Handheld UHF RFID Reader
IDRO900H-BT
User's Manual

Oct 30th, 2024
Ver. 24110401

UHF RFID Reader

Visible RFID Reader & Tag

Visible Light Communication System

Table of Contents

1. Revision History

This chapter shows the modification history of the user manual.

1. Revision History

Document Number	Description	Revision Date
2024103001	Preliminary	Oct 2024

2. Scope of Manual

This document provides users with instruction on how to use the IDRO900H-BT, as well as solutions to potential problems that may occur during use.
IDRO900H-BT supports UHF RFID and Optical RFID SCAN as its main functions.
IDRO900H-BT provides an interface for connecting and using with a HOST device HOST Device (Smart devices).

- ✓ **Introduction**

- ✓ **Contents**

- ✓ **Related documents and software**

- ✓ **Service information**

2. Scope of Manual

2. 1 Introduction

This document is for those who wants to set up and operate the IDRO900H-BT RFID Sled.

2. 2 Contents

This manual covers the following IDRO900H-BT series RFID readers.

2.2.1 IDRO900H-BT with RFID and Optical RFID

Part Number	Description
IDRO900H-BT-R100-WW	✓ KOREA, USA
IDRO900H-BT-R100-EU	✓ EUROPE

2.2.2 IDRO900H-BT with RFID and Barcode reader

Part Number	Description
IDRO900H-BT-R200-WW	✓ KOREA, USA
IDRO900H-BT-R200-EU	✓ EUROPE

2.2.3 Accessories

Part Number	Description
BAT-IDRO900H-BT	✓ Rechargeable Li-ion Battery
CUSBCBL-IDRO900H-BT-001M	✓ C-Type USB cable
WS-IDRO900H-BT-001W	✓ Wrist Strap

NOTE
√ If you wish to purchase products or accessories, please refer to the Part Number when your purchase request.

2. 3　Related documents and software

The following document provides additional information on the IDRO900H-BT RFID Sled.
- IDRO900H-BT Specification
- IDRO Reader API Document
- PDA User's Manual

2. 4　Service

If you have any issues while using the device, please contact IDRO sales team first.
Contact information can be found on the following website. www.idro.co.kr.

When you contacting the IDRO sales team, please provide the following information.
- Device Serial number
- Product name or model name
- Software version information

Please note that IDRO will respond to email, phone, or fax inquires within the time frame specified in the service Contract. If the issue cannot be resolved through remote support from IDRO, the equipment can be returned for Service, and specific instruction will be provided.
IDRO will not be responsible for any damages or incorrect shipment of equipment that may occur during the return process. If you purchased the product from an IDRO business partner and require the support, please contact them for the support.

3. Overview

**This chapter provides information on the Hardware components and names of the IDRO900H-BT Handheld UHF RFID Reader.**

The detailed contents of this chapter are as follow:

- ✓ **Components**

- ✓ **Setting**

- ✓ **Sled characteristics**

3. Overview

3. 1　Components

Carefully remove the packaging box of the IDRO900H-BT Sled and check if the following components are included
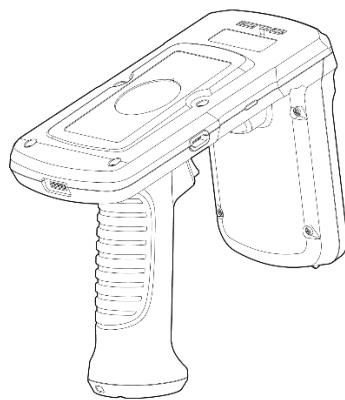
| IDRO900H-BT Sled | Wrist Strap | C-Type USB Cable |

NOTE
√ The actual product may differ from the components shown in the picture, and the USB cable provided with the product may be subject to change depends on the circumstance.

3. 2　Setting

IDRO900H-BT UHF RFID Reader provides tag reading, writing and location verification functions when connected to the Smart devices.

The preparation steps for using the device are as follows.

1. Connect the IDRO900H-BT Sled and Smart devices. (Refer to the Chapter 4.3 for instruction on how to connect.)

2. Charge the IDRO900H-BT Sled using the C-Type USB cable.

3. Turn on the power for IDRO900H-BT Sled and Smart devices.

4. Launch the "Reader@Express_BT" application installed on the Smart devices.

3. 3   Sled characteristics

3. 3. 1   Description
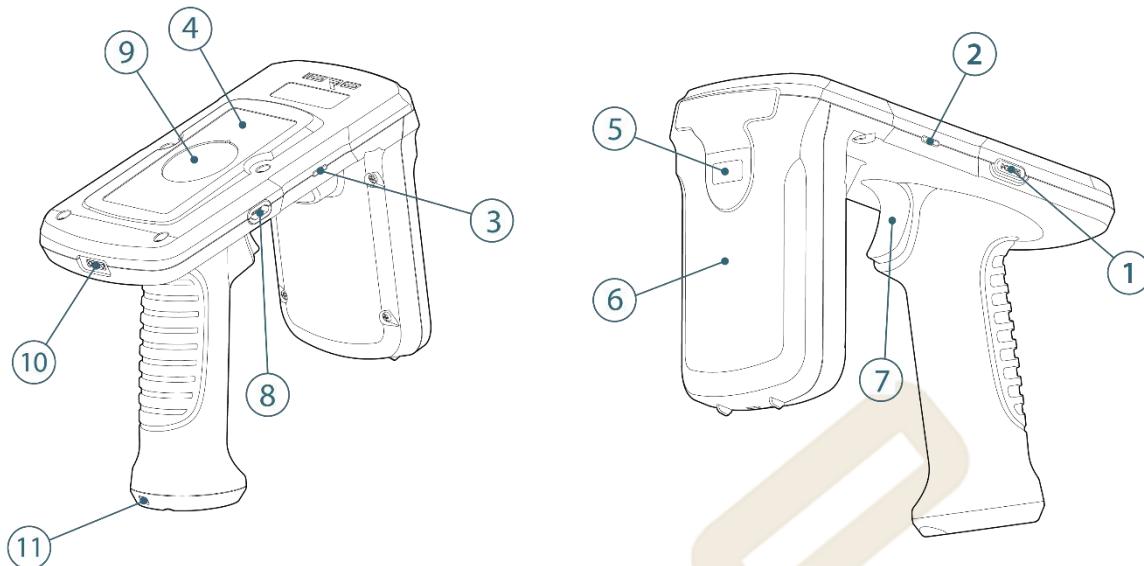
[TABLE 3.3.1] Sled part name and description

No.	Part name	Description
1	Power button	Power on/off, Enter firmware Update Mode.
2	LED Status	Indicated the power, tag reading, battery charging, and firmware update mode status.
3	Bluetooth LED	Indicated the tag reading, and Bluetooth Connection Status.
4	Smart Device Mounting part	Dual-sided tape attachment for mounting the smart device.
5	Optical Lens unit Barcode Lens unit	LED/Barcode lights on the Optical RFID/Barcode mode.
6	RFID Antenna	It transmits or receives RFID data.
7	Gun trigger	It is used for the operation or reading RFID tag data.
8	USB Type-C port	It is used for charging and connecting devices using a USB Type-C cable.
9	Mounting part 2	SP connector attachment for mounting the smart device.

10	**Charging contacts**	It is a charging cradle contact for the battry charging.
11	**Wrist Strap attachment loop**	Wrist strap attachment for product drop prevention.

3. 3. 2 LED Status, Bluetooth LED

[TABLE 3.3.2] LED Status, Bluetooth LED.

Sled Status	LED Indication
Power On	Green LED stays on
Power Off	LED turns off
Tag reading	Green LED blinking
Charging	Red LED stays on
Charging completed	Blue LED stays on
Charging error	Red and Blue LED blinking
Bluetooth connection	Green LED stays on (Bluetooth LED)
Firmware update mode	Green LED blinking

4.   Getting started

In this chapter, we will explain what you need to know before using the IDRO900H-BT.

