



## Appendix B. Radiated Spurious Emission

Test Engineer :	Lewis He and Stan Hsieh	Temperature :	24~25°C
		Relative Humidity :	52~53%

### 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		5148.5	64.28	-9.72	74	56.93	31.98	32.57	7.94	100	195	P	H
		5150	52.26	-1.74	54	44.91	31.98	32.57	7.94	100	195	A	H
	*	5184	111.03	-	-	103.67	32.02	32.57	7.91	100	195	P	H
	*	5184	103.57	-	-	96.21	32.02	32.57	7.91	100	195	A	H
													H
													H
		5146.55	59.7	-14.3	74	52.35	31.98	32.57	7.94	104	243	P	V
		5150	50	-4	54	42.65	31.98	32.57	7.94	104	243	A	V
	*	5181	108.84	-	-	101.48	32.02	32.57	7.91	104	243	P	V
	*	5181	101.59	-	-	94.23	32.02	32.57	7.91	104	243	A	V
													V
													V
802.11a CH 44 5220MHz		5063.75	55.97	-18.03	74	48.67	31.88	32.57	7.99	110	199	P	H
		5141.9	45.69	-8.31	54	38.34	31.98	32.57	7.94	110	199	A	H
	*	5223	112.61	-	-	105.11	32.06	32.57	8.01	110	199	P	H
	*	5223	105.05	-	-	97.55	32.06	32.57	8.01	110	199	A	H
		5385.2	50.41	-23.59	74	42.43	32.26	32.57	8.29	110	199	P	H
		5350	41.8	-12.2	54	33.92	32.22	32.57	8.23	110	199	A	H
		5135	52.38	-21.62	74	45.05	31.96	32.57	7.94	140	249	P	V
		5142.05	42.89	-11.11	54	35.54	31.98	32.57	7.94	140	249	A	V
	*	5216	109.79	-	-	102.29	32.06	32.57	8.01	140	249	P	V
	*	5216	102.09	-	-	94.59	32.06	32.57	8.01	140	249	A	V
		5352.97	50.1	-23.9	74	42.22	32.22	32.57	8.23	140	249	P	V
		5350	41.42	-12.58	54	33.54	32.22	32.57	8.23	140	249	A	V



<b>802.11a CH 48 5240MHz</b>		5148.5	53.23	-20.77	74	45.88	31.98	32.57	7.94	100	207	P	H
		5136.05	43.63	-10.37	54	36.3	31.96	32.57	7.94	100	207	A	H
	*	5238	112.06	-	-	104.54	32.08	32.57	8.01	100	207	P	H
	*	5238	105.26	-	-	97.74	32.08	32.57	8.01	100	207	A	H
		5429.97	50.27	-23.73	74	42.23	32.32	32.57	8.29	100	207	P	H
		5350	41.89	-12.11	54	34.01	32.22	32.57	8.23	100	207	A	H
		5109.95	52.88	-21.12	74	45.55	31.94	32.57	7.96	100	246	P	V
		5135.9	42.52	-11.48	54	35.19	31.96	32.57	7.94	100	246	A	V
	*	5241	110.61	-	-	103.09	32.08	32.57	8.01	100	246	P	V
	*	5241	103.91	-	-	96.39	32.08	32.57	8.01	100	246	A	V
		5359.24	51.21	-22.79	74	43.33	32.22	32.57	8.23	100	246	P	V
		5350.33	42.04	-11.96	54	34.16	32.22	32.57	8.23	100	246	A	V
<b>Remark</b>	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



