



Appendix A. Radiated Spurious Emission

Test Engineer :	Derreck Chen	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.
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE CH 00 2402MHz		2332.41	47.62	-26.38	74	42.91	32.09	6.84	34.22	100	0	P	H
		2311.62	35.52	-18.48	54	30.84	32.07	6.8	34.19	100	0	A	H
	*	2403.758	47.76	-	-	42.95	32.2	6.91	34.3	100	0	P	H
	*	2402	34.54	-	-	29.75	32.18	6.91	34.3	100	0	P	H
													H
													H
		2366.07	48.04	-25.96	74	43.31	32.13	6.87	34.27	100	0	P	V
		2362.65	35.74	-18.26	54	30.99	32.13	6.87	34.25	100	0	A	V
	*	2402	44.71	-	-	39.92	32.18	6.91	34.3	100	0	P	V
	*	2402.004	34.42	-	-	29.63	32.18	6.91	34.3	100	0	P	V
													V
													V
BLE CH 19 2440MHz		2359.77	47.89	-26.11	74	43.14	32.13	6.87	34.25	100	0	P	H
		2362.29	35.41	-18.59	54	30.66	32.13	6.87	34.25	100	0	A	H
	*	2440	45.31	-	-	40.47	32.24	6.95	34.35	100	0	P	H
	*	2440	34.55	-	-	29.71	32.24	6.95	34.35	100	0	P	H
		2491.08	47.66	-26.34	74	42.79	32.3	7	34.43	100	0	P	H
		2486.32	35.55	-18.45	54	30.7	32.28	7	34.43	100	0	A	H
		2340.24	47.43	-26.57	74	42.73	32.11	6.84	34.25	100	0	P	V
		2357.52	35.53	-18.47	54	30.78	32.13	6.87	34.25	100	0	A	V
	*	2440	45.61	-	-	40.77	32.24	6.95	34.35	100	0	P	V
	*	2440	34.55	-	-	29.71	32.24	6.95	34.35	100	0	P	V
		2484.88	47.88	-26.12	74	43.03	32.28	7	34.43	100	0	P	V
		2498.32	35.58	-18.42	54	30.76	32.3	7	34.48	100	0	A	V



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 39 2480MHz	*	2480	44.89	-	-	40.04	32.28	7	34.43	100	0	P	H
	*	2480	34.63	-	-	29.78	32.28	7	34.43	100	0	P	H
		2494.68	47.59	-26.41	74	42.77	32.3	7	34.48	100	0	P	H
		2485.04	35.56	-18.44	54	30.71	32.28	7	34.43	100	0	A	H
													H
													H
	*	2480	44.73	-	-	39.88	32.28	7	34.43			P	V
	*	2480	34.88	-	-	30.03	32.28	7	34.43			P	V
		2493.4	48.12	-25.88	74	43.3	32.3	7	34.48	100	0	P	V
		2486	35.69	-18.31	54	30.84	32.28	7	34.43	100	0	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	40.73	-33.27	74	54.33	34.25	11.11	58.96	100	0	P	H
													H
													H
													H
		4804	41.78	-32.22	74	55.38	34.25	11.11	58.96	100	0	P	V
													V
													V
													V
BLE CH 19 2440MHz		4880	40.75	-33.25	74	54.07	34.3	11.21	58.83	100	0	P	H
		7320	42.52	-31.48	74	49.58	35.6	15.08	57.74	100	0	P	H
													H
													H
		4880	41.8	-32.2	74	55.12	34.3	11.21	58.83	100	0	P	V
		7320	43.01	-30.99	74	50.07	35.6	15.08	57.74	100	0	P	V
													V
													V
BLE CH 39 2480MHz		4962	40.7	-33.3	74	53.67	34.37	11.32	58.66	100	0	P	H
		7440	42.72	-31.28	74	49.84	35.6	15.13	57.85	100	0	P	H
													H
													H
		4962	41.12	-32.88	74	54.09	34.37	11.32	58.66	100	0	P	V
		7440	42.65	-31.35	74	49.77	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		85.89	10.69	-29.31	40	31.51	8.22	2.06	31.1			P	H
		153.12	21.71	-21.79	43.5	39.49	10.74	2.61	31.13			P	H
		255.45	17.3	-28.7	46	32.14	13.2	2.96	31			P	H
		358.1	18.28	-27.72	46	31.34	14.64	3.39	31.09			P	H
		582.1	22.66	-23.34	46	29.67	19.58	4.08	30.67			P	H
		874	26.96	-19.04	46	29.69	22.96	4.66	30.35	128	21	P	H
													H
													H
													H
													H
													H
													H
		66.45	9.05	-30.95	40	32.07	6.16	2.06	31.24			P	V
		153.39	15.97	-27.53	43.5	33.76	10.74	2.61	31.14			P	V
		266.79	29.39	-16.61	46	44	13.23	3.16	31			P	V
		423.2	19.53	-26.47	46	29.93	16.76	3.63	30.79			P	V
		602.4	22.07	-23.93	46	28.93	19.66	4.08	30.6			P	V
		855.1	30.93	-15.07	46	33.37	23.25	4.7	30.39	189	61	P	V
													V
													V
													V
													V
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													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”.