

**** MPE Calculations ****

The MPE calculation for this exposure is shown below.

The peak radiated output power (EIRP) is calculated as follows:

- Port 1

$EIRP = P + G$ $EIRP = 19.82 \text{ dBm} + 3.21 \text{ dBi}$ $EIRP = 23.03 \text{ dBm}$	Where, P = Power input to the antenna (mW) G = Power gain of the antenna (dBi)
---	--

Power density at the specific separation:

$S = PG / (4R^2 \pi)$ $S = (95.94 * 2.09) / (4 * 20^2 * \pi)$ $S = 0.0400 \text{ mW/cm}^2$	Where, S = Maximum power density (mW/cm ²) P = Power input to the antenna (mW) G = Numeric power gain of the antenna R = Distance to the center of the radiation of the antenna (20 cm = limit for MPE)
--	--

The Maximum permissible exposure (MPE) for the general population is 1 mW/cm².

The power density does not exceed the 1 mW/cm² limit.

Therefore, the exposure condition is compliant with FCC rules.

Estimated safe separation:

$R = \sqrt{PG / 4 \pi}$ $R = \sqrt{(95.94 * 2.09) / 4 \pi}$ $R = 4.00 \text{ cm}$	Where, P = Power input to the antenna (mW) G = Numeric power gain of the antenna R = Distance to the center of the radiation of the antenna (20 cm = limit for MPE)
---	---

The numeric gain(G) of the antenna with a gain specified in dB is determined by:

$$G = \text{Log}^{-1} (\text{dB antenna gain} / 10)$$

$$G = \text{Log}^{-1} (3.21 / 10)$$

$$G = 2.09$$

**** MPE Calculations ****

The MPE calculation for this exposure is shown below.

The peak radiated output power (EIRP) is calculated as follows:

- Port 2

$\text{EIRP} = P + G$ $\text{EIRP} = 19.10 \text{ dBm} + 3.21 \text{ dBi}$ $\text{EIRP} = 22.31 \text{ dBm}$	Where, P = Power input to the antenna (mW) G = Power gain of the antenna (dBi)
--	--

Power density at the specific separation:

$S = PG / (4R^2 \pi)$ $S = (81.28 * 2.09) / (4 * 20^2 * \pi)$ $S = 0.0339 \text{ mW/cm}^2$	Where, S = Maximum power density (mW/cm ²) P = Power input to the antenna (mW) G = Numeric power gain of the antenna R = Distance to the center of the radiation of the antenna (20 cm = limit for MPE)
--	--

The Maximum permissible exposure (MPE) for the general population is 1 mW/cm².

The power density does not exceed the 1 mW/cm² limit.

Therefore, the exposure condition is compliant with FCC rules.

Estimated safe separation:

$R = \sqrt{PG / 4 \pi}$ $R = \sqrt{(81.28 * 2.09) / 4 \pi}$ $R = 3.68 \text{ cm}$	Where, P = Power input to the antenna (mW) G = Numeric power gain of the antenna R = Distance to the center of the radiation of the antenna (20 cm = limit for MPE)
---	---

The numeric gain(G) of the antenna with a gain specified in dB is determined by:

$$G = \text{Log}^{-1} (\text{dB antenna gain} / 10)$$

$$G = \text{Log}^{-1} (3.21 / 10)$$

$$G = 2.09$$