



3.12 RF EXPOSURE CALCULATION

From FCC 1.1310 table 1A, the maximum permissible RF exposure for an uncontrolled environment is $1\text{mW}/\text{cm}^2$. The Electric field generated for a $1\text{mW}/\text{cm}^2$ exposure (S) is calculated as follows:

$$S = E^2/Z$$

where:

S = Power density

E = Electric field

Z = Impedance.

$$3.12.1 \quad E = \sqrt{S \times Z}$$

$$1\text{mW}/\text{cm}^2 = 10 \text{ W}/\text{m}^2$$

The impedance of free space is 377 ohms, where E and H fields are perpendicular.

Thus:

$$E = \sqrt{10 \times 377} = 61.4 \text{ V}/\text{m} \text{ which is equivalent to } 1\text{mW}/\text{cm}^2$$

Using the relationship between Electric field E, Power in watts P, and distance in meters d, the corresponding Antenna numeric gain G and the transmitter output power and solving for d,

$$d = \sqrt{\frac{P_{\text{eak}} \times 30 \times G}{E}}$$

1. The Numeric gain G of antenna with a gain specified in dB is determined by:

$$G = \text{Log}^{-1}(\text{dB gain}/10)$$

$$G = \text{Log}^{-1} 2.15 = 1.64$$



The table below identifies the distances where the $1\text{mW}/\text{cm}^2$ exposure limits may be exceeded during continuous transmission using the proposed fixed antennas

Antenna Type	Gain (dBi)	Numeric gain	Channel	Amp defacto Peak output Power (mW)	Calculated Distance (m)	Minimum RF Exposure Separation Distance (m)
Uni Grid 24	24	251.2	80	208.9	0.65	2
Uni Patch 16	16	39.8	80	446.7	0.38	2
Uni Patch 16	16	39.8	80	208.9	0.26	2
Uni Patch 11	11	12.6	80	446.7	0.21	2
Uni Patch 11	11	12.6	80	208.9	0.14	2
Uni Patch 9	9	7.9	80	446.7	0.17	2
Uni Patch 9	9	7.9	80	208.9	0.11	2
Omni 8	8	6.3	80	446.7	0.15	2
Omni 8	8	6.3	80	208.9	0.10	2

WARNING: It is the responsibility of the professional installer to ensure that when using the outdoor antenna kits in the United States (or where FCC rules apply), only these antenna configurations shown in the table in section 1.4 are used. The use of any antenna other than those listed is expressly forbidden in accordance to FCC rules CFR47 part 15.204.

Notice in Installation Manual:

FCC Radiation Exposure Statement

- i) This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment when installed as directed. This equipment should be installed and operated with fix-mounted antennas that are installed with a minimum of 2 meters of separation distance between the antenna and all persons body during normal operation and the antennas as shown below: