



## Appendix B. Radiated Spurious Emission

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

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		5013.5	55.74	-18.26	74	42.24	34.42	11.37	32.29	100	0	P	H	
		5149.7	42.34	-11.66	54	28.67	34.61	11.55	32.49	100	0	A	H	
	*	5177	57.32	-	-	43.63	34.66	11.55	32.52	100	0	P	H	
													H	
													H	
													H	
			5023.55	56.51	-17.49	74	42.97	34.45	11.41	32.32	100	0	P	V
			5148.35	42.39	-11.61	54	28.72	34.61	11.55	32.49	100	0	A	V
	*		5180	56.89	-	-	43.2	34.66	11.55	32.52	100	0	P	V
														V
													V	
802.11a CH 44 5220MHz		5079.8	56.61	-17.39	74	43.02	34.52	11.46	32.39	100	0	P	H	
		5142.05	42.33	-11.67	54	28.62	34.61	11.55	32.45	100	0	A	H	
	*	5217	60.34	-	-	46.6	34.7	11.59	32.55	100	0	P	H	
		5407.64	56.6	-17.4	74	43.29	34.96	11.74	33.39	100	0	P	H	
		5386.74	42.71	-11.29	54	29.31	34.94	11.74	33.28	100	0	A	H	
														H
			5140.85	56.26	-17.74	74	42.55	34.61	11.55	32.45	100	0	P	V
			5145.8	42.37	-11.63	54	28.7	34.61	11.55	32.49	100	0	A	V
	*		5218	58.35	-	-	44.61	34.7	11.59	32.55	100	0	P	V
			5388.94	56.27	-17.73	74	42.87	34.94	11.74	33.28	100	0	P	V
		5380.47	42.62	-11.38	54	29.22	34.94	11.74	33.28	100	0	A	V	
													V	



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 48 5240MHz		5082.3	56.55	-17.45	74	42.96	34.52	11.46	32.39	100	0	P	H	
		5143.7	42.05	-11.95	54	28.34	34.61	11.55	32.45	100	0	A	H	
	*	5239	64.88	-	-	51.18	34.73	11.62	32.65	100	0	P	H	
		5412.26	55.96	-18.04	74	42.63	34.98	11.74	33.39	100	0	P	H	
		5375.74	42.59	-11.41	54	29.25	34.91	11.71	33.28	100	0	A	H	
														H
		5142.7	56.03	-17.97	74	42.32	34.61	11.55	32.45	100	0	P	V	
		5144.1	42.18	-11.82	54	28.51	34.61	11.55	32.49	100	0	A	V	
	*	5239	62.72	-	-	49.02	34.73	11.62	32.65	100	0	P	V	
		5364.3	56.93	-17.07	74	43.49	34.91	11.71	33.18	100	0	P	V	
		5399.94	42.69	-11.31	54	29.38	34.96	11.74	33.39	100	0	A	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 802.11a (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		10359	42.4	-31.6	74	47.71	37.22	16.34	58.87	100	0	P	H
		15540	47.01	-26.99	74	43.8	40.34	20.36	57.49	100	0	P	H
													H
													H
		10359	44.03	-29.97	74	49.34	37.22	16.34	58.87	100	0	P	V
		15540	47.27	-26.73	74	44.06	40.34	20.36	57.49	100	0	P	V
													V
													V
802.11a CH 44 5220MHz		10440	42.1	-31.9	74	47.31	37.26	16.41	58.88	100	0	P	H
		15660	46.25	-27.75	74	42.7	40.49	20.41	57.35	100	0	P	H
													H
													H
		10440	43.6	-30.4	74	48.81	37.26	16.41	58.88	100	0	P	V
		15660	46.57	-27.43	74	43.02	40.49	20.41	57.35	100	0	P	V
													V
													V
802.11a CH 48 5240MHz		10479	42.55	-31.45	74	47.7	37.29	16.45	58.89	100	0	P	H
		15720	47.37	-26.63	74	43.62	40.57	20.45	57.27	100	0	P	H
													H
													H
		10479	42.69	-31.31	74	47.84	37.29	16.45	58.89	100	0	P	V
		15720	47.81	-26.19	74	44.06	40.57	20.45	57.27	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 2 - 5250~5350MHz

