



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 4 - 5725~5850MHz

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 149 5745MHz		5708.36	65.94	-8.06	74	55.14	35.77	7.15	32.12	100	172	P	H
		5724.68	77.41	-0.89	78.3	66.59	35.78	7.16	32.12	100	172	P	H
		5714.84	48.57	-5.43	54	37.77	35.77	7.15	32.12	100	172	A	H
	*	5747	107.94	-	-	97.08	35.79	7.18	32.11	100	172	P	H
	*	5747	97.72	-	-	86.86	35.79	7.18	32.11	100	172	A	H
													H
													H
													H
		5709.96	62.11	-11.89	74	51.31	35.77	7.15	32.12	100	50	P	V
		5724.52	73.97	-4.33	78.3	63.15	35.78	7.16	32.12	100	50	P	V
		5714.84	45.87	-8.13	54	35.07	35.77	7.15	32.12	100	50	A	V
	*	5744	103.39	-	-	92.53	35.79	7.18	32.11	100	50	P	V
	*	5744	93.53	-	-	82.67	35.79	7.18	32.11	100	50	A	V
													V
													V
													V



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 157 5785MHz		5688.12	57.9	-16.1	74	47.15	35.75	7.13	32.13	109	171	P	H
		5720.44	56.59	-21.71	78.3	45.77	35.78	7.16	32.12	109	171	P	H
		5687.96	45.99	-8.01	54	35.24	35.75	7.13	32.13	109	171	A	H
	*	5784	108.01	-	-	97.09	35.82	7.2	32.1	109	171	P	H
	*	5784	97.74	-	-	86.82	35.82	7.2	32.1	109	171	A	H
		5851.84	55.91	-22.39	78.3	44.85	35.88	7.26	32.08	109	171	P	H
		5870.64	56.09	-17.91	74	44.98	35.9	7.28	32.07	109	171	P	H
		5869.92	44.77	-9.23	54	33.67	35.89	7.28	32.07	109	171	A	H
		5698.36	54.86	-19.14	74	44.09	35.75	7.15	32.13	100	52	P	V
		5724.92	54.42	-23.88	78.3	43.6	35.78	7.16	32.12	100	52	P	V
		5695	44.19	-9.81	54	33.42	35.75	7.15	32.13	100	52	A	V
	*	5787	103.71	-	-	92.78	35.83	7.2	32.1	100	52	P	V
	*	5787	93.74	-	-	82.81	35.83	7.2	32.1	100	52	A	V
		5856.72	54.51	-23.79	78.3	43.43	35.89	7.26	32.07	100	52	P	V
		5862.08	54.31	-19.69	74	43.21	35.89	7.28	32.07	100	52	P	V
		5872.08	44.09	-9.91	54	32.98	35.9	7.28	32.07	100	52	A	V



