Application M9H95MASV2C

Prediction of MPE limit at given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

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

where: S = power density
P = power input to the antenna
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

The table below is excerpted from Table 1B of 47 CFR 1.1310 titled Limits for Maximum Permissible Exposure (MPE), Limits for General Population/Uncontrolled Exposure:

Frequency Range (MHz)	Power Density (mW/cm^2)	Averaging Time (minutes)
300 – 1500	f/1500	30
1500 – 100.000	1.0	30

where f = frequency in MHz

Prediction
Antenna Type: 0 dBi Antenna / 3 dBi Antenna / 4 dBi Antenna / 5 dBi Antenna

Maximum peak output power at antenna input terminal:	31.46	*dBm*
Maximum peak output power at antenna input terminal:	1399.59	*mW*
Antenna gain(typical):	0	*dBi*
Maximum antenna gain:	1	*numerical*
Prediction distance:	20	*cm*
Prediction frequency:	1880	*MHz*
MPE limit for uncontrolled exposure at prediction frequency	**1**	***mW / cm²***
Power density at prediction frequency: with Antenna Gain of **0 dBi**	0.2784	*mW / cm²*
Power density at prediction frequency: with Antenna Gain of **3 dBi**	0.5556	*mW / cm²*
Power density at prediction frequency: with Antenna Gain of **4 dBi**	0.6994	*mW / cm²*
Power density at prediction frequency: with Antenna Gain of **5 dBi**	0.8805	*mW / cm²*
Maximum allowable antenna gain:	5.5526	*dBi*

This predictions demonstrate the following:

1) The power density levels at a distance of 20 cm with typical antennas of 0-5 *dBi* are below the maximum levels allowed by the FCC regulations.

2) The antenna gain where 1 *mW / cm²* would be reached at 20 cm distance, is **G= 5.5526 dBi**

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