The detailed contents of this chapter are as follow:

- ✓ **Battery replacement**
- ✓ **Battery charging**
- ✓ **Smart devices connection**
- ✓ **Power On/Off**

4. Getting started

4. 1   Battery replacement

4. 1. 1   Remove the battery

1. Remove the battery cap by using the screwdriver that fits the specification and then remove the cap.
2. Use the battery removal handle to remove the battery.
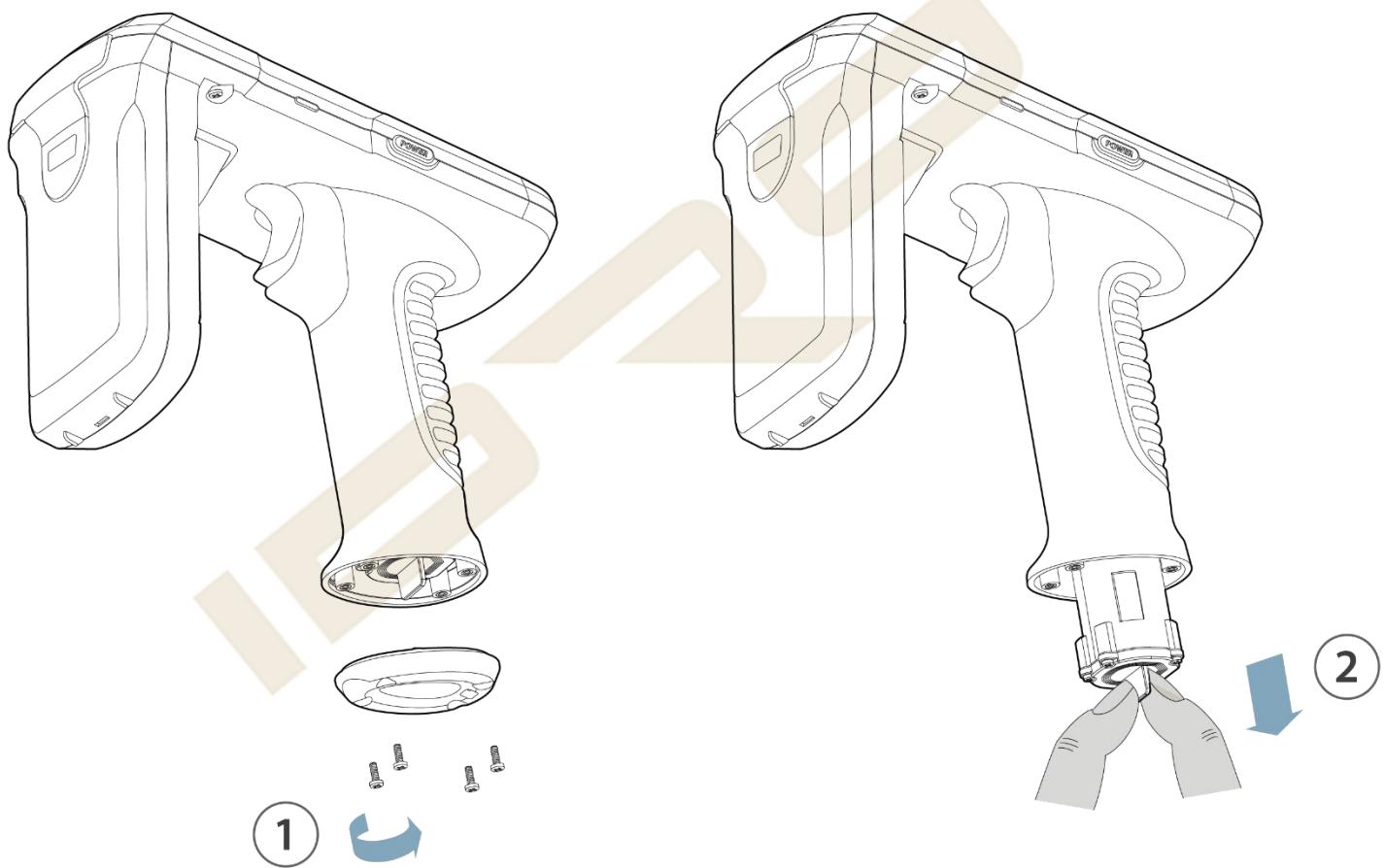
4. 1. 2   Installing the battery

1. Insert the battery in a way that the battery label faces the opposite direction of the trigger.

2. Close the battery cap and tighten it using a cross-head screwdriver that fits the specification.
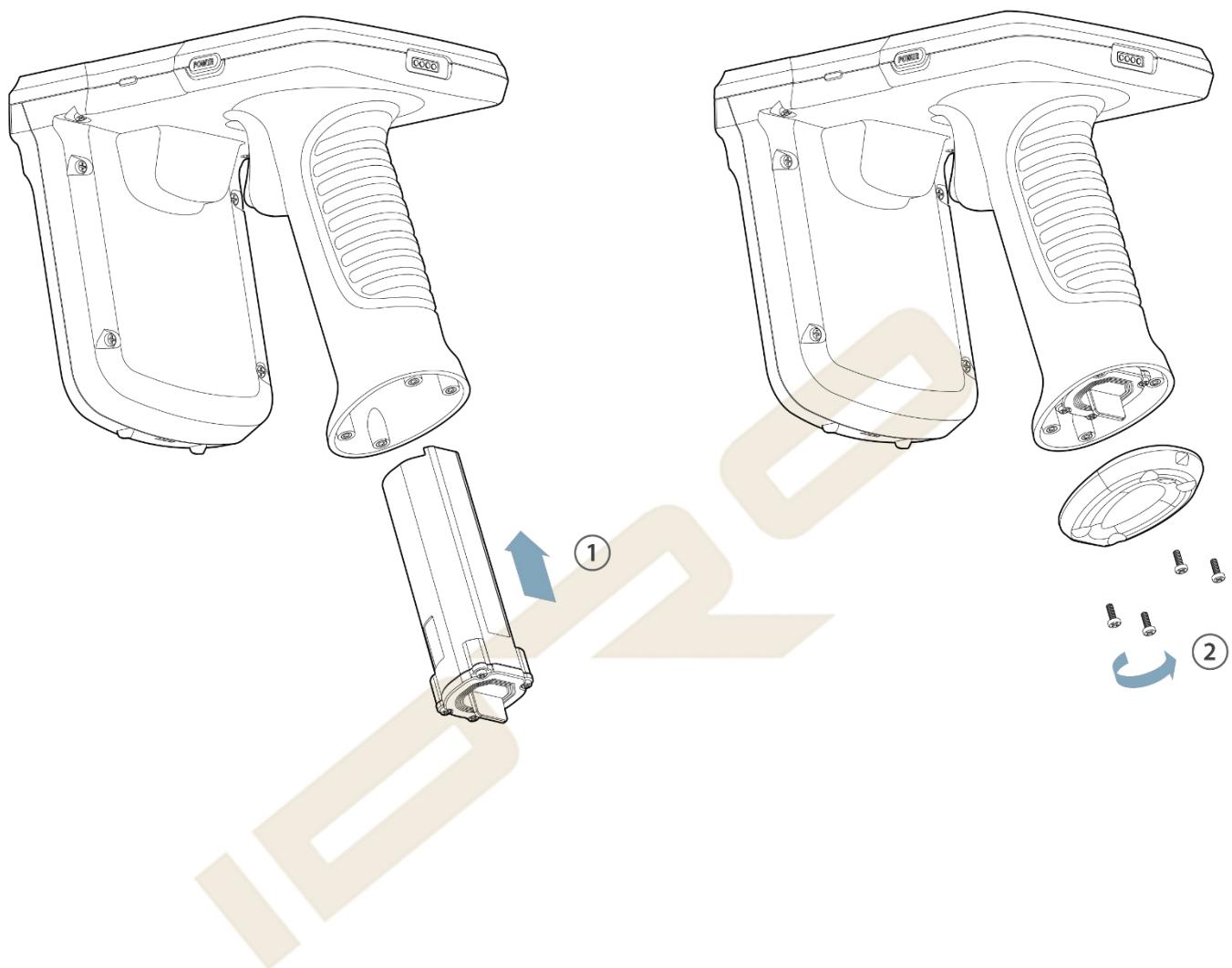
4. 2   Battery charging

Before using the IDRO900H-BT, please fully charge the battery using the C-Type USB Cable. When the status LED of the Sled changes from Red to Blue, it indicated that the battery is fully charged.

