



Appendix A. Radiated Spurious Emission

Test Engineer :	Luke Chang	Temperature :	21~22°C
		Relative Humidity :	45~47%

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		5713.72	61.63	-12.37	74	50.48	35.22	10.08	34.15	117	18	P	H
		5724.52	76.87	-1.43	78.3	65.76	35.23	10.03	34.15	117	18	P	H
		5714.6	45.65	-8.35	54	34.5	35.22	10.08	34.15	117	18	A	H
	*	5749	104.26	-	-	93.21	35.24	9.98	34.17	117	18	P	H
	*	5749	94.98	-	-	83.93	35.24	9.98	34.17	117	18	A	H
													H
													H
													H
		5714.9	59.24	-14.76	74	48.09	35.22	10.08	34.15	176	360	P	V
		5724.68	71.84	-6.46	78.3	60.73	35.23	10.03	34.15	176	360	P	V
		5713.88	43.6	-10.4	54	32.45	35.22	10.08	34.15	176	360	A	V
	*	5745	102.47	-	-	91.42	35.24	9.98	34.17	176	360	P	V
	*	5745	92.46	-	-	81.41	35.24	9.98	34.17	176	360	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		5714.04	55.69	-12.61	68.3	44.54	35.22	10.08	34.15	116	20	P	H
		5720.92	57.63	-20.67	78.3	46.52	35.23	10.03	34.15	116	20	P	H
	*	5785	108.74	-	-	97.77	35.27	9.93	34.23	116	20	P	H
	*	5785	98.84	-	-	87.87	35.27	9.93	34.23	116	20	A	H
		5851.52	56.04	-22.26	78.3	45.06	35.31	9.98	34.31	116	20	P	H
		5876.88	54.62	-13.68	68.3	43.61	35.33	10.03	34.35	116	20	P	H
													H
													H
		5690.2	54.7	-13.6	68.3	43.48	35.21	10.13	34.12	176	4	P	V
		5721.88	55.46	-22.84	78.3	44.35	35.23	10.03	34.15	176	4	P	V
	*	5787	106.91	-	-	95.93	35.28	9.93	34.23	176	4	P	V
	*	5787	96.74	-	-	85.76	35.28	9.93	34.23	176	4	A	V
		5852.16	55.09	-23.21	78.3	44.11	35.31	9.98	34.31	176	4	P	V
		5867.36	55.1	-13.2	68.3	44.1	35.32	10.03	34.35	176	4	P	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 165 5825MHz	*	5825	105.55	-	-	94.59	35.3	9.93	34.27	102	81	P	H
	*	5825	95.4	-	-	84.44	35.3	9.93	34.27	102	81	A	H
		5851.2	68.08	-10.22	78.3	57.1	35.31	9.98	34.31	102	81	P	H
		5860.4	62.38	-5.92	68.3	51.38	35.32	10.03	34.35	102	81	P	H
													H
													H
													H
													H
	*	5825	101.72	-	-	90.76	35.3	9.93	34.27	171	360	P	V
	*	5825	91.51	-	-	80.55	35.3	9.93	34.27	171	360	A	V
		5852.64	65.26	-13.04	78.3	54.28	35.31	9.98	34.31	171	360	P	V
		5863.04	58.24	-10.06	68.3	47.24	35.32	10.03	34.35	171	360	P	V
													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.
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		11487	50.09	-23.91	74	54.38	38.19	14.49	56.97	100	0	P	H
		17235	50.03	-23.97	74	47.05	42.21	16.96	56.19	100	0	P	H
													H
													H
		11490	47.17	-26.83	74	51.46	38.19	14.49	56.97	100	0	P	V
		17235	49.87	-24.13	74	46.89	42.21	16.96	56.19	100	0	P	V
													V
													V
802.11a CH 157 5785MHz		11568	52.58	-21.42	74	56.53	38.3	14.53	56.78	100	302	P	H
		11568	42.43	-11.57	54	46.38	38.3	14.53	56.78	100	302	A	H
		17355	50.71	-17.59	68.3	47.73	42.12	17.08	56.22	100	17	P	H
													H
		11568	49.11	-24.89	74	53.06	38.3	14.53	56.78	100	0	P	V
		17355	51.45	-16.85	68.3	48.47	42.12	17.08	56.22	100	0	P	V
													V
													V
802.11a CH 165 5825MHz		11655	51.6	-22.4	74	55.16	38.42	14.59	56.57	100	300	P	H
		11655	39.66	-14.34	54	43.22	38.42	14.59	56.57	100	300	A	H
		17475	51.25	-17.05	68.3	48.27	42.03	17.2	56.25	100	0	P	H
													H
		11650	49.11	-24.89	74	52.74	38.39	14.59	56.61	100	0	P	V
		17475	50.47	-17.83	68.3	47.49	42.03	17.2	56.25	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		5714.84	61.7	-6.6	68.3	50.55	35.22	10.08	34.15	118	16	P	H
