



Appendix B. Radiated Spurious Emission

Test Engineer :	Citta Ke	Temperature :	21~23°C
		Relative Humidity :	51~54%

<Sample 1>

Band 4 - 5725~5850MHz

WIFI 802.11a (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)
802.11a CH 149 5745MHz		5711.56	56.5	-17.5	74	46.82	32.23	11.61	34.16	100	278	P	H
		5724.2	70.4	-7.9	78.3	60.69	32.26	11.61	34.16	100	278	P	H
		5714.84	44.23	-9.77	54	34.55	32.23	11.61	34.16	100	278	P	H
	*	5747	101.15	-	-	91.38	32.29	11.64	34.16	100	278	P	H
	*	5747	91.3	-	-	81.53	32.29	11.64	34.16	100	278	A	H
													H
													H
													H
		5713.88	59.45	-14.55	74	49.77	32.23	11.61	34.16	100	228	P	V
		5724.68	72.63	-5.67	78.3	62.92	32.26	11.61	34.16	100	228	P	V
		5714.76	45	-9	54	35.32	32.23	11.61	34.16	100	228	P	V
	*	5744	105.75	-	-	95.98	32.29	11.64	34.16	100	228	P	V
	*	5744	95.57	-	-	85.8	32.29	11.64	34.16	100	228	A	V
													V
													V
													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		5713.96	54.69	-19.31	74	45.01	32.23	11.61	34.16	100	303	P	H
		5716.36	54.25	-24.05	78.3	44.57	32.23	11.61	34.16	100	303	P	H
		5703.56	43.27	-10.73	54	33.59	32.23	11.61	34.16	100	303	P	H
	*	5783	102.38	-	-	92.54	32.34	11.67	34.17	100	303	P	H
	*	5783	91.96	-	-	82.12	32.34	11.67	34.17	100	303	A	H
		5857.44	55.43	-22.87	78.3	45.37	32.48	11.76	34.18	100	303	P	H
		5888.08	55.35	-18.65	74	45.19	32.53	11.81	34.18	100	303	P	H
		5865.36	43.72	-10.28	54	33.66	32.48	11.76	34.18	100	303	P	H
		5701.88	54.92	-19.08	74	45.24	32.23	11.61	34.16	100	56	P	V
		5721	54.82	-23.48	78.3	45.11	32.26	11.61	34.16	100	56	P	V
		5709.32	43.51	-10.49	54	33.83	32.23	11.61	34.16	100	56	P	V
	*	5783	105.58	-	-	95.74	32.34	11.67	34.17	100	56	P	V
	*	5783	95.71	-	-	85.87	32.34	11.67	34.17	100	56	A	V
		5858.32	55.4	-22.9	78.3	45.34	32.48	11.76	34.18	100	56	P	V
		5868.16	56.31	-17.69	74	46.25	32.48	11.76	34.18	100	56	P	V
		5860.96	43.89	-10.11	54	33.83	32.48	11.76	34.18	100	56	P	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	*	5827	102.85	-	-	92.88	32.42	11.72	34.17	100	308	P	H
	*	5827	92.51	-	-	82.54	32.42	11.72	34.17	100	308	A	H
		5850.08	62.14	-16.16	78.3	52.1	32.45	11.76	34.17	100	308	P	H
		5864.48	55.87	-18.13	74	45.81	32.48	11.76	34.18	100	308	P	H
		5860.24	44.5	-9.5	54	34.44	32.48	11.76	34.18	100	308	P	H
													H
													H
													H
	*	5827	106.65	-	-	96.68	32.42	11.72	34.17	100	55	P	V
	*	5827	96	-	-	86.03	32.42	11.72	34.17	100	55	A	V
		5850.72	63.84	-14.46	78.3	53.8	32.45	11.76	34.17	100	55	P	V
		5863.36	57.36	-16.64	74	47.3	32.48	11.76	34.18	100	55	P	V
		5860.08	45.09	-8.91	54	35.03	32.48	11.76	34.18	100	55	P	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	47.25	-26.75	74	47.49	40.21	17.73	58.18	100	0	P	H
		17235	50.44	-23.56	74	45.77	41.56	20.8	57.69	100	0	P	H
													H
													H
		11490	47.72	-26.28	74	47.96	40.21	17.73	58.18	100	0	P	V
		17235	49.47	-24.53	74	44.8	41.56	20.8	57.69	100	0	P	V
													V
													V
802.11a CH 157 5785MHz		11570	48.27	-25.73	74	48.62	40.03	17.83	58.21	100	0	P	H
		17355	49.32	-24.68	74	44.45	42.19	20.77	58.09	100	0	P	H
													H
													H
		11570	48.56	-25.44	74	48.91	40.03	17.83	58.21	100	0	P	V
		17355	49.81	-24.19	74	44.94	42.19	20.77	58.09	100	0	P	V
													V
													V
802.11a CH 165 5825MHz		11650	47.76	-26.24	74	48.2	39.87	17.92	58.23	100	0	P	H
		17475	49.13	-24.87	74	44.07	42.82	20.73	58.49	100	0	P	H
													H
													H
		11650	48.53	-25.47	74	48.97	39.87	17.92	58.23	100	0	P	V
		17475	49.78	-24.22	74	44.72	42.82	20.73	58.49	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		5714.52	56.17	-17.83	74	46.49	32.23	11.61	34.16	113	280	P	H
		5724.76	69.39	-8.91	78.3	59.68	32.26	11.61	34.16	113	280	P	H
		5714.98	43.95	-10.05	54	34.27	32.23	11.61	34.16	113	280	P	H
	*	5743	101.25	-	-	91.48	32.29	11.64	34.16	113	280	P	H
	*	5743	91.46	-	-	81.69	32.29	11.64	34.16	113	280	A	H
													H
													H
