# FCC 47 CFR MPE REPORT

Hisense Home Appliances Group Co., Ltd. Qingdao Branch

Wi-Fi/BLE Intelligent controls module

Model Number: HLW3215-TG

Additional Model: HLW3215-TG01

FCC ID: 2A9F9HLW32155V

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# Maximum Permissible Exposure

## 1. Applicable Standards

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2m normally can be maintained between the user and the device.

## 1.1. Limits for Maximum Permissible Exposure (MPE)

**(a) Limits for Occupational/Controlled Exposure**

| Frequency Range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (H) (A/m) | Power Density (S) (mW/cm$^2$) | Averaging Times $\mid E \mid^2$, $\mid H \mid^2$ or S (minutes) |
|---|---|---|---|---|
| 0.3-3.0 | 614 | 1.63 | (100)* | 6 |
| 3.0-30 | 1842/f | 4.89/f | (900/f)* | 6 |
| 30-300 | 61.4 | 0.163 | 1.0 | 6 |
| 300-1500 | | | F/300 | 6 |
| 1500-10000 | | | 5 | 6 |

**(b) Limits for General Population / Uncontrolled Exposure**

| Frequency Range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (H) (A/m) | Power Density (S) (mW/cm$^2$) | Averaging Times $\mid E \mid^2$, $\mid H \mid^2$ or S (minutes) |
|---|---|---|---|---|
| 0.3-1.34 | 614 | 1.63 | (100)* | 30 |
| 1.34-30 | 824/f | 2.19/f | (180/f)* | 30 |
| 30-300 | 27.5 | 0.073 | 0.2 | 30 |
| 300-1500 | | | F/1500 | 30 |
| 1500-10000 | | | 1.o | 30 |

Note: f=frequency in MHz; *Plane-wave equivalent power density

## 1.2. MPE Calculation Method

$$E\,(V/m) = \frac{\sqrt{30 \times P \times G}}{d} \qquad \text{Power Density: Pd (W/m}^2) = \frac{E^2}{377}$$

E = Electric Field (V/m)

P = Peak RF output Power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$

From the peak EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained

## 2. Conducted Power Result

| Mode | Frequency (MHz) | Peak output power (dBm) | Peak output power (mW) |
|---|---|---|---|
| BLE | 2402 | 7.27 | 5.333 |
| | 2440 | 7.27 | 5.333 |
| | 2480 | 5.75 | 3.758 |
| IEEE 802.11b | 2412 | 20.79 | 119.950 |
| | 2437 | 20.53 | 112.980 |
| | 2462 | 21.23 | 132.739 |
| IEEE 802.11g | 2412 | 23.14 | 206.063 |
| | 2437 | 22.78 | 189.671 |
| | 2462 | 23.14 | 206.063 |
| IEEE 802.11n HT20 | 2412 | 22.95 | 197.242 |
| | 2437 | 22.56 | 180.302 |
| | 2462 | 22.90 | 194.984 |

## 3. Calculated Result and Limit

| Mode | Peak output power (dBm) | Target power (dBm) | MAX Target power (dBm) | Antenna gain (dBi) | (Linear) | Power Density (S) (mW/cm$^2$) | Limited of Power Density (S) (mW/cm$^2$) | Test Result |
|---|---|---|---|---|---|---|---|---|
| 2.4G Band | | | | | | | | |
| BLE | 7.27 | 7±1 | 8 | 0 | 1.000 | 0.00126 | 1 | Complies |
| IEEE 802.11b | 21.23 | 21±1 | 22 | 0 | 1.000 | 0.03153 | 1 | Complies |
| IEEE 802.11g | 23.14 | 23±1 | 24 | 0 | 1.000 | 0.04997 | 1 | Complies |
| IEEE 802.11n HT20 | 22.95 | 22±1 | 23 | 0 | 1.000 | 0.03969 | 1 | Complies |

**End of Test Report**