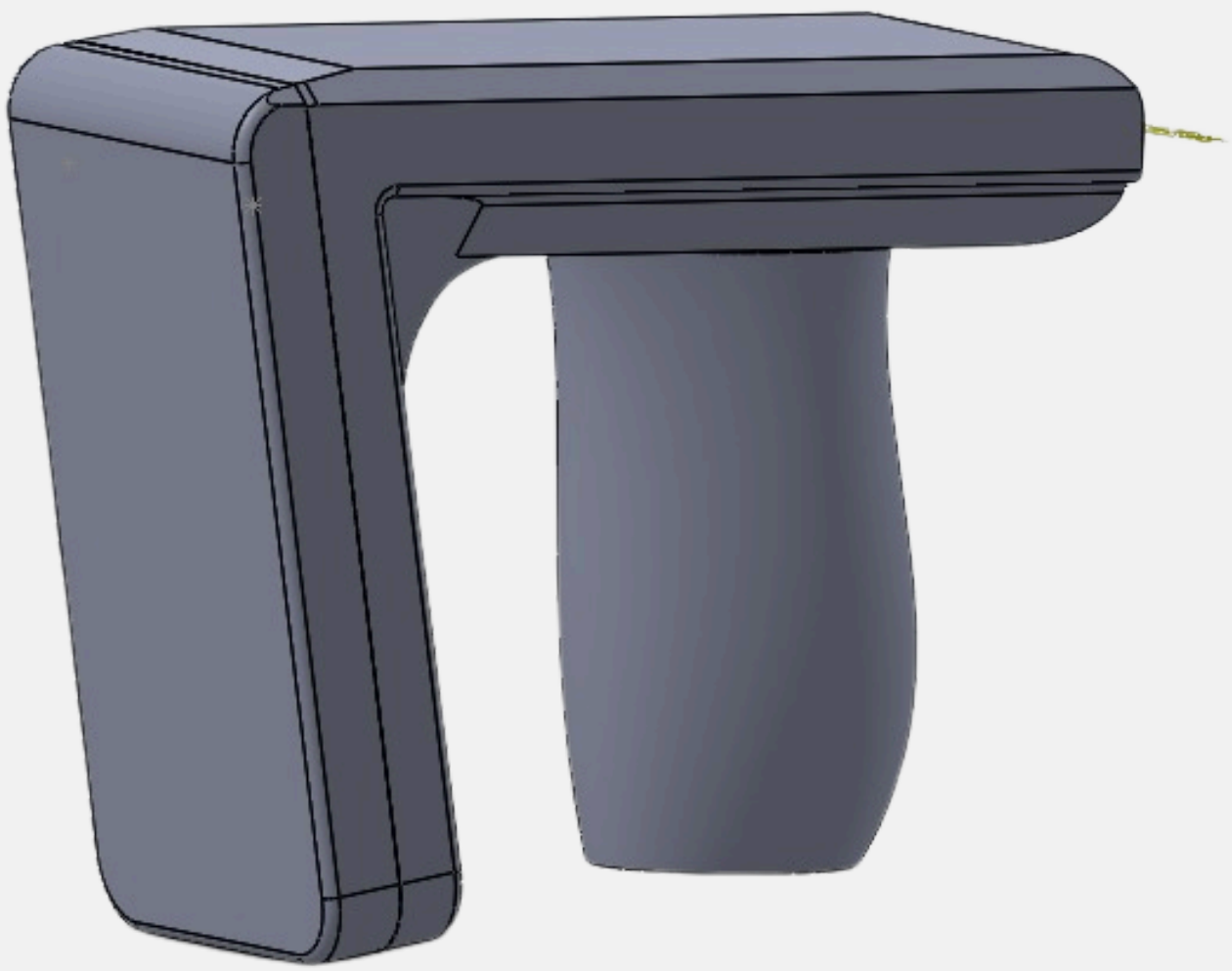
Electronic and Telecommunication Engineering

