



## Appendix A. Radiated Spurious Emission

Test Engineer :	Lewis He	Temperature :	23~24°C
		Relative Humidity :	50~51%

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 )	Limit	Level	Factor	Loss	Factor	Pos	Pos	Avg.		
					Line	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )	
BLE CH 00 2402MHz		2327.55	52.87	-21.13	74	53.1	27.05	33.26	5.98	207	141	P	H	
		2388.21	43.32	-10.68	54	43.31	27.23	33.24	6.02	207	141	A	H	
	*	2402.338	96.59	-	-	96.56	27.23	33.22	6.02	207	141	P	H	
	*	2402.087	96.3	-	-	96.27	27.23	33.22	6.02	207	141	A	H	
													H	
														H
			2346.81	53.19	-20.81	74	53.36	27.1	33.25	5.98	280	68	P	V
			2380.92	43.29	-10.71	54	43.32	27.19	33.24	6.02	280	68	A	V
	*		2402.338	99.58	-	-	99.55	27.23	33.22	6.02	280	68	P	V
	*		2402.004	99.26	-	-	99.23	27.23	33.22	6.02	280	68	A	V
														V
													V	
BLE CH 19 2440MHz		2388.48	54.32	-19.68	74	54.31	27.23	33.24	6.02	322	6	P	H	
		2347.89	43.42	-10.58	54	43.59	27.1	33.25	5.98	322	6	A	H	
	*	2439.83	100.4	-	-	100.16	27.37	33.21	6.08	322	6	P	H	
	*	2440.08	100.13	-	-	99.89	27.37	33.21	6.08	322	6	A	H	
			2493.08	53.04	-20.96	74	52.49	27.5	33.17	6.22	322	6	P	H
			2489.52	43.91	-10.09	54	43.37	27.5	33.18	6.22	322	6	A	H
			2373.99	53.37	-20.63	74	53.4	27.19	33.24	6.02	338	351	P	V
			2388.75	43.31	-10.69	54	43.3	27.23	33.24	6.02	338	351	A	V
	*		2439.83	98.64	-	-	98.4	27.37	33.21	6.08	338	351	P	V
	*		2440.08	98.34	-	-	98.1	27.37	33.21	6.08	338	351	A	V
			2487.64	53.25	-20.75	74	52.71	27.5	33.18	6.22	338	351	P	V
		2488.16	43.87	-10.13	54	43.33	27.5	33.18	6.22	338	351	A	V	



<b>BLE CH 39 2480MHz</b>	*	2479.826	97.77	-	-	97.34	27.46	33.18	6.15	309	10	P	H
	*	2480.076	97.4	-	-	96.97	27.46	33.18	6.15	309	10	A	H
		2487.56	53.05	-20.95	74	52.51	27.5	33.18	6.22	309	10	P	H
		2483.52	44.9	-9.1	54	44.4	27.46	33.18	6.22	309	10	A	H
													H
													H
	*	2479.826	98.6	-	-	98.17	27.46	33.18	6.15	294	104	P	V
	*	2480.076	98.24	-	-	97.81	27.46	33.18	6.15	294	104	A	V
		2495.92	53.28	-20.72	74	52.73	27.5	33.17	6.22	294	104	P	V
		2483.52	45.14	-8.86	54	44.64	27.46	33.18	6.22	294	104	A	V
													V
													V
<b>Remark</b>	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.	
		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )	
BLE CH 00 2402MHz		4804	37.09	-36.91	74	58.8	31.42	60.64	7.51	100	0	P	H	
													H	
													H	
													H	
			4804	38.1	-35.9	74	59.81	31.42	60.64	7.51	100	0	P	V
														V
														V
														V
BLE CH 19 2440MHz		4880	37.23	-36.77	74	58.65	31.56	60.52	7.54	-	-	P	H	
		7320	42.99	-31.01	74	56.49	36.22	60.98	11.26	100	0	P	H	
													H	
													H	
			4880	37.47	-36.53	74	58.89	31.56	60.52	7.54	-	-	P	V
			7320	43.07	-30.93	74	56.57	36.22	60.98	11.26	100	0	P	V
														V
														V
BLE CH 39 2480MHz		4960	38.69	-35.31	74	59.72	31.73	60.36	7.6	-	-	P	H	
		7440	44.16	-29.84	74	57.24	36.49	61.34	11.77	100	0	P	H	
													H	
													H	
			4960	38.27	-35.73	74	59.3	31.73	60.36	7.6	-	-	P	V
			7440	43.89	-30.11	74	56.97	36.49	61.34	11.77	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 @ 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 )	
2.4GHz BLE LF		104.52	30.6	-12.9	43.5	51.08	10.9	32.63	1.25	-	-	P	H	
		132.33	32.16	-11.34	43.5	51.38	11.98	32.66	1.46	-	-	P	H	
		140.97	32.38	-11.12	43.5	51.72	11.87	32.67	1.46	100	0	P	H	
		515.6	19.35	-26.65	46	31.39	18.36	32.94	2.54	-	-	P	H	
		799.1	23.37	-22.63	46	30.9	22.09	32.88	3.26	-	-	P	H	
		927.9	25.46	-20.54	46	30.13	23.83	32	3.5	-	-	P	H	
														H
														H
														H
														H
														H
														H
														H
			32.43	34.3	-5.7	40	48.01	18.38	32.82	0.73	100	0	P	V
			39.72	30.01	-9.99	40	47.58	14.5	32.8	0.73	-	-	P	V
			144.75	30.69	-12.81	43.5	50.14	11.76	32.67	1.46	-	-	P	V
			352.5	18.65	-27.35	46	34.14	15.25	32.79	2.05	-	-	P	V
			667.5	20.93	-25.07	46	30.69	20.34	33	2.9	-	-	P	V
			965	26.37	-27.63	54	29.88	24.24	31.59	3.84	-	-	P	V
														V
													V	
													V	
													V	
													V	
													V	
<b>Remark</b>	1. No other spurious found. 2. All results are PASS against limit line.													



**Note symbol**

*	<b>Fundamental Frequency</b> which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is <b>over limit</b> line.
P/A	<b>Peak</b> or <b>Average</b>
H/V	<b>Horizontal</b> or <b>Vertical</b>



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

- Level(dBμV/m) =  
Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
- Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

**For Peak Limit @ 2390MHz:**

- 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)
- Over Limit(dB)  
= Level(dBμV/m) – Limit Line(dBμV/m)  
= 55.45(dBμV/m) – 74(dBμV/m)  
= -18.55(dB)

**For Average Limit @ 2390MHz:**

- 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)
- 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”.