



APPENDIX A: RF EXPOSURE CALCULATIONS FOR HIGH GAIN ANTENNAS

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.

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

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

The impedance of free space is 337 ohms, where E and H fields are perpendicular.
Thus:

$$E = \sqrt{10 \times 337} = 61.4\text{ V}/\text{m} \text{ which is equivalent to } 1\text{mW}/\text{cm}^2$$

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,

$$d = \sqrt{\frac{\text{EIRP}_{\text{peak}} \times 30}{E}}$$

TABLE 10-1: RF EXPOSURE SEPARATION DISTANCE

ANTENNA TYPE	Max EIRP CH 6 (dBm)	CALCULATED RF EXPOSURE SEPARATION DISTANCE (cm)	MINIMUM RF EXPOSURE SEPARATION DISTANCE (cm)
Main TX Internal antenna on left side of LCD	13.4	1.3	20.0