Handheld RFID Reader

User Manual



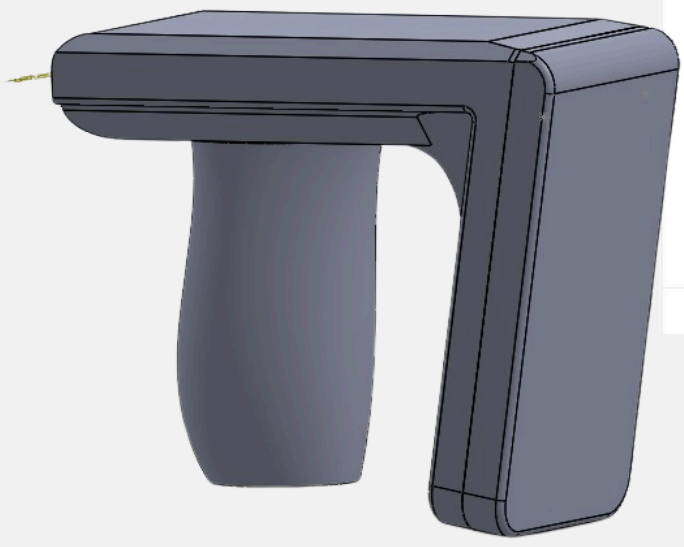
PREPARED BY: Team Handheld RFID

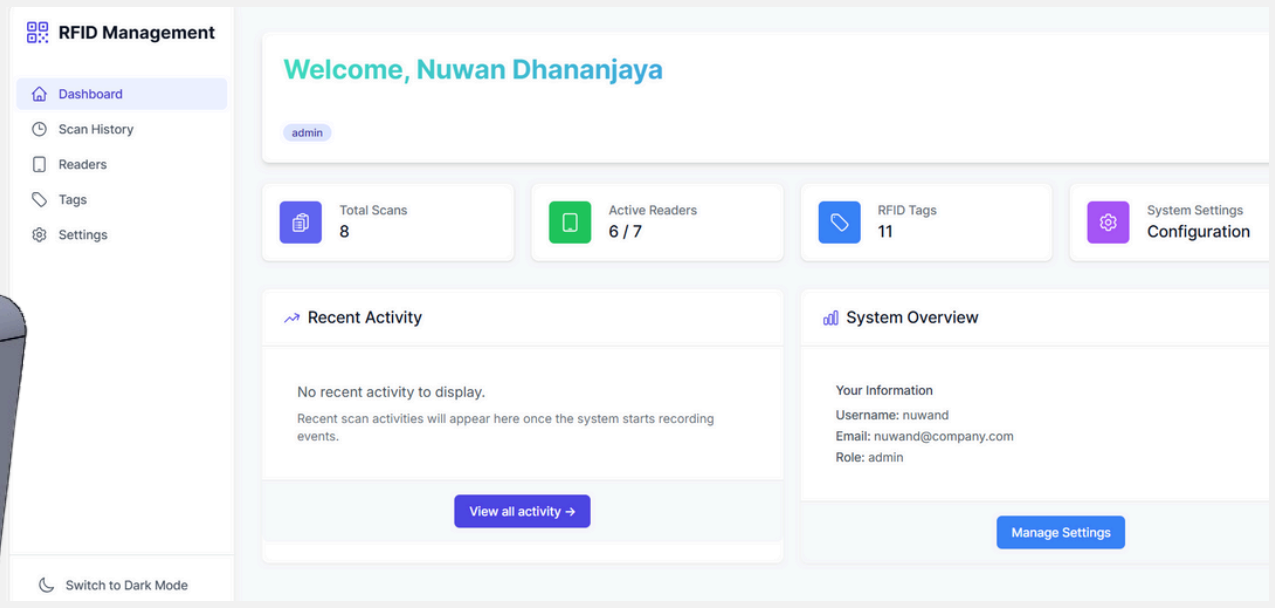
1.0 Introduction

RFID.V1 RFID Sled Handheld Reader

The HF Handheld RFID Reader is a compact, portable device designed for fast and reliable identification and tracking of HF (13.56 MHz) RFID tags. Engineered with ease of use and seamless connectivity in mind, this reader enables users to interact with tagged items through a simple interface while maintaining robust performance across various environments. Whether used for inventory management, access control, healthcare, or retail applications, the HF handheld reader provides a versatile and modern solution for short-range RFID operations. Its ergonomic design, combined with wireless connectivity, makes it ideal for mobile workflows and real-time data collection.

The HF RFID handheld reader can be controlled through a web-based dashboard accessible over Wi-Fi from any device with a modern web browser. Below is an example where it is accessed from a tablet running the Windows operating system:





Handheld RFID reader with the dashboard

Supported Host Platforms and Connection Types

Host Platform	Interface Physical Media	Method
Apple iPhone	Web browser (Safari/Chrome)	AppStore App/WebApp
Apple iPad	Web browser (Safari/Chrome)	Appstore App/WebApp
Android Phone	Web browser (Chrome) Wi-Fi	App/WebApp
Windows 10/11 Laptop	Web browser (Edge/Chrome)	Web Dashboard
macOS Laptop/Desktop	Web browser (Safari/Chrome) Wi-Fi	Web Dashboard

Note:

• If you use the web based Dashboard no software installation is required—access the reader entirely through a web interface.

• Ensure the device and the handheld reader are connected to the same Wi-Fi network during setup or operation.

• The dashboard supports all major modern browsers.

2.0 Product Specifications

2.1 Product Packaging

1. RFID.V1 : Handheld HF RFID Reader Unit
2. Power Cradle RFID stand
3. Lithium-Ion rechargeable Battery backs,3700Mah (2 pcs)
4. 12V power pack
5. Quick Start Guide (Video Series)
6. User Manual

2.2 Key Components

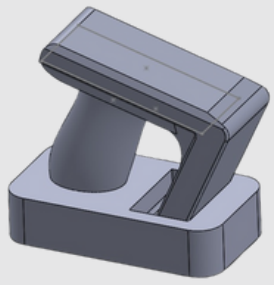
- RFID Reader Chip: PN5180
- Microcontroller: ATmega32U4
- Wi-Fi Module: ESP8266
- Power Supply: 2 3.3V Li-Ion rechargeable batteries with a separate charging system cradle.
- Indicators: LEDs for status and an optional vibration motor for haptic feedback.

3.4 Product Accessories

The following accessories are available for the RFID.V1 Handheld HF RFID Reader

1. RFID.V1 Spare Battery Pack

Each RFID.V1 unit includes two 3700 mAh lithium-ion rechargeable battery packs. Additional batteries are available for extended use or replacement.



2. RFID.V1 Dual Battery Charging Cradle (Power Cradle)

The Power Cradle serves as both a stand and a dual-slot external battery charger, allowing you to recharge spare battery packs independently of the reader.

3. RFID.V1 12V Power Adapter

A 12V wall adapter compatible with the Power Cradle for efficient charging.

3.0 Getting Started

3.1 Introduction

This chapter explains how to set up the device for the first time.

