



Appendix A. Radiated Spurious Emission

Test Engineer :	Kyle Jhuang and Citta Ke and Karl Hou	Temperature :	25~26°C
		Relative Humidity :	50~51%

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		2390	60.6	-13.4	74	56.86	32.77	4.62	33.65	110	18	P	H	
		2390	52.23	-1.77	54	48.49	32.77	4.62	33.65	110	18	A	H	
	*	2410.521	109.83	-	-	106	32.81	4.65	33.63	110	18	P	H	
	*	2411.189	105.27	-	-	101.44	32.81	4.65	33.63	110	18	A	H	
													H	
														H
			2390	57.28	-16.72	74	53.54	32.77	4.62	33.65	146	150	P	V
			2390	47.46	-6.54	54	43.72	32.77	4.62	33.65	146	150	A	V
	*		2410.438	105.44	-	-	101.61	32.81	4.65	33.63	146	150	P	V
	*		2411.105	100.96	-	-	97.13	32.81	4.65	33.63	146	150	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		2354.28	56.51	-17.49	74	52.92	32.7	4.57	33.68	110	20	P	H	
		2358.69	43.33	-10.67	54	39.71	32.7	4.6	33.68	110	20	A	H	
	*	2435.905	110.75	-	-	106.84	32.85	4.68	33.62	110	20	P	H	
	*	2436.239	105.92	-	-	102.01	32.85	4.68	33.62	110	20	A	H	
		2489.64	56.22	-17.78	74	52.05	33	4.73	33.56	110	20	P	H	
														H
		2359.95	55.5	-18.5	74	51.88	32.7	4.6	33.68	148	243	P	V	
		2359.05	42.25	-11.75	54	38.63	32.7	4.6	33.68	148	243	A	V	
	*	2435.571	106.96	-	-	103.05	32.85	4.68	33.62	148	243	P	V	
	*	2436.156	102.42	-	-	98.51	32.85	4.68	33.62	148	243	A	V	
		2498.44	55.51	-18.49	74	51.34	33	4.73	33.56	148	243	P	V	
		2484.12	42.36	-11.64	54	38.24	32.96	4.73	33.57	148	243	A	V	
	802.11b CH 11 2462MHz	*	2463.376	109.67	-	-	105.64	32.92	4.7	33.59	109	64	P	H
*		2462.792	104.21	-	-	100.18	32.92	4.7	33.59	109	64	A	H	
		2483.64	59.52	-14.48	74	55.4	32.96	4.73	33.57	109	64	P	H	
		2483.52	50.48	-3.52	54	46.36	32.96	4.73	33.57	109	64	A	H	
													H	
													H	
*		2463.126	102.55	-	-	98.52	32.92	4.7	33.59	100	78	P	V	
*		2461.206	98.02	-	-	93.99	32.92	4.7	33.59	100	78	A	V	
		2483.64	56.12	-17.88	74	52	32.96	4.73	33.57	100	78	P	V	
		2483.52	44.33	-9.67	54	40.21	32.96	4.73	33.57	100	78	A	V	
													V	
												V		
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.													



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	49.52	-24.48	74	66.56	35.03	6.54	58.61	100	0	P	H
													H
													H
													H
		4824	46.86	-27.14	74	63.9	35.03	6.54	58.61	100	0	P	V
													V
													V
													V
802.11b CH 06 2437MHz		4875	46.49	-27.51	74	63.43	35.02	6.56	58.52	100	0	P	H
		7311	48.79	-25.21	74	62.32	36.39	8.24	58.16	100	0	P	H
													H
													H
		4875	48.17	-25.83	74	65.11	35.02	6.56	58.52	100	0	P	V
		7311	53.14	-20.86	74	66.67	36.39	8.24	58.16	100	0	P	V
													V
													V
802.11b CH 11 2462MHz		4926	47.54	-26.46	74	64.35	35.01	6.6	58.42	100	0	P	H
		7386	48.23	-25.77	74	61.79	36.44	8.31	58.31	100	0	P	H
													H
													H
		4926	48.99	-25.01	74	65.8	35.01	6.6	58.42	100	0	P	V
		7386	51.02	-22.98	74	64.58	36.44	8.31	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.												



