

**OPTICON**

Wireless Handheld 2D Scanner

**OPI-3301**

Tentative

This manual provides specifications for the OPI-3301 rugged handheld 1D/2D imager scanner with auto-focus.

**Specifications Manual**

All information subject to change without notice.

## Document History

|               |                   |                       |                |
|---------------|-------------------|-----------------------|----------------|
| Model Number: | <b>OPI-3301</b>   | Specification Number: | <b>SS11012</b> |
| Edition:      | <b>1st</b>        | Original Spec Number: | <b>SS10037</b> |
| Date:         | <b>2011-05-XX</b> |                       |                |

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**Revision History**

Specification No. : SS11012  
Product name : OPI-3301

| Edition | Date       | Page | Section | Description of Changes |
|---------|------------|------|---------|------------------------|
| First   | 2011/05/xx | -    | -       | Initial release        |

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## 1. Abstract

This manual provides specifications for the OPI-3301 rugged wireless handheld 1D/2D imager scanner.

## 2. Overview

The OPI-3301 scanner enables data transmission of linear (1D) and 2D symbologies using Bluetooth wireless technology. Main features of the OPI-3301 are as follows:

- High-speed scanning  
A custom high-speed / high-sensitive CMOS image sensor with a maximum frame rate of 80 fps and the fastest shutter speed in the industry enable high speed scanning without being affected by hand movement.
- Auto-focus  
Focus adjustment function using liquid lens enables reading of high resolution codes and long depth of field.
- Antimicrobial coating  
Special antimicrobial treatment is applied to chassis, and alcohol can be used to wipe the scanner clean (except for the scanning window).
- Bluetooth interface  
The specification of transmission output Class 2 enables communication range of approximately 10 meters.
- Full charge in 3 hours with a dedicated cradle  
A communication cradle CRD-3301 with charging function can fully charge the OPI-3301 in 3 hours (it takes 6 hours with USB bus power).
- Wide range of supported symbologies  
1D bar codes: WPC (EAN, JAN, UPC-A/UPC-E), Industrial 2 of 5, IATA, Interleaved 2 of 5, Codabar (NW-7), Code 39, Code 93, Code 128, MSI/Plessey, RSS codes are supported.  
2D codes: PDF417, MicroPDF417, QR Code, Micro QR Code, DataMatrix (ECC 0 - 140 / ECC 200), MaxiCode (Modes 0 ~ 5), Aztec Code, Composite codes are supported.  
For details, refer to Chapter 9 "Default Settings"
- RoHS compliance  
The OPI-3301 is a RoHS compliant product, which is declared by Optoelectronics Co., Ltd.

### 3. Basic Specifications

| Item                       |                         | Specification  |                    | Note   |         |
|----------------------------|-------------------------|--|--------------------|--|---------|
| Control Section            | ASIC                    | OEY-0603   |                    | CPU: ARM-1026EJ-S<br>Core: 160 MHz               |         |
|                            | SDRAM                   | 128 Mbits (1 M × 4 Banks × 32 Bits)  |                    | SDCLK: 80 MHz                                    |         |
|                            | Flash ROM               | 16 Mbits (1 M × 16 Bits) Flash Memory  |                    |  |         |
| Wireless Section           | Frequency               | 2402 MHz ~ 2480 MHz  |                    |  |         |
|                            | Specification           | Bluetooth V2.0 compliant   |                    |  |         |
|                            | Transmission output     | Class 2 (up to 4 dBm)  |                    |  |         |
|                            | Communication distance  | 10 meters  |                    | It may be shorter depending on usage environment |         |
|                            | Profile                 | SPP  |                    |  |         |
|                            | Antenna                 | 1/4λ surface-mount type  |                    |  |         |
| Optical Section            | Scanning method         | CMOS area sensor   |                    | Frame rate: 80 fps (fastest)                     |         |
|                            | Scanning light source   | InGaAIP 1 red LED  |                    |  |         |
|                            | Effective pixels        | (H: 900 x V: 512)  |                    |  |         |
|                            | View angle              | Horizontal: about 40°<br>Vertical: about 23°   |                    |  |         |
| Supported 1D Symbolologies | Symbologies             | UPC-A, UPC-A Add-on, UPC-E, UPC-E Add-on, EAN-13, EAN-13 Add-on, EAN-8, EAN-8 Add-on, JAN-8, JAN-13, Code 39, Tri-Optic, Codabar (NW-7), Industrial 2 of 5, Interleaved 2 of 5, Code 93, Code 128, EAN-128, S-Code, MSI/Plessey, UK/Plessey, TELEPEN, Matrix 2 of 5, Chinese Post Matrix 2 of 5, IATA, Code 11, Korean Postal Authority code, GS1 DataBar, Postal Code |                    | The GS1 DataBar is formerly called "RSS".        |         |
|                            | Minimum resolution      | Code 39: 0.1 mm  |                    | PCS 0.9  |         |
|                            | Curvature               | Radius ≥ 15 mm (8-digit JAN)<br>Radius ≥ 20 mm (13-digit JAN)  |                    | PCS 0.9  |         |
|                            | Depth of field (mm)     | Code 39  | Resolution (0.127) | 15 ~ 55  | PCS 0.9 |
|                            |                         |  | Resolution (0.254) | 15 ~ 200   |         |
| Resolution (1.0)           |                         |  | 90 ~ 870           |  |         |
| Supported 2D Symbolologies | Symbologies             | PDF417, MicroPDF417, QR Code, Micro QR Code, DataMatrix (ECC 0 - 140 / ECC 200), MaxiCode (Modes 2 to 5), Aztec Code, EAN.UCC Composite bar code, Codablock F  |                    | Disable Code 128 when Codablock F is active.     |         |
|                            | Minimum resolution (mm) | QR Code: 0.127 mm DataMatrix: 0.169 mm   |                    | PCS 0.9  |         |
|                            | Depth of field (mm)     | PDF417   | Resolution (0.127) | 15 ~ 70  | PCS 0.9 |
|                            |                         |  | Resolution (0.254) | 20 ~ 210   |         |
|                            |                         | QR Code  | Resolution (0.339) | 15 ~ 170   |         |
|                            |                         | DataMatrix   | Resolution (0.169) | 15 ~ 40  |         |
| Resolution (0.339)         |                         |  | 15 ~ 100           |  |         |
| Micro QR                   | Resolution (0.212)      | 15 ~ 65  |                    |  |         |

| Item                         |                        | Specification  | Note   |  |
|------------------------------|------------------------|--|--|--|
| 1/2 D Common                 | Scan angle             | Pitch: $\pm 50^\circ$ (Skew $\beta = +15^\circ$ )  | Code: Code 39<br>Resolution: 0.254 mm<br>Distance: 100 mm from the edge of the scanner<br>*Curvature R = $\infty$  |  |
|                              |                        | Skew: $\pm 50^\circ$   |  |  |
|                              |                        | Tilt: $360^\circ$ (Skew $\beta = +15^\circ$ )  |  |  |
|                              |                        | *There are some areas in which scanning fails due to specular reflection.                          |  |  |
| Minimum PCS                  |                        | 0.45 or more   | MRD: 32% or more   |  |
| Environmental Specifications | Temperature            | Operating  | -20 ~ 50°C   | AC adapter: 0 ~ 40°C   |
|                              |                        | Storage  | -25 ~ 60°C   |  |
|                              | Humidity               | Operating  | 20 ~ 85% (no condensing, no frost)   |  |
|                              |                        | Storage  | 20 ~ 85% (no condensing, no frost)   |  |
|                              | Ambient light immunity | Fluorescent  | 10,000lx or less   | QR Code<br>(Resolution: 0.25 mm)<br>Optical axis angle: 75°<br>DOF: 100 mm                               |
|                              |                        | Sunlight   | 100,000lx or less  |  |
|                              | Dust and drip proof    |  | IP42   |  |
|                              | Vibration              |  | Increase the frequency of vibration from 10 Hz to 100 Hz at an accelerated velocity of 19.6 m/s <sup>2</sup> (2G) for 60 minutes each in X, Y and Z-direction. |  |
| Drop                         |                        | Drop 3 times (18 times in total), at each 6 face, from a height of 150 cm onto a concrete surface. |  |  |
| Regulatory (*)               | LED safety             |  | IEC 62471:2006 Exempt Risk Group   |  |
|                              | Laser safety           |  | IEC 60825-1:2007 Laser Class 1, 21 CFR 1040.10 & 1040.11 (CDRH) Class 1  | Peak wavelength: 650 nm  |
|                              | EMI                    |  | VCCI Class-B / EN55022 Class-B / FCC Part15,C  | Residential, commercial and light-industrial environments  |
|                              | Safety standards       |  | IEC/EN 60950-1   | Information technology equipment   |
|                              | Immunity standards     |  | EN 61000-4-2, -4-3, -4-4,- 4-5, -4-6, -4-11 Class B  |  |
|                              | Product safety         | CE Marking   |  | R&TTE directive<br>EN300 328<br>V1.6.1:2004<br>EN301 489-1<br>V1.5.1:2004<br>EN301 489-17<br>V1.2.1:2002 |
|                              |                        | Certification for Construction Design of Specified Radio Equipment                                 |  | Radio Law 38-24-1  |
|                              | Logo certification     |  | Bluetooth logo certification   |  |



| Item   |   | Specification          |   | Note                                     |   |
|--|---|------------------------|---|--|---|
| Immunity Test (*)                                | ESD immunity  | No destruction         | 15 kV (apply static electricity 50 times to the surface of the scanner)                 | Condition:<br>IEC:61000-4-2<br>compliant |   |
|  |   | No malfunction         | Contact discharge (direct / indirect): $\pm 6$ kV<br>Air discharge (direct): $\pm 8$ kV |  |   |
|  | Radio-frequency electromagnetic field. Amplitude modulation | Frequency              | 80 ~ 1000 MHz   |  | Condition:<br>IEC61000-4-3<br>compliant |
|  |   | Level                  | 3 V/m   |  |   |
|  |   | AM                     | 80% (AM)  |  |   |
|  | Fast transient  | Voltage                | Alternating-current input cable: $\pm 1$ kV   |  | Condition:<br>IEC61000-4-4<br>compliant |
|  |   | Pulse                  | 5 / 50 ns (Tr / Tw)   |  |   |
|  |   | Frequency              | 5 kHz   |  |   |
|  | Surge   | Pulse                  | 1.2 / 50 $\mu$ s (Tr / Th)  |  | Condition:<br>IEC61000-4-5<br>compliant |
|  |   | Voltage                | From L to P : $\pm 2$ kV (closed-loop voltage)  |  |   |
|  |   |                        | From L to L : $\pm 1$ kV (closed-loop voltage)  |  |   |
|  | Radio-frequency common mode                                 | Frequency              | 0.15 ~ 80 MHz   |  | Condition:<br>IEC61000-4-6<br>compliant |
|  |   | Level                  | 3 V   |  |   |
|  |   | AM                     | 80% (AM)  |  |   |
|  | Power frequency magnetic field                              | Frequency              | 50, 60 Hz   |  | Condition:<br>IEC61000-4-8<br>compliant |
| Level  |   | 3 A/m                  |   |  |   |
| Voltage dip, momentary voltage drop, fluctuation | Dip 1   | Drop 30%, 0.5 cycles   |   | Condition:<br>IEC61000-4-11<br>compliant |   |
|  | Dip 2   | Drop 60%, 5 cycles     |   |  |   |
|  | Momentary drop  | Drop > 95%, 250 cycles |   |  |   |
| Physical Features                                | Dimensions  |                        | Approx. 56 × 113 × 137 (WDH mm)   |  |   |
|  | Weight  |                        | Approx. 110 g   |  |   |

(\*) : Items in combination with the communication cradle are included.

**4. Detailed View**

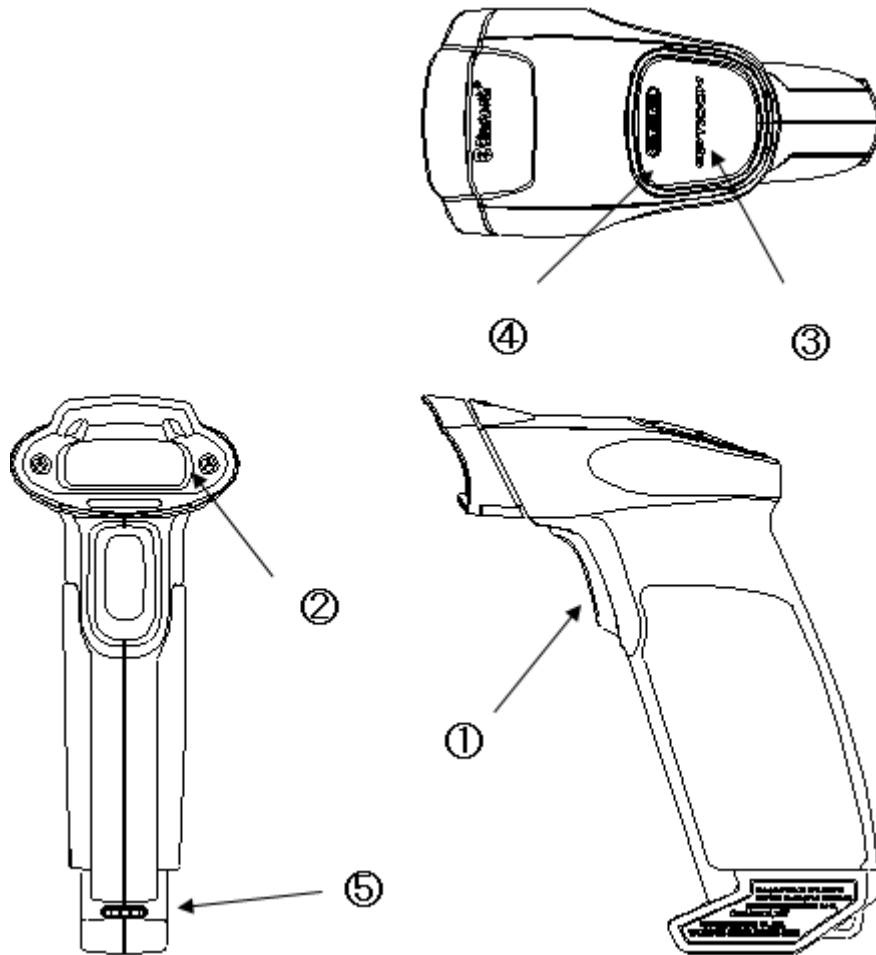


Figure 1: Detailed View of OPI-3301

| No. | Name            | Description  |
|-----|-----------------|--|
| 1   | Trigger Key     | Laser aiming light is emitted by pressing this key to read 1D/2D codes.  |
| 2   | Scanning Window | The laser light is emitted through this window. Ensure that the lens is not exposed to dust and dirt before scanning.  |
| 3   | Status LED      | The operating status is indicated by each LED color (see 4.1. for details).  |
| 4   | Buzzer Hole     | A sound from a built-in buzzer comes out through these holes. When they are covered, the buzzer sound may not be able to be heard. The sound varies depending on the status (see 4.1. for details). Buzzer settings can be configured in various ways: enable or disable buzzer as well as change the loudness and duration. |

#### 4.1. Status LED and Buzzer

The operating state is indicated by LED colors and buzzer sound.

| State                  | LED Color | Indication          | Description  | Buzzer   |
|------------------------|-----------|---------------------|--|----------|
| Charging               | Red       | ON                  | <b>Charging:</b> When the scanner is placed on the cradle, the LED lights up to indicate the scanner is charged. | —        |
|                        | Green     | ON                  | <b>Fully charged:</b> LED color changes from Red to Green.   |          |
| Bar code Read          | Blue      | Blinking            | <b>Successful:</b> Bar code reading / transmission has been done successfully.                                   | Pi       |
|                        | Red       |                     | <b>Failed:</b> Bar code data was not able to be transmitted.   | Pi-pi-pi |
|                        | Green     |                     | <b>Storing data:</b> Bar code data is stored in the memory in the scanner.                                       | Pi       |
| Wireless Connection    | Blue      | Continuous Blinking | <b>Connecting:</b> The scanner is attempting to establish a wireless connection                                  | —        |
|                        |           | ON                  | <b>Connected:</b> The wireless connection has been established.  | Pi-ro-pi |
|                        | Red       | ON                  | <b>Failed:</b> The wireless connection was unable to be established.   | Pi-pi-pi |
| Wireless Disconnection | Red       | ON                  | <b>Disconnected:</b> The wireless connection is disconnected.  | Pi-ro    |
|                        |           |                     | <b>Lost:</b> The wireless connection is lost due to out of the range of communication.                           |          |
| Low Battery Power      | Orange    | ON                  | The remaining battery pack power level is low. Recharge is required.   | —        |

## 5. Electrical Specifications

### 5.1. Configuration

The OPI-3301 consists of

- Camera Module section, where images are captured and output as analog data.
- Decode and Wireless Communication Control section, where the signals from the camera section are processed. This section also controls the whole system.
- Interface section that contains the user interface.
- Power supply section that contains the power supply and the battery charger.

The power is supplied from the battery pack or the CRD-3301.