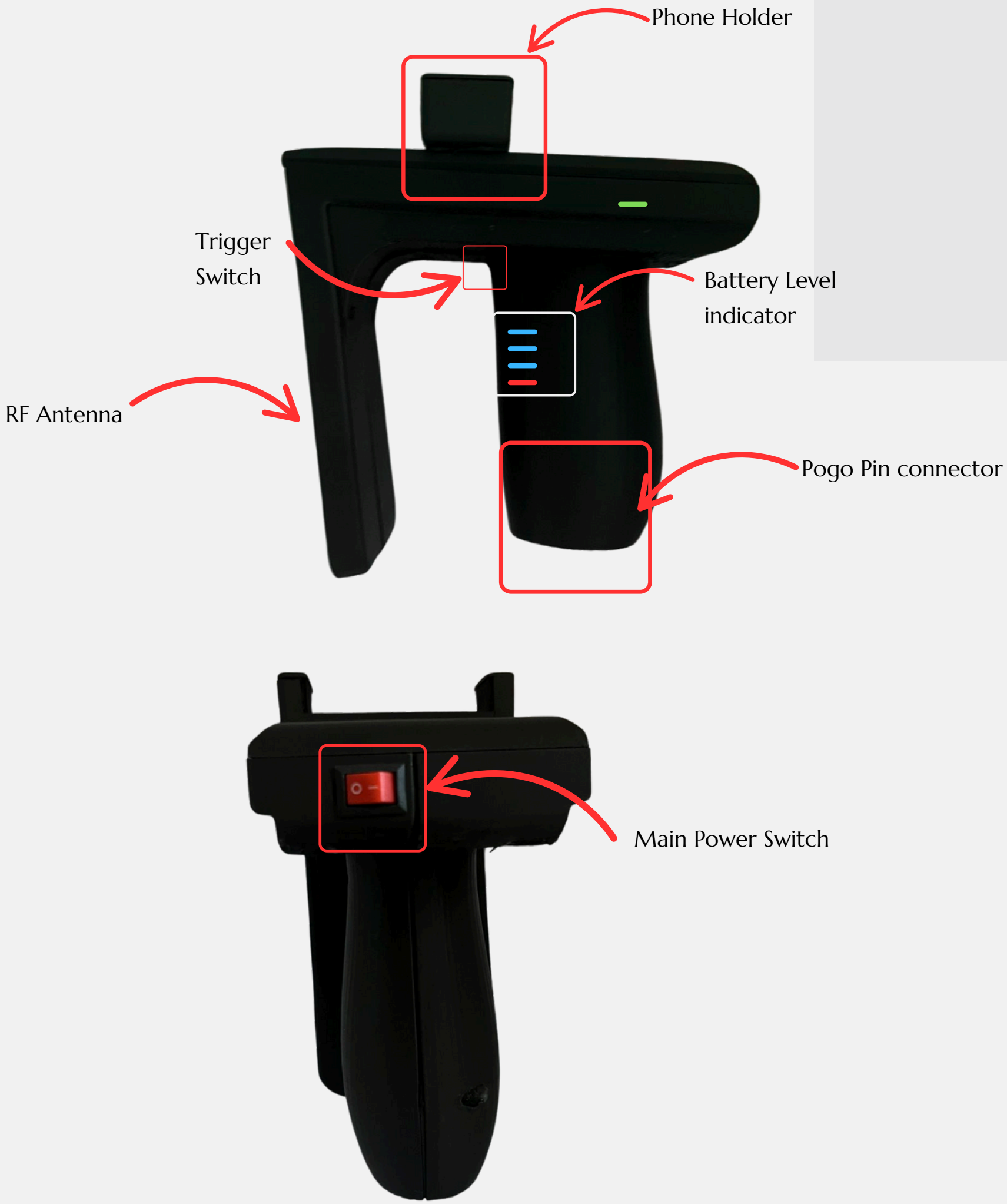
3.2 Unpacking

Carefully open the RFID.V1 package and remove all protective plastic coverings. We recommend retaining the original shipping container and internal packaging materials for future storage or transportation.
Verify that the following items are included in the box:

1. RFID.V1 Handheld HF RFID Reader Unit
2. Two (2) Lithium-Ion Rechargeable Battery Packs, 3700 mAh each
3. Power Cradle RFID Stand (Seperate Box)
4. 12V Power Pack (for use with the Power Cradle)
5. Quick Start Guide (Video Series Access)
6. User Manual

3.3 Features

Below is the front view of the RFID.VI reader. RFID Reading PCB module is located at the top-front with a forward facing embedded patch antenna..



3.4 Powering Up for the first time

1. Ensure that a fully charged battery is properly inserted into the RFID.V1 unit or that the device is docked in the powered cradle with the 12V adapter connected.
2. Turn on the power switch at the back side of the reader
3. Power LED will turn on to indicate the device is powered. Simultaneously, the red Wi-Fi Setup LED will begin blinking slowly.
4. The RFID.V1 is now powered on and ready to be configured via Wi-Fi (see Section 4.1 for connection instructions)

3.5 Charging the RFID reader

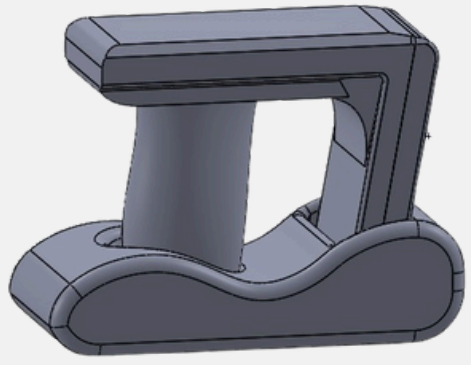
To charge the RFID.V1 handheld reader:

1. Connect the included 12V power adapter to the Power Cradle.
2. Plug the adapter into a standard AC power outlet.
3. Place the RFID.V1 reader securely onto the cradle.
4. Ensure the Battery Charging LED on the side of the reader begins to blink. This indicates that charging is in progress.
5. The current battery level is displayed using a 3-LED battery status array:

- 1 LED = Low charge
- 2 LEDs = Medium charge
- 3 LEDs = Full charge

6. When all three LEDs are lit solid, the battery is fully charged and the Charging LED will turn off or remain solid (depending on device firmware).

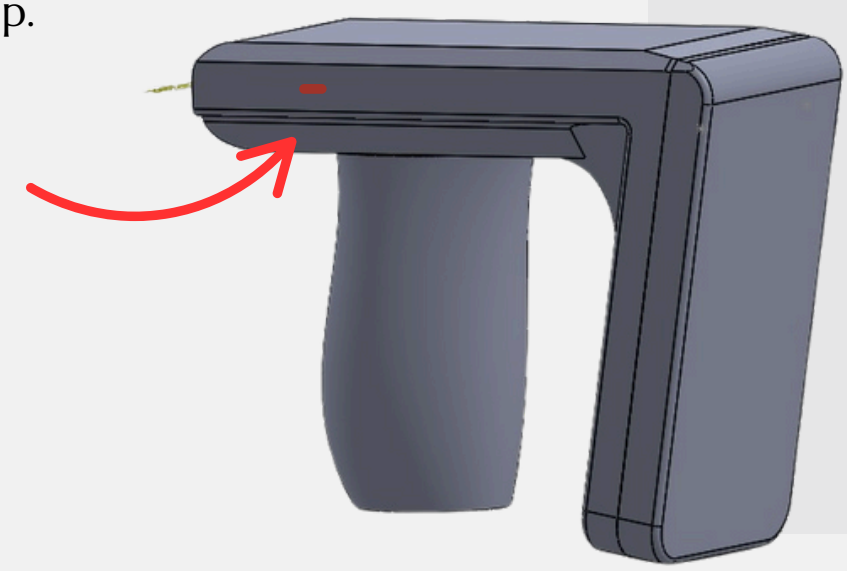
Note: For optimal battery health, always use the official Power Cradle and 12V adapter supplied with the RFID.V1.



3.6 Powering Up and WiFi Setup

WiFi Pairing with Mobile Devices

1. When you power on the RFID.V1 reader, the Wi-Fi status LED will begin flashing red. This indicates that the device has entered Setup Mode and is broadcasting its configuration network for initial setup.



