

EXHIBIT 13. MPE CALCULATIONS

13.1.1 Module with 6dBi antenna

The following MPE calculations are based on a 6dBi dipole antenna with a measured ERP of 131.4dBuV/m (Peak detector), at 3 meters, and conducted RF power of +29.2 dBm as presented to the antenna. The source-based time average power of the module was calculated to be 19.2 dBm. The gain of this antenna based on the specification sheet 6.0dBi maximum.

<u>Prediction of MPE limit at a given distance</u>	
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
Maximum peak output power at antenna input terminal:	19.20 (dBm)
Maximum peak output power at antenna input terminal:	83.176 (mW)
Antenna gain(typical):	6 (dBi)
Maximum antenna gain:	3.981 (numeric)
Prediction distance:	20 (cm)
Prediction frequency:	2405 (MHz)
MPE limit for uncontrolled exposure at prediction frequency:	1 (mW/cm^2)
Power density at prediction frequency:	0.065876 (mW/cm^2)
Maximum allowable antenna gain:	17.8 (dBi)
Margin of Compliance at 20 cm =	11.8 dB

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13.1.2 Module with PCB trace inverted-L antenna

The following MPE calculations are based on a PCB trace inverted-L antenna with a measured ERP of 131.1dBuV/m (Peak detector), at 3 meters, and conducted RF power of +29.2 dBm as presented to the antenna. The source-based time average power of the module was calculated to be 19.2 dBm. The gain of this antenna based on the specification sheet 1.1dBi maximum.

<u>Prediction of MPE limit at a given distance</u>	
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
Maximum peak output power at antenna input terminal:	19.20 (dBm)
Maximum peak output power at antenna input terminal:	83.176 (mW)
Antenna gain(typical):	1.1 (dBi)
Maximum antenna gain:	1.288 (numeric)
Prediction distance:	20 (cm)
Prediction frequency:	2405 (MHz)
MPE limit for uncontrolled exposure at prediction frequency:	1 (mW/cm ²)
Power density at prediction frequency:	0.021317 (mW/cm ²)
Maximum allowable antenna gain:	17.8 (dBi)
Margin of Compliance at 20 cm =	16.7 dB

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