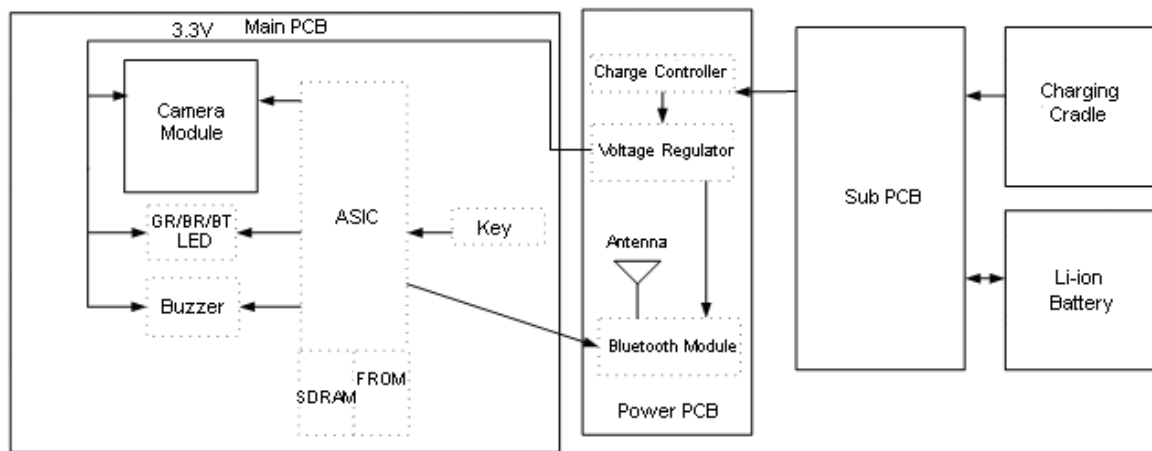


Figure 2: Block Diagram

### 5.2. Current Consumption

| Item                            | Spec   | Remarks                               |
|---------------------------------|--|---------------------------------------|
| Standby                         | 150 mA or less   | With wireless connection              |
| Sleep                           | 1 mA or less   |                                       |
| Operating Current               | 300 mA or less   | During reading, communication, LED ON |
| Measurement Condition<br>Others | - Power supply voltage 3.7 V, 25 °C<br>- The operating current is measured in Test mode. |                                       |

### 5.3. Charging Current

| Item                               | Spec   | Remarks   |
|------------------------------------|--|---|
| Charging CRD-3301                  | Approx. 600 mA   | With RS-232C connection (AC adapter)                      |
|                                    | Approx. 300 mA   | With USB connection<br>Bus-Power Class: Hi-POWER (500 mA) |
| Measurement<br>Condition<br>Others | - Measured at 25°C<br>- Charging should be done at 0 ~ 40°C<br>- When the temperature is over 40°C, the protection function start working and it may stop charging.<br>- To protect the scanner when the power supply is abnormal, charging stops when the applied voltage to the charging contacts is not within about 3 ~ 6 V. |   |

## 5.4. Operating and Charging Time

|               | Item            | Spec              | Remarks  |
|---------------|-----------------|-------------------|--|
| Battery Life  | Sleep           | 200 hours or more |  |
|               | Standby         | Approx. 12 hours  | With wireless connection                                 |
|               | Reading         | Approx. 10 hours  | 1 scan / 5 sec with wireless connection                  |
| Charging Time | Charging time 1 | Approx. 3 hours   | When the cradle is connected with RS-232C.               |
|               | Charging time 2 | Approx. 6 hours   | When the cradle is connected with USB (Bus-Power supply) |

The above specification may not be satisfied when the battery pack is degraded.

## 6. Optical Specifications

|   | Item                             | Characteristics |
|---|----------------------------------|-----------------|
| Scan method                                     | CMOS area sensor (white / black) | -               |
| Number of effective pixel (*1)                  | (Column) × (Row)                 | 900 × 512 dots  |
| Image capture speed                             | Frame rate                       | 80 fps          |
| View angle                                      | Horizontal                       | Approx. 40°     |
|   | Vertical                         | Approx. 23°     |
| Auxiliary light source (LED)                    | InGaP red LED                    | -               |
|   | Peak wave length                 | 645 nm          |
|   | Directivity angle: 2Φ 1/2 (*2)   | 60°             |
|   | Maximum radiation output (*3)    | 5040 mcd        |
| Light source for aiming / ranging (Laser diode) | Red laser diode                  | -               |
|   | Peak wave length                 | 650 nm          |
|   | Maximum radiation output (*4)    | 390 μW          |

Note:

\*1: Readable pixel count: 1282 (column) × 1026 (row) dots.

\*2: Reference value extracted from the datasheet.

\*3: Reference value based on the datasheet (25°C, IF = 50 mA ).

Class 1M compliant output: Refer to the Chapter 14 for further information.

\*4: Class 1 compliant output: Refer to the Chapter 14 for further information.

## 7. Technical Specifications

Aim the laser light at the center of a code to scan it. For long distance scanning, ambient light entering the angle of view may affect the scanning performance. The conditions for technical specifications are as follows, unless otherwise specified in each section.

<Conditions>

|                                  |  |
|----------------------------------|--|
| Ambient Temperature and Humidity | Room temperature, room humidity  |
| Ambient Light                    | 1000 ~ 1500 lx (on code surface)   |
| Angles                           | Pitch: $\alpha = 0^\circ$ , Skew: $\beta = 15^\circ$ , Tilt: $\gamma = 0^\circ$  |
| Curvature                        | $R = \infty$   |
| Power Supply Voltage             | 3.7 V  |
| PCS (1D and 2D)                  | 0.9 or higher  |
| Reading Test                     | Judge within 2 seconds for every 2 scanning. Accept the performance with 70% or more success rate for 10 tries.  |
| Barcode Test Sample (1D and 2D)  | Specified below. Code 39 (resolution 0.1 and 0.127 mm) and JAN codes are OPTOELECTRONICS test samples. Others are printed by a normal printer. (NW ratio = 1 : 1.25) |

### Supported 1D symbology

<Code 39>

| Resolution | Symbology | PCS | Size (mm) | No. of digits |
|------------|-----------|-----|-----------|---------------|
| 0.1 mm     | Code 39   | 0.9 | 10 × 9    | 4             |
| 0.127 mm   |           |     | 11 × 10   |               |
| 0.254 mm   |           |     | 14 × 10   | 2             |
| 1.0 mm     |           |     | 56 × 30   |               |

<JAN>

| Resolution | Symbology    | PCS      | Size (mm)   | No. of digits |
|------------|--------------|----------|-------------|---------------|
| 0.260 mm   | 13-digit JAN | 0.9/0.45 | 25 × 19     | 13            |
| 0.260 mm   | 8-digit JAN  | 0.9      | 17.5 × 15.5 | 8             |

### Supported 2D symbology

<PDF417>

| Resolution | Error correction | PCS | Size (mm) | No. of characters |
|------------|------------------|-----|-----------|-------------------|
| 0.254 mm   | Level-4          | 0.9 | 26 × 16.5 | 17                |
| 0.127 mm   |                  |     | 13 × 8    |                   |

<QR Code: Model-2>

| Resolution | Error correction | PCS | Size (mm) | No. of characters |
|------------|------------------|-----|-----------|-------------------|
| 0.339 mm   | M                | 0.9 | 10 × 10   | 44                |
| 0.127 mm   |                  |     | 4 × 4     |                   |

<Data Matrix>

| Resolution | Model  | PCS | Size (mm) | No. of characters |
|------------|--------|-----|-----------|-------------------|
| 0.339 mm   | ECC200 | 0.9 | 8 × 8     | 40                |
| 0.169 mm   |        |     | 4 × 4     |                   |

<MicroQR>

| Resolution | Error correction | PCS | Size (mm) | No. of characters |
|------------|------------------|-----|-----------|-------------------|
| 0.212 mm   | L                | 0.9 | 5 × 5     | 11                |