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 165 5825MHz	*	5824	107.96	-	-	96.95	35.86	7.24	32.09	108	171	P	H
	*	5824	97.87	-	-	86.86	35.86	7.24	32.09	108	171	A	H
		5850.8	70.64	-7.66	78.3	59.58	35.88	7.26	32.08	108	171	P	H
		5860.72	61.21	-12.79	74	50.11	35.89	7.28	32.07	108	171	P	H
		5860.48	46	-8	54	34.9	35.89	7.28	32.07	108	171	A	H
													H
													H
													H
	*	5827	104.17	-	-	93.16	35.86	7.24	32.09	101	17	P	V
	*	5827	94.19	-	-	83.18	35.86	7.24	32.09	101	17	A	V
		5852.56	65.36	-12.94	78.3	54.3	35.88	7.26	32.08	101	17	P	V
		5861.84	57.48	-16.52	74	46.38	35.89	7.28	32.07	101	17	P	V
		5865.84	44.8	-9.2	54	33.7	35.89	7.28	32.07	101	17	A	V
													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.
				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 149 5745MHz		11490	45.23	-28.77	74	52.82	38.99	10.33	56.91	100	0	P	H
		17235	48.67	-25.33	74	51.72	42.01	12.65	57.71	100	0	P	H
													H
													H
		11490	45.73	-28.27	74	53.32	38.99	10.33	56.91	100	0	P	V
		17235	46.67	-27.33	74	49.72	42.01	12.65	57.71	100	0	P	V
													V
													V
802.11a CH 157 5785MHz		11570	44.97	-29.03	74	52.49	39.03	10.36	56.91	100	0	P	H
		17355	48.28	-25.72	74	51.48	41.96	12.85	58.01	100	0	P	H
													H
													H
		11570	44.58	-29.42	74	52.1	39.03	10.36	56.91	100	0	P	V
		17355	47.95	-26.05	74	51.15	41.96	12.85	58.01	100	0	P	V
													V
													V
802.11a CH 165 5825MHz		11650	44.23	-29.77	74	51.69	39.06	10.41	56.93	100	0	P	H
		17475	49.05	-24.95	74	52.41	41.91	13.04	58.31	100	0	P	H
													H
													H
		11650	44.47	-29.53	74	51.93	39.06	10.41	56.93	100	0	P	V
		17475	48.38	-25.62	74	51.74	41.91	13.04	58.31	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.
				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 149 5745MHz		5714.68	64.12	-9.88	74	53.32	35.77	7.15	32.12	100	177	P	H
		5724.2	77.93	-0.37	78.3	67.11	35.78	7.16	32.12	100	177	P	H
		5714.92	47.14	-6.86	54	36.34	35.77	7.15	32.12	100	177	A	H
	*	5743	107.4	-	-	96.54	35.79	7.18	32.11	100	177	P	H
	*	5743	97.49	-	-	86.63	35.79	7.18	32.11	100	177	A	H
													H
													H
													H
		5711.56	59.5	-14.5	74	48.7	35.77	7.15	32.12	111	56	P	V
		5724.92	68.71	-9.59	78.3	57.89	35.78	7.16	32.12	111	56	P	V
		5714.36	44.93	-9.07	54	34.13	35.77	7.15	32.12	111	56	A	V
	*	5743	103.07	-	-	92.21	35.79	7.18	32.11	111	56	P	V
	*	5743	93.18	-	-	82.32	35.79	7.18	32.11	111	56	A	V
													V
													V
													V



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 157 5785MHz		5688.68	58.43	-15.57	74	47.68	35.75	7.13	32.13	108	144	P	H
		5724.44	57.47	-20.83	78.3	46.65	35.78	7.16	32.12	108	144	P	H
		5686.36	46.43	-7.57	54	35.68	35.75	7.13	32.13	108	144	A	H
	*	5787	109.01	-	-	98.08	35.83	7.2	32.1	108	144	P	H
	*	5787	98.76	-	-	87.83	35.83	7.2	32.1	108	144	A	H
		5858.96	57.68	-20.62	78.3	46.6	35.89	7.26	32.07	108	144	P	H
		5864.56	61.17	-12.83	74	50.07	35.89	7.28	32.07	108	144	P	H
		5864.56	45.52	-8.48	54	34.42	35.89	7.28	32.07	108	144	A	H
		5708.68	55.31	-18.69	74	44.51	35.77	7.15	32.12	100	59	P	V
		5717.56	54.85	-23.45	78.3	44.03	35.78	7.16	32.12	100	59	P	V
		5690.2	44.11	-9.89	54	33.36	35.75	7.13	32.13	100	59	A	V
	*	5787	104.15	-	-	93.22	35.83	7.2	32.1	100	59	P	V
	*	5787	94.38	-	-	83.45	35.83	7.2	32.1	100	59	A	V
		5859.44	55.14	-23.16	78.3	44.06	35.89	7.26	32.07	100	59	P	V
		5882	55.22	-18.78	74	44.11	35.9	7.28	32.07	100	59	P	V
		5870.16	44.13	-9.87	54	33.03	35.89	7.28	32.07	100	59	A	V



