



Appendix A. Radiated Spurious Emission

Test Engineer :	James Chiu, Ken Wu, Nike Yu, and Luke Chang	Temperature :	20~22°C
		Relative Humidity :	50~55%

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.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE CH 00 2402MHz		2355.45	51.26	-22.74	74	52.22	27.14	34.05	5.95	115	289	P	H
		2322.15	42.94	-11.06	54	44.06	27.05	34.06	5.89	115	289	A	H
	*	2402.004	98.54	-	-	99.34	27.23	34.04	6.01	115	289	P	H
	*	2402.087	98.04	-	-	98.84	27.23	34.04	6.01	115	289	A	H
													H
													H
		2359.95	50.49	-23.51	74	51.45	27.14	34.05	5.95	332	215	P	V
		2347.26	41.37	-12.63	54	42.37	27.1	34.05	5.95	332	215	A	V
	*	2402.254	94.78	-	-	95.58	27.23	34.04	6.01	332	215	P	V
	*	2402.004	94.24	-	-	95.04	27.23	34.04	6.01	332	215	A	V
													V
													V
BLE CH 19 2440MHz		2360.4	50.88	-23.12	74	51.84	27.14	34.05	5.95	100	290	P	H
		2379.93	42.22	-11.78	54	43.06	27.19	34.04	6.01	100	290	A	H
	*	2440	100.63	-	-	101.25	27.37	34.03	6.04	100	290	P	H
	*	2439.997	100.11	-	-	100.73	27.37	34.03	6.04	100	290	A	H
		2499.88	51.51	-22.49	74	51.92	27.5	34	6.09	100	290	P	H
		2499.88	44.18	-9.82	54	44.59	27.5	34	6.09	100	290	A	H
		2354.82	50.68	-23.32	74	51.64	27.14	34.05	5.95	290	214	P	V
		2385.33	41.46	-12.54	54	42.3	27.19	34.04	6.01	290	214	A	V
	*	2439.997	97.82	-	-	98.44	27.37	34.03	6.04	290	214	P	V
	*	2439.997	97.29	-	-	97.91	27.37	34.03	6.04	290	214	A	V
		2495.72	50.76	-23.24	74	51.17	27.5	34	6.09	290	214	P	V
		2499.88	42.61	-11.39	54	43.02	27.5	34	6.09	290	214	A	V



BLE CH 39 2480MHz	*	2480.243	102.12	-	-	102.6	27.46	34.01	6.07	100	316	P	H
	*	2480	101.65	-	-	102.13	27.46	34.01	6.07	100	316	A	H
		2485	56.28	-17.72	74	56.74	27.46	34.01	6.09	100	316	P	H
		2484.92	49.32	-4.68	54	49.78	27.46	34.01	6.09	100	316	A	H
													H
													H
	*	2479.742	99.55	-	-	100.03	27.46	34.01	6.07	321	213	P	V
	*	2479.993	99.06	-	-	99.54	27.46	34.01	6.07	321	213	A	V
		2485	54.52	-19.48	74	54.98	27.46	34.01	6.09	321	213	P	V
		2484.92	47.38	-6.62	54	47.84	27.46	34.01	6.09	321	213	A	V
													V
													V
Remark	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	44.79	-29.21	74	38.39	31.3	33.55	8.65	100	0	P	H
													H
													H
													H
		4804	46.17	-27.83	74	39.77	31.3	33.55	8.65	100	0	P	V
													V
													V
													V
BLE CH 19 2440MHz		4880	44.99	-29.01	74	38.43	31.41	33.54	8.69	100	0	P	H
		7320	41.53	-32.47	74	29.28	36.32	34.46	10.39	100	0	P	H
													H
													H
		4880	45.48	-28.52	74	38.92	31.41	33.54	8.69	100	0	P	V
		7320	41.46	-32.54	74	29.21	36.32	34.46	10.39	100	0	P	V
													V
													V
BLE CH 39 2480MHz		4960	45.33	-28.67	74	38.54	31.54	33.54	8.79	100	0	P	H
		7440	40.51	-33.49	74	27.92	36.59	34.52	10.52	100	0	P	H
													H
													H
		4960	45.64	-28.36	74	38.85	31.54	33.54	8.79	100	0	P	V
		7440	41.12	-32.88	74	28.53	36.59	34.52	10.52	100	0	P	V
													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.	
				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		66.45	18.75	-21.25	40	44.58	4.92	31.79	1.04	128	12	P	H	
		149.88	11.94	-31.56	43.5	32.25	10.01	31.78	1.46	-	-	P	H	
		250.05	23.19	-22.81	46	41.01	12.01	31.77	1.94	-	-	P	H	
		387.5	20.24	-25.76	46	34.59	15.12	31.79	2.32	-	-	P	H	
		623.4	22.6	-23.4	46	32.68	19	32.04	2.96	-	-	P	H	
		874.7	24.17	-21.83	46	32.23	20.05	31.55	3.44	-	-	P	H	
													H	
													H	
													H	
													H	
													H	
													H	
		44.04	25.14	-14.86	40	45.9	10.38	31.81	0.67	196	298	P	V	
		169.32	21.9	-21.6	43.5	43.2	8.84	31.78	1.64	-	-	P	V	
		270.3	17.68	-28.32	46	35.11	12.4	31.77	1.94	-	-	P	V	
		332.9	19.47	-26.53	46	35.41	13.66	31.77	2.17	-	-	P	V	
		624.8	23.56	-22.44	46	33.64	19	32.04	2.96	-	-	P	V	
		874.7	22.66	-23.34	46	30.72	20.05	31.55	3.44	-	-	P	V	
														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.
!	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

1. Level(dBμV/m) =

Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. 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)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. 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)

2. 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”.