

## 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)

FCC ID: 2AGQF-WT-OP

### EUT Specification

| EUT                               | Opinion Plus                                                                                                                                                                                                                   |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Frequency band (Operating)</b> | <input checked="" type="checkbox"/> WLAN: 2.412GHz ~ 2.462GHz<br><input type="checkbox"/> WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz<br><input type="checkbox"/> WLAN: 5.745GHz ~ 5825GHz<br><input type="checkbox"/> Others  |
| <b>Device category</b>            | <input checked="" type="checkbox"/> Portable (<20cm separation)<br><input type="checkbox"/> Mobile (>20cm separation)<br><input type="checkbox"/> Others ____                                                                  |
| <b>Exposure classification</b>    | <input type="checkbox"/> Occupational/Controlled exposure (S = 5mW/cm <sup>2</sup> )<br><input checked="" type="checkbox"/> General Population/Uncontrolled exposure (S=1mW/cm <sup>2</sup> )                                  |
| <b>Antenna diversity</b>          | <input checked="" type="checkbox"/> Single antenna<br><input type="checkbox"/> Multiple antennas<br><input type="checkbox"/> Tx diversity<br><input type="checkbox"/> Rx diversity<br><input type="checkbox"/> Tx/Rx diversity |
| <b>Max. output power</b>          | 15.66dBm (0.0368W)                                                                                                                                                                                                             |
| <b>Antenna gain (Max)</b>         | 1.56 dBi                                                                                                                                                                                                                       |
| <b>Evaluation applied</b>         | <input checked="" type="checkbox"/> MPE Evaluation<br><input type="checkbox"/> SAR Evaluation                                                                                                                                  |

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>    |

## Friis transmission formula: $P_d = \frac{P_{out} \cdot G}{4 \cdot \pi \cdot R^2}$

Where

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

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

$G$  = gain of antenna in linear scale

$\pi$  = 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.

## Measurement Result

| Operating Mode | Channel Frequency (MHz) | Measured Power (dBm) | Tune up tolerance (dBm) | Max. Tune up Power (dBm) | Antenna Gain (dBi) | Power density at 20cm (mW/ cm <sup>2</sup> ) | Power density Limits (mW/cm <sup>2</sup> ) |
|----------------|-------------------------|----------------------|-------------------------|--------------------------|--------------------|----------------------------------------------|--------------------------------------------|
| 802.11b        | 2412                    | 14.90                | 14.90±1                 | 15.90                    | 1.56               | 0.0111                                       | 1                                          |
|                | 2437                    | 14.59                | 14.59±1                 | 15.59                    | 1.56               | 0.0103                                       | 1                                          |
|                | 2462                    | 15.66                | 15.66±1                 | 16.66                    | 1.56               | 0.0132                                       | 1                                          |
| 802.11g        | 2412                    | 12.18                | 12.18±1                 | 13.18                    | 1.56               | 0.0059                                       | 1                                          |
|                | 2437                    | 14.69                | 14.69±1                 | 15.69                    | 1.56               | 0.0106                                       | 1                                          |
|                | 2462                    | 14.13                | 14.13±1                 | 15.13                    | 1.56               | 0.0093                                       | 1                                          |
| 802.11n (HT20) | 2412                    | 12.47                | 12.47±1                 | 13.47                    | 1.56               | 0.0063                                       | 1                                          |
|                | 2437                    | 14.51                | 14.51±1                 | 15.51                    | 1.56               | 0.0101                                       | 1                                          |
|                | 2462                    | 13.74                | 13.74±1                 | 14.74                    | 1.56               | 0.0085                                       | 1                                          |
| 802.11n (HT40) | 2412                    | 10.32                | 10.32±1                 | 11.32                    | 1.56               | 0.0039                                       | 1                                          |
|                | 2437                    | 12.40                | 12.40±1                 | 13.40                    | 1.56               | 0.0062                                       | 1                                          |
|                | 2462                    | 11.13                | 11.13±1                 | 12.13                    | 1.56               | 0.0047                                       | 1                                          |