2. Using your smart device (smartphone, tablet, or laptop), open the list of available Wi-Fi networks and look for an SSID similar to:

📶RFID.V1-Setup-XXXX

(where XXXX is a unique identifier for your device)

3. Connect to the RFID.V1-Setup network.

- Password: 1234

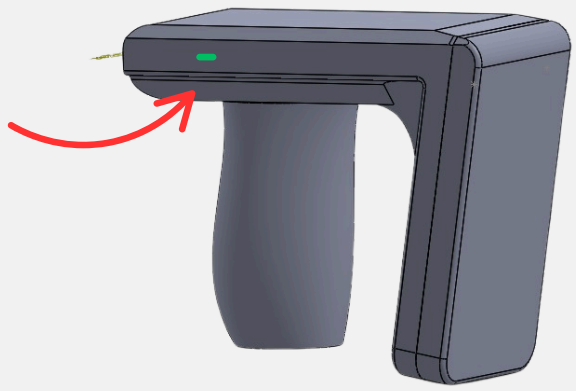
4. Once connected, open a web browser on your device and enter the following address into the URL bar:

- http://192.168.4.1

5. You will be directed to the RFID.V1 Setup Page. From here, you can:

- View available Wi-Fi networks
- Select your local Wi-Fi network
- Enter your Wi-Fi password
- Save and reboot the device

6. After rebooting, the RFID.V1 will automatically connect to the selected Wi-Fi network. The LED will turn solid green to indicate a successful connection.



7. You can now access the RFID.V1 Web Dashboard from any browser on the same network by entering its local IP address (shown during setup or available via the connected router's device list).

4.7 Battery Changing

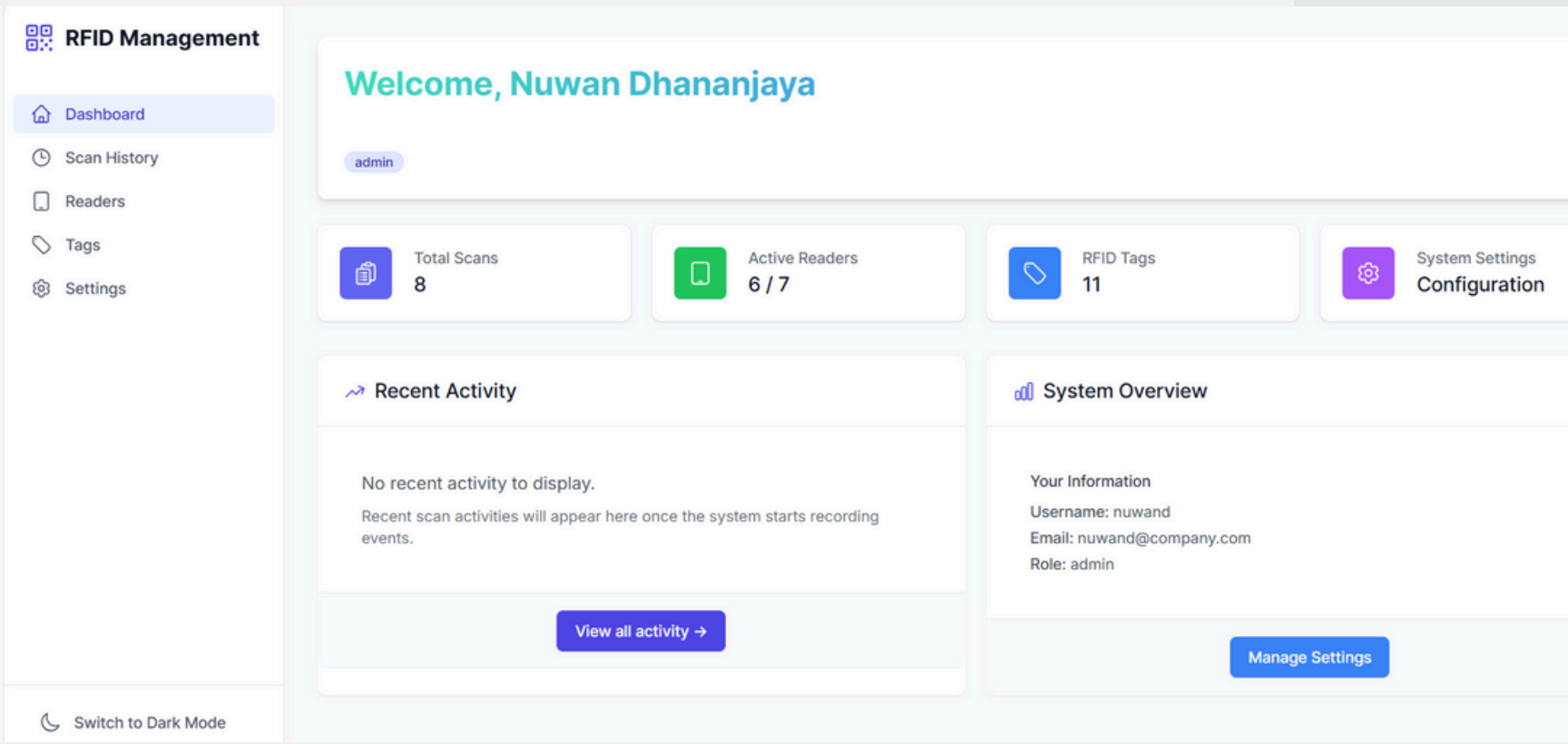
1. Slide the battery cover at the bottom of the Handle

