

HVIN: GMN-01322		Test Number: 220801					
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/cm <sup>2</sup>						
	Transmitter Output power (mW)	8.4					
	Transmitter Output power (W)	0.008					
Output Power for % duty Cycle operation (Watts)	100	0.008		Antenna Gain (dBi)	-5		
Output Power for 100% duty Cycle operation (Watts)		0.008		Antenna Gain (Numeric)	0.32		
Tx Frequency (MHz)	2442	Calculation power (Watts)	0.008	dBd + 2.17 = dBi	dBi to dBd	2.17	
				Antenna Gain (dBd)	-7.17		
Cable Loss (dB)	0.0	Adjusted Power (dBm)	9.24	Antenna minus cable (dB)	-5.00		
				Antenna Gain (Numeric)	0.32		
	Calculated ERP (mw)	1.611		EIRP = Po(dBm) + Gain (dB)			
	Calculated EIRP (mw)	2.655		Radiated (EIRP) dBm	4.240		
				ERP = EIRP - 2.17 dB			
				Radiated (ERP) dBm	2.070		
	<div style="border: 1px solid black; padding: 5px; width: fit-content;"> <math display="block">\text{Power density (S) mW/cm}^2 = \frac{\text{EIRP}}{4\pi r^2}</math> <p>r (cm) EIRP (mW)</p> </div>						
	<b>Occupational Limit</b>	FCC radio frequency radiation exposure limits per 1.1310					
	mW/cm <sup>2</sup>	Frequency (MHz)	Occupational Limit (mW/cm <sup>2</sup> )	Public Limit (mW/cm <sup>2</sup> )			
5	W/m <sup>2</sup>	30-300	1	0.2			
50.0							
	<b>General Public Limit</b>	300-1,500	f/300	f/1500			
1	mW/cm <sup>2</sup>	1,500-10,000	5	1			
10.0	W/m <sup>2</sup>						
	<b>Occupational Limit</b>	IC radio frequency radiation exposure limits per RSS-102					
	W/m <sup>2</sup>	Frequency (MHz)	Occupational Limit (W/m <sup>2</sup> )	Public Limit (W/m <sup>2</sup> )			
0.6455f <sup>0.5</sup>	W/m <sup>2</sup>	100-6,000	0.6455f <sup>0.5</sup>				
31.9							
	<b>General Public Limit</b>	6,000-15,000	50				
0.02619f <sup>0.6834</sup>	W/m <sup>2</sup>	48-300		1.291			
5.41	W/m <sup>2</sup>	300-6,000		0.02619f <sup>0.6834</sup>			
		6,000-15,000	50	10			
					General Public	Occupational	
f = Transmit Frequency (MHz)				f (MHz) =	2442	2442	MHz
P <sub>T</sub> = Power Input to Antenna (mW)				P <sub>T</sub> (mW) =	8.3946	8.3946	mW
Duty cycle (percentage of operation)				% =	100	100	%
P <sub>A</sub> = Adjusted Power due to Duty cycle or Cable Loss (mW)				P <sub>A</sub> (mW) =	8.39	8.39	mW
G <sub>N</sub> = Numeric Gain of the Antenna				G <sub>N</sub> (numeric) =	0.32	0.32	numeric
S <sub>20</sub> = Power Density of device at 20cm (mW/m <sup>2</sup> )		S <sub>20</sub> = (P <sub>A</sub> G <sub>N</sub> )/(4πR <sub>20</sub> <sup>2</sup> )		S <sub>20</sub> (mW/m <sup>2</sup> ) =	0.00	0.00	mW/m <sup>2</sup>
S <sub>20</sub> = Power Density of device at 20cm (W/m <sup>2</sup> )		S <sub>20</sub> = (P <sub>A</sub> G <sub>N</sub> )/(4πR <sub>20</sub> <sup>2</sup> )		S <sub>20</sub> (W/m <sup>2</sup> ) =	0.01	0.01	W/m <sup>2</sup>
S <sub>L</sub> = Power Density Limit (W/m <sup>2</sup> ) FCC				S <sub>L</sub> (W/m <sup>2</sup> ) =	10.000	50.000	W/m <sup>2</sup>
S <sub>L</sub> = Power Density Limit (W/m <sup>2</sup> ) Canada				S <sub>L</sub> (W/m <sup>2</sup> ) =	5.412	31.898	W/m <sup>2</sup>
R <sub>C</sub> = Minimum distance to the Radiating Element for Compliance (cm) FCC		R <sub>C</sub> = √((P <sub>A</sub> G <sub>N</sub> )/(4πS <sub>L</sub> ))		R <sub>C</sub> (cm) =	0.5	0.2	cm
R <sub>C</sub> = Minimum distance to the Radiating Element for Compliance (cm) Canada		R <sub>C</sub> = √((P <sub>A</sub> G <sub>N</sub> )/(4πS <sub>L</sub> ))		R <sub>C</sub> (cm) =	0.6	0.3	cm
S <sub>C</sub> = Power Density of the device at the Compliance Distance R <sub>C</sub> (W/m <sup>2</sup> ) FCC		S <sub>C</sub> = (P <sub>A</sub> G <sub>N</sub> )/(4πR <sub>C</sub> <sup>2</sup> )		S <sub>C</sub> (W/m <sup>2</sup> ) =	10.00	50.00	W/m <sup>2</sup>
S <sub>C</sub> = Power Density of the device at the Compliance Distance R <sub>C</sub> (W/m <sup>2</sup> ) Canada		S <sub>C</sub> = (P <sub>A</sub> G <sub>N</sub> )/(4πR <sub>C</sub> <sup>2</sup> )		S <sub>C</sub> (W/m <sup>2</sup> ) =	5.41	31.90	W/m <sup>2</sup>
R <sub>20</sub> = 20cm				R <sub>20</sub> =	20	20	cm
					0.6	0.1	Meters
					0.6	0.1	Meters
					0.6	0.1	Meters
<b>Summary: Standalone MPE Calculations and Summary</b>							
	Tx Duty Cycle (%)	Tx Frequency (MHz)	Power Total (mW)	Antenna Gain (numeric)	Public Limit	S <sub>20</sub> (W/m <sup>2</sup> )	Public
FCC	100	2442	8	0.32	10.000	0.01	0.5
Canada	100	2442	8	0.32	5.412	0.01	0.6
			Limit	Overall Minimum (cm)	Overall Minimum (inches)		
		Public	Occupational				
FCC (cm)		0.5	0.2				
FCC (inches)		1.0	1.0				
Canada (cm)		0.6	0.3				
Canada (inches)		1.0	1.0				
	Overall Minimum Limit Public	Overall Minimum Limit Occupational					
	1 cm	1 cm					
	1 inches	1 inches					

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Revision 1

Garmin International, Inc.  
Model: GMN-01322  
Test: 220801  
Test to: CFR47 15C, RSS-210, RSS-247  
File: GMN01322 RFExp

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