

# 1. RF Exposure Requirements

---

## 1.1 General Information

### Client Information

Applicant: PIN GENIE, INC. DBA LOCKLY  
Address of applicant: 2024 Macopin Rd., Unit E, West Milford, NJ 07480 U.S.A.

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: PIN Genie Pro Zeno Series Deadbolt Edition  
Trade Name: LOCKLY  
Model No.: PGK7SWHK  
Adding Model(s): /  
Rated Voltage: DC1.5V\*4"AA"  
Battery Capacity: /  
Power Adapter Model: /  
FCC ID: 2ASIVPGK7SWHKE1  
Equipment Type: Mobile device

### Technical Characteristics of EUT:

#### Bluetooth

Bluetooth Version: V5.0 (LE mode)  
Frequency Range: 2402-2480MHz  
RF Output Power: -1.13dBm (Conducted)  
Data Rate: 1Mbps  
Modulation: GFSK  
Quantity of Channels: 40  
Channel Separation: 2MHz  
Type of Antenna: FPC Antenna  
Antenna Gain: 1.8dBi

#### Wi-Fi

Support Standards: 802.11b, 802.11g, 802.11n  
Frequency Range: 2412-2462MHz for 802.11b/g/n(HT20)  
RF Output Power: 18.17dBm (Conducted)  
Type of Modulation: CCK, OFDM, QPSK, BPSK, 16QAM, 64QAM  
Quantity of Channels: 11 for 802.11b/g/n(HT20)  
Channel Separation: 5MHz  
Type of Antenna: FPC Antenna  
Antenna Gain: -0.3dBi

#### NFC

|                      |                     |
|----------------------|---------------------|
| Support Standards:   | NFC                 |
| Frequency Range:     | 13.56MHz            |
| Max. Field Strength: | 46.10dBuV/m (at 3m) |
| Antenna Type:        | FPC Antenna         |
| Antenna Gain         | 0dBi                |

## 1.2 RF Exposure Exemption

According to §1.1307(b)(3) and KDB 447498 D04 Interim General RF Exposure Guidance v01, 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.

**Option A:** FCC Rule Part 1.1307 (b)(3)(i)(A): The available maximum time-averaged power is no more than 1mW, regardless of separation distance.

**Option B:** FCC Rule Part 1.1307 (b)(3)(i)(B): The available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold  $P_{th}$  (mW) described in the following formula.  $P_{th}$  is given by:

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}}(d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where

$$x = -\log_{10} \left( \frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

$d$  = the separation distance (cm);

**Option C:** FCC Rule Part 1.1307 (b)(3)(i)(C): The minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. R must be at least  $\lambda/2\pi$ , where  $\lambda$  is the free-space operating wavelength in meters.

| Single RF Sources Subject to Routine Environmental Evaluation |                       |
|---|-----------------------|
| RF Source frequency (MHz)                                     | Threshold ERP (watts) |
| 0.3-1.34  | 1,920 $R^2$           |

|               |                                      |
|---------------|--------------------------------------|
| 1.34-30       | 3,450 R <sup>2</sup> /f <sup>2</sup> |
| 30-300        | 3.83 R <sup>2</sup>                  |
| 300-1,500     | 0.0128 R <sup>2</sup> f              |
| 1,500-100,000 | 19.2R <sup>2</sup>                   |

**For Multiple RF sources:** FCC Rule Part 1.1307(b)(3)(ii):

(A) The available maximum time-averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required).

(B) In the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure\ Limit_k} \leq 1$$

### 1.3 Calculated Result

| Radio Access Technology | Prediction Frequency (MHz) | Output Power (dBm) | Antenna Gain (dBi) | Duty Cycle (%) | Tune-Up Time-Averaged Power (dBm) | ERP (dBm) |
|-------------------------|----------------------------|--------------------|--------------------|----------------|-----------------------------------|-----------|
| Bluetooth               | 2402                       | -1.13              | 1.8                | 100            | -1.00                             | -1.35     |
| Wi-Fi                   | 2412                       | 18.17              | -0.3               | 100            | 19.00                             | 16.55     |
| NFC                     | 13.56                      | -49.16             | 0                  | 100            | -49.00                            | -51.15    |

| Frequency (MHz) | Option | Min. Distance (cm) | Max. Power (dBm) (mW) |       | Exposure Limit (mW) | Ratio | Result |
|-----------------|--------|--------------------|-----------------------|-------|---------------------|-------|--------|
|                 |        |                    | (dBm)                 | (mW)  |                     |       |        |
| 2402            | C      | 20.00              | -1.35                 | 0.73  | 768.00              | 0.01  | Pass   |
| 2412            | C      | 20.00              | 16.55                 | 45.19 | 768.00              | 0.06  | Pass   |
| 13.56           | C      | 20.00              | -51.15                | 0.00  | 750.52              | 0.01  | Pass   |

Note: 1. Time-Averaged Power=Output Power \* Duty Cycle; ERP= Time-Averaged Power+ Antenna gain-2.15dB

2. Option A, B and C refers as clause 1.2.
3. For option B, Max (time-averaged power, effective radiated power (ERP)) converts to Max. Power. For option C, ERP converts to Max. Power;
4. For option B,  $P_{th}$  (mW) converts to Exposure Limit (mW); For option C, ERP (W) converts to Exposure Limit (mW).
5. Ratio= Tune-Up ERP (mW)/ Exposure Limit (mW)

**Mode for Simultaneous Multi-band Transmission:**

| <b>Radio Access Technology</b> | <b>Ratio 1</b> | <b>Ratio 2</b> | <b>Ratio 3</b> | <b>Simultaneous Ratio</b> | <b>Limit</b> | <b>Result</b>    |
|--------------------------------|----------------|----------------|----------------|---------------------------|--------------|------------------|
|                                |                |                |                |                           |              | <b>Pass/Fail</b> |
| Bluetooth + Wi-Fi + NFC        | 0.01           | 0.06           | 0.01           | 0.08                      | 1            | Pass             |

Result: Pass