4. 2. 1   Charging with USB port

•
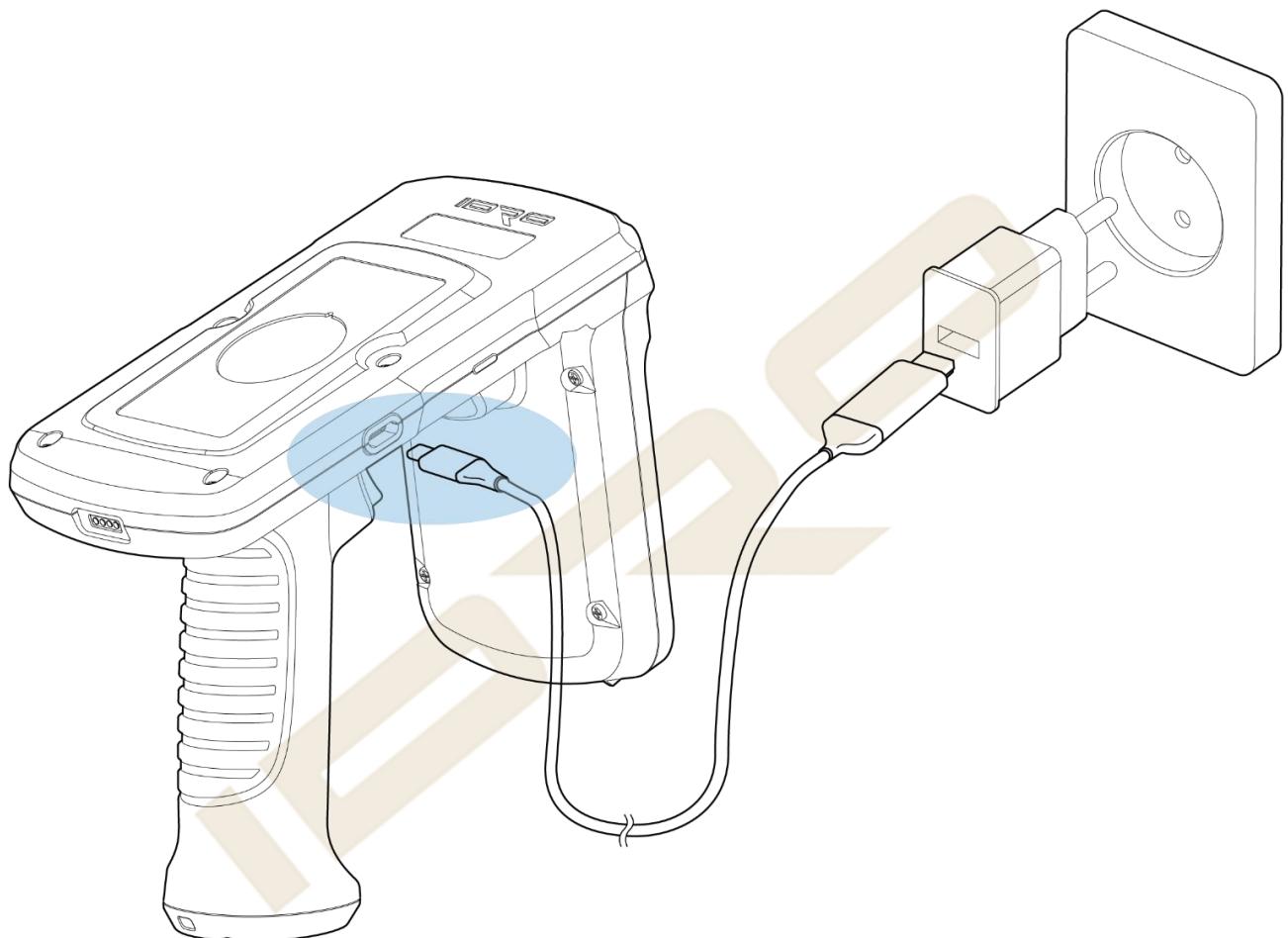
4. 3　Connecting to the Smart devices

1. Use double-sided tape to attach the IDRO900H-BT Sled and smart device.
2. Attach the smart device as closely as possible to the front of the top surface of the IDRO900H-BT Sled, as shown in the image below.
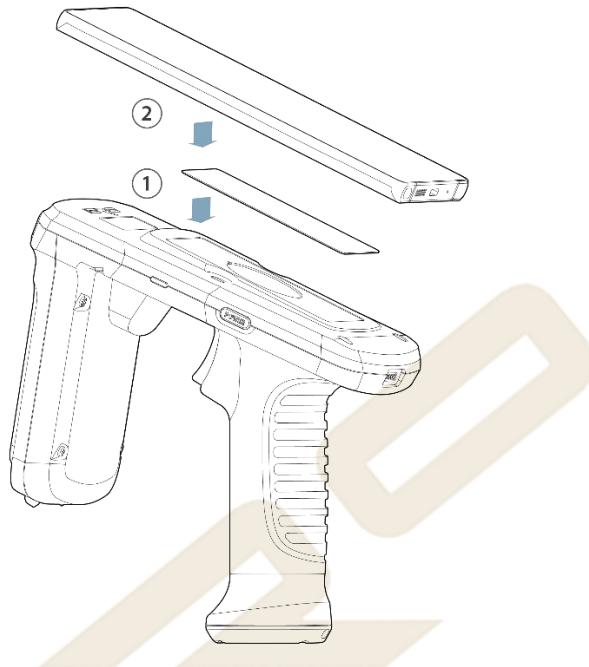
4. 4　Power On/Off

1. To turn on the power, press the POWER button. Keep pressing it until the status LED turns green.
2. To turn off the power, press and hold the POWER button for a few seconds. The status LED will turn off.
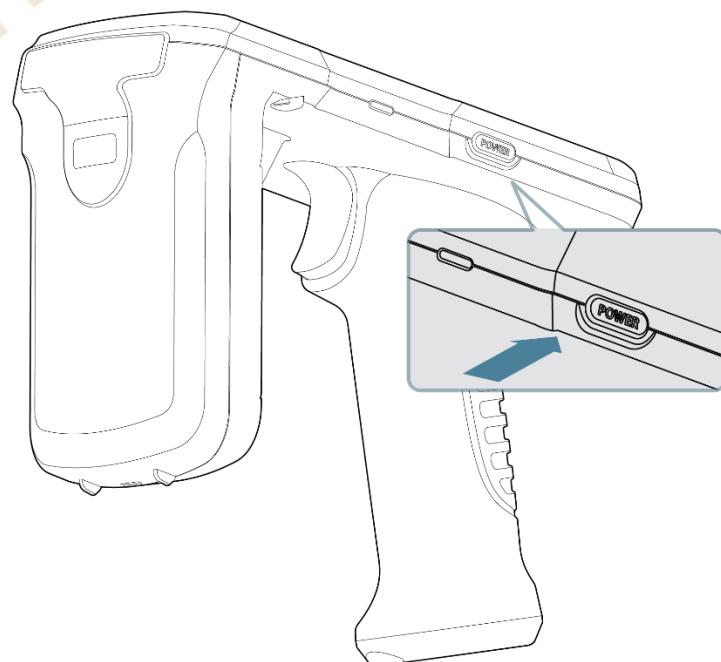
5. How to use

In this chapter, we will explain the method of reading RFID tags and barcode using the IDRO900H-BT equipped with the smart devices.

The detailed contents for this chapter are as follows:

- ✓ **RFID tag reading**

- ✓ **Optical RFID tag reading**

- ✓ **Barcode scanning**

- ✓ **Firmware update**

<div align="right">

5. How to use

</div>

5. 1　Use the device

5. 1. 1　RFID tag reading

1. Turn on the power of the IDRO900H-BT Sled and the smart device.
2. Run the Reader@Express-BT app on the smart device.
   √ Make sure the Reader Mode is set to RFID.
3. Press the gun trigger to start tag reading. If the tag is successfully read, a beep sound will be heard and the tag list will be displayed on the mobile screen.
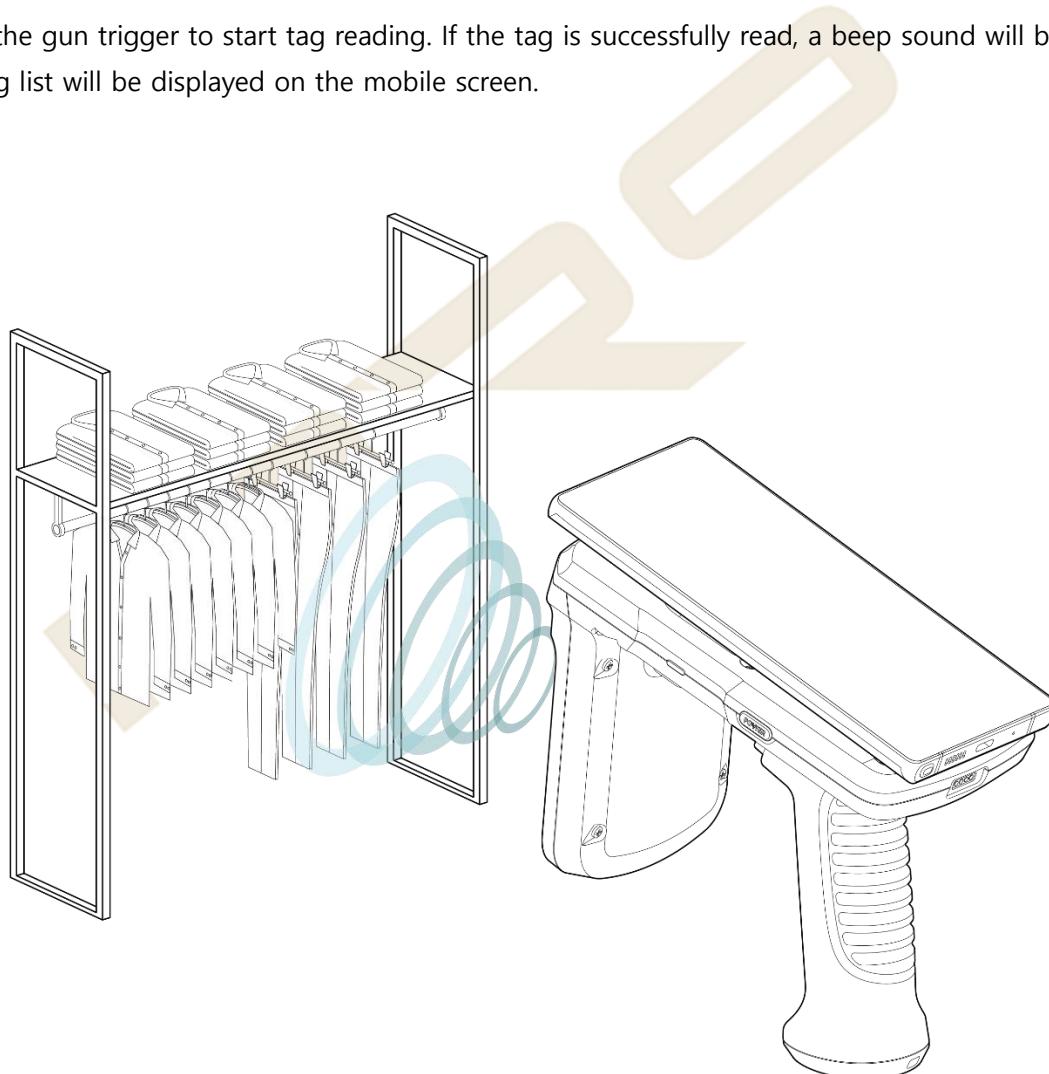
5. 1. 2　Optical RFID tag reading

1. Turn on the power of the IDRO900H-BT Sled and the smart device.
2. Run the Reader@Express-BT app.
   √ Make sure the Reader Mode is set to Optical.
4. Press gun trigger to start tag reading in the LED light area. If the tag is successfully read, a beep sound and a tag list will be displayed on the mobile computer screen.

