



Appendix A. Radiated Spurious Emission

Test Engineer :	Eric Shih, Stan Hsieh and Derreck Chen	Temperature :	20~22°C
		Relative Humidity :	46~48%

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		2387.04	56.72	-17.28	74	57.52	27.23	6.01	34.04	137	125	P	H	
		2386.41	47.71	-6.29	54	48.51	27.23	6.01	34.04	137	125	A	H	
	*	2412.024	102.24	-	-	102.96	27.28	6.04	34.04	137	125	P	H	
	*	2411.022	99.6	-	-	100.32	27.28	6.04	34.04	137	125	A	H	
													H	
														H
			2386.68	55.28	-18.72	74	56.08	27.23	6.01	34.04	173	167	P	V
			2386.23	46.99	-7.01	54	47.79	27.23	6.01	34.04	173	167	A	V
	*		2412.107	102.52	-	-	103.24	27.28	6.04	34.04	173	167	P	V
	*		2412.942	99.86	-	-	100.58	27.28	6.04	34.04	173	167	A	V
														V
														V
802.11b CH 06 2437MHz		2378.58	53.14	-20.86	74	53.98	27.19	6.01	34.04	103	127	P	H	
		2389.74	42.07	-11.93	54	42.87	27.23	6.01	34.04	103	127	A	H	
	*	2437.074	102.1	-	-	102.72	27.37	6.04	34.03	103	127	P	H	
	*	2435.989	99.51	-	-	100.18	27.32	6.04	34.03	103	127	A	H	
			2485.52	54.92	-19.08	74	55.38	27.46	6.09	34.01	103	127	P	H
			2490.96	42.32	-11.68	54	42.74	27.5	6.09	34.01	103	127	A	H
			2382.09	52.77	-21.23	74	53.61	27.19	6.01	34.04	167	153	P	V
			2388.84	41.96	-12.04	54	42.76	27.23	6.01	34.04	167	153	A	V
	*		2437.074	103.46	-	-	104.08	27.37	6.04	34.03	167	153	P	V
	*		2437.992	100.71	-	-	101.33	27.37	6.04	34.03	167	153	A	V
			2490.16	53.16	-20.84	74	53.58	27.5	6.09	34.01	167	153	P	V
			2484.4	42.54	-11.46	54	43	27.46	6.09	34.01	167	153	A	V



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 11 2462MHz	*	2461.957	102.02	-	-	102.56	27.41	6.07	34.02	103	127	P	H
	*	2461.039	99.44	-	-	99.98	27.41	6.07	34.02	103	127	A	H
		2487.64	54.63	-19.37	74	55.05	27.5	6.09	34.01	103	127	P	H
		2487.76	46.12	-7.88	54	46.54	27.5	6.09	34.01	103	127	A	H
													H
													H
	*	2462.041	103.57	-	-	104.11	27.41	6.07	34.02	186	150	P	V
	*	2462.959	100.95	-	-	101.49	27.41	6.07	34.02	186	150	A	V
		2488.48	56.18	-17.82	74	56.6	27.5	6.09	34.01	186	150	P	V
		2487.64	47.72	-6.28	54	48.14	27.5	6.09	34.01	186	150	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	36.01	-37.99	74	54.65	31.32	8.65	58.61	100	0	P	H	
													H	
													H	
													H	
		4824	35.57	-38.43	74	54.21	31.32	8.65	58.61	100	0	P	V	
														V
														V
														V
802.11b CH 06 2437MHz		4872	37.49	-36.51	74	55.91	31.41	8.69	58.52	100	0	P	H	
		7308	38.77	-35.23	74	50.26	36.28	10.39	58.16	100	0	P	H	
													H	
													H	
		4872	36.8	-37.2	74	55.22	31.41	8.69	58.52	100	0	P	V	
		7308	38.21	-35.79	74	49.7	36.28	10.39	58.16	100	0	P	V	
														V
														V
802.11b CH 11 2462MHz		4926	38.08	-35.92	74	56.22	31.49	8.79	58.42	100	0	P	H	
		7386	38.4	-35.6	74	49.76	36.47	10.48	58.31	100	0	P	H	
													H	
													H	
		4926	37.62	-36.38	74	55.76	31.49	8.79	58.42	100	0	P	V	
		7386	38.87	-35.13	74	50.23	36.47	10.48	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.													



