



Appendix B. Radiated Spurious Emission

Test Engineer :	Elvis Chen, Stan Hsieh, Karl Hou, and Nick Yu	Temperature :	21~23°C
		Relative Humidity :	60~63%

<Sample 5>

Band 4 - 5725~5850MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 149 5745MHz		5707.48	53.23	-20.77	74	45.07	32.52	8.3	32.66	100	315	P	H
		5723.56	65.21	-13.09	78.3	57.01	32.53	8.33	32.66	100	315	P	H
		5715	44.09	-9.91	54	35.93	32.52	8.3	32.66	100	315	A	H
	*	5745	104.64	-	-	96.44	32.54	8.33	32.67	100	315	P	H
	*	5745	96.65	-	-	88.45	32.54	8.33	32.67	100	315	A	H
		5851.52	49.63	-28.67	78.3	41.29	32.61	8.43	32.7	371	21	P	H
		5879.28	51.54	-22.46	74	43.19	32.63	8.43	32.71	371	21	P	H
		5881.68	42.1	-11.9	54	33.71	32.63	8.47	32.71	371	21	A	H
		5713.32	58.69	-15.31	74	50.53	32.52	8.3	32.66	322	0	P	V
		5724.68	69.26	-9.04	78.3	61.06	32.53	8.33	32.66	322	0	P	V
		5714.52	49.07	-4.93	54	40.91	32.52	8.3	32.66	322	0	A	V
	*	5743	110.46	-	-	102.26	32.54	8.33	32.67	322	0	P	V
	*	5743	103.6	-	-	95.4	32.54	8.33	32.67	322	0	A	V
		5857.68	50.77	-27.53	78.3	42.42	32.62	8.43	32.7	322	0	P	V
		5877.6	52.34	-21.66	74	43.99	32.63	8.43	32.71	322	0	P	V
		5860.32	42.52	-11.48	54	34.18	32.62	8.43	32.71	322	0	A	V



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 157 5785MHz		5699.56	51.33	-22.67	74	43.17	32.51	8.3	32.65	383	18	P	H
		5724.68	50.41	-27.89	78.3	42.21	32.53	8.33	32.66	383	18	P	H
		5699.88	41.9	-12.1	54	33.74	32.51	8.3	32.65	383	18	A	H
	*	5782	102.97	-	-	94.73	32.57	8.35	32.68	383	18	P	H
	*	5782	96.43	-	-	88.19	32.57	8.35	32.68	383	18	A	H
		5851.68	50.68	-27.62	78.3	42.34	32.61	8.43	32.7	383	18	P	H
		5889.52	51.04	-22.96	74	42.65	32.64	8.47	32.72	383	18	P	H
		5860.48	42.24	-11.76	54	33.9	32.62	8.43	32.71	383	18	A	H
		5713.48	54.02	-19.98	74	45.86	32.52	8.3	32.66	318	0	P	V
		5719.88	54.62	-23.68	78.3	46.45	32.53	8.3	32.66	318	0	P	V
		5713.16	44.82	-9.18	54	36.66	32.52	8.3	32.66	318	0	A	V
	*	5787	110.46	-	-	102.21	32.58	8.35	32.68	318	0	P	V
	*	5787	104.13	-	-	95.88	32.58	8.35	32.68	318	0	A	V
		5852.64	52.15	-26.15	78.3	43.81	32.61	8.43	32.7	318	0	P	V
		5883.44	52.55	-21.45	74	44.17	32.63	8.47	32.72	318	0	P	V
		5860.72	43.42	-10.58	54	35.08	32.62	8.43	32.71	318	0	A	V



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 165 5825MHz	*	5823	103.88	-	-	95.58	32.6	8.39	32.69	393	14	P	H
	*	5823	97.29	-	-	88.99	32.6	8.39	32.69	393	14	A	H
		5850.16	56.02	-22.28	78.3	47.68	32.61	8.43	32.7	393	14	P	H
		5860.8	52.48	-21.52	74	44.14	32.62	8.43	32.71	393	14	P	H
		5861.68	43.52	-10.48	54	35.18	32.62	8.43	32.71	393	14	A	H
													H
													H
													H
	*	5827	108.05	-	-	99.75	32.6	8.39	32.69	341	1	P	V
	*	5827	102.83	-	-	94.53	32.6	8.39	32.69	341	1	A	V
		5850.32	60.82	-17.48	78.3	52.48	32.61	8.43	32.7	341	1	P	V
		5863.68	54.37	-19.63	74	46.03	32.62	8.43	32.71	341	1	P	V
		5860.08	46.48	-7.52	54	38.14	32.62	8.43	32.71	341	1	A	V
													V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz

