



Appendix A. Radiated Spurious Emission

Test Engineer :	Karl Hou	Temperature :	24~25°C
		Relative Humidity :	53~54%

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		2389.65	54.46	-19.54	74	55.08	27.23	5.39	33.24	122	324	P	H
		2389.47	42.47	-11.53	54	43.09	27.23	5.39	33.24	122	324	A	H
	*	2402	93.74	-	-	94.34	27.23	5.39	33.22	122	324	P	H
	*	2402	93.18	-	-	93.78	27.23	5.39	33.22	122	324	A	H
													H
													H
		2310.45	51.4	-22.6	74	52.4	27.01	5.27	33.28	340	7	P	V
		2356.62	41.93	-12.07	54	42.71	27.14	5.33	33.25	340	7	A	V
	*	2402	85.53	-	-	86.13	27.23	5.39	33.22	340	7	P	V
	*	2402	84.91	-	-	85.51	27.23	5.39	33.22	340	7	A	V
													V
													V
BLE CH 19 2440MHz		2357.43	51.78	-22.22	74	52.56	27.14	5.33	33.25	135	327	P	H
		2385.6	42.23	-11.77	54	42.85	27.23	5.39	33.24	135	327	A	H
	*	2440	94.09	-	-	94.51	27.37	5.42	33.21	135	327	P	H
	*	2440	93.57	-	-	93.99	27.37	5.42	33.21	135	327	A	H
		2494.04	51.47	-22.53	74	51.68	27.5	5.46	33.17	135	327	P	H
		2492.12	42.38	-11.62	54	42.59	27.5	5.46	33.17	135	327	A	H
		2382.36	51.48	-22.52	74	52.14	27.19	5.39	33.24	370	25	P	V
		2371.02	41.8	-12.2	54	42.46	27.19	5.39	33.24	370	25	A	V
	*	2440	86.12	-	-	86.54	27.37	5.42	33.21	370	25	P	V
	*	2440	85.43	-	-	85.85	27.37	5.42	33.21	370	25	A	V
		2492.8	52.27	-21.73	74	52.48	27.5	5.46	33.17	370	25	P	V
		2484.56	42.64	-11.36	54	42.9	27.46	5.46	33.18	370	25	A	V



BLE CH 39 2480MHz	*	2480	94.38	-	-	94.66	27.46	5.44	33.18	137	312	P	H
	*	2480	93.76	-	-	94.04	27.46	5.44	33.18	137	312	A	H
		2484.76	60.91	-13.09	74	61.17	27.46	5.46	33.18	137	312	P	H
		2483.52	46.62	-7.38	54	46.88	27.46	5.46	33.18	137	312	A	H
													H
													H
	*	2480	88.93	-	-	89.21	27.46	5.44	33.18	361	41	P	V
	*	2480	88.3	-	-	88.58	27.46	5.44	33.18	361	41	P	V
		2484.88	56.33	-17.67	74	56.59	27.46	5.46	33.18	361	41	P	V
		2484.36	43.64	-10.36	54	43.9	27.46	5.46	33.18	361	41	A	V
													V
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													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		4803	55.56	-18.44	74	77.2	31.42	7.58	60.64	102	283	P	H
		4803	53.51	-0.49	54	75.15	31.42	7.58	60.64	102	283	A	H
													H
													H
		4803	55.05	-18.95	74	76.69	31.42	7.58	60.64	100	241	P	V
		4803	53.24	-0.76	54	74.88	31.42	7.58	60.64	100	241	A	V
													V
													V
BLE CH 19 2440MHz		4878	56.38	-17.62	74	77.64	31.56	7.7	60.52	112	281	P	H
		4878	53.63	-0.37	54	74.89	31.56	7.7	60.52	112	281	A	H
		7320	50.68	-23.32	74	65.95	36.22	9.49	60.98	100	0	P	H
													H
		4878	55.26	-18.74	74	76.52	31.56	7.7	60.52	100	119	P	V
		4878	52.66	-1.34	54	73.92	31.56	7.7	60.52	100	119	A	V
		7320	50.72	-23.28	74	65.99	36.22	9.49	60.98	100	0	P	V
													V
BLE CH 39 2480MHz		4959	54.79	-19.21	74	75.49	31.73	7.93	60.36	100	271	P	H
		4959	51.98	-2.02	54	72.68	31.73	7.93	60.36	100	271	A	H
		7440	50.84	-23.16	74	66.08	36.49	9.61	61.34	100	0	P	H
													H
		4962	55	-19	74	75.58	31.73	8.05	60.36	265	249	P	V
		4962	52.11	-1.89	54	72.69	31.73	8.05	60.36	265	249	A	V
		7440	50.55	-23.45	74	65.79	36.49	9.61	61.34	100	0	P	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		32.97	18.48	-21.52	40	32.26	18.38	0.65	32.81			P	H
		122.88	14.34	-29.16	43.5	33.92	11.93	1.14	32.65			P	H
		269.49	19.81	-26.19	46	37.28	13.5	1.76	32.73			P	H
		443.5	20.95	-25.05	46	34.47	17.19	2.16	32.87			P	H
		458.2	21.54	-24.46	46	34.69	17.44	2.3	32.89			P	H
		612.2	27.35	-18.65	46	38.02	19.74	2.62	33.03	100	0	P	H
													H
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													H
													H
													H
													H
		32.7	20.11	-19.89	40	33.89	18.38	0.65	32.81			P	V
		41.07	19.46	-20.54	40	37.67	13.94	0.65	32.8			P	V
		64.29	16.68	-23.32	40	42.15	6.34	0.93	32.74			P	V
		454.7	22.98	-23.02	46	36.17	17.39	2.3	32.88			P	V
		612.2	25.13	-20.87	46	35.8	19.74	2.62	33.03			P	V
		947.5	26.82	-19.18	46	31.06	24.26	3.29	31.79	100	0	P	V
													V
													V
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												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.
!	Test result is over limit line.
P/A	Peak or Average
H/V	H orizontal or V ertical

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”.