

## 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: 2ABC5-E0009

### EUT Specification

| EUT                        | Android Tablet                                                                                                                                                                                                                                                       |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Frequency band (Operating) | <input checked="" type="checkbox"/> WLAN: 2.412GHz ~ 2.462GHz<br><input checked="" type="checkbox"/> WLAN: 5.18GHz ~ 5.24GHz<br><input checked="" type="checkbox"/> WLAN: 5.745GHz ~ 5.825GHz<br><input checked="" type="checkbox"/> Others: 2.402GHz~2.480GHz (BLE) |
| Device category            | <input type="checkbox"/> Portable (<20cm separation)<br><input checked="" type="checkbox"/> Mobile (>20cm separation)<br><input type="checkbox"/> Others ____                                                                                                        |
| Exposure classification    | <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> )                                                                        |
| Antenna diversity          | <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                                       |
| Max. output power          | 2.4GHz WiFi: <b>17.68</b> dBm (0.0586W)<br>BLE: 4.934dBm (0.0031W)<br>5.1GHz WIFI: 16.39dBm (0.0435W)<br>5.8GHz WIFI: 14.09dBm (0.0256W)                                                                                                                             |
| Antenna gain (Max)         | <b>2.4GHz WiFi &amp; BLE:</b> 1.5 dBi <b>5.1G Wifi/5.8G Wifi:</b> 1.8 dBi                                                                                                                                                                                            |
| Evaluation applied         | <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: $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

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

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

$G$  = 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

### 2.4GHz WiFi & BLE:

| Operating Mode | Channel Frequency | Measured Power | Tune up tolerance | Max. Tune up Power | Antenna Gain | Power density at 20cm  | Power density Limits (mW/cm <sup>2</sup> ) |
|----------------|-------------------|----------------|-------------------|--------------------|--------------|------------------------|--------------------------------------------|
|                | (MHz)             | (dBm)          | (dBm)             | (dBm)              | (dBi)        | (mW/ cm <sup>2</sup> ) |                                            |
| 802.11b        | 2412              | 14.77          | 16.45±1           | 15.77              | 1.5          | 0.0106                 | 1                                          |
|                | 2437              | 15.05          | 16.33±1           | 16.05              | 1.5          | 0.0113                 | 1                                          |
|                | 2462              | 15.12          | 16.60±1           | 16.12              | 1.5          | 0.0115                 | 1                                          |
| 802.11g        | 2412              | 14.19          | 14.31±1           | 15.19              | 1.5          | 0.0093                 | 1                                          |
|                | 2437              | 14.47          | 16.38±1           | 15.47              | 1.5          | 0.0099                 | 1                                          |
|                | 2462              | 14.32          | 14.97±1           | 15.32              | 1.5          | 0.0096                 | 1                                          |
| 802.11n (HT20) | 2412              | 13.96          | 14.52±1           | 14.96              | 1.5          | 0.0088                 | 1                                          |
|                | 2437              | 14.78          | 14.54±1           | 15.78              | 1.5          | 0.0106                 | 1                                          |
|                | 2462              | 14.21          | 13.34±1           | 15.21              | 1.5          | 0.0093                 | 1                                          |
| 802.11n (HT40) | 2422              | 16.78          | 9.61±1            | 17.78              | 1.5          | 0.0169                 | 1                                          |
|                | 2437              | 17.68          | 11.96±1           | 18.68              | 1.5          | 0.0207                 | 1                                          |
|                | 2452              | 16.81          | 10.22±1           | 17.81              | 1.5          | 0.0170                 | 1                                          |
| BLE            | 2402              | 3.717          | 0.616±1           | 4.717              | 1.5          | 0.0008                 | 1                                          |
|                | 2440              | 4.934          | 0.921±1           | 5.934              | 1.5          | 0.0011                 | 1                                          |
|                | 2480              | 4.613          | 1.401±1           | 5.613              | 1.5          | 0.0010                 | 1                                          |