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 52 5260MHz		5083.4	56.72	-17.28	74	43.13	34.52	11.46	32.39	100	0	P	H	
		5149.85	42.56	-11.44	54	28.89	34.61	11.55	32.49	100	0	A	H	
	*	5265	62.97	-	-	49.31	34.77	11.65	32.76	100	0	P	H	
		5421.3	55.78	-18.22	74	42.39	34.98	11.8	33.39	100	0	P	H	
		5379.88	42.13	-11.87	54	28.76	34.94	11.71	33.28	100	0	A	H	
														H
		5079.5	56.22	-17.78	74	42.63	34.52	11.46	32.39	100	0	P	V	
		5148.5	42.41	-11.59	54	28.74	34.61	11.55	32.49	100	0	A	V	
	*	5262	61.69	-	-	48.03	34.77	11.65	32.76	100	0	P	V	
		5371	56.71	-17.29	74	43.27	34.91	11.71	33.18	100	0	P	V	
		5409.91	42.55	-11.45	54	29.24	34.96	11.74	33.39	100	0	A	V	
														V
802.11a CH 60 5300MHz		5043.95	55.98	-18.02	74	42.45	34.47	11.41	32.35	100	0	P	H	
		5149.4	42.4	-11.6	54	28.73	34.61	11.55	32.49	100	0	A	H	
	*	5298	62.69	-	-	49.19	34.82	11.65	32.97	100	0	P	H	
		5370.68	55.78	-18.22	74	42.34	34.91	11.71	33.18	100	0	P	H	
		5386.41	42.71	-11.29	54	29.31	34.94	11.74	33.28	100	0	A	H	
														H
		5016.05	56.07	-17.93	74	42.57	34.42	11.37	32.29	100	0	P	V	
		5147.15	42.44	-11.56	54	28.77	34.61	11.55	32.49	100	0	A	V	
	*	5299	61.01	-	-	47.51	34.82	11.65	32.97	100	0	P	V	
		5389.38	56.38	-17.62	74	42.98	34.94	11.74	33.28	100	0	P	V	
		5390.04	42.66	-11.34	54	29.26	34.94	11.74	33.28	100	0	A	V	
														V



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 64 5320MHz	*	5319	61.47	-	-	47.92	34.84	11.68	32.97	100	0	P	H
		5385.86	56.24	-17.76	74	42.84	34.94	11.74	33.28	100	0	P	H
		5387.95	42.69	-11.31	54	29.29	34.94	11.74	33.28	100	0	A	H
													H
													H
													H
	*	5320	61.5	-	-	47.95	34.84	11.68	32.97	100	0	P	V
		5414.68	56.16	-17.84	74	42.83	34.98	11.74	33.39	100	0	P	V
		5405.11	42.73	-11.27	54	29.42	34.96	11.74	33.39	100	0	A	V
													V
													V
													V
<b>Remark</b>	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15E band 2 5250~5350MHz  
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 52 5260MHz		10521	42.98	-31.02	74	48.01	37.32	16.49	58.84	100	0	P	H
		15780	47.34	-26.66	74	43.47	40.63	20.46	57.22	100	0	P	H
													H
													H
		10521	42.07	-31.93	74	47.1	37.32	16.49	58.84	100	0	P	V
		15780	47.78	-26.22	74	43.91	40.63	20.46	57.22	100	0	P	V
													V
													V
802.11a CH 60 5300MHz		10599	41.22	-32.78	74	45.85	37.42	16.56	58.61	100	0	P	H
		15900	48.28	-25.72	74	44.06	40.78	20.52	57.08	100	0	P	H
													H
													H
		10600	41.85	-32.15	74	46.48	37.42	16.56	58.61	100	0	P	V
		15900	47.25	-26.75	74	43.03	40.78	20.52	57.08	100	0	P	V
													V
													V
802.11a CH 64 5320MHz		10641	41.3	-32.7	74	45.75	37.47	16.6	58.52	100	0	P	H
		15960	46.81	-27.19	74	42.4	40.86	20.55	57	100	0	P	H
													H
													H
		10641	41.45	-32.55	74	45.9	37.47	16.6	58.52	100	0	P	V
		15960	46.92	-27.08	74	42.51	40.86	20.55	57	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 3 - 5470~5725MHz

