



Appendix B. Radiated Spurious Emission

Test Engineer :	Bill Chang and Ken Wu and J.C. Liang	Temperature :	20~23 °C
		Relative Humidity :	54~56%

15E Band 1 - 5150~5250MHz

WIFI 802.11a (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)
802.11a CH 36 5180MHz		5137.85	62.69	-11.31	74	55.72	31.56	8.95	33.54	253	138	P	H
		5150	51.3	-2.7	54	44.31	31.58	8.95	33.54	253	138	A	H
	*	5180	107.29	-	-	100.24	31.62	8.97	33.54	253	138	P	H
	*	5180	101.33	-	-	94.28	31.62	8.97	33.54	253	138	A	H
													H
													H
		5126.9	54.72	-19.28	74	47.75	31.56	8.95	33.54	100	166	P	V
		5150	45.17	-8.83	54	38.18	31.58	8.95	33.54	100	166	A	V
	*	5180	99.35	-	-	92.3	31.62	8.97	33.54	100	166	P	V
	*	5180	92.38	-	-	85.33	31.62	8.97	33.54	100	166	A	V
													V
													V
802.11a CH 44 5220MHz		5148.5	52.72	-21.28	74	45.73	31.58	8.95	33.54	255	138	P	H
		5149.55	43.56	-10.44	54	36.57	31.58	8.95	33.54	255	138	A	H
	*	5220	107.11	-	-	100.01	31.66	8.98	33.54	255	138	P	H
	*	5220	102.22	-	-	95.12	31.66	8.98	33.54	255	138	A	H
		5421.72	49.67	-24.33	74	42.15	31.9	9.17	33.55	255	138	P	H
		5350.66	40.02	-13.98	54	32.66	31.82	9.08	33.54	255	138	A	H
		5146.4	49.14	-24.86	74	42.15	31.58	8.95	33.54	248	277	P	V
		5147.45	40.79	-13.21	54	33.8	31.58	8.95	33.54	248	277	A	V
	*	5220	101.54	-	-	94.44	31.66	8.98	33.54	248	277	P	V
	*	5220	95.89	-	-	88.79	31.66	8.98	33.54	248	277	A	V
		5388.06	49.73	-24.27	74	42.29	31.86	9.13	33.55	248	277	P	V
		5405.88	39.57	-14.43	54	32.07	31.88	9.17	33.55	248	277	A	V



802.11a CH 48 5240MHz		5022.8	50.58	-23.42	74	43.81	31.44	8.86	33.53	251	137	P	H
		5149.25	41.76	-12.24	54	34.77	31.58	8.95	33.54	251	137	A	H
	*	5240	108.11	-	-	100.99	31.68	8.98	33.54	251	137	P	H
	*	5240	101.65	-	-	94.53	31.68	8.98	33.54	251	137	A	H
		5350.77	49.4	-24.6	74	42.04	31.82	9.08	33.54	251	137	P	H
		5353.63	41.54	-12.46	54	34.18	31.82	9.08	33.54	251	137	A	H
		5100.95	49.53	-24.47	74	42.62	31.52	8.92	33.53	247	275	P	V
		5142.35	40.33	-13.67	54	33.34	31.58	8.95	33.54	247	275	A	V
	*	5240	101.91	-	-	94.79	31.68	8.98	33.54	247	275	P	V
	*	5240	95.8	-	-	88.68	31.68	8.98	33.54	247	275	A	V
		5421.72	49.32	-24.68	74	41.8	31.9	9.17	33.55	247	275	P	V
		5351.54	39.68	-14.32	54	32.32	31.82	9.08	33.54	247	275	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15E band 1 5150~5250MHz
WIFI 802.11a (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)
802.11a CH 36 5180MHz		10360	46.81	-27.19	74	61.43	39.79	13.09	67.5	100	0	P	H
		15540	47.03	-26.97	74	57.27	38.6	16.55	65.39	100	0	P	H
													H
													H
		10360	50.17	-23.83	74	64.79	39.79	13.09	67.5	100	0	P	V
		15540	48.33	-25.67	74	58.57	38.6	16.55	65.39	100	0	P	V
													V
													V
802.11a CH 44 5220MHz		10440	45.91	-28.09	74	60.41	39.89	13.11	67.5	100	0	P	H
		15660	46.75	-27.25	74	57.33	38.23	16.56	65.37	100	0	P	H
													H
													H
		10440	49.13	-24.87	74	63.63	39.89	13.11	67.5	100	0	P	V
		15660	47.67	-26.33	74	58.25	38.23	16.56	65.37	100	0	P	V
													V
													V
802.11a CH 48 5240MHz		10480	45.05	-28.95	74	59.47	39.97	13.11	67.5	100	0	P	H
		15720	47.69	-26.31	74	58.45	38.03	16.57	65.36	100	0	P	H
													H
													H
		10480	48.07	-25.93	74	62.49	39.97	13.11	67.5	100	0	P	V
		15720	47.59	-26.41	74	58.35	38.03	16.57	65.36	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15E band 1 5150~5250MHz

