

		Model: GMN 02481	Test Number: 230727	
MPE Calculator	RF Exposure 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/cm²			
	Transmitter Output power (mW)	16,557.0		
	Transmitter Output power (W)	16.56		
	Output Power for % duty Cycle operation (Watts)	50	8.28	Antenna Gain (dBi) 2.2
	Output Power for 50% duty Cycle operation (Watts)	8.28		Antenna Gain (Numeric) 1.66
Tx Frequency (MHz)	118	Calculation power (Watts) 8.28	dBd + 2.17 = dBi	dBi to dBd 2.17
				Antenna Gain (dBd) 0.03
Cable Loss (dB)	0.0	Adjusted Power (dBm)	39.18	Antenna minus cable (dB) 2.20
				Antenna Gain (Numeric) 1.66
	Calculated ERP (mw)	8335.884		EIRP = Po(dBm) + Gain (dB)
	Calculated EIRP (mw)	13738.890		Radiated (EIRP) dBm 41.380
	Power density (S) mW/cm² =	EIRP ----- 4 π r²		ERP = EIRP - 2.17 dB
	r (cm)	EIRP (mW)		Radiated (ERP) dBm 39.210
Occupational Limit				
FCC radio frequency radiation exposure limits per 1.1310				
1	mW/cm²	Frequency (MHz)	Occupational Limit (mW/cm²)	Public Limit (mW/cm²)
10.0	W/m²	30-300	1	0.2
General Public Limit		300-1,500	£300	£1500
0.2	mW/cm²	1,500-10,000	5	1
2.0	W/m²			
Occupational Limit				
IC radio frequency radiation exposure limits per RSS-102				
0.6455f ^{-0.5}	W/m²	Frequency (MHz)	Occupational Limit (W/m²)	Public Limit (W/m²)
7.0	W/m²	100-6,000	0.6455f ^{-0.5}	
General Public Limit		6,000-15,000	50	
1.29	W/m²	48-300		1.291
1.29	W/m²	300-6,000		0.02619f ^{-0.6834}
		6,000-15,000	50	10
f = Transmit Frequency (MHz)				General Public 118 MHz
P _T = Power Input to Antenna (mW)				Occupational 118 MHz
Duty cycle (percentage of operation)				8,278.5000 mW
P _A = Adjusted Power due to Duty cycle or Cable Loss (mW)				50 %
G _A = Numeric Gain of the Antenna				8,278.50 mW
S ₂₀ = Power Density of device at 20cm (mW/m²)				8,278.50 mW
S ₂₀ = Power Density of device at 20cm (W/m²)		S ₂₀ = (P _A G _A)/(4πR ₂₀)²		1.66 numeric
S _L = Power Density Limit (W/m²) FCC		S ₂₀ = (P _A G _A)/(4πR ₂₀)²		2.73 mW/m²
S _L = Power Density Limit (W/m²) Canada				27.33 W/m²
R _C = Minimum distance to the Radiating Element for Compliance (cm) FCC		R _C = √(P _A G _A /4πS _L)		2.000 W/m²
R _C = Minimum distance to the Radiating Element for Compliance (cm) Canada		R _C = √(P _A G _A /4πS _L)		1.29 W/m² = 7.012 W/m²
S _C = Power Density of the device at the Compliance Distance R _C (W/m²) FCC		S _C = (P _A G _A)/(4πR _C)²		R _C (cm) = 73.9 cm
S _C = Power Density of the device at the Compliance Distance R _C (W/m²) Canada		S _C = (P _A G _A)/(4πR _C)²		R _C (cm) = 92.1 cm
R ₂₀ = 20cm				R ₂₀ = 20 cm
For Compliance with Canada General Population Limits, User Manual must indicate a minimum separation distance of				92.1 cm
Or in Meters for Compliance with Canada General Population Limits, a minimum separation distance of				0.92 Meters
Summary: Standalone MPE Calculations and Summary				
	Tx Duty Cycle (%)	Tx Frequency (MHz)	Power Total (mW)	Antenna Gain (numeric)
FCC	50	118	8,279	1.66
Canada	50	118	8,279	1.66
				S _L (W/m²) 2.000
				S ₂₀ (W/m²) 27.33
				R _C (cm) 73.9
				S _C (W/m²) 2.00
				R ₂₀ 20 cm
	Limit		Overall Minimum (cm)	Overall Minimum (inches)
	Public	Occupational		
FCC (cm)	73.9	33.1		
FCC (inches)	30.0	14.0		
Canada (cm)	92.1	39.5		
Canada (inches)	37.0	16.0		
Overall Minimum Limit Public		Overall Minimum Limit Occupational		
93 cm		40 cm		
37 inches		16 inches		

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 Revision 1

Garmin International, Inc.
 HVIN: GMN-02481
 Test: 230727
 Test to: FCC Parts 2, 15, 87
 File: GMN02481 FCC TNB RFExp

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