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		2387.94	72.35	-1.65	74	68.61	32.77	4.62	33.65	109	82	P	H	
		2388.93	47.95	-6.05	54	44.21	32.77	4.62	33.65	109	82	A	H	
	*	2410	109.16	-	-	105.33	32.81	4.65	33.63	109	82	P	H	
	*	2410	99	-	-	95.17	32.81	4.65	33.63	109	82	A	H	
													H	
													H	
			2389.74	68.92	-5.08	74	65.18	32.77	4.62	33.65	112	84	P	V
			2388.48	44.8	-9.2	54	41.06	32.77	4.62	33.65	112	84	A	V
	*		2410	103.54	-	-	99.71	32.81	4.65	33.63	112	84	P	V
	*		2410	91.99	-	-	88.16	32.81	4.65	33.63	112	84	A	V
														V
														V
802.11g CH 06 2437MHz		2389.65	73.25	-0.75	74	69.51	32.77	4.62	33.65	108	16	P	H	
		2390	48.65	-5.35	54	44.91	32.77	4.62	33.65	108	16	A	H	
	*	2435	111.42	-	-	107.51	32.85	4.68	33.62	108	16	P	H	
	*	2435	101.45	-	-	97.54	32.85	4.68	33.62	108	16	A	H	
			2485.2	70.34	-3.66	74	66.22	32.96	4.73	33.57	108	16	P	H
			2483.52	47.67	-6.33	54	43.55	32.96	4.73	33.57	108	16	A	H
			2386.86	65.12	-8.88	74	61.38	32.77	4.62	33.65	188	182	P	V
			2389.56	45.14	-8.86	54	41.4	32.77	4.62	33.65	188	182	A	V
	*		2435	106.16	-	-	102.25	32.85	4.68	33.62	188	182	P	V
	*		2435	96.21	-	-	92.3	32.85	4.68	33.62	188	182	A	V
			2487.92	64.58	-9.42	74	60.41	33	4.73	33.56	188	182	P	V
			2483.6	44.29	-9.71	54	40.17	32.96	4.73	33.57	188	182	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	*	2460	108.82	-	-	104.79	32.92	4.7	33.59	108	15	P	H
	*	2460	98.82	-	-	94.79	32.92	4.7	33.59	108	15	A	H
		2484	73.12	-0.88	74	69	32.96	4.73	33.57	108	15	P	H
		2484.04	47.58	-6.42	54	43.46	32.96	4.73	33.57	108	15	A	H
													H
													H
	*	2460	100.71	-	-	96.68	32.92	4.7	33.59	100	67	P	V
	*	2460	89.26	-	-	85.23	32.92	4.7	33.59	100	67	A	V
		2484.64	64.06	-9.94	74	59.94	32.96	4.73	33.57	100	67	P	V
		2484.04	43.34	-10.66	54	39.22	32.96	4.73	33.57	100	67	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



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		4826	44.78	-29.22	74	61.82	35.03	6.54	58.61	100	0	P	H	
													H	
													H	
													H	
		4826	43.2	-30.8	74	60.24	35.03	6.54	58.61	100	0	P	V	
														V
														V
														V
802.11g CH 06 2437MHz		4875	44.75	-29.25	74	61.69	35.02	6.56	58.52	100	0	P	H	
		7313	49.3	-24.7	74	62.83	36.39	8.24	58.16	100	0	P	H	
													H	
													H	
		4876	44.96	-29.04	74	61.88	35.02	6.58	58.52	100	0	P	V	
		7313	53.36	-20.64	74	66.89	36.39	8.24	58.16	100	0	P	V	
														V
														V
802.11g CH 11 2462MHz		4923	42.75	-31.25	74	59.57	35.01	6.59	58.42	100	0	P	H	
		7386	42.27	-31.73	74	55.83	36.44	8.31	58.31	100	0	P	H	
													H	
													H	
		4923	43.4	-30.6	74	60.22	35.01	6.59	58.42	100	0	P	V	
		7384	47.43	-26.57	74	60.99	36.44	8.31	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.													



