

MPE calculations

6-foot Antenna

Garmin		A02546	Test Number:	160113		
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 ²					
					Antenna Gain (dBi)	29
		Output Power		dBd + 2.17 = dBi	dBi to dBd	2.2
Tx Frequency (MHz)	9400	Maximum (Watts)	4.480000		Antenna Gain (dBd)	26.83
Cable Loss (dB)	0.0	(dBm)	36.51		Antenna minus cable (dBi)	29.00
	Calculated ERP (mw)	2159126.133		EIRP = Po(dBm) + Gain (dB)		
	Calculated EIRP (mw)	3558590.492			Radiated (EIRP) dBm	65.513
				ERP = EIRP - 2.17 dB		
					Radiated (ERP) dBm	63.343
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> Power density (S) EIRP ----- = mW/cm² 4 π r² r (cm) EIRP (mW) </div>						
FCC Occupational Limit						
FCC radio frequency radiation exposure limits per 1.1310						
	5.00000 mW/cm ²		Frequency (MHz)	Occupational Limit (mW/cm ²)	Public Limit (mW/cm ²)	
	50.00000 W/m ²		300-1,500	ƒ/300	ƒ/1500	
	FCC General Public Limit		1,500-10,000	5	1	
	1.00000 mW/cm ²					
	10.00000 W/m ²					
IC Occupational Limit						
IC radio frequency radiation exposure limits per RSS-102						
	5.00000 mW/cm ²		Frequency (MHz)	Occupational Limit (W/m ²)	Public Limit (W/m ²)	
	50.00000 W/m ²		100-6,000	0.6455ƒ ^{0.5}		
	IC General Public Limit		6,000-15,000	50		
	1.00000 mW/cm ²		300-6,000		0.02619ƒ ^{0.6834}	
	10.00000 W/m ²		6,000-15,000	50	10	
EIRP	S	S	Distance	Distance	Distance	Distance
milliwatts	mW/cm ²	W/m ²	cm	meter	inches	Feet
3558590.492	0.28318	2.83184	1000.00	10.00	393.70	32.81
3558590.492	0.34961	3.49609	900.00	9.00	354.33	29.53
3558590.492	0.44247	4.42474	800.00	8.00	314.96	26.25
3558590.492	0.57793	5.77926	700.00	7.00	275.59	22.97
3558590.492	0.78662	7.86621	600.00	6.00	236.22	19.69
3558590.492	0.93614	9.36144	550.00	5.50	216.54	18.04
3558590.492	0.97114	9.71137	540.00	5.40	212.60	17.72
3558590.492	1.00813	10.08130	530.00	5.30	208.66	17.39
3558590.492	1.13273	11.32735	500.00	5.00	196.85	16.40
3558590.492	1.76990	17.69898	400.00	4.00	157.48	13.12
3558590.492	3.14648	31.46485	300.00	3.00	118.11	9.84
3558590.492	4.53094	45.30938	250.00	2.50	98.43	8.20
3558590.492	4.91638	49.16383	240.00	2.40	94.49	7.87
3558590.492	5.35319	53.53188	230.00	2.30	90.55	7.55
3558590.492	7.07959	70.79591	200.00	2.00	78.74	6.56
3558590.492	12.58594	125.85939	150.00	1.50	59.06	4.92
3558590.492	28.31836	283.18363	100.00	1.00	39.37	3.28
			Standard	Occupational Limit minimum Distance (meters)	Public Limit minimum distance (meters)	
			47CFR 1.1310	2.40	5.30	
			RSS-102	2.40	5.30	

Rogers Labs, Inc.
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 Revision 1

Garmin International, Inc.
 Model: A02546
 Test #: 160113
 Test to: CFR47 Parts 2, 80, RSS-238
 File: A02546 RFExp

FCC ID: IPH-02546
 IC: 1792A-02546
 SN: FF-ENG#2
 Date: February 14, 2016
 Page: 1 of 2

4-foot Antenna

Garmin	A02546	Test Number:	160113		
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 ²				
		Output Power	dBd + 2.17 = dBi	Antenna Gain (dBi)	27
Tx Frequency (MHz)	9400	Maximum (Watts)	4.480000	dBi to dBd	2.2
				Antenna Gain (dBd)	24.83
Cable Loss (dB)	0.0	(dBm)	36.51	Antenna minus cable (dBi)	27.00
	Calculated ERP (mw)	1362316.492	EIRP = Po(dBm) + Gain (dB)		
	Calculated EIRP (mw)	2245318.807		Radiated (EIRP) dBm	63.513
			ERP = EIRP - 2.17 dB	Radiated (ERP) dBm	61.343
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> Power density (S) $EIRP$ $\text{-----} = mW/cm^2$ $4 \pi r^2$ $r \text{ (cm) } EIRP \text{ (mW)}$ </div>					
FCC Occupational Limit		FCC radio frequency radiation exposure limits per 1.1310			
	5.00000 mW/cm ²	Frequency (MHz)	Occupational Limit (mW/cm ²)	Public Limit (mW/cm ²)	
	50.00000 W/m ²	300-1,500	ƒ/300	ƒ/1500	
	FCC General Public Limit	1,500-10,000	5	1	
	1.00000 mW/cm ²				
	10.00000 W/m ²				
IC Occupational Limit		IC radio frequency radiation exposure limits per RSS-102			
	5.00000 mW/cm ²	Frequency (MHz)	Occupational Limit (W/m ²)	Public Limit (W/m ²)	
	50.00000 W/m ²	100-6,000	$0.6455f^{0.5}$		
	IC General Public Limit	6,000-15,000	50		
	1.00000 mW/cm ²	300-6,000		$0.02619f^{0.6834}$	
	10.00000 W/m ²	6,000-15,000	50	10	
EIRP	S	S	Distance	Distance	Distance
milliwatts	mW/cm ²	W/m ²	cm	meter	inches
2245318.807	0.17868	1.78677	1000.00	10.00	393.70
2245318.807	0.22059	2.20589	900.00	9.00	354.33
2245318.807	0.27918	2.79182	800.00	8.00	314.96
2245318.807	0.36465	3.64647	700.00	7.00	275.59
2245318.807	0.49632	4.96324	600.00	6.00	236.22
2245318.807	0.59067	5.90667	550.00	5.50	216.54
2245318.807	0.71471	7.14707	500.00	5.00	196.85
2245318.807	0.88235	8.82355	450.00	4.50	177.17
2245318.807	0.98921	9.89214	425.00	4.25	167.32
2245318.807	1.11673	11.16730	400.00	4.00	157.48
2245318.807	1.98530	19.85298	300.00	3.00	118.11
2245318.807	2.85883	28.58829	250.00	2.50	98.43
2245318.807	4.46692	44.66920	200.00	2.00	78.74
2245318.807	4.94950	49.49496	190.00	1.90	74.80
2245318.807	5.51472	55.14716	180.00	1.80	70.87
2245318.807	7.94119	79.41191	150.00	1.50	59.06
2245318.807	17.86768	178.67679	100.00	1.00	39.37
		Standard	Occupational Limit minimum Distance (meters)	Public Limit minimum distance (meters)	
		47CFR 1.1310	1.90	4.25	
		RSS-102	1.90	4.25	

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