NOTE
√ To implement the Optical RFID system, you must use the Optical RFID tags provided by IDRO.
√ If you need Optical RFID tags, please contact the IDRO sales team.
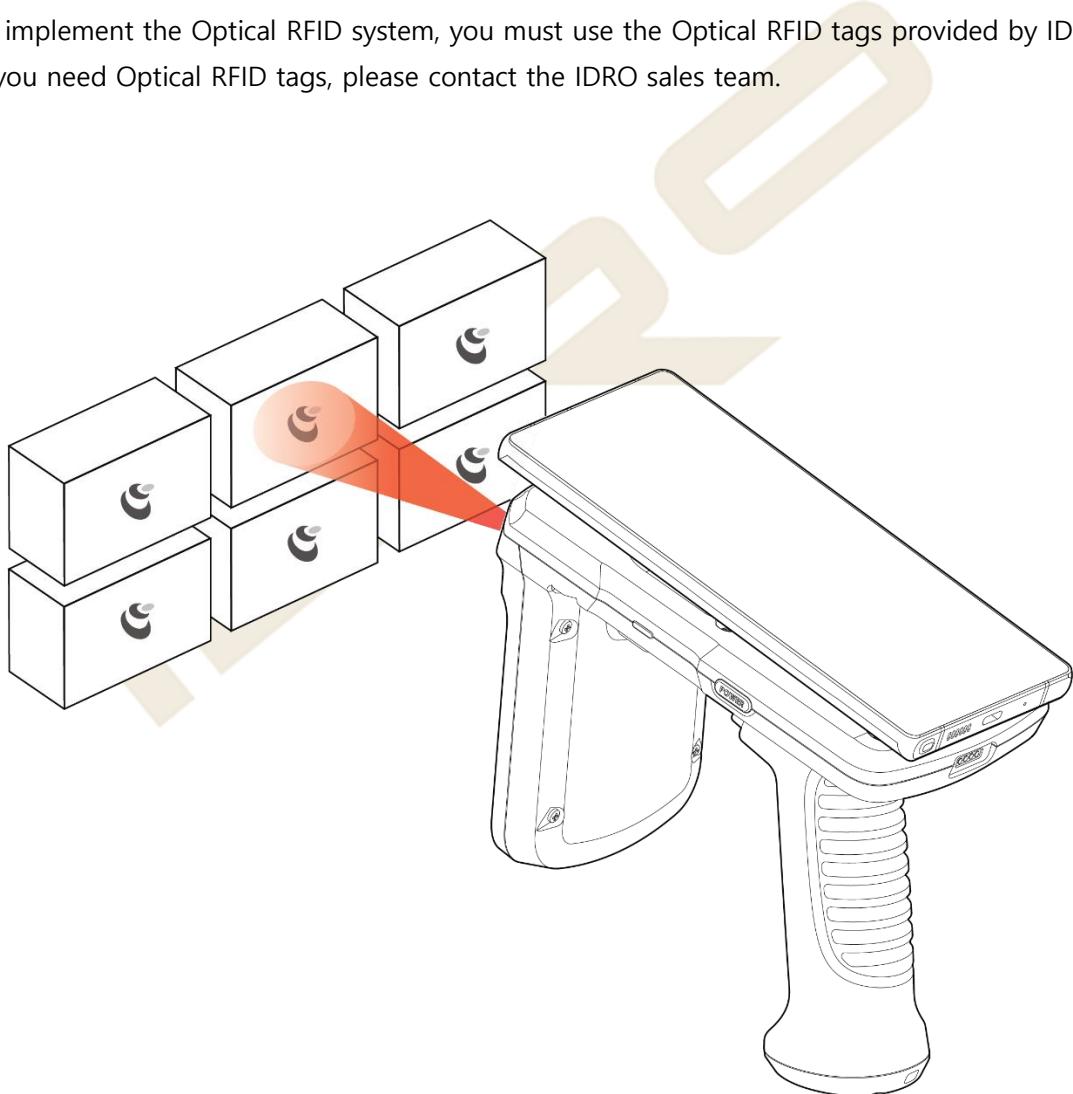
5. 1. 3   Barcode scanning

1.   Turn on the power of the IDRO900H-BT Sled and the smart device.

2.   Run the Reader@Express-BT app.

3.   Press the trigger on the IDRO900H-BT Sled or the barcode scan key on smart device to start scanning the barcode. If the barcode is successfully scanned, a beep sound will be heard and the data will be displayed on the mobile screen.
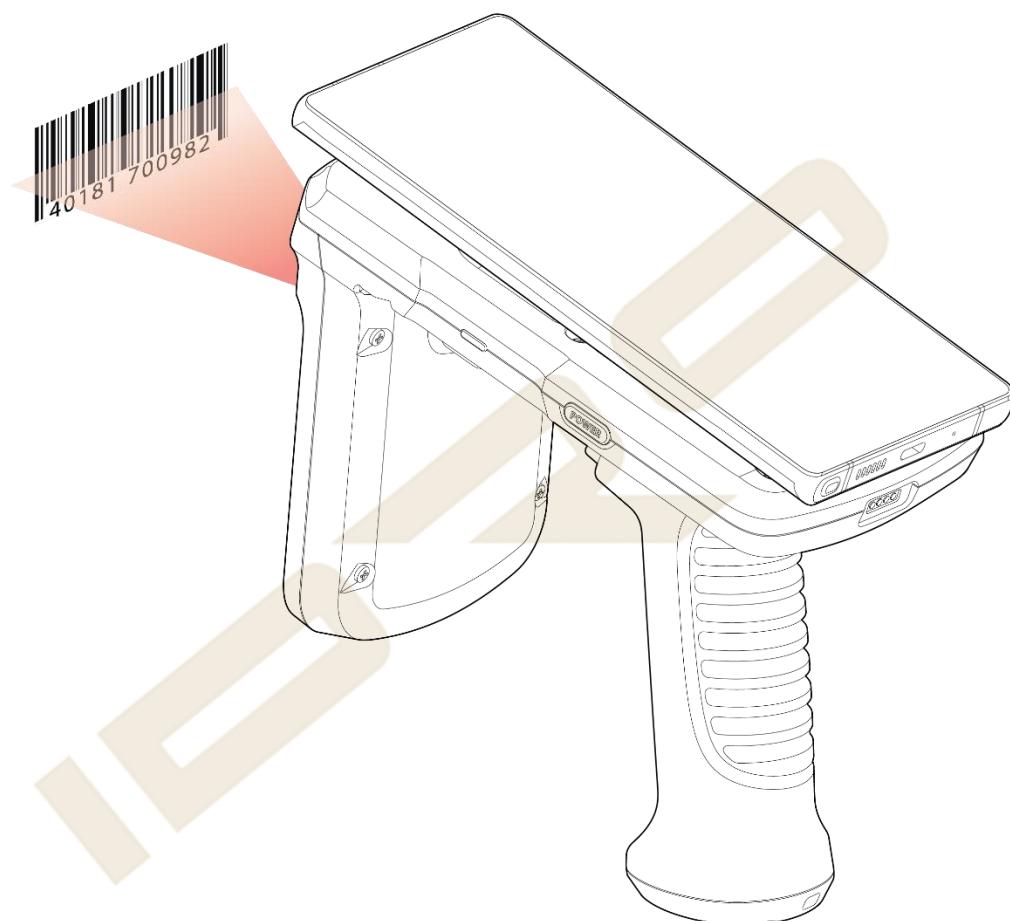
5. 2   Firmware update

