

N2-4XE1 Installation and Operation Manual

Microwave Antenna Radiation Warning

Designed for point-to-point operation, an N2-4XE1 microwave radio system will use directional antennas to transmit and receive microwave signals. These directional antennas are usually circular or rectangular in shape, are generally located outdoors, and are usually mounted on a tower or mast.

Referencing OET Bulletin 65 (Edition 97-01, August 1997) from the Federal Communication Commission's Office of Engineering & Technology, limits for maximum permissible exposure (MPE) to microwave signals have been adopted by the FCC for both Occupational/Controlled environments and General Population/Uncontrolled environments. These limits are 5.0 mW/cm² and 1.0 mW/cm² respectively.

The closer you are to the front center-point of a microwave antenna, the greater the power density of its transmitted microwave signal. Unless you are very close, however, microwave exposure levels will fall far below the MPE limits. To determine how close to a microwave antenna you can be and still remain below the MPE limits noted above, "worst case" predictions of the field strength and power density levels in the vicinity of an N2-4XE1™ microwave antenna

can be made from the following calculations. The equation is generally accurate in the far-field of an antenna, and will over-predict power density in the near-field (i.e. close to the antenna).

$$S = PG / 4 \pi R^2$$

where:

S = power density (in mW/cm²)

P = power input to the antenna (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 (cm)

Note that G, the power gain factor, is usually expressed in logarithmic terms (i.e., dB), and must be converted using the following equation:

$$G = 10^{dB/10}$$

In order to satisfy FCC RF exposure requirements, the antennas used with this product must be installed in such a way as to insure a minimum separation distance between the antennas and all persons of the amounts shown in the table below:

RF Exposure Safety Information

Max RF Power	TX Antenna	Uncontrolled Environment	Controlled MPE 1 mW/cm ²
P, dBm	G, dBi	MPE 1 mW/cm ²	MPE 5 mW/cm ²
P, dBm	G, dBi	Safe Distance, cm	Safe Distance, cm
12.0	18.0	20*	20*
12.0	23.0	20*	20*
12.0	26.0	22.4	20*
12.0	28.5	29.9	20*

* For fixed and mobile antenna installations, FCC requires a minimum separation distance of 20 cm, regardless of whether calculations would indicate a lesser distance.

Wireless, Inc. fully supports the FCC's adopted MPE limits, and recommends that personnel maintain appropriate distances from the front of all directional microwave antennas. Should you have questions about N2-4XE1™ microwave signal radiation, please contact the Wireless, Inc. Customer Service Department.