



Appendix A. Radiated Spurious Emission

Test Engineer :	Luke Chang	Temperature :	18~20°C
		Relative Humidity :	41~42%

15C 2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 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		2362.11	53.51	-20.49	74	50.1	31.92	6.14	34.65	243	26	P	H	
		2362.02	46.4	-7.6	54	42.99	31.92	6.14	34.65	243	26	A	H	
	*	2401.67	100.08	-	-	96.57	31.94	6.21	34.64	243	26	P	H	
	*	2402.004	99.06	-	-	95.55	31.94	6.21	34.64	243	26	A	H	
													H	
														H
			2374.35	52	-22	74	48.55	31.93	6.17	34.65	170	210	P	V
			2362.38	41.18	-12.82	54	37.77	31.92	6.14	34.65	170	210	A	V
	*		2401.67	92.06	-	-	88.55	31.94	6.21	34.64	170	210	P	V
	*		2401.92	91.2	-	-	87.69	31.94	6.21	34.64	170	210	A	V
														V
													V	
BLE CH 19 2440MHz		2379.75	52.76	-21.24	74	49.31	31.93	6.17	34.65	254	21	P	H	
		2359.95	45.9	-8.1	54	42.49	31.92	6.14	34.65	254	21	A	H	
	*	2439.746	98.94	-	-	95.37	31.97	6.24	34.64	254	21	P	H	
	*	2439.997	98.09	-	-	94.52	31.97	6.24	34.64	254	21	A	H	
			2499.8	54.13	-19.87	74	50.42	32	6.34	34.63	254	21	P	H
			2499.92	48.49	-5.51	54	44.78	32	6.34	34.63	254	21	A	H
			2383.53	52.89	-21.11	74	49.44	31.93	6.17	34.65	184	211	P	V
			2359.95	41.4	-12.6	54	37.99	31.92	6.14	34.65	184	211	A	V
	*		2439.746	92.64	-	-	89.07	31.97	6.24	34.64	184	211	P	V
	*		2439.997	91.8	-	-	88.23	31.97	6.24	34.64	184	211	A	V
			2492.16	52.04	-21.96	74	48.33	32	6.34	34.63	184	211	P	V
		2499.92	42.54	-11.46	54	38.83	32	6.34	34.63	184	211	A	V	



BLE CH 39 2480MHz	*	2480.076	99.97	-	-	96.31	31.99	6.3	34.63	201	8	P	H
	*	2479.993	98.98	-	-	95.32	31.99	6.3	34.63	201	8	A	H
		2483.72	55.92	-18.08	74	52.26	31.99	6.3	34.63	201	8	P	H
		2483.52	49.2	-4.8	54	45.54	31.99	6.3	34.63	201	8	A	H
													H
													H
	*	2479.742	94.12	-	-	90.46	31.99	6.3	34.63	165	210	P	V
	*	2480.076	93.44	-	-	89.78	31.99	6.3	34.63	165	210	A	V
		2483.52	52.4	-21.6	74	48.74	31.99	6.3	34.63	165	210	P	V
		2483.52	44.93	-9.07	54	41.27	31.99	6.3	34.63	165	210	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.	
		(MHz)	(dBμV/m)	(dB)	Limit	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		4804	35.71	-38.29	74	53.7	34.35	8.52	60.86	100	0	P	H	
													H	
													H	
													H	
		4804	36.73	-37.27	74	54.72	34.35	8.52	60.86	100	0	P	V	
														V
														V
														V
BLE CH 19 2440MHz		4880	35.83	-38.17	74	53.35	34.4	8.77	60.69	100	0	P	H	
		7320	40.46	-33.54	74	53.31	35.73	11.95	60.53	100	0	P	H	
													H	
													H	
		4880	36.25	-37.75	74	53.77	34.4	8.77	60.69	100	0	P	V	
		7320	39.65	-34.35	74	52.5	35.73	11.95	60.53	100	0	P	V	
														V
														V
BLE CH 39 2480MHz		4960	39.12	-34.88	74	56.11	34.47	9.02	60.48	100	0	P	H	
		7440	39.47	-34.53	74	52.33	35.71	12.01	60.58	100	0	P	H	
													H	
													H	
		4960	37.86	-36.14	74	54.85	34.47	9.02	60.48	100	0	P	V	
		7440	39.49	-34.51	74	52.35	35.71	12.01	60.58	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.	
				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)	
2.4GHz BLE LF		61.05	27.16	-12.84	40	51.65	6.4	0.88	31.77			P	H	
		168.24	30.67	-12.83	43.5	51.07	9.74	1.61	31.75			P	H	
		260.04	39.25	-6.75	46	55.49	13.7	1.79	31.73	237	105	P	H	
		408.5	38.38	-7.62	46	51.89	16.11	2.21	31.83			P	H	
		455.4	38.07	-7.93	46	50.71	16.92	2.32	31.88			P	H	
		800.5	35.13	-10.87	46	44.12	19.9	3.06	31.95			P	H	
														H
														H
														H
														H
														H
														H
			30.54	36.47	-3.53	40	49.6	18.02	0.65	31.8	100	83	P	V
			127.74	29.69	-13.81	43.5	48.48	11.7	1.26	31.75			P	V
			260.04	31.99	-14.01	46	48.23	13.7	1.79	31.73			P	V
			455.4	40.42	-5.58	46	53.06	16.92	2.32	31.88			P	V
			758.5	33.24	-12.76	46	42.45	19.72	3.05	31.98			P	V
			937	33.72	-12.28	46	40.88	20.67	3.36	31.19			P	V
														V
														V
													V	
													V	
													V	
													V	
Remark	1. No other spurious found. 2. All results are PASS against limit line.													



Note symbol

*	Fundamental Frequency 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 over limit line.
P/A	Peak or Average
H/V	Horizontal or Vertical



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”.