

## 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: 2AON7-9520

### EUT Specification

| EUT                               | Projector                                                                                                                                                                                                                                                          |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Frequency band (Operating)</b> | <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 |
| <b>Device category</b>            | <input type="checkbox"/> Portable (<20cm separation)<br><input checked="" 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 type="checkbox"/> Single antenna<br><input checked="" 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>          | BLE: -1.64dBm (0.0007W)<br>2.4G WiFi: 14.97dBm (0.0314W)<br>5.1G WiFi: 12.37dBm (0.0173W)<br>5.8G WiFi: 18.18dBm (0.0658W)                                                                                                                                         |
| <b>Antenna gain (Max)</b>         | BLE: -0.68 dBi<br>2.4G WiFi: 3.16 dBi<br>5.1G WiFi: 3.00 dBi<br>5.8G WiFi: 2.34 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: $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

$P_d$  = Power density in  $mW/cm^2$

$P_{out}$  = 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,  $1mW/cm^2$ . 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

worst case:

| Operating Mode | Channel Frequency | Measured Power | Tune up tolerance | Max. Tune up Power | Antenna Gain | Power density at 20cm | Power density Limits ( $mW/cm^2$ ) |
|----------------|-------------------|----------------|-------------------|--------------------|--------------|-----------------------|------------------------------------|
|                | (MHz)             | (dBm)          | (dBm)             | (dBm)              | (dBi)        | ( $mW/cm^2$ )         |                                    |
| 802.11n (HT20) | 2412              | 14.97          | $14.97 \pm 1$     | 15.97              | 3.16         | 0.0163                | 1                                  |

### 5.1GHz WiFi

worst case:

| Operating Mode | Channel Frequency | Measured Power | Tune up tolerance | Max. Tune up Power | Antenna Gain | Power density at 20cm | Power density Limits ( $mW/cm^2$ ) |
|----------------|-------------------|----------------|-------------------|--------------------|--------------|-----------------------|------------------------------------|
|                | (MHz)             | (dBm)          | (dBm)             | (dBm)              | (dBi)        | ( $mW/cm^2$ )         |                                    |
| 802.11n (HT20) | 5240              | 12.37          | $12.37 \pm 1$     | 13.37              | 3.00         | 0.0086                | 1                                  |

### 5.8GHz WiFi

worst case:

| Operating Mode | Channel Frequency | Measured Power | Tune up tolerance | Max. Tune up Power | Antenna Gain | Power density at 20cm | Power density Limits ( $mW/cm^2$ ) |
|----------------|-------------------|----------------|-------------------|--------------------|--------------|-----------------------|------------------------------------|
|                | (MHz)             | (dBm)          | (dBm)             | (dBm)              | (dBi)        | ( $mW/cm^2$ )         |                                    |
| 802.11n (HT40) | 5755              | 18.18          | $18.18 \pm 1$     | 19.18              | 2.34         | 0.0282                | 1                                  |

**BLE worst case:**

| 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> ) |                                            |
| BLE(1M)        | 2440              | -1.64          | -1.64±1           | -0.64              | -0.68        | 0.0001                 | 1                                          |

**Note: 2.4G WiFi & 5GHz WiFi and BLE do not support simultaneous transmission.**

**Test Result: Pass**