

**\*\* 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<br>EIRP = 19.82 dBm + 3.21 dBi<br>EIRP = 23.03 dBm | Where,<br>P = Power input to the antenna (mW)<br>G = Power gain of the antenna (dBi) |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------------|

**Power density at the specific separation:**

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

The Maximum permissible exposure (MPE) for the general population is 1 mW/cm<sup>2</sup>.

The power density does not exceed the 1 mW/cm<sup>2</sup> limit.

Therefore, the exposure condition is compliant with FCC rules.

**Estimated safe separation:**

|                                                                                   |                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| R = $\sqrt{PG / 4 \pi}$<br><br>R = $\sqrt{95.94*2.09 / 4 \pi}$<br><br>R = 4.00 cm | Where,<br><br>P = Power input to the antenna (mW)<br>G = Numeric power gain of the antenna<br>R = Distance to the center of the radiation of the antenna<br>(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,<br>$P$ = Power input to the antenna (mW)<br>$G$ = 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,<br>$S$ = Maximum power density (mW/cm <sup>2</sup> )<br>$P$ = Power input to the antenna (mW)<br>$G$ = Numeric power gain of the antenna<br>$R$ = Distance to the center of the radiation of the antenna<br>(20 cm = limit for MPE) |
|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

The Maximum permissible exposure (MPE) for the general population is 1 mW/cm<sup>2</sup>.

The power density does not exceed the 1 mW/cm<sup>2</sup> 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,<br>$P$ = Power input to the antenna (mW)<br>$G$ = Numeric power gain of the antenna<br>$R$ = Distance to the center of the radiation of the antenna<br>(20 cm = limit for MPE) |
|---------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

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

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

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

$$G = 2.09$$