

WARNING - RF Power Hazard

WARNING *The unit has high levels of RF power. Exposure to RF or microwave power can cause burns and may be harmful to health.*

- Remove power from the unit before disconnecting any RF cables and before inspecting damaged cables and/or antennas.
- Avoid standing in front of high gain antennas (such as a dish antenna) and never look into the open end of a waveguide or cable where RF power may be present.

The following guidelines for safe operation were derived from OET bulletin 65, August 1997, as recommended by the Federal Communications Commission (FCC).

The PTX-PRO was designed to provide services to broadcast ENG users under CFR 74 subpart F and 74.601 TV pickup stations. This unit, operated without an antenna, will not create RF energy exceeding 1.0 mW/cm^2 , the FCC limit for exposure. Once connected to an antenna, the potential for harmful exposure will be greatly enhanced.

In this situation, a certain distance from the radiator is to be maintained. Calculations need to be performed to understand what that safe margin for exposure is. This is known as the Maximum Permissible Exposure (MPE) limit.

Calculations provided are for common antennas often utilized in the ENG environment. The following formula used is that suggested by OET 65.

Calculating MPE

$$\text{EIRP} = P * (10 ^ { (G / 10) }) = (\text{antilog of } G/10) * P$$

P = RF power delivered to the antenna in mW

G = Power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna in centimeters

S = MPE in mW/cm^2 (milliwatts per square centimeters)

Conversions

dBi to numeric gain = $\text{Antilog} (\text{dBi}/10)$

Feet to centimeters = $\text{Feet} * 30.48$

Centimeters to Feet = $\text{cm} * .0328$

$4 \pi = 12.57$

User Input

RF power delivered to the antenna = Watts

Antenna gain (referenced to isotropic antenna) = dBi

Distance from the center of radiation = Feet

Calculation steps:

1. [P] RF power input. Watts to milliwatts = Watts * 1000
2. [G] Antenna gain dBi. Numeric gain = Antilog (dBi/10)
3. [EIRP] Multiply P * G
4. [R] Centimeters to feet = Centimeters * .0328
5. Square R
6. Multiply $R^2 * 4\pi$
7. [S] Divide $(R^2 * 4\pi)$ into EIRP
S = Power Density in milliwatts per square centimeters.

Note At frequencies above 1500 MHz, S must not be greater than 1.

Reference

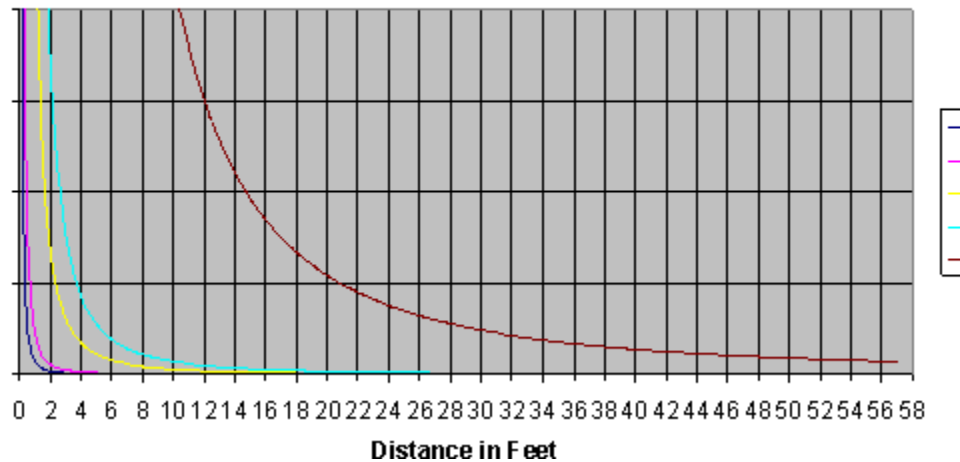
FCC OET Bulletin 65, August 1997 - Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields

The following graph and associated table show the permissible exposure distance for various antennas. Graphs and data will vary, based on the actual transmitter, output power, frequency, and antenna utilized. One plot provides the permissible output of the transmitter for digital modulation, and the other plot for analog modulation.

This information is provided, in accordance with the requirements set forth by the FCC, as a guide for you assuming that users of this equipment are licensed and qualified to operate the equipment per the guidelines and recommendations contained within the product user guides and in accordance with any FCC rules that may apply.

Maximum Permissible Exposure

@ .8 Watts RF Power, 13GHz Digital



Antenna Gain (dBi)	Minimum Safe Distance from Antenna (cm)	Minimum Safe Distance from Antenna (inch)
0	20	7.9
5	32	12.6
16	113	44.5
20	178	70.1
35	1001	394.1

2.2.2 Powering and Grounding the PTX-PRO

For safe operation, all equipment must be properly grounded.

- Connect the unit to a common (vehicle or aircraft) ground.
- Make the ground wire as short and straight as possible.

CAUTION

Be sure the equipment grounding follows applicable electrical codes. Never modify a grounded power plug to connect to an ungrounded receptacle.

Ensure that the power being supplied matches the power required by the equipment. You can find power ratings for equipment on a rating plate, usually on the rear panel. Ensure that the electrical supply is protected by over-current protection devices as required by the applicable electrical codes. If necessary, consult a licensed electrician.