

## **FCC ID : 2ACWISE65UPC4T**

### **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>         |                              |                              |                                    |              |
| <b>300-1500</b>                                              | --                           | --                           | <b>F/300</b>                       | <b>6</b>     |
| <b>1500-100000</b>                                           | --                           | --                           | <b>5</b>                           | <b>6</b>     |
| <b>(B) Limits for General Population/Uncontrol Exposures</b> |                              |                              |                                    |              |
| <b>300-1500</b>                                              | --                           | --                           | <b>F/1500</b>                      | <b>6</b>     |
| <b>1500-100000</b>                                           | --                           | --                           | <b>1</b>                           | <b>30</b>    |

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

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

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

## 11.2 Measurement Result

WIFI ANT A:

| Channel Freq. (MHz) | modulation | conducted power (mW) | EIRP (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> ) |
|---------------------|------------|----------------------|------------|---------------------|-------------------------|----------------------|-----------------------------------------|--------------------------------------------|
| 2.412               | 11b        | 63.53                | 18.03      | 17dBm to 19dBm      | 19                      | 1.58                 | 0.02510                                 | 1                                          |
| 2.437               | 11b        | 76.21                | 18.82      | 17dBm to 19dBm      | 19                      | 1.58                 | 0.02510                                 | 1                                          |
| 2.462               | 11b        | 70.15                | 18.46      | 17dBm to 19dBm      | 19                      | 1.58                 | 0.02510                                 | 1                                          |
| 2.412               | 11g        | 78.89                | 18.97      | 18.5dBm to 20.5dBm  | 20.5                    | 1.58                 | 0.03546                                 | 1                                          |
| 2.437               | 11g        | 106.91               | 20.29      | 18.5dBm to 20.5dBm  | 20.5                    | 1.58                 | 0.03546                                 | 1                                          |
| 2.462               | 11g        | 88.51                | 19.47      | 18.5dBm to 20.5dBm  | 20.5                    | 1.58                 | 0.03546                                 | 1                                          |
| 2.412               | 11n HT20   | 62.52                | 17.96      | 17.5dBm to 19.5dBm  | 19.5                    | 1.58                 | 0.02816                                 | 1                                          |
| 2.437               | 11n HT20   | 85.70                | 19.33      | 17.5dBm to 19.5dBm  | 19.5                    | 1.58                 | 0.02816                                 | 1                                          |
| 2.462               | 11n HT20   | 72.11                | 18.58      | 17.5dBm to 19.5dBm  | 19.5                    | 1.58                 | 0.02816                                 | 1                                          |
| 2.422               | 11n HT40   | 76.74                | 18.85      | 17.5dBm to 19.5dBm  | 19.5                    | 1.58                 | 0.02816                                 | 1                                          |
| 2.437               | 11n HT40   | 71.78                | 18.56      | 17.5dBm to 19.5dBm  | 19.5                    | 1.58                 | 0.02816                                 | 1                                          |
| 2.452               | 11n HT40   | 64.42                | 18.09      | 17.5dBm to 19.5dBm  | 19.5                    | 1.58                 | 0.02816                                 | 1                                          |

WIFI ANT B:

| Channel Freq. (MHz) | modulation | conducted power (mW) | conducted power (dBm) | Tune-up power (dBm) | Max tune-up power (dBm) | Antenna Gain Numeric | Evaluation result (mW/cm2 ) | Power density Limits (mW/cm2 ) |
|---------------------|------------|----------------------|-----------------------|---------------------|-------------------------|----------------------|-----------------------------|--------------------------------|
| 2.412               | 11b        | 59.29                | 17.73                 | 17dBm to 19dBm      | 19                      | 1.58                 | 0.02510                     | 1                              |
| 2.437               | 11b        | 68.39                | 18.35                 | 17dBm to 19dBm      | 19                      | 1.58                 | 0.02510                     | 1                              |
| 2.462               | 11b        | 72.44                | 18.6                  | 17dBm to 19dBm      | 19                      | 1.58                 | 0.02510                     | 1                              |
| 2.412               | 11g        | 83.75                | 19.23                 | 18dBm to 20dBm      | 20                      | 1.58                 | 0.03160                     | 1                              |
| 2.437               | 11g        | 91.41                | 19.61                 | 18dBm to 20dBm      | 20                      | 1.58                 | 0.03160                     | 1                              |
| 2.462               | 11g        | 98.63                | 19.94                 | 18dBm to 20dBm      | 20                      | 1.58                 | 0.03160                     | 1                              |
| 2.412               | 11n HT20   | 61.24                | 17.87                 | 17.5dBm to 19.5dBm  | 19.5                    | 1.58                 | 0.02816                     | 1                              |
| 2.437               | 11n HT20   | 75.34                | 18.77                 | 17.5dBm to 19.5dBm  | 19.5                    | 1.58                 | 0.02816                     | 1                              |
| 2.462               | 11n HT20   | 81.10                | 19.09                 | 17.5dBm to 19.5dBm  | 19.5                    | 1.58                 | 0.02816                     | 1                              |
| 2.422               | 11n HT40   | 53.58                | 17.29                 | 17dBm to 19dBm      | 19                      | 1.58                 | 0.02510                     | 1                              |
| 2.437               | 11n HT40   | 74.47                | 18.72                 | 18dBm to 20dBm      | 20                      | 1.58                 | 0.03160                     | 1                              |
| 2.452               | 11n HT40   | 90.36                | 19.56                 | 18dBm to 20dBm      | 20                      | 1.58                 | 0.03160                     | 1                              |