		5724.04	76.97	-1.33	78.3	65.86	35.23	10.03	34.15	118	16	P	H
	*	5741	104.16	-	-	93.11	35.24	9.98	34.17	118	16	P	H
	*	5741	93.42	-	-	82.37	35.24	9.98	34.17	118	16	A	H
													H
													H
													H
													H
		5713.96	57.46	-10.84	68.3	46.31	35.22	10.08	34.15	112	164	P	V
		5724.52	73.49	-4.81	78.3	62.38	35.23	10.03	34.15	112	164	P	V
	*	5743	101.07	-	-	90.02	35.24	9.98	34.17	112	164	P	V
	*	5743	97.09	-	-	86.04	35.24	9.98	34.17	112	164	A	V
													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		5712.6	55.82	-12.48	68.3	44.67	35.22	10.08	34.15	103	68	P	H
		5724.84	55.83	-22.47	78.3	44.72	35.23	10.03	34.15	103	68	P	H
	*	5783	107.28	-	-	96.31	35.27	9.93	34.23	103	68	P	H
	*	5783	102.28	-	-	91.31	35.27	9.93	34.23	103	68	A	H
		5851.84	55.6	-22.7	78.3	44.62	35.31	9.98	34.31	103	68	P	H
		5875.84	54.63	-13.67	68.3	43.62	35.33	10.03	34.35	103	68	P	H
													H
													H
		5697.32	55.41	-12.89	68.3	44.24	35.21	10.08	34.12	176	11	P	V
		5719.4	55.06	-23.24	78.3	43.95	35.23	10.03	34.15	176	11	P	V
	*	5786	104.5	-	-	93.52	35.28	9.93	34.23	176	11	P	V
	*	5786	99.82	-	-	88.84	35.28	9.93	34.23	176	11	A	V
		5855.92	54.79	-23.51	78.3	43.8	35.32	9.98	34.31	176	11	P	V
		5869.44	55.38	-12.92	68.3	44.38	35.32	10.03	34.35	176	11	P	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 165 5825MHz	*	5824	104.06	-	-	93.1	35.3	9.93	34.27	112	67	P	H
	*	5824	99.08	-	-	88.12	35.3	9.93	34.27	112	67	A	H
		5850.48	70.96	-7.34	78.3	59.98	35.31	9.98	34.31	112	67	P	H
		5861.12	62.24	-6.06	68.3	51.24	35.32	10.03	34.35	112	67	P	H
													H
													H
													H
													H
	*	5827	103.92	-	-	92.96	35.3	9.93	34.27	199	24	P	V
	*	5827	98.12	-	-	87.16	35.3	9.93	34.27	199	24	A	V
		5850.24	70.13	-8.17	78.3	59.15	35.31	9.98	34.31	199	24	P	V
		5861.04	62.64	-5.66	68.3	51.64	35.32	10.03	34.35	199	24	P	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 802.11n 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		11489	50.56	-23.44	74	54.85	38.19	14.49	56.97	100	0	P	H
		17235	50.1	-18.2	68.3	47.12	42.21	16.96	56.19	100	0	P	H
													H
													H
		11489	47.32	-26.68	74	51.61	38.19	14.49	56.97	100	0	P	V
		17235	49.9	-18.4	68.3	46.92	42.21	16.96	56.19	100	0	P	V
													V
													V
802.11n HT20 CH 157 5785MHz		11569.8	53.67	-20.33	74	57.62	38.3	14.53	56.78	100	303	P	H
		11569.8	42.5	-11.5	54	46.45	38.3	14.53	56.78	100	303	A	H
		17355	49.72	-18.58	68.3	46.74	42.12	17.08	56.22	100	0	P	H
													H
		11570	48.24	-25.76	74	52.19	38.3	14.53	56.78	100	0	P	V
		17355	51.46	-16.84	68.3	48.48	42.12	17.08	56.22	100	0	P	V
													V
													V
802.11n HT20 CH 165 5825MHz		11650	51.41	-22.59	74	55.04	38.39	14.59	56.61	100	289	P	H
		11650	43.54	-10.46	54	47.17	38.39	14.59	56.61	100	289	A	H
		17475	49.92	-18.38	68.3	46.94	42.03	17.2	56.25	100	0	P	H
													H
		11650	47.78	-26.22	74	51.41	38.39	14.59	56.61	100	0	P	V
		17475	50.75	-17.55	68.3	47.77	42.03	17.2	56.25	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 HT40 (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 HT40 CH 151 5755MHz		5713.4	72.12	-1.88	74	60.97	35.22	10.08	34.15	106	16	P	H
		5719.64	72.16	-6.14	78.3	61.05	35.23	10.03	34.15	106	16	P	H
		5714.68	51.02	-2.98	54	39.87	35.22	10.08	34.15	106	16	A	H
