

## 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/cm<sup>2</sup> and 1.0 mW/cm<sup>2</sup> 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/cm<sup>2</sup>)

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 comply with FCC RF Exposure requirements for fixed and mobile operations, the antenna must be installed such that the minimum separation distance, as shown for each antenna, is always maintained between the antenna and all persons.

### RF Exposure Safety Information

Max RF Power	TX Antenna	<b>Uncontrolled Environment</b>	Controlled MPE 1 mW/cm <sup>2</sup>
P, dBm	G, dBi	<b>MPE 1 mW/cm<sup>2</sup></b>	MPE 5 mW/cm <sup>2</sup>

P, dBm	G, dBi	Safe Distance, cm	Safe Distance, cm
12.0	18.0	<b>20*</b>	20*
12.0	23.0	<b>20*</b>	20*
12.0	26.0	<b>22.4</b>	20*
12.0	28.5	<b>29.9</b>	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.

In order to comply with FCC RF Exposure requirements for fixed and mobile operations, the antenna must be installed such that the minimum separation distance, as shown for each antenna, is always maintained between the antenna and all persons.

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.