



## Appendix B. Radiated Spurious Emission

Test Engineer :	Nick Yu, Ken Wu, and James Chiu	Temperature :	21~23°C
		Relative Humidity :	47~49%

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		2351.67	58.01	-15.99	74	52.45	32.13	7.68	34.25	302	342	P	H	
		2389.83	44.93	-9.07	54	39.3	32.18	7.75	34.3	302	342	A	H	
	*	2410.855	101.49	-	-	95.84	32.2	7.75	34.3	302	342	P	H	
	*	2411.272	97.62	-	-	91.97	32.2	7.75	34.3	302	342	A	H	
													H	
														H
			2387.49	58.67	-15.33	74	53.01	32.18	7.75	34.27	341	13	P	V
			2389.47	45.66	-8.34	54	40	32.18	7.75	34.27	341	13	A	V
	*		2413.277	108.57	-	-	102.92	32.2	7.75	34.3	341	13	P	V
	*		2412.692	104.89	-	-	99.24	32.2	7.75	34.3	341	13	A	V
														V
														V
802.11b CH 06 2437MHz		2335.2	58.71	-15.29	74	53.22	32.11	7.6	34.22	300	328	P	H	
		2333.13	44.65	-9.35	54	39.18	32.09	7.6	34.22	300	328	A	H	
	*	2438.243	98.83	-	-	93.11	32.24	7.83	34.35	300	328	P	H	
	*	2437.742	95.03	-	-	89.31	32.24	7.83	34.35	300	328	A	H	
			2484.08	58.78	-15.22	74	53.02	32.28	7.91	34.43	300	328	P	H
			2488.12	44.77	-9.23	54	38.99	32.3	7.91	34.43	300	328	A	H
			2360.04	58.84	-15.16	74	53.28	32.13	7.68	34.25	102	7	P	V
			2389.29	44.73	-9.27	54	39.07	32.18	7.75	34.27	102	7	A	V
	*		2435.822	106.59	-	-	100.89	32.22	7.83	34.35	102	7	P	V
	*		2436.239	102.69	-	-	96.99	32.22	7.83	34.35	102	7	A	V
			2484.24	58.79	-15.21	74	53.03	32.28	7.91	34.43	102	7	P	V
			2483.72	44.89	-9.11	54	39.13	32.28	7.91	34.43	102	7	A	V



<b>802.11b CH 11 2462MHz</b>	*	2460.788	102.77	-	-	96.99	32.26	7.91	34.39	332	316	P	H
	*	2461.289	99.07	-	-	93.29	32.26	7.91	34.39	332	316	A	H
		2484.08	58.96	-15.04	74	53.2	32.28	7.91	34.43	332	316	P	H
		2484.28	44.85	-9.15	54	39.09	32.28	7.91	34.43	332	316	A	H
													H
													H
	*	2460.955	108.41	-	-	102.63	32.26	7.91	34.39	114	15	P	V
	*	2461.289	104.7	-	-	98.92	32.26	7.91	34.39	114	15	A	V
		2495.52	58.94	-15.06	74	53.21	32.3	7.91	34.48	114	15	P	V
		2486.52	45.2	-8.8	54	39.44	32.28	7.91	34.43	114	15	A	V
													V
													V
<b>Remark</b>	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	43.74	-30.26	74	57.25	34.26	11.16	58.93	100	0	P	H
													H
													H
													H
		4824	43.1	-30.9	74	56.61	34.26	11.16	58.93	100	0	P	V
													V
													V
													V
802.11b CH 06 2437MHz		4872	42.58	-31.42	74	55.9	34.3	11.21	58.83	100	0	P	H
		7308	44.4	-29.6	74	51.45	35.6	15.08	57.73	100	0	P	H
													H
													H
		4872	42.46	-31.54	74	55.78	34.3	11.21	58.83	100	0	P	V
		7308	44.85	-29.15	74	51.9	35.6	15.08	57.73	100	0	P	V
													V
													V
802.11b CH 11 2462MHz		4926	43.01	-30.99	74	56.13	34.34	11.27	58.73	100	0	P	H
		7386	43.36	-30.64	74	50.42	35.6	15.14	57.8	100	0	P	H
													H
													H
		4926	42.73	-31.27	74	55.85	34.34	11.27	58.73	100	0	P	V
		7386	44.05	-29.95	74	51.11	35.6	15.14	57.8	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		2389.74	64.4	-9.6	74	58.74	32.18	7.75	34.27	302	336	P	H	
		2389.56	48.11	-5.89	54	42.45	32.18	7.75	34.27	302	336	A	H	
	*	2410	102.99	-	-	97.34	32.2	7.75	34.3	302	336	P	H	
	*	2410	91.74	-	-	86.09	32.2	7.75	34.3	302	336	A	H	
													H	
														H
			2389.29	67.39	-6.61	74	61.73	32.18	7.75	34.27	215	19	P	V
			2389.74	50.35	-3.65	54	44.69	32.18	7.75	34.27	215	19	A	V
	*		2414.947	110.35	-	-	104.7	32.2	7.75	34.3	215	19	P	V
	*		2414	99.12	-	-	93.47	32.2	7.75	34.3	215	19	A	V
														V
														V
802.11g CH 06 2437MHz		2376.96	59.33	-14.67	74	53.76	32.16	7.68	34.27	300	340	P	H	
		2384.7	45.11	-8.89	54	39.47	32.16	7.75	34.27	300	340	A	H	
	*	2440	100.94	-	-	95.22	32.24	7.83	34.35	300	340	P	H	
	*	2440	90.57	-	-	84.85	32.24	7.83	34.35	300	340	A	H	
			2494.12	58.33	-15.67	74	52.6	32.3	7.91	34.48	300	340	P	H
			2490.48	45.29	-8.71	54	39.51	32.3	7.91	34.43	300	340	A	H
			2373.09	58.96	-15.04	74	53.39	32.16	7.68	34.27	341	0	P	V
			2384.61	45.6	-8.4	54	39.96	32.16	7.75	34.27	341	0	A	V
	*		2440	107.75	-	-	102.03	32.24	7.83	34.35	341	0	P	V
	*		2440	96.7	-	-	90.98	32.24	7.83	34.35	341	0	A	V
			2487.12	58.56	-15.44	74	52.8	32.28	7.91	34.43	341	0	P	V
			2489.44	45.69	-8.31	54	39.91	32.3	7.91	34.43	341	0	A	V



