



## Appendix B. Radiated Spurious Emission

Test Engineer :	Wei Chen and Ken Wu	Temperature :	22~25°C
		Relative Humidity :	61~63%

### 15E Band 4 - 5725~5850MHz

### 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 149 5745MHz		5714.28	65.83	-8.17	74	52.5	35.22	12.26	34.15	105	276	P	H	
		5715	47.11	-6.89	54	33.78	35.22	12.26	34.15	105	276	A	H	
		5724.36	76.46	-1.84	78.3	63.12	35.23	12.26	34.15	105	276	P	H	
	*	5745	111.1	-	-	97.7	35.24	12.33	34.17	105	276	P	H	
	*	5745	99.42	-	-	86.02	35.24	12.33	34.17	105	276	A	H	
														H
														H
														H
			5714.36	62.14	-11.86	74	48.81	35.22	12.26	34.15	309	261	P	V
			5715	45.4	-8.6	54	32.07	35.22	12.26	34.15	309	261	A	V
			5724.68	74.14	-4.16	78.3	60.8	35.23	12.26	34.15	309	261	P	V
	*		5747	108.06	-	-	94.66	35.24	12.33	34.17	309	261	P	V
	*		5747	97.62	-	-	84.22	35.24	12.33	34.17	309	261	A	V
														V
														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 157 5785MHz		5711.64	64.67	-9.33	74	51.34	35.22	12.26	34.15	100	274	P	H
		5715	47.51	-6.49	54	34.18	35.22	12.26	34.15	100	274	A	H
		5724.92	68.66	-9.64	78.3	55.32	35.23	12.26	34.15	100	274	P	H
	*	5784	114.25	-	-	100.81	35.27	12.4	34.23	100	274	P	H
	*	5784	103.62	-	-	90.18	35.27	12.4	34.23	100	274	A	H
		5853.04	62.83	-15.47	78.3	49.38	35.31	12.45	34.31	100	274	P	H
		5860.16	60.09	-13.91	74	46.63	35.32	12.49	34.35	100	274	P	H
		5860	45.62	-8.38	54	32.2	35.32	12.45	34.35	100	274	A	H
		5714.04	62.88	-11.12	74	49.55	35.22	12.26	34.15	317	260	P	V
		5714.92	46.16	-7.84	54	32.83	35.22	12.26	34.15	317	260	A	V
		5725	65.47	-12.83	78.3	52.13	35.23	12.26	34.15	317	260	P	V
	*	5785	113.09	-	-	99.65	35.27	12.4	34.23	317	260	P	V
	*	5785	102.76	-	-	89.32	35.27	12.4	34.23	317	260	A	V
		5851.84	62.17	-16.13	78.3	48.72	35.31	12.45	34.31	317	260	P	V
		5860.48	60.08	-13.92	74	46.62	35.32	12.49	34.35	317	260	P	V
	5860.24	44.9	-9.1	54	31.44	35.32	12.49	34.35	317	260	A	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 165 5825MHz	*	5824	112.62	-	-	99.14	35.3	12.45	34.27	107	275	P	H	
	*	5824	101.5			89.06	35.3	12.45	35.31	107	275	A	H	
		5851.92	76.25	-2.05	78.3	62.8	35.31	12.45	34.31	107	275	P	H	
		5862.8	67.43	-6.57	74	53.97	35.32	12.49	34.35	107	275	P	H	
		5860	50.1	-3.9	54	36.68	35.32	12.45	34.35	107	275	A	H	
														H
														H
														H
	*	5827	109.77	-	-	96.29	35.3	12.45	34.27	292	259	P	V	
	*	5827	99.5	-	-	86.02	35.3	12.45	34.27	292	259	A	V	
		5853.84	77.16	-1.14	78.3	63.7	35.32	12.45	34.31	292	259	P	V	
		5862	69.47	-4.53	74	56.01	35.32	12.49	34.35	292	259	P	V	
		5860	50.7	-3.3	54	37.28	35.32	12.45	34.35	292	259	A	V	
														V
														V
														V
													V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.													



