



Appendix B. Radiated Spurious Emission

Test Engineer :	Stan Hsieh, Ken Wu, Nick Yu, 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		2386.41	60.54	-13.46	74	54.88	32.18	7.75	34.27	102	204	P	H
		2385.78	50.05	-3.95	54	44.39	32.18	7.75	34.27	102	204	A	H
	*	2413.36	105.34	-	-	99.69	32.2	7.75	34.3	102	204	P	H
	*	2412.692	101.12	-	-	95.47	32.2	7.75	34.3	102	204	A	H
													H
													H
		2387.04	61.59	-12.41	74	55.93	32.18	7.75	34.27	104	157	P	V
		2385.78	51.25	-2.75	54	45.59	32.18	7.75	34.27	104	157	A	V
	*	2413.193	108.63	-	-	102.98	32.2	7.75	34.3	104	157	P	V
	*	2411.189	104.52	-	-	98.87	32.2	7.75	34.3	104	157	A	V
													V
													V
802.11b CH 06 2437MHz		2355.9	59.74	-14.26	74	54.18	32.13	7.68	34.25	100	203	P	H
		2387.22	44.97	-9.03	54	39.31	32.18	7.75	34.27	100	203	A	H
	*	2438.326	105.23	-	-	99.51	32.24	7.83	34.35	100	203	P	H
	*	2437.742	101.12	-	-	95.4	32.24	7.83	34.35	100	203	A	H
		2491.68	58.59	-15.41	74	52.81	32.3	7.91	34.43	100	203	P	H
		2488.12	44.96	-9.04	54	39.18	32.3	7.91	34.43	100	203	A	H
		2382.18	60.15	-13.85	74	54.51	32.16	7.75	34.27	100	159	P	V
		2389.02	45.23	-8.77	54	39.57	32.18	7.75	34.27	100	159	A	V
	*	2435.905	107.88	-	-	102.18	32.22	7.83	34.35	100	159	P	V
	*	2436.239	103.81	-	-	98.11	32.22	7.83	34.35	100	159	A	V
		2495.8	59.32	-14.68	74	53.59	32.3	7.91	34.48	100	159	P	V
		2487.28	45.17	-8.83	54	39.41	32.28	7.91	34.43	100	159	A	V



802.11b CH 11 2462MHz	*	2463.293	106.79	-	-	101.01	32.26	7.91	34.39	230	131	P	H
	*	2461.206	102.64	-	-	96.86	32.26	7.91	34.39	230	131	A	H
		2483.52	61.99	-12.01	74	56.23	32.28	7.91	34.43	230	131	P	H
		2488.36	51.52	-2.48	54	45.74	32.3	7.91	34.43	230	131	A	H
													H
													H
	*	2463.209	108.31	-	-	102.53	32.26	7.91	34.39	100	160	P	V
	*	2461.289	104.28	-	-	98.5	32.26	7.91	34.39	100	160	A	V
		2488.52	61.63	-12.37	74	55.85	32.3	7.91	34.43	100	160	P	V
		2488.28	50.07	-3.93	54	44.29	32.3	7.91	34.43	100	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 802.11b (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	48.87	-25.13	74	62.38	34.26	11.16	58.93	100	0	P	H
													H
													H
													H
		4824	45.65	-28.35	74	59.16	34.26	11.16	58.93	100	0	P	V
													V
													V
													V
802.11b CH 06 2437MHz		4872	49.06	-24.94	74	62.38	34.3	11.21	58.83	100	0	P	H
		7311	53.5	-20.5	74	60.55	35.6	15.08	57.73	270	337	P	H
		7311	48.6	-5.4	54	55.65	35.6	15.08	57.73	270	337	A	H
													H
		4872	44.09	-29.91	74	57.41	34.3	11.21	58.83	100	0	P	V
		7311	53.18	-20.82	74	60.23	35.6	15.08	57.73	141	0	P	V
		7311	47.87	-6.13	54	54.92	35.6	15.08	57.73	141	0	A	V
													V
802.11b CH 11 2462MHz		4926	50.4	-23.6	74	63.52	34.34	11.27	58.73	100	0	P	H
		7386	55.42	-18.58	74	62.48	35.6	15.14	57.8	110	46	P	H
		7386	49.83	-4.17	54	56.89	35.6	15.14	57.8	110	46	A	H
													H
		4926	46.4	-27.6	74	59.52	34.34	11.27	58.73	100	0	P	V
		7386	57.19	-16.81	74	64.25	35.6	15.14	57.8	362	19	P	V
		7386	52.75	-1.25	54	59.81	35.6	15.14	57.8	362	19	A	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	73.39	-0.61	74	67.76	32.18	7.75	34.3	104	206	P	H
		2390	51.97	-2.03	54	46.34	32.18	7.75	34.3	104	206	A	H
	*	2414	106.28	-	-	100.63	32.2	7.75	34.3	104	206	P	H
	*	2414	95.99	-	-	90.34	32.2	7.75	34.3	104	206	A	H
													H
													H
		2389.92	73.15	-0.85	74	67.52	32.18	7.75	34.3	103	219	P	V
		2390	52.6	-1.4	54	46.97	32.18	7.75	34.3	103	219	A	V
	*	2414	108.87	-	-	103.22	32.2	7.75	34.3	103	219	P	V
	*	2414	98.66	-	-	93.01	32.2	7.75	34.3	103	219	A	V
													V
													V
802.11g CH 06 2437MHz		2389.83	63.58	-10.42	74	57.95	32.18	7.75	34.3	242	135	P	H
		2390	47.24	-6.76	54	41.61	32.18	7.75	34.3	242	135	A	H
	*	2435.321	109.63	-	-	103.93	32.22	7.83	34.35	242	135	P	H
	*	2436.156	99.32	-	-	93.62	32.22	7.83	34.35	242	135	A	H
		2487.12	63.93	-10.07	74	58.17	32.28	7.91	34.43	242	135	P	H
		2483.8	47.17	-6.83	54	41.41	32.28	7.91	34.43	242	135	A	H
		2389.2	63.36	-10.64	74	57.7	32.18	7.75	34.27	102	160	P	V
		2390	47.94	-6.06	54	42.31	32.18	7.75	34.3	102	160	A	V
	*	2435.321	109.56	-	-	103.86	32.22	7.83	34.35	102	160	P	V
	*	2435	99.41	-	-	93.71	32.22	7.83	34.35	102	160	A	V
		2486.16	62.87	-11.13	74	57.11	32.28	7.91	34.43	102	160	P	V
		2483.52	47.12	-6.88	54	41.36	32.28	7.91	34.43	102	160	A	V