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		2389.92	65.08	-8.92	74	65.88	27.23	6.01	34.04	115	126	P	H	
		2389.83	48.57	-5.43	54	49.37	27.23	6.01	34.04	115	126	A	H	
	*	2413.11	102.29	-	-	103.01	27.28	6.04	34.04	115	126	P	H	
	*	2411.189	94.74	-	-	95.46	27.28	6.04	34.04	115	126	A	H	
													H	
													H	
			2388.84	64.59	-9.41	74	65.39	27.23	6.01	34.04	202	182	P	V
			2389.74	46.79	-7.21	54	47.59	27.23	6.01	34.04	202	182	A	V
	*		2413.945	102.75	-	-	103.47	27.28	6.04	34.04	202	182	P	V
	*		2411.022	95.18	-	-	95.9	27.28	6.04	34.04	202	182	A	V
													V	
													V	
802.11g CH 06 2437MHz		2386.77	57.67	-16.33	74	58.47	27.23	6.01	34.04	178	124	P	H	
		2387.94	44.9	-9.1	54	45.7	27.23	6.01	34.04	178	124	A	H	
	*	2437.241	102.59	-	-	103.21	27.37	6.04	34.03	178	124	P	H	
	*	2436.156	94.42	-	-	95.09	27.32	6.04	34.03	178	124	A	H	
			2492.36	56.18	-17.82	74	56.59	27.5	6.09	34	178	124	P	H
			2486.84	45.49	-8.51	54	45.95	27.46	6.09	34.01	178	124	A	H
			2387.13	56.09	-17.91	74	56.89	27.23	6.01	34.04	196	151	P	V
			2389.47	44.54	-9.46	54	45.34	27.23	6.01	34.04	196	151	A	V
	*		2436.907	103.95	-	-	104.57	27.37	6.04	34.03	196	151	P	V
	*		2438.076	96.26	-	-	96.88	27.37	6.04	34.03	196	151	A	V
			2483.56	58.26	-15.74	74	58.72	27.46	6.09	34.01	196	151	P	V
			2483.76	45.97	-8.03	54	46.43	27.46	6.09	34.01	196	151	A	V



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 11 2462MHz	*	2463.126	103.28	-	-	103.82	27.41	6.07	34.02	100	127	P	H
	*	2462.875	95.4	-	-	95.94	27.41	6.07	34.02	100	127	A	H
		2484.4	65.3	-8.7	74	65.76	27.46	6.09	34.01	100	127	P	H
		2483.52	49.39	-4.61	54	49.85	27.46	6.09	34.01	100	127	A	H
													H
													H
	*	2461.957	103.93	-	-	104.47	27.41	6.07	34.02	208	160	P	V
	*	2462.959	95.95	-	-	96.49	27.41	6.07	34.02	208	160	A	V
		2484.64	66.03	-7.97	74	66.49	27.46	6.09	34.01	208	160	P	V
		2483.72	49.77	-4.23	54	50.23	27.46	6.09	34.01	208	160	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	32.52	-41.48	74	51.16	31.32	8.65	58.61	100	0	P	H	
													H	
													H	
													H	
		4824	33.61	-40.39	74	52.25	31.32	8.65	58.61	100	0	P	V	
														V
														V
														V
802.11g CH 06 2437MHz		4874	34.26	-39.74	74	52.68	31.41	8.69	58.52	100	0	P	H	
		7311	38.15	-35.85	74	49.64	36.28	10.39	58.16	100	0	P	H	
													H	
													H	
		4874	35.15	-38.85	74	53.57	31.41	8.69	58.52	100	0	P	V	
		7311	37.98	-36.02	74	49.47	36.28	10.39	58.16	100	0	P	V	
														V
														V
802.11g CH 11 2462MHz		4926	33.12	-40.88	74	51.26	31.49	8.79	58.42	100	0	P	H	
		7386	37.71	-36.29	74	49.07	36.47	10.48	58.31	100	0	P	H	
													H	
													H	
		4926	33.76	-40.24	74	51.9	31.49	8.79	58.42	100	0	P	V	
		7386	37.95	-36.05	74	49.31	36.47	10.48	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.													