**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		2388.12	72.9	-1.1	74	69.16	32.77	4.62	33.65	108	82	P	H	
		2388.84	47.62	-6.38	54	43.88	32.77	4.62	33.65	108	82	A	H	
	*	2410	108.22	-	-	104.39	32.81	4.65	33.63	108	82	P	H	
	*	2410	97.99	-	-	94.16	32.81	4.65	33.63	108	82	A	H	
													H	
													H	
			2388.03	68.82	-5.18	74	65.08	32.77	4.62	33.65	147	182	P	V
			2389.29	45.45	-8.55	54	41.71	32.77	4.62	33.65	147	182	A	V
	*		2414	103.55	-	-	99.72	32.81	4.65	33.63	147	182	P	V
	*		2414	93.17	-	-	89.34	32.81	4.65	33.63	147	182	A	V
													V	
													V	
802.11n HT20 CH 06 2437MHz		2388.3	68.79	-5.21	74	65.05	32.77	4.62	33.65	109	24	P	H	
		2389.92	47.44	-6.56	54	43.7	32.77	4.62	33.65	109	24	A	H	
	*	2435	109.85	-	-	105.94	32.85	4.68	33.62	109	24	P	H	
	*	2435	99.87	-	-	95.96	32.85	4.68	33.62	109	24	A	H	
			2484.48	65.54	-8.46	74	61.42	32.96	4.73	33.57	109	24	P	H
			2483.52	45.27	-8.73	54	41.15	32.96	4.73	33.57	109	24	A	H
			2389.2	62.7	-11.3	74	58.96	32.77	4.62	33.65	147	243	P	V
			2388.48	44.36	-9.64	54	40.62	32.77	4.62	33.65	147	243	A	V
	*		2435	106.15	-	-	102.24	32.85	4.68	33.62	147	243	P	V
	*		2435	96.36	-	-	92.45	32.85	4.68	33.62	147	243	A	V
		2486.08	63.07	-10.93	74	58.95	32.96	4.73	33.57	147	243	P	V	
		2483.92	44.01	-9.99	54	39.89	32.96	4.73	33.57	147	243	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	*	2460	105.97	-	-	101.94	32.92	4.7	33.59	106	30	P	H
	*	2460	95.91	-	-	91.88	32.92	4.7	33.59	106	30	A	H
		2483.52	73.31	-0.69	74	69.19	32.96	4.73	33.57	106	30	P	H
		2483.76	46.04	-7.96	54	41.92	32.96	4.73	33.57	106	30	A	H
													H
													H
	*	2464	100.49	-	-	96.46	32.92	4.7	33.59	100	78	P	V
	*	2464	90.46	-	-	86.43	32.92	4.7	33.59	100	78	A	V
		2486.56	66.56	-7.44	74	62.44	32.96	4.73	33.57	100	78	P	V
		2486.44	43.91	-10.09	54	39.79	32.96	4.73	33.57	100	78	A	V
													V
													V
Remark	3. No other spurious found. 4. All results are PASS against Peak and Average limit line.												



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		4826	42.96	-31.04	74	60	35.03	6.54	58.61	100	0	P	H
													H
													H
													H
		4824	41.85	-32.15	74	58.89	35.03	6.54	58.61	100	0	P	V
													V
													V
802.11n HT20 CH 06 2437MHz		4872	43.7	-30.3	74	60.64	35.02	6.56	58.52	100	0	P	H
		7311	45.56	-28.44	74	59.09	36.39	8.24	58.16	100	0	P	H
													H
													H
		4876	43.76	-30.24	74	60.68	35.02	6.58	58.52	100	0	P	V
		7313	51.05	-22.95	74	64.58	36.39	8.24	58.16	100	0	P	V
													V
802.11n HT20 CH 11 2462MHz		4926	43.51	-30.49	74	60.32	35.01	6.6	58.42	100	0	P	H
		7386	43.09	-30.91	74	56.65	36.44	8.31	58.31	100	0	P	H
													H
													H
		4922	43.63	-30.37	74	60.45	35.01	6.59	58.42	100	0	P	V
		7386	43.66	-30.34	74	57.22	36.44	8.31	58.31	100	0	P	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”.



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.		
2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
802.11b CH 01 2412MHz		2389.56	59.98	-14.02	74	56.24	32.77	4.62	33.65	108	306	P	H	
		2390	50.33	-3.67	54	46.59	32.77	4.62	33.65	108	306	A	H	
	*	2413	107.62	-	-	103.79	32.81	4.65	33.63	108	306	P	H	
	*	2413	102.97	-	-	99.14	32.81	4.65	33.63	108	306	A	H	
													H	
														H
			2389.83	59.54	-14.46	74	55.8	32.77	4.62	33.65	100	283	P	V
			2390	50.44	-3.56	54	46.7	32.77	4.62	33.65	100	283	A	V
	*		2410.438	110.23	-	-	106.4	32.81	4.65	33.63	100	283	P	V
	*		2411.189	105.31	-	-	101.48	32.81	4.65	33.63	100	283	A	V
														V
														V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.													

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.		
2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
802.11b CH 01 2412MHz		4824	52.77	-21.23	74	69.81	35.03	6.54	58.61	100	0	P	H	
													H	
													H	
													H	
			4824	47.96	-26.04	74	65	35.03	6.54	58.61	100	0	P	V
														V
														V
														V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.													



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	*	2464	104.76	-	-	100.73	32.92	4.7	33.59	110	307	P	H
	*	2464	93.79	-	-	89.76	32.92	4.7	33.59	110	307	A	H
		2484.84	70.91	-3.09	74	66.79	32.96	4.73	33.57	110	307	P	H
		2483.68	46.15	-7.85	54	42.03	32.96	4.73	33.57	110	307	A	H
													H
													H
	*	2464	106.4	-	-	102.37	32.92	4.7	33.59	100	278	P	V
	*	2464	96.15	-	-	92.12	32.92	4.7	33.59	100	278	A	V
		2483.92	70.81	-3.19	74	66.69	32.96	4.73	33.57	100	278	P	V
		2483.52	46.89	-7.11	54	42.77	32.96	4.73	33.57	100	278	A	V
												V	
												V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

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		4922	45.82	-28.18	74	62.64	35.01	6.59	58.42	100	0	P	H
		7388	49.75	-24.25	74	63.31	36.44	8.31	58.31	100	0	P	H
													H
													H
		4926	42.76	-31.24	74	59.57	35.01	6.6	58.42	100	0	P	V
		7386	49.59	-24.41	74	63.15	36.44	8.31	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.												