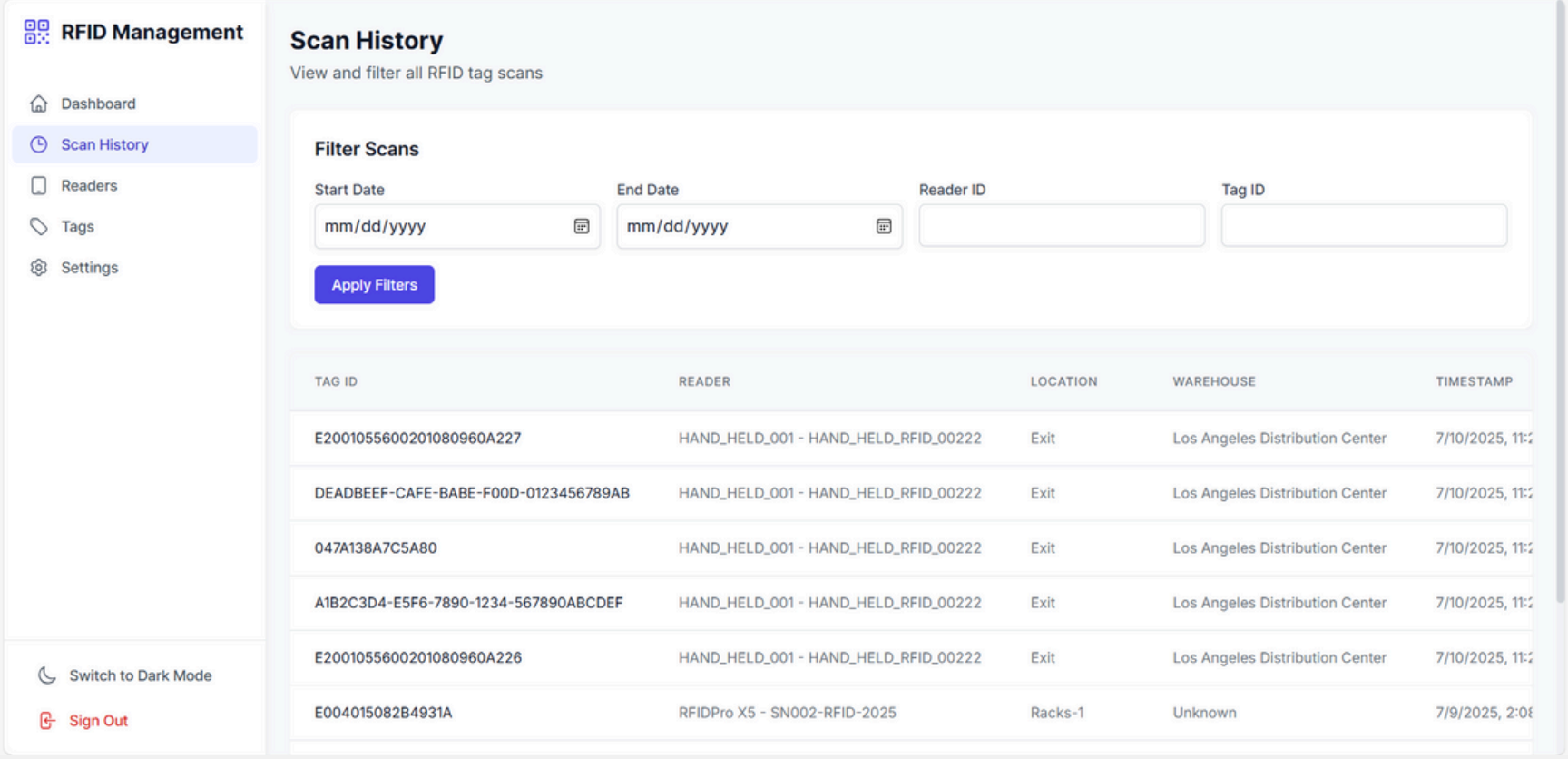
2. Remove the JST connector of the battery. from the Circuit board

3. Get the Battery Outside and Connect the new battery unit

4. Close the Lid safely

3.9 Web App


RFID Management
Dashboard
Scan History
Readers
Tags
Settings
Switch to Dark Mode
Welcome, Nuwan Dhananjaya
admin
Total Scans
8
Active Readers
6 / 7
RFID Tags
11
System Settings
Configuration
Recent Activity
No recent activity to display.
Recent scan activities will appear here once the system starts recording events.
View all activity →
System Overview
Your Information
Username: nuwand
Email: nuwand@company.com
Role: admin
Manage Settings


RFID Management
Dashboard
Scan History
Readers
Tags
Settings
Switch to Dark Mode
Sign Out
Scan History
View and filter all RFID tag scans
Filter Scans
Start Date
mm/dd/yyyy
End Date
mm/dd/yyyy
Reader ID
Tag ID
Apply Filters
TAG ID
READER
LOCATION
WAREHOUSE
TIMESTAMP
E2001055600201080960A227
HAND_HELD_001 - HAND_HELD_RFID_00222
Exit
Los Angeles Distribution Center
DEADBEEF-CAFE-BABE-F00D-0123456789AB
HAND_HELD_001 - HAND_HELD_RFID_00222
Exit
Los Angeles Distribution Center
047A138A7C5A80
HAND_HELD_001 - HAND_HELD_RFID_00222
Exit
Los Angeles Distribution Center
A1B2C3D4-E5F6-7890-1234-567890ABCDEF
HAND_HELD_001 - HAND_HELD_RFID_00222
Exit
Los Angeles Distribution Center
E2001055600201080960A226
HAND_HELD_001 - HAND_HELD_RFID_00222
Exit
Los Angeles Distribution Center
E004015082B4931A
RFIDPro X5 - SN002-RFID-2025
Racks-1
Unknown

RFID Management

- Dashboard
- Scan History
- Readers
- Tags
- Settings

Switch to Dark Mode

Sign Out

RFID Readers

Manage and monitor RFID reader devices

Reader Devices

Add New Reader

SERIAL NUMBER	MODEL	LOCATION	WAREHOUSE	STATUS	LAST ACTIVE	ACTIONS
SN001-RFID-2025	RFIDPro X5	Loading Dock	Los Angeles Distribution Center	active	5/1/2025, 3:15:00 PM	Edit Delete
SN003-RFID-2025	RFIDPro X7		Not assigned	active	5/1/2025, 3:25:00 PM	Edit Delete
SN004-RFID-2025	RFIDPro X7		Not assigned	maintenance	5/1/2025, 12:00:00 AM	Edit Delete
SN005-RFID-2025	RFIDPro X9	Shipping Area	Phoenix Storage Facility	active	5/1/2025, 3:28:00 PM	Edit Delete
HAND_HELD_RFID_001	RFID_001	Entry	North Seattle Distribution	active	Never	Edit Delete
SN002-RFID-2025	RFIDPro X5	Racks-1	San Francisco Warehouse	active	5/1/2025, 3:20:00 PM	Edit Delete
HAND_HELD_RFID_00222	HAND_HELD_001	Exit	Los Angeles Distribution Center	active	Never	Edit Delete

