Appendix B. Radiated Spurious Emission

Test Engineer :	Citta Ke, Kyle Jhuang, Karl Hou and Nick Yu	Temperature :	21~22°C
		Relative Humidity :	49~50%

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		2360.4	56.76	-17.24	74	50.78	33.07	6.59	33.68	138	300	P	H
		2381.46	43.88	-10.12	54	37.85	33.04	6.65	33.66	138	300	A	H
	*	2410	95.46	-	-	89.39	33	6.7	33.63	138	300	P	H
	*	2410	91.21	-	-	85.14	33	6.7	33.63	138	300	A	H
													H
													H
		2340.78	56.72	-17.28	74	50.73	33.09	6.59	33.69	223	268	P	V
		2386.77	43.89	-10.11	54	37.87	33.02	6.65	33.65	223	268	A	V
	*	2412	100.3	-	-	94.23	33	6.7	33.63	223	268	P	V
	*	2412	96.26	-	-	90.19	33	6.7	33.63	223	268	A	V
													V
													V
802.11b CH 06 2437MHz		2358.33	56.98	-17.02	74	51	33.07	6.59	33.68	225	304	P	H
		2372.46	43.93	-10.07	54	37.9	33.04	6.65	33.66	225	304	A	H
	*	2437	95.68	-	-	89.62	32.96	6.7	33.6	225	304	P	H
	*	2437	91.16	-	-	85.1	32.96	6.7	33.6	225	304	A	H
		2499.76	57.11	-16.89	74	50.96	32.9	6.81	33.56	225	304	P	H
		2485.28	43.97	-10.03	54	37.86	32.92	6.76	33.57	225	304	A	H
		2351.4	57.26	-16.74	74	51.27	33.09	6.59	33.69	277	270	P	V
		2332.41	43.89	-10.11	54	37.89	33.11	6.59	33.7	277	270	A	V
	*	2437	101.16	-	-	95.1	32.96	6.7	33.6	277	270	P	V
	*	2437	96.79	-	-	90.73	32.96	6.7	33.6	277	270	A	V
		2487	57.2	-16.8	74	51.09	32.92	6.76	33.57	277	270	P	V
		2484.28	43.96	-10.04	54	37.85	32.92	6.76	33.57	277	270	A	V

802.11b CH 11 2462MHz	*	2462	100.79	-	-	94.68	32.94	6.76	33.59	313	235	P	H
	*	2462	96.61	-	-	90.5	32.94	6.76	33.59	313	235	A	H
		2489.52	56.65	-17.35	74	50.5	32.9	6.81	33.56	313	235	P	H
		2486.28	44.27	-9.73	54	38.16	32.92	6.76	33.57	313	235	A	H
													H
													H
	*	2460	101.3	-	-	95.19	32.94	6.76	33.59	206	266	P	V
	*	2460	97.09	-	-	90.98	32.94	6.76	33.59	206	266	A	V
		2493.32	56.94	-17.06	74	50.79	32.9	6.81	33.56	206	266	P	V
		2485.92	44.33	-9.67	54	38.22	32.92	6.76	33.57	206	266	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

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	39.97	-34.03	74	56.35	32.53	9.7	58.61	100	0	P	H
													H
													H
													H
		4824	39.39	-34.61	74	55.77	32.53	9.7	58.61	100	0	P	V
													V
													V
													V
802.11b CH 06 2437MHz		4875	40.77	-33.23	74	56.97	32.58	9.74	58.52	100	0	P	H
		7311	41.91	-32.09	74	54.16	34.06	11.85	58.16	100	0	P	H
													H
													H
		4875	40.18	-33.82	74	56.38	32.58	9.74	58.52	100	0	P	V
		7311	41.59	-32.41	74	53.84	34.06	11.85	58.16	100	0	P	V
													V
													V
802.11b CH 11 2462MHz		4923	40.57	-33.43	74	56.57	32.63	9.79	58.42	100	0	P	H
		7386	41.94	-32.06	74	54.2	34.08	11.97	58.31	100	0	P	H
													H
													H
		4923	40.66	-33.34	74	56.66	32.63	9.79	58.42	100	0	P	V
		7386	41.58	-32.42	74	53.84	34.08	11.97	58.31	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

