

# FCC ID : 2AATV-FWR7102

## RF EXPOSURE EVALUATION

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency(RF) Radiation as specified in §1.1307(b)

Limits for Maximum Permissible Exposure (MPE)

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density(mW/cm <sup>2</sup> )	Average Time
<b>(A) Limits for Occupational/Control Exposures</b>				
300-1500	--	--	F/300	6
1500-100000	--	--	5	6
<b>(B) Limits for General Population/Uncontrol Exposures</b>				
300-1500	--	--	F/1500	6
1500-100000	--	--	1	30

### 11.1 Friis transmission formula: $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

$P_d$  = Power density in mW/cm<sup>2</sup>

$P_{out}$  = output power to antenna in mW

$G$  = Numeric gain of the antenna relative to isotropic antenna

$\pi$  = 3.1416

$R$  = distance between observation point and center of the radiator in cm

$P_d$  the limit of MPE, 1mW/cm<sup>2</sup>. If we know the maximum gain of the antenna and total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

### 11.2 Measurement Result

Antenna gain: WIFI antenna A: 2.5dBi

WIFI antenna B: 2.5dBi

Array gain:  $\approx$ 5.51dBi

## Tune up power

Mode	Ant. A	Ant.B
80.22b	16±1	16±1
802.11g	19±1	19±1
802.11n (ht20)	19±1	19±1
802.11n (ht40)	17±1	17±1

### Antenna A

Mode	Channel Freq. (MHz)	Measured power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Antenna Gain Numeric	Evaluation result (mW/cm <sup>2</sup> )	Power density Limits (mW/cm <sup>2</sup> )
802.11b	2412	16.71	16±1	17	1.778	0.0177	1
	2437	16.69	16±1	17	1.778	0.0177	1
	2462	16.41	16±1	17	1.778	0.0177	1
80.11g	2412	19.41	19±1	20	1.778	0.0354	1
	2437	19.75	19±1	20	1.778	0.0354	1
	2462	19.32	19±1	20	1.778	0.0354	1
802.11n (ht20)	2412	19.09	19±1	20	1.778	0.0354	1
	2437	18.93	19±1	20	1.778	0.0354	1
	2462	18.81	19±1	20	1.778	0.0354	1
802.11n (ht40)	2422	17.16	17±1	18	1.778	0.0223	1
	2437	17.34	17±1	18	1.778	0.0223	1
	2452	17.09	17±1	18	1.778	0.0223	1

### Antenna B

Mode	Channel Freq. (MHz)	Measured power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Antenna Gain Numeric	Evaluation result (mW/cm <sup>2</sup> )	Power density Limits (mW/cm <sup>2</sup> )
802.11b	2412	16.65	16±1	17	1.778	0.0177	1
	2437	16.44	16±1	17	1.778	0.0177	1
	2462	16.37	16±1	17	1.778	0.0177	1
80.11g	2412	19.41	19±1	20	1.778	0.0354	1
	2437	19.59	19±1	20	1.778	0.0354	1
	2462	19.27	19±1	20	1.778	0.0354	1
802.11n (ht20)	2412	19.01	19±1	20	1.778	0.0354	1
	2437	19.05	19±1	20	1.778	0.0354	1
	2462	18.62	19±1	20	1.778	0.0354	1
802.11n (ht40)	2422	17.25	17±1	18	1.778	0.0223	1
	2437	17.11	17±1	18	1.778	0.0223	1
	2452	16.91	17±1	18	1.778	0.0223	1

802.11n HT20: Antenna A+B

Evaluation result (mW/cm <sup>2</sup> ) Ant A	Evaluation result (mW/cm <sup>2</sup> ) Ant B	Evaluation result (mW/cm <sup>2</sup> ) Ant A+B	Power density Limits (mW/cm <sup>2</sup> )
0.0354	0.0354	0.0707	1

802.11n HT40 : Antenna A+B

Evaluation result (mW/cm <sup>2</sup> ) Ant A	Evaluation result (mW/cm <sup>2</sup> ) Ant B	Evaluation result (mW/cm <sup>2</sup> ) Ant A+B	Power density Limits (mW/cm <sup>2</sup> )
0.0223	0.0223	0.0466	1