



## Appendix B. Radiated Spurious Emission

Test Engineer :	James Chiu and Jesse Wang	Temperature :	24~26°C
		Relative Humidity :	54~59%

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.	(H/V)	
					Line	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )	
BLE CH 00 2402MHz		2384.34	55.08	-18.92	74	50.05	32.06	7.31	34.34	278	64	P	H	
		2387.175	45.94	-8.06	54	40.89	32.08	7.31	34.34	278	64	A	H	
	*	2402	98.55	-	-	93.47	32.08	7.31	34.31	278	64	P	H	
	*	2402	98.1	-	-	93.02	32.08	7.31	34.31	278	64	A	H	
													H	
														H
			2381.085	55.21	-18.79	74	50.19	32.06	7.31	34.35	380	152	P	V
			2383.92	45.68	-8.32	54	40.65	32.06	7.31	34.34	380	152	A	V
	*		2402	96.56	-	-	91.48	32.08	7.31	34.31	380	152	P	V
	*		2402	95.93	-	-	90.85	32.08	7.31	34.31	380	152	A	V
														V
													V	
BLE CH 19 2440MHz		2388.26	55	-19	74	49.95	32.08	7.31	34.34	266	223	P	H	
		2365.44	45.78	-8.22	54	40.88	32.03	7.24	34.37	266	223	A	H	
	*	2440	97.13	-	-	91.88	32.14	7.36	34.25	266	223	P	H	
	*	2440	96.67	-	-	91.42	32.14	7.36	34.25	266	223	A	H	
			2492.37	55.31	-18.69	74	49.87	32.2	7.4	34.16	266	223	P	H
			2489.36	46.19	-7.81	54	40.76	32.2	7.4	34.17	266	223	A	H
			2366.7	55	-19	74	50.1	32.03	7.24	34.37	380	186	P	V
			2335.06	45.58	-8.42	54	40.81	32.01	7.18	34.42	380	186	A	V
	*		2440	96.27	-	-	91.02	32.14	7.36	34.25	380	186	P	V
	*		2440	95.69	-	-	90.44	32.14	7.36	34.25	380	186	A	V
			2484.46	55.15	-18.85	74	49.75	32.18	7.4	34.18	380	186	P	V
		2493.7	46.07	-7.93	54	40.63	32.2	7.4	34.16	380	186	A	V	



<b>BLE CH 39 2480MHz</b>	*	2480	98.65	-	-	93.25	32.18	7.4	34.18	297	92	P	H
	*	2480	98.06	-	-	92.66	32.18	7.4	34.18	297	92	A	H
		2490	55.74	-18.26	74	50.31	32.2	7.4	34.17	297	92	P	H
		2497.52	46.18	-7.82	54	40.73	32.2	7.4	34.15	297	92	A	H
													H
													H
	*	2480	97.77	-	-	92.37	32.18	7.4	34.18	375	341	P	V
	*	2480	97.27	-	-	91.87	32.18	7.4	34.18	375	341	A	V
		2499.04	55.5	-18.5	74	50.05	32.2	7.4	34.15	375	341	P	V
		2491.56	46.33	-7.67	54	40.89	32.2	7.4	34.16	375	341	A	V
													V
													V
<b>Remark</b>	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		4804	43.6	-30.4	74	56.75	34.1	11.83	59.08	100	0	P	H	
													H	
													H	
													H	
		4804	41.22	-32.78	74	54.37	34.1	11.83	59.08	100	0	P	V	
														V
														V
BLE CH 19 2440MHz		4880	40.69	-33.31	74	54	34.1	11.53	58.94	100	0	P	H	
		7320	41.97	-32.03	74	50.02	36.1	13.81	57.96	100	0	P	H	
													H	
													H	
		4880	39.93	-34.07	74	53.24	34.1	11.53	58.94	100	0	P	V	
		7320	41.2	-32.8	74	49.25	36.1	13.81	57.96	100	0	P	V	
														V
BLE CH 39 2480MHz		4960	40.64	-33.36	74	54.09	34.1	11.22	58.77	100	0	P	H	
		7440	41.62	-32.38	74	49.53	36.17	14.05	58.13	100	0	P	H	
													H	
													H	
		4960	41.55	-32.45	74	55	34.1	11.22	58.77	100	0	P	V	
		7440	40.68	-33.32	74	48.59	36.17	14.05	58.13	100	0	P	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.	
		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )	
2.4GHz BLE LF		30	27.43	-12.57	40	31.71	26	1.07	31.35	-	-	P	H	
		168.24	23.95	-19.55	43.5	37.56	16.1	1.78	31.49	-	-	P	H	
		252.21	28.34	-17.66	46	38.44	19.2	2.07	31.37	-	-	P	H	
		336.4	29.01	-16.99	46	37.01	20.82	2.41	31.23	-	-	P	H	
		420.4	37.78	-8.22	46	43.35	22.68	2.89	31.14	100	0	P	H	
		912.5	35.33	-10.67	46	32.44	29.31	4.12	30.54	-	-	P	H	
														H
														H
														H
														H
														H
														H
			31.62	28.11	-11.89	40	33.5	24.92	1.07	31.38	100	0	P	V
			83.46	21.05	-18.95	40	37.06	14.26	1.28	31.55	-	-	P	V
			252.21	27.74	-18.26	46	37.84	19.2	2.07	31.37	-	-	P	V
			420.4	33.89	-12.11	46	39.46	22.68	2.89	31.14	-	-	P	V
			794.2	32.24	-13.76	46	31.3	27.64	3.9	30.6	-	-	P	V
			952.4	33.55	-12.45	46	29.8	30.21	4.07	30.53	-	-	P	V
														V
														V
													V	
													V	
													V	
													V	
Remark	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”.