### 5.1GHz &5.8GHz WiFi:

| Operating Mode | Channel Frequency | Measured Power | Tune up tolerance | Max. Tune up Power | Antenna Gain | Power density at 20cm | Power density Limits |
|----------------|-------------------|----------------|-------------------|--------------------|--------------|-----------------------|----------------------|
|                | (MHz)             | (dBm)          | (dBm)             | (dBm)              | (dBi)        | (mW/ cm2 )            |                      |
| 802.11a        | 5180              | 15.04          | 15.04±1           | 16.04              | 1.8          | 0.0121                | 1                    |
|                | 5200              | 15.31          | 15.31±1           | 16.31              | 1.8          | 0.0129                | 1                    |
|                | 5240              | 16.39          | 16.39±1           | 17.39              | 1.8          | 0.0165                | 1                    |
| 802.11n20      | 5180              | 14.59          | 14.59±1           | 15.59              | 1.8          | 0.0109                | 1                    |
|                | 5200              | 14.65          | 14.65±1           | 15.65              | 1.8          | 0.0111                | 1                    |
|                | 5240              | 15.21          | 15.21±1           | 16.21              | 1.8          | 0.0126                | 1                    |
| 802.11ac20     | 5180              | 14.7           | 14.7±1            | 15.7               | 1.8          | 0.0112                | 1                    |
|                | 5200              | 14.6           | 14.6±1            | 15.6               | 1.8          | 0.0109                | 1                    |
|                | 5240              | 14.9           | 14.9±1            | 15.9               | 1.8          | 0.0117                | 1                    |
| 802.11n40      | 5190              | 15.01          | 15.01±1           | 16.01              | 1.8          | 0.0120                | 1                    |
|                | 5230              | 15.39          | 15.39±1           | 16.39              | 1.8          | 0.0131                | 1                    |
| 802.11ac40     | 5190              | 15.11          | 15.11±1           | 16.11              | 1.8          | 0.0123                | 1                    |
|                | 5230              | 15.3           | 15.3±1            | 16.3               | 1.8          | 0.0128                | 1                    |
| 802.11ac80     | 5210              | 15.21          | 15.21±1           | 16.21              | 1.8          | 0.0126                | 1                    |
| 802.11a        | 5745              | 14.09          | 14.09±1           | 15.09              | 1.8          | 0.0097                | 1                    |
|                | 5785              | 13.6           | 13.6±1            | 14.6               | 1.8          | 0.0087                | 1                    |
|                | 5825              | 13.14          | 13.14±1           | 14.14              | 1.8          | 0.0078                | 1                    |
| 802.11n20      | 5745              | 13.98          | 13.98±1           | 14.98              | 1.8          | 0.0095                | 1                    |
|                | 5785              | 13.11          | 13.11±1           | 14.11              | 1.8          | 0.0078                | 1                    |
|                | 5825              | 12.18          | 12.18±1           | 13.18              | 1.8          | 0.0063                | 1                    |
| 802.11ac20     | 5745              | 13.59          | 13.59±1           | 14.59              | 1.8          | 0.0087                | 1                    |
|                | 5785              | 13.1           | 13.1±1            | 14.1               | 1.8          | 0.0077                | 1                    |
|                | 5825              | 12.51          | 12.51±1           | 13.51              | 1.8          | 0.0068                | 1                    |
| 802.11n40      | 5755              | 13.88          | 13.88±1           | 14.88              | 1.8          | 0.0093                | 1                    |
|                | 5795              | 13.71          | 13.71±1           | 14.71              | 1.8          | 0.0089                | 1                    |
| 802.11ac40     | 5755              | 13.99          | 13.99±1           | 14.99              | 1.8          | 0.0095                | 1                    |
|                | 5795              | 13.32          | 13.32±1           | 14.32              | 1.8          | 0.0081                | 1                    |
| 802.11ac80     | 5775              | 13.80          | 13.80±1           | 14.80              | 1.8          | 0.0091                | 1                    |