Appendix B. Radiated Spurious Emission

Test Engineer :	Donny Tang	Temperature :	22~24°C
		Relative Humidity :	47~50%

15C 2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2385.6	48.99	-25.01	74	45.53	31.94	6.17	34.65	105	56	P	H
		2390	36.4	-17.6	54	32.89	31.94	6.21	34.64	105	56	A	H
	*	2413.11	103.63	-	-	100.11	31.95	6.21	34.64	105	56	P	H
	*	2412.692	98.65	-	-	95.13	31.95	6.21	34.64	105	56	A	H
													H
													H
		2328.27	46.85	-27.15	74	43.5	31.9	6.1	34.65	256	110	P	V
		2390	35.27	-18.73	54	31.76	31.94	6.21	34.64	256	110	A	V
	*	2413.026	101.1	-	-	97.58	31.95	6.21	34.64	256	110	P	V
	*	2412.775	96.1	-	-	92.58	31.95	6.21	34.64	256	110	A	V
													V
													V
802.11b CH 06 2437MHz		2388.21	47.6	-26.4	74	44.14	31.94	6.17	34.65	100	60	P	H
		2390	34.77	-19.23	54	31.26	31.94	6.21	34.64	100	60	A	H
	*	2436	104.08	-	-	100.52	31.96	6.24	34.64	100	60	P	H
	*	2436	99.2	-	-	95.64	31.96	6.24	34.64	100	60	A	H
		2484.6	48.31	-25.69	74	44.65	31.99	6.3	34.63	100	60	P	H
		2484	35.76	-18.24	54	32.1	31.99	6.3	34.63	100	60	A	H
		2373.36	47.17	-26.83	74	43.72	31.93	6.17	34.65	282	117	P	V
		2390	34.34	-19.66	54	30.83	31.94	6.21	34.64	282	117	A	V
	*	2437.076	100.96	-	-	97.39	31.97	6.24	34.64	282	117	P	V
	*	2437.742	95.97	-	-	92.4	31.97	6.24	34.64	282	117	A	V
		2484.4	47.46	-26.54	74	43.8	31.99	6.3	34.63	282	117	P	V
		2483.64	34.82	-19.18	54	31.16	31.99	6.3	34.63	282	117	A	V

802.11b CH 11 2462MHz	*	2460.872	103.49	-	-	99.88	31.98	6.27	34.64	130	57	P	H
	*	2461.289	98.73	-	-	95.12	31.98	6.27	34.64	130	57	A	H
		2483.56	49.43	-24.57	74	45.77	31.99	6.3	34.63	130	57	P	H
		2483.52	38.73	-15.27	54	35.07	31.99	6.3	34.63	130	57	A	H
													H
													H
	*	2460.955	100.46	-	-	96.85	31.98	6.27	34.64	347	120	P	V
	*	2461.206	95.4	-	-	91.79	31.98	6.27	34.64	347	120	A	V
		2499.88	47.87	-26.13	74	44.16	32	6.34	34.63	347	120	P	V
		2483.52	36.91	-17.09	54	33.25	31.99	6.3	34.63	347	120	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

WIFI 802.11b (Harmonic @ 3m)

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		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		4824	41.54	-32.46	74	56.19	34.36	8.6	57.61	100	0	P	H
													H
													H
													H
		4824	41.27	-32.73	74	55.92	34.36	8.6	57.61	100	0	P	V
													V
													V
													V
802.11b CH 06 2437MHz		4874	41.51	-32.49	74	55.88	34.4	8.77	57.54	100	0	P	H
		7311	43.65	-30.35	74	55.08	35.74	11.94	59.11	100	0	P	H
													H
													H
		4874	42.16	-31.84	74	56.53	34.4	8.77	57.54	100	0	P	V
		7311	43.61	-30.39	74	55.04	35.74	11.94	59.11	100	0	P	V
													V
													V
802.11b CH 11 2462MHz		4924	42.75	-31.25	74	56.85	34.44	8.94	57.48	100	0	P	H
		7386	43.86	-30.14	74	55.36	35.72	11.98	59.2	100	0	P	H
													H
													H
		4924	42.03	-31.97	74	56.13	34.44	8.94	57.48	100	0	P	V
		7386	43.35	-30.65	74	54.85	35.72	11.98	59.2	100	0	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

WIFI 802.11g (Band Edge @ 3m)

