



Appendix B. Radiated Spurious Emission

Test Engineer :	Elvis Chen and Tsung Lee	Temperature :	20~21°C
		Relative Humidity :	44~45%

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
BLE CH 00 2402MHz		2369.04	52.56	-21.44	74	53.22	27.19	5.39	33.24	100	55	P	H
		2368.68	41.86	-12.14	54	42.52	27.19	5.39	33.24	100	55	A	H
	*	2401.753	88.6	-	-	89.2	27.23	5.39	33.22	100	55	P	H
	*	2402.004	87.54	-	-	88.14	27.23	5.39	33.22	100	55	A	H
													H
													H
		2368.86	58.63	-15.37	74	59.29	27.19	5.39	33.24	105	294	P	V
		2368.77	46.88	-7.12	54	47.54	27.19	5.39	33.24	105	294	A	V
	*	2401.753	96.35	-	-	96.95	27.23	5.39	33.22	105	294	P	V
	*	2402.004	95.3	-	-	95.9	27.23	5.39	33.22	105	294	A	V
													V
													V
BLE CH 19 2440MHz		2334.39	50.7	-23.3	74	51.58	27.05	5.33	33.26	100	52	P	H
		2382.45	41.03	-12.97	54	41.69	27.19	5.39	33.24	100	52	A	H
	*	2439.746	87.86	-	-	88.28	27.37	5.42	33.21	100	52	P	H
	*	2439.997	86.79	-	-	87.21	27.37	5.42	33.21	100	52	A	H
		2492.8	51.31	-22.69	74	51.52	27.5	5.46	33.17	100	52	P	H
		2492.56	41.59	-12.41	54	41.8	27.5	5.46	33.17	100	52	A	H
		2380.11	50.31	-23.69	74	50.97	27.19	5.39	33.24	109	293	P	V
		2336.91	41.12	-12.88	54	41.95	27.1	5.33	33.26	109	293	A	V
	*	2440.247	94.68	-	-	95.1	27.37	5.42	33.21	109	293	P	V
	*	2439.997	93.68	-	-	94.1	27.37	5.42	33.21	109	293	A	V
		2492.92	56.73	-17.27	74	56.94	27.5	5.46	33.17	109	293	P	V
		2492.72	44.88	-9.12	54	45.09	27.5	5.46	33.17	109	293	A	V



BLE CH 39 2480MHz	*	2479.742	85.25	-	-	85.53	27.46	5.44	33.18	100	0	P	H
	*	2479.993	84.2	-	-	84.48	27.46	5.44	33.18	100	0	A	H
		2492.44	51.92	-22.08	74	52.13	27.5	5.46	33.17	100	0	P	H
		2492.6	42.88	-11.12	54	43.09	27.5	5.46	33.17	100	0	A	H
													H
													H
	*	2479.742	93.66	-	-	93.94	27.46	5.44	33.18	123	282	P	V
	*	2479.993	92.63	-	-	92.91	27.46	5.44	33.18	123	282	A	V
		2492.44	56.72	-17.28	74	56.93	27.5	5.46	33.17	123	282	P	V
		2492.56	47.23	-6.77	54	47.44	27.5	5.46	33.17	123	282	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 (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
BLE CH 00 2402MHz		4805	38.05	-35.95	74	59.69	31.42	7.58	60.64	100	0	P	H
													H
													H
													H
		4803	41.29	-32.71	74	62.93	31.42	7.58	60.64	100	0	P	V
													V
													V
													V
BLE CH 19 2440MHz		4482	37.87	-36.13	74	60.97	30.77	7.32	61.19	100	0	P	H
		7320	43.18	-30.82	74	58.45	36.22	9.49	60.98	100	0	P	H
													H
													H
		4481	40.78	-33.22	74	63.88	30.77	7.32	61.19	100	0	P	V
		7320	42.22	-31.78	74	57.49	36.22	9.49	60.98	100	0	P	V
													V
													V
BLE CH 39 2480MHz		4961	38.27	-35.73	74	58.97	31.73	7.93	60.36	100	0	P	H
		7440	43.59	-30.41	74	58.83	36.49	9.61	61.34	100	0	P	H
													H
													H
		4961	38.01	-35.99	74	58.71	31.73	7.93	60.36	100	0	P	V
		7440	43.26	-30.74	74	58.5	36.49	9.61	61.34	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)

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		31.89	16.67	-23.33	40	29.92	18.92	0.65	32.82			P	H
		106.41	10.78	-32.72	43.5	31.18	11.1	1.14	32.64			P	H
		255.45	14.07	-31.93	46	31.69	13.35	1.76	32.73			P	H
		733.3	22.61	-23.39	46	31.38	21.27	2.91	32.95			P	H
		837.6	24.98	-21.02	46	32.16	22.41	3.07	32.66			P	H
		944.7	26.49	-19.51	46	30.83	24.19	3.29	31.82	100	58	P	H
													H
													H
													H
													H
													H
													H
													H
		31.62	27.52	-12.48	40	40.77	18.92	0.65	32.82	100	167	P	V
		40.53	25.96	-14.04	40	44.17	13.94	0.65	32.8			P	V
		107.22	12.09	-31.41	43.5	32.39	11.2	1.14	32.64			P	V
		727.7	22.01	-23.99	46	30.91	21.15	2.91	32.96			P	V
		836.9	24.19	-21.81	46	31.39	22.4	3.07	32.67			P	V
		948.2	27	-19	46	31.21	24.28	3.29	31.78			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.
!	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”.