

MPE Calculator

RF Exposure uses EIRP for calculation. EIRP is based on TX power added to the antenna gain in dBi.

Measured Values		
Transmitter Output Power	18.10	W
Operating Duty Cycle	50	%
Transmit Frequency (f)	118.000	MHz
Cable Loss	0	dB
Antenna Gain (Isotropic)	2.15	dBi
Antenna Linear Gain	1.64	
Antenna Gain (Dipole)	0.00	dBd
Final Antenna Gain (dBi)**	2.15	dBi
Final Antenna Linear Gain (G _N)**	1.64	
Operating Output Power*	9.05	W
Operating Output Power (EIRP)*	41.72	dBm
Operating Output Power (ERP)*	39.57	dBm
Operating EIRP*	14,847.34	mW
Operating ERP (P _A)*	9,050.00	mW

*duty cycle (%) applied.

** Antenna gain minus cable loss.

Equations
$Antenna\ Gain\ (linear) = 10^{Antenna\ Gain\ (dBi)/10}$
$Antenna\ Gain\ (dBd) = Antenna\ Gain\ dBi - 2.15$
$EIRP = ERP\ (dBm) + Antenna\ Gain\ (dBi)$
$Power\ Density\ (S)\ mW/cm^2 = \frac{P_A G_N}{4\pi r^2}$
$Minimum\ Distance\ (r) = \sqrt{\frac{P_A G_N}{4\pi S}}$
$S = Power\ Density\ in\ mW/cm^2.$
$r = distance\ to\ radiating\ element\ in\ cm.$
$P_A = Operating\ ERP\ in\ mW\ with\ Duty\ Cycle\ Applied.$
$G_N = Total\ Antenna\ Linear\ Gain.$

Exposure Limits		
FCC radio frequency radiation exposure limits per 1.1310		
Frequency (MHz)	Occupational Limit (mW/cm ²)	Public Limit (mW/cm ²)
30-300	1	0.2
300-1,500	f/300	f/1500
1,500-100,000	5	1
IC radio frequency radiation exposure limits per RSS-102		
Frequency (MHz)	Occupational Limit (W/m ²)	Public Limit (W/m ²)
10-20	10	2
20-48	44.72/f ^{0.5}	8.944/f ^{0.5}
48-100	6.455	N/A
48-300	N/A	1.291
100-6,000	0.6455*f ^{0.5}	N/A
300-6,000	N/A	0.02619*f ^{0.6834}
6,000-15,000	50	10
15,000-50,000	50	10
150,000-300,000	3.33x10 ⁻⁴ *f	6.67x10 ⁻⁵ *f

Applied Exposure Limit***			
		mW/cm2	W/m2
FCC	Occupational	1	10
	Public	0.2	2
Canada	Occupational	0	0.000
	Public	0.1291	1.291

***Limits determined by listed transmit frequency (f)

Minimum Distance Calculations								
		Frequency (MHz)	Duty Cycle (%)	Output Power - ERP (mW)	Antenna Gain (Linear)	Exposure Limit (mW/cm2)	Minimum Distance (cm)	Minimum Distance (Inches)
FCC	Occupational	118.000	50	9,050.00	1.64	1	34.37315192	13.53273698
	Public	118.000	50	9,050.00	1.64	0.2	76.86070431	30.26011981
Canada	Occupational	118.000	50	9,050.00	1.64	0.70119925	41.04862707	16.1608768
	Public	118.000	50	9,050.00	1.64	0.1291	95.66569621	37.66365993

Overall Minimum Limit Public	
95.66569621	cm
37.66365993	Inches

Overall Minimum Limit Occupational	
41.04862707	cm
16.1608768	Inches