802.11g CH 11 2462MHz	*	2467.218	107.65	-	-	101.91	32.26	7.91	34.43	204	174	P	H
	*	2464.128	97.39	-	-	91.61	32.26	7.91	34.39	204	174	A	H
		2483.64	72.8	-1.2	74	67.04	32.28	7.91	34.43	204	174	P	H
		2483.56	51.87	-2.13	54	46.11	32.28	7.91	34.43	204	174	A	H
													H
													H
	*	2460.204	108.19	-	-	102.41	32.26	7.91	34.39	101	161	P	V
	*	2464.128	97.89	-	-	92.11	32.26	7.91	34.39	101	161	A	V
		2483.52	72.25	-1.75	74	66.49	32.28	7.91	34.43	101	161	P	V
		2483.68	51.59	-2.41	54	45.83	32.28	7.91	34.43	101	161	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	45.23	-28.77	74	58.74	34.26	11.16	58.93	100	0	P	H
													H
													H
													H
		4824	42.24	-31.76	74	55.75	34.26	11.16	58.93	100	0	P	V
													V
													V
													V
802.11g CH 06 2437MHz		4874	47.66	-26.34	74	60.98	34.3	11.21	58.83	100	0	P	H
		7311	58.71	-15.29	74	65.76	35.6	15.08	57.73	238	351	P	H
		7311	41.88	-12.12	54	48.93	35.6	15.08	57.73	238	351	A	H
													H
		4874	44.62	-29.38	74	57.94	34.3	11.21	58.83	100	0	P	V
		7311	57.85	-16.15	74	64.9	35.6	15.08	57.73	329	13	P	V
		7311	40.93	-13.07	54	47.98	35.6	15.08	57.73	329	13	A	V
													V
802.11g CH 11 2462MHz		4926	47.64	-26.36	74	60.76	34.34	11.27	58.73	100	0	P	H
		7386	57.59	-16.41	74	64.65	35.6	15.14	57.8	108	48	P	H
		7386	41.16	-12.84	54	48.22	35.6	15.14	57.8	108	48	A	H
													H
		4926	44.19	-29.81	74	57.31	34.34	11.27	58.73	100	0	P	V
		7386	59.18	-14.82	74	66.24	35.6	15.14	57.8	347	18	P	V
		7386	42.65	-11.35	54	49.71	35.6	15.14	57.8	347	18	A	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		2389.38	73.47	-0.53	74	67.81	32.18	7.75	34.27	102	207	P	H
		2389.83	53.29	-0.71	54	47.66	32.18	7.75	34.3	102	207	A	H
	*	2414	106.32	-	-	100.67	32.2	7.75	34.3	102	207	P	H
	*	2414	95.61	-	-	89.96	32.2	7.75	34.3	102	207	A	H
													H
													H
		2389.47	73.22	-0.78	74	67.56	32.18	7.75	34.27	104	221	P	V
		2389.92	53.11	-0.89	54	47.48	32.18	7.75	34.3	104	221	A	V
	*	2414	108.38	-	-	102.73	32.2	7.75	34.3	104	221	P	V
	*	2414	98.29	-	-	92.64	32.2	7.75	34.3	104	221	A	V
													V
													V
802.11n HT20 CH 06 2437MHz		2387.94	60.48	-13.52	74	54.82	32.18	7.75	34.27	100	205	P	H
		2388.12	46.96	-7.04	54	41.3	32.18	7.75	34.27	100	205	A	H
	*	2439	106.47	-	-	100.75	32.24	7.83	34.35	100	205	P	H
	*	2438.994	96.08	-	-	90.36	32.24	7.83	34.35	100	205	A	H
		2483.52	60.21	-13.79	74	54.45	32.28	7.91	34.43	100	205	P	H
		2484.2	46.38	-7.62	54	40.62	32.28	7.91	34.43	100	205	A	H
		2389.92	63.49	-10.51	74	57.86	32.18	7.75	34.3	102	159	P	V
		2389.2	48	-6	54	42.34	32.18	7.75	34.27	102	159	A	V
	*	2435	109.75	-	-	104.05	32.22	7.83	34.35	102	159	P	V
	*	2439	98.96	-	-	93.24	32.24	7.83	34.35	102	159	A	V
		2484.64	63.59	-10.41	74	57.83	32.28	7.91	34.43	102	159	P	V
		2483.56	47.22	-6.78	54	41.46	32.28	7.91	34.43	102	159	A	V



