



## Appendix A. Radiated Spurious Emission

Test Engineer :	Donny Tang	Temperature :	22~24°C
		Relative Humidity :	47~50%

### 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	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )	
BLE CH 00 2402MHz		2364	45.07	-28.93	74	41.66	31.92	6.14	34.65	156	299	P	H	
		2374.35	33.3	-20.7	54	29.85	31.93	6.17	34.65	156	299	A	H	
	*	2402.171	93.02	-	-	89.51	31.94	6.21	34.64	156	299	P	H	
	*	2402.254	92.89	-	-	89.38	31.94	6.21	34.64	156	299	A	H	
													H	
													H	
			2359.23	45.09	-28.91	74	41.68	31.92	6.14	34.65	105	31	P	V
			2349.87	33.14	-20.86	54	29.74	31.91	6.14	34.65	105	31	A	V
	*		2402.254	91.14	-	-	87.63	31.94	6.21	34.64	105	31	P	V
	*		2402.254	91.05	-	-	87.54	31.94	6.21	34.64	105	31	A	V
													V	
												V		
BLE CH 19 2440MHz		2363.28	44.31	-29.69	74	40.9	31.92	6.14	34.65	100	310	P	H	
		2348.07	33.15	-20.85	54	29.75	31.91	6.14	34.65	100	310	A	H	
	*	2440	93.28	-	-	89.71	31.97	6.24	34.64	100	310	P	H	
	*	2440	92.94	-	-	89.37	31.97	6.24	34.64	100	310	A	H	
			2496.24	44.54	-29.46	74	40.83	32	6.34	34.63	100	310	P	H
			2492.36	33.03	-20.97	54	29.32	32	6.34	34.63	100	310	A	H
			2361.12	44.56	-29.44	74	41.15	31.92	6.14	34.65	103	2	P	V
			2355.63	33.01	-20.99	54	29.6	31.92	6.14	34.65	103	2	A	V
	*		2440	91.5	-	-	87.93	31.97	6.24	34.64	103	2	P	V
	*		2440	91.36	-	-	87.79	31.97	6.24	34.64	103	2	A	V
			2493.24	45.12	-28.88	74	41.41	32	6.34	34.63	103	2	P	V
			2483.52	33.36	-20.64	54	29.7	31.99	6.3	34.63	103	2	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	*	2479.909	92.39	-	-	88.73	31.99	6.3	34.63	100	308	P	H	
	*	2480.327	91.84	-	-	88.18	31.99	6.3	34.63	100	308	P	H	
		2484.4	45.07	-28.93	74	41.41	31.99	6.3	34.63	100	308	P	H	
		2483.52	35.57	-18.43	54	31.91	31.99	6.3	34.63	100	308	A	H	
													H	
													H	
	*	2479.826	88.97	-	-	85.31	31.99	6.3	34.63				P	V
	*	2480.327	88.63	-	-	84.97	31.99	6.3	34.63				A	V
		2490.52	44.82	-29.18	74	41.15	32	6.3	34.63				P	V
		2483.52	35.37	-18.63	54	31.71	31.99	6.3	34.63				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		4806	48.44	-25.56	74	66.43	34.35	8.52	60.86	100	0	P	H	
													H	
													H	
													H	
		4806	48.56	-25.44	74	66.55	34.35	8.52	60.86	100	0	P	V	
														V
														V
														V
BLE CH 19 2440MHz		4881	48.01	-25.99	74	62.38	34.4	8.77	57.54	100	0	P	H	
		7323	42.69	-31.31	74	54.14	35.73	11.95	59.13	100	0	P	H	
													H	
													H	
		4881	48.2	-25.8	74	62.57	34.4	8.77	57.54	100	0	P	V	
		7323	42.94	-31.06	74	54.39	35.73	11.95	59.13	100	0	P	V	
														V
														V
BLE CH 39 2480MHz		4962	48.1	-25.9	74	62.05	34.47	9.02	57.44	100	0	P	H	
		7440	42.75	-31.25	74	54.28	35.71	12.01	59.25	100	0	P	H	
													H	
													H	
		4962	46.28	-27.72	74	60.23	34.47	9.02	57.44	100	0	P	V	
		7440	43.21	-30.79	74	54.74	35.71	12.01	59.25	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		30	16.95	-23.05	40	29.71	18.4	0.64	31.8			P	H	
		34.05	16.54	-23.46	40	30.77	16.88	0.68	31.79			P	H	
		135.3	14.4	-29.1	43.5	33.18	11.68	1.29	31.75			P	H	
		597.5	22.07	-23.93	46	32.77	18.6	2.76	32.06			P	H	
		751.5	22.69	-23.31	46	31.84	19.78	3.05	31.98			P	H	
		835.5	25.75	-20.25	46	34.27	20.1	3.18	31.8	112	325	P	H	
													H	
													H	
													H	
													H	
													H	
													H	
			34.05	17.1	-22.9	40	31.33	16.88	0.68	31.79			P	V
			67.26	14.17	-25.83	40	38.86	6.16	0.92	31.77			P	V
			101.55	13.85	-29.65	43.5	33.57	10.92	1.11	31.75			P	V
			592.6	21.04	-24.96	46	31.76	18.6	2.73	32.05			P	V
			762	22.61	-23.39	46	31.82	19.72	3.05	31.98			P	V
			867	24.81	-21.19	46	32.83	20.37	3.28	31.67	100	258	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”.