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 149 5745MHz		11490	48.03	-25.97	74	58.24	40.01	12.58	62.8	100	0	P	H
		17235	59.13	-14.87	74	62.56	41.05	15.66	60.14	100	335	P	H
		17235	46.09	-7.91	54	49.52	41.05	15.66	60.14	100	335	A	H
													H
		11490	47.34	-26.66	74	57.55	40.01	12.58	62.8	100	0	P	V
		17233	49.39	-24.61	74	52.87	41.05	15.61	60.14	100	0	P	V
													V
													V
802.11a CH 157 5785MHz		11571	46.82	-27.18	74	57.02	39.88	12.66	62.74	100	0	P	H
		17355	61.21	-12.79	74	64.25	41.38	15.79	60.21	100	327	P	H
		17355	47.87	-6.13	54	50.91	41.38	15.79	60.21	100	327	A	H
													H
		11571	46.72	-27.28	74	56.92	39.88	12.66	62.74	100	0	P	V
		17355	47.82	-26.18	74	50.86	41.38	15.79	60.21	100	0	P	V
													V
													V
802.11a CH 165 5825MHz		11649	47.05	-26.95	74	57.26	39.75	12.73	62.69	100	0	P	H
		17475	61.97	-12.03	74	64.61	41.71	15.93	60.28	103	327	P	H
		17475	48.13	-5.87	54	50.77	41.71	15.93	60.28	103	327	A	H
													H
		11649	45.4	-28.6	74	55.61	39.75	12.73	62.69	100	0	P	V
		17475	48.57	-25.43	74	51.21	41.71	15.93	60.28	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

**Band 4 5725~5850MHz****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 149 5745MHz		5713.4	56.12	-17.88	74	47.96	32.52	8.3	32.66	372	234	P	H
		5724.68	67.02	-11.28	78.3	58.82	32.53	8.33	32.66	372	234	P	H
		5714.68	45.2	-8.8	54	37.04	32.52	8.3	32.66	372	234	A	H
	*	5747	104.01	-	-	95.81	32.54	8.33	32.67	372	234	P	H
	*	5747	97.2	-	-	89	32.54	8.33	32.67	372	234	A	H
		5851.2	50.09	-28.21	78.3	41.75	32.61	8.43	32.7	372	234	P	H
		5872.08	50.23	-23.77	74	41.88	32.63	8.43	32.71	372	234	P	H
		5882.72	41.92	-12.08	54	33.53	32.63	8.47	32.71	372	234	A	H
		5714.04	58.26	-15.74	74	50.1	32.52	8.3	32.66	335	0	P	V
		5723.48	70.1	-8.2	78.3	61.9	32.53	8.33	32.66	335	0	P	V
		5714.12	49.97	-4.03	54	41.81	32.52	8.3	32.66	335	0	A	V
	*	5746	109.75	-	-	101.55	32.54	8.33	32.67	335	0	P	V
	*	5746	103.16	-	-	94.96	32.54	8.33	32.67	335	0	A	V
		5854	51.86	-26.44	78.3	43.51	32.62	8.43	32.7	335	0	P	V
		5863.52	50.95	-23.05	74	42.61	32.62	8.43	32.71	335	0	P	V
		5867.04	43.14	-10.86	54	34.8	32.62	8.43	32.71	335	0	A	V



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 157 5785MHz		5686.36	51.85	-22.15	74	43.69	32.51	8.3	32.65	383	15	P	H
		5718.6	49.94	-28.36	78.3	41.77	32.53	8.3	32.66	383	15	P	H
		5699.88	42.08	-11.92	54	33.92	32.51	8.3	32.65	383	15	A	H
	*	5783	104.81	-	-	96.57	32.57	8.35	32.68	383	15	P	H
	*	5783	97.47	-	-	89.23	32.57	8.35	32.68	383	15	A	H
		5851.84	51.83	-26.47	78.3	43.49	32.61	8.43	32.7	383	15	P	H
		5888.32	50.88	-23.12	74	42.49	32.64	8.47	32.72	383	15	P	H
		5864.96	42.29	-11.71	54	33.95	32.62	8.43	32.71	383	15	A	H
		5712.12	53.45	-20.55	74	45.29	32.52	8.3	32.66	333	0	P	V
		5723.72	53.5	-24.8	78.3	45.3	32.53	8.33	32.66	333	0	P	V
		5714.84	44.65	-9.35	54	36.49	32.52	8.3	32.66	333	0	A	V
	*	5783	111.07	-	-	102.83	32.57	8.35	32.68	333	0	P	V
	*	5783	103.76	-	-	95.52	32.57	8.35	32.68	333	0	A	V
		5853.44	51.86	-26.44	78.3	43.52	32.61	8.43	32.7	333	0	P	V
		5865.2	53.18	-20.82	74	44.84	32.62	8.43	32.71	333	0	P	V
		5864.56	43.34	-10.66	54	35	32.62	8.43	32.71	333	0	A	V