	*	5755	99.96	-	-	88.91	35.24	9.98	34.17	106	16	P	H
	*	5755	90.05	-	-	78.98	35.26	9.98	34.17	106	16	A	H
		5859	53.6	-24.7	78.3	42.65	35.32	9.98	34.35	106	16	P	H
		5874.8	54.68	-19.32	74	43.67	35.33	10.03	34.35	106	16	P	H
		5875.12	43.65	-10.35	54	32.64	35.33	10.03	34.35	106	16	A	H
		5713.08	64.39	-9.61	74	53.24	35.22	10.08	34.15	108	0	P	V
		5721.56	70.93	-7.37	78.3	59.82	35.23	10.03	34.15	108	0	P	V
		5714.68	49.4	-4.6	54	38.25	35.22	10.08	34.15	108	0	A	V
	*	5756	97.75	-	-	86.71	35.26	9.98	34.2	108	0	P	V
	*	5756	92.28	-	-	81.24	35.26	9.98	34.2	108	0	A	V
		5856.88	54.88	-23.42	78.3	43.89	35.32	9.98	34.31	108	0	P	V
		5875.04	54.7	-19.3	74	43.69	35.33	10.03	34.35	108	0	P	V
		5874.96	42.42	-11.58	54	31.41	35.33	10.03	34.35	108	0	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 HT40 CH 159 5795MHz		5713.56	57.64	-16.36	74	46.49	35.22	10.08	34.15	100	48	P	H
		5724.76	62.99	-15.31	78.3	51.88	35.23	10.03	34.15	100	48	P	H
		5714.76	44.78	-9.22	54	33.63	35.22	10.08	34.15	100	48	A	H
	*	5797	104.92	-	-	93.99	35.28	9.88	34.23	100	48	P	H
	*	5797	99.92	-	-	88.99	35.28	9.88	34.23	100	48	A	H
		5853.36	65.45	-12.85	78.3	54.47	35.31	9.98	34.31	100	48	P	H
		5860	59.22	-14.78	74	48.27	35.32	9.98	34.35	100	48	P	H
		5860.08	46.67	-7.33	54	35.67	35.32	10.03	34.35	100	48	A	H
		5709	57.15	-16.85	74	46	35.22	10.08	34.15	112	45	P	V
		5721	57.04	-21.26	78.3	45.93	35.23	10.03	34.15	112	45	P	V
		5714.2	43.33	-10.67	54	32.18	35.22	10.08	34.15	112	45	A	V
	*	5791	101.82	-	-	90.89	35.28	9.88	34.23	112	45	P	V
	*	5791	96.81	-	-	85.88	35.28	9.88	34.23	112	45	A	V
		5850.32	60.84	-17.46	78.3	49.86	35.31	9.98	34.31	112	45	P	V
		5872.16	59.04	-14.96	74	48.03	35.33	10.03	34.35	112	45	P	V
		5861.28	45.19	-8.81	54	34.19	35.32	10.03	34.35	112	45	A	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 HT40 (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 HT40 CH 151 5755MHz		11510	47.19	-26.81	74	51.43	38.2	14.51	56.95	100	0	P	H
		17265	50.18	-23.82	74	47.18	42.19	17.01	56.2	100	0	P	H
													H
													H
		11510	46.34	-27.66	74	50.58	38.2	14.51	56.95	100	0	P	V
		17265	49.23	-24.77	74	46.23	42.19	17.01	56.2	100	0	P	V
													V
													V
802.11n HT40 CH 159 5795MHz		11590	50.55	-23.45	74	54.42	38.32	14.55	56.74	100	0	P	H
		17385	50.04	-23.96	74	47.05	42.09	17.13	56.23	100	0	P	H
													H
													H
		11590	46.69	-27.31	74	50.56	38.32	14.55	56.74	100	0	P	V
		17385	51.15	-22.85	74	48.16	42.09	17.13	56.23	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.
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		30.81	20.5	-19.5	40	33.14	18.28	0.54	31.46			P	H
		84.54	21.03	-18.97	40	43.37	7.88	0.9	31.12	223	303	P	H
		118.29	20.74	-22.76	43.5	39.47	11.29	1.09	31.11			P	H
		540.8	23.49	-22.51	46	33	18.72	2.53	30.76			P	H
		778.1	25.56	-20.44	46	30.79	22.02	3.1	30.35			P	H
		923	26.81	-19.19	46	29.67	24.09	3.4	30.35			P	H
													H
													H
													H
													H
													H
													H
		39.18	23.3	-16.7	40	39.45	14.44	0.61	31.2	164	22	P	V
		85.89	23.27	-16.73	40	45.23	8.22	0.92	31.1			P	V
		118.83	21.7	-21.8	43.5	40.36	11.35	1.1	31.11			P	V
		422.5	18.62	-27.38	46	30.43	16.76	2.22	30.79			P	V
		579.3	25.03	-20.97	46	33.47	19.61	2.63	30.68			P	V
		870.5	26.72	-19.28	46	30.78	23	3.3	30.36			P	V
	\												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”.