			HVIN: A04797, B04797			Test Number: 230721A			
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^2								
	Transmitter Output power (mW)		32.5						
	Transmitter Output power (W)		0.03						
Output Power for % duty Cycle operation (Watts)	100		0.03			Antenna Gain (dBi)	3.1		
Output Power for 100% duty Cycle operation (Watts)			0.03			Antenna Gain (Numeric)	2.04		
Tx Frequency (MHz)	2412	Calculation power (Watts)	0.03		dBd + 2.17 = dBi	dBi to dBd	2.17		
						Antenna Gain (dBd)	0.93		
Cable Loss (dB)	0.0	Adjusted Power (dBm)	15.12			Antenna minus cable (dBi)	3.10		
						Antenna Gain (Numeric)	2.04		
	Calculated ERP (mw)	40.272			EIRP = Po(dBm) + Gain (dB)				
	Calculated EIRP (mw)	66.374			Radiated (EIRP) dBm	18.220			
						ERP = EIRP - 2.17 dB			
						Radiated (ERP) dBm	16.050		

Power density (S) mW/cm² = $\dfrac{EIRP}{4\pi r^2}$

r (cm)   EIRP (mW)

Occupational Limit		FCC radio frequency radiation exposure limits per 1.1310		
5	mW/cm²	Frequency (MHz)	Occupational Limit (mW/cm²)	Public Limit (mW/cm²)
50.0	W/m²	30-300	1	0.2
General Public Limit		300-1,500	f/300	f/1500
1	mW/cm²	1,500-100,000	5	1
10.0	W/m²			

Occupational Limit		IC radio frequency radiation exposure limits per RSS-102		
$0.6455 f^{0.5}$	W/m²			
31.7	W/m²	Frequency (MHz)	Occupational Limit (W/m²)	Public Limit (W/m²)
General Public Limit		100-6,000	$0.6455 f^{0.5}$	
$0.02619 f^{0.6834}$	W/m²	6,000-15,000	50	
5.37	W/m²	48-300		1.291
		300-6,000		$0.02619 f^{0.6834}$
		6,000-15,000	50	10
		15,000-150,000	50	10

					General Public	Occupational	
f = Transmit Frequency (MHz)			f (MHz) =		2412	2412	MHz
P_T = Power Input to Antenna (mW)			P_T (mW) =		32.5087	32.5087	mW
Duty cycle (percentage of operation)			% =		100	100	%
P_A = Adjusted Power due to Duty cycle or Cable Loss (mW)			P_A (mW) =		32.51	32.51	mW
G_N = Numeric Gain of the Antenna			GN (numeric) =		2.04	2.04	numeric
S_{20} = Power Density of device at 20cm (mW/m²)		$S_{20}=(P_A G_N)/(4\pi R_{20})^2$	S_{20} (mW/m²) =		0.01	0.01	mW/m²
S_{20} = Power Density of device at 20cm (W/m²)		$S_{20}=(P_A G_N)/(4\pi R_{20})^2$	S_{20} (W/m²) =		0.13	0.13	W/m²
S_L = Power Density Limit (W/m²) FCC			S_L (W/m²)=		10.000	50.000	W/m²
S_L = Power Density Limit (W/m²) Canada			S_L (W/m²)=		5.366	31.702	W/m²
R_C = Minimum distance to the Radiating Element for Compliance (cm) FCC		$R_C=\sqrt{(P_A G_N/4\pi S_L)}$	R_C (cm) =		2.3	1.0	cm
R_C = Minimum distance to the Radiating Element for Compliance (cm) Canada		$R_C=\sqrt{(P_A G_N/4\pi S_L)}$	R_C (cm) =		3.1	1.3	cm
S_C = Power Density of the device at the Compliance Distance R_C (W/m²) FCC		$S_C=(P_A G_N)/(4\pi R_C)^2$	S_C (W/m²) =		10.00	50.00	W/m²
S_C = Power Density of the device at the Compliance Distance R_C (W/m²) Canada		$S_C=(P_A G_N)/(4\pi R_C)^2$	S_C (W/m²) =		5.37	31.70	W/m²
R_{20} = 20cm			R20=		20	20	cm

	For Compliance with Canada General Population Limits, User Manual must indicate a minimum separation distance of		3.1	cm
	Or in Meters for Compliance with Canada General Population Limits, a minimum separation distance of		0.03	Meters

Summary: Standalone MPE Calculations and Summary					Public Limit		Public	
	Tx Duty Cycle (%)	Tx Frequency (MHz)	Power Total (mW)	Antenna Gain (numeric)	S_L (W/m²)	S_{20} (W/m²)	R_C (cm)	S_C (W/m²)
FCC	100	2412	33	2.04	10.000	0.13	2.3	10.00
Canada	100	2412	33	2.04	5.366	0.13	3.1	5.37

	Limit		Overall Minimum (cm)	Overall Minimum (inches)
	Public	Occupational		
FCC (cm)	2.3	1.0		
FCC (inches)	1.0	1.0		
Canada (cm)	3.1	1.3		
Canada (inches)	2.0	1.0		

Overall Minimum Limit Public	Overall Minumu Limit Occuppational
4 cm	2 cm
2 inches	1 inches