

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.

Prediction of MPE limit at a 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		
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

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