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 165 5825MHz	*	5824	107.58	-	-	96.57	35.86	7.24	32.09	120	171	P	H
	*	5824	97.9	-	-	86.89	35.86	7.24	32.09	120	171	A	H
		5850	69.11	-4.89	74	58.05	35.88	7.26	32.08	120	171	P	H
		5863.84	60.74	-13.26	74	49.64	35.89	7.28	32.07	120	171	P	H
		5864.24	46.21	-7.79	54	35.11	35.89	7.28	32.07	120	171	A	H
													H
													H
													H
	*	5827	103.77	-	-	92.76	35.86	7.24	32.09	100	17	P	V
	*	5827	93.91	-	-	82.9	35.86	7.24	32.09	100	17	A	V
		5854.24	66.22	-12.08	78.3	55.14	35.89	7.26	32.07	100	17	P	V
		5860.8	58.07	-15.93	74	46.97	35.89	7.28	32.07	100	17	P	V
		5864.96	44.77	-9.23	54	33.67	35.89	7.28	32.07	100	17	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.
				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 149 5745MHz		11490	44.71	-29.29	74	52.3	38.99	10.33	56.91	100	0	P	H
		17235	47.43	-26.57	74	50.48	42.01	12.65	57.71	100	0	P	H
													H
													H
		11490	44.51	-29.49	74	52.1	38.99	10.33	56.91	100	0	P	V
		17235	47.53	-26.47	74	50.58	42.01	12.65	57.71	100	0	P	V
													V
													V
802.11n HT20 CH 157 5785MHz		11570	43.96	-30.04	74	51.48	39.03	10.36	56.91	100	0	P	H
		17355	47.79	-26.21	74	50.99	41.96	12.85	58.01	100	0	P	H
													H
													H
		11570	44.85	-29.15	74	52.37	39.03	10.36	56.91	100	0	P	V
		17355	47.89	-26.11	74	51.09	41.96	12.85	58.01	100	0	P	V
													V
													V
802.11n HT20 CH 165 5825MHz		11650	44.12	-29.88	74	51.58	39.06	10.41	56.93	100	0	P	H
		17472	49.05	-24.95	74	52.41	41.91	13.04	58.31	100	0	P	H
													H
													H
		11650	44.5	-29.5	74	51.96	39.06	10.41	56.93	100	0	P	V
		17475	47.28	-26.72	74	50.64	41.91	13.04	58.31	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

5GHz WIFI 802.11n HT20 (LF @ 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)
5GHz 802.11n HT20 LF		109.11	34.21	-9.29	43.5	53.95	10.9	1.14	31.78			P	H
		141.51	37.53	-5.97	43.5	56.55	11.5	1.26	31.78	124	225	P	H
		191.19	36.81	-6.69	43.5	58.35	8.8	1.44	31.78			P	H
		318.2	34.19	-11.81	46	50.76	13.38	1.82	31.77			P	H
		812.4	31.9	-14.1	46	38.52	22.39	2.85	31.86			P	H
		985.3	25.73	-28.27	54	28.44	24.85	3.2	30.76			P	H
													H
													H
													H
													H
													H
													H
		125.04	32.71	-10.79	43.5	51.68	11.6	1.21	31.78			P	V
		141.24	37.48	-6.02	43.5	56.5	11.5	1.26	31.78	199	20	P	V
		250.05	32.71	-13.29	46	50.44	12.4	1.64	31.77			P	V
		500.2	29.89	-16.11	46	41.55	18	2.23	31.89			P	V
		750.1	32.06	-13.94	46	39.1	22.2	2.74	31.98			P	V
		913.2	35.72	-10.28	46	40.37	23.65	3.02	31.32			P	V
													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 per 15.209(c).
!	Test result is over limit line.
P/A	Peak or Average
H/V	H orizontal or V 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”.