



## Appendix A. Radiated Spurious Emission

<b>Test Engineer :</b>	Derreck Chen, Ken Wu, and Nick Yu	<b>Temperature :</b>	23~25°C
		<b>Relative Humidity :</b>	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 )	Limit	Level	Factor	Loss	Factor	Pos	Pos	Avg.		
					Line	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )	
BLE CH 39 2480MHz	*	2480.076	97.52	-	-	91.76	32.28	7.91	34.43	320	38	P	H	
	*	2480.076	96.76	-	-	91	32.28	7.91	34.43	320	38	A	H	
		2499.64	48.3	-25.7	74	42.57	32.3	7.91	34.48	320	38	P	H	
		2500	38.75	-15.25	54	33.02	32.3	7.91	34.48	320	38	A	H	
													H	
														H
	*	2480.076	90.42	-	-	84.66	32.28	7.91	34.43	345	0	P	V	
	*	2480.076	89.65	-	-	83.89	32.28	7.91	34.43	345	0	A	V	
		2494.36	46.46	-27.54	74	40.73	32.3	7.91	34.48	345	0	P	V	
		2500	35.67	-18.33	54	29.94	32.3	7.91	34.48	345	0	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 )	( dB $\mu$ V/m )	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
				( dB )	( dB $\mu$ V/m )	( dB $\mu$ V )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
BLE CH 39 2480MHz		4962	47.75	-26.25	74	60.72	34.37	11.32	58.66	100	0	P	H
		7440	43.88	-30.12	74	51	35.6	15.13	57.85	100	0	P	H
													H
													H
		4962	46.3	-27.7	74	59.27	34.37	11.32	58.66	100	0	P	V
		7440	45.27	-28.73	74	52.39	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.	
		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )	
2.4GHz BLE LF		69.42	36.31	-3.69	40	59.15	6.4	2.06	31.3	-	-	P	H	
		138.81	41.16	-2.34	43.5	58.38	11.5	2.38	31.1	158	265	P	H	
		240.06	36.47	-9.53	46	53.11	11.4	2.96	31	-	-	P	H	
		555.5	37.68	-8.32	46	44.53	19.92	4.01	30.78	-	-	P	H	
		764.1	43.33	-2.67	46	47.12	22.1	4.48	30.37	-	-	P	H	
		902.7	39.91	-6.09	46	42.13	23.29	4.8	30.31	-	-	P	H	
														H
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														H
														H
			116.94	30.66	-12.84	43.5	48.17	11.24	2.38	31.13	-	-	P	V
			208.47	36.31	-7.19	43.5	55.54	9.18	2.69	31.1	-	-	P	V
			277.86	34.1	-11.9	46	49.05	12.82	3.16	30.93	-	-	P	V
			430.2	37.89	-8.11	46	48.1	16.91	3.63	30.75	-	-	P	V
			664	43.87	-2.13	46	49.64	20.35	4.35	30.47	183	265	P	V
			902.7	35.42	-10.58	46	37.64	23.29	4.8	30.31	-	-	P	V
														V
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**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 per 15.209(c).
!	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”.**