



Appendix A. Radiated Spurious Emission

Test Engineer :	Kyle Jhuang, Citta Ke, and Karl Hou	Temperature :	25~26°C
		Relative Humidity :	50~51%

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 00 2402MHz		2371.02	51.34	-22.66	74	47.67	32.73	4.6	33.66	109	132	P	H	
		2367.06	40.3	-13.7	54	36.68	32.7	4.6	33.68	109	132	A	H	
	*	2401.67	99.93	-	-	96.19	32.77	4.62	33.65	109	132	P	H	
	*	2402.004	98.88	-	-	95.14	32.77	4.62	33.65	109	132	A	H	
													H	
														H
			2377.5	50.84	-23.16	74	47.17	32.73	4.6	33.66	141	349	P	V
			2380.56	40.45	-13.55	54	36.76	32.73	4.62	33.66	141	349	A	V
	*		2401.67	98.59	-	-	94.85	32.77	4.62	33.65	141	349	P	V
	*		2402.004	97.63	-	-	93.89	32.77	4.62	33.65	141	349	A	V
														V
														V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.													



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 19 2440MHz		2381	51.36	-22.64	74	47.67	32.73	4.62	33.66	111	295	P	H
		2365	41.03	-12.97	54	37.41	32.7	4.6	33.68	111	295	A	H
	*	2440	105.72	-	-	101.75	32.89	4.68	33.6	111	295	P	H
	*	2440	104.88	-	-	100.91	32.89	4.68	33.6	111	295	A	H
		2488	52.2	-21.8	74	48.03	33	4.73	33.56	111	295	P	H
		2487	41.14	-12.86	54	37.02	32.96	4.73	33.57	111	295	A	H
		2381	51.13	-22.87	74	47.44	32.73	4.62	33.66	104	65	P	V
		2386	40.45	-13.55	54	36.71	32.77	4.62	33.65	104	65	A	V
	*	2439	100.76	-	-	96.79	32.89	4.68	33.6	104	65	P	V
	*	2439	99.76	-	-	95.79	32.89	4.68	33.6	104	65	A	V
		2498	51.68	-22.32	74	47.51	33	4.73	33.56	104	65	P	V
		2489	40.68	-13.32	54	36.51	33	4.73	33.56	104	65	A	V
BLE CH 39 2480MHz	*	2480	107.36	-	-	103.24	32.96	4.73	33.57	109	200	P	H
	*	2480	106.45	-	-	102.33	32.96	4.73	33.57	109	200	A	H
		2484.4	53.52	-20.48	74	49.4	32.96	4.73	33.57	109	200	P	H
		2483.68	42.65	-11.35	54	38.53	32.96	4.73	33.57	109	200	P	H
													H
													H
	*	2480	104.04	-	-	99.92	32.96	4.73	33.57	172	139	P	V
	*	2480	103.09	-	-	98.97	32.96	4.73	33.57	172	139	A	V
		2484.08	52.23	-21.77	74	48.11	32.96	4.73	33.57	172	139	P	V
		2483.92	41.6	-12.4	54	37.48	32.96	4.73	33.57	172	139	P	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		4805	47.28	-26.72	74	64.34	35.04	6.54	58.64	100	0	P	H	
													H	
													H	
													H	
		4805	47.93	-26.07	74	64.99	35.04	6.54	58.64	100	0	P	V	
														V
														V
														V
BLE CH 19 2440MHz		4881	46.5	-27.5	74	63.42	35.02	6.58	58.52	100	0	P	H	
		7320	42.74	-31.26	74	56.29	36.4	8.24	58.19	100	0	P	H	
													H	
													H	
		4881	49.74	-24.26	74	66.66	35.02	6.58	58.52	100	0	P	V	
		7320	43.38	-30.62	74	56.93	36.4	8.24	58.19	100	0	P	V	
														V
														V
BLE CH 39 2480MHz		4961	48.02	-25.98	74	64.76	35.01	6.61	58.36	100	0	P	H	
		7440	41.79	-32.21	74	55.37	36.47	8.36	58.41	100	0	P	H	
													H	
													H	
		4961	48.59	-25.41	74	65.33	35.01	6.61	58.36	100	0	P	V	
		7440	41.1	-32.9	74	54.68	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.	
				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		98.31	26.44	-17.06	43.5	47.21	9.92	1.09	31.78	-	-	P	H	
		165.27	34	-9.5	43.5	54.64	9.8	1.34	31.78	100	33	P	H	
		253.02	28.28	-17.72	46	45.55	12.85	1.65	31.77	-	-	P	H	
		500.2	30.5	-15.5	46	42.16	18	2.23	31.89	-	-	P	H	
		718.6	32.06	-13.94	46	40.03	21.36	2.69	32.02	-	-	P	H	
		868.4	33.84	-12.16	46	39.45	23.02	2.95	31.58	-	-	P	H	
														H
														H
														H
														H
														H
														H
			62.94	28.58	-11.42	40	53.52	5.96	0.89	31.79	100	89	P	V
			95.61	27.73	-15.77	43.5	48.99	9.44	1.08	31.78	-	-	P	V
			121.53	27.85	-15.65	43.5	46.92	11.52	1.19	31.78	-	-	P	V
			332.9	27.42	-18.58	46	43.45	13.88	1.86	31.77	-	-	P	V
			500.2	28.77	-17.23	46	40.43	18	2.23	31.89	-	-	P	V
			666.8	28.2	-17.8	46	37.34	20.3	2.6	32.04	-	-	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”.