

# FCC ID : X7D-IP04213

## 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: 5.0dBi for per antenna

## 802.11b:Antenna 1

Channel	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> )
1	2412	10.17	10.0±1	11.0	3.1623	0.0079	1
6	2437	9.80	10.0±1	11.0	3.1623	0.0079	1
11	2462	9.38	10.0±1	11.0	3.1623	0.0079	1

## 802.11b:Antenna 2

Channel	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> )
1	2412	9.29	10.0±1	11.0	3.1623	0.0079	1
6	2437	9.07	10.0±1	11.0	3.1623	0.0079	1
11	2462	9.67	10.0±1	11.0	3.1623	0.0079	1

## 802.11g: Antenna 1

Channel	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> )
1	2412	12.71	12.0±1	13.0	3.1623	0.0126	1
6	2437	11.70	12.0±1	13.0	3.1623	0.0126	1
11	2462	11.39	12.0±1	13.0	3.1623	0.0126	1

## 802.11g: Antenna 2

Channel	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> )
1	2412	11.87	12.0±1	13.0	3.1623	0.0126	1
6	2437	12.28	12.0±1	13.0	3.1623	0.0126	1
11	2462	11.86	12.0±1	13.0	3.1623	0.0126	1

## 802.11n HT20: Antenna 1

Channel	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> )
1	2412	10.43	10.0±1	11.0	3.1623	0.0079	1
6	2437	10.37	10.0±1	11.0	3.1623	0.0079	1
11	2462	9.63	10.0±1	11.0	3.1623	0.0079	1

## 802.11n HT20: Antenna 2

Channel	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> )
1	2412	11.63	11.0±1	12.0	3.1623	0.0100	1
6	2437	11.40	11.0±1	12.0	3.1623	0.0100	1
11	2462	11.93	11.0±1	12.0	3.1623	0.0100	1

802.11n HT40 : Antenna 1

Channel	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> )
3	2432	12.60	13.0±1	14.0	3.1623	0.0158	1
6	2437	12.70	13.0±1	14.0	3.1623	0.0158	1
9	2452	13.89	13.0±1	14.0	3.1623	0.0158	1

802.11n HT40 : Antenna 2

Channel	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> )
3	2432	11.51	11.0±1	12.0	3.1623	0.0100	1
6	2437	11.45	11.0±1	12.0	3.1623	0.0100	1
9	2452	11.80	11.0±1	12.0	3.1623	0.0100	1

802.11n HT40 : Antenna 1+2

Channel	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> )
3	2432	15.10	15.0±1	16.0	6.3096	0.0500	1
6	2437	15.13	15.0±1	16.0	6.3096	0.0500	1
9	2452	15.98	15.0±1	16.0	6.3096	0.0500	1