802.11n HT20 CH 11 2462MHz	*	2464	107.91	-	-	102.13	32.26	7.91	34.39	201	176	P	H
	*	2464	97.17	-	-	91.39	32.26	7.91	34.39	201	176	A	H
		2484.8	73.11	-0.89	74	67.35	32.28	7.91	34.43	201	176	P	H
		2483.64	51	-3	54	45.24	32.28	7.91	34.43	201	176	A	H
													H
													H
	*	2463.293	107.9	-	-	102.12	32.26	7.91	34.39	102	160	P	V
	*	2460.287	96.96	-	-	91.18	32.26	7.91	34.39	102	160	A	V
		2484.84	73.71	-0.29	74	67.95	32.28	7.91	34.43	102	160	P	V
		2483.56	51.12	-2.88	54	45.36	32.28	7.91	34.43	102	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 802.11n 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	45.76	-28.24	74	59.27	34.26	11.16	58.93	100	0	P	H
													H
													H
													H
		4824	42.82	-31.18	74	56.33	34.26	11.16	58.93	100	0	P	V
													V
													V
													V
802.11n HT20 CH 06 2437MHz		4874	47.45	-26.55	74	60.77	34.3	11.21	58.83	100	0	P	H
		7311	56.75	-17.25	74	63.8	35.6	15.08	57.73	257	351	P	H
		7311	41.58	-12.42	54	48.63	35.6	15.08	57.73	257	351	A	H
													H
		4874	45	-29	74	58.32	34.3	11.21	58.83	100	0	P	V
		7311	56.99	-17.01	74	64.04	35.6	15.08	57.73	140	0	P	V
		7311	41.16	-12.84	54	48.21	35.6	15.08	57.73	140	0	A	V
													V
802.11n HT20 CH 11 2462MHz		4924	46.53	-27.47	74	59.65	34.34	11.27	58.73	100	0	P	H
		7386	49.65	-24.35	74	56.71	35.6	15.14	57.8	100	0	P	H
													H
													H
		4924	43.89	-30.11	74	57.01	34.34	11.27	58.73	100	0	P	V
		7386	56.72	-17.28	74	63.78	35.6	15.14	57.8	374	359	P	V
		7386	40.88	-13.12	54	47.94	35.6	15.14	57.8	374	359	A	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)
2.4GHz 802.11n HT20 LF		74.28	29.38	-10.62	40	51.72	6.8	2.06	31.2	110	121	P	H
		145.29	27.8	-15.7	43.5	44.79	11.5	2.61	31.1			P	H
		240.87	22.01	-23.99	46	38.65	11.4	2.96	31			P	H
		439.3	27.5	-18.5	46	37.58	16.99	3.63	30.7			P	H
		715.8	16.24	-29.76	46	20.99	21.24	4.41	30.4			P	H
		911.1	19.79	-26.21	46	21.76	23.55	4.8	30.32			P	H
													H
													H
													H
													H
													H
													H
		74.01	31.23	-8.77	40	53.67	6.72	2.06	31.22	134	214	P	V
		167.7	22.14	-21.36	43.5	40.92	9.74	2.61	31.13			P	V
		238.44	23.31	-22.69	46	40.17	11.18	2.96	31			P	V
		624.8	21.13	-24.87	46	27.17	20.29	4.22	30.55			P	V
		800.5	27.12	-18.88	46	30.8	22	4.62	30.3			P	V
		996.5	28.56	-25.44	54	29.07	24.68	5.03	30.22			P	V
													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”.