<b>802.11g CH 11 2462MHz</b>	*	2460	102.42	-	-	96.72	32.26	7.83	34.39	300	323	P	H
	*	2460	91.63	-	-	85.93	32.26	7.83	34.39	300	323	A	H
		2484.6	60.62	-13.38	74	54.86	32.28	7.91	34.43	300	323	P	H
		2483.92	45.84	-8.16	54	40.08	32.28	7.91	34.43	300	323	A	H
													H
													H
	*	2460.287	109.12	-	-	103.34	32.26	7.91	34.39	312	12	P	V
	*	2460	98.75	-	-	93.05	32.26	7.83	34.39	312	12	A	V
		2483.8	67.05	-6.95	74	61.29	32.28	7.91	34.43	312	12	P	V
		2483.52	46.91	-7.09	54	41.15	32.28	7.91	34.43	312	12	A	V
													V
													V
<b>Remark</b>	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	41.99	-32.01	74	55.5	34.26	11.16	58.93	100	0	P	H
													H
													H
													H
		4824	41.96	-32.04	74	55.47	34.26	11.16	58.93	100	0	P	V
													V
													V
													V
802.11g CH 06 2437MHz		4872	42.01	-31.99	74	55.33	34.3	11.21	58.83	100	0	P	H
		7308	44.01	-29.99	74	51.06	35.6	15.08	57.73	100	0	P	H
													H
													H
		4872	42.22	-31.78	74	55.54	34.3	11.21	58.83	100	0	P	V
		7308	45.09	-28.91	74	52.14	35.6	15.08	57.73	100	0	P	V
													V
													V
802.11g CH 11 2462MHz		4926	42.46	-31.54	74	55.58	34.34	11.27	58.73	100	0	P	H
		7386	43.46	-30.54	74	50.52	35.6	15.14	57.8	100	0	P	H
													H
													H
		4926	42.26	-31.74	74	55.38	34.34	11.27	58.73	100	0	P	V
		7386	43.81	-30.19	74	50.87	35.6	15.14	57.8	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		2388.84	62.47	-11.53	74	56.81	32.18	7.75	34.27	276	100	P	H	
		2389.74	47.25	-6.75	54	41.59	32.18	7.75	34.27	276	100	A	H	
	*	2406.429	102.69			97.04	32.2	7.75	34.3	276	100	P	H	
	*	2408.35	91.9			86.25	32.2	7.75	34.3	276	100	A	H	
													H	
													H	
			2389.02	70.68	-3.32	74	65.02	32.18	7.75	34.27	377	71	P	V
			2390	50.84	-3.16	54	45.21	32.18	7.75	34.3	377	71	A	V
		*	2416.616	108.48			102.88	32.2	7.75	34.35	377	71	P	V
		*	2416.783	97.37			91.77	32.2	7.75	34.35	377	71	A	V
													V	
													V	
802.11n HT20 CH 06 2437MHz		2331.06	58.74	-15.26	74	53.27	32.09	7.6	34.22	240	101	P	H	
		2324.67	45.15	-8.85	54	39.68	32.09	7.6	34.22	240	101	A	H	
	*	2439.913	102.67	-	-	96.95	32.24	7.83	34.35	240	101	P	H	
	*	2439	91.52	-	-	85.8	32.24	7.83	34.35	240	101	A	H	
			2494.36	59.4	-14.6	74	53.67	32.3	7.91	34.48	240	101	P	H
			2489.88	45.37	-8.63	54	39.59	32.3	7.91	34.43	240	101	A	H
			2384.34	58.62	-15.38	74	52.98	32.16	7.75	34.27	295	39	P	V
			2384.88	46.02	-7.98	54	40.38	32.16	7.75	34.27	295	39	A	V
		*	2439	108.56	-	-	102.84	32.24	7.83	34.35	295	39	P	V
		*	2439	96.92	-	-	91.2	32.24	7.83	34.35	295	39	A	V
			2489.64	58.93	-15.07	74	53.15	32.3	7.91	34.43	295	39	P	V
			2488.88	45.95	-8.05	54	40.17	32.3	7.91	34.43	295	39	A	V



