MPE Calculation - FCC ID: 2AGBW9290030171X

The FCC requires 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 Wall Switch Module covers the 2.4GHz operating band.

Simultaneous transmission is not supported.

The following FCC Rule Parts are applicable:

Part 1.1310 – Radiofrequency radiation exposure limits
Part 2.1091(c) – Radiofrequency radiation exposure evaluation: mobile devices

CALCULATION

The following far field power density equation is applicable:

$$S = EIRP/4 \pi R^2$$

Where S = Power density (mW/cm2)

EIRP = Effective Isotropically Radiated Power (EIRP = P x G) (mW)

P = Conducted Transmitter Power (dBm)

G = Antenna Gain (relative to an isotropic radiator)

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

Calculation for 2.4GHz Zigbee:

Values:

Transmitter frequency range = 2402 – 2480MHz

P = 2.2dBm

G = 0dBi (x 1.0)

EIRP = 2.2dBm (1.66mW)

R = 20cm

Power Density Requirement

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

S_{req1} = 1.0 mW/cm^2

Calculation:

$$S = EIRP/4\,\pi\,R^2$$
$$= 1.66/(12.56 \times 20^2)$$
$$= 1.66/(5024)$$

$S_1 = 0.0003\ mW/cm^2$

(Equivalent to 0.36cm safe operating distance)

Conclusion

The required 20cm RF exposure limits for General Population/ Uncontrolled Exposure FCC Rule Part 1.1310 limits will not be exceeded for the Wall Switch Module using antennas having a maximum gain of 0dBi.

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