### 7.1. Scan Area and Depth of Field

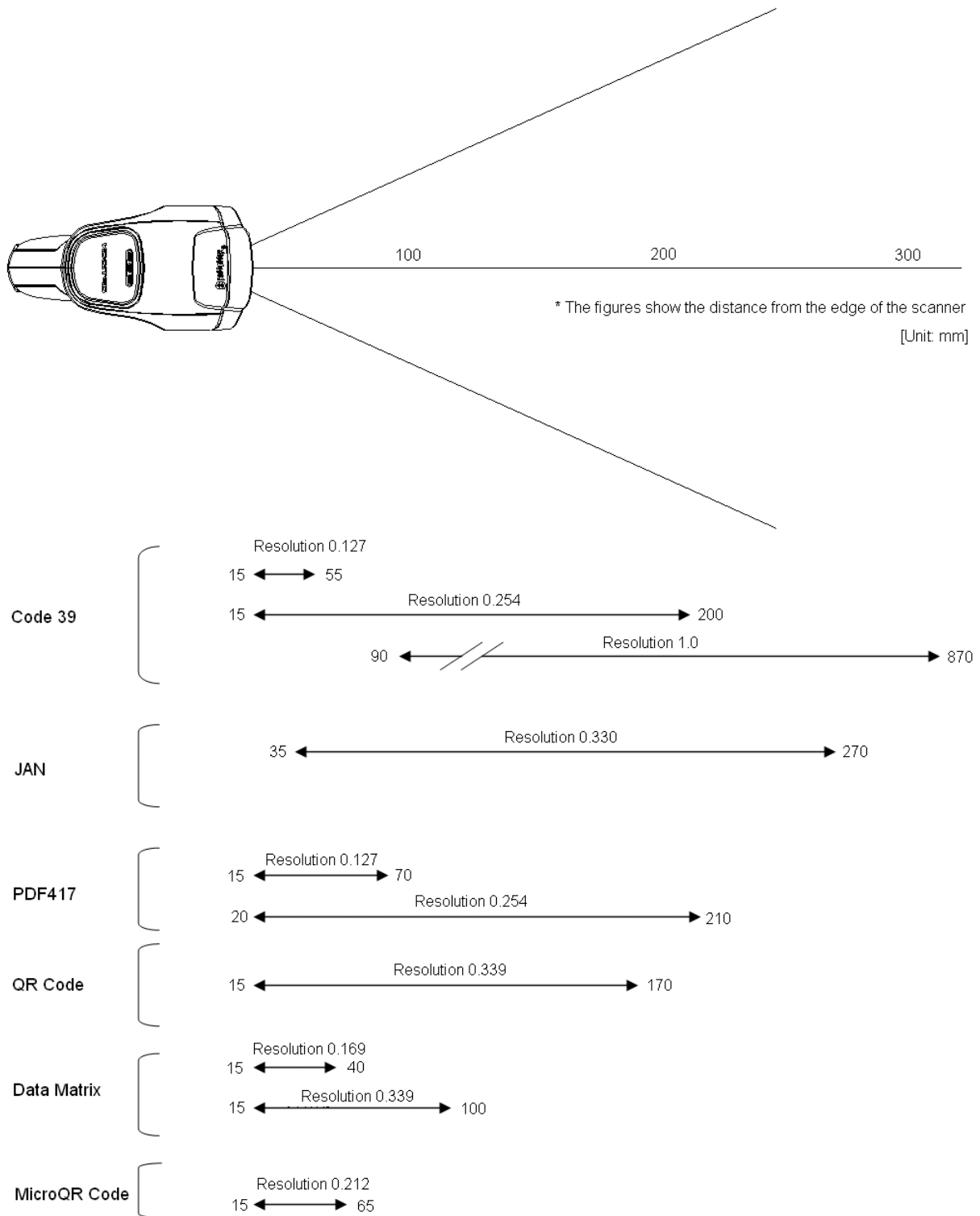


Figure 3: Scan Area and Depth of Field

**7.2. Printed Contrast Signal (PCS)**

0.45 or higher (70% or more reflectivity of space and quiet zone)

$$PCS = \frac{\text{Reflectance of white bar} - \text{Reflectance of black bar}}{\text{Reflectance of white bar}}$$

\* Be sure to keep the optical window clean without dirt or scratches, or it may have a bad effect on the reading characteristics..

**7.3. Minimum Resolution**

|         |                   |                          |
|---------|-------------------|--------------------------|
| 0.1mm   | : Code 39         | (specified in Chapter 7) |
| 0.127mm | : PDF417, QR code | (specified in Chapter 7) |
| 0.169mm | : Data Matrix     | (specified in Chapter 7) |
| 0.212mm | : Micro QR        | (specified in Chapter 7) |

**7.4. Pitch, Skew and Tilt**

|             |                         |
|-------------|-------------------------|
| Pitch angle | $\alpha = \pm 50^\circ$ |
| Skew angle  | $\beta = \pm 50^\circ$  |
| Tilt angle  | $\gamma = 360^\circ$    |

<Conditions>

|                            |  |
|----------------------------|--|
| Barcode Sample (1D and 2D) | : Code 39 specified in Chapter 7<br>(Resolution 0.254 mm, PCS 0.9)   |
| Distance                   | : 80 mm from the front edge of the scanner.  |
| Angle                      | : Pitch angle measurement - set the skew angle $\beta = 15^\circ$ fixed.<br>Tilt angle measurement - set the skew angle $\beta = 15^\circ$ when pitch angle is $0^\circ$ and rotate 1D/2D codes. |
| Curvature                  | : $R = \infty$   |

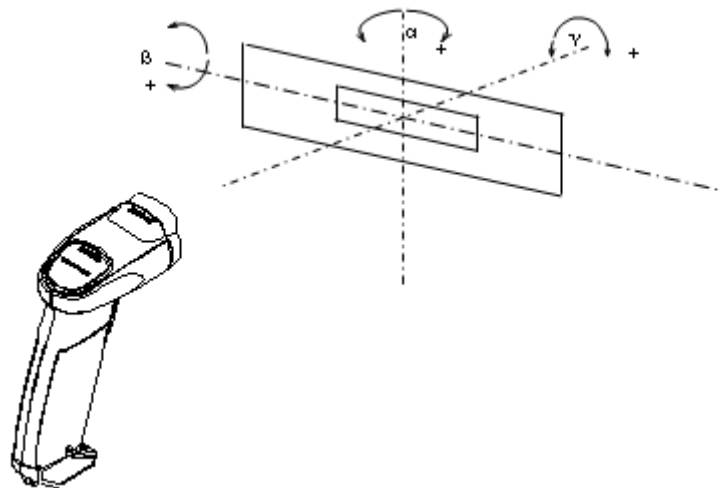


Figure4: Pitch, Skew and Tilt



## 7.5. Curvature

8-digit JAN :  $R \geq 15$  mm  
13-digit JAN :  $R \geq 20$  mm

<Conditions>

Barcode Test Sample (1D and 2D) : PCS 0.9, Resolution 0.26 mm, Quiet Zone 10 mm as specified in Chapter 7  
Distance : 80 mm from the front edge of the scanner.  
Angles : Skew:  $\beta = 15^\circ$

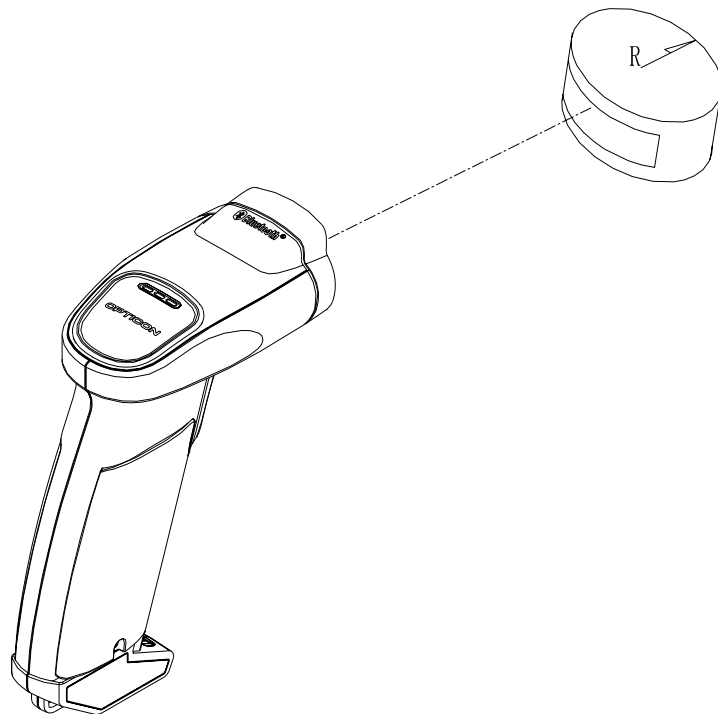


Figure 5: Curvature

Note: Scanning may fail due to the specular reflection of illumination LEDs when the reflectivity is high. In that case, scan the code tilting the scanner in the skew direction or set the illumination LED off so that the performance can improve. Make sure of the sufficient environmental illuminance (500 lx or more) when the illumination LED is off to keep the scanning performance. The ambient lights also may cause the reflection and the degraded scanning performance.

## 8. Bluetooth

OPI-3301 uses Bluetooth as a wireless interface: Compliant with Bluetooth specification version 1.2, supporting Serial Port Profile (SPP).

- **Implemented Profile**

SPP (Serial Port Profile)

- **Communication Configuration**

1 to 1

\* 1 to N (Multiple-channel) is not supported.

- **Operating Mode in Communication**

Master : OPI-3301

Slave : CRD-3301 and other Bluetooth devices

- **Power saving**

Low-power sniff mode is not supported

- **Security and Encryption**

Authentication and Encryption are supported

- **Communication Distance**

Approx 10m

## 9. Default Settings

The OPI-3301 is set to the following factory default settings by reading menu code “SO”.