<b>802.11n</b> <b>HT20</b> <b>CH 11</b> <b>2462MHz</b>	*	2461	101.22	-	-	95.44	32.26	7.91	34.39	330	326	P	H
	*	2460	90.49	-	-	84.79	32.26	7.83	34.39	330	326	A	H
		2483.52	61.82	-12.18	74	56.06	32.28	7.91	34.43	330	326	P	H
		2483.8	45.73	-8.27	54	39.97	32.28	7.91	34.43	330	326	A	H
													H
													H
	*	2464	107.95	-	-	102.17	32.26	7.91	34.39	362	15	P	V
	*	2462	97.24	-	-	91.46	32.26	7.91	34.39	362	15	A	V
		2484.68	70.03	-3.97	74	64.27	32.28	7.91	34.43	362	15	P	V
		2483.8	48.5	-5.5	54	42.74	32.28	7.91	34.43	362	15	A	V
													V
												V	
<b>Remark</b>	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	42.49	-31.51	74	56	34.26	11.16	58.93	100	0	P	H
													H
													H
													H
		4824	42.2	-31.8	74	55.71	34.26	11.16	58.93	100	0	P	V
													V
													V
802.11n HT20 CH 06 2437MHz		4872	41.55	-32.45	74	54.87	34.3	11.21	58.83	100	0	P	H
		7308	43.66	-30.34	74	50.71	35.6	15.08	57.73	100	0	P	H
													H
													H
		4872	41.91	-32.09	74	55.23	34.3	11.21	58.83	100	0	P	V
		7308	43.79	-30.21	74	50.84	35.6	15.08	57.73	100	0	P	V
													V
802.11n HT20 CH 11 2462MHz		4926	42.48	-31.52	74	55.6	34.34	11.27	58.73	100	0	P	H
		7386	43.7	-30.3	74	50.76	35.6	15.14	57.8	100	0	P	H
													H
													H
		4926	41.95	-32.05	74	55.07	34.34	11.27	58.73	100	0	P	V
		7386	43.96	-30.04	74	51.02	35.6	15.14	57.8	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 802.11n HT20 (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)	
<b>2.4GHz 802.11n HT20 LF</b>		36.21	28.84	-11.16	40	42.59	15.76	1.77	31.28	109	88	P	H	
		103.71	19.33	-24.17	43.5	37.61	10.48	2.38	31.14			P	H	
		143.4	19.59	-23.91	43.5	36.58	11.5	2.61	31.1			P	H	
		348.3	18.11	-27.89	46	31.42	14.34	3.39	31.04			P	H	
		531.7	20.27	-25.73	46	28.76	18.35	3.89	30.73			P	H	
		815.2	26.93	-19.07	46	30.29	22.35	4.62	30.33			P	H	
														H
														H
														H
														H
														H
														H
														H
														H
														H
														H
														H
														H
														H
			46.2	21.34	-18.66	40	40.97	9.8	1.77	31.2	116	37	P	V
		113.97	18.25	-25.25	43.5	35.96	11.07	2.38	31.16			P	V	
		223.32	23.03	-22.97	46	41.53	9.54	2.96	31			P	V	
		313.3	19.54	-26.46	46	33.93	13.33	3.28	31			P	V	
		458.9	22.57	-23.43	46	32.35	17.39	3.63	30.8			P	V	
		944.7	27.31	-18.69	46	28.41	24.35	4.94	30.39			P	V	
													V	
													V	
													V	
													V	
													V	
													V	
													V	
													V	
<b>Remark</b>	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".