



Appendix A. Radiated Spurious Emission

Test Engineer :	Donny Tang	Temperature :	22~25°C
		Relative Humidity :	42~45%

15C 2.4GHz 2400~2483.5MHz

WIFI 802.11b (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)	
802.11b CH 01 2412MHz		2388.75	48.74	-25.26	74	45.28	31.94	6.17	34.65	109	17	P	H	
		2389.65	37.13	-16.87	54	33.67	31.94	6.17	34.65	109	17	A	H	
	*	2412	104.01	-	-	100.49	31.95	6.21	34.64	109	17	P	H	
	*	2412	99.96	-	-	96.44	31.95	6.21	34.64	109	17	A	H	
													H	
													H	
			2362.2	49.12	-24.88	74	45.71	31.92	6.14	34.65	102	119	P	V
			2389.29	37.19	-16.81	54	33.73	31.94	6.17	34.65	102	119	A	V
	*		2412	101.41	-	-	97.89	31.95	6.21	34.64	102	119	P	V
	*		2412	97.16	-	-	93.64	31.95	6.21	34.64	102	119	A	V
														V
														V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.													



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 CH 06 2437MHz		2388.21	49.02	-24.98	74	45.56	31.94	6.17	34.65	137	64	P	H
		2389.83	37.17	-16.83	54	33.66	31.94	6.21	34.64	137	64	A	H
	*	2437	104.11	-	-	100.54	31.97	6.24	34.64	137	64	P	H
	*	2437	99.94	-	-	96.37	31.97	6.24	34.64	137	64	A	H
		2484.32	49.27	-24.73	74	45.61	31.99	6.3	34.63	137	64	P	H
		2483.88	37.42	-16.58	54	33.76	31.99	6.3	34.63	137	64	A	H
		2389.02	48.65	-25.35	74	45.19	31.94	6.17	34.65	100	118	P	V
		2389.74	37.06	-16.94	54	33.6	31.94	6.17	34.65	100	118	A	V
	*	2437	102.8	-	-	99.23	31.97	6.24	34.64	100	118	P	V
	*	2437	98.53	-	-	94.96	31.97	6.24	34.64	100	118	A	V
		2487.08	49.23	-24.77	74	45.57	31.99	6.3	34.63	100	118	P	V
		2483.6	37.3	-16.7	54	33.64	31.99	6.3	34.63	100	118	A	V
802.11b CH 11 2462MHz	*	2462	104.03	-	-	100.42	31.98	6.27	34.64	107	57	P	H
	*	2462	99.85	-	-	96.24	31.98	6.27	34.64	107	57	A	H
		2485.8	49.03	-24.97	74	45.37	31.99	6.3	34.63	107	57	P	H
		2483.6	37.76	-16.24	54	34.1	31.99	6.3	34.63	107	57	A	H
													H
													H
	*	2462	104.9	-	-	101.29	31.98	6.27	34.64	100	101	P	V
	*	2462	100.46	-	-	96.85	31.98	6.27	34.64	100	101	A	V
		2486.28	48.93	-25.07	74	45.27	31.99	6.3	34.63	100	101	P	V
		2483.68	37.71	-16.29	54	34.05	31.99	6.3	34.63	100	101	A	V
												V	
												V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15C 2.4GHz 2400~2483.5MHz

WIFI 802.11b (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)	
802.11b CH 01 2412MHz		4824	41.35	-32.65	74	59.2	34.36	8.6	60.81	100	0	P	H	
													H	
													H	
													H	
		4824	41.74	-32.26	74	59.59	34.36	8.6	60.81	100	0	P	V	
														V
														V
														V
802.11b CH 06 2437MHz		4875	42.73	-31.27	74	60.25	34.4	8.77	60.69	100	0	P	H	
		7311	47.27	-26.73	74	60.11	35.74	11.94	60.52	100	0	P	H	
													H	
													H	
		4875	42.47	-31.53	74	59.99	34.4	8.77	60.69	100	0	P	V	
		7311	47.7	-26.3	74	60.54	35.74	11.94	60.52	100	0	P	V	
														V
														V
802.11b CH 11 2462MHz		4923	41.1	-32.9	74	58.29	34.44	8.94	60.57	100	0	P	H	
		7386	46.82	-27.18	74	59.68	35.72	11.98	60.56	100	0	P	H	
													H	
													H	
		4923	41.55	-32.45	74	58.74	34.44	8.94	60.57	100	0	P	V	
		7386	47.2	-26.8	74	60.06	35.72	11.98	60.56	100	0	P	V	
														V
														V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.													