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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11g CH 01 2412MHz		2390	48.03	-25.97	74	44.52	31.94	6.21	34.64	150	47	P	H
		2390	36.33	-17.67	54	32.82	31.94	6.21	34.64	150	47	A	H
	*	2414	102.87	-	-	99.32	31.95	6.24	34.64	150	47	P	H
	*	2414	92.58	-	-	89.03	31.95	6.24	34.64	150	47	A	H
													H
													H
		2389.29	48.11	-25.89	74	44.65	31.94	6.17	34.65	256	106	P	V
		2390	35.73	-18.27	54	32.22	31.94	6.21	34.64	256	106	A	V
	*	2414.947	100.59	-	-	97.07	31.95	6.21	34.64	256	106	P	V
	*	2414.362	90.13	-	-	86.61	31.95	6.21	34.64	256	106	A	V
													V
													V
802.11g CH 06 2437MHz		2387.94	47.81	-26.19	74	44.35	31.94	6.17	34.65	100	56	P	H
		2390	35.46	-18.54	54	31.95	31.94	6.21	34.64	100	56	A	H
	*	2438	103.35	-	-	99.79	31.96	6.24	34.64	100	56	P	H
	*	2438	93.17	-	-	89.61	31.96	6.24	34.64	100	56	A	H
		2485.88	48.26	-25.74	74	44.6	31.99	6.3	34.63	100	56	P	H
		2483.64	36.66	-17.34	54	33	31.99	6.3	34.63	100	56	A	H
		2354.01	47.76	-26.24	74	44.35	31.92	6.14	34.65	282	118	P	V
		2348.16	35.06	-18.94	54	31.66	31.91	6.14	34.65	282	118	A	V
	*	2436	100.46	-	-	96.89	31.97	6.24	34.64	282	118	P	V
	*	2436	89.96	-	-	86.39	31.97	6.24	34.64	282	118	A	V
		2483.88	47.52	-26.48	74	43.86	31.99	6.3	34.63	282	118	P	V
		2483.96	35.63	-18.37	54	31.97	31.99	6.3	34.63	282	118	A	V

802.11g CH 11 2462MHz	*	2460	102.96	-	-	99.35	31.98	6.27	34.64	130	59	P	H
	*	2460	92.73	-	-	89.12	31.98	6.27	34.64	130	59	A	H
		2484	51.43	-22.57	74	47.77	31.99	6.3	34.63	130	59	P	H
		2483.52	38.73	-15.27	54	35.07	31.99	6.3	34.63	130	59	A	H
													H
													H
	*	2464	99.69	-	-	96.08	31.98	6.27	34.64	348	112	P	V
	*	2464	89.55	-	-	85.94	31.98	6.27	34.64	348	112	A	V
		2483.6	49.05	-24.95	74	45.39	31.99	6.3	34.63	348	112	P	V
		2483.6	36.98	-17.02	54	33.32	31.99	6.3	34.63	348	112	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

WIFI 802.11g (Harmonic @ 3m)

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		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11g CH 01 2412MHz		4824	42.64	-31.36	74	57.29	34.36	8.6	57.61	100	0	P	H
													H
													H
													H
		4824	40.57	-33.43	74	55.22	34.36	8.6	57.61	100	0	P	V
													V
													V
													V
802.11g CH 06 2437MHz		4874	41.94	-32.06	74	56.31	34.4	8.77	57.54	100	0	P	H
		7311	42.56	-31.44	74	53.99	35.74	11.94	59.11	100	0	P	H
													H
													H
		4874	44.06	-29.94	74	58.43	34.4	8.77	57.54	100	0	P	V
		7311	44.31	-29.69	74	55.74	35.74	11.94	59.11	100	0	P	V
													V
													V
802.11g CH 11 2462MHz		4924	41.65	-32.35	74	55.75	34.44	8.94	57.48	100	0	P	H
		7386	44.86	-29.14	74	56.36	35.72	11.98	59.2	100	0	P	H
													H
													H
		4924	43.23	-30.77	74	57.33	34.44	8.94	57.48	100	0	P	V
		7386	43.61	-30.39	74	55.11	35.72	11.98	59.2	100	0	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

WIFI 802.11n HT20 (Band Edge @ 3m)