RFID Management

- Dashboard
- Scan History
- Readers
- Tags
- Settings

Switch to Dark Mode

Sign Out

https://webapp.rfidmanagement.duckdns.org/tags

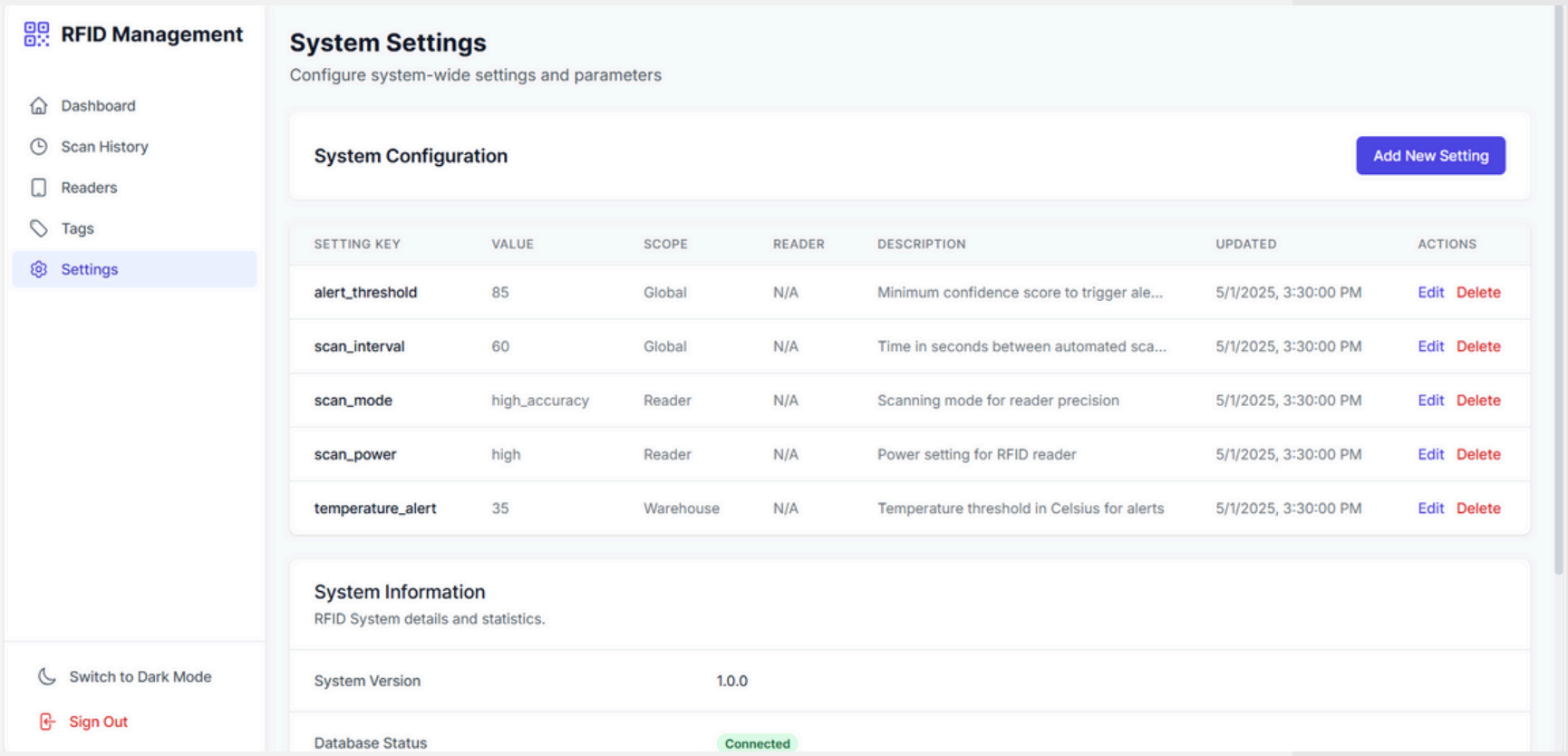
RFID Tags

Manage and track all RFID tags

All Tags

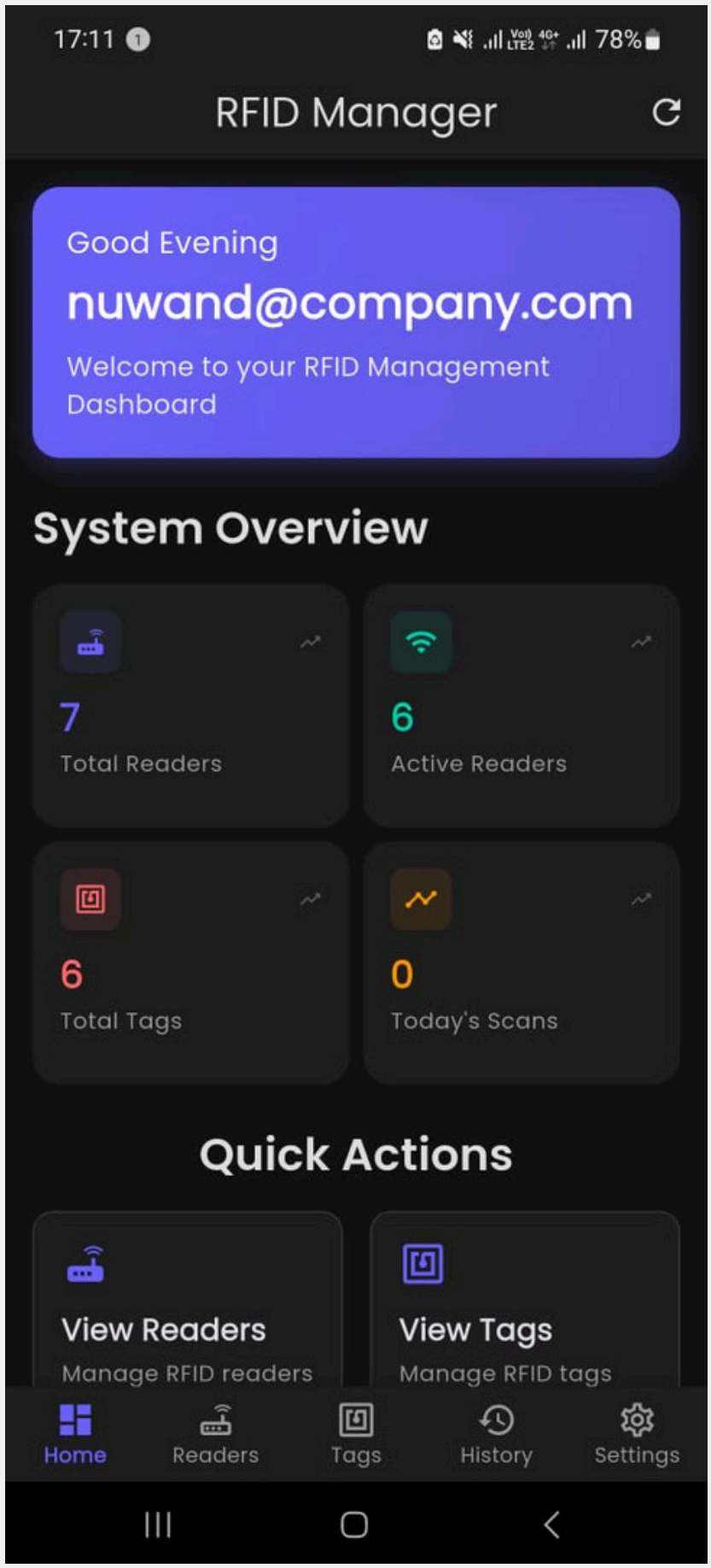
Add New Tag

TAG ID	PRODUCT	STATUS	LAST SCAN	ACTIONS
E2001055600201080960A227	Auto-Generated	active	7/10/2025, 11:26:40 PM	Edit Delete
DEADBEEF-CAFE-BABE-F00D-0123456789AB	Auto-Generated	active	7/10/2025, 11:26:29 PM	Edit Delete
047A138A7C5A80	Auto-Generated	active	7/10/2025, 11:26:24 PM	Edit Delete
A1B2C3D4-E5F6-7890-1234-567890ABCDEF	Auto-Generated	active	7/10/2025, 11:26:19 PM	Edit Delete
E2001055600201080960A226	Auto-Generated	active	7/10/2025, 11:26:13 PM	Edit Delete
E004015082B4931A	Default Owner	active	7/9/2025, 2:06:08 PM	Edit Delete
UID001-TAG-2025	Electronics Corp	active	5/1/2025, 3:30:00 PM	Edit Delete
