

## RF Exposure

The GMR60X is a marine mount radar system operating in the marine services authorized under part 80 of CFR 47. Per 2.1091(c) of CFR 47, the equipment is categorically excluded from routine environmental evaluation for RF exposure prior to equipment authorization or use. The radiating structure for the device is typically mounted more than 265 centimeters away and located outside and above the craft's helm. Due to the location of the antenna, normal operating conditions, and use the unit will satisfy the requirements for RF Exposure per CFR rule 1.1311. MPE calculations are shown below demonstrating compliance.

MPE calculations

MPE Calculator	MPE uses EIRP for calculation. EIRP is based on TX power added to the antenna gain in dBi.			
	dBi = dB gain compared to an isotropic radiator.			
	S = power density in mW/cm <sup>2</sup>			
			Antenna Gain (dBi)	30
		Output Power	dBd + 2.17 = dBi	dBi to dBd
				2.17
Tx Frequency (MHz)	9400	Average (Watts)	4.8000	Antenna Gain (dBi)
				27.83
Cable Loss (dB)	0.0	(dBm)	36.81	Antenna minus cable (dBi)
				30.00
	Calculated ERP (mw)	2912334.382	EIRP = Po(dBm) + Gain (dB)	
	Calculated EIRP (mw)	4800000.000	Radiated (EIRP) dBm	
			ERP = EIRP - 2.17 dB	
			Radiated (ERP) dBm	
			64.642	
<b>Occupational Limit</b>	Power density (S) $EIRP$ $\frac{EIRP}{4\pi r^2} = mW/cm^2$ $r (cm) = \sqrt{\frac{EIRP (mW)}{4\pi S}}$			
5.00000				
<b>General Public Limit</b>				
1.00000	mW/cm <sup>2</sup>			
FCC radio frequency radiation exposure limits per 1.1310				
	Frequency (MHz)	Occupational Limit	Public Limit	
	300-1,500	f/300	f/1500	
	1,500-10,000	5	1	
FCC radio frequency radiation exposure limits per 1.1310				
	Frequency (MHz)	Occupational Limit @ Tx Freq (mW/cm <sup>2</sup> )	Public Limit @ Tx Freq (mW/cm <sup>2</sup> )	
	300-1,500	31.33333333	6.266666667	
	1,500-10,000	5	1	
	EIRP	Distance	Distance	S
	milliwatts	cm	inches	mW/cm <sup>2</sup>
	4800000.000	900.00	354.33	0.47157
	4800000.000	800.00	314.96	0.59683
	4800000.000	700.00	275.59	0.77953
	4800000.000	650.00	255.91	0.90408
	4800000.000	620.00	244.09	0.99368
	4800000.000	600.00	236.22	1.06103
	4800000.000	550.00	216.54	1.26272
	4800000.000	500.00	196.85	1.52789
	4800000.000	450.00	177.17	1.88628
	4800000.000	400.00	157.48	2.38732
	4800000.000	350.00	137.80	3.11814
	4800000.000	300.00	118.11	4.24413
	4800000.000	275.00	108.27	5.05087
	4800000.000	195.00	76.77	10.04528
	4800000.000	150.00	59.06	16.97653
	Distance	Distance	Distance	
	feet	feet	feet	
	9.02	6.40	4.92	
	Frequency (MHz)	Occupational Limit minimum Distance (feet)	Public Limit minimum distance (feetm)	
	300-1,500	N/A	N/A	
	1,500-10,000	9.00	20.34	