													H
		5714.68	60.18	-13.82	74	50.5	32.23	11.61	34.16	100	233	P	V
		5724.68	75.42	-2.88	78.3	65.71	32.26	11.61	34.16	100	233	P	V
		5714.2	44.88	-9.12	54	35.2	32.23	11.61	34.16	100	233	P	V
	*	5744	105.54	-	-	95.77	32.29	11.64	34.16	100	233	P	V
													V
													V
													V
													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		5711	55.25	-18.75	74	45.57	32.23	11.61	34.16	100	310	P	H
		5716.44	54.42	-23.88	78.3	44.74	32.23	11.61	34.16	100	310	P	H
		5707.88	43.12	-10.88	54	33.44	32.23	11.61	34.16	100	310	P	H
	*	5787	98.91	-	-	89.04	32.37	11.67	34.17	100	310	P	H
	*	5787	90.5	-	-	80.63	32.37	11.67	34.17	100	310	A	H
		5858.8	54.95	-23.35	78.3	44.89	32.48	11.76	34.18	100	310	P	H
		5870	55.47	-18.53	74	45.41	32.48	11.76	34.18	100	310	P	H
		5862	43.59	-10.41	54	33.53	32.48	11.76	34.18	100	310	A	H
		5709.4	55.6	-18.4	74	45.92	32.23	11.61	34.16	100	53	P	V
		5722.68	55.23	-23.07	78.3	45.52	32.26	11.61	34.16	100	53	P	V
		5712.36	43.49	-10.51	54	33.81	32.23	11.61	34.16	100	53	P	V
	*	5785	107.05	-	-	97.21	32.34	11.67	34.17	100	53	P	V
	*	5785	96.73	-	-	86.89	32.34	11.67	34.17	100	53	A	V
		5855.6	55.19	-23.11	78.3	45.13	32.48	11.76	34.18	100	53	P	V
		5874.16	55.16	-18.84	74	45.07	32.51	11.76	34.18	100	53	P	V
		5869.36	43.78	-10.22	54	33.72	32.48	11.76	34.18	100	53	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	102.78	-	-	92.81	32.42	11.72	34.17	100	304	P	H
	*	5824	92	-	-	82.03	32.42	11.72	34.17	100	304	A	H
		5850.1	62	-16.3	78.3	51.96	32.45	11.76	34.17	100	304	P	H
		5860.4	55.44	-18.56	74	45.38	32.48	11.76	34.18	100	304	P	H
		5860.4	44.02	-9.98	54	33.96	32.48	11.76	34.18	100	304	P	H
													H
													H
													H
	*	5827	107.11	-	-	97.14	32.42	11.72	34.17	112	56	P	V
	*	5827	96.97	-	-	87	32.42	11.72	34.17	112	56	A	V
		5850.64	64.33	-13.97	78.3	54.29	32.45	11.76	34.17	112	56	P	V
		5860.08	58.77	-15.23	74	48.71	32.48	11.76	34.18	112	56	P	V
		5860.1	44.74	-9.26	54	34.68	32.48	11.76	34.18	112	56	P	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	48.23	-25.77	74	48.47	40.21	17.73	58.18	100	0	P	H
		17235	48.79	-25.21	74	44.12	41.56	20.8	57.69	100	0	P	H
													H
													H
		11490	48.49	-25.51	74	48.73	40.21	17.73	58.18	100	0	P	V
		17235	48.83	-25.17	74	44.16	41.56	20.8	57.69	100	0	P	V
													V
													V
802.11n HT20 CH 157 5785MHz		11570	47.38	-26.62	74	47.73	40.03	17.83	58.21	100	0	P	H
		17355	50.32	-23.68	74	45.45	42.19	20.77	58.09	100	0	P	H
													H
													H
		11570	48.03	-25.97	74	48.38	40.03	17.83	58.21	100	0	P	V
		17355	49.57	-24.43	74	44.7	42.19	20.77	58.09	100	0	P	V
													V
													V
802.11n HT20 CH 165 5825MHz		11650	47.87	-26.13	74	48.31	39.87	17.92	58.23	100	0	P	H
		17435	48.08	-25.92	74	43.07	42.64	20.74	58.37	100	0	P	H
													H
													H
		11650	47.93	-26.07	74	48.37	39.87	17.92	58.23	100	0	P	V
		17435	48.99	-25.01	74	43.98	42.64	20.74	58.37	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 802.11a (LF @ 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)
5GHz 802.11a LF		181.74	26.48	-17.02	43.5	45.71	9	2.09	30.32	-	-	P	H
		208.74	29.49	-14.01	43.5	48.58	9.11	2.09	30.29	153	67	P	H
		271.92	27.93	-18.07	46	42.54	13.24	2.34	30.19	-	-	P	H
		478.5	27.64	-18.36	46	36.86	17.52	3.12	29.86	-	-	P	H
		882.4	31.61	-14.39	46	33.59	23.01	4.3	29.29	-	-	P	H
		960.8	33.99	-20.01	54	33.41	25.06	4.58	29.06	-	-	P	H
													H
													H
													H
													H
													H
													H
		119.1	32.23	-11.27	43.5	49.55	11.43	1.64	30.39	-	-	P	V
		200.37	36.17	-7.33	43.5	55.32	9.06	2.09	30.3	184	63	P	V
		218.46	38.01	-7.99	46	56.9	9.17	2.21	30.27	-	-	P	V
		778.1	30.18	-15.82	46	33.17	22.26	4.17	29.42	-	-	P	V
		891.5	31.53	-14.47	46	33.37	23.02	4.42	29.28	-	-	P	V
		961.5	33.48	-20.52	54	32.9	25.06	4.58	29.06	-	-	P	V
													V
													V
													V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



