



## Appendix A. Radiated Spurious Emission

Test Engineer :	Bill Chang and Ian Liang	Temperature :	25~26°C
		Relative Humidity :	50~51%

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		2389.2	43.56	-30.44	74	43.33	27.03	6.57	33.37	182	323	P	H	
		2390	33.92	-20.08	54	33.69	27.03	6.57	33.37	182	323	A	H	
	*	2412.859	97.17	-	-	96.75	27.08	6.68	33.34	182	323	P	H	
	*	2412.859	95.2	-	-	94.78	27.08	6.68	33.34	182	323	A	H	
													H	
														H
			2389.56	45.33	-28.67	74	45.1	27.03	6.57	33.37	121	46	P	V
			2390	35.89	-18.11	54	35.66	27.03	6.57	33.37	121	46	A	V
	*		2411.105	98.64	-	-	98.22	27.08	6.68	33.34	121	46	P	V
	*		2411.272	96.65	-	-	96.23	27.08	6.68	33.34	121	46	A	V
														V
														V
802.11b CH 06 2437MHz		2358.6	41.38	-32.62	74	41.22	26.94	6.62	33.4	176	320	P	H	
		2389.65	30.66	-23.34	54	30.43	27.03	6.57	33.37	176	320	A	H	
	*	2437.909	98.02	-	-	97.38	27.17	6.79	33.32	176	320	P	H	
	*	2436.323	95.96	-	-	95.37	27.12	6.79	33.32	176	320	A	H	
			2484.2	45.01	-28.99	74	44.01	27.26	7.01	33.27	176	320	P	H
			2484.44	34.82	-19.18	54	33.82	27.26	7.01	33.27	176	320	A	H
			2390	42.42	-31.58	74	42.19	27.03	6.57	33.37	117	46	P	V
			2390	32.23	-21.77	54	32	27.03	6.57	33.37	117	46	A	V
	*		2436.156	100.24	-	-	99.65	27.12	6.79	33.32	117	46	P	V
	*		2436.239	98.29	-	-	97.7	27.12	6.79	33.32	117	46	A	V
			2485.36	45.1	-28.9	74	44.1	27.26	7.01	33.27	117	46	P	V
			2483.96	35.23	-18.77	54	34.23	27.26	7.01	33.27	117	46	A	V



<b>802.11b</b> <b>CH 11</b> <b>2462MHz</b>	*	2461.122	99.17	-	-	98.35	27.21	6.9	33.29	125	335	P	H
	*	2461.289	97.18	-	-	96.36	27.21	6.9	33.29	125	335	A	H
		2484.08	47.45	-26.55	74	46.45	27.26	7.01	33.27	125	335	P	H
		2483.84	37.4	-16.6	54	36.4	27.26	7.01	33.27	125	335	A	H
													H
													H
	*	2461.122	99.77	-	-	98.95	27.21	6.9	33.29	116	45	P	V
	*	2461.206	97.69	-	-	96.87	27.21	6.9	33.29	116	45	A	V
		2483.72	47.97	-26.03	74	46.97	27.26	7.01	33.27	116	45	P	V
		2483.6	38.37	-15.63	54	37.37	27.26	7.01	33.27	116	45	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	43.45	-30.55	74	57.21	31.06	10.57	55.39	100	0	P	H	
													H	
													H	
													H	
		4824	43.48	-30.52	74	57.24	31.06	10.57	55.39	100	0	P	V	
														V
														V
														V
802.11b CH 06 2437MHz		4872	43.64	-30.36	74	57.3	31.13	10.63	55.42	100	0	P	H	
		7311	49.14	-24.86	74	54.99	36.11	13.63	55.59	100	0	P	H	
													H	
													H	
		4872	43.65	-30.35	74	57.31	31.13	10.63	55.42	100	0	P	V	
		7311	50.66	-23.34	74	56.51	36.11	13.63	55.59	100	0	P	V	
														V
														V
802.11b CH 11 2462MHz		4926	43.66	-30.34	74	57.19	31.2	10.73	55.46	100	0	P	H	
		7386	49.99	-24.01	74	55.52	36.33	13.66	55.52	100	0	P	H	
													H	
													H	
		4926	43.74	-30.26	74	57.27	31.2	10.73	55.46	100	0	P	V	
		7386	48.64	-25.36	74	54.17	36.33	13.66	55.52	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	52.72	-21.28	74	52.49	27.03	6.57	33.37	125	336	P	H	
		2390	37.77	-16.23	54	37.54	27.03	6.57	33.37	125	336	A	H	
	*	2410	96.86	-	-	96.44	27.08	6.68	33.34	125	336	P	H	
	*	2414	89.13	-	-	88.71	27.08	6.68	33.34	125	336	A	H	
													H	
														H
			2389.92	58.26	-15.74	74	58.03	27.03	6.57	33.37	121	48	P	V
			2390	39.41	-14.59	54	39.18	27.03	6.57	33.37	121	48	A	V
	*		2410	98.25	-	-	97.83	27.08	6.68	33.34	121	48	P	V
	*		2410	90.53	-	-	90.11	27.08	6.68	33.34	121	48	A	V
														V
														V
802.11g CH 06 2437MHz		2389.29	42.13	-31.87	74	41.9	27.03	6.57	33.37	126	337	P	H	
		2389.65	31.54	-22.46	54	31.31	27.03	6.57	33.37	126	337	A	H	
	*	2435	98.99	-	-	98.4	27.12	6.79	33.32	126	337	P	H	
	*	2435	90.32	-	-	89.73	27.12	6.79	33.32	126	337	A	H	
		2489	45.61	-28.39	74	44.56	27.3	7.01	33.26	126	337	P	H	
		2489.36	35.51	-18.49	54	34.46	27.3	7.01	33.26	126	337	A	H	
		2388.66	41.82	-32.18	74	41.59	27.03	6.57	33.37	117	47	P	V	
		2390	32.47	-21.53	54	32.24	27.03	6.57	33.37	117	47	A	V	
	*		2435	100.2	-	-	99.61	27.12	6.79	33.32	117	47	P	V
	*		2435	91.48	-	-	90.89	27.12	6.79	33.32	117	47	A	V
			2485.6	46.8	-27.2	74	45.8	27.26	7.01	33.27	117	47	P	V
			2489.12	36.83	-17.17	54	35.78	27.3	7.01	33.26	117	47	A	V