### Default Settings 1: Readable Codes

| Code type                    | Read | Transmit Code Length | Transmit CD | Calculate CD | Transmit Other     | Set Prefix | Set Suffix |
|------------------------------|------|----------------------|-------------|--------------|--------------------|------------|------------|
| UPC-A                        | ○    | ×                    | ○           | ○            |                    | -          | CR         |
| UPC-A Add-on                 | ×    | ×                    | ○           | ○            |                    | -          | CR         |
| UPC-E                        | ○    | ×                    | ○           | ○            |                    | -          | CR         |
| UPC-E1                       | ×    | ×                    | ○           | ○            |                    | -          | CR         |
| UPC-E Add-on                 | ×    | ×                    | ○           | ○            |                    | -          | CR         |
| EAN-13                       | ○    | ×                    | ○           | ○            |                    | -          | CR         |
| EAN-13 Add-on                | ×    | ×                    | ○           | ○            |                    | -          | CR         |
| EAN-8                        | ○    | ×                    | ○           | ○            |                    | -          | CR         |
| EAN-8 Add-on                 | ×    | ×                    | ○           | ○            |                    | -          | CR         |
| Code 39                      | ○    | ×                    | ○           | ×            | Not transmit ST/SP | -          | CR         |
| Tri-Optic                    | ○    | ×                    | -           | -            | Not transmit ST/SP | -          | CR         |
| Codabar (NW-7)               | ○    | ×                    | ○           | ×            | Not transmit ST/SP | -          | CR         |
| Industrial 2 of 5            | ○    | ×                    | ○           | ×            |                    | -          | CR         |
| Interleaved 2 of 5           | ○    | ×                    | ○           | ×            |                    | -          | CR         |
| Code 93                      | ○    | ×                    | -           | ○            |                    | -          | CR         |
| Code 128                     | ○    | ×                    | -           | ○            |                    | -          | CR         |
| EAN-128                      | ×    | ×                    | -           | ○            |                    | -          | CR         |
| S-Code                       | ○    | ×                    | ○           | ×            |                    | -          | CR         |
| MSI/Plessey                  | ○    | ×                    | ○           | ○            | Not transmit CD2   | -          | CR         |
| UK/Plessey                   | ○    | ×                    | ○           | ○            |                    | -          | CR         |
| TELEPEN                      | ○    | ×                    | ×           | ○            |                    | -          | CR         |
| Matrix 2 of 5                | ×    | ×                    | ○           | ×            |                    | -          | CR         |
| Chinese Post Matrix 2 of 5   | ×    | ×                    | ○           | ×            |                    | -          | CR         |
| IATA                         | ○    | ×                    | ○           | ×            |                    | -          | CR         |
| Code 11                      | ×    | ×                    | ×           | ○            |                    | -          | CR         |
| Postal Code (JPN)            | ×    | ×                    | -           | ○            |                    | -          | CR         |
| Postal Code (USPS)           | ×    | ×                    | -           | ○            |                    | -          | CR         |
| Postal Code (POSTNET)        | ×    | ×                    | -           | ○            |                    | -          | CR         |
| Korean Postal Authority code | ×    | ×                    | ×           | ○            |                    | -          | CR         |
| PDF417                       | ○    | ×                    | -           | ○            |                    | -          | CR         |
| QR Code                      | ○    | ×                    | -           | ○            |                    | -          | CR         |
| Micro QR Code                | ○    | ×                    | -           | ○            |                    | -          | CR         |
| DataMatrix (ECC200)          | ○    | ×                    | -           | ○            |                    | -          | CR         |
| DataMatrix (ECC0-140)        | ×    | ×                    | -           | ○            |                    | -          | CR         |
| MaxiCode                     | ○    | ×                    | -           | ○            |                    | -          | CR         |
| MicroPDF417                  | ○    | ×                    | -           | ○            |                    | -          | CR         |
| Aztec Code                   | ○    | ×                    | -           | ○            |                    | -          | CR         |
| Aztec Runes                  | ×    | ×                    | -           | ○            |                    | -          | CR         |
| Codablock F                  | ×    | ×                    | -           | ○            |                    | -          | CR         |

Note: Disable Code 128 when enabling Codablock F. The scanner may incorrectly recognize a broken Codablock F as Code 128.



**Default Settings 3: Wireless Communication Settings**

|                                 | Item                                      | "UB" Default Setting                             |
|---------------------------------|---|--|
| Wireless communication settings | Set connection                            | Connect to RS-232C cradle                        |
|                                 | Data memorizing                           | Disable  |
|                                 | Trigger connect / disconnect              | Disable  |
|                                 | Trigger connect (time to press switch)    | Disable  |
|                                 | Trigger disconnect (time to press switch) | Disable  |
|                                 | Auto disconnect                           | Disable  |
|                                 | Auto reconnect                            | 5 minutes  |
|                                 | ACK/NAK                                   | No control                                       |
|                                 | ACK/NAK time out                          | 1 second   |
|                                 | Pin code                                  | Set (connect to the last 4 digits of BD address) |
| Bluetooth settings              | BT address auto connect                   | Enable   |
|                                 | Authentication                            | Enable (auto pairing)                            |
|                                 | Encryption                                | Disable  |

- \* The interface to connect the CRD-3301 and the host is RS-232C by factory default.
- \* When USB is used to connect the CRD-3301 and the host, set to "Connect to USB-HID cradle".
- \* Do not select "Connect to PC" in a combination of the OPI-3301 and the CRD-3301

**Default Settings 4: Communication Settings between CRD-3301 and Host (RS-232C)**

| Item                 | "U2" Default Setting |
|----------------------|----------------------|
| Baud rate            | 9600 bps             |
| Parity bits          | No parity            |
| Data length          | 8 bits               |
| Stop bits            | 1 bit                |
| Handshaking          | No handshake         |
| ACK/NAK              | No control           |
| CS time out          | Indefinitely         |
| Intercharacter delay | No delay             |

**Default Settings 5: Communication Settings between CRD-3301 and Host (USB-HID)**

| Item                 | "SU"/"C01" Default Setting        |
|----------------------|-----------------------------------|
| Keyboard language    | US                                |
| Numpad               | Do not use numpad (Full Key Code) |
| CAPSLOCK             | No CAPSLOCK mode                  |
| Intercharacter delay | No delay                          |

## 10. Product Labels

The labels shown below are attached to the scanner.

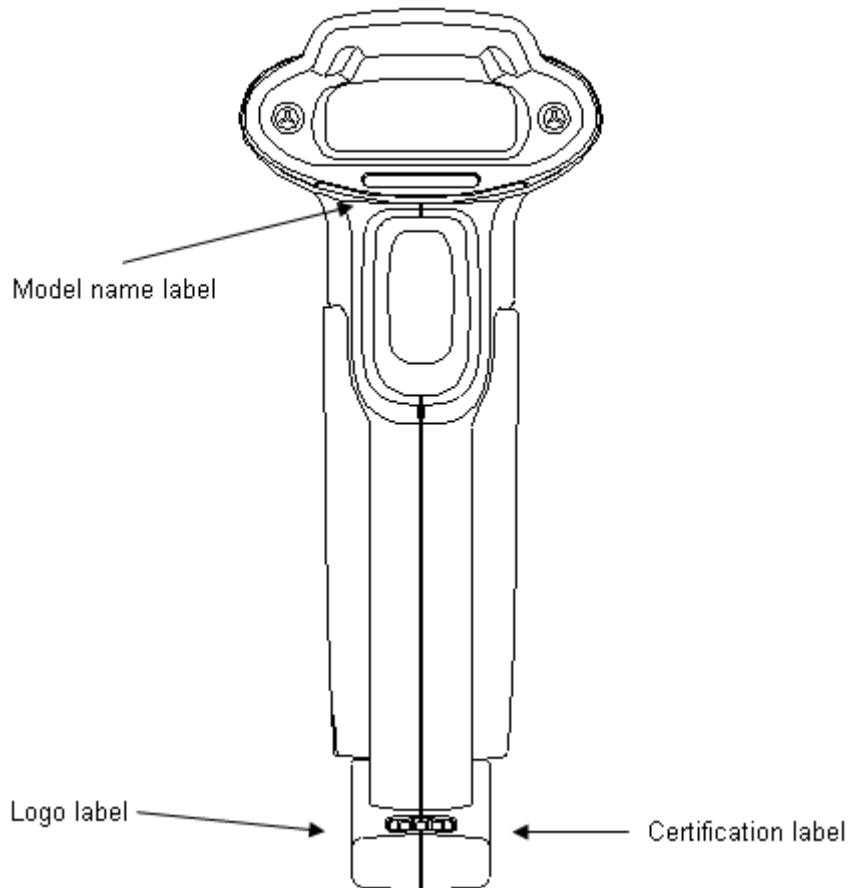


Figure 6: Product Labels

|                     |   |
|---------------------|---|
| Model name label    | Shows the product name, serial number, month and year of manufacture, laser caution and laser Class 2 |
| Logo label          | Shows certified standard logos.   |
| Certification label | Shows the standards-compliant languages and certificate numbers.                                      |

