

## RF EXPOSURE EVALUATION

KDB 447498 D01 Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies v06.

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)

### EUT Specification

|                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>FCC ID</b>                     | 2BERO-HY300MAX                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>EUT</b>                        | Smart Projector                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Frequency band (Operating)</b> | <input checked="" type="checkbox"/> BT: 2.402GHz ~ 2.480GHz<br><input checked="" type="checkbox"/> WLAN: 2.412GHz ~ 2.462GHz<br><input checked="" type="checkbox"/> RLAN: 5.180GHz ~ 5.240GHz<br><input checked="" type="checkbox"/> RLAN: 5.260GHz ~ 5.320GHz<br><input checked="" type="checkbox"/> RLAN: 5.500GHz ~ 5.700GHz<br><input checked="" type="checkbox"/> RLAN: 5.745GHz ~ 5.825GHz<br><input type="checkbox"/> Others: |
| <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>Antenna gain (Max)</b>         | Wi-Fi 2.4G/BT: 3.41dBi<br>Wi-Fi 5.2G: 3.41dBi<br>Wi-Fi 5.3G: 3.8dBi<br>Wi-Fi 5.6G: 4.4dBi<br>Wi-Fi 5.8G: 4.9dBi                                                                                                                                                                                                                                                                                                                      |
| <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 |
|-------------------------------------------------------|------------------------------|------------------------------|------------------------------------|--------------|
| (A) Limits for Occupational/Control Exposures         |                              |                              |                                    |              |
| 300-1500                                              | --                           | --                           | F/300                              | 6            |
| 1500-100000                                           | --                           | --                           | 5                                  | 6            |
| (B) Limits for General Population/Uncontrol Exposures |                              |                              |                                    |              |
| 300-1500                                              | --                           | --                           | F/1500                             | 6            |
| 1500-100000                                           | --                           | --                           | 1                                  | 30           |

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## 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.

## Max Measurement Result

| Operating Mode | Measured Power | Tune up tolerance |    | Max. Tune up Power | Antenna Gain | Power density at 20cm  | Power density Limits (mW/cm <sup>2</sup> ) |
|----------------|----------------|-------------------|----|--------------------|--------------|------------------------|--------------------------------------------|
|                | (dBm)          | (dBm)             |    | (dBm)              | (dBi)        | (mW/ cm <sup>2</sup> ) |                                            |
| BDR&EDR        | 5.2            | 5.20              | ±1 | 6.20               | 3.41         | 0.0018                 | 1                                          |
| BLE            | 1.88           | 1.88              | ±1 | 2.88               | 3.41         | 0.0008                 | 1                                          |
| WiFi 2.4G      | 15             | 15.00             | ±1 | 16.00              | 3.41         | 0.0174                 | 1                                          |
| WiFi 5.2G      | 15.07          | 15.07             | ±1 | 16.07              | 3.41         | 0.0177                 | 1                                          |
| WiFi 5.3G      | 14.56          | 14.56             | ±1 | 15.56              | 3.8          | 0.0172                 | 1                                          |
| WiFi 5.6G      | 15.48          | 15.48             | ±1 | 16.48              | 4.46         | 0.0247                 | 1                                          |
| WiFi 5.8G      | 14.65          | 14.65             | ±1 | 15.65              | 4.9          | 0.0226                 | 1                                          |

## The Maximum simultaneous transmission for WiFi 2.4G+WiFi 5.6G

$$\sum_i \frac{S_i}{S_{Limit,i}}$$

$$= S_{WLAN} / S_{limit-2.4} + S_{WiFi5.6} / S_{limit-2.4}$$

$$= 0.0174/1 + 0.0247/1$$

$$= 0.0421$$

$$< 1.0$$

**Result:** No Standalone SAR test is required.