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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
		2389.74	48.14	-25.86	74	44.68	31.94	6.17	34.65	149	46	P	H
		2390	36.54	-17.46	54	33.03	31.94	6.21	34.64	149	46	A	H
	*	2414	102.86	-	-	99.31	31.95	6.24	34.64	149	46	P	H
	*	2414	92.28	-	-	88.72	31.96	6.24	34.64	149	46	A	H
802.11n													H
HT20													H
CH 01		2389.83	48.17	-25.83	74	44.66	31.94	6.21	34.64	257	111	P	V
2412MHz		2390	36.55	-17.45	54	33.04	31.94	6.21	34.64	257	111	A	V
	*	2410	100.13	-	-	96.58	31.95	6.24	34.64	257	111	P	V
	*	2410	89.88	-	-	86.33	31.95	6.24	34.64	257	111	A	V
													V
													V
		2371.47	47.11	-26.89	74	43.66	31.93	6.17	34.65	100	58	P	H
		2389.56	35.39	-18.61	54	31.93	31.94	6.17	34.65	100	58	A	H
	*	2436	103.17	-	-	99.61	31.96	6.24	34.64	100	58	P	H
	*	2436	92.72	-	-	89.16	31.96	6.24	34.64	100	58	A	H
802.11n		2485.72	49.32	-24.68	74	45.66	31.99	6.3	34.63	100	58	P	H
HT20		2483.52	36.69	-17.31	54	33.03	31.99	6.3	34.63	100	58	A	H
CH 06		2325.48	47.49	-26.51	74	44.14	31.9	6.1	34.65	282	113	P	V
2437MHz		2389.29	34.96	-19.04	54	31.5	31.94	6.17	34.65	282	113	A	V
	*	2437	100	-	-	96.44	31.96	6.24	34.64	282	113	P	V
	*	2437	89.82	-	-	86.25	31.97	6.24	34.64	282	113	A	V
		2484.2	48.42	-25.58	74	44.76	31.99	6.3	34.63	282	113	P	V
		2483.6	35.45	-18.55	54	31.79	31.99	6.3	34.63	282	113	A	V

	*	2464	103.02	-	-	99.41	31.98	6.27	34.64	114	60	P	H
	*	2464	92.58	-	-	88.97	31.98	6.27	34.64	114	60	A	H
		2484.52	50.11	-23.89	74	46.45	31.99	6.3	34.63	114	60	P	H
		2483.52	37.68	-16.32	54	34.02	31.99	6.3	34.63	114	60	A	H
802.11n													H
HT20													H
CH 11	*	2460	100.03	-	-	96.42	31.98	6.27	34.64	348	112	P	V
2462MHz	*	2460	89.04	-	-	85.43	31.98	6.27	34.64	348	112	A	V
		2483.56	49.44	-24.56	74	45.78	31.99	6.3	34.63	348	112	P	V
		2483.8	36.28	-17.72	54	32.62	31.99	6.3	34.63	348	112	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

WIFI 802.11n HT20 (Harmonic @ 3m)

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		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
		4824	41.99	-32.01	74	56.64	34.36	8.6	57.61	100	0	P	H
													H
802.11n													H
HT20													H
CH 01		4824	41.09	-32.91	74	55.74	34.36	8.6	57.61	100	0	P	V
2412MHz													V
													V
													V
		4874	42.71	-31.29	74	57.08	34.4	8.77	57.54	100	0	P	H
		7311	43.26	-30.74	74	54.69	35.74	11.94	59.11	100	0	P	H
802.11n													H
HT20													H
CH 06		4874	43.06	-30.94	74	57.43	34.4	8.77	57.54	100	0	P	V
2437MHz		7311	43.21	-30.79	74	54.64	35.74	11.94	59.11	100	0	P	V
													V
													V
		4924	42.25	-31.75	74	56.35	34.44	8.94	57.48	100	0	P	H
		7386	43.16	-30.84	74	54.66	35.72	11.98	59.2	100	0	P	H
802.11n													H
HT20													H
CH 11		4924	41.73	-32.27	74	55.83	34.44	8.94	57.48	100	0	P	V
2462MHz		7386	43.65	-30.35	74	55.15	35.72	11.98	59.2	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 WIFI 802.11b (LF)

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		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11b LF		30.54	17.09	-22.91	40	30.22	18.02	0.65	31.8			P	H
		125.85	13.28	-30.22	43.5	31.88	11.9	1.25	31.75			P	H
		258.96	15.11	-30.89	46	31.5	13.56	1.78	31.73			P	H
		567.4	21.87	-24.13	46	32.62	18.65	2.62	32.02			P	H
		835.5	24.67	-21.33	46	33.19	20.1	3.18	31.8			P	H
		942.6	25.26	-20.74	46	32.31	20.73	3.35	31.13	115	205	P	H
													H
													H
													H
													H
													H
													H
		30	16.96	-23.04	40	29.72	18.4	0.64	31.8			P	V
		34.05	16.8	-23.2	40	31.03	16.88	0.68	31.79			P	V
		67.26	13.92	-26.08	40	38.61	6.16	0.92	31.77			P	V
		599.6	21.35	-24.65	46	32.04	18.6	2.77	32.06			P	V
		762	23.85	-22.15	46	33.06	19.72	3.05	31.98			P	V
		940.5	24.56	-21.44	46	31.66	20.71	3.35	31.16	100	236	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	**P**eak or **A**verage
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 CH 01 2412MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		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".