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		2389.83	59.67	-14.33	74	53.65	33.02	6.65	33.65	111	305	P	H
		2389.83	44.89	-9.11	54	38.87	33.02	6.65	33.65	111	305	A	H
	*	2410	96.33	-	-	90.26	33	6.7	33.63	111	305	P	H
	*	2410	86.46	-	-	80.39	33	6.7	33.63	111	305	A	H
													H
													H
		2389.29	60.31	-13.69	74	54.29	33.02	6.65	33.65	364	265	P	V
		2389.74	45.61	-8.39	54	39.59	33.02	6.65	33.65	364	265	A	V
	*	2410	98.66	-	-	92.59	33	6.7	33.63	364	265	P	V
	*	2410	88.49	-	-	82.42	33	6.7	33.63	364	265	A	V
													V
													V
802.11g CH 06 2437MHz		2329.62	57.46	-16.54	74	51.46	33.11	6.59	33.7	113	303	P	H
		2343.3	44.24	-9.76	54	38.25	33.09	6.59	33.69	113	303	A	H
	*	2439	97.09	-	-	91.03	32.96	6.7	33.6	113	303	P	H
	*	2439	86.54	-	-	80.48	32.96	6.7	33.6	113	303	A	H
		2485.84	56.92	-17.08	74	50.81	32.92	6.76	33.57	113	303	P	H
		2498.04	44.22	-9.78	54	38.07	32.9	6.81	33.56	113	303	A	H
		2313.33	57.02	-16.98	74	51.07	33.13	6.54	33.72	280	255	P	V
		2386.59	44.28	-9.72	54	38.26	33.02	6.65	33.65	280	255	A	V
	*	2439	100.32	-	-	94.26	32.96	6.7	33.6	280	255	P	V
	*	2439	89.98	-	-	83.92	32.96	6.7	33.6	280	255	A	V
		2484.56	56.65	-17.35	74	50.54	32.92	6.76	33.57	280	255	P	V
		2484.64	44.49	-9.51	54	38.38	32.92	6.76	33.57	280	255	A	V

802.11g CH 11 2462MHz	*	2460	99.18	-	-	93.07	32.94	6.76	33.59	187	295	P	H
	*	2460	88.96	-	-	82.85	32.94	6.76	33.59	187	295	P	H
		2484.2	61.03	-12.97	74	54.92	32.92	6.76	33.57	187	295	P	H
		2483.68	45.59	-8.41	54	39.48	32.92	6.76	33.57	187	295	A	H
													H
													H
	*	2460	101.57	-	-	95.46	32.94	6.76	33.59	390	269	P	V
	*	2460	91.2	-	-	85.09	32.94	6.76	33.59	390	269	A	V
		2484.24	60.93	-13.07	74	54.82	32.92	6.76	33.57	390	269	P	V
		2483.52	45.72	-8.28	54	39.61	32.92	6.76	33.57	390	269	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

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	39.74	-34.26	74	56.12	32.53	9.7	58.61	100	0	P	H
													H
													H
													H
		4824	39.64	-34.36	74	56.02	32.53	9.7	58.61	100	0	P	V
													V
													V
													V
802.11g CH 06 2437MHz		4875	40.45	-33.55	74	56.65	32.58	9.74	58.52	100	0	P	H
		7311	41.71	-32.29	74	53.96	34.06	11.85	58.16	100	0	P	H
													H
													H
		4875	40.59	-33.41	74	56.79	32.58	9.74	58.52	100	0	P	V
		7311	42.25	-31.75	74	54.5	34.06	11.85	58.16	100	0	P	V
													V
													V
802.11g CH 11 2462MHz		4923	40.64	-33.36	74	56.64	32.63	9.79	58.42	100	0	P	H
		7386	40.87	-33.13	74	53.13	34.08	11.97	58.31	100	0	P	H
													H
													H
		4923	40.8	-33.2	74	56.8	32.63	9.79	58.42	100	0	P	V
		7386	41.55	-32.45	74	53.81	34.08	11.97	58.31	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