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 100 5500MHz		5406.64	56.16	-17.84	74	42.85	34.96	11.74	33.39	100	0	P	H	
		5397.84	42.67	-11.33	54	29.25	34.96	11.74	33.28	100	0	A	H	
	*	5499	60.81	-	-	47.51	35.1	11.86	33.66	100	0	P	H	
													H	
													H	
													H	
			5406.48	57.42	-16.58	74	44.11	34.96	11.74	33.39	100	0	P	V
			5407.6	42.7	-11.3	54	29.39	34.96	11.74	33.39	100	0	A	V
	*		5503	58.9	-	-	45.62	35.1	11.92	33.74	100	0	P	V
														V
														V
	802.11a CH 116 5580MHz		5444.4	55.92	-18.08	74	42.59	35.01	11.8	33.48	100	0	P	H
		5402.32	42.67	-11.33	54	29.36	34.96	11.74	33.39	100	0	A	H	
*		5579	62.5	-	-	49.39	35.14	11.98	34.01	100	0	P	H	
		5762.76	56.36	-17.64	74	42.97	35.26	12.33	34.2	100	0	P	H	
		5753	42.41	-11.59	54	28.99	35.26	12.33	34.17	100	0	A	H	
													H	
			5352.24	56.04	-17.96	74	42.62	34.89	11.71	33.18	100	0	P	V
			5388.24	42.67	-11.33	54	29.27	34.94	11.74	33.28	100	0	A	V
*			5578	64.5	-	-	51.39	35.14	11.98	34.01	100	0	P	V
			5728.76	55.91	-18.09	74	42.57	35.23	12.26	34.15	100	0	P	V
			5762.52	42.45	-11.55	54	29.06	35.26	12.33	34.2	100	0	A	V
														V



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 140 5700MHz	*	5704	58.76	-	-	45.4	35.22	12.26	34.12	100	0	P	H
		5761.08	56.67	-17.33	74	43.28	35.26	12.33	34.2	100	0	P	H
		5757	42.37	-11.63	54	28.98	35.26	12.33	34.2	100	0	A	H
													H
													H
													H
	*	5696	58.51	-	-	45.24	35.21	12.18	34.12	100	0	P	V
		5761.32	57.04	-16.96	74	43.65	35.26	12.33	34.2	100	0	P	V
		5757.72	42.4	-11.6	54	29.01	35.26	12.33	34.2	100	0	A	V
													V
													V
													V
<b>Remark</b>	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												





15E band 3 - 5470~5725MHz  
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 100 5500MHz		11001	43.94	-30.06	74	46.66	37.9	16.94	57.56	100	0	P	H
		16500	47.94	-26.06	74	41.63	41.4	20.88	55.97	100	0	P	H
													H
													H
		11000	44.24	-29.76	74	46.96	37.9	16.94	57.56	100	0	P	V
		16500	47.19	-26.81	74	40.88	41.4	20.88	55.97	100	0	P	V
													V
													V
802.11a CH 116 5580MHz		11160	44.56	-29.44	74	46.84	38	17.08	57.36	100	0	P	H
		16740	48.08	-25.92	74	41.21	41.88	21.04	56.05	100	0	P	H
													H
													H
		11160	43.98	-30.02	74	46.26	38	17.08	57.36	100	0	P	V
		16740	48.9	-25.1	74	42.03	41.88	21.04	56.05	100	0	P	V
													V
													V
802.11a CH 140 5700MHz		11400	44.09	-29.91	74	45.71	38.14	17.31	57.07	100	0	P	H
		17100	50.01	-23.99	74	42.58	42.32	21.27	56.16	100	0	P	H
													H
													H
		11400	44.97	-29.03	74	46.59	38.14	17.31	57.07	100	0	P	V
		17100	48.68	-25.32	74	41.25	42.32	21.27	56.16	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		40.53	28.36	-11.64	40	44.49	13.3	1.77	31.2			P	H	
		209.28	35.78	-7.72	43.5	55	9.19	2.69	31.1	197	286	P	H	
		288.39	26.65	-19.35	46	41.51	13.04	3.16	31.06			P	H	
		324.5	25.96	-20.04	46	40.08	13.6	3.28	31			P	H	
		493.2	26.24	-19.76	46	35.2	17.94	3.77	30.67			P	H	
		948.9	28.09	-17.91	46	29.16	24.39	4.94	30.4			P	H	
													H	
													H	
													H	
													H	
													H	
													H	
			46.47	28.67	-11.33	40	48.3	9.8	1.77	31.2	125	12	P	V
			209.28	32.11	-11.39	43.5	51.33	9.19	2.69	31.1			P	V
			275.97	27.61	-18.39	46	42.56	12.84	3.16	30.95			P	V
			344.8	29.96	-16.04	46	43.34	14.25	3.39	31.02			P	V
			620.6	32.33	-13.67	46	38.45	20.22	4.22	30.56			P	V
			897.1	32.59	-13.41	46	35.13	23.11	4.66	30.31			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

- 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”.