## MAXIMUM PERMISSIBLE EXPOSURE (MPE)

## **Applicable Standard**

General population/uncontrolled exposure apply in situations is which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure. The exposure levels can be expressed in terms of power density, electric field strength, or magnetic field strength, as averaged over 30minutes for the general public and 6 minutes for trained personnel. The exposure criterion is frequency dependent, and a chart covering the range from 3 kHz to 100 GHz can be found in NCRP No.86 (references IEEE C95.1-1999). Below are the limits.

**Limits for General Population/Uncontrolled Exposure** 

Limits for General Population/Uncontrolled Exposure								
Frequency	Electric Field	Magnetic Field	Power	Averaging				
Range	Range Strength		Density	Time				
(MHz)	(V/m)	(A/m)	(mW/cm <sup>2</sup> )	(Minutes)				
0.3-1.34	614	1.63	*(100)	30				
1.34-30	824/f	2.19/f	$*(180/f^2)$	30				
30-300	27.5	0.073	0.2	30				
300-1500	/	/	f/1500	30				
1500-100,000	/	/	1.0	30				

f = frequency in MHz

\* = Plane-wave equivalent power density

S= f (MHz)/1500=848.8/1500= 0.566 mW/cm2

## Result

## **Calculated Formulary:**

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

S = power density (in appropriate units, e.g. mW/cm2)

P = power input to the antenna (in appropriate units, e.g., mW).

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

Frequency	Antenna Gain		Conducted Power		Evaluation	Power	MPE Limit
(MHz)	(dBi)	(numeric)	(dBm)	(mW)	Distance(cm)	Density	$(mW/cm^2)$
						$(mW/cm^2)$	
848.8	0.5	1.12	32.48	1770	20	0.395	0.566
1850.2	2.2	1.66	28.88	772.68	20	0.255	1.0

Note: To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20cm from nearby persons.

**Result: Compliance**