



Appendix B. Radiated Spurious Emission

Test Engineer :	JC Liang and Nick Yu	Temperature :	20~23°C
		Relative Humidity :	58~63%

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		2364.075	53.43	-20.57	74	51.51	27.09	8.82	33.99	225	325	P	H	
		2390	42.93	-11.07	54	40.83	27.19	8.89	33.98	225	325	A	H	
	*	2412	104.35	-	-	102.2	27.24	8.89	33.98	225	325	P	H	
	*	2412	100.85	-	-	98.7	27.24	8.89	33.98	225	325	A	H	
													H	
														H
			2341.5	53.2	-20.8	74	51.34	27.03	8.82	33.99	256	20	P	V
			2387.595	42.83	-11.17	54	40.74	27.19	8.89	33.99	256	20	A	V
	*		2412	104.91	-	-	102.76	27.24	8.89	33.98	256	20	P	V
	*		2412	101.36	-	-	99.21	27.24	8.89	33.98	256	20	A	V
														V
														V
802.11b CH 06 2437MHz		2318.4	54	-20	74	52.27	26.98	8.75	34	245	326	P	H	
		2388.54	42.73	-11.27	54	40.64	27.19	8.89	33.99	245	326	A	H	
	*	2437	104.44	-	-	102.13	27.34	8.94	33.97	245	326	P	H	
	*	2437	100.95	-	-	98.64	27.34	8.94	33.97	245	326	A	H	
			2484.39	53.29	-20.71	74	50.81	27.45	8.98	33.95	245	326	P	H
			2483.55	43.19	-10.81	54	40.71	27.45	8.98	33.95	245	326	A	H
			2334.64	53.74	-20.26	74	51.96	27.03	8.75	34	250	32	P	V
			2389.94	42.71	-11.29	54	40.61	27.19	8.89	33.98	250	32	A	V
	*		2437	103.69	-	-	101.38	27.34	8.94	33.97	250	32	P	V
	*		2437	100.32	-	-	98.01	27.34	8.94	33.97	250	32	A	V
			2497.83	53.99	-20.01	74	51.45	27.5	8.98	33.94	250	32	P	V
			2483.97	43.25	-10.75	54	40.77	27.45	8.98	33.95	250	32	A	V



WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)	
802.11b CH 11 2462MHz	*	2462	104.43	-	-	102.01	27.4	8.98	33.96	242	327	P	H	
	*	2462	101.04	-	-	98.62	27.4	8.98	33.96	242	327	A	H	
		2484.6	53.8	-20.2	74	51.32	27.45	8.98	33.95	242	327	P	H	
		2483.88	43.35	-10.65	54	40.87	27.45	8.98	33.95	242	327	A	H	
													H	
														H
	*	2462	104.83	-	-	102.41	27.4	8.98	33.96	281	19	P	V	
	*	2462	101.3	-	-	98.88	27.4	8.98	33.96	281	19	A	V	
		2483.8	54.39	-19.61	74	51.91	27.45	8.98	33.95	281	19	P	V	
		2483.68	43.49	-10.51	54	41.01	27.45	8.98	33.95	281	19	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 Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)	
802.11b CH 01 2412MHz		4824	33.63	-40.37	74	42.26	31.69	10.77	51.09	100	0	P	H	
													H	
													H	
													H	
			4824	34.27	-39.73	74	42.9	31.69	10.77	51.09	100	0	P	V
														V
														V
802.11b CH 06 2437MHz		4874	32.78	-41.22	74	41.18	31.78	10.88	51.06	100	0	P	H	
		7311	37.82	-36.18	74	38.27	37.27	12.79	50.51	100	0	P	H	
													H	
													H	
			4874	33.06	-40.94	74	41.46	31.78	10.88	51.06	100	0	P	V
			7311	37.98	-36.02	74	38.43	37.27	12.79	50.51	100	0	P	V
														V
802.11b CH 11 2462MHz		4924	33.84	-40.16	74	42	31.88	11	51.04	100	0	P	H	
		7386	38.13	-35.87	74	38.38	37.38	12.88	50.51	100	0	P	H	
													H	
													H	
			4924	33.5	-40.5	74	41.66	31.88	11	51.04	100	0	P	V
			7386	37.6	-36.4	74	37.85	37.38	12.88	50.51	100	0	P	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 Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)	
802.11g CH 01 2412MHz		2385.6	54.76	-19.24	74	52.67	27.19	8.89	33.99	173	333	P	H	
		2390	43.99	-10.01	54	41.89	27.19	8.89	33.98	173	333	A	H	
	*	2412	103.87	-	-	101.72	27.24	8.89	33.98	173	333	P	H	
	*	2412	95.24	-	-	93.09	27.24	8.89	33.98	173	333	A	H	
													H	
														H
			2390	54.78	-19.22	74	52.68	27.19	8.89	33.98	295	21	P	V
			2390	43.97	-10.03	54	41.87	27.19	8.89	33.98	295	21	A	V
	*		2412	104.2	-	-	102.05	27.24	8.89	33.98	295	21	P	V
	*		2412	95.69	-	-	93.54	27.24	8.89	33.98	295	21	A	V
														V
														V
802.11g CH 06 2437MHz		2382.66	53.79	-20.21	74	51.75	27.14	8.89	33.99	172	334	P	H	
		2384.76	43.75	-10.25	54	41.71	27.14	8.89	33.99	172	334	A	H	
	*	2437	104.64	-	-	102.33	27.34	8.94	33.97	172	334	P	H	
	*	2437	96.03	-	-	93.72	27.34	8.94	33.97	172	334	A	H	
			2498.95	53.94	-20.06	74	51.4	27.5	8.98	33.94	172	334	P	H
			2489.15	43.78	-10.22	54	41.25	27.5	8.98	33.95	172	334	A	H
			2384.2	54.03	-19.97	74	51.99	27.14	8.89	33.99	281	22	P	V
			2384.76	43.63	-10.37	54	41.59	27.14	8.89	33.99	281	22	A	V
	*		2437	104.91	-	-	102.6	27.34	8.94	33.97	281	22	P	V
	*		2437	96.36	-	-	94.05	27.34	8.94	33.97	281	22	A	V
			2499.93	53.81	-20.19	74	51.27	27.5	8.98	33.94	281	22	P	V
			2489.08	44.05	-9.95	54	41.52	27.5	8.98	33.95	281	22	A	V



WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 11 2462MHz	*	2462	105.44	-	-	103.02	27.4	8.98	33.96	217	332	P	H
	*	2462	97.08	-	-	94.66	27.4	8.98	33.96	217	332	A	H
		2483.56	58.96	-15.04	74	56.48	27.45	8.98	33.95	217	332	P	H
		2483.52	46.19	-7.81	54	43.71	27.45	8.98	33.95	217	332	A	H
													H
													H
	*	2462	104.27	-	-	101.85	27.4	8.98	33.96	307	36	P	V
	*	2462	95.64	-	-	93.22	27.4	8.98	33.96	307	36	A	V
		2483.8	55.81	-18.19	74	53.33	27.45	8.98	33.95	307	36	P	V
		2483.52	45.54	-8.46	54	43.06	27.45	8.98	33.95	307	36	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 Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)	
802.11g CH 01 2412MHz		4824	31.95	-42.05	74	40.58	31.69	10.77	51.09	100	0	P	H	
													H	
													H	
													H	
			4824	33.72	-40.28	74	42.35	31.69	10.77	51.09	100	0	P	V
														V
														V
802.11g CH 06 2437MHz		4874	31.89	-42.11	74	40.29	31.78	10.88	51.06	100	0	P	H	
		7311	37.98	-36.02	74	38.43	37.27	12.79	50.51	100	0	P	H	
													H	
													H	
			4874	32.13	-41.87	74	40.53	31.78	10.88	51.06	100	0	P	V
			7311	37.85	-36.15	74	38.3	37.27	12.79	50.51	100	0	P	V
														V
802.11g CH 11 2462MHz		4924	32.63	-41.37	74	40.79	31.88	11	51.04	100	0	P	H	
		7386	39.11	-34.89	74	39.36	37.38	12.88	50.51	100	0	P	H	
													H	
													H	
			4924	33.72	-40.28	74	41.88	31.88	11	51.04	100	0	P	V
			7386	37.91	-36.09	74	38.16	37.38	12.88	50.51	100	0	P	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 Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)	
802.11n HT20 CH 01 2412MHz		2383.5	54.41	-19.59	74	52.37	27.14	8.89	33.99	197	334	P	H	
		2389.8	44.92	-9.08	54	42.82	27.19	8.89	33.98	197	334	A	H	
	*	2412	103.22	-	-	101.07	27.24	8.89	33.98	197	334	P	H	
	*	2412	94.69	-	-	92.54	27.24	8.89	33.98	197	334	A	H	
													H	
														H
			2390	55.43	-18.57	74	53.33	27.19	8.89	33.98	253	35	P	V
			2389.8	44.92	-9.08	54	42.82	27.19	8.89	33.98	253	35	A	V
		*	2412	104.1	-	-	101.95	27.24	8.89	33.98	253	35	P	V
		*	2412	95.44	-	-	93.29	27.24	8.89	33.98	253	35	A	V
													V	
													V	
802.11n HT20 CH 06 2437MHz		2386.58	53.94	-20.06	74	51.85	27.19	8.89	33.99	200	324	P	H	
		2384.9	44.57	-9.43	54	42.53	27.14	8.89	33.99	200	324	A	H	
	*	2437	104.6	-	-	102.29	27.34	8.94	33.97	200	324	P	H	
	*	2437	95.82	-	-	93.51	27.34	8.94	33.97	200	324	A	H	
			2488.31	54.08	-19.92	74	51.55	27.5	8.98	33.95	200	324	P	H
			2488.38	44.61	-9.39	54	42.08	27.5	8.98	33.95	200	324	A	H
			2364.32	53.6	-20.4	74	51.68	27.09	8.82	33.99	246	33	P	V
			2385.46	44.28	-9.72	54	42.24	27.14	8.89	33.99	246	33	A	V
		*	2437	104.07	-	-	101.76	27.34	8.94	33.97	246	33	P	V
		*	2437	95.69	-	-	93.38	27.34	8.94	33.97	246	33	A	V
		2483.9	54.73	-19.27	74	52.25	27.45	8.98	33.95	246	33	P	V	
		2488.66	44.9	-9.1	54	42.37	27.5	8.98	33.95	246	33	A	V	



WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)	
802.11n HT20 CH 11 2462MHz	*	2462	105.29	-	-	102.87	27.4	8.98	33.96	243	326	P	H	
	*	2462	96.46	-	-	94.04	27.4	8.98	33.96	243	326	A	H	
		2484	57.79	-16.21	74	55.31	27.45	8.98	33.95	243	326	P	H	
		2483.52	47.03	-6.97	54	44.55	27.45	8.98	33.95	243	326	A	H	
													H	
														H
	*	2462	105.18	-	-	102.76	27.4	8.98	33.96	248	16	P	V	
	*	2462	96.4	-	-	93.98	27.4	8.98	33.96	248	16	A	V	
		2483.64	58.83	-15.17	74	56.35	27.45	8.98	33.95	248	16	P	V	
		2483.52	47.73	-6.27	54	45.25	27.45	8.98	33.95	248	16	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 Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)	
802.11n HT20 CH 01 2412MHz		4824	32.39	-41.61	74	41.02	31.69	10.77	51.09	100	0	P	H	
													H	
													H	
													H	
			4824	32.84	-41.16	74	41.47	31.69	10.77	51.09	100	0	P	V
														V
														V
802.11n HT20 CH 06 2437MHz		4874	32.51	-41.49	74	40.91	31.78	10.88	51.06	100	0	P	H	
		7311	38.12	-35.88	74	38.57	37.27	12.79	50.51	100	0	P	H	
													H	
													H	
			4874	33.22	-40.78	74	41.62	31.78	10.88	51.06	100	0	P	V
			7311	38.2	-35.8	74	38.65	37.27	12.79	50.51	100	0	P	V
														V
802.11n HT20 CH 11 2462MHz		4924	32.87	-41.13	74	41.03	31.88	11	51.04	100	0	P	H	
		7386	38.77	-35.23	74	39.02	37.38	12.88	50.51	100	0	P	H	
													H	
													H	
			4924	32.78	-41.22	74	40.94	31.88	11	51.04	100	0	P	V
			7386	38.1	-35.9	74	38.35	37.38	12.88	50.51	100	0	P	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 802.11n 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		76.44	28.3	-11.7	40	45.35	13.23	1.51	31.79	-	-	P	H	
		98.31	32.29	-11.21	43.5	46.7	15.86	1.51	31.78	251	314	P	H	
		192	31.69	-11.81	43.5	45.93	15.44	2.1	31.78	-	-	P	H	
		407.8	27.18	-18.82	46	33.54	22.54	2.91	31.81	-	-	P	H	
		746.6	33.28	-12.72	46	33.53	27.64	4.09	31.98	-	-	P	H	
		953.8	33.67	-12.33	46	29.39	30.59	4.69	31	-	-	P	H	
														H
														H
														H
														H
														H
														H
														H
			32.7	35.05	-4.95	40	41.45	24.14	1.29	31.83	124	121	P	V
			78.06	32.67	-7.33	40	49.49	13.46	1.51	31.79	-	-	P	V
			181.74	25.9	-17.6	43.5	40.37	15.21	2.1	31.78	-	-	P	V
			406.4	28.25	-17.75	46	34.63	22.52	2.91	31.81	-	-	P	V
			843.9	31.86	-14.14	46	30.34	28.83	4.39	31.7	-	-	P	V
		951.7	34.28	-11.72	46	30.01	30.6	4.69	31.02	-	-	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.
!	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		(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”.