1. Press and hold the power button for more than 5 seconds while the power is off. When the green LED turns on and then off again, release the power button.
2. If the LED blinks, the update mode has been successfully entered.
3. Connect the IDRO900H-BT and PC with USB cable.
4. Run the firmware update program on the PC. (IDRO900H FW Updater.exe)
5. Select the COM PORT and click the OPEN button. (1. Connection)
6. Select the firmware file. (2. File Selection)
7. Click the START button and wait for the update to complete. (3. F/W Update)
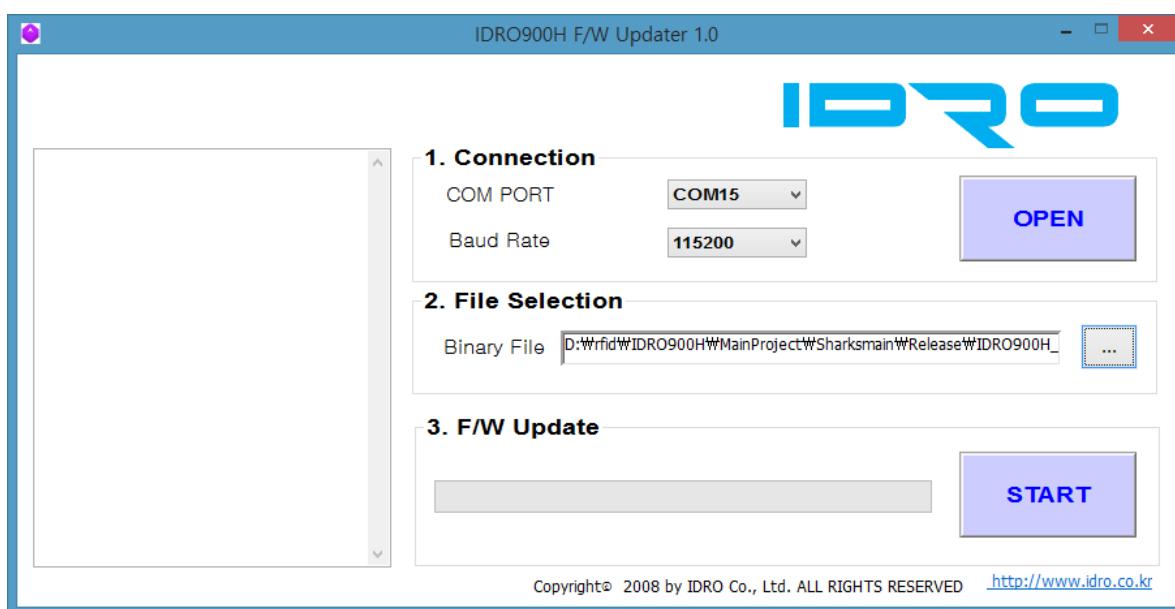
6. Electrical characteristics

In this chapter, we provided information on the electrical characteristics and environmental specifications of the IDRO900H-BT RFID Reader.

6. Electrical characteristics

6. 1 Environmental Specifications

[TABLE 6.1] Environmental Specifications

Parameter	Description
Operating Temperature	-20 ~55℃
Storage Temperature	-40 ~70℃
Humidity	5~95% non-condensing
Case Material	PC (Polycarbonate)
ESD immunity (Air discharge)	±15 kV
(Direct discharge)	±8 kV
Sealing	IP54
Drop	1.5m drops to concrete

6. 2 Physical Specifications

[TABLE 6.2] Physical Specifications

Parameter	Description
Dimensions	157mm(H) x 85mm(W) x 168mm(L)
Weight	400g/14.1oz
Battery	3.63V, 4900mA
Notification	LED
LED Status	Status of charging / Data / Bluetooth
User Input	Trigger

6. 3 Optical & RFID Performance

[TABLE 6.3] Optical & RFID Performance

Parameter	Description
Standard supported	ISO 18000-63, EPC Gen2V2(RFID) Optical RFID Protocol
RFID Engine	Impinj R2000 or Impinj E710
Frequency	860 ~ 960MHz (Customizable)
Read Rate	800+ tags/sec (R2000) 1000+ tags/sec (E710)
Read Range	10+m (Max.) / 33+ft. (RFID) 2.3+m (Max.) / 7.5+ft. (Optical)
RF Output	5 ~ 30dBm (1watt) Enable Power Control by 1dB step
Optical Power	110mW LED

6. 4 Communication

[TABLE 6.4] Communication Specifications

Parameter	Description
USB	USB 2.0 Virtual com port
Connection with Mobile	Bluetooth version 5.0 Dual mode

7. Package specification

In this chapter, we provide the information on the packaging specifications of the IDRO900H-BT RFID Reader.

7. Package specification

7. 1 Reader packaging

The cushioning inside the packaging is made of P-foam material to protect against external damage. The package include 1 main unit and 1 C-Type USB cable.

7. 2 Packaging box

The arrangement and dimension of the components inside the packaging box is as follows.

5mm

260 x 180 x 86 mm

5mm
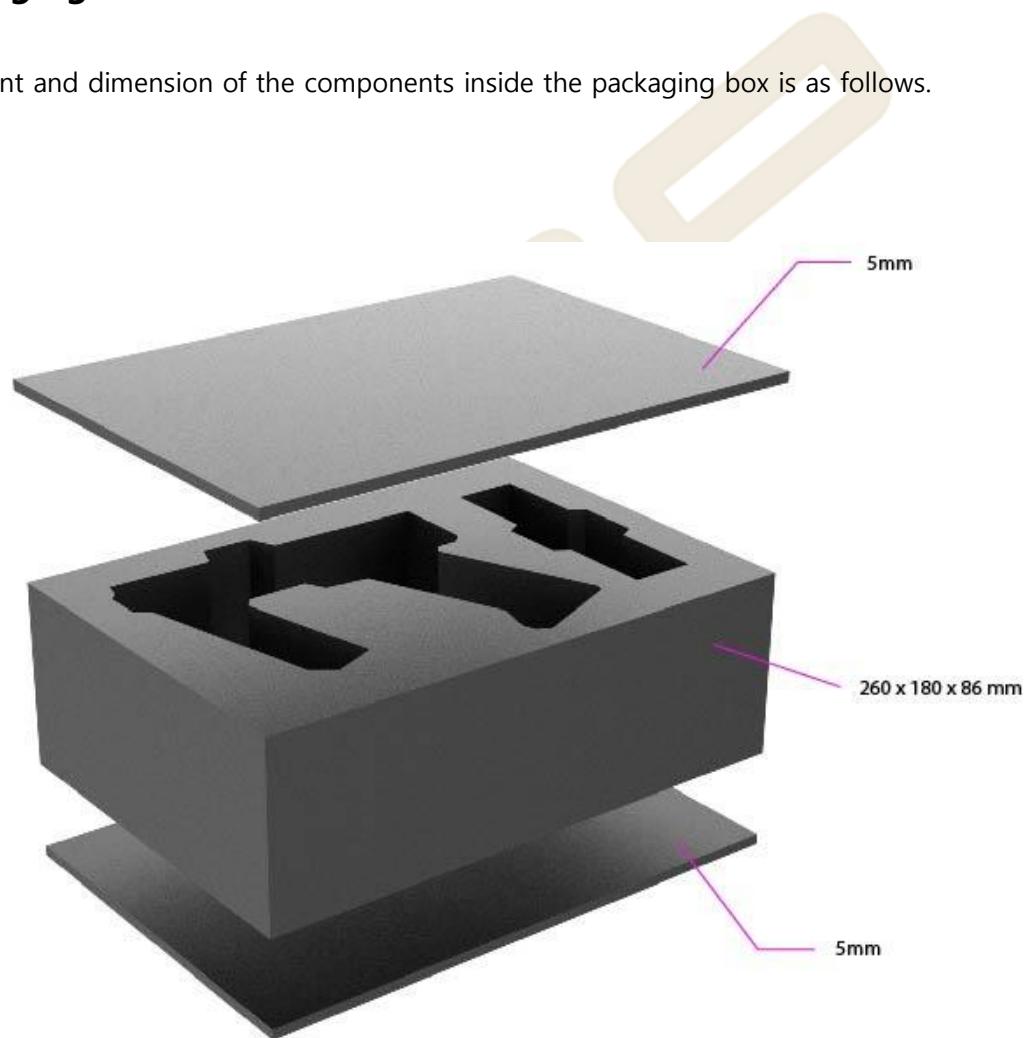
8. How to use application

In this chapter, we provide information on how to use the software application for the IDRO900H-BT Handheld UHF RFID Reader.

8. How to use application

8. 1 Application

"Reader@Express-BT" is Android based app which designed for setting up and operating the IDRO900H-BT RFID Reader System. It can be installed through the SDK provided by IDRO for use.

* To develop an application, you can refer to the supported library (jar) and its documentation IDRO Reader SW API Reference Manual V24.10.08 IDRO900H-BT_Android).

