

Changes or modifications not expressly approved by MRC could void the user’s authority to operate the equipment.

General Safety Information

The following safety requirements, as well as local site requirements and regulations, must be observed by personnel operating and maintaining the equipment covered by this manual to ensure awareness of potential hazards.

WARNING - RF Power Hazard

High levels of RF power are present in the unit. 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.

RF Exposure - Safe Working Distances

MRC provides this warning for safety purposes with the intent to inform the user of the potential hazard to RF exposure. The following guidelines for safe operation were derived from OET bulletin 65, August 1997, as recommended by the Federal Communications Commission (FCC).

The MTX5000 Transmitter System is a mobile transmitter system 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/cm², 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.

Note	Hazardous RF radiation limits and recommended distances may vary by country. Ensure that all applicable state and federal regulations are observed when using this transmitter.
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Calculations provided are for common antennas often utilized in the ENG environment. The following formula used is that suggested by OET 65.

Calculating MPE

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

- 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/cm² (milliwatts per square centimeters)

Conversions

- dBi to numeric gain = Antilog (dBi/10)
- Feet to centimeters = Feet * 30.48
- Centimeters to Feet = cm * .0328
- 4 π = 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. Convert watts to milliwatts = Watts * 1000
2. [G] Antenna gain dBi. Convert to numeric gain = Antilog (dBi/10)
3. [EIRP] Multiply P * G
4. [R] Convert 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

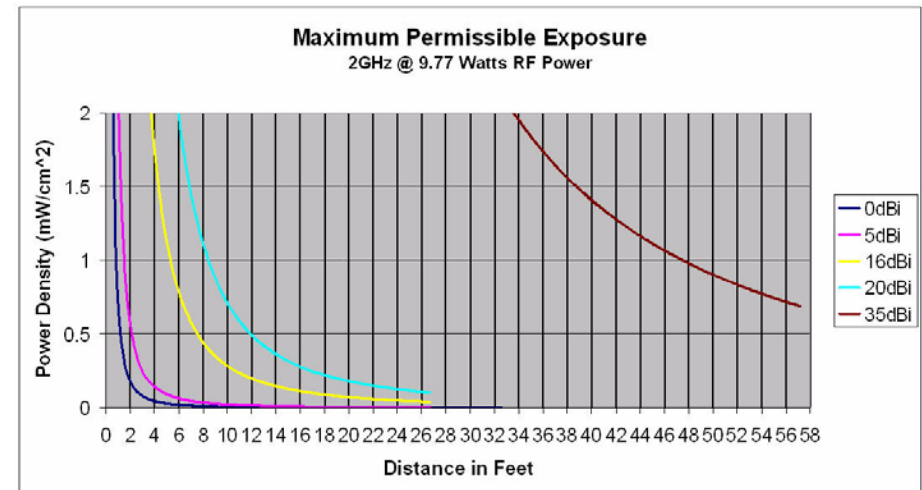
FCC OET Bulletin 65, August 1997 - Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields

The examples shown in Figure 1 and Figure 2 are typical graphs for an MRC STRATA Transmitter and 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.

MRC, in accordance with the requirements set forth by the FCC, provides this information as a guide to the user. It is assumed that the 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.

Figure 1 with its corresponding table shows the 2GHz MPE.

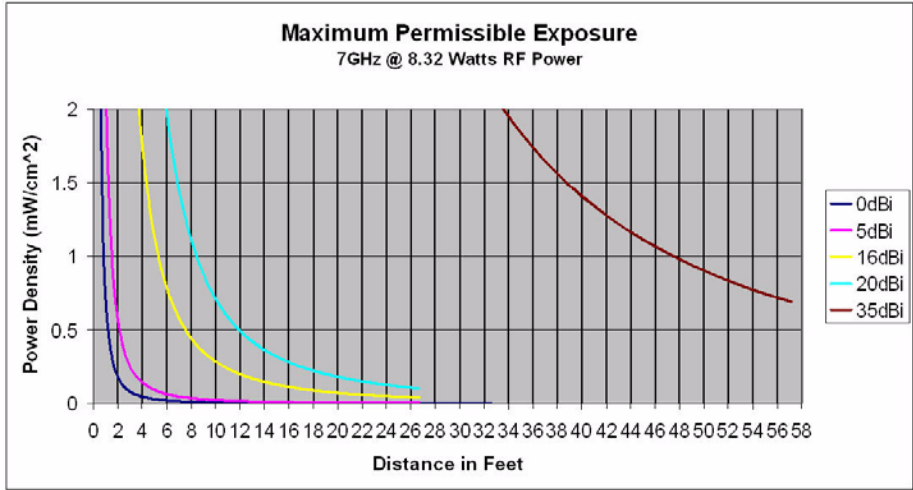
Figure 1: MTX5000 MPE 2GHz



Antenna Gain (dBi)	Minimum Distance from Antenna (cm)	Minimum Distance from Antenna (inch)
0	28	11.02
5	50	19.68
16	177	69.67
20	279	109.81
35	1569	617.56

Figure 2 with its corresponding table shows the 7GHz MPE.

Figure 2: MTX5000 MPE 7GHz



Conventions

Pay special attention to information marked in one of the following ways:

WARNING Follow WARNINGS closely to prevent personal injury or death.

CAUTION Follow CAUTIONS to prevent damage to the equipment.

Note Notes provide additional information to assist you in using and maintaining the equipment.

Antenna Gain (dBi)	Minimum Distance from Antenna (cm)	Minimum Distance from Antenna (inch)
0	26	10.23
5	46	18.11
16	163	64.16
20	258	101.55
35	1448	569.93