# MAXIMUM PERMISSIBLE EXPOSURE

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

2.1091 Radio frequency radiation exposure evaluation: mobile devices.

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

| | |
|---|---|
| **FCC ID** | 2A7VD-H706BA |
| **EUT** | Govee Permanent Outdoor Lights Pro |
| **Frequency band (Operating)** | ☒ BT: 2.402GHz ~ 2.480GHz<br>☒ WLAN: 2.412GHz ~ 2.462GHz<br>☐ RLAN: 5.180GHz ~ 5.240GHz<br>☐ RLAN: 5.260GHz ~ 5.320GHz<br>☐ RLAN: 5.500GHz ~ 5.700GHz<br>☐ RLAN: 5.745GHz ~ 5.825GHz<br>☐ Others: |
| **Device category** | ☐ Portable (<20cm separation)<br>☒ Mobile (>20cm separation)<br>☐ Others ___ |
| **Exposure classification** | ☐ Occupational/Controlled exposure<br>☒ General Population/Uncontrolled exposure |
| **Antenna diversity** | ☐ Single antenna<br>☒ Multiple antennas<br>☐ Tx diversity<br>☐ Rx diversity<br>☐ Tx/Rx diversity |
| **Antenna gain (Max)** | BLE: 1.54dBi<br>WLAN: 3.98dBi |
| **Evaluation applied** | ☒ MPE Evaluation<br>☐ SAR Evaluation |


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Limits for Maximum Permissible Exposure(MPE)

| Frequency Range(MHz) | Electric Field Strength(V/m) | Magnetic Field Strength(A/m) | Power Density($mW/cm^2$) | 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 | 30 |
| 1500-100000 | -- | -- | 1 | 30 |

## Friis transmission formula: Pd=(Pout*G)\(4*pi*R2)

Where
Pd= Power density in $mW/cm^2$
Pout=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
Pd the limit of MPE. 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 | Maximum output power (dBm) | Tune up tolerance (dBm) | Max. Tune up Power (dBm) | Antenna Gain (dBi) | Power density at 20cm ($mW/cm^2$ ) | Power density Limits ($mW/cm^2$ ) |
|---|---|---|---|---|---|---|
| BLE | 2.17 | 2.17 ±1 | 3.17 | 1.54 | 0.0006 | 1 |
| WiFi 2.4G | 15.62 | 15.62 ±1 | 16.62 | 3.98 | 0.0229 | 1 |

**The Maximum simultaneous transmission for BLE+WLAN:**

$$\sum_i \frac{S_i}{S_{Limit_i}}$$

$=S_{BLE}/S_{limit}+ S_{WLAN}/S_{limit}$
$=0.0006/1+0.0229/1$
$=0.0235$
$< 1.0$


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