15C 2.4GHz 2400~2483.5MHz
WIFI 802.11g (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)	
802.11g CH 01 2412MHz		2389.11	58.19	-15.81	74	54.73	31.94	6.17	34.65	139	62	P	H	
		2389.92	40.9	-13.1	54	37.39	31.94	6.21	34.64	139	62	A	H	
	*	2412	106.09	-	-	102.57	31.95	6.21	34.64	139	62	P	H	
	*	2412	94.88	-	-	91.36	31.95	6.21	34.64	139	62	A	H	
													H	
													H	
			2389.38	54.31	-19.69	74	50.85	31.94	6.17	34.65	100	100	P	V
			2390	40.3	-13.7	54	36.79	31.94	6.21	34.64	100	100	A	V
	*		2412	103.97	-	-	100.45	31.95	6.21	34.64	100	100	P	V
	*		2412	93.58	-	-	90.06	31.95	6.21	34.64	100	100	A	V
													V	
													V	
802.11g CH 06 2437MHz		2384.34	49.3	-24.7	74	45.85	31.93	6.17	34.65	109	71	P	H	
		2384.61	38.08	-15.92	54	34.63	31.93	6.17	34.65	109	71	A	H	
	*	2437	105.85	-	-	102.28	31.97	6.24	34.64	109	71	P	H	
	*	2437	95.75	-	-	92.18	31.97	6.24	34.64	109	71	A	H	
			2493.68	49.35	-24.65	74	45.64	32	6.34	34.63	109	71	P	H
			2488.8	37.91	-16.09	54	34.24	32	6.3	34.63	109	71	A	H
			2385.42	49.54	-24.46	74	46.09	31.93	6.17	34.65	100	97	P	V
			2384.79	37.87	-16.13	54	34.42	31.93	6.17	34.65	100	97	A	V
	*		2437	105.6	-	-	102.03	31.97	6.24	34.64	100	97	P	V
	*		2437	95.42	-	-	91.85	31.97	6.24	34.64	100	97	A	V
			2486.68	48.63	-25.37	74	44.97	31.99	6.3	34.63	100	97	P	V
			2488.92	37.64	-16.36	54	33.97	32	6.3	34.63	100	97	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.													



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)	
802.11g CH 11 2462MHz	*	2462	106.36	-	-	102.75	31.98	6.27	34.64	107	66	P	H	
	*	2462	95.44	-	-	91.83	31.98	6.27	34.64	107	66	A	H	
		2484.12	63.18	-10.82	74	59.52	31.99	6.3	34.63	107	66	P	H	
		2483.52	41.24	-12.76	54	37.58	31.99	6.3	34.63	107	66	A	H	
													H	
														H
	*	2462	104.13	-	-	100.52	31.98	6.27	34.64	100	97	P	V	
	*	2462	93.87	-	-	90.26	31.98	6.27	34.64	100	97	A	V	
		2483.6	59.75	-14.25	74	56.09	31.99	6.3	34.63	100	97	P	V	
		2483.6	39.56	-14.44	54	35.9	31.99	6.3	34.63	100	97	A	V	
														V
														V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.													



15C 2.4GHz 2400~2483.5MHz

WIFI 802.11g (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)	
802.11g CH 01 2412MHz		4824	40.16	-33.84	74	58.01	34.36	8.6	60.81	100	0	P	H	
													H	
													H	
													H	
		4824	40.99	-33.01	74	58.84	34.36	8.6	60.81	100	0	P	V	
														V
														V
														V
802.11g CH 06 2437MHz		4875	41.96	-32.04	74	59.48	34.4	8.77	60.69	100	0	P	H	
		7311	43.26	-30.74	74	56.1	35.74	11.94	60.52	100	0	P	H	
													H	
													H	
		4875	40.73	-33.27	74	58.25	34.4	8.77	60.69	100	0	P	V	
		7311	44.73	-29.27	74	57.57	35.74	11.94	60.52	100	0	P	V	
														V
														V
802.11g CH 11 2462MHz		4923	40.63	-33.37	74	57.82	34.44	8.94	60.57	100	0	P	H	
		7386	44.53	-29.47	74	57.39	35.72	11.98	60.56	100	0	P	H	
													H	
													H	
		4923	40.54	-33.46	74	57.73	34.44	8.94	60.57	100	0	P	V	
		7386	44.01	-29.99	74	56.87	35.72	11.98	60.56	100	0	P	V	
														V
														V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.													