<b>802.11g</b> <b>CH 11</b> <b>2462MHz</b>	*	2460	98.53	-	-	97.71	27.21	6.9	33.29	125	336	P	H
	*	2460	90.15	-	-	89.33	27.21	6.9	33.29	125	336	A	H
		2483.52	56.43	-17.57	74	55.43	27.26	7.01	33.27	125	336	P	H
		2483.56	42.71	-11.29	54	41.71	27.26	7.01	33.27	125	336	A	H
													H
													H
	*	2461.79	99.16	-	-	98.34	27.21	6.9	33.29	120	46	P	V
	*	2460	91.21	-	-	90.39	27.21	6.9	33.29	120	46	A	V
		2483.6	59.83	-14.17	74	58.83	27.26	7.01	33.27	120	46	P	V
		2483.64	44.4	-9.6	54	43.4	27.26	7.01	33.27	120	46	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	42.6	-31.4	74	56.36	31.06	10.57	55.39	100	0	P	H
													H
													H
													H
		4824	43.27	-30.73	74	57.03	31.06	10.57	55.39	100	0	P	V
													V
													V
													V
802.11g CH 06 2437MHz		4875	43.08	-30.92	74	56.74	31.13	10.63	55.42	100	0	P	H
		7311	50.44	-23.56	74	56.29	36.11	13.63	55.59	100	0	P	H
													H
													H
		4875	43.28	-30.72	74	56.94	31.13	10.63	55.42	100	0	P	V
		7311	50.01	-23.99	74	55.86	36.11	13.63	55.59	100	0	P	V
													V
													V
802.11g CH 11 2462MHz		4923	44.05	-29.95	74	57.61	31.2	10.7	55.46	100	0	P	H
		7386	49.95	-24.05	74	55.48	36.33	13.66	55.52	100	0	P	H
													H
													H
		4923	43.57	-30.43	74	57.13	31.2	10.7	55.46	100	0	P	V
		7386	50.43	-23.57	74	55.96	36.33	13.66	55.52	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)	
802.11n HT20 CH 01 2412MHz		2390	46.39	-27.61	74	46.16	27.03	6.57	33.37	119	46	P	H	
		2389.83	32.45	-21.55	54	32.22	27.03	6.57	33.37	119	46	A	H	
	*	2410	88.2	-	-	87.78	27.08	6.68	33.34	119	46	P	H	
	*	2414	80.3	-	-	79.88	27.08	6.68	33.34	119	46	A	H	
													H	
													H	
			2389.83	56.84	-17.16	74	56.61	27.03	6.57	33.37	120	44	P	V
			2390	39.9	-14.1	54	39.67	27.03	6.57	33.37	120	44	A	V
		*	2410	98.24	-	-	97.82	27.08	6.68	33.34	120	44	P	V
		*	2410	89.92	-	-	89.5	27.08	6.68	33.34	120	44	A	V
													V	
													V	
802.11n HT20 CH 06 2437MHz		2366.07	41.63	-32.37	74	41.46	26.94	6.62	33.39	182	322	P	H	
		2390	31.48	-22.52	54	31.25	27.03	6.57	33.37	182	322	A	H	
		*	2435	97.75	-	-	97.16	27.12	6.79	33.32	182	322	P	H
		*	2439	89.67	-	-	89.03	27.17	6.79	33.32	182	322	A	H
			2488.44	45.94	-28.06	74	44.89	27.3	7.01	33.26	182	322	P	H
			2488.56	36.77	-17.23	54	35.72	27.3	7.01	33.26	182	322	A	H
			2388.03	41.4	-32.6	74	41.17	27.03	6.57	33.37	120	44	P	V
			2390	32.57	-21.43	54	32.34	27.03	6.57	33.37	120	44	A	V
		*	2435.404	99.02	-	-	98.43	27.12	6.79	33.32	120	44	P	V
		*	2439	90.71	-	-	90.07	27.17	6.79	33.32	120	44	A	V
		2488.4	47.21	-26.79	74	46.16	27.3	7.01	33.26	120	44	P	V	
		2488.4	37.41	-16.59	54	36.36	27.3	7.01	33.26	120	44	A	V	