**15E Band 4 5725~5850MHz  
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 149 5745MHz		11490	43.12	-30.88	74	45.39	38.19	17.38	57.84	100	0	P	H
		17235	49.34	-24.66	74	42.29	42.21	21.38	56.54	100	0	P	H
													H
													H
		11490	44.31	-29.69	74	46.58	38.19	17.38	57.84	100	0	P	V
		17235	49.57	-24.43	74	42.52	42.21	21.38	56.54	100	0	P	V
													V
													V
802.11a CH 157 5785MHz		11570	44.9	-29.1	74	46.83	38.3	17.46	57.69	100	0	P	H
		17355	54.57	-19.43	74	47.61	42.12	21.45	56.61	100	336	P	H
		17355	40.49	-13.51	54	33.53	42.12	21.45	56.61	100	336	A	H
													H
		11570	43.6	-30.4	74	45.53	38.3	17.46	57.69	100	0	P	V
		17355	49.6	-24.4	74	42.64	42.12	21.45	56.61	100	0	P	V
													V
													V
802.11a CH 165 5825MHz		11650	43.21	-30.79	74	44.87	38.39	17.53	57.58	100	0	P	H
		17475	54.75	-19.25	74	47.87	42.03	21.53	56.68	100	337	P	H
		17475	41.9	-12.1	54	35.02	42.03	21.53	56.68	100	337	A	H
													H
		11650	44.18	-29.82	74	45.84	38.39	17.53	57.58	100	0	P	V
		17475	50.74	-23.26	74	43.86	42.03	21.53	56.68	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 4 5725~5850MHz  
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 149 5745MHz		5713.88	67.96	-6.04	74	54.63	35.22	12.26	34.15	101	278	P	H	
		5714.84	47.34	-6.66	54	34.01	35.22	12.26	34.15	101	278	A	H	
		5724.6	77.29	-1.01	78.3	63.95	35.23	12.26	34.15	101	278	P	H	
	*	5744	110	-	-	96.6	35.24	12.33	34.17	101	278	P	H	
	*	5744	99.41	-	-	86.01	35.24	12.33	34.17	101	278	A	H	
														H
														H
														H
			5714.76	64.45	-9.55	74	51.12	35.22	12.26	34.15	307	260	P	V
			5715	45.75	-8.25	54	32.42	35.22	12.26	34.15	307	260	A	V
			5724.12	76.55	-1.75	78.3	63.21	35.23	12.26	34.15	307	260	P	V
	*		5745	107.92	-	-	94.52	35.24	12.33	34.17	307	260	P	V
	*		5745	97.43	-	-	84.03	35.24	12.33	34.17	307	260	A	V
														V
														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)
802.11n HT20 CH 157 5785MHz		5710.92	67.84	-6.16	74	54.51	35.22	12.26	34.15	101	274	P	H
		5715	48.26	-5.74	54	34.93	35.22	12.26	34.15	101	274	A	H
		5725	71.91	-6.39	78.3	58.57	35.23	12.26	34.15	101	274	P	H
	*	5784	115.05	-	-	101.61	35.27	12.4	34.23	101	274	P	H
	*	5784	104.63	-	-	91.19	35.27	12.4	34.23	101	274	A	H
		5852.88	66.01	-12.29	78.3	52.56	35.31	12.45	34.31	101	274	P	H
		5861.44	62.79	-11.21	74	49.33	35.32	12.49	34.35	101	274	P	H
		5860	46.21	-7.79	54	32.79	35.32	12.45	34.35	101	274	A	H
		5714.28	67.83	-6.17	74	54.5	35.22	12.26	34.15	319	249	P	V
		5715	46.69	-7.31	54	33.36	35.22	12.26	34.15	319	249	A	V
		5720.52	69.05	-9.25	78.3	55.71	35.23	12.26	34.15	319	249	P	V
	*	5785	113.24	-	-	99.8	35.27	12.4	34.23	319	249	P	V
	*	5785	102.71	-	-	89.27	35.27	12.4	34.23	319	249	A	V
		5856.08	63.4	-14.9	78.3	49.94	35.32	12.45	34.31	319	249	P	V
		5867.6	61.1	-12.9	74	47.64	35.32	12.49	34.35	319	249	P	V
	5860	45.02	-8.98	54	31.6	35.32	12.45	34.35	319	249	A	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)	
802.11n HT20 CH 165 5825MHz	*	5825	111.13	-	-	97.65	35.3	12.45	34.27	100	274	P	H	
	*	5825	100.55	-	-	87.07	35.3	12.45	34.27	100	274	A	H	
		5851.6	77.01	-1.29	78.3	63.56	35.31	12.45	34.31	100	274	P	H	
		5861.76	68.99	-5.01	74	55.53	35.32	12.49	34.35	100	274	P	H	
		5860	49.84	-4.16	54	36.42	35.32	12.45	34.35	100	274	A	H	
														H
														H
														H
	*	5825	109.96	-	-	96.48	35.3	12.45	34.27	309	260	P	V	
	*	5825	99.44	-	-	85.96	35.3	12.45	34.27	309	260	A	V	
		5850.08	77.13	-1.17	78.3	63.68	35.31	12.45	34.31	309	260	P	V	
		5860.56	66.9	-7.1	74	53.44	35.32	12.49	34.35	309	260	P	V	
		5860	48.54	-5.46	54	35.12	35.32	12.45	34.35	309	260	A	V	
														V
													V	
													V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.													



