



## Appendix A. Radiated Spurious Emission

Test Engineer :	Kyle Jhuang	Temperature :	25~26°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 Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	(H/V)	
					( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )	
BLE CH 00 2402MHz		2358.6	51.59	-22.41	74	47.97	32.7	4.6	33.68	118	302	P	H	
		2382.27	40.59	-13.41	54	36.9	32.73	4.62	33.66	118	302	A	H	
	*	2402.254	104.24	-	-	100.5	32.77	4.62	33.65	118	302	P	H	
	*	2402.004	103.26	-	-	99.52	32.77	4.62	33.65	118	302	A	H	
													H	
														H
			2357.07	51.88	-22.12	74	48.26	32.7	4.6	33.68	101	339	P	V
			2382.45	40.52	-13.48	54	36.83	32.73	4.62	33.66	101	339	A	V
	*		2401.67	100.78	-	-	97.04	32.77	4.62	33.65	101	339	P	V
	*		2402.004	99.9	-	-	96.16	32.77	4.62	33.65	101	339	A	V
														V
													V	
BLE CH 19 2440MHz		2360.49	52.11	-21.89	74	48.49	32.7	4.6	33.68	146	312	P	H	
		2380.92	40.59	-13.41	54	36.9	32.73	4.62	33.66	146	312	A	H	
	*	2439.663	104.05	-	-	100.08	32.89	4.68	33.6	146	312	P	H	
	*	2439.997	103.2	-	-	99.23	32.89	4.68	33.6	146	312	A	H	
			2490.44	51.74	-22.26	74	47.57	33	4.73	33.56	146	312	P	H
			2493.8	41.03	-12.97	54	36.86	33	4.73	33.56	146	312	A	H
			2351.76	51.22	-22.78	74	47.63	32.7	4.57	33.68	101	197	P	V
			2388.21	40.57	-13.43	54	36.83	32.77	4.62	33.65	101	197	A	V
	*		2439.746	102.86	-	-	98.89	32.89	4.68	33.6	101	197	P	V
	*		2439.913	101.94	-	-	97.97	32.89	4.68	33.6	101	197	A	V
			2484	51.18	-22.82	74	47.06	32.96	4.73	33.57	101	197	P	V
			2487.24	40.68	-13.32	54	36.56	32.96	4.73	33.57	101	197	A	V



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 39 2480MHz	*	2479.742	100.29	-	-	96.17	32.96	4.73	33.57	126	127	P	H
	*	2479.993	99.42	-	-	95.3	32.96	4.73	33.57	126	127	A	H
		2489.72	51.42	-22.58	74	47.25	33	4.73	33.56	126	127	P	H
		2483.64	40.9	-13.1	54	36.78	32.96	4.73	33.57	126	127	A	H
													H
													H
	*	2479.742	99.93	-	-	95.81	32.96	4.73	33.57	100	184	P	V
	*	2480.076	99.09	-	-	94.97	32.96	4.73	33.57	100	184	A	V
		2496.8	51.56	-22.44	74	47.39	33	4.73	33.56	100	184	P	V
		2483.76	40.9	-13.1	54	36.78	32.96	4.73	33.57	100	184	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		4803	44.89	-29.11	74	61.97	35.04	6.52	58.64	100	0	P	H	
													H	
													H	
													H	
		4805	43.84	-30.16	74	60.9	35.04	6.54	58.64	100	0	P	V	
														V
														V
														V
BLE CH 19 2440MHz		4881	44.59	-29.41	74	61.51	35.02	6.58	58.52	100	0	P	H	
		7320	41.78	-32.22	74	55.33	36.4	8.24	58.19	100	0	P	H	
													H	
													H	
		4881	44.91	-29.09	74	61.83	35.02	6.58	58.52	100	0	P	V	
		7320	41.77	-32.23	74	55.32	36.4	8.24	58.19	100	0	P	V	
														V
														V
BLE CH 39 2480MHz		4959	44.3	-29.7	74	61.04	35.01	6.61	58.36	100	0	P	H	
		7440	41.38	-32.62	74	54.96	36.47	8.36	58.41	100	0	P	H	
													H	
													H	
		4959	46.52	-27.48	74	63.26	35.01	6.61	58.36	100	0	P	V	
		7440	42.38	-31.62	74	55.96	36.47	8.36	58.41	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		118.56	27.9	-15.6	43.5	46.88	11.62	1.18	31.78			P	H	
		155.82	31.01	-12.49	43.5	50.75	10.74	1.3	31.78	100	58	P	H	
		205.5	23.21	-20.29	43.5	44.35	9.15	1.49	31.78			P	H	
		475	20.52	-25.48	46	32.61	17.6	2.18	31.87			P	H	
		666.8	25.9	-20.1	46	35.04	20.3	2.6	32.04			P	H	
		833.4	28.95	-17.05	46	34.83	22.99	2.89	31.76			P	H	
													H	H
													H	H
													H	H
													H	H
													H	H
													H	H
													H	H
			64.02	35.71	-4.29	40	60.63	5.98	0.89	31.79	100	115	P	V
			119.1	26.94	-16.56	43.5	45.98	11.56	1.18	31.78			P	V
			155.82	28.71	-14.79	43.5	48.45	10.74	1.3	31.78			P	V
			593.3	20.42	-25.58	46	30.39	19.64	2.42	32.03			P	V
			666.8	23.06	-22.94	46	32.2	20.3	2.6	32.04			P	V
			833.4	29.39	-16.61	46	35.27	22.99	2.89	31.76			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 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”.