



Appendix A. Radiated Spurious Emission

Test Engineer :	Derreck Chen, Ken Wu and Nick Yu	Temperature :	23~25°C
		Relative Humidity :	48~51%

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		2325.12	57.59	-16.41	74	52.12	32.09	7.6	34.22	144	22	P	H	
		2389.65	44.68	-9.32	54	39.02	32.18	7.75	34.27	144	22	A	H	
	*	2412	105.55	-	-	99.9	32.2	7.75	34.3	144	22	P	H	
	*	2412	102.1	-	-	96.45	32.2	7.75	34.3	144	22	A	H	
													H	
														H
			2388.75	57.83	-16.17	74	52.17	32.18	7.75	34.27	153	245	P	V
			2389.83	44.85	-9.15	54	39.22	32.18	7.75	34.3	153	245	A	V
	*		2412	103.53	-	-	97.88	32.2	7.75	34.3	153	245	P	V
	*		2412	100.06	-	-	94.41	32.2	7.75	34.3	153	245	A	V
														V
														V
802.11b CH 06 2437MHz		2322.6	57.54	-16.46	74	52.07	32.09	7.6	34.22	138	21	P	H	
		2354.82	45.08	-8.92	54	39.52	32.13	7.68	34.25	138	21	A	H	
	*	2437	105.01	-	-	99.29	32.24	7.83	34.35	138	21	P	H	
	*	2437	101.46	-	-	95.74	32.24	7.83	34.35	138	21	A	H	
			2492.24	58.33	-15.67	74	52.6	32.3	7.91	34.48	138	21	P	H
			2486.36	45.24	-8.76	54	39.48	32.28	7.91	34.43	138	21	A	H
			2332.77	58.19	-15.81	74	52.72	32.09	7.6	34.22	179	30	P	V
			2310.36	44.79	-9.21	54	39.31	32.07	7.6	34.19	179	30	A	V
	*		2438.159	104.07	-	-	98.35	32.24	7.83	34.35	179	30	P	V
	*		2436.323	100.64	-	-	94.94	32.22	7.83	34.35	179	30	A	V
			2498.52	58.42	-15.58	74	52.69	32.3	7.91	34.48	179	30	P	V
			2493.96	45.41	-8.59	54	39.68	32.3	7.91	34.48	179	30	A	V



802.11b CH 11 2462MHz	*	2460.872	105.19	-	-	99.41	32.26	7.91	34.39	157	330	P	H
	*	2461.289	101.75	-	-	95.97	32.26	7.91	34.39	157	330	A	H
		2483.6	59.19	-14.81	74	53.43	32.28	7.91	34.43	157	330	P	H
		2492	45.72	-8.28	54	39.99	32.3	7.91	34.48	157	330	A	H
													H
													H
	*	2460.705	103.35	-	-	97.57	32.26	7.91	34.39	100	33	P	V
	*	2461.289	99.85	-	-	94.07	32.26	7.91	34.39	100	33	A	V
		2499.56	58.58	-15.42	74	52.85	32.3	7.91	34.48	100	33	P	V
		2485.72	45.45	-8.55	54	39.69	32.28	7.91	34.43	100	33	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	49.49	-24.51	74	63	34.26	11.16	58.93	100	0	P	H
													H
													H
													H
		4824	48.41	-25.59	74	61.92	34.26	11.16	58.93	100	0	P	V
													V
													V
													V
802.11b CH 06 2437MHz		4872	44.02	-29.98	74	57.34	34.3	11.21	58.83	100	0	P	H
		7311	47.15	-26.85	74	54.2	35.6	15.08	57.73	100	0	P	H
													H
													H
		4872	44.33	-29.67	74	57.65	34.3	11.21	58.83	100	0	P	V
		7311	48.11	-25.89	74	55.16	35.6	15.08	57.73	100	0	P	V
													V
													V
802.11b CH 11 2462MHz		4926	48.18	-25.82	74	61.3	34.34	11.27	58.73	100	0	P	H
		7386	46.83	-27.17	74	53.89	35.6	15.14	57.8	100	0	P	H
													H
													H
		4924	46.35	-27.65	74	59.47	34.34	11.27	58.73	100	0	P	V
		7386	47.89	-26.11	74	54.95	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		2389.29	60.78	-13.22	74	55.12	32.18	7.75	34.27	175	24	P	H	
		2390	45.92	-8.08	54	40.29	32.18	7.75	34.3	175	24	A	H	
	*	2412	107.01	-	-	101.36	32.2	7.75	34.3	175	24	P	H	
	*	2412	95.71	-	-	90.06	32.2	7.75	34.3	175	24	A	H	
													H	
													H	
			2389.2	61.63	-12.37	74	55.97	32.18	7.75	34.27	136	242	P	V
			2389.92	45.65	-8.35	54	40.02	32.18	7.75	34.3	136	242	A	V
	*		2412	104.33	-	-	98.68	32.2	7.75	34.3	136	242	P	V
	*		2412	93.94	-	-	88.29	32.2	7.75	34.3	136	242	A	V
														V
														V
802.11g CH 06 2437MHz		2327.19	57.91	-16.09	74	52.44	32.09	7.6	34.22	207	352	P	H	
		2385.42	44.61	-9.39	54	38.97	32.16	7.75	34.27	207	352	A	H	
	*	2435	107.17	-	-	101.47	32.22	7.83	34.35	207	352	P	H	
	*	2435	96.78	-	-	91.08	32.22	7.83	34.35	207	352	A	H	
			2489.52	58.44	-15.56	74	52.66	32.3	7.91	34.43	207	352	P	H
			2489.44	46.04	-7.96	54	40.26	32.3	7.91	34.43	207	352	A	H
			2331.33	58.41	-15.59	74	52.94	32.09	7.6	34.22	106	272	P	V
			2383.71	44.57	-9.43	54	38.93	32.16	7.75	34.27	106	272	A	V
	*		2435	105.43	-	-	99.73	32.22	7.83	34.35	106	272	P	V
	*		2435	94.28	-	-	88.58	32.22	7.83	34.35	106	272	A	V
			2489.96	58.7	-15.3	74	52.92	32.3	7.91	34.43	106	272	P	V
			2490.16	45.13	-8.87	54	39.35	32.3	7.91	34.43	106	272	A	V