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”.



**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+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
802.11n HT20 CH 01 2412MHz		2389.47	67.91	-6.09	74	64.17	32.77	4.62	33.65	109	74	P	H	
		2389.74	44.86	-9.14	54	41.12	32.77	4.62	33.65	109	74	A	H	
	*	2410	103.82	-	-	99.99	32.81	4.65	33.63	109	74	P	H	
	*	2410	93.83	-	-	90	32.81	4.65	33.63	109	74	A	H	
													H	
													H	
			2387.76	68.2	-5.8	74	64.46	32.77	4.62	33.65	154	189	P	V
			2389.65	43.97	-10.03	54	40.23	32.77	4.62	33.65	154	189	A	V
		*	2410	101.24	-	-	97.41	32.81	4.65	33.63	154	189	P	V
		*	2410	91.03	-	-	87.2	32.81	4.65	33.63	154	189	A	V
													V	
													V	
802.11n HT20 CH 06 2437MHz		2388.03	62.07	-11.93	74	58.33	32.77	4.62	33.65	105	75	P	H	
		2389.65	44.13	-9.87	54	40.39	32.77	4.62	33.65	105	75	A	H	
		*	2435	104.96	-	-	101.05	32.85	4.68	33.62	105	75	P	H
		*	2435	94.99	-	-	91.08	32.85	4.68	33.62	105	75	A	H
			2491.08	62.26	-11.74	74	58.09	33	4.73	33.56	105	75	P	H
			2490.6	43.68	-10.32	54	39.51	33	4.73	33.56	105	75	A	H
			2343.75	55.32	-18.68	74	51.78	32.66	4.57	33.69	102	69	P	V
			2385.06	42.42	-11.58	54	38.73	32.73	4.62	33.66	102	69	A	V
		*	2439	100.17	-	-	96.2	32.89	4.68	33.6	102	69	P	V
		*	2439	90.01	-	-	86.04	32.89	4.68	33.6	102	69	A	V
		2487.88	55.58	-18.42	74	51.41	33	4.73	33.56	102	69	P	V	
		2484.44	42.97	-11.03	54	38.85	32.96	4.73	33.57	102	69	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+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
802.11n HT20 CH 11 2462MHz	*	2464	107.13	-	-	103.1	32.92	4.7	33.59	107	65	P	H	
	*	2464	96.63	-	-	92.6	32.92	4.7	33.59	107	65	A	H	
		2485.32	73.13	-0.87	74	69.01	32.96	4.73	33.57	107	65	P	H	
		2486.68	46.88	-7.12	54	42.76	32.96	4.73	33.57	107	65	A	H	
													H	
														H
	*	2464	99.91	-	-	95.88	32.92	4.7	33.59	100	79	P	V	
	*	2464	89.03	-	-	85	32.92	4.7	33.59	100	79	A	V	
		2484.84	64.12	-9.88	74	60	32.96	4.73	33.57	100	79	P	V	
		2488.24	43.44	-10.56	54	39.27	33	4.73	33.56	100	79	A	V	
														V
														V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.													



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+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
802.11n HT20 CH 01 2412MHz		4824	40.66	-33.34	74	57.7	35.03	6.54	58.61	100	0	P	H	
													H	
													H	
													H	
		4824	39.99	-34.01	74	57.03	35.03	6.54	58.61	100	0	P	V	
														V
														V
802.11n HT20 CH 06 2437MHz		4876	41.8	-32.2	74	58.72	35.02	6.58	58.52	100	0	P	H	
		7311	41.82	-32.18	74	55.35	36.39	8.24	58.16	100	0	P	H	
													H	
													H	
		4875	43.15	-30.85	74	60.09	35.02	6.56	58.52	100	0	P	V	
		7311	46.36	-27.64	74	59.89	36.39	8.24	58.16	100	0	P	V	
														V
802.11n HT20 CH 11 2462MHz		4926	43.12	-30.88	74	59.93	35.01	6.6	58.42	100	0	P	H	
		7386	41.73	-32.27	74	55.29	36.44	8.31	58.31	100	0	P	H	
													H	
													H	
		4926	42.17	-31.83	74	58.98	35.01	6.6	58.42	100	0	P	V	
		7386	43.83	-30.17	74	57.39	36.44	8.31	58.31	100	0	P	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

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”.