

HVIN/PMN: A04879
47CFR 1.1310, RSS-102 Issue 6

[illegible]

Garmin A04879 MPE Exhibit

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MPE – BLE

Garmin	A04879	Test Number:	250123						
MPE Calculator	The Usage Case for this product is in a Public / Uncontrolled Environment w/ > 20cm separation								
	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)	3.51			
					dBi to dBd	2.2			
Tx Frequency (MHz)	2402	Peak Power (Watts)	0.0011		Antenna Gain (dBd)	1.34			
		Peak Power (mW)	1.1						
Cable Loss (dB)	0.0	(dBm)	0.6		Antenna minus cable (dBi)	3.51			
		Max Duty Cycle (%)	100.0%						
		Adjusted Power (mW)	1.1						
		Adjusted Power (dBm)	0.6						
	Calculated ERP (mw)	1.563			EIRP = Po(dBm) + Gain (dB)				
	Calculated EIRP (mw)	2.576			Radiated (EIRP) dBm	4.110			
					ERP = EIRP - 2.17 dB				
					Radiated (ERP) dBm	1.940			
Occupational Limit	Power density (S)								
5 mW/cm ²	EIRP								
50.00000 W/m ²	----- = mW/cm ²								
	4 π r ²								
General Public Limit	r (cm) EIRP (mW)								
1 mW/cm ²									
10.00000 W/m ²									
FCC radio frequency radiation exposure limits per 1.1310					IC radio frequency radiation exposure limits per RSS-102, Issue 6				
Frequency (MHz)	Occupational Limit W/n	Public Limit W/m ²	Frequency (MHz)	Mobile					
300-1,500	f/30	f/150	10-20	1.0	1.0				
1,500-100,000	50	10	20-48	4.49/f ^{0.5}	0.1				
2402.0	50	10	48-300	0.6	1.29				
			300-6,000	(1.31*10 ⁻²)*f ^{0.6834}	2.68				
			6,000-15,000	5.0	5.0				
				FCC	ISED				
f = Transmit Frequency (MHz)			f (MHz) =	2402	2402 MHz				
P _T = Power Input to Antenna (mW)			P _T (mW) =	1.1	1.1 mW				
Duty cycle (percentage of operation)			% =	100.0%	100.0% %				
P _A = Adjusted Power due to Duty cycle or Cable Loss (mW)			P _A (mW) =	1.15	1.15 mW				
G _N = Numeric Gain of the Antenna			G _N (numeric) =	2.17	2.17 numeric				
S ₂₀ = Power Density of device at 20cm (mW/m ²)		S ₂₀ =(P _A G _N)/(4πR ₂₀) ²	S ₂₀ (mW/m ²) =	0.0005	0.0005 mW/m ²				
S ₂₀ = Power Density of device at 20cm (W/m ²)		S ₂₀ =(P _A G _N)/(4πR ₂₀) ²	S ₂₀ (W/m ²) =	0.005	0.005 W/m ²				
S _L = Power Density Limit (W/m ²)			S _L (W/m ²) =	10.00	2.68 W/m ²				
R _C = Minimum distance to the Radiating Element for Compliance		R _C =√(P _A G _N /4πS _L)	R _C (cm) =	1.4	1.9 cm				
S _C = Power Density of the device at the Compliance Distance R _C		S _C =(P _A G _N)/(4πR _C) ²	S _C (W/m ²) =	0.95	0.57 W/m ²				
R ₂₀ = 20cm			R ₂₀ =	20	20 cm				
			For Compliance with Use Case Limits	1.4	1.9 cm				
			Or in Meters for Compliance with Use Case Limits	0.01	0.02 Meters				
Summary: Standalone MPE Calculations and Summary									
Radio	x Duty Cycle (%)	Tx Frequency (MHz)	Power Total (mW)	Ant. Gain (numeric)	FCC S _L (W/m ²)	ISED S _L (W/m ²)	S ₂₀ (W/m ²)	R _C (cm)	S _C (W/m ²)
BLE	100.0%	2402	1.15	2.2	10.0	2.7	0.005	1.4	0.95

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Conclusion

The A04879, a mobile product, meets RF exposure exemption requirements for both FCC and Industry Canada for mobile products typically >20cm from users. The sum of Total Exposure Ratios (TERs) is < 1.0. The product manuals clearly indicates minimum separation of 20cm from users which is more than adequate to provide safety given the above simultaneous MPE calculations.