



Appendix A. Radiated Spurious Emission

Test Engineer :	Nick Yu, Ken Wu and Derreck Chen	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.
				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		2318.64	56.23	-17.77	74	51.56	32.09	6.8	34.22	137	64	P	H
		2390	45.82	-8.18	54	41.03	32.18	6.91	34.3	137	64	A	H
	*	2402.171	105.01	-	-	100.22	32.18	6.91	34.3	137	64	P	H
	*	2401.92	104.42	-	-	99.63	32.18	6.91	34.3	137	64	A	H
													H
													H
		2382.09	56.89	-17.11	74	52.09	32.16	6.91	34.27	144	145	P	V
		2358.24	45.66	-8.34	54	40.91	32.13	6.87	34.25	144	145	A	V
	*	2401.753	97.74	-	-	92.95	32.18	6.91	34.3	144	145	P	V
	*	2401.92	97.19	-	-	92.4	32.18	6.91	34.3	144	145	A	V
													V
													V
BLE CH 19 2440MHz		2355	56.28	-17.72	74	51.56	32.13	6.84	34.25	109	58	P	H
		2372.64	46.05	-7.95	54	41.29	32.16	6.87	34.27	109	58	A	H
	*	2439.746	105.98	-	-	101.14	32.24	6.95	34.35	109	58	P	H
	*	2439.913	105.42	-	-	100.58	32.24	6.95	34.35	109	58	A	H
		2489.88	56.37	-17.63	74	51.5	32.3	7	34.43	109	58	P	H
		2497.4	46.32	-7.68	54	41.5	32.3	7	34.48	109	58	A	H
		2382.99	56.82	-17.18	74	52.02	32.16	6.91	34.27	200	133	P	V
		2353.47	45.75	-8.25	54	41.03	32.13	6.84	34.25	200	133	A	V
	*	2440.247	97.7	-	-	92.86	32.24	6.95	34.35	200	133	P	V
	*	2439.997	97.05	-	-	92.21	32.24	6.95	34.35	200	133	A	V
		2496.04	56.65	-17.35	74	51.83	32.3	7	34.48	200	133	P	V
		2498.32	45.82	-8.18	54	41	32.3	7	34.48	200	133	A	V



BLE CH 39 2480MHz	*	2479.826	106.78	-	-	101.93	32.28	7	34.43	105	61	P	H
	*	2480.076	106.09	-	-	101.24	32.28	7	34.43	105	61	A	H
		2483.8	59.16	-14.84	74	54.31	32.28	7	34.43	105	61	P	H
		2484.24	46.31	-7.69	54	41.46	32.28	7	34.43	105	61	A	H
													H
													H
	*	2480.243	99.65	-	-	94.8	32.28	7	34.43	200	132	P	V
	*	2479.993	99.03	-	-	94.18	32.28	7	34.43	200	132	A	V
		2483.52	57.32	-16.68	74	52.47	32.28	7	34.43	200	132	P	V
		2496.36	45.93	-8.07	54	41.11	32.3	7	34.48	200	132	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		4804	45.76	-28.24	74	61.74	34.25	8.73	58.96	100	0	P	H
													H
													H
													H
		4804	45.2	-28.8	74	61.18	34.25	8.73	58.96	100	0	P	V
													V
													V
													V
BLE CH 19 2440MHz		4880	45.64	-28.36	74	61.24	34.3	8.93	58.83	100	0	P	H
		7320	41.5	-32.5	74	52.65	35.6	10.99	57.74	100	0	P	H
													H
													H
		4880	45.42	-28.58	74	61.02	34.3	8.93	58.83	100	0	P	V
		7320	42.08	-31.92	74	53.23	35.6	10.99	57.74	100	0	P	V
													V
													V
BLE CH 39 2480MHz		4960	45.68	-28.32	74	60.88	34.37	9.09	58.66	100	0	P	H
		7440	40.59	-33.41	74	51.72	35.6	11.12	57.85	100	0	P	H
													H
													H
		4960	44.74	-29.26	74	59.94	34.37	9.09	58.66	100	0	P	V
		7440	40.91	-33.09	74	52.04	35.6	11.12	57.85	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		56.73	20.34	-19.66	40	44.6	6.24	0.74	31.24			P	H	
		140.43	29.21	-14.29	43.5	47.61	11.5	1.2	31.1			P	H	
		270.3	35.83	-10.17	46	52.29	12.89	1.64	30.99	101	28	P	H	
		332.9	31.83	-14.17	46	47.09	13.88	1.86	31			P	H	
		710.9	28.74	-17.26	46	35.13	21.04	2.97	30.4			P	H	
		995.8	32.96	-21.04	54	34.99	24.68	3.51	30.22			P	H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
		37.56	29.23	-10.77	40	44.99	14.88	0.6	31.24				P	V
		173.64	30.12	-13.38	43.5	50.54	9.38	1.24	31.04				P	V
		284.34	40.25	-5.75	46	56.65	12.92	1.66	30.98	189	143		P	V
		363	26.37	-19.63	46	40.64	14.75	2.07	31.09				P	V
		666.8	23.89	-22.11	46	31.13	20.36	2.87	30.47				P	V
		995.8	36.21	-17.79	54	38.24	24.68	3.51	30.22				P	V
														V
														V
														V
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														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

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”.