

Analysis Report

The Equipment Under Test (EUT) is a PowerUp FPV Paper Airplane VR Drone, equipped with WiFi and SD Interface. The EUT is powered by 3.7VDC LI-PO Rechargeable battery. The applicant declared that only WiFi 2.4GHz band functions are used in this product.

For the WLAN (WiFi) module:

For 802.11b mode, it operates at frequency range of 2412.000MHz to 2462.00MHz with 11 channels. It transmits via direct-sequence spread spectrum (DSSS) modulation through Antenna 0 only. Maximum bit rate can be up to 11Mbps. For 802.11g mode, it operates at frequency range of 2412.000MHz to 2462.000MHz with 11 channels. It transmits via Orthogonal Frequency Division Multiplexing (OFDM) modulation though Antenna 0 or 1 only. Maximum bit rate can be up to 54Mbps. For 802.11n (HT20 with 20MHz bandwidth) mode, it operates at frequency range of 2412.000MHz to 2462.000MHz with 11 channels. It transmits via Orthogonal Frequency Division Multiplexing (OFDM) modulation (mcs0 to mcs7) though Antenna 0 and/or 1 (MIMO). Maximum bit rate can support up to 65Mbps.

For the PowerUp FPV Paper Airplane VR Drone, the measured powers among all the measured channels were within its production tolerance: +25.7 dBm (Minimum) and +29.7 dBm (Maximum). The antenna gain of EUT is 0 dBi = 1.0 (num gain) and its maximum source-based time-averaging duty factor is 100.0% (1 x100%). From these data and its operating configuration – Mobile device, the exposed power density at a distance (R) of 20cm from the center of radiation of the antenna can be calculated according to OET Bulletin 65 as follow:

ANT0:

The Conducted Power = 29.7 dBm
 = 933.3mW

The Conducted Power source-based time-averaging output power
 = (933.3* 1.000) mW
 = 933.3 mW

The power density at 20cm = $933.3 \cdot 1 / 4\pi R^2$
 = 0.186 mW cm⁻²

ANT1:

$$\begin{aligned}\text{The Conducted Power} &= 29.7 \text{ dBm} \\ &= 933.3 \text{ mW}\end{aligned}$$

$$\begin{aligned}\text{The Conducted Power source-based time-averaging output power} & \\ &= (933.3 * 1.000) \text{ mW} \\ &= 933.3 \text{ mW}\end{aligned}$$

$$\begin{aligned}\text{The power density at 20cm} &= 933.3 * 1 / 4\pi R^2 \\ &= 0.186 \text{ mW cm}^{-2}\end{aligned}$$

The sum of the MPE ratios for all simultaneous transmitting antennas:

$$\begin{aligned}&= 0.186 * 2 \\ &= 0.372\end{aligned}$$

As the sum of MPE ratios for all simultaneous transmitting antennas is ≤ 1.0 , simultaneous transmission MPE test exclusion will be applied.

Conclusion:

In the frequency range of 1,500 - 100,000MHz, the MPE limit is 1.0 mWcm⁻² for general population and uncontrolled exposure. As the measured power density at 20cm from the transmitter is lower than the MPE limit, the compliance to the MPE limit can be ensured by indicating the minimum 20cm separation between the transmitter's radiating structures and body of the user or nearby persons. The following RF exposure statement is proposed to be included in the user manual:

“ FCC RF Radiation Exposure Statement

Caution: To maintain compliance with the FCC’s RF exposure guidelines, place the base unit at least 20cm from nearby persons.”