UID005-TAG-202733	Office Supply Ltd	damaged	5/1/2025, 3:30:00 PM	Edit Delete

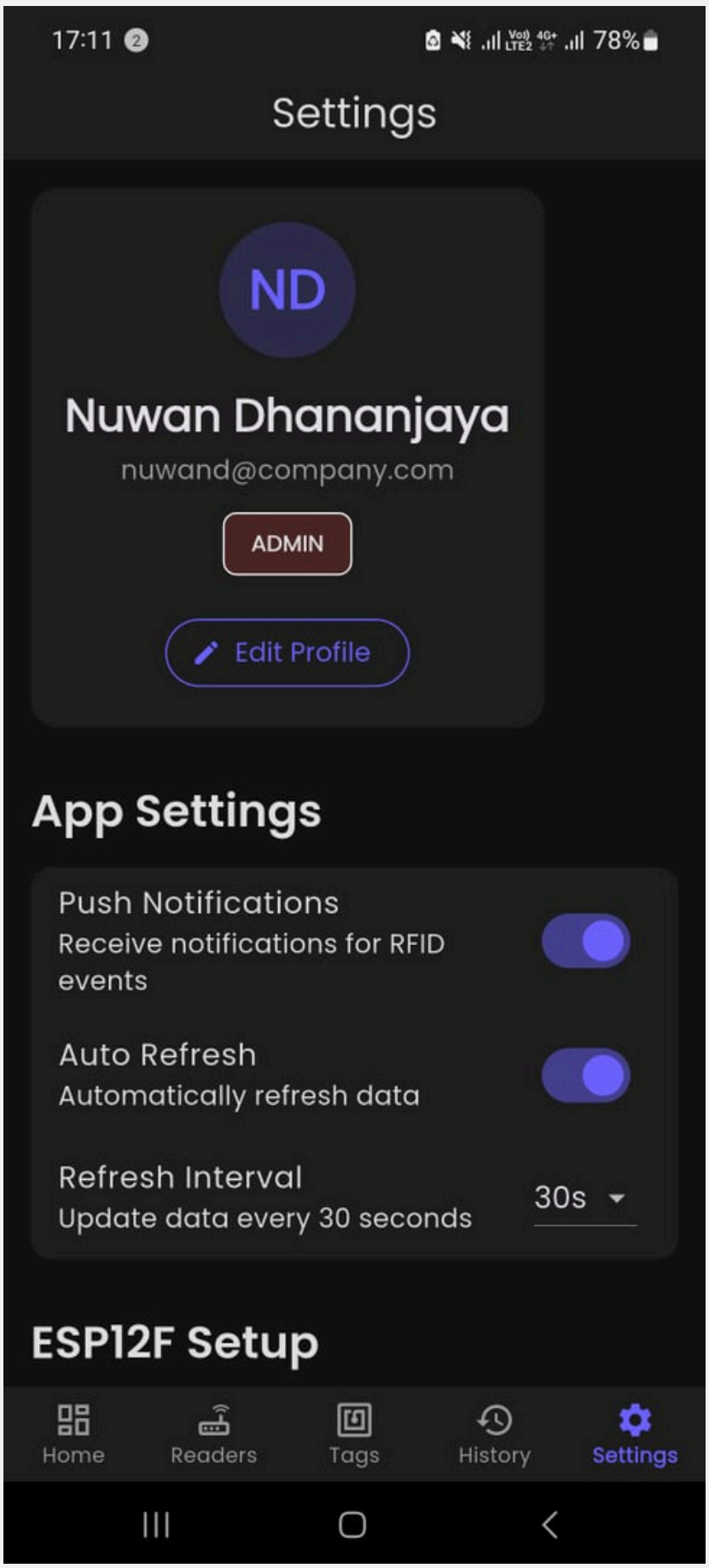

RFID Management
Dashboard
Scan History
Readers
Tags
Settings
Switch to Dark Mode
Sign Out
System Settings
Configure system-wide settings and parameters
System Configuration
Add New Setting
SETTING KEY
VALUE
SCOPE
READER
DESCRIPTION
UPDATED
ACTIONS
alert_threshold
85
Global
N/A
Minimum confidence score to trigger ale...
5/1/2025, 3:30:00 PM
Edit Delete
scan_interval
60
Global
N/A
Time in seconds between automated sca...
5/1/2025, 3:30:00 PM
Edit Delete
scan_mode
high_accuracy
Reader
N/A
Scanning mode for reader precision
5/1/2025, 3:30:00 PM
Edit Delete
scan_power
high
Reader
N/A
Power setting for RFID reader
5/1/2025, 3:30:00 PM
Edit Delete
temperature_alert
35
Warehouse
N/A
Temperature threshold in Celsius for alerts
5/1/2025, 3:30:00 PM
Edit Delete
System Information
RFID System details and statistics.
System Version
1.0.0
Database Status
Connected