<Product Label 1>

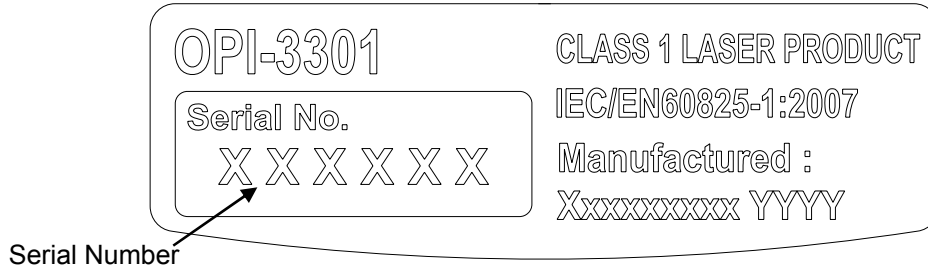


Figure 7: Model Name Label

<Product Label 2>

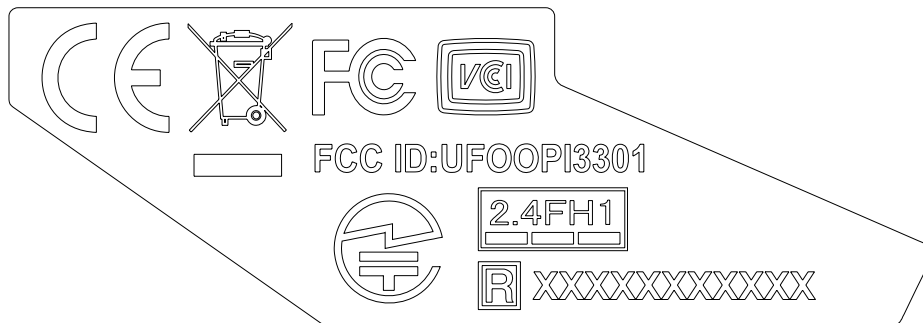


Figure 8: Logo Label

<Product Label 3>

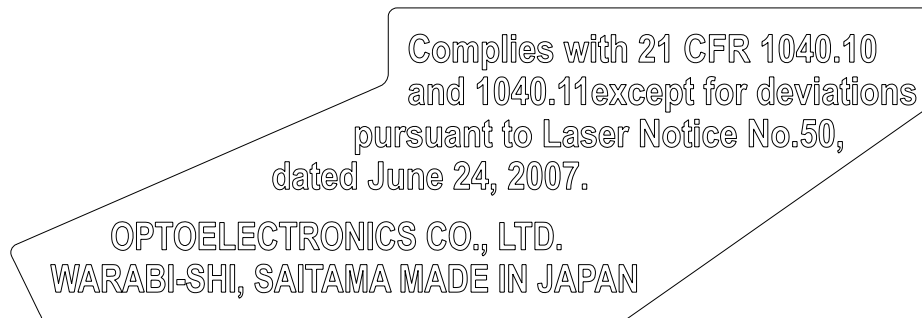


Figure 9: Certification Label

## 11. Packaging Specifications

### 11.1. Individual Packaging Specification

Assembled package size: 165 x 110 x 82 (WDH mm)

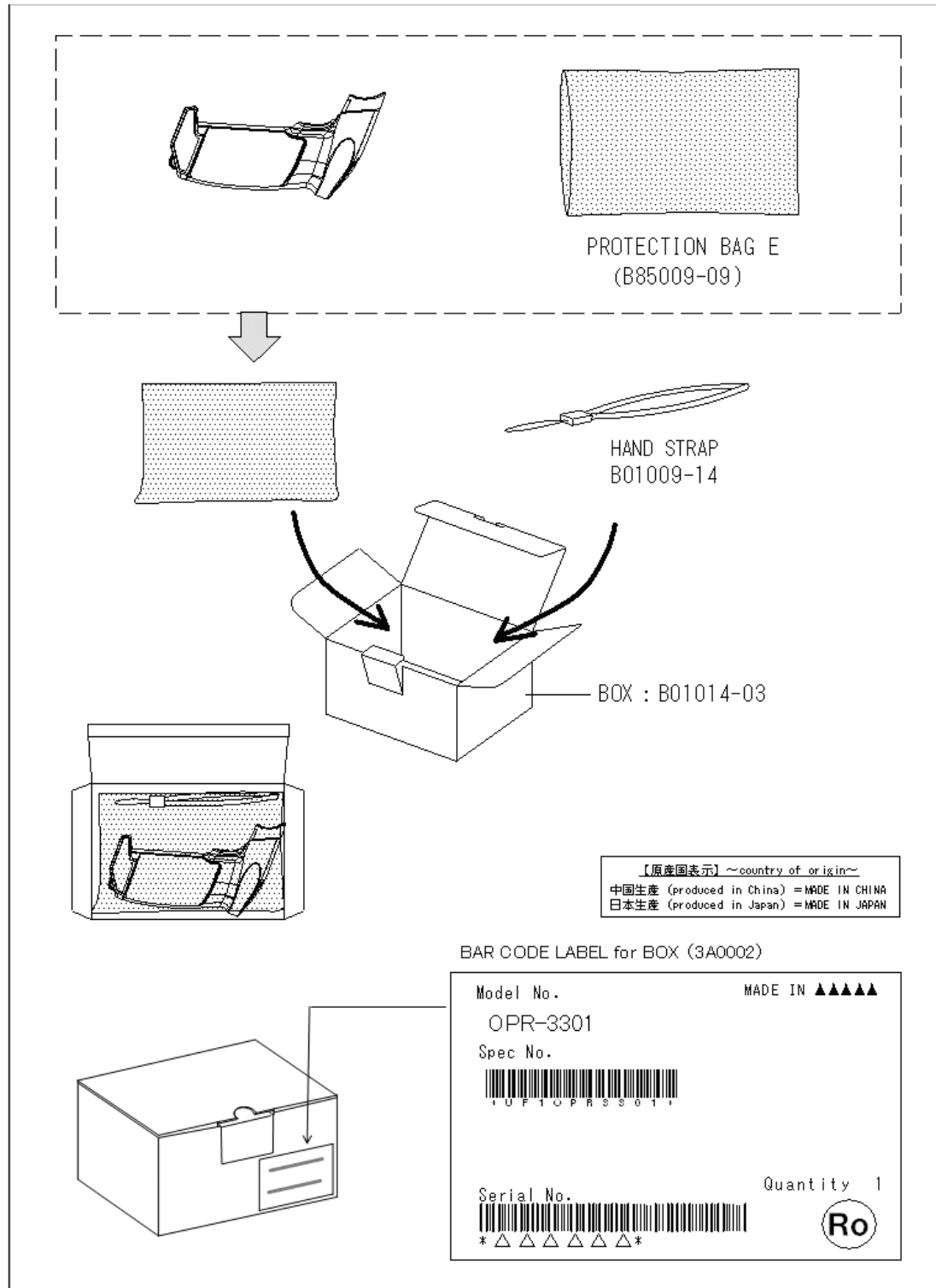


Figure 10: Individual Packaging



### 11.2. Collective Packaging Specification

Assembled package size: 585 x 520 x 200 (WDH mm)

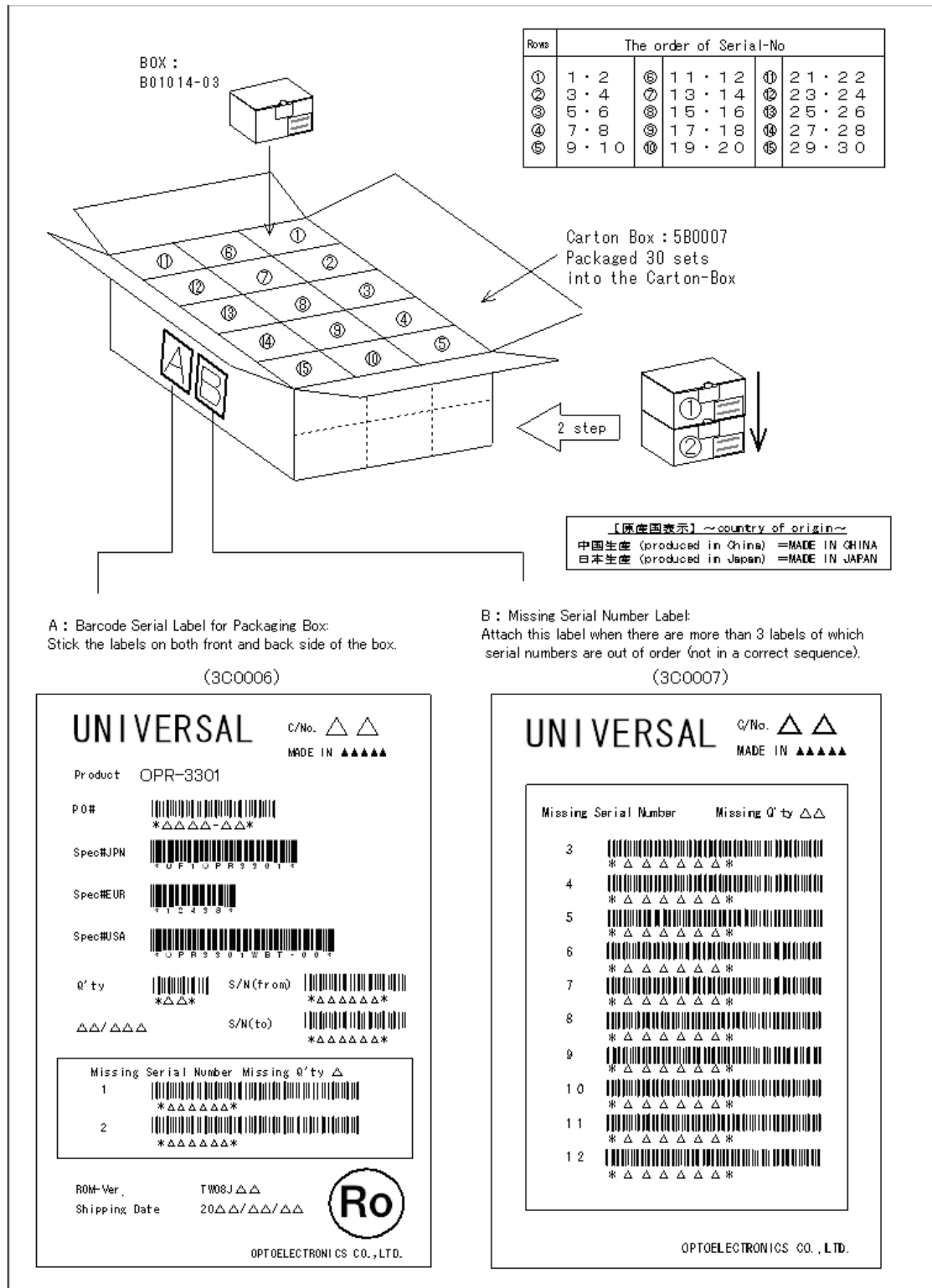


Figure 11: Collective Packaging

Note: 'Ro mark' on the trays and the boxes for the product indicates that the product is RoHS compliant, which is declared by Optoelectronics Co., Ltd.