802.11g CH 11 2462MHz	*	2464	106.97	-	-	101.19	32.26	7.91	34.39	221	350	P	H
	*	2464	96.46	-	-	90.68	32.26	7.91	34.39	221	350	A	H
		2483.64	73.58	-0.42	74	67.82	32.28	7.91	34.43	221	350	P	H
		2483.56	53.1	-0.9	54	47.34	32.28	7.91	34.43	221	350	A	H
													H
													H
	*	2464	103.87	-	-	98.09	32.26	7.91	34.39	100	276	P	V
	*	2464	93.41	-	-	87.63	32.26	7.91	34.39	100	276	A	V
		2483.84	71.67	-2.33	74	65.91	32.28	7.91	34.43	100	276	P	V
		2483.64	50.95	-3.05	54	45.19	32.28	7.91	34.43	100	276	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	45.28	-28.72	74	58.79	34.26	11.16	58.93	100	0	P	H	
													H	
													H	
													H	
		4824	46.2	-27.8	74	59.71	34.26	11.16	58.93	100	0	P	V	
														V
														V
802.11g CH 06 2437MHz		4872	41.77	-32.23	74	55.09	34.3	11.21	58.83	100	0	P	H	
		7311	46.5	-27.5	74	53.55	35.6	15.08	57.73	100	0	P	H	
													H	
													H	
		4874	41.53	-32.47	74	54.85	34.3	11.21	58.83	100	0	P	V	
		7308	48.59	-25.41	74	55.64	35.6	15.08	57.73	100	0	P	V	
														V
802.11g CH 11 2462MHz		4926	45.85	-28.15	74	58.97	34.34	11.27	58.73	100	0	P	H	
		7386	46.61	-27.39	74	53.67	35.6	15.14	57.8	100	0	P	H	
													H	
													H	
		4926	43.72	-30.28	74	56.84	34.34	11.27	58.73	100	0	P	V	
		7386	48.94	-25.06	74	56	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 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	61.84	-12.16	74	56.21	32.18	7.75	34.3	218	360	P	H	
		2389.92	47.25	-6.75	54	41.62	32.18	7.75	34.3	218	360	A	H	
	*	2410	106.23	-	-	100.58	32.2	7.75	34.3	218	360	P	H	
	*	2410	94.83	-	-	89.18	32.2	7.75	34.3	218	360	A	H	
													H	
														H
			2389.02	62.14	-11.86	74	56.48	32.18	7.75	34.27	108	269	P	V
			2389.92	46.52	-7.48	54	40.89	32.18	7.75	34.3	108	269	A	V
		*	2410	103.03	-	-	97.38	32.2	7.75	34.3	108	269	P	V
		*	2410	92.6	-	-	86.95	32.2	7.75	34.3	108	269	A	V
													V	
													V	
802.11n HT20 CH 06 2437MHz		2345.64	57.99	-16.01	74	52.45	32.11	7.68	34.25	259	322	P	H	
		2385.06	44.57	-9.43	54	38.93	32.16	7.75	34.27	259	322	A	H	
	*	2435	106.76	-	-	101.06	32.22	7.83	34.35	259	322	P	H	
	*	2435	95.76	-	-	90.06	32.22	7.83	34.35	259	322	A	H	
			2489.2	58.69	-15.31	74	52.91	32.3	7.91	34.43	259	322	P	H
			2488.88	46.22	-7.78	54	40.44	32.3	7.91	34.43	259	322	A	H
			2369.49	57.57	-16.43	74	52	32.16	7.68	34.27	103	269	P	V
			2385.24	44.57	-9.43	54	38.93	32.16	7.75	34.27	103	269	A	V
		*	2435	103.41	-	-	97.71	32.22	7.83	34.35	103	269	P	V
		*	2435	93	-	-	87.3	32.22	7.83	34.35	103	269	A	V
			2484.2	58.11	-15.89	74	52.35	32.28	7.91	34.43	103	269	P	V
			2489.16	45.38	-8.62	54	39.6	32.3	7.91	34.43	103	269	A	V