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 36 5180MHz		5149.7	65.49	-8.51	74	58.5	31.58	8.95	33.54	242	138	P	H
		5149.7	53.04	-0.96	54	46.05	31.58	8.95	33.54	242	138	A	H
	*	5180	107.82	-	-	100.77	31.62	8.97	33.54	242	138	P	H
	*	5180	101.51	-	-	94.46	31.62	8.97	33.54	242	138	A	H
													H
													H
		5149.7	57.78	-16.22	74	50.79	31.58	8.95	33.54	100	165	P	V
		5148.95	45.76	-8.24	54	38.77	31.58	8.95	33.54	100	165	A	V
	*	5180	99.27	-	-	92.22	31.62	8.97	33.54	100	165	P	V
	*	5180	92.88	-	-	85.83	31.62	8.97	33.54	100	165	A	V
													V
													V
802.11n HT20 CH 44 5220MHz		5149.85	52.79	-21.21	74	45.8	31.58	8.95	33.54	100	127	P	H
		5149.1	43.5	-10.5	54	36.51	31.58	8.95	33.54	100	127	A	H
	*	5220	106.15	-	-	99.05	31.66	8.98	33.54	100	127	P	H
	*	5220	100.03	-	-	92.93	31.66	8.98	33.54	100	127	A	H
		5357.59	48.81	-25.19	74	41.45	31.82	9.08	33.54	100	127	P	H
		5357.92	39.86	-14.14	54	32.5	31.82	9.08	33.54	100	127	A	H
		5102	49.22	-24.78	74	42.31	31.52	8.92	33.53	100	111	P	V
		5148.5	40.24	-13.76	54	33.25	31.58	8.95	33.54	100	111	A	V
	*	5220	96.8	-	-	89.7	31.66	8.98	33.54	100	111	P	V
	*	5220	91.26	-	-	84.16	31.66	8.98	33.54	100	111	A	V
		5453.62	49.18	-24.82	74	41.57	31.94	9.22	33.55	100	111	P	V
		5451.42	39.36	-14.64	54	31.75	31.94	9.22	33.55	100	111	A	V



802.11n HT20 CH 48 5240MHz		5143.7	49.24	-24.76	74	42.25	31.58	8.95	33.54	238	141	P	H
		5142.35	41.05	-12.95	54	34.06	31.58	8.95	33.54	238	141	A	H
	*	5240	105.88	-	-	98.76	31.68	8.98	33.54	238	141	P	H
	*	5240	99.24	-	-	92.12	31.68	8.98	33.54	238	141	A	H
		5354.4	49.89	-24.11	74	42.53	31.82	9.08	33.54	238	141	P	H
		5351.87	40.83	-13.17	54	33.47	31.82	9.08	33.54	238	141	A	H
		5024.3	48.44	-25.56	74	41.67	31.44	8.86	33.53	109	165	P	V
		5072.15	39.97	-14.03	54	33.11	31.5	8.89	33.53	109	165	A	V
	*	5240	99.28	-	-	92.16	31.68	8.98	33.54	109	165	P	V
	*	5240	91.72	-	-	84.6	31.68	8.98	33.54	109	165	A	V
		5449	49.13	-24.87	74	41.52	31.94	9.22	33.55	109	165	P	V
		5448.78	39.37	-14.63	54	31.76	31.94	9.22	33.55	109	165	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15E band 1 5150~5250MHz
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 36 5180MHz		10360	46.1	-27.9	74	60.72	39.79	13.09	67.5	100	0	P	H
		15540	47.04	-26.96	74	57.28	38.6	16.55	65.39	100	0	P	H
													H
													H
		10360	49.12	-24.88	74	63.74	39.79	13.09	67.5	100	0	P	V
		15540	51.17	-22.83	74	61.41	38.6	16.55	65.39	100	0	P	V
													V
													V
802.11n HT20 CH 44 5220MHz		10440	44.72	-29.28	74	59.22	39.89	13.11	67.5	100	0	P	H
		15660	48.98	-25.02	74	59.56	38.23	16.56	65.37	100	0	P	H
													H
													H
		10440	48.25	-25.75	74	62.75	39.89	13.11	67.5	100	0	P	V
		15660	49.67	-24.33	74	60.25	38.23	16.56	65.37	100	0	P	V
													V
													V
802.11n HT20 CH 48 5240MHz		10480	42.38	-31.62	74	56.8	39.97	13.11	67.5	100	0	P	H
		15720	45.77	-28.23	74	56.53	38.03	16.57	65.36	100	0	P	H
													H
													H
		10480	47.17	-26.83	74	61.59	39.97	13.11	67.5	100	0	P	V
		15720	44.01	-29.99	74	54.77	38.03	16.57	65.36	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15E band 1 5150~5250MHz