**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		2389.92	67.41	-6.59	74	68.21	27.23	6.01	34.04	140	126	P	H	
		2390	48.4	-5.6	54	49.2	27.23	6.01	34.04	140	126	A	H	
	*	2412.274	102.52	-	-	103.24	27.28	6.04	34.04	140	126	P	H	
	*	2411.022	94.86	-	-	95.58	27.28	6.04	34.04	140	126	A	H	
													H	
														H
			2389.92	67.01	-6.99	74	67.81	27.23	6.01	34.04	173	164	P	V
			2389.92	47.67	-6.33	54	48.47	27.23	6.01	34.04	173	164	A	V
	*		2411.69	102.7	-	-	103.42	27.28	6.04	34.04	173	164	P	V
	*		2412.859	95.22	-	-	95.94	27.28	6.04	34.04	173	164	A	V
													V	
													V	
802.11n HT20 CH 06 2437MHz		2385.87	57.73	-16.27	74	58.53	27.23	6.01	34.04	141	125	P	H	
		2389.65	44.86	-9.14	54	45.66	27.23	6.01	34.04	141	125	A	H	
	*	2435.321	103.13	-	-	103.8	27.32	6.04	34.03	141	125	P	H	
	*	2438.076	94.41	-	-	95.03	27.37	6.04	34.03	141	125	A	H	
			2487.48	58.15	-15.85	74	58.61	27.46	6.09	34.01	141	125	P	H
			2484.12	45.32	-8.68	54	45.78	27.46	6.09	34.01	141	125	A	H
			2389.56	57.12	-16.88	74	57.92	27.23	6.01	34.04	195	147	P	V
			2390	44.71	-9.29	54	45.51	27.23	6.01	34.04	195	147	A	V
	*		2437.742	103.32	-	-	103.94	27.37	6.04	34.03	195	147	P	V
	*		2437.909	95.87	-	-	96.49	27.37	6.04	34.03	195	147	A	V
		2488.08	58.68	-15.32	74	59.1	27.5	6.09	34.01	195	147	P	V	
		2484	46.19	-7.81	54	46.65	27.46	6.09	34.01	195	147	A	V	



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 11 2462MHz	*	2461.54	102.6	-	-	103.14	27.41	6.07	34.02	101	127	P	H
	*	2461.122	94.45	-	-	94.99	27.41	6.07	34.02	101	127	A	H
		2484.4	67.93	-6.07	74	68.39	27.46	6.09	34.01	101	127	P	H
		2483.92	48.71	-5.29	54	49.17	27.46	6.09	34.01	101	127	A	H
													H
													H
	*	2461.79	101.25	-	-	101.79	27.41	6.07	34.02	107	137	P	V
	*	2461.122	93.74	-	-	94.28	27.41	6.07	34.02	107	137	A	V
		2483.68	66.03	-7.97	74	66.49	27.46	6.09	34.01	107	137	P	V
		2483.88	49.19	-4.81	54	49.65	27.46	6.09	34.01	107	137	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	34.21	-39.79	74	52.85	31.32	8.65	58.61	100	0	P	H
													H
													H
													H
													V
													V
													V
802.11n HT20 CH 06 2437MHz		4872	31.64	-42.36	74	50.06	31.41	8.69	58.52	100	0	P	H
		7308	38.01	-35.99	74	49.5	36.28	10.39	58.16	100	0	P	H
													H
													H
													V
													V
													V
802.11n HT20 CH 11 2462MHz		4926	33.33	-40.67	74	51.47	31.49	8.79	58.42	100	0	P	H
		7386	38.19	-35.81	74	49.55	36.47	10.48	58.31	100	0	P	H
													H
													H
													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		49.17	29.47	-10.53	40	52.24	7.99	1.04	31.8	100	77	P	H	
		159.33	25.66	-17.84	43.5	46.35	9.63	1.46	31.78			P	H	
		217.92	14.11	-31.89	46	36.01	8.09	1.79	31.78			P	H	
		364.4	22.44	-23.56	46	37.32	14.74	2.17	31.79			P	H	
		574.4	30.22	-15.78	46	40.83	18.5	2.89	32			P	H	
		820.1	26.11	-19.89	46	34.43	20.1	3.4	31.82			P	H	
														H
														H
														H
														H
														H
														H
														H
			48.36	27.57	-12.43	40	50.06	8.27	1.04	31.8	155	185	P	V
			93.72	26.46	-17.04	43.5	47.82	9.14	1.28	31.78			P	V
			159.33	26.72	-16.78	43.5	47.41	9.63	1.46	31.78			P	V
			365.8	19.08	-26.92	46	33.79	14.76	2.32	31.79			P	V
			585.6	28.41	-17.59	46	39.04	18.5	2.89	32.02			P	V
			820.1	27.35	-18.65	46	35.67	20.1	3.4	31.82			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	Peak or Average
H/V	Horizontal or Vertical



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”.