8. 1. 1 Application Name & ICON

Reader@Express-BT

8. 2 Application Start

8. 2. 1 Bluetooth Device Scan
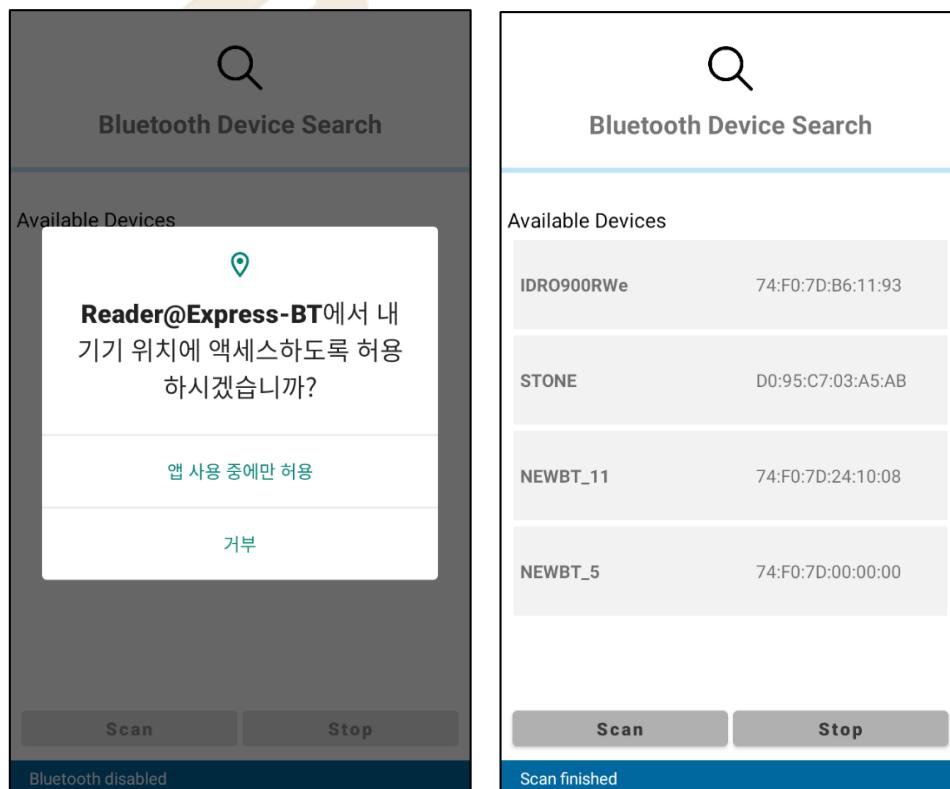
[IMAGE 8.2.1] Bluetooth Device Scan Viewer

When you run the 'Reader@Express-BT' app, a permission request pop-up for Bluetooth usage will appear.

When you select the [앱 사용 중에만 허용] and grant permission, the app will scan for nearby Bluetooth devices and display them in a list.

8. 2. 2 Start
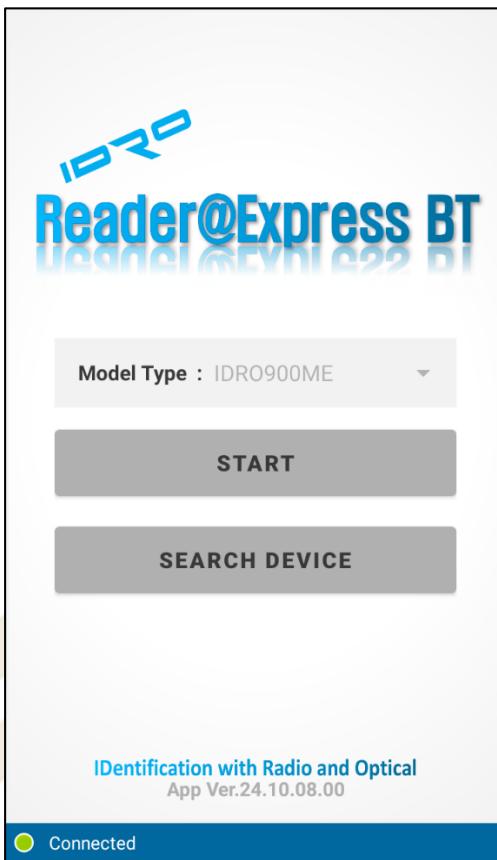
[IMAGE 8.2.2] Start Viewer

On the Bluetooth Device Scan screen, it connects to the selected device and displays the Model Type.
When you click [Start] button, It moves to the Menu screen.

If a Bluetooth Device has been connected previously, the Start screen will launch instead of the Bluetooth Device Scan screen, and it will automatically connect to the most recently connected device.

To change the device you want to connect to, click the [Search Device] button on the Start screen to go to the Bluetooth Device Search screen.

8. 2. 3 Search Device
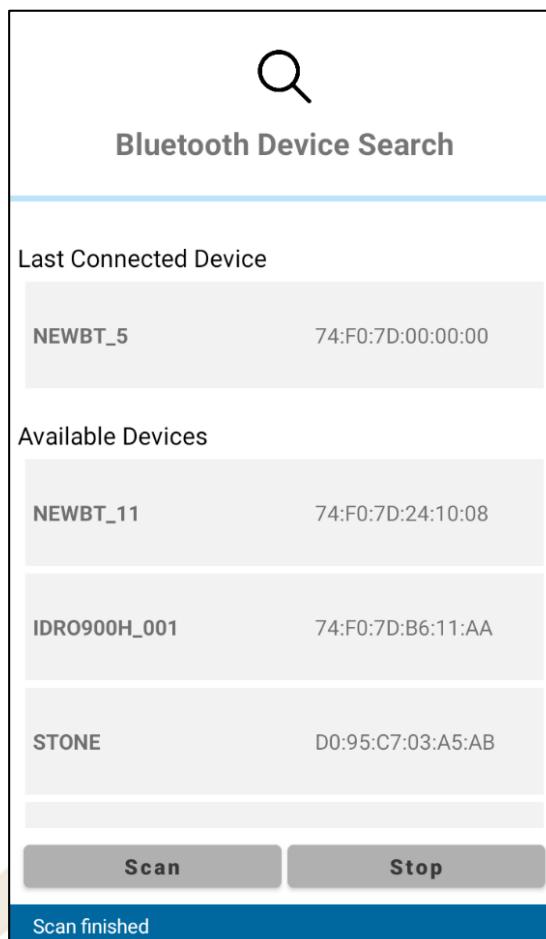
[IMAGE 8.2.3] Bluetooth Device Scan Viewer

The most recently connected device information is displayed at the top of the list, and nearby Bluetooth devices are scanned and shown below in the list.

Select the device you want to connect to from the list.

After moving to the Start screen, click the [Start] button to go to the Menu screen.

8. 3　Application Menu

You can access the main operations, 'Inventory', 'Access', 'Config Settings' by selecting them.
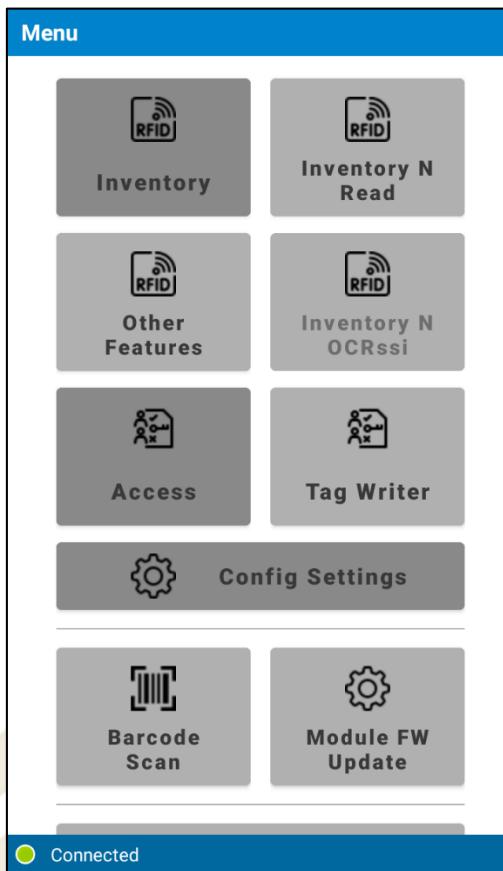
[IMAGE 8.3] Menu Viewer

[TABLE 8.3.1] Reader@Express Menu Viewer

Menu	Description
Inventory	Inventory Control & Data Viewer
Inventory N Read	Inventory & Access Read Control & Data Viewer
Other Features	Temperature Tag Inventory Control
Access	Access(Read, Write, Lock, Kill) Control
Tag Writer	Access Writer Control
Config Settings	RF, System Settings
Barcode Scan	Barcode Scan Control