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)
		2377.59	57.64	-16.36	74	51.61	33.04	6.65	33.66	251	345	P	H
		2345.64	44.31	-9.69	54	38.32	33.09	6.59	33.69	251	345	A	H
	*	2410	93.21	-	-	87.14	33	6.7	33.63	251	345	P	H
	*	2410	82.65	-	-	76.58	33	6.7	33.63	251	345	A	H
802.11n													H
HT20													H
CH 01		2389.83	56.76	-17.24	74	50.74	33.02	6.65	33.65	224	293	P	V
2412MHz		2389.11	44.39	-9.61	54	38.37	33.02	6.65	33.65	224	293	A	V
	*	2412	96.91	-	-	90.84	33	6.7	33.63	224	293	P	V
	*	2412	86.5	-	-	80.43	33	6.7	33.63	224	293	A	V
													V
													V
		2373	57.13	-16.87	74	51.1	33.04	6.65	33.66	369	13	P	H
		2389.74	44.3	-9.7	54	38.28	33.02	6.65	33.65	369	13	A	H
	*	2439	92.6	-	-	86.54	32.96	6.7	33.6	369	13	P	H
	*	2439	81.89	-	-	75.83	32.96	6.7	33.6	369	13	A	H
802.11n		2491.64	56.39	-17.61	74	50.24	32.9	6.81	33.56	369	13	P	H
HT20		2485.8	44.25	-9.75	54	38.14	32.92	6.76	33.57	369	13	A	H
CH 06		2382.72	57.17	-16.83	74	51.14	33.04	6.65	33.66	217	265	P	V
2437MHz		2335.2	44.38	-9.62	54	38.39	33.09	6.59	33.69	217	265	A	V
	*	2439	99.35	-	-	93.29	32.96	6.7	33.6	217	265	P	V
	*	2439	88.28	-	-	82.22	32.96	6.7	33.6	217	265	A	V
		2489.36	57.19	-16.81	74	51.04	32.9	6.81	33.56	217	265	P	V
		2488.96	44.18	-9.82	54	38.03	32.9	6.81	33.56	217	265	A	V

	*	2460	92.72	-	-	86.61	32.94	6.76	33.59	115	315	P	H
	*	2460	82.78	-	-	76.67	32.94	6.76	33.59	115	315	A	H
		2485.2	56.98	-17.02	74	50.87	32.92	6.76	33.57	115	315	P	H
		2486.44	44.31	-9.69	54	38.2	32.92	6.76	33.57	115	315	A	H
802.11n													H
HT20													H
CH 11	*	2460	100.01	-	-	93.9	32.94	6.76	33.59	238	269	P	V
2462MHz	*	2460	89.64	-	-	83.53	32.94	6.76	33.59	238	269	A	V
		2483.96	58.98	-15.02	74	52.87	32.92	6.76	33.57	238	269	P	V
		2483.56	45.54	-8.46	54	39.43	32.92	6.76	33.57	238	269	A	V
													V
													V

Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.

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	39.16	-34.84	74	55.54	32.53	9.7	58.61	100	0	P	H
													H
802.11n													H
HT20													H
CH 01		4824	39.27	-34.73	74	55.65	32.53	9.7	58.61	100	0	P	V
2412MHz													V
													V
													V
		4875	40.18	-33.82	74	56.38	32.58	9.74	58.52	100	0	P	H
		7311	42.18	-31.82	74	54.43	34.06	11.85	58.16	100	0	P	H
802.11n													H
HT20													H
CH 06		4875	40.93	-33.07	74	57.13	32.58	9.74	58.52	100	0	P	V
2437MHz		7311	42.03	-31.97	74	54.28	34.06	11.85	58.16	100	0	P	V
													V
													V
		4923	40.82	-33.18	74	56.82	32.63	9.79	58.42	100	0	P	H
		7386	41.14	-32.86	74	53.4	34.08	11.97	58.31	100	0	P	H
802.11n													H
HT20													H
CH 11		4923	41.04	-32.96	74	57.04	32.63	9.79	58.42	100	0	P	V
2462MHz		7386	41.51	-32.49	74	53.77	34.08	11.97	58.31	100	0	P	V
													V
													V

Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.

Emission below 1GHz

2.4GHz WIFI 802.11g (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 802.11g LF		61.59	19.24	-20.76	40	42.52	5.94	1.22	30.44			P	H
		104.52	33.17	-10.33	43.5	51.5	10.6	1.48	30.41	108	1	P	H
		158.79	28.68	-14.82	43.5	46.77	10.56	1.71	30.36			P	H
		322.4	16.27	-29.73	46	30.61	13.48	2.3	30.12			P	H
		461	18.99	-27.01	46	28.69	17.41	2.77	29.88			P	H
		645.1	22.85	-23.15	46	28.67	20.4	3.33	29.55			P	H
													H
													H
													H
													H
													H
													H
		75.63	27.56	-12.44	40	49.92	6.85	1.22	30.43	144	69	P	V
		165.27	24.74	-18.76	43.5	43.59	9.8	1.71	30.36			P	V
		205.23	23.95	-19.55	43.5	43.23	9.15	1.89	30.32			P	V
		547.8	20.78	-25.22	46	27.94	19.46	3.09	29.71			P	V
		731.9	23.03	-22.97	46	26.98	21.96	3.54	29.45			P	V
		885.9	24.21	-21.79	46	26.53	23	3.84	29.16			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".