## 12. Environmental Specifications

### 12.1. Operating Temperature and Humidity

Temperature : -20 ~ 50°C (-0 ~ 40°C when charging)  
Humidity : 5 ~ 85%RH (no condensation, no frost)

### 12.2. Storage Temperature and Humidity

Temperature : -25 ~ 60°C  
Humidity : 5 ~ 85RH% (no condensation, no frost)

### 12.3. Ambient Light Immunity

Scanning performance is guaranteed when the range of illumination on a barcode surface is the following values.

Incandescent light : 0 ~ 10,000 lx  
Fluorescent light : 0 ~ 10,000 lx  
Sunlight : 0 ~ 100,000 lx

<Conditions>

|                     |   |
|---------------------|---|
| Barcode Test Sample | OPTOELECTRONICS test chart<br>Resolution 0.254 mm PDF417 specified in Chapter 7 |
| Distance            | 100 mm from the front edge of the scanner.                                      |
| Angles              | Pitch: $\alpha = 0^\circ$ , Skew: $\beta = 15^\circ$ , Tilt: $\gamma = 0^\circ$ |
| Curvature           | $R = \infty$  |
| Power Voltage       | 3.7 V   |

\* Be sure that the direct light or specular reflection from the light source does not enter the light receiving section of the OPI-3301.

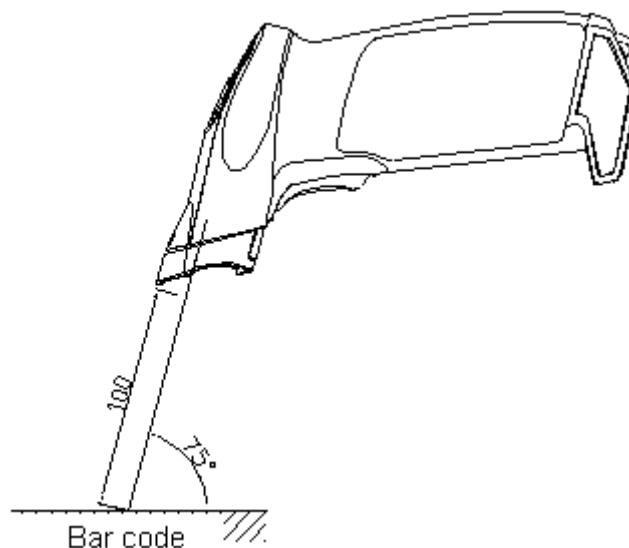


Figure 12: Ambient Light Immunity

## 12.4. Dust and Drip Proof

IEC IP42 equivalent

Protection against solid objects: Level 4

Protected against solid objects greater than 1.0 mm

Protection against liquids: Level 2 (JIS IPX2)

Protected against dripping water from the vertical when tilted up to 15°

## 12.5. Electrical Characteristics

The characteristics in combination with the communication cradle CRD-3301 is included.

|                                  |   |
|----------------------------------|---|
| Power Line Noise Immunity        | : ±1 kV   |
| Power Line Noise Immunity        | : ±1 kV   |
| Electrostatic Discharge Immunity | : <u>No destruction</u><br>±15 kV (air or direct discharge)<br><u>No malfunction</u><br>±10 kV (air or direct discharge),<br>± 6 kV (contact, direct or indirect discharge) |

\*Note: Testing method is compliant with IEC-61000-4-2. (150 pf, 330 ohm)

## 12.6. Drop Impact Strength (without packaging)

There shall be no sign of malfunction after the following drop test.

**Drop test:** Drop the scanner 8 times (48 times in total), at each 5 face, from a height of 150 cm onto a concrete floor as shown below.

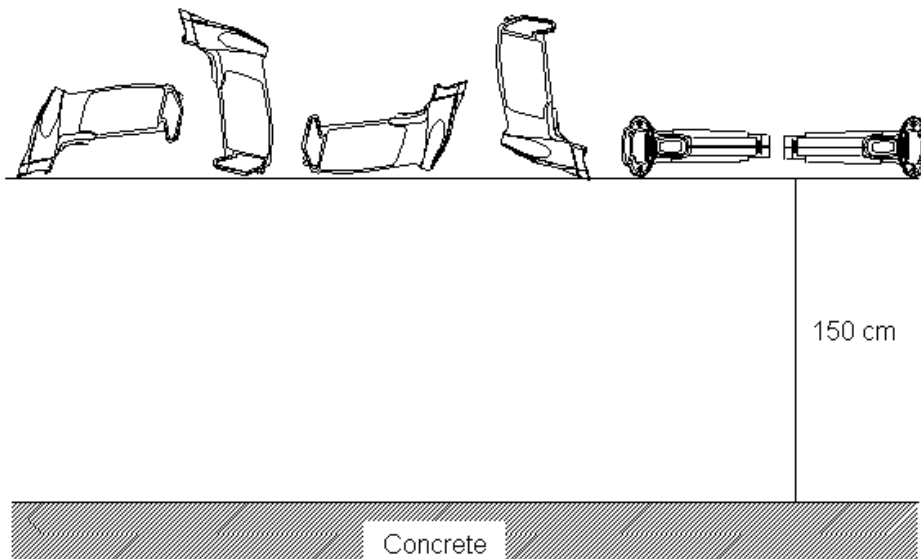


Figure 13: Drop Test

## 12.7. Drop Impact Strength (in individual packaging)

There shall be no sign of malfunction after the following drop test.

**Drop test:** Drop an individually packaged scanner 10 times in total, at any of 1 corner, 3 edges, and 6 faces, from a height of 150 cm onto a concrete floor.

## 12.8. Vibration Strength

There shall be no sign of malfunction after the following vibration test.

**Vibration test:** Increase the frequency of the vibration from 10 Hz to 100 Hz at an accelerated velocity of 19.6 m/s<sup>2</sup> (2.0 G) for 60 minutes in the non-operating state. Repeat this in each X, Y and Z direction.

## 13. Reliability

MTBF (Mean Time Between Failures) 40,000 hours (excluding the following parts)

|             |              |
|-------------|--------------|
| Laser diode | 10,000 hours |
| CMOS sensor | 10,000 hours |
| Liquid lens | 10,000 hours |

\* The value is based on the assumption of normal operation in the operating temperature range without excessive electrical / mechanical shock or impact.

## 14. Regulatory Compliance

### 14.1. LED Safety

IEC 62471:2006 Exempt Risk Group

### 14.2. Laser Safety

JIS C 6802:2005 Class 2  
IEC 60825-1+A:2001 Class 2  
CDRH Class II

### 14.3. Product Safety

IEC 60950-1:2005  
EN 60950-1:2006/A11:2009

### 14.4. EMC

FCC Part 15 Subpart B Class B

This device complies with part 15 of the FCC Rules. Operation is subject To the following two conditions: ( 1 ) this device may not cause harmful Interference, and ( 2 ) this device must accept any interference received, including interference that may cause undesired operation.

VCCI Class B

This is a Class B product, to be used in a domestic environment, based on the Technical Requirement of the Voluntary Control Council for Interference from Information Technology Equipment (VCCI). If this is used near a radio or television receiver in a domestic environment, it may cause radio interference.

### 14.5. Others

Certification for Construction Design of Specified Radio Equipment (Radio Law 38-24-1)

Bluetooth logo certification

|                 |               |
|-----------------|---------------|
| R&TTE Directive | EN 300 328    |
|                 | EN 301 489-1  |
|                 | EN 301 489-17 |
|                 | EN 55022:2006 |

## 15. RoHS

The OPI-3301 is compliant with RoHS.

RoHS: The restriction of the use of certain hazardous substances in electrical and electronic equipment, 2002/95/EC

## 16. Precautions

### 16.1. Precaution against Laser Light

\*Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Caution - Do not stare into the laser light from a scanning window. It may harm your eyes.  
Do not point the laser directly at others' eyes. It may harm your eyes.  
Do not stare into the beam with optical instruments. It may harm your eyes.

### 16.2. Precaution against LED Light

Do not stare into the LED light from a scanning window. It may harm your eyes.

### 16.3. Handling

Handle this product carefully. Do not deliberately subject it to any of the following:

(1) Shock:

- Do not drop this product from a height greater than specified in this manual.
- Do not swing the cable around.

(2) Temperature Conditions:

- Do not use this product at temperatures outside the specified range.
- Do not pour boiling water on this product.
- Do not throw this product into a fire.

(3) Foreign Materials:

- Do not immerse this product in water or other liquid.
- Do not expose this product to chemicals.

(4) Others

- Do not disassemble this product.
- Do not use this product near a radio or a TV. It may cause reception problems.
- Excessive static electricity may cause this product to malfunction.
- This product may be affected by a momentary voltage drop caused by lightning.
- This product may not perform properly in environments when placed near a flickering light, such as a CRT (computer monitor, television, etc.).
- Do not use excessive force to turn the screw for the battery cover. Adjust it within indicated range.

