



Appendix B. Radiated Spurious Emission

Test Engineer :	Jesse Wang and James Chiu	Temperature :	21~23°C
		Relative Humidity :	60~63%

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		2314.86	56.54	-17.46	74	51.31	32.07	7.6	34.44	126	4	P	H
		2375.88	46.83	-7.17	54	41.35	32.16	7.68	34.36	126	4	A	H
	*	2402	100.71	-	-	95.1	32.18	7.75	34.32	126	4	P	H
	*	2402	99.84	-	-	94.23	32.18	7.75	34.32	126	4	A	H
													H
													H
		2352.75	56.85	-17.15	74	51.44	32.13	7.68	34.4	241	352	P	V
		2320.35	46.81	-7.19	54	41.56	32.09	7.6	34.44	241	352	A	V
	*	2402	101.36	-	-	95.75	32.18	7.75	34.32	241	352	P	V
	*	2402	100.52	-	-	94.91	32.18	7.75	34.32	241	352	A	V
													V
													V
BLE CH 19 2440MHz		2363.46	48.63	-25.37	74	43.22	32.13	7.68	34.4	101	33	P	H
		2380.65	36.49	-17.51	54	30.94	32.16	7.75	34.36	101	33	A	H
	*	2440	99.54	-	-	93.74	32.24	7.83	34.27	101	33	P	H
	*	2440	98.83	-	-	93.03	32.24	7.83	34.27	101	33	A	H
		2488.52	49.61	-24.39	74	43.59	32.3	7.91	34.19	101	33	P	H
		2495.6	36.92	-17.08	54	30.86	32.3	7.91	34.15	101	33	A	H
		2326.2	48.87	-25.13	74	43.62	32.09	7.6	34.44	290	359	P	V
		2366.43	36.49	-17.51	54	31.04	32.13	7.68	34.36	290	359	A	V
	*	2440	100.93	-	-	95.13	32.24	7.83	34.27	290	359	P	V
	*	2440	100.19	-	-	94.39	32.24	7.83	34.27	290	359	A	V
		2484.6	49.46	-24.54	74	43.46	32.28	7.91	34.19	290	359	P	V
		2499.92	37.09	-16.91	54	31.03	32.3	7.91	34.15	290	359	A	V



BLE CH 39 2480MHz	*	2480	99.64	-	-	93.64	32.28	7.91	34.19	110	30	P	H
	*	2480	98.95	-	-	92.95	32.28	7.91	34.19	110	30	A	H
		2483.52	59.41	-14.59	74	53.41	32.28	7.91	34.19	110	30	P	H
		2483.84	37.8	-16.2	54	31.8	32.28	7.91	34.19	110	30	A	H
													H
													H
	*	2480	100.97	-	-	94.97	32.28	7.91	34.19	112	72	P	V
	*	2480	100.26	-	-	94.26	32.28	7.91	34.19	112	72	A	V
		2483.52	60.37	-13.63	74	54.37	32.28	7.91	34.19	112	72	P	V
		2483.96	37.77	-16.23	54	31.77	32.28	7.91	34.19	112	72	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		4806	46.04	-27.96	74	60.35	34.25	11.11	59.67	100	0	P	H
													H
													H
													H
		4806	46.25	-27.75	74	60.56	34.25	11.11	59.67	100	0	P	V
													V
													V
													V
BLE CH 19 2440MHz		4884	42.2	-31.8	74	56.26	34.3	11.21	59.57	100	0	P	H
		7326	46.84	-27.16	74	54.65	35.6	15.08	58.49	100	0	P	H
													H
													H
		4884	43	-31	74	57.06	34.3	11.21	59.57	100	0	P	V
		7326	49.47	-24.53	74	57.28	35.6	15.08	58.49	100	0	P	V
													V
													V
BLE CH 39 2480MHz		4962	43.96	-30.04	74	57.72	34.37	11.32	59.45	100	0	P	H
		7440	48.09	-25.91	74	56	35.6	15.13	58.64	100	0	P	H
													H
													H
		4962	43.59	-30.41	74	57.35	34.37	11.32	59.45	100	0	P	V
		7440	49.09	-24.91	74	57	35.6	15.13	58.64	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		30.27	28.33	-11.67	40	38.16	19.9	1.77	31.5			P	H
		147.45	31.12	-12.38	43.5	48.19	11.42	2.61	31.1			P	H
		255.72	35.81	-10.19	46	50.15	13.7	2.96	31	100	0	P	H
		307.7	32.65	-13.35	46	46.25	14.12	3.28	31			P	H
		585.6	30.81	-15.19	46	38.38	19.01	4.08	30.66			P	H
		857.9	29.1	-16.9	46	33.19	21.59	4.7	30.38			P	H
													H
													H
													H
													H
													H
													H
		32.97	36.14	-3.86	40	47.53	18.22	1.77	31.38	100	0	P	V
		146.37	28.36	-15.14	43.5	45.36	11.49	2.61	31.1			P	V
		252.48	38.03	-7.97	46	52.77	13.3	2.96	31			P	V
		318.9	23.76	-22.24	46	37.04	14.44	3.28	31			P	V
		600.3	25.81	-20.19	46	33.23	19.1	4.08	30.6			P	V
		900.6	28.7	-17.3	46	32.19	22.01	4.8	30.3			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 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”.