<Sample 2>

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		5712.44	56.19	-17.81	74	46.51	32.23	11.61	34.16	115	232	P	H
		5724.36	70.55	-7.75	78.3	60.84	32.26	11.61	34.16	115	232	P	H
		5714.68	43.94	-10.06	54	34.26	32.23	11.61	34.16	115	232	P	H
	*	5747	102.4	-	-	92.63	32.29	11.64	34.16	115	232	P	H
	*	5747	92.14	-	-	82.37	32.29	11.64	34.16	115	232	A	H
													H
													H
													H
		5713.72	62.41	-11.59	74	52.73	32.23	11.61	34.16	100	205	P	V
		5724.36	74.56	-3.74	78.3	64.85	32.26	11.61	34.16	100	205	P	V
		5714.98	46.02	-7.98	54	36.34	32.23	11.61	34.16	100	205	P	V
	*	5744	106.41	-	-	96.64	32.29	11.64	34.16	100	205	P	V
	*	5744	96.61	-	-	86.84	32.29	11.64	34.16	100	205	A	V
													V
													V
													V
Remark - No other spurious found. - All results are PASS against 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	47.42	-26.58	74	47.66	40.21	17.73	58.18	100	0	P	H
		17235	53.53	-20.47	74	48.86	41.56	20.8	57.69	106	328	P	H
		17235	41.45	-12.55	54	36.78	41.56	20.8	57.69	106	328	A	H
													H
		11490	47.99	-26.01	74	48.23	40.21	17.73	58.18	100	0	P	V
		17235	56.91	-17.09	74	52.24	41.56	20.8	57.69	100	232	P	V
		17235	44.55	-9.45	54	39.88	41.56	20.8	57.69	100	232	A	V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission below 1GHz

5GHz WIFI 802.11a (LF @ 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)
5GHz 802.11a LF		93.18	23.95	-19.55	43.5	43.61	9.12	1.64	30.42	-	-	P	H
		133.68	24.37	-19.13	43.5	41.32	11.53	1.89	30.37	-	-	P	H
		143.13	23.54	-19.96	43.5	40.57	11.44	1.89	30.36	-	-	P	H
		710.2	28.85	-17.15	46	33.73	20.74	3.88	29.5	-	-	P	H
		860	31.33	-14.67	46	33.23	23.12	4.3	29.32	132	20	P	H
		978.3	33.71	-20.29	54	33.26	24.78	4.67	29	-	-	P	H
													H
													H
													H
													H
													H
													H
		95.88	24.99	-18.51	43.5	44.23	9.53	1.64	30.41	-	-	P	V
		209.55	30.83	-12.67	43.5	49.92	9.11	2.09	30.29	-	-	P	V
		268.95	27.95	-18.05	46	42.4	13.41	2.34	30.2	-	-	P	V
		582.8	26.35	-19.65	46	32.77	19.61	3.66	29.69	-	-	P	V
		762	30.45	-15.55	46	33.67	22.17	4.05	29.44	-	-	P	V
		951	34.45	-11.55	46	34.17	24.79	4.58	29.09	101	103	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.
!	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 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)
802.11b CH 01		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
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”.