### 16.4. Radio Low

This scanner qualifies as radio equipment for low-power radio stations (2.4 GHz band advanced data communication systems) as specified in the Radio Law 38-24-1. The scanner has obtained the Certification for Construction Design of Specified Radio Equipment. Therefore it does not need to have a radio station license in Japan.

The following activities are prohibited under the Radio Law:

- Remodeling and disassembly
- Peeling off the certificate label

Do NOT use the scanner under the following environment, as radio interference may affect other device and end up with causing physical or material damage.

- Safety apparatus and medical device for human body protection
- Environment where is concerned to cause serious damage

## 16.5. Export Administration Regulations

This product is subject to the strategically controlled exports regulated under “Foreign Exchange and Foreign Trade Laws”. Therefore, export of this product may require an export permission of Japanese government.

## 16.6. Bluetooth

- Bluetooth® is a registered trademark owned by its proprietor and used by OPTOELECTRONICS Co., Ltd. under license.
- To communicate via Bluetooth, the device that communicates with this scanner must support the same Bluetooth version and profile as this scanner’s.
- This scanner is compliant with Bluetooth standards. We cannot guarantee the connection between this scanner and other Bluetooth devices which have not been tested.
- Bluetooth devices use 2.4 GHz frequency band, and many other sorts of devices also utilize this frequency band. It may have affect the communication speed or communication range of the scanner.
- The communication speed and range may differ due to the obstacles and radio wave conditions between this scanner and the device to which this scanner is connected.
- Conditions of the device, to which this scanner is connected, may also affect the communication speed and communication range of this scanner.
- When any metallic object is present close to the upper posterior part of the scanner where an antenna is installed, the communication may be affected.
- An anticipated interference distance is 20 meters or less.

## 16.7. Frequency Band

The frequency band 2.4 GHz is utilized by this product. Read carefully the followings before using this product.

In the frequency band of this product, scientific, medical and industrial devices including microwaves are used. Also other radio stations including local private radio station for mobile object identification requiring license for such as manufacturing lines at factories, specific power-saving radio station requiring no license and amateur radio station are managed.

1. Please make sure that “other radio stations” are not managed in the frequency band 2.4 GHz before using this product.
2. In case that radio interference occurs between this product and “other radio stations,” change the service space immediately, or stop transmitting radio wave to avoid the interference.
3. If you have any questions or troubles, please contact our sales office.

## 17. Auto Trigger

The OPI-3301 can be set to auto trigger mode. This means that the scanner starts scanning automatically when it detects a change in brightness that occurs when a bar code label is presented in front of it.

### 17.1. Outline of Operation

In auto trigger mode, the scanner captures a barcode image using the ambient light and detects the brightness of multiple bright / dark parts in the detection area of the image (a shaded area in the figure below). The scanner constantly monitors the areas to see if the brightness is changed. When the brightness variations at regular time intervals in either area is larger than the threshold value, the scanning operation (multiple read) starts. After the elapse of the specified read time, the scanning stops.

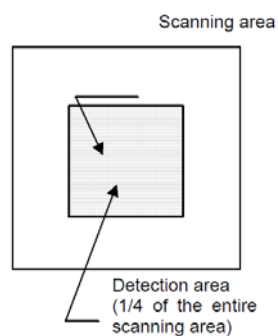


Figure 14: Detection Area

### 17.2. Specifications

Trigger is enabled when inserting a gray-colored paper on a black backing paper. Trigger is also enabled when inserting a black-colored paper on a gray backing paper.

<Conditions>

|                                  |   |
|----------------------------------|---|
| Paper used                       | : Black paper from Glory called as Black 010010016<br>Gray paper from Glory called as Silver-gray 010010016 |
| Ambient Light                    | : 300 lx or more  |
| Background Size                  | : Larger than the scanning area   |
| Detected Paper Size              | : Larger than the detecting area  |
| Moving Speed of Detected Paper   | : 105 mm/second or slower   |
| Ambient Temperature and Humidity | : Room temperature and room humidity  |

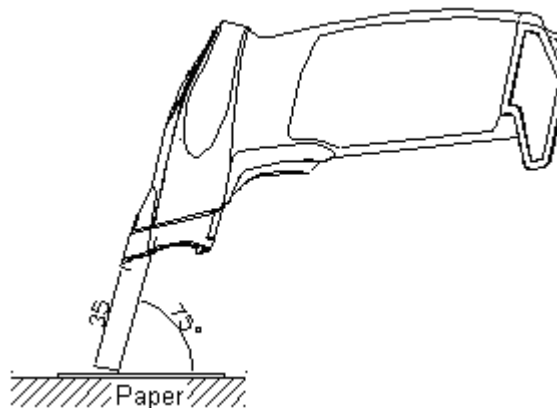


Figure 15: Auto Trigger

\* When using the auto trigger function, it is recommended to fully confirm the performance under real operating conditions with bar codes, 2D codes, background and operating environments (ambient light etc.) that are actually used.

**\*Note**

When scanning a barcode with low resolution from a distance, the scanner may be considerably affected by ambient lights other than the brightness of the barcode (brightness of detecting field) and start scanning.



## Appendix 1: Mechanical Drawings

Dimensions: 137 × 56 x 113 (HWD mm, except protruding portion)

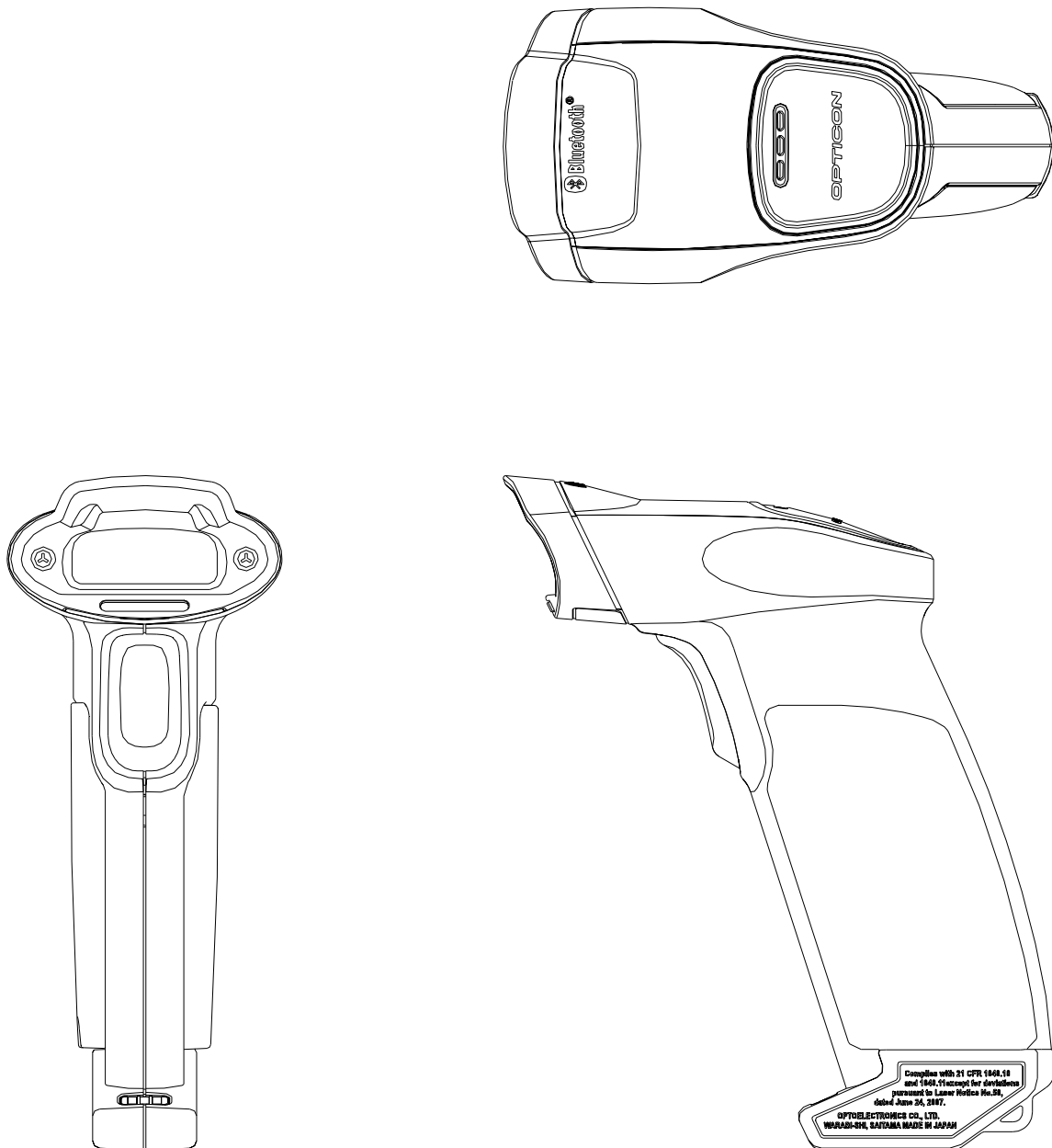


Figure 16: Mechanical Drawing