802.11n HT20 CH 11 2462MHz	*	2464	106.15	-	-	100.37	32.26	7.91	34.39	283	337	P	H
	*	2464	95.82	-	-	90.04	32.26	7.91	34.39	283	337	A	H
		2484.24	72.45	-1.55	74	66.69	32.28	7.91	34.43	283	337	P	H
		2483.6	53.43	-0.57	54	47.67	32.28	7.91	34.43	283	337	A	H
													H
													H
	*	2464	103.12	-	-	97.34	32.26	7.91	34.39	100	275	P	V
	*	2464	91.41	-	-	85.63	32.26	7.91	34.39	100	275	A	V
		2484.24	69.29	-4.71	74	63.53	32.28	7.91	34.43	100	275	P	V
		2483.52	50.1	-3.9	54	44.34	32.28	7.91	34.43	100	275	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	45.19	-28.81	74	58.7	34.26	11.16	58.93	100	0	P	H
													H
													H
													H
		4824	44.02	-29.98	74	57.53	34.26	11.16	58.93	100	0	P	V
													V
													V
802.11n HT20 CH 06 2437MHz		4872	41.47	-32.53	74	54.79	34.3	11.21	58.83	100	0	P	H
		7311	46.58	-27.42	74	53.63	35.6	15.08	57.73	100	0	P	H
													H
													H
		4872	41.68	-32.32	74	55	34.3	11.21	58.83	100	0	P	V
		7311	47.96	-26.04	74	55.01	35.6	15.08	57.73	100	0	P	V
													V
802.11n HT20 CH 11 2462MHz		4926	43.26	-30.74	74	56.38	34.34	11.27	58.73	100	0	P	H
		7386	44.73	-29.27	74	51.79	35.6	15.14	57.8	100	0	P	H
													H
													H
		4926	41.54	-32.46	74	54.66	34.34	11.27	58.73	100	0	P	V
		7386	47.9	-26.1	74	54.96	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 802.11g (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 802.11g LF		57.54	37.37	-2.63	40	60.6	6.24	1.77	31.24	108	15	P	H	
		158.25	34.72	-8.78	43.5	52.72	10.58	2.61	31.19			P	H	
		264.09	32.34	-13.66	46	46.62	13.56	3.16	31			P	H	
		431.6	39.45	-6.55	46	49.64	16.92	3.63	30.74			P	H	
		664	40.74	-5.26	46	46.51	20.35	4.35	30.47			P	H	
		960.1	30.69	-23.31	54	31.41	24.7	4.94	30.36			P	H	
														H
														H
														H
														H
														H
														H
														H
			59.16	37.86	-2.14	40	61.29	6.08	1.77	31.28	192	254	P	V
			139.62	29.87	-13.63	43.5	47.09	11.5	2.38	31.1			P	V
			240.06	35.95	-10.05	46	52.59	11.4	2.96	31			P	V
			384	34.09	-11.91	46	46.29	15.26	3.52	30.98			P	V
			664	40.38	-5.62	46	46.15	20.35	4.35	30.47			P	V
			941.2	27.98	-18.02	46	29.11	24.31	4.94	30.38			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

- 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”.