Web Site	IDRO Web Site

8. 4 Application Inventory

In the 'Inventory' section, the RFID and Optical Inventory are the main purpose based on the Reader Mode.
You can adjust the RF power level to perform the inventory.
You can operate by using the 'Inventory&Stop' button, and also by using the Sled's Gun Press&Release.
The Data Viewer can switch the screen between simple Type and Report List type which shows detailed information.
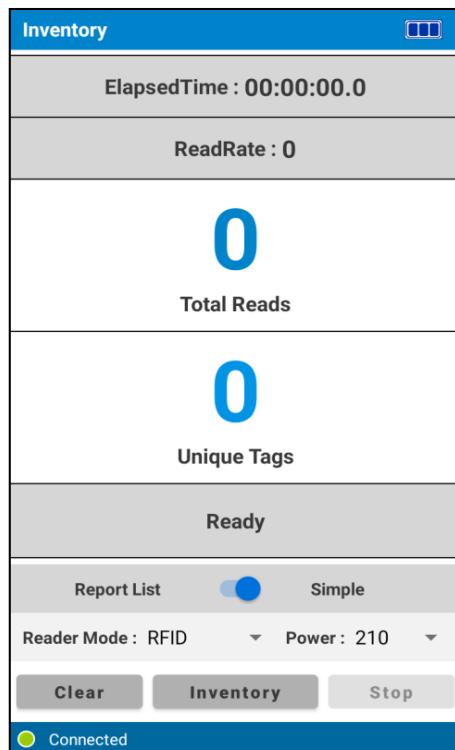
[IMAGE 8.4.1] Inventory Simpe Viewer	[IMAGE 8.4.2] Inventory Report List Viewer
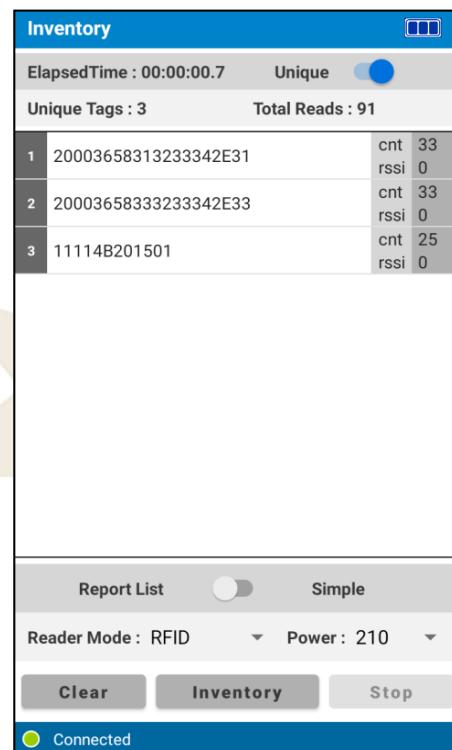
[TABLE 8.4.1] Reader@Express Inventory

Menu	Description
Viewer Type	To set the Simple, Report List Viewer Type
ElapsedTime	Inventory ElapsedTime
Unique	Display of duplicate Tags
ReadRate	The ReadRate counted per second
Filter	When set to 'On', the duplicate tag filter count is applied
Total Reads	Total Count detected during Inventory

Unique Tags	The Count of tags that were processed as duplicates during Inventory
Reader Mode	Operates with RFID or Optical mode selectable (can be set in the Settings)
Power	To set the RF Power value (can be set in the Settings)
Clear	Tag Data List Clear
Inventory & Stop	Tag Reading Inventory & Stop

8. 5 Application Inventory N Read

Inventory N Read', RFID and Optical Inventory N Read are primarily used depending on the Reader Mode.
This allows you to check the EPC of the Inventory and the Value of the selected Access Read together..
You can conduct Inventory N Read by adjusting the RF power level..
You can operate it using the Inventory & Stop buttons..
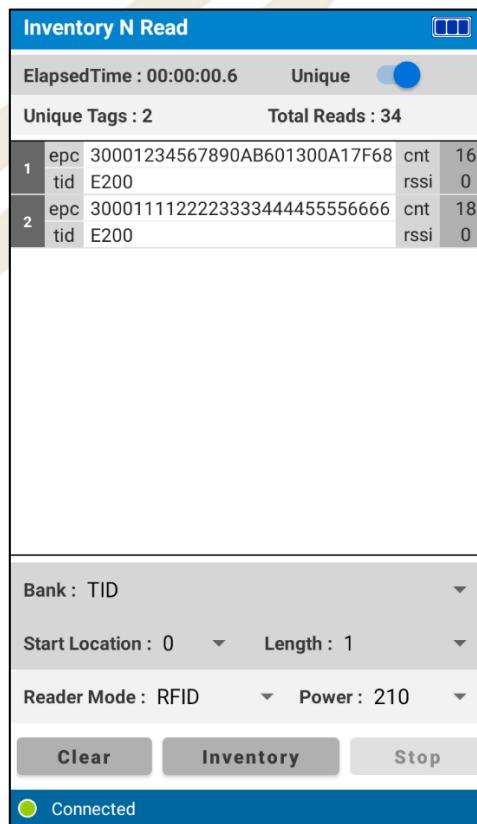
[IMAGE 8.5] Inventory N Read Viewer

[TABLE 8.5.1] Reader@Express Inventory N Read

Menu	Description
ElapsedTime	Inventory N Read ElapsedTime
Unique	Display of duplicate Tags
Total Reads	Total count detected during Inventory
Unique Tags	Count of duplicate tags processed during Inventory
Bank	Access Read Memory Bank Type
Start Location	Access Read Start Location (Starting address to read)
Length	Access Read Length (Length to read)
Clear	Tag Data List Clear
Reader Mode	Operates with RFID or Optical mode selectable (can be set in the Settings)
Power	To set the RF Power value (can be set in the Settings)
Inventory & Stop	Tag Reading Inventory & Stop

8. 6 Application Access

'Access' is primarily used for the Read, Write, Lock, and Kill operations of a Tag.

It can be used with RFID or Optical depending on the Reader Mode.

You can access it by adjusting the RF power level.

You can select the Access Command (Read, Write, Lock, and Kill) item with the Radio button to operate.
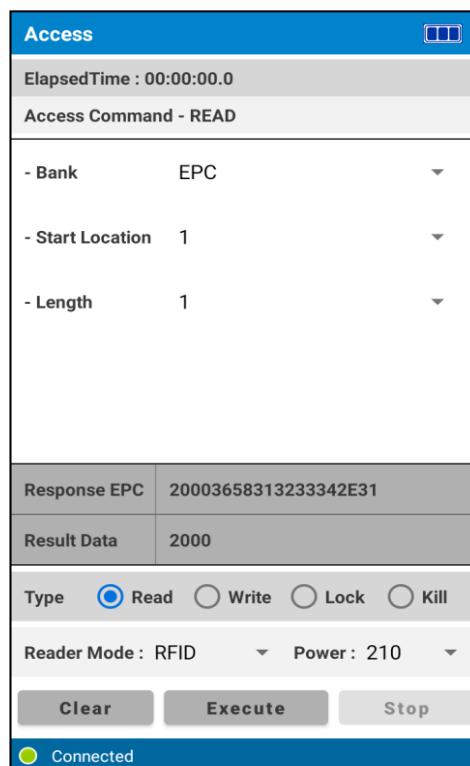
[IMAGE 8.6] Tag Writer Viewer

[TABLE 8.6.1] Reader@Express Access

Menu	Description
Type	Select Access Command Type
Response EPC	The TAG EPC Data value depending on the result of the Access operation
Result Data	Access result value (Response code: Success or Failure)
Clear	Access Data & Result Data Clear
Reader Mode	Operates with RFID or Optical mode selectable (can be set in the Settings)
Power	To set the RF Power value (can be set in the Settings)
Execute & Stop	Tag Access Start & Stop

If the Access Command is successful, the EPC Data of the tag will be displayed in the Response EPC, and the result value of the selected Access Command will be displayed in the Result Data.
If the Access fails, it may be indicated as an error code or timeout.

[TABLE 8.6.2] Reader@Express Access Type

Menu	Description
Read	Read Tag Data
Write	Write Tag Data
Lock	It is used for security to prevent Tag Read or Write
Kill	It is used when the Tag will no longer be used

There are four types of Access: Read, Write, Lock and Kill. You can select and use them.

[TABLE 8.6.3] Reader@Express Access Read

Menu	Description
Bank	Access Read Memory Bank Type
Start Location	Access Read Start Location (Starting address to read)
Length	Access Read Length (Length to read)

[TABLE 8.6.4] Reader@Express Access Write

Menu	Description
Bank	Access Write Memory Bank Type
Start Location	Access Write Start Location (Starting address to write)
Data	Data (hex) to be written using Access Write

[TABLE 8.6.5] Reader@Express Access Lock

Menu	Description
Kill Password	Access Lock KillPassword Lock Setting
Access Password	Access Lock AccessPassword Lock Setting
EPC	Access Lock EPC Lock Setting
TID	Access Lock TID Lock Setting

User	Access Lock User Lock Setting

[TABLE 8.6.6] Reader@Express Access Lock Mask Type

Lock Mask Type
Accessible
Always Accessible
Password Accessible
Always Password Accessible
No Change

[TABLE 8.6.7] Reader@Express Access Kill

Menu	Description
Kill Password	The Password required for Access Kill

8. 7   Application Tag Writer

'Tag Writer' is mainly used for the Write operation of a Tag.

You can Write in both Hex and Text formats, and in the case of Text, it will be encoded as Hex values before being Written.

To ensure the accuracy of Write, Verify (Access Read) is performed and it represents the final Tag's Write Result.

You can use RFID and Optical depending on the Reader Mode.