3.10 Mobile Application

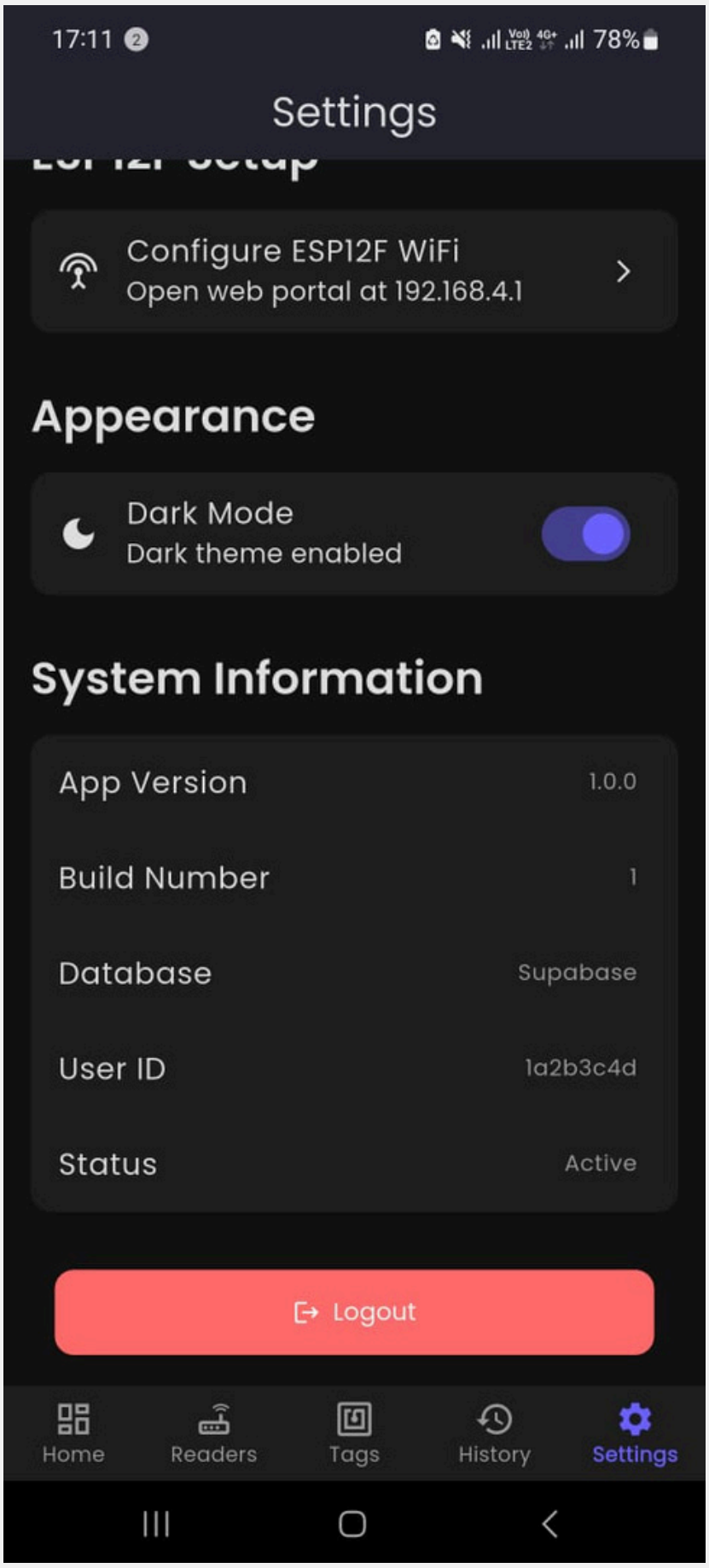
Step 1 : After installing the app, open the RFID Manager app and log in with your credentials to view the dashboard



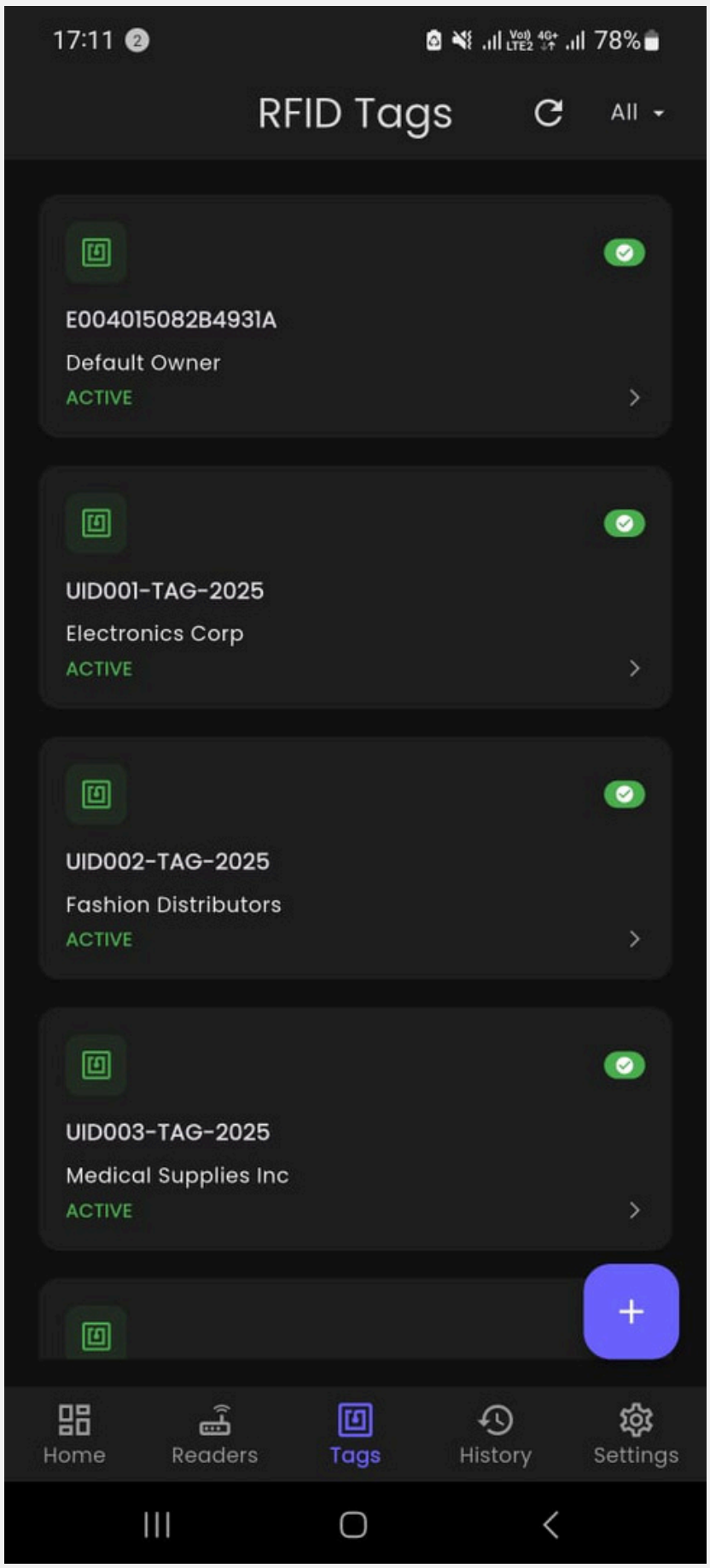
Step 2 : Tap the "Settings" icon to access your profile and adjust app settings