WIFI 802.11n HT40 (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 HT40 CH 38 5190MHz		5142.8	66.41	-7.59	74	59.42	31.58	8.95	33.54	100	125	P	H
		5149.7	53.36	-0.64	54	46.37	31.58	8.95	33.54	100	125	A	H
	*	5190	103.69	-	-	96.64	31.62	8.97	33.54	100	125	P	H
	*	5190	97.85	-	-	90.8	31.62	8.97	33.54	100	125	A	H
		5373.1	49.8	-24.2	74	42.37	31.84	9.13	33.54	100	125	P	H
		5355.83	40.66	-13.34	54	33.3	31.82	9.08	33.54	100	125	A	H
		5145.05	56.73	-17.27	74	49.74	31.58	8.95	33.54	100	164	P	V
		5146.7	48.47	-5.53	54	41.48	31.58	8.95	33.54	100	164	A	V
	*	5190	95.8	-	-	88.75	31.62	8.97	33.54	100	164	P	V
	*	5190	89.26	-	-	82.21	31.62	8.97	33.54	100	164	A	V
		5442.07	48.47	-25.53	74	40.88	31.92	9.22	33.55	100	164	P	V
		5448.56	39.95	-14.05	54	32.34	31.94	9.22	33.55	100	164	A	V
802.11n HT40 CH 46 5230MHz		5143.7	52.41	-21.59	74	45.42	31.58	8.95	33.54	243	126	P	H
		5149.25	44.36	-9.64	54	37.37	31.58	8.95	33.54	243	126	A	H
	*	5230	102.73	-	-	95.61	31.68	8.98	33.54	243	126	P	H
	*	5230	96.59	-	-	89.47	31.68	8.98	33.54	243	126	A	H
		5358.8	49.18	-24.82	74	41.82	31.82	9.08	33.54	243	126	P	H
		5350.77	41.35	-12.65	54	33.99	31.82	9.08	33.54	243	126	A	H
		5141.75	48.98	-25.02	74	41.99	31.58	8.95	33.54	100	166	P	V
		5143.85	41.08	-12.92	54	34.09	31.58	8.95	33.54	100	166	A	V
	*	5230	94.56	-	-	87.44	31.68	8.98	33.54	100	166	P	V
	*	5230	88.33	-	-	81.21	31.68	8.98	33.54	100	166	A	V
		5363.42	49.38	-24.62	74	41.95	31.84	9.13	33.54	100	166	P	V
		5385.2	40.14	-13.86	54	32.7	31.86	9.13	33.55	100	166	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15E band 1 5150~5250MHz
WIFI 802.11n HT40 (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 HT40 CH 38 5190MHz		10380	45.28	-28.72	74	59.88	39.81	13.09	67.5	100	0	P	H
		15570	44.48	-29.52	74	54.83	38.49	16.55	65.39	100	0	P	H
													H
													H
		10380	44.8	-29.2	74	59.4	39.81	13.09	67.5	100	0	P	V
		15570	44.63	-29.37	74	54.98	38.49	16.55	65.39	100	0	P	V
													V
													V
802.11n HT40 CH 46 5230MHz		10460	41.87	-32.13	74	56.34	39.92	13.11	67.5	100	0	P	H
		15690	43.78	-30.22	74	54.45	38.13	16.56	65.36	100	0	P	H
													H
													H
		10460	46.72	-27.28	74	61.19	39.92	13.11	67.5	100	0	P	V
		15690	45.73	-28.27	74	56.4	38.13	16.56	65.36	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15E Emission below 1GHz

WIFI 802.11n HT40 (LF @ 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 HT40 LF		115.86	18.4	-25.1	43.5	37.58	11.32	1.28	31.78			P	H
		216.3	23.19	-22.81	46	45.25	7.93	1.79	31.78			P	H
		294.6	26.24	-19.76	46	43.01	12.88	2.11	31.76			P	H
		502.3	37.24	-8.76	46	49.17	17.32	2.64	31.89	311	152	P	H
		692	31.74	-14.26	46	41.74	18.9	3.14	32.04			P	H
		820.1	35.43	-10.57	46	43.75	20.1	3.4	31.82			P	H
													H
													H
													H
													H
													H
													H
		41.34	21.75	-18.25	40	41	11.9	0.67	31.82			P	V
		148.26	22.5	-21	43.5	42.72	10.1	1.46	31.78			P	V
		204.96	25.62	-17.88	43.5	47.21	8.4	1.79	31.78			P	V
		421.1	33.38	-12.62	46	46.11	16.68	2.41	31.82	300	87	P	V
		694.8	26.85	-19.15	46	36.85	18.9	3.14	32.04			P	V
		820.1	30.97	-15.03	46	39.29	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.
!	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

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”.