

## 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: 2BFMQ-L021

### 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 type="checkbox"/> WLAN: 5.745GHz ~ 5.825GHz<br><input checked="" type="checkbox"/> Others: 2.402GHz~2.480GHz (BDR&EDR) |
| <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>          | BDR&EDR: 5.73dBm (0.0037W)<br>2.4G WiFi: 18.88dBm (0.0773W)<br>5G WiFi: 15.96dBm (0.0394W)  |
| <b>Antenna gain (Max)</b>         | BDR&EDR: -0.58 dBi<br>2.4G WiFi: 4.14 dBi<br>5G WiFi: 2.33 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>         |                              |                              |                                    |              |
| 300-1500   | --                           | --                           | <b>F/300</b>                       | <b>6</b>     |
| 1500-100000  | --                           | --                           | <b>5</b>                           | <b>6</b>     |
| <b>(B) Limits for General Population/Uncontrol Exposures</b> |                              |                              |                                    |              |
| 300-1500   | --                           | --                           | <b>F/1500</b>                      | <b>6</b>     |
| 1500-100000  | --                           | --                           | <b>1</b>                           | <b>30</b>    |

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

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

### BT 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)        | ( $mW/cm^2$ )         |                                    |
| 8DPSK          | 2402              | 5.73           | 5.73±1            | 6.73               | -0.58        | 0.0008                | 1                                  |

### 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 (HT40) | 2422              | 18.88          | 18.88±1           | 19.88              | 4.14         | 0.0502                | 1                                  |

### 5G 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)        | ( $mW/cm^2$ )         |                                    |
| 802.11ac (VHT40) | 5230              | 15.96          | 15.96±1           | 16.96              | 2.33         | 0.0169                | 1                                  |

**Note: BT, 2.4G WiFi and 5G WiFi do not support simultaneous transmission.**

**Test Result: Pass**