## Band 1 5150~5250MHz

## WIFI 802.11a (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 )
802.11a CH 36 5180MHz		10360	45.71	-28.29	74	57.17	39.69	63.11	11.96	100	0	P	H
		15540	45.17	-28.83	74	52.56	38.04	60.19	14.76	100	0	P	H
													H
													H
		10360	45.59	-28.41	74	57.05	39.69	63.11	11.96	100	0	P	V
		15540	46.74	-27.26	74	54.13	38.04	60.19	14.76	100	0	P	V
													V
													V
802.11a CH 44 5220MHz		10445	48.81	-25.19	74	60	39.82	63.04	12.03	100	0	P	H
		15666	56.4	-17.6	74	63.96	37.82	60.17	14.79	100	191	P	H
		15666	43.97	-10.03	54	51.53	37.82	60.17	14.79	100	191	A	H
													H
		10435	49.92	-24.08	74	61.18	39.79	63.05	12	100	0	P	V
		15654	63.15	-10.85	74	70.68	37.85	60.17	14.79	100	205	P	V
		15654	49.86	-4.14	54	57.39	37.85	60.17	14.79	100	205	A	V
													V
802.11a CH 48 5240MHz		10485	50.22	-23.78	74	61.3	39.87	63.01	12.06	100	0	P	H
		15708	57.25	-16.75	74	64.84	37.77	60.16	14.8	100	191	P	H
		15708	43.8	-10.2	54	51.39	37.77	60.16	14.8	100	191	A	H
													H
		10480	49.28	-24.72	74	60.36	39.87	63.01	12.06	100	0	P	V
		15714	60.05	-13.95	74	67.67	37.74	60.16	14.8	100	209	P	V
		15714	48.92	-5.08	54	56.54	37.74	60.16	14.8	100	209	A	V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



## Band 1 5150~5250MHz

## 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 36 5180MHz		5147.75	62.15	-11.85	74	54.8	31.98	32.57	7.94	108	202	P	H
		5150	52.21	-1.79	54	44.86	31.98	32.57	7.94	108	202	A	H
	*	5181	111.5	-	-	104.14	32.02	32.57	7.91	108	202	P	H
	*	5181	106.13	-	-	98.77	32.02	32.57	7.91	108	202	A	H
													H
													H
		5148.95	62.44	-11.56	74	55.09	31.98	32.57	7.94	113	243	P	V
		5150	49.53	-4.47	54	42.18	31.98	32.57	7.94	113	243	A	V
	*	5185	109.08	-	-	101.72	32.02	32.57	7.91	113	243	P	V
	*	5185	105.14	-	-	97.78	32.02	32.57	7.91	113	243	A	V
													V
													V
802.11n HT20 CH 44 5220MHz		5142.5	52.92	-21.08	74	45.57	31.98	32.57	7.94	100	195	P	H
		5142.05	45.41	-8.59	54	38.06	31.98	32.57	7.94	100	195	A	H
	*	5218	112.5	-	-	105	32.06	32.57	8.01	100	195	P	H
	*	5218	104.9	-	-	97.4	32.06	32.57	8.01	100	195	A	H
		5355.94	50.42	-23.58	74	42.54	32.22	32.57	8.23	100	195	P	H
		5350	41.89	-12.11	54	34.01	32.22	32.57	8.23	100	195	A	H
		5139.8	52.59	-21.41	74	45.24	31.98	32.57	7.94	100	242	P	V
		5142.05	44.21	-9.79	54	36.86	31.98	32.57	7.94	100	242	A	V
	*	5219	111.63	-	-	104.13	32.06	32.57	8.01	100	242	P	V
	*	5219	104.09	-	-	96.59	32.06	32.57	8.01	100	242	A	V
		5372	57.17	-16.83	74	49.21	32.24	32.57	8.29	100	242	P	V
		5350	42.5	-11.5	54	34.62	32.22	32.57	8.23	100	242	A	V



