## 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：2AF6B-RAK41X

## EUT Specification

| **EUT** | **EZCast Pro** |
|---|---|
| **Frequency band (Operating)** | ☒ WLAN: 2.412GHz ~ 2.462GHz<br>☐ WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz<br>☐ WLAN: 5.745GHz ~ 5825GHz<br>☐ Others |
| **Device category** | ☐ Portable (<20cm separation)<br>☒ Mobile (>20cm separation)<br>☐ Others ___ |
| **Exposure classification** | ☐ Occupational/Controlled exposure (S = 5mW/cm2)<br>☒ General Population/Uncontrolled exposure (S=1mW/cm2) |
| **Antenna diversity** | ☐ Single antenna<br>☒ Multiple antennas<br>☐ Tx diversity<br>☐ Rx diversity<br>☐ Tx/Rx diversity |
| **Max. output power** | 16.30dBm (0.0427W) |
| **Antenna gain (Max)** | External Antenna: 2.0 dBi<br>Onboard Antenna: 0.5 dBi |
| **Evaluation applied** | ☒ MPE Evaluation<br>☐ SAR Evaluation |

Limits for Maximum Permissible Exposure(MPE)

| **Frequency Range(MHz)** | **Electric Field Strength(V/m)** | **Magnetic Field Strength(A/m)** | **Power Density($mW/cm^2$)** | **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** | **6** |
| **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, 1mW/cm2. 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

**External Antenna:**

| Operating Mode | Channel Frequency (MHz) | Measured Power (dBm) | Tune up tolerance (dBm) | Max. Tune up Power (dBm) | Antenna Gain (dBi) | Power density at 20cm ($mW/cm^2$) | Power density Limits ($mW/cm^2$) |
|---|---|---|---|---|---|---|---|
| 802.11b | 2412 | 14.90 | 14.90±1 | 15.90 | 2.0 | 0.01227 | 1 |
| | 2437 | 15.45 | 15.45±1 | 16.45 | 2.0 | 0.01392 | 1 |
| | 2462 | 16.30 | 16.30±1 | 17.30 | 2.0 | 0.01693 | 1 |
| 802.11g | 2412 | 12.58 | 12.58±1 | 13.58 | 2.0 | 0.00719 | 1 |
| | 2437 | 13.27 | 13.27±1 | 14.27 | 2.0 | 0.00843 | 1 |
| | 2462 | 13.96 | 13.96±1 | 14.96 | 2.0 | 0.00988 | 1 |
| 802.11n (HT20) | 2412 | 11.09 | 11.09±1 | 12.09 | 2.0 | 0.00510 | 1 |
| | 2437 | 11.63 | 11.63±1 | 12.63 | 2.0 | 0.00578 | 1 |
| | 2462 | 12.33 | 12.33±1 | 13.33 | 2.0 | 0.00679 | 1 |

**Onboard Antenna:**

| Operating Mode | Channel Frequency (MHz) | Measured Power (dBm) | Tune up tolerance (dBm) | Max. Tune up Power (dBm) | Antenna Gain (dBi) | Power density at 20cm ($mW/cm^2$) | Power density Limits ($mW/cm^2$) |
|---|---|---|---|---|---|---|---|
| 802.11b | 2412 | 14.80 | 14.80±1 | 15.80 | 0.5 | 0.00849 | 1 |
| | 2437 | 15.35 | 15.35±1 | 16.35 | 0.5 | 0.00365 | 1 |
| | 2462 | 16.10 | 16.10±1 | 17.10 | 0.5 | 0.01145 | 1 |
| 802.11g | 2412 | 12.66 | 12.66±1 | 13.66 | 0.5 | 0.00519 | 1 |
| | 2437 | 13.19 | 13.19±1 | 14.19 | 0.5 | 0.00586 | 1 |
| | 2462 | 13.89 | 13.89±1 | 14.89 | 0.5 | 0.00688 | 1 |
| 802.11n (HT20) | 2412 | 11.10 | 11.10±1 | 12.10 | 0.5 | 0.00362 | 1 |
| | 2437 | 11.60 | 11.60±1 | 12.60 | 0.5 | 0.00406 | 1 |
| | 2462 | 12.37 | 12.37±1 | 13.37 | 0.5 | 0.00485 | 1 |

External Antenna Gain= 2.0 dBi

Onboard Antenna Gain= 0.5 dBi

Array Gain= 4.32 dBi= 10*log((10^(2/10)+(10^(0.5/10)))

| Operating Mode | Channel Frequency (MHz) | External Antenna Power density at 20cm ($mW/cm^2$) | Onboard Antenna Power density at 20cm ($mW/cm^2$) | Power density at 20cm ($mW/cm^2$) | Power density Limits ($mW/cm^2$) |
|---|---|---|---|---|---|
| 802.11n (HT20) | 2412 | 0.00510 | 0.00362 | 0.00872 | 1 |
| | 2437 | 0.00578 | 0.00406 | 0.00984 | 1 |
| | 2462 | 0.00679 | 0.00485 | 0.01164 | 1 |