



Appendix A. Radiated Spurious Emission

Test Engineer :	Kyle Jhuang, Citta Ke and Karl Hou	Temperature :	25~26°C
		Relative Humidity :	50~51%

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)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE CH 00 2402MHz		2329.71	52.91	-21.09	74	49.44	32.62	4.55	33.7	105	124	P	H
		2383.17	40.22	-13.78	54	36.53	32.73	4.62	33.66	105	124	A	H
	*	2402.171	95.09	-	-	91.35	32.77	4.62	33.65	105	124	P	H
	*	2402.004	94.21	-	-	90.47	32.77	4.62	33.65	105	124	A	H
													H
													H
		2312.25	51.4	-22.6	74	47.99	32.58	4.55	33.72	100	171	P	V
		2376.87	40.14	-13.86	54	36.47	32.73	4.6	33.66	100	171	A	V
	*	2401.92	91.49	-	-	87.75	32.77	4.62	33.65	100	171	P	V
	*	2401.92	90.69	-	-	86.95	32.77	4.62	33.65	100	171	A	V
													V
													V
BLE CH 19 2440MHz		2353.83	51.54	-22.46	74	47.95	32.7	4.57	33.68	106	120	P	H
		2380.11	40.7	-13.3	54	37.01	32.73	4.62	33.66	106	120	A	H
	*	2439.746	96.2	-	-	92.23	32.89	4.68	33.6	106	120	P	H
	*	2440.08	95.35	-	-	91.38	32.89	4.68	33.6	106	120	A	H
		2495.6	51.25	-22.75	74	47.08	33	4.73	33.56	106	120	P	H
		2497.6	40.72	-13.28	54	36.55	33	4.73	33.56	106	120	A	H
		2383.35	51.14	-22.86	74	47.45	32.73	4.62	33.66	116	203	P	V
		2334.03	40.37	-13.63	54	36.88	32.62	4.57	33.7	116	203	A	V
	*	2439.746	92.78	-	-	88.81	32.89	4.68	33.6	116	203	P	V
	*	2439.997	91.97	-	-	88	32.89	4.68	33.6	116	203	A	V
		2496.04	51.25	-22.75	74	47.08	33	4.73	33.56	116	203	P	V
		2483.84	40.56	-13.44	54	36.44	32.96	4.73	33.57	116	203	A	V



BLE CH 39 2480MHz	*	2479.742	92.84	-	-	88.72	32.96	4.73	33.57	104	54	P	H
	*	2480.076	92.04	-	-	87.92	32.96	4.73	33.57	104	54	A	H
		2485.08	52.7	-21.3	74	48.58	32.96	4.73	33.57	104	54	P	H
		2484.92	42.51	-11.49	54	38.39	32.96	4.73	33.57	104	54	A	H
													H
													H
	*	2480.243	89.92	-	-	85.8	32.96	4.73	33.57	105	79	P	V
	*	2479.993	89.03	-	-	84.91	32.96	4.73	33.57	105	79	A	V
		2497.72	51.69	-22.31	74	47.52	33	4.73	33.56	105	79	P	V
		2485.16	41.19	-12.81	54	37.07	32.96	4.73	33.57	105	79	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	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		4803	40.42	-33.58	74	57.5	35.04	6.52	58.64	100	0	P	H
													H
													H
													H
		4803	40.13	-33.87	74	57.21	35.04	6.52	58.64	100	0	P	V
													V
													V
													V
BLE CH 19 2440MHz		4881	40.37	-33.63	74	57.29	35.02	6.58	58.52	100	0	P	H
		7320	42.07	-31.93	74	55.62	36.4	8.24	58.19	100	0	P	H
													H
													H
		4881	39.96	-34.04	74	56.88	35.02	6.58	58.52	100	0	P	V
		7320	42.64	-31.36	74	56.19	36.4	8.24	58.19	100	0	P	V
													V
													V
BLE CH 39 2480MHz		4962	41.75	-32.25	74	58.49	35.01	6.61	58.36	100	0	P	H
		7440	41.82	-32.18	74	55.4	36.47	8.36	58.41	100	0	P	H
													H
													H
		4962	41.07	-32.93	74	57.81	35.01	6.61	58.36	100	0	P	V
		7440	42.01	-31.99	74	55.59	36.47	8.36	58.41	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		162.03	25.02	-18.48	43.5	45.25	10.22	1.33	31.78			P	H
		198.75	23.17	-20.33	43.5	44.44	9.04	1.47	31.78			P	H
		261.12	22.67	-23.33	46	38.96	13.8	1.68	31.77			P	H
		600.3	36.63	-9.37	46	46.53	19.7	2.44	32.04	190	2	P	H
		799.8	33.25	-12.75	46	40.34	22	2.83	31.92			P	H
		890.1	28.89	-17.11	46	34.38	23	2.99	31.48			P	H
													H
													H
													H
													H
													H
													H
		120.72	28.82	-14.68	43.5	47.89	11.52	1.19	31.78			P	V
		167.97	25.88	-17.62	43.5	46.56	9.74	1.36	31.78			P	V
		254.64	20.2	-25.8	46	37.16	13.15	1.66	31.77			P	V
		601	38.39	-7.61	46	48.27	19.72	2.44	32.04	178	189	P	V
		797	29.79	-16.21	46	36.88	22	2.83	31.92			P	V
		939.1	26.4	-19.6	46	29.99	24.48	3.05	31.12			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	P eak or A verage
H/V	H orizontal or V ertical



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”.