<b>802.11n</b> <b>HT20</b> <b>CH 48</b> <b>5240MHz</b>		5129.75	53.65	-20.35	74	46.32	31.96	32.57	7.94	111	197	P	H
		5135.9	43.28	-10.72	54	35.95	31.96	32.57	7.94	111	197	A	H
	*	5239	112.6	-	-	105.08	32.08	32.57	8.01	111	197	P	H
	*	5239	104.61	-	-	97.09	32.08	32.57	8.01	111	197	A	H
		5395.1	59.3	-14.7	74	51.3	32.28	32.57	8.29	111	197	P	H
		5350.55	41.41	-12.59	54	33.53	32.22	32.57	8.23	111	197	A	H
		5133.05	51.97	-22.03	74	44.64	31.96	32.57	7.94	108	243	P	V
		5149.55	42.29	-11.71	54	34.94	31.98	32.57	7.94	108	243	A	V
	*	5242	110.61	-	-	102.96	32.1	32.57	8.12	108	243	P	V
	*	5242	103.9	-	-	96.25	32.1	32.57	8.12	108	243	A	V
		5355.83	52.2	-21.8	74	44.32	32.22	32.57	8.23	108	243	P	V
		5370.02	41.56	-12.44	54	33.6	32.24	32.57	8.29	108	243	A	V
<b>Remark</b>	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



## Band 1 5150~5250MHz

## 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 36 5180MHz		10360	46.86	-27.14	74	58.32	39.69	63.11	11.96	100	0	P	H
		15540	43.72	-30.28	74	51.11	38.04	60.19	14.76	100	0	P	H
													H
													H
		10360	45.69	-28.31	74	57.15	39.69	63.11	11.96	100	0	P	V
		15540	46.39	-27.61	74	53.78	38.04	60.19	14.76	100	0	P	V
													V
													V
802.11n HT20 CH 44 5220MHz		10440	46.76	-27.24	74	57.99	39.79	63.05	12.03	100	0	P	H
		15648	56.43	-17.57	74	63.96	37.85	60.17	14.79	100	242	P	H
		15648	47.25	-6.75	54	54.78	37.85	60.17	14.79	100	242	A	H
													H
		10440	47.57	-26.43	74	58.8	39.79	63.05	12.03	100	0	P	V
		15654	59.14	-14.86	74	66.67	37.85	60.17	14.79	100	205	P	V
		15654	49.77	-4.23	54	57.3	37.85	60.17	14.79	100	205	A	V
													V
802.11n HT20 CH 48 5240MHz		10480	48.68	-25.32	74	59.76	39.87	63.01	12.06	100	0	P	H
		15708	57.25	-16.75	74	64.84	37.77	60.16	14.8	100	242	P	H
		15708	48.49	-5.51	54	56.08	37.77	60.16	14.8	100	242	A	H
													H
		10480	50.49	-23.51	74	61.57	39.87	63.01	12.06	100	0	P	V
		15714	58.41	-15.59	74	66.03	37.74	60.16	14.8	100	204	P	V
		15714	49.85	-4.15	54	57.47	37.74	60.16	14.8	100	204	A	V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

## Emission below 1GHz

**WIFI 802.11a (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)
802.11a CH 36 5180MHz LF		85.08	31.89	-8.11	40	54.82	8.6	32.67	1.14	100	85	P	H
		109.92	28.6	-14.9	43.5	48.7	11.4	32.64	1.14			P	H
		139.89	26.47	-17.03	43.5	45.91	11.9	32.67	1.33			P	H
		307.7	16.37	-29.63	46	33.21	14.02	32.74	1.88			P	H
		463.1	17.55	-28.45	46	30.62	17.52	32.89	2.3			P	H
		844.6	23.5	-22.5	46	30.5	22.46	32.62	3.16			P	H
													H
													H
													H
													H
													H
													H
		31.35	26.36	-13.64	40	39.07	19.46	32.82	0.65			P	V
		88.32	35.72	-7.78	43.5	58.29	8.96	32.67	1.14	226	32	P	V
		117.75	27.69	-15.81	43.5	47.44	11.76	32.65	1.14			P	V
		363.7	15.31	-30.69	46	30.61	15.56	32.8	1.94			P	V
		584.9	19.68	-26.32	46	30.8	19.32	33.01	2.57			P	V
		923	25.26	-20.74	46	30.4	23.72	32.06	3.2			P	V
													V
													V
												V	
												V	
												V	
												V	
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

