	74	60.62	31.73	8.05	60.36	100	0	P	H
		7440	43.59	-30.41	74	58.83	36.49	9.61	61.34	100	0	P	H
													H
													H
		4962	42.99	-31.01	74	63.57	31.73	8.05	60.36	100	0	P	V
		7440	41.72	-32.28	74	56.96	36.49	9.61	61.34	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 (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)
2.4GHz BLE LF		72.12	32.78	-7.22	40	51.92	12.64	0.93	32.71	-	-	P	H
		119.91	37.68	-5.82	43.5	51.49	17.7	1.14	32.65	-	-	P	H
		207.66	36.7	-6.8	43.5	51.66	16.15	1.62	32.73	-	-	P	H
		311.9	40.52	-5.48	46	51.33	20.05	1.88	32.74	101	341	P	H
		360.2	35.29	-10.71	46	44.8	21.35	1.94	32.8	-	-	P	H
		815.9	35.86	-10.14	46	37.09	28.49	3.07	32.79	-	-	P	H
													H
													H
													H
													H
													H
													H
		52.95	30.89	-9.11	40	48.73	14	0.93	32.77	-	-	P	V
		119.91	36.14	-7.36	43.5	49.95	17.7	1.14	32.65	-	-	P	V
		207.12	37.33	-6.17	43.5	52.29	16.15	1.62	32.73	102	16	P	V
		797.7	31.55	-14.45	46	33.19	28.27	2.97	32.88	-	-	P	V
		897.8	31.95	-14.05	46	31.88	29.19	3.2	32.32	-	-	P	V
		927.2	32	-14	46	30.75	29.97	3.29	32.01	-	-	P	V
													V
													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	H orizontal or V ertical

A calculation example for radiated spurious emission is shown as below:

WIFI Ant. 1+2	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)
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”.