The Device is a carrier grade gateway designed for IoT applications. The Pico gateway is designed to be used as indoor table top equipment for home or small office.

The device has 1 antenna port, which must be used with antenna respecting the requirement specified in the technical documentation.

Per OET Bulletin 65 Edition 97-01, Appendix A Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	**Uncontrolled Exposure (table 1 B) Power Density 'S' (mW/cm^2)**
300-1500	f/1500

We are using the lowest transmitter frequency of all possible on-board radio (module radio WiFi/Lora 500KHz) for worst case calculation: 923.3 MHz (Lowest Frequency of on board radios)

For the LoRa transmitter, the maximum power density exposure is:

S = 0.616 mW/cm^2, for uncontrolled exposure

For the WiFi transmitter, the maximum power density exposure (at 2442 MHz) is:

S = 1.628 mW/cm^2, for uncontrolled exposure

LoRa RF conducted power measurement and antenna gain as per ETC test report t29e17a238-FCC are reported below. The transmitter has a maximum transmitter duty cycle of 75%. The worst case value is in bold below

TX	Frequency (MHz)	RF Output **100%** Duty Cycle (dBm)	Max. antenna gain (dBi)	EIRP **100%** duty Cycle(dBm)	EIRP **100 %** Duty Cycle (mW)	EIRP **75 %** Duty Cycle (mW)
LoRa	923.3	27.47	2.7	30.17	1039.9	779.925
	925.5	27.41	2.7	30.11	1025.7	769.275
	927.5	**27.56**	**2.7**	**30.26**	**1061.7**	**796.275**

Pre Approved WiFi Module worst case EIRP is shown in bold (ref. US Tech Test report number 13-0186):

Technology	**Frequency (MHz)**	**Max. Antenna gain (dBi)**	**Max. Cond. Power (W)**	**duty cycle**	**Avg EIRP (mW)**
802.11g	2412	0	0.09333	1	93.3254
	2442	0	0.097724	1	**97.7237**
	2462	0	0.09333	1	93.3254

For worst case scenario, the highest measured EIRP value for the LoRa transmitter was rounded up to 800 mW.

The highest measured EIRP value for the WiFi transmitter was rounded up to 100 mW.

To determine the minimum safe distance, the sum of all transmitted power is used with the equation (4) from the OET bulletin 65,

LoRa 500 KHz and WiFi Module (Power Linearly adds) = 800mW + 100 mW = 900 mW

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

Where: S, power density in 'mW/cm^2' (we use the value for the LoRa band of 0.616 W/m^2)
EIRP, Effective Isotropic Radiated Power in 'mW'
R, distance to the center of the radiation of the antenna in 'cm'

$S = 0.18$ mW/cm^2 << 0.616 mW/cm^2

and then re-arrange to determine the minimum safe distance.

$$R = \sqrt{[EIRP / (4 \pi S)]}$$

R = 10.8 cm, for uncontrolled exposure (rounded up to the first decimal)

The manufacturer manual specified a minimum safe distance of **20cm**.

The device is intended to be installed in uncontrolled area like small offices or home.