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)
802.11a  CH 44  5220MHz  LF		84	33.01	-6.99	40	56.28	8.48	32.68	0.93	105	36	P	H
		109.92	29.12	-14.38	43.5	49.22	11.4	32.64	1.14			P	H
		166.62	25.11	-18.39	43.5	45.93	10.4	32.7	1.48			P	H
		469.4	18	-28	46	30.95	17.65	32.9	2.3			P	H
		749.4	22.47	-23.53	46	30.9	21.6	32.94	2.91			P	H
		959.4	26.24	-19.76	46	30.35	24.26	31.66	3.29			P	H
													H
													H
													H
													H
													H
													H
		44.85	23.47	-16.53	40	43.91	11.7	32.79	0.65			P	V
		92.1	36.25	-7.25	43.5	58.32	9.44	32.65	1.14	123	87	P	V
		155.28	20.45	-23.05	43.5	40.46	11.35	32.69	1.33			P	V
		541.5	18.99	-27.01	46	30.88	18.61	32.97	2.47			P	V
		650	21.95	-24.05	46	32.09	20.2	33.01	2.67			P	V
		842.5	23.78	-22.22	46	30.9	22.45	32.64	3.07			P	V
													V
													V
												V	
												V	
												V	
												V	
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



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)
802.11a  CH 48  5240MHz  LF		83.19	33.96	-6.04	40	57.35	8.36	32.68	0.93	111	332	P	H
		108.57	29.92	-13.58	43.5	50.12	11.3	32.64	1.14			P	H
		128.28	26.46	-17.04	43.5	45.81	11.98	32.66	1.33			P	H
		436.5	18.46	-27.54	46	32.09	17.08	32.87	2.16			P	H
		710.2	22.81	-23.19	46	32.17	20.8	32.98	2.82			P	H
		818.7	23.77	-22.23	46	31.22	22.25	32.77	3.07			P	H
													H
													H
													H
													H
													H
													H
		73.2	26.63	-13.37	40	51.24	7.17	32.71	0.93			P	V
		86.7	36.29	-3.71	40	59.1	8.72	32.67	1.14	100	5	P	V
		92.1	36.98	-6.52	43.5	59.05	9.44	32.65	1.14			P	V
		470.8	17.71	-28.29	46	30.65	17.66	32.9	2.3			P	V
		761.3	22.59	-23.41	46	30.88	21.72	32.92	2.91			P	V
		959.4	26.31	-19.69	46	30.42	24.26	31.66	3.29			P	V
													V
													V
													V
												V	
												V	
												V	
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

### Emission below 1GHz

**WIFI 802.11n HT20 (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 HT20 CH 36 5180MHz LF		84	33.69	-6.31	40	56.96	8.48	32.68	0.93	100	325	P	H
		108.57	30.21	-13.29	43.5	50.41	11.3	32.64	1.14			P	H
		155.28	27.38	-16.12	43.5	47.39	11.35	32.69	1.33			P	H
		306.3	17.74	-28.26	46	34.61	13.99	32.74	1.88			P	H
		515.6	18.3	-27.7	46	30.55	18.36	32.94	2.33			P	H
		910.4	26.18	-19.82	46	31.74	23.44	32.2	3.2			P	H
													H
													H
													H
													H
													H
													H
		85.62	34.97	-5.03	40	57.9	8.6	32.67	1.14	121	225	P	V
		93.18	36.46	-7.04	43.5	58.41	9.56	32.65	1.14			P	V
		104.52	29.6	-13.9	43.5	50.19	10.9	32.63	1.14			P	V
		428.1	16.02	-29.98	46	29.77	16.95	32.86	2.16			P	V
		607.3	20.09	-25.91	46	30.82	19.68	33.03	2.62			P	V
		833.4	27.96	-18.04	46	35.21	22.37	32.69	3.07			P	V
													V
													V
												V	
												V	
												V	
												V	
												V	
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

[illegible]

[illegible]



**Note symbol**

*	<b>Fundamental Frequency</b> which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is <b>over limit</b> line.
P/A	<b>P</b> eak or <b>A</b> verage
H/V	<b>H</b> orizontal or <b>V</b> ertical



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”.**