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 165 5825MHz	*	5824	103.98	-	-	95.68	32.6	8.39	32.69	373	15	P	H
	*	5824	97.2	-	-	88.9	32.6	8.39	32.69	373	15	A	H
		5850.56	55.96	-22.34	78.3	47.62	32.61	8.43	32.7	373	15	P	H
		5873.2	52.33	-21.67	74	43.98	32.63	8.43	32.71	373	15	P	H
		5861.2	43.82	-10.18	54	35.48	32.62	8.43	32.71	373	15	A	H
													H
													H
													H
	*	5823	107.97	-	-	99.67	32.6	8.39	32.69	342	0	P	V
	*	5823	102.55	-	-	94.25	32.6	8.39	32.69	342	0	A	V
		5851.92	61.5	-16.8	78.3	53.16	32.61	8.43	32.7	342	0	P	V
		5861.44	55.47	-18.53	74	47.13	32.62	8.43	32.71	342	0	P	V
		5860.24	46.66	-7.34	54	38.32	32.62	8.43	32.71	342	0	A	V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz

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 149 5745MHz		11490	48.37	-25.63	74	58.58	40.01	12.58	62.8	100	0	P	H
		17235	59.59	-14.41	74	63.02	41.05	15.66	60.14	113	327	P	H
		17235	46.89	-7.11	54	50.32	41.05	15.66	60.14	113	327	A	H
													H
		11490	47.72	-26.28	74	57.93	40.01	12.58	62.8	100	0	P	V
		17235	47.7	-26.3	74	51.13	41.05	15.66	60.14	100	0	P	V
													V
													V
802.11n HT20 CH 157 5785MHz		11571	47.96	-26.04	74	58.16	39.88	12.66	62.74	100	0	P	H
		17355	61.27	-12.73	74	64.31	41.38	15.79	60.21	103	328	P	H
		17355	48.2	-5.8	54	51.24	41.38	15.79	60.21	103	328	A	H
													H
		11571	46.95	-27.05	74	57.15	39.88	12.66	62.74	100	0	P	V
		17355	48.15	-25.85	74	51.19	41.38	15.79	60.21	100	0	P	V
													V
													V
802.11n HT20 CH 165 5825MHz		11649	46.75	-27.25	74	56.96	39.75	12.73	62.69	100	0	P	H
		17475	60.66	-13.34	74	63.3	41.71	15.93	60.28	104	328	P	H
		17475	48.35	-5.65	54	50.99	41.71	15.93	60.28	104	328	A	H
													H
		11649	45.5	-28.5	74	55.71	39.75	12.73	62.69	100	0	P	V
		17475	47.69	-26.31	74	50.33	41.71	15.93	60.28	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

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	22.4	-17.6	40	33.58	20	0.65	31.83	115	147	P	H	
		54.84	21.79	-18.21	40	45.01	7.65	0.93	31.8			P	H	
		269.49	21.57	-24.43	46	38.08	13.5	1.76	31.77			P	H	
		521.2	20.57	-25.43	46	31.75	18.41	2.33	31.92			P	H	
		779.5	26.03	-19.97	46	33.11	21.9	2.97	31.95			P	H	
		961.5	28.86	-25.14	54	32.27	24.25	3.29	30.95			P	H	
													H	
													H	
													H	
													H	
													H	
													H	
		30	22.68	-17.32	40	33.86	20	0.65	31.83				P	V
		54.03	22.01	-17.99	40	44.92	7.96	0.93	31.8				P	V
		207.66	20.38	-23.12	43.5	40.22	10.32	1.62	31.78				P	V
		400.8	22.94	-23.06	46	36.09	16.52	2.13	31.8				P	V
		789.3	25.61	-20.39	46	32.58	21.99	2.97	31.93				P	V
		943.3	28.95	-17.05	46	32.58	24.17	3.29	31.09	103	157		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”.