



Appendix A. Radiated Spurious Emission

Test Engineer :	Jet Lui, Kyle Jhuang, and Karl Hou	Temperature :	23~24°C
		Relative Humidity :	45~46%

15C 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		2335.29	51.33	-22.67	74	47.97	31.91	6.1	34.65	183	148	P	H
		2385.15	40.45	-13.55	54	37	31.93	6.17	34.65	183	148	A	H
	*	2402.254	95.34	-	-	91.83	31.94	6.21	34.64	183	148	P	H
	*	2402.004	94.45	-	-	90.94	31.94	6.21	34.64	183	148	A	H
													H
													H
		2382.09	53.09	-20.91	74	49.64	31.93	6.17	34.65	102	293	P	V
		2326.29	40.34	-13.66	54	36.99	31.9	6.1	34.65	102	293	A	V
	*	2402.254	94.26	-	-	90.75	31.94	6.21	34.64	102	293	P	V
	*	2401.92	93.38	-	-	89.87	31.94	6.21	34.64	102	293	A	V
													V
													V
BLE CH 19 2440MHz		2318.1	51.77	-22.23	74	48.42	31.9	6.1	34.65	186	189	P	H
		2321.07	40.43	-13.57	54	37.08	31.9	6.1	34.65	186	189	A	H
	*	2440.247	90.42	-	-	86.85	31.97	6.24	34.64	186	189	P	H
	*	2439.997	89.56	-	-	85.99	31.97	6.24	34.64	186	189	A	H
		2494.88	51.58	-22.42	74	47.87	32	6.34	34.63	186	189	P	H
		2489.2	40.66	-13.34	54	36.99	32	6.3	34.63	186	189	A	H
		2372.73	51.41	-22.59	74	47.96	31.93	6.17	34.65	100	283	P	V
		2371.56	40.4	-13.6	54	36.95	31.93	6.17	34.65	100	283	A	V
	*	2439.746	95.44	-	-	91.87	31.97	6.24	34.64	100	283	P	V
	*	2440.08	94.62	-	-	91.05	31.97	6.24	34.64	100	283	A	V
		2499.16	51.22	-22.78	74	47.51	32	6.34	34.63	100	283	P	V
		2499.6	40.55	-13.45	54	36.84	32	6.34	34.63	100	283	A	V



BLE CH 39 2480MHz	*	2480.243	97.27	-	-	93.61	31.99	6.3	34.63	107	113	P	H
	*	2480.076	96.41	-	-	92.75	31.99	6.3	34.63	107	113	A	H
		2484.88	55.96	-18.04	74	52.3	31.99	6.3	34.63	107	113	P	H
		2484.96	45.92	-8.08	54	42.26	31.99	6.3	34.63	107	113	A	H
													H
													H
	*	2480.327	96.12	-	-	92.46	31.99	6.3	34.63	100	48	P	V
	*	2480.076	95.33	-	-	91.67	31.99	6.3	34.63	100	48	A	V
		2484.92	56.13	-17.87	74	52.47	31.99	6.3	34.63	100	48	P	V
		2485.12	45.23	-8.77	54	41.57	31.99	6.3	34.63	100	48	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15C 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	42.64	-31.36	74	60.63	34.35	8.52	60.86	100	0	P	H
													H
													H
													H
		4803	39.67	-34.33	74	57.66	34.35	8.52	60.86	100	0	P	V
													V
													V
													V
BLE CH 19 2440MHz		4880	40.79	-33.21	74	58.31	34.4	8.77	60.69	100	0	P	H
		7320	43.91	-30.09	74	56.76	35.73	11.95	60.53	100	0	P	H
													H
													H
		4880	40.43	-33.57	74	57.95	34.4	8.77	60.69	100	0	P	V
		7320	42.94	-31.06	74	55.79	35.73	11.95	60.53	100	0	P	V
													V
													V
BLE CH 39 2480MHz		4962	45.99	-28.01	74	62.98	34.47	9.02	60.48	100	0	P	H
		7440	40.96	-33.04	74	53.82	35.71	12.01	60.58	100	0	P	H
													H
													H
		4962	41.53	-32.47	74	58.52	34.47	9.02	60.48	100	0	P	V
		7440	40.58	-33.42	74	53.44	35.71	12.01	60.58	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15C 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		142.05	35.6	-7.9	43.5	55.18	10.85	1.32	31.75			P	H
		152.04	35.52	-7.98	43.5	55.4	10.5	1.37	31.75			P	H
		285.15	40.73	-5.27	46	57.7	12.9	1.85	31.72	125	15	P	H
		310.5	38.34	-7.66	46	54.73	13.4	1.94	31.73			P	H
		462.4	34.71	-11.29	46	47.02	17.25	2.33	31.89			P	H
		772.5	40.66	-5.34	46	49.46	20.12	3.05	31.97			P	H
		42.96	26.72	-13.28	40	46.84	10.92	0.75	31.79			P	V
		151.77	38.96	-4.54	43.5	58.84	10.5	1.37	31.75	100	248	P	V
		285.15	34.08	-11.92	46	51.05	12.9	1.85	31.72			P	V
		305.6	31.61	-14.39	46	48.11	13.31	1.92	31.73			P	V
		442.1	33.58	-12.42	46	46.34	16.82	2.29	31.87			P	V
		758.5	34	-12	46	42.73	20.2	3.05	31.98			P	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 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”.