



Appendix A. Radiated Spurious Emission

Test Engineer :	Derreck Chen, Ken Wu and Nick Yu	Temperature :	23~25°C
		Relative Humidity :	48~51%

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		2330.88	46	-28	74	40.53	32.09	7.6	34.22	121	360	P	H
		2363.37	34.03	-19.97	54	28.47	32.13	7.68	34.25	121	360	A	H
	*	2402.254	97.74	-	-	92.11	32.18	7.75	34.3	121	360	P	H
	*	2401.92	96.83	-	-	91.2	32.18	7.75	34.3	121	360	A	H
													H
													H
		2336.28	46.22	-27.78	74	40.73	32.11	7.6	34.22	118	6	P	V
		2347.62	33.99	-20.01	54	28.45	32.11	7.68	34.25	118	6	A	V
	*	2402.254	95.91	-	-	90.28	32.18	7.75	34.3	118	6	P	V
	*	2402.004	94.96	-	-	89.33	32.18	7.75	34.3	118	6	A	V
													V
													V
BLE CH 19 2440MHz		2324.76	45.98	-28.02	74	40.51	32.09	7.6	34.22	100	358	P	H
		2352.3	33.96	-20.04	54	28.4	32.13	7.68	34.25	100	358	A	H
	*	2440.247	97.69	-	-	91.97	32.24	7.83	34.35	100	358	P	H
	*	2439.997	96.84	-	-	91.12	32.24	7.83	34.35	100	358	A	H
		2496.36	46.1	-27.9	74	40.37	32.3	7.91	34.48	100	358	P	H
		2488.2	34.09	-19.91	54	28.31	32.3	7.91	34.43	100	358	A	H
		2320.89	46.05	-27.95	74	40.58	32.09	7.6	34.22	143	103	P	V
		2356.8	33.87	-20.13	54	28.31	32.13	7.68	34.25	143	103	A	V
	*	2440.331	97.06	-	-	91.34	32.24	7.83	34.35	143	103	P	V
	*	2439.997	96.2	-	-	90.48	32.24	7.83	34.35	143	103	A	V
		2496.44	46.74	-27.26	74	41.01	32.3	7.91	34.48	143	103	P	V
		2488.36	34.18	-19.82	54	28.4	32.3	7.91	34.43	143	103	A	V



BLE CH 39 2480MHz	*	2479.826	97.49	-	-	91.73	32.28	7.91	34.43	120	359	P	H
	*	2480.076	96.63	-	-	90.87	32.28	7.91	34.43	120	359	A	H
		2487	47.15	-26.85	74	41.39	32.28	7.91	34.43	120	359	P	H
		2483.72	34.67	-19.33	54	28.91	32.28	7.91	34.43	120	359	A	H
													H
													H
	*	2480.327	96.9	-	-	91.14	32.28	7.91	34.43	302	119	P	V
	*	2480.076	96.04	-	-	90.28	32.28	7.91	34.43	302	119	A	V
		2483.52	46.67	-27.33	74	40.91	32.28	7.91	34.43	302	119	P	V
		2483.52	34.53	-19.47	54	28.77	32.28	7.91	34.43	302	119	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	47.03	-26.97	74	60.63	34.25	11.11	58.96	100	0	P	H
													H
													H
													H
		4806	45.81	-28.19	74	59.41	34.25	11.11	58.96	100	0	P	V
													V
													V
													V
BLE CH 19 2440MHz		4878	44.14	-29.86	74	57.46	34.3	11.21	58.83	100	0	P	H
		7320	45.09	-28.91	74	52.15	35.6	15.08	57.74	100	0	P	H
													H
													H
		4878	42.15	-31.85	74	55.47	34.3	11.21	58.83	100	0	P	V
		7320	47.28	-26.72	74	54.34	35.6	15.08	57.74	100	0	P	V
													V
													V
BLE CH 39 2480MHz		4962	42.15	-31.85	74	55.12	34.37	11.32	58.66	100	0	P	H
		7440	42.9	-31.1	74	50.02	35.6	15.13	57.85	100	0	P	H
													H
													H
		4962	40.85	-33.15	74	53.82	34.37	11.32	58.66	100	0	P	V
		7440	43.25	-30.75	74	50.37	35.6	15.13	57.85	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		56.46	35.98	-4.02	40	59.11	6.32	1.77	31.22	186	365	P	H	
		182.28	39	-4.5	43.5	58.39	8.86	2.69	30.94			P	H	
		264.09	30.27	-15.73	46	44.55	13.56	3.16	31			P	H	
		407.8	36.29	-9.71	46	47.51	16.12	3.52	30.86			P	H	
		664	40.69	-5.31	46	46.46	20.35	4.35	30.47			P	H	
		899.9	30.32	-15.68	46	32.76	23.2	4.66	30.3			P	H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
		70.5	29.73	-10.27	40	52.47	6.48	2.06	31.28				P	V
		192	32.55	-10.95	43.5	52.1	8.86	2.69	31.1				P	V
		264.09	31.67	-14.33	46	45.95	13.56	3.16	31				P	V
		431.6	32.16	-13.84	46	42.35	16.92	3.63	30.74				P	V
		663.3	38.57	-7.43	46	44.35	20.34	4.35	30.47	128	52		P	V
		912.5	27.96	-18.04	46	29.84	23.64	4.8	30.32				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	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”.