<b>802.11n</b> <b>HT20</b> <b>CH 11</b> <b>2462MHz</b>	*	2461.54	97.63	-	-	96.81	27.21	6.9	33.29	182	322	P	H
	*	2464	89.35	-	-	88.53	27.21	6.9	33.29	182	322	A	H
		2484.52	59.61	-14.39	74	58.61	27.26	7.01	33.27	182	322	P	H
		2483.6	44.56	-9.44	54	43.56	27.26	7.01	33.27	182	322	A	H
													H
													H
	*	2462.542	98.49	-	-	97.67	27.21	6.9	33.29	117	45	P	V
	*	2464	90.17	-	-	89.35	27.21	6.9	33.29	117	45	A	V
		2484.08	63.21	-10.79	74	62.21	27.26	7.01	33.27	117	45	P	V
		2483.52	45.67	-8.33	54	44.67	27.26	7.01	33.27	117	45	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 )	
802.11n HT20 CH 01 2412MHz		4824	43.51	-30.49	74	57.27	31.06	10.57	55.39	100	0	P	H	
													H	
													H	
													H	
		4824	44.33	-29.67	74	58.09	31.06	10.57	55.39	100	0	P	V	
														V
														V
802.11n HT20 CH 06 2437MHz		4875	44.18	-29.82	74	57.84	31.13	10.63	55.42	100	0	P	H	
		7311	50.57	-23.43	74	56.42	36.11	13.63	55.59	100	0	P	H	
													H	
													H	
		4875	43.71	-30.29	74	57.37	31.13	10.63	55.42	100	0	P	V	
		7311	49.87	-24.13	74	55.72	36.11	13.63	55.59	100	0	P	V	
														V
802.11n HT20 CH 11 2462MHz		4923	44.16	-29.84	74	57.72	31.2	10.7	55.46	100	0	P	H	
		7386	50.8	-23.2	74	56.33	36.33	13.66	55.52	100	0	P	H	
													H	
													H	
		4923	43.86	-30.14	74	57.42	31.2	10.7	55.46	100	0	P	V	
		7386	50.24	-23.76	74	55.77	36.33	13.66	55.52	100	0	P	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		125.04	19.89	-23.61	43.5	37.76	12.4	1.51	31.78			P	H	
		165.81	20	-23.5	43.5	39.16	10.84	1.78	31.78			P	H	
		238.71	16.97	-29.03	46	34.86	11.73	2.15	31.77	177	110	P	H	
		614.3	23.15	-22.85	46	31.82	19.84	3.53	32.04			P	H	
		783	26.61	-19.39	46	32.63	21.93	3.99	31.94			P	H	
		944.7	27.43	-18.57	46	30.35	23.72	4.43	31.07			P	H	
														H
														H
														H
														H
														H
														H
			115.05	25.11	-18.39	43.5	43.59	11.84	1.46	31.78			P	V
			263.55	20.48	-25.52	46	36.34	13.64	2.27	31.77			P	V
			297.03	17.98	-28.02	46	33.56	13.74	2.44	31.76			P	V
			612.2	21.48	-24.52	46	30.18	19.82	3.52	32.04			P	V
			783	28.11	-17.89	46	34.13	21.93	3.99	31.94	110	340	P	V
			985.336	21.48	-32.52	54	23.73	23.94	4.57	30.76			P	V
														V
														V
													V	
													V	
													V	
Remark	1. No other spurious found. 2. All results are PASS against limit line.													



**Note symbol**

*	<b>Fundamental Frequency</b> 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 <b>over limit</b> line.
P/A	<b>Peak</b> or <b>Average</b>
H/V	<b>Horizontal</b> or <b>Vertical</b>



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”.**