



Appendix A. Radiated Spurious Emission

Test Engineer :	Karl Hou and Jie Cheng	Temperature :	24~25°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.
				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		2389.47	51.53	-22.47	74	47.79	32.77	4.62	33.65	114	200	P	H
		2370.03	39.84	-14.16	54	36.17	32.73	4.6	33.66	114	200	A	H
	*	2402	96.68	-	-	92.94	32.77	4.62	33.65	114	200	P	H
	*	2402	95.48	-	-	91.74	32.77	4.62	33.65	114	200	A	H
													H
													H
		2389.47	52.12	-21.88	74	48.38	32.77	4.62	33.65	135	246	P	V
		2388.03	38.65	-15.35	54	34.91	32.77	4.62	33.65	135	246	A	V
	*	2402	89.93	-	-	86.19	32.77	4.62	33.65	135	246	P	V
	*	2402	88.5	-	-	84.76	32.77	4.62	33.65	135	246	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



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 19 2440MHz		2317.83	51.38	-22.62	74	47.91	32.62	4.55	33.7	141	4	P	H
		2381.55	38.59	-15.41	54	34.9	32.73	4.62	33.66	141	4	A	H
	*	2440	96.9	-	-	92.93	32.89	4.68	33.6	141	4	P	H
	*	2440	95.65	-	-	91.68	32.89	4.68	33.6	141	4	A	H
		2499.44	51.66	-22.34	74	47.49	33	4.73	33.56	141	4	P	H
		2485.48	39.02	-14.98	54	34.9	32.96	4.73	33.57	141	4	A	H
		2385.6	51.4	-22.6	74	47.66	32.77	4.62	33.65	131	250	P	V
		2387.22	38.6	-15.4	54	34.86	32.77	4.62	33.65	131	250	A	V
	*	2440	88.63	-	-	84.66	32.89	4.68	33.6	131	250	P	V
	*	2440	87.26	-	-	83.29	32.89	4.68	33.6	131	250	A	V
		2485.6	51.69	-22.31	74	47.57	32.96	4.73	33.57	131	250	P	V
		2492.52	38.99	-15.01	54	34.82	33	4.73	33.56	131	250	A	V
BLE CH 39 2480MHz	*	2480	96.45	-	-	92.33	32.96	4.73	33.57	109	170	P	H
	*	2480	95.13	-	-	91.01	32.96	4.73	33.57	109	170	A	H
		2483.52	56.05	-17.95	74	51.93	32.96	4.73	33.57	109	170	P	H
		2483.52	47.19	-6.81	54	43.07	32.96	4.73	33.57	109	170	A	H
													H
													H
	*	2480	89.68	-	-	85.56	32.96	4.73	33.57	199	293	P	V
	*	2480	88.12	-	-	84	32.96	4.73	33.57	199	293	A	V
		2484.08	51.99	-22.01	74	47.87	32.96	4.73	33.57	199	293	P	V
		2483.52	42.05	-11.95	54	37.93	32.96	4.73	33.57	199	293	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		4804	40	-34	74	57.08	35.04	6.52	58.64	100	0	P	H
													H
													H
													H
		4804	40.39	-33.61	74	57.47	35.04	6.52	58.64	100	0	P	V
													V
													V
													V
BLE CH 19 2440MHz		4880	46.31	-27.69	74	63.23	35.02	6.58	58.52	100	0	P	H
		7320	42.61	-31.39	74	56.16	36.4	8.24	58.19	100	0	P	H
													H
													H
		4880	45.33	-28.67	74	62.25	35.02	6.58	58.52	100	0	P	V
		7320	42.44	-31.56	74	55.99	36.4	8.24	58.19	100	0	P	V
													V
													V
BLE CH 39 2480MHz		4960	50.47	-23.53	74	67.21	35.01	6.61	58.36	100	0	P	H
		7440	42.1	-31.9	74	55.68	36.47	8.36	58.41	100	0	P	H
													H
													H
		4960	46.06	-27.94	74	62.8	35.01	6.61	58.36	100	0	P	V
		7440	41.84	-32.16	74	55.42	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)

[illegible]

**Note symbol**

*	Fundamental Frequency which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency per 15.209(c).
!	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”.