15C 2.4GHz 2400~2483.5MHz
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 01 2412MHz		2389.92	59.76	-14.24	74	56.25	31.94	6.21	34.64	111	59	P	H	
		2390	42.51	-11.49	54	39	31.94	6.21	34.64	111	59	A	H	
	*	2412	105.3	-	-	101.78	31.95	6.21	34.64	111	59	P	H	
	*	2412	94.88	-	-	91.36	31.95	6.21	34.64	111	59	A	H	
													H	
														H
			2390	55.21	-18.79	74	51.7	31.94	6.21	34.64	100	102	P	V
			2390	40.35	-13.65	54	36.84	31.94	6.21	34.64	100	102	A	V
		*	2412	103.12	-	-	99.6	31.95	6.21	34.64	100	102	P	V
		*	2412	92.32	-	-	88.8	31.95	6.21	34.64	100	102	A	V
														V
														V
802.11n HT20 CH 06 2437MHz		2385.24	48.89	-25.11	74	45.44	31.93	6.17	34.65	109	60	P	H	
		2385.6	38.39	-15.61	54	34.93	31.94	6.17	34.65	109	60	A	H	
	*	2437	105.52	-	-	101.95	31.97	6.24	34.64	109	60	P	H	
	*	2437	95.03	-	-	91.46	31.97	6.24	34.64	109	60	A	H	
			2489	49.7	-24.3	74	46.03	32	6.3	34.63	109	60	P	H
			2488.4	38.37	-15.63	54	34.7	32	6.3	34.63	109	60	A	H
			2313.15	48.8	-25.2	74	45.49	31.89	6.07	34.65	100	99	P	V
			2385.6	37.43	-16.57	54	33.97	31.94	6.17	34.65	100	99	A	V
		*	2437	103.4	-	-	99.83	31.97	6.24	34.64	100	99	P	V
		*	2437	92.43	-	-	88.86	31.97	6.24	34.64	100	99	A	V
			2488.68	48.22	-25.78	74	44.55	32	6.3	34.63	100	99	P	V
			2488.52	37.73	-16.27	54	34.06	32	6.3	34.63	100	99	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.													



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 11 2462MHz	*	2462	106.57	-	-	102.96	31.98	6.27	34.64	107	57	P	H	
	*	2462	95.79	-	-	92.18	31.98	6.27	34.64	107	57	A	H	
		2483.84	64.28	-9.72	74	60.62	31.99	6.3	34.63	107	57	P	H	
		2483.52	41.05	-12.95	54	37.39	31.99	6.3	34.63	107	57	A	H	
													H	
														H
	*	2462	103.62	-	-	100.01	31.98	6.27	34.64	100	98	P	V	
	*	2462	92.88	-	-	89.27	31.98	6.27	34.64	100	98	A	V	
		2483.84	57.48	-16.52	74	53.82	31.99	6.3	34.63	100	98	P	V	
		2483.56	38.93	-15.07	54	35.27	31.99	6.3	34.63	100	98	A	V	
														V
														V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.													



15C 2.4GHz 2400~2483.5MHz

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 01 2412MHz		4824	40.67	-33.33	74	566.1	-500	8.6	34.03	100	0	P	H
													H
													H
													H
													V
													V
													V
802.11n HT20 CH 06 2437MHz		4875	40.14	-33.86	74	57.66	34.4	8.77	60.69	100	0	P	H
		7311	43.55	-30.45	74	56.39	35.74	11.94	60.52	100	0	P	H
													H
													H
													V
													V
													V
802.11n HT20 CH 11 2462MHz		4923	41.05	-32.95	74	58.24	34.44	8.94	60.57	100	0	P	H
		7386	43.79	-30.21	74	56.65	35.72	11.98	60.56	100	0	P	H
													H
													H
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average 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	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+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”.



15C 2.4GHz 2400~2483.5MHz
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.		
2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
802.11n HT20 CH 11 2462MHz	*	2462.124	103.54	-	-	99.93	31.98	6.27	34.64	164	188	P	H	
	*	2462	92.57	-	-	88.96	31.98	6.27	34.64	164	188	A	H	
		2484.12	56.51	-17.49	74	52.85	31.99	6.3	34.63	164	188	P	H	
		2483.56	39.34	-14.66	54	35.68	31.99	6.3	34.63	164	188	A	H	
													H	
														H
	*	2462	99.58	-	-	95.97	31.98	6.27	34.64	100	242	P	V	
	*	2462	88.84	-	-	85.23	31.98	6.27	34.64	100	242	A	V	
		2483.8	52.81	-21.19	74	49.15	31.99	6.3	34.63	100	242	P	V	
		2483.52	37.68	-16.32	54	34.02	31.99	6.3	34.63	100	242	A	V	
													V	
													V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.													

15C 2.4GHz 2400~2483.5MHz
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.		
2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
802.11n HT20 CH 11 2462MHz		4923	42.05	-31.95	74	59.24	34.44	8.94	60.57	100	0	P	H	
		7386	44.79	-29.21	74	57.65	35.72	11.98	60.56	100	0	P	H	
													H	
														H
		4923	41.6	-32.4	74	58.79	34.44	8.94	60.57	100	0	P	V	
		7386	42.3	-31.7	74	55.16	35.72	11.98	60.56	100	0	P	V	
														V
													V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average 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	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+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”.