# **RF Exposure calculation report**

FCC ID: 2AFLZRPIRM0 IC: 11880A-RPIRM0 Model/HVIN: Raspberry PI RM0

The FCC and ISED require that the calculated MPE be equal to or less than a given limit dependent on frequency at a distance of 20 cm from a device to the body of a user.

The transmitter operation for the Raspberry Pi RMO covers the 2.4 GHz and 5 GHz operating bands.

Simultaneous transmission is not supported between any of the transmitters.

The following FCC/ISED Rule Parts are applicable: Part 1.1310 — Radiofrequency radiation exposure limits Part 2.1091(c) — Radiofrequency radiation exposure evaluation: mobile devices ISED RSS-102 Issue 6, Dec 2023

#### CALCULATION

The following far field power density equation is applicable:

#### $S = EIRP/(4 pi R^2)$

Where

S - Power density

EIRP = Effective Isotropically Radiated Power (EIRP = P×G)

P = Conducted Transmitter Power

G = Antenna Gain (relative to an isotropic radiator)

R = distance to the centre of radiation of the antenna (safe operating distance)

### Calculation for 2.4GHz BT (BDR/ EDR worst case):

Values:

Transmitter frequency range = 2402-2480 MHz P = 6.5 dBm G = 3.5 dBi (x 2.24) EIRP = 10 dBm (10.0 mW) R = 20cm

## Power Density Requirement

From table 1 (b) - Limits for General Population/ Uncontrolled Exposure of FCC Rule Pan 1.1310 for 2.4GHz

S<sub>req1</sub> = 1.0 mW/cm<sup>2</sup>

Calculation:

S = EIRP/(4 pi R<sup>2</sup>) = 10 / (12.56 x 20<sup>2</sup>) = 10 / 5024 S<sub>1</sub> = 0.002 (Equivalent to 0.89 cm safe operating distance)

# Calculation for 2.4GHz WLAN

<u>Values:</u> Transmitter frequency range = 2412–2462 MHz P = 15.4 dBm G = 3.5 dBi EIRP= 18.9 dBm (77.6 mW)

<u>Power Density Requirement</u> From table 1 (b) - Limits for General Population/ Uncontrolled Exposure of FCC Rule Pan 1.1310 for 2.4GHz

S<sub>req2</sub> = 1.0 mW/cm<sup>2</sup>

### Calculation:

S = EIRP/(4 pi R<sup>2</sup>) = 77.6 / (12.56 x 20<sup>2</sup>) = 77.6 / 5024 S<sub>2</sub> = 0.0154 (Equivalent to 2.5 cm safe operating distance)

## **Calculation for 5GHz WLAN**

<u>Values:</u> Transmitter frequency range = 5170–5825 MHz P = 18.2 dBm G = 2.3 dBi EIRP= 20.5 dBm (112.2 mW)

<u>Power Density Requirement</u> From table 1 (b) - Limits for General Population/ Uncontrolled Exposure of FCC Rule Pan 1.1310 for 5GHz

S<sub>req3</sub> = 1.0 mW/cm<sup>2</sup>

Calculation:

S = EIRP/(4 pi R<sup>2</sup>) = 112.2 / (12.56 x 20<sup>2</sup>) = 112.2 / 5024  $S_3 = 0.0223$ (Equivalent to 3.0 cm safe operating distance)

#### Conclusion

The minimum required 20 cm RF exposure limits for General Population/ Uncontrolled Exposure FCC Rule Part 1.1310 and RSS-102 Issue 6 limits will not be exceeded for the Raspberry RMO using antennas having a maximum gain of 3.5 dBi (for 2.4GHz) and 2.3 dBi (for 5 GHz).