1. MAXIMUM PERMISSIBLE EXPOSURE (MPE)

1.1 General Information

Client Information	
Applicant:	PIN GENIE, INC. DBA LOCKLY
Address of applicant:	676 Transfer Rd., St. Paul, MN 55114
Manufacturer:	Smart Electronic Industrial (Dong Guan) Co., Ltd.
Address of manufacturer:	Qing Long Road, Long Jian Tian Village, Huang Jiang Town, Dong Guan, Guang Dong, China
General Description of EUT:	
Product Name:	Lockly Vision Elite
Trade Name:	LOCKLY
Model No.:	PGD798NV
Adding Model(s):	/
Rated Voltage:	Battery:DC3.7V
FCC ID:	2ASIVPGD798NV
Equipment Type:	Fixed
Technical Characteristics of EUT:	
2.4GHz	
Frequency Range:	2403.01-2471.01MHz
RF Output Power:	19.27dBm (Conducted)
Modulation:	GFSK
Quantity of Channels:	18
Channel Separation:	4MHz
Type of Antenna:	Integral Antenna
Antenna Gain:	2.0dBi
Frequency Range:	2403.01-2471.01MHz
RF Output Power:	19.27dBm (Conducted)
Bluetooth	
Bluetooth Version:	V5.0 (BLE mode)
Frequency Range:	2402-2480MHz
RF Output Power:	-4.91dBm (Conducted)
Data Rate:	1Mbps
Modulation:	GFSK
Quantity of Channels:	40
Channel Separation:	2MHz
Type of Antenna:	FPC Antenna
Antenna Gain:	3.4dBi

1.2 Standard Applicable

According to § 1.1307(b)(1) and KDB 447498 D01 General RF Exposure Guidance v06, system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

(a) Limits for Occupational / Controlled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Times $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500	/	/	F/300	6
1500-100000	/	/	5	6

(b) Limits for General Population / Uncontrolled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Times $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	F/1500	30
1500-100000	/	/	1	30

Note: f = frequency in MHz: * = Plane-wave equivalents power density

1.3 MPE Calculation Method

$S = (30*P*G) / (377*R^2)$
S = power density (in appropriate units, e.g., mw/cm^2)
P = power input to the antenna (in appropriate units, e.g., mw)
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor is normally numeric gain.
R = distance to the center of radiation of the antenna (in appropriate units, e.g., cm)

1.4 MPE Calculation Result

For 2.4GHz
Maximum Tune-Up output power: 19.27(dBm)
Maximum peak output power at antenna input terminal: 84.53(mW)
Prediction distance: >20(cm)
Prediction frequency: 2403.01 (MHz)
Antenna gain: 2.0 (dBi)
Directional gain (numeric gain): 1.58
The worst case is power density at prediction frequency at 20cm: 0.027(mw/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mw/cm^2)

For Bluetooth
Maximum Tune-Up output power: -4.91 (dBm)
Maximum peak output power at antenna input terminal: 0.32(mW)
Prediction distance: >20(cm)
Prediction frequency: 2480(MHz)
Antenna gain: 3.4 (dBi)
Directional gain (numeric gain): 2.19
The worst case is power density at prediction frequency at 20cm: 0.0001(mw/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mw/cm^2)

2.4G and BT simultaneous transmission: 0.027(mw/cm^2)+ 0.0001(mw/cm^2)=0.0271(mw/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mw/cm^2)

Result: Pass