RF Power can be adjusted to perform Access Write.
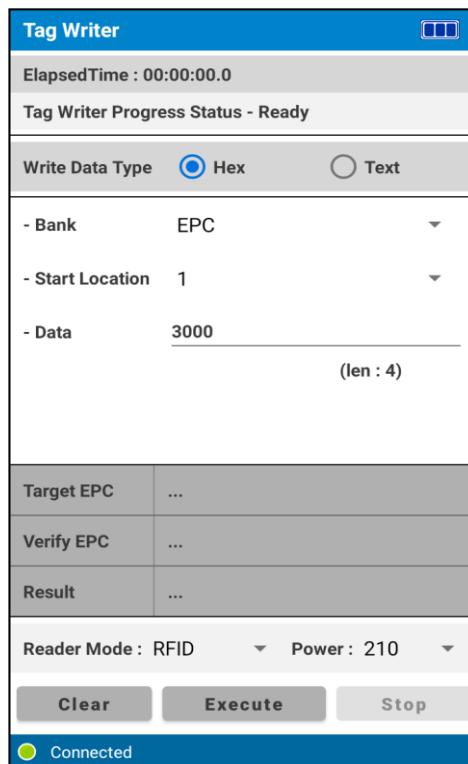
[IMAGE 8.7] Tag Writer Viewer

[TABLE 8.7.1] Reader@Express Tag Writer

Menu	Description
Write Data Type	If Text is selected, decode it into hexadecimal values and then perform the Write operation
Bank	Access Write Memory Bank Type
Start Location	Access Write Start Location (Starting address to Write)
Data	Data to be written for Access Write
Target EPC	EPC data of the tag before performing the Write operation
Verify EPC	Perform Access Read to verify the EPC data after performing the Write operation to confirm that it has been successfully written
Result Data	The result value (Response code: success or failure)
Reader Mode	Operates with RFID or Optical mode selectable (can be set in the Settings)
Power	To set the RF Power value (can be set in the Settings)
Clear	Access Data & Result Data Clear

Execute & Stop	Tag Access Start & Stop

When the Access Command is successful, the Response EPC will display the EPC data of the tag and the Result Data will show the result of the selected Access Command.
If the Access fails, it may be displayed as an error code or Timeout.

8. 8 Application Config Settings

In 'Config Settings', you can configure the settings for the RF Reader and System.
By configuring the RFID Reader settings, you can use the IDRO900H-BT optimized for your environment.

Config Settings

Type	Basic
- Power (1/10 dBm)	300
- Access Password (hex : 8)	00000000
- GlobalBand	KOREA
- RFID Version	22120675
- App Version	24100700
- Sled Version	HIB24100800

Default   Apply   Refresh
● Connected
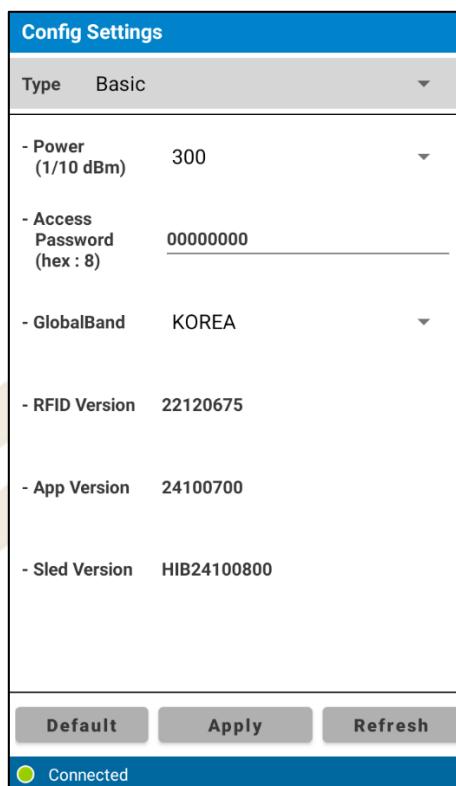
[IMAGE 8.8] Config Settings Viewer

[TABLE 8.8.1] Reader@Express Settings

Menu	Description
Type	Select the Settings Part Type
Default	Set all configuration values to their default values
Apply	Apply the configured values (Only applies to the selected items in the chosen Type)

Refresh	Display the current applied configuration values before applying the changes (Only shoes the selected items in the chosen Type)

The Default option will change all values to their initial setting.

Apply & Refresh only applies to the selected Type tab's list.

You need to click "Apply" for the changes to take effect after modifying the desired setting.

[TABLE 8.8.2] Reader@Express Settings Type

Menu	Description
Basic	RF Power, Region, Access Pwd, Reader Version Settings
Options	Tag Report Rssi Setting
Port	RF Inventory Idle, Dwell Time Settings
Selection	Tag Selection Settings
Algorithms	RF Algorithms Q, Toggle Settings
Reader Mode	Reader Mode (RF, GlowFly) Setting
Engineer	Hopping, LinkProfile Settings
System	System Version, Sled Battery Check

8. 9 Application Barcode Scan

Under Barcode Scan, you can perform barcode scanning using the scanner provided by the device.
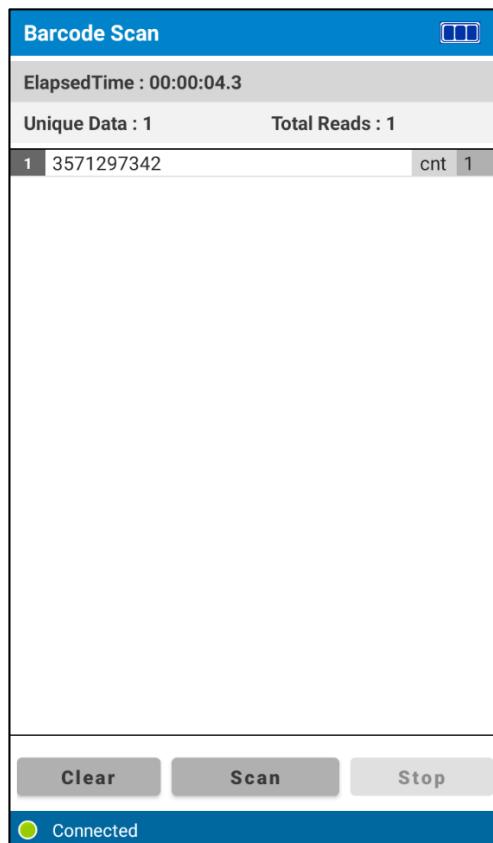
[IMAGE 8.9] Barcode Scan Viewer

[TABLE 8.9.1] Reader@Express Barcode Scan

Menu	Description
ElapsedTime	Bacode Scan ElapsedTime
Total Reads	The total count of recognized barcodes during the barcode scan
Unique Tags	Number of duplicate tags processed during Barcode Scan
Barcode Data	The recognized barcode data during a barcode scan
Clear	Tag Data List Clear
Scan & Stop	Barcode Scan & Stop

8. 10   Application Web Site

'Web Site' allows you to access our company's website.
You can access the website at www.idro.co.kr

[IMAGE 8.10] Web Site Viewer

Appendix

This chapter provides information on potential issues, solutions and precautions related to the user of IDRO900H-BT.

✓ **Problem solving**
✓ **Precautions**

Appendix A. Troubleshooting

Troubleshooting

[TABLE A] Resolving issues in IDRO900H-BT Sled.

Issue	Probable cause	Solution
If there is no response from the RFID application even when the trigger on the RFID Sled equipped with a mobile computer is pressed	If the smart device is not properly connected to the RFID Sled	Please re-connect the smart device to the RFID Sled (Refer to Chapter 4.3)
	The RFID operation is not working due to low battery level	Please charge using the charging cradle or USB cable
	It is not working due to a damaged battery	Please check for a red light while charging in the cradle. If the LED light does not turn blue even after charging for more than 6 hours, please replace the battery
Is the LED of the RFID Sled flashes red or blue while charging in the cradle	Charging error	Please remove the USB cable and try to reconnect.
	Poor battery contact	Please open the battery cap, remove the battery, and then reattach it.
If takes a long time to charge via USB	In case of using a PC's USB port	Please charge using a USB adapter (5V,2A)

Appendix B. Caution

Caution

(1) Please provide the power supply according to the rated power specifications of the product. Failure to do so may cause fire or damage to the product.

(2) Do not disassemble or apply impact to the product. It may cause damage to the product.

(3) Do not install the product in a place with high humidity. It may cause damage to the product or electric shock. Please use it within the humidity range specified in the user manual.

(4) Do not attempt to disassemble or repair the product by yourself. It may cause damage to the product and void the warranty.

(5) Do not use the product in environments where there are liquids such as water, oil, or organic solvents.

(6) Make sure that there are no metal objects near the front of the antenna. It may cause a deterioration in performance

(7) Avoid rapid temperature changed in the product. It may cause a deterioration in performance.

FCC Information to User

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

— Reorient or relocate the receiving antenna.

— Increase the separation between the equipment and receiver.

— Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

— Consult the dealer or an experienced radio/TV technician for help.

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.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

▶ **Contains FCC ID: 2APDI-BCM-DC100-XS**

Specific Absorption Rate (SAR) information:

This Device meets the government's requirements for exposure to radio waves. The guidelines are based on standards that were developed by independent scientific organizations through periodic and thorough evaluation of scientific studies. The standards include a substantial safety margin designed to assure the safety of all persons regardless of age or health. FCC RF Exposure Information and Statement The Hands SAR limit of USA (FCC) is 4.0 W/kg averaged over one gram of tissue. Device types: **Handheld UHF RFID Reader (FCC ID: XVY-IDRO900H-BT)** has also been tested against this SAR limit. The highest SAR value reported under this standard during product certification for when properly worn on the body is **1.94 W/kg.**

UHF RFID Reader

Visible RFID Reader & Tag

Visible Light Communication System