**15E Band 4 5725~5850MHz**  
**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 149 5745MHz		11490	44.63	-29.37	74	46.9	38.19	17.38	57.84	100	0	P	H
		17232	50.23	-23.77	74	43.18	42.21	21.38	56.54	100	0	P	H
													H
													H
		11490	45.3	-28.7	74	47.57	38.19	17.38	57.84	100	0	P	V
		17232	50.35	-23.65	74	43.3	42.21	21.38	56.54	100	0	P	V
													V
802.11n HT20 CH 157 5785MHz		11550	43.33	-30.67	74	45.32	38.27	17.46	57.72	100	0	P	H
		17328	49.68	-24.32	74	42.69	42.15	21.43	56.59	100	0	P	H
													H
													H
		11550	43.58	-30.42	74	45.57	38.27	17.46	57.72	100	0	P	V
		17328	49.44	-24.56	74	42.45	42.15	21.43	56.59	100	0	P	V
													V
802.11n HT20 CH 165 5825MHz		11650	44.39	-29.61	74	46.05	38.39	17.53	57.58	100	0	P	H
		17475	52.05	-21.95	74	45.17	42.03	21.53	56.68	205	337	P	H
		17475	41.7	-12.3	54	34.82	42.03	21.53	56.68	205	337	A	H
													H
		11650	44.71	-29.29	74	46.37	38.39	17.53	57.58	100	0	P	V
		17472	50.62	-23.38	74	43.74	42.03	21.53	56.68	100	0	P	V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												





15E Emission below 1GHz

5GHz 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)	
5GHz 802.11n HT20 LF		30	23.24	-16.76	40	34.17	18.8	1.77	31.5			P	H	
		153.66	30.02	-13.48	43.5	47.81	10.74	2.61	31.14	100	0	P	H	
		255.99	23.51	-22.49	46	38.19	13.36	2.96	31			P	H	
		307	26.97	-19.03	46	41.42	13.27	3.28	31			P	H	
		512.1	28.09	-17.91	46	36.75	18.1	3.89	30.65			P	H	
		819.4	30.79	-15.21	46	34.01	22.5	4.62	30.34			P	H	
														H
														H
														H
														H
														H
														H
			30	26.28	-13.72	40	37.21	18.8	1.77	31.5	100	0	P	V
			168.78	23.8	-19.7	43.5	42.59	9.72	2.61	31.12			P	V
			248.43	22.75	-23.25	46	38.59	12.2	2.96	31			P	V
			307	22.48	-23.52	46	36.93	13.27	3.28	31			P	V
		716.5	28.19	-17.81	46	32.9	21.28	4.41	30.4			P	V	
		975.5	29.37	-24.63	54	29.81	24.92	4.94	30.3			P	V	
													V	
													V	
													V	
													V	
													V	
													V	
Remark	<p>1. No other spurious found.</p> <p>2. All results are PASS against limit line.</p>													



**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>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+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”.**