



Appendix A. Radiated Spurious Emission

Test Engineer :	Nick Yu and James Chiu	Temperature :	21~23°C
		Relative Humidity :	47~49%

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	Level	Factor	Loss	Factor	Pos	Pos	Avg.		
					Line	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
BLE CH 00 2402MHz		2317.92	46.69	-27.31	74	41.22	32.09	7.6	34.22	100	216	P	H	
		2365.62	33.12	-20.88	54	27.58	32.13	7.68	34.27	100	216	A	H	
		2401.753	71.83	-	-	66.2	32.18	7.75	34.3	100	216	P	H	
	*	2402.004	70.59	-	-	64.96	32.18	7.75	34.3	100	216	A	H	
													H	
														H
			2375.43	47.66	-26.34	74	42.09	32.16	7.68	34.27	102	132	P	V
			2344.11	33.12	-20.88	54	27.58	32.11	7.68	34.25	102	132	A	V
			2402.254	71.31	-	-	65.68	32.18	7.75	34.3	102	132	P	V
	*		2401.92	70.06	-	-	64.43	32.18	7.75	34.3	102	132	A	V
														V
													V	
BLE CH 19 2440MHz		2315.13	47.09	-26.91	74	41.64	32.07	7.6	34.22	100	252	P	H	
		2366.43	33.12	-20.88	54	27.58	32.13	7.68	34.27	100	252	A	H	
		2440.247	68.49	-	-	62.77	32.24	7.83	34.35	100	252	P	H	
	*	2439.997	67.06	-	-	61.34	32.24	7.83	34.35	100	252	A	H	
		2485.12	47.14	-26.86	74	41.38	32.28	7.91	34.43	100	252	P	H	
		2490.84	33.29	-20.71	54	27.51	32.3	7.91	34.43	100	252	A	H	
		2345.01	48.3	-25.7	74	42.76	32.11	7.68	34.25	102	137	P	V	
		2366.52	33.12	-20.88	54	27.58	32.13	7.68	34.27	102	137	A	V	
		2440.247	66.58	-	-	60.86	32.24	7.83	34.35	102	137	P	V	
	*	2439.997	64.82	-	-	59.1	32.24	7.83	34.35	102	137	A	V	
		2496.28	47.48	-26.52	74	41.75	32.3	7.91	34.48	102	137	P	V	
		2491.28	33.29	-20.71	54	27.51	32.3	7.91	34.43	102	137	A	V	



BLE CH 39 2480MHz	*	2479.826	75.44	-	-	69.68	32.28	7.91	34.43	100	232	P	H
	*	2479.993	74.25	-	-	68.49	32.28	7.91	34.43	100	232	A	H
		2485.96	47.86	-26.14	74	42.1	32.28	7.91	34.43	100	232	P	H
		2483.52	33.39	-20.61	54	27.63	32.28	7.91	34.43	100	232	A	H
													H
													H
		2479.826	73.6	-	-	67.84	32.28	7.91	34.43	100	136	P	V
	*	2480.076	72.36	-	-	66.6	32.28	7.91	34.43	100	136	A	V
		2489.96	47.56	-26.44	74	41.78	32.3	7.91	34.43	100	136	P	V
		2483.52	33.29	-20.71	54	27.53	32.28	7.91	34.43	100	136	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		4806	49.53	-24.47	74	63.84	34.25	11.11	59.67	100	0	P	H	
													H	
													H	
													H	
		4806	47.51	-26.49	74	61.82	34.25	11.11	59.67	100	0	P	V	
														V
														V
														V
BLE CH 19 2440MHz		4884	47.54	-26.46	74	61.6	34.3	11.21	59.57	100	0	P	H	
		7320	43.84	-30.16	74	51.65	35.6	15.08	58.49	100	0	P	H	
													H	
													H	
		4884	46.29	-27.71	74	60.35	34.3	11.21	59.57	100	0	P	V	
		7320	42.66	-31.34	74	50.47	35.6	15.08	58.49	100	0	P	V	
														V
														V
BLE CH 39 2480MHz		4959	47.85	-26.15	74	61.61	34.37	11.32	59.45	100	0	P	H	
		7440	42.66	-31.34	74	50.57	35.6	15.13	58.64	100	0	P	H	
													H	
													H	
		4959	47.49	-26.51	74	61.25	34.37	11.32	59.45	100	0	P	V	
		7440	43.61	-30.39	74	51.52	35.6	15.13	58.64	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		135.03	17.86	-25.64	43.5	35.08	11.5	2.38	31.1			P	H	
		168.78	25.94	-17.56	43.5	44.73	9.72	2.61	31.12	100	0	P	H	
		231.15	23.74	-22.26	46	41.56	10.22	2.96	31			P	H	
		358.1	17.79	-28.21	46	30.85	14.64	3.39	31.09			P	H	
		515.6	21.71	-24.29	46	30.38	18.1	3.89	30.66			P	H	
		855.8	27.71	-18.29	46	30.15	23.25	4.7	30.39			P	H	
														H
														H
														H
														H
														H
														H
			68.88	30.15	-9.85	40	53.05	6.32	2.06	31.28	100	0	P	V
			118.56	24.12	-19.38	43.5	41.56	11.29	2.38	31.11			P	V
			237.09	19.74	-26.26	46	36.84	10.94	2.96	31			P	V
			396.6	24.21	-21.79	46	35.83	15.78	3.52	30.92			P	V
			628.3	24.52	-21.48	46	30.48	20.36	4.22	30.54			P	V
			850.2	27.73	-18.27	46	30.14	23.29	4.7	30.4			P	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”.