



## Appendix A. Radiated Spurious Emission

Test Engineer :	Kyle Jhuang, Citta Ke, Karl Hou, and Chengjie Huang	Temperature :	16~17°C
		Relative Humidity :	52~53%

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.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
802.11a CH 36 5180MHz		5149.55	57.36	-16.64	74	47.75	35.18	6.72	32.29	100	251	P	H
		5149.55	43.8	-10.2	54	34.19	35.18	6.72	32.29	100	251	A	H
	*	5178	104.64	-	-	94.97	35.22	6.73	32.28	100	251	P	H
	*	5178	94.41	-	-	84.74	35.22	6.73	32.28	100	251	A	H
													H
													H
		5141	56.77	-17.23	74	47.16	35.18	6.72	32.29	101	178	P	V
		5149.7	45.27	-8.73	54	35.66	35.18	6.72	32.29	101	178	A	V
	*	5181	108.5	-	-	98.83	35.22	6.73	32.28	101	178	P	V
	*	5181	98.53	-	-	88.86	35.22	6.73	32.28	101	178	A	V
													V
													V
802.11a CH 44 5220MHz		5110.55	53.98	-20.02	74	44.45	35.14	6.69	32.3	100	250	P	H
		5089.7	43.08	-10.92	54	33.58	35.12	6.68	32.3	100	250	A	H
	*	5218	104.94	-	-	95.19	35.26	6.76	32.27	100	250	P	H
	*	5218	94.79	-	-	85.04	35.26	6.76	32.27	100	250	A	H
		5383.33	57.25	-16.75	74	47.13	35.46	6.88	32.22	100	250	P	H
		5372.33	43.96	-10.04	54	33.9	35.44	6.85	32.23	100	250	A	H
		5115.8	55.31	-18.69	74	45.78	35.14	6.69	32.3	100	191	P	V
		5139.5	43.96	-10.04	54	34.36	35.18	6.71	32.29	100	191	A	V
	*	5221	109.24	-	-	99.49	35.26	6.76	32.27	100	191	P	V
	*	5221	99.23	-	-	89.48	35.26	6.76	32.27	100	191	A	V
		5383.11	62.06	-11.94	74	51.94	35.46	6.88	32.22	100	191	P	V
		5368.26	45.8	-8.2	54	35.74	35.44	6.85	32.23	100	191	A	V



<b>802.11a CH 48 5240MHz</b>		5118.2	53.92	-20.08	74	44.37	35.14	6.71	32.3	100	4	P	H
		5118.05	42.77	-11.23	54	33.22	35.14	6.71	32.3	100	4	A	H
	*	5238	104.34	-	-	94.55	35.28	6.77	32.26	100	4	P	H
	*	5238	94.29	-	-	84.5	35.28	6.77	32.26	100	4	A	H
		5387.29	53.9	-20.1	74	43.78	35.46	6.88	32.22	100	4	P	H
		5370.46	43.36	-10.64	54	33.3	35.44	6.85	32.23	100	4	A	H
		5118.8	54.97	-19.03	74	45.42	35.14	6.71	32.3	100	178	P	V
		5110.1	44.38	-9.62	54	34.85	35.14	6.69	32.3	100	178	A	V
	*	5242	109.23	-	-	99.42	35.3	6.77	32.26	100	178	P	V
	*	5242	98.71	-	-	88.9	35.3	6.77	32.26	100	178	A	V
		5397.41	59.09	-14.91	74	48.95	35.48	6.88	32.22	100	178	P	V
		5383.88	45.8	-8.2	54	35.68	35.46	6.88	32.22	100	178	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.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
802.11a CH 36 5180MHz		10360	46.01	-27.99	74	55.19	38.2	9.8	57.18	100	0	P	H
		15540	45.08	-28.92	74	50.9	40.64	11.81	58.27	100	0	P	H
													H
													H
		10360	46.42	-27.58	74	55.6	38.2	9.8	57.18	100	0	P	V
		15540	46.18	-27.82	74	52	40.64	11.81	58.27	100	0	P	V
													V
													V
802.11a CH 44 5220MHz		10440	43.29	-30.71	74	52.41	38.2	9.82	57.14	100	0	P	H
		15660	45.31	-28.69	74	50.9	40.79	11.8	58.18	100	0	P	H
													H
													H
		10440	43.96	-30.04	74	53.08	38.2	9.82	57.14	100	0	P	V
		15660	45.76	-28.24	74	51.35	40.79	11.8	58.18	100	0	P	V
													V
													V
802.11a CH 48 5240MHz		10480	44.21	-29.79	74	53.28	38.2	9.84	57.11	100	0	P	H
		15720	46.47	-27.53	74	51.92	40.87	11.8	58.12	100	0	P	H
													H
													H
		10480	44.52	-29.48	74	53.59	38.2	9.84	57.11	100	0	P	V
		15720	46.43	-27.57	74	51.88	40.87	11.8	58.12	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.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
802.11n HT20 CH 36 5180MHz		5146.85	53.12	-20.88	74	43.51	35.18	6.72	32.29	100	245	P	H
		5150	42.84	-11.16	54	33.23	35.18	6.72	32.29	100	245	A	H
	*	5181	103.11	-	-	93.44	35.22	6.73	32.28	100	245	P	H
	*	5181	92.7	-	-	83.03	35.22	6.73	32.28	100	245	A	H
													H
													H
		5146.55	54.28	-19.72	74	44.67	35.18	6.72	32.29	101	172	P	V
		5149.85	43.75	-10.25	54	34.14	35.18	6.72	32.29	101	172	A	V
	*	5182	107.38	-	-	97.71	35.22	6.73	32.28	101	172	P	V
	*	5182	97.62	-	-	87.95	35.22	6.73	32.28	101	172	A	V
													V
													V
802.11n HT20 CH 44 5220MHz		5139.65	53.04	-20.96	74	43.44	35.18	6.71	32.29	100	247	P	H
		5089.7	42.8	-11.2	54	33.3	35.12	6.68	32.3	100	247	A	H
	*	5221	102.89	-	-	93.14	35.26	6.76	32.27	100	247	P	H
	*	5221	96.09	-	-	86.34	35.26	6.76	32.27	100	247	A	H
		5382.78	55.55	-18.45	74	45.43	35.46	6.88	32.22	100	247	P	H
		5370.46	43.96	-10.04	54	33.9	35.44	6.85	32.23	100	247	A	H
		5146.7	54.43	-19.57	74	44.82	35.18	6.72	32.29	100	174	P	V
		5138.75	43.78	-10.22	54	34.2	35.16	6.71	32.29	100	174	A	V
	*	5221	107.92	-	-	98.17	35.26	6.76	32.27	100	174	P	V
	*	5221	97.78	-	-	88.03	35.26	6.76	32.27	100	174	A	V
		5382.78	61.84	-12.16	74	51.72	35.46	6.88	32.22	100	174	P	V
		5366.5	45.52	-8.48	54	35.46	35.44	6.85	32.23	100	174	A	V



<b>802.11n</b> <b>HT20</b> <b>CH 48</b> <b>5240MHz</b>		5081.9	53.75	-20.25	74	44.28	35.1	6.68	32.31	158	245	P	H
		5110.1	43.17	-10.83	54	33.64	35.14	6.69	32.3	158	245	A	H
	*	5238	103.43	-	-	93.64	35.28	6.77	32.26	158	245	P	H
	*	5238	93.21	-	-	83.42	35.28	6.77	32.26	158	245	A	H
		5399.94	55.56	-18.44	74	45.42	35.48	6.88	32.22	158	245	P	H
		5405.33	43.57	-10.43	54	33.41	35.48	6.9	32.22	158	245	A	H
		5110.4	54.23	-19.77	74	44.7	35.14	6.69	32.3	100	177	P	V
		5138.9	43.65	-10.35	54	34.07	35.16	6.71	32.29	100	177	A	V
	*	5239	108.07	-	-	98.28	35.28	6.77	32.26	100	177	P	V
	*	5239	97.82	-	-	88.03	35.28	6.77	32.26	100	177	A	V
		5397.52	60.24	-13.76	74	50.1	35.48	6.88	32.22	100	177	P	V
		5384.21	45.5	-8.5	54	35.38	35.46	6.88	32.22	100	177	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.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
802.11n HT20 CH 36 5180MHz		10360	45.6	-28.4	74	54.78	38.2	9.8	57.18	100	0	P	H
		15540	45.72	-28.28	74	51.54	40.64	11.81	58.27	100	0	P	H
													H
													H
		10360	46.26	-27.74	74	55.44	38.2	9.8	57.18	100	0	P	V
		15540	45.99	-28.01	74	51.81	40.64	11.81	58.27	100	0	P	V
													V
													V
802.11n HT20 CH 44 5220MHz		10440	44.06	-29.94	74	53.18	38.2	9.82	57.14	100	0	P	H
		15660	45.15	-28.85	74	50.74	40.79	11.8	58.18	100	0	P	H
													H
													H
		10440	44.95	-29.05	74	54.07	38.2	9.82	57.14	100	0	P	V
		15660	45.68	-28.32	74	51.27	40.79	11.8	58.18	100	0	P	V
													V
													V
802.11n HT20 CH 48 5240MHz		10480	44.83	-29.17	74	53.9	38.2	9.84	57.11	100	0	P	H
		15720	45.3	-28.7	74	50.75	40.87	11.8	58.12	100	0	P	H
													H
													H
		10480	44.38	-29.62	74	53.45	38.2	9.84	57.11	100	0	P	V
		15720	46.08	-27.92	74	51.53	40.87	11.8	58.12	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 802.11a (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 LF		106.68	39.3	-4.2	43.5	59.23	10.72	1.13	31.78			P	H
		191.46	39.42	-4.08	43.5	60.96	8.8	1.44	31.78	100	160	P	H
		250.05	34.13	-11.87	46	51.86	12.4	1.64	31.77			P	H
		696.2	33.34	-12.66	46	42.14	20.59	2.65	32.04			P	H
		811.7	25.06	-20.94	46	31.71	22.36	2.85	31.86			P	H
		984.6	39.3	-14.7	54	42.02	24.85	3.19	30.76			P	H
													H
													H
													H
													H
													H
													H
		125.04	33.22	-10.28	43.5	52.19	11.6	1.21	31.78			P	V
		141.24	38.14	-5.36	43.5	57.16	11.5	1.26	31.78	122	36	P	V
		250.05	33.74	-12.26	46	51.47	12.4	1.64	31.77			P	V
		459.6	28.57	-17.43	46	40.87	17.4	2.15	31.85			P	V
		747.3	20.98	-25.02	46	28.02	22.2	2.74	31.98			P	V
		984.6	31.18	-22.82	54	33.9	24.85	3.19	30.76			P	V
													V
													V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



**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 per 15.209(c).
!	Test result is <b>over limit</b> line.
P/A	<b>Peak</b> or <b>Average</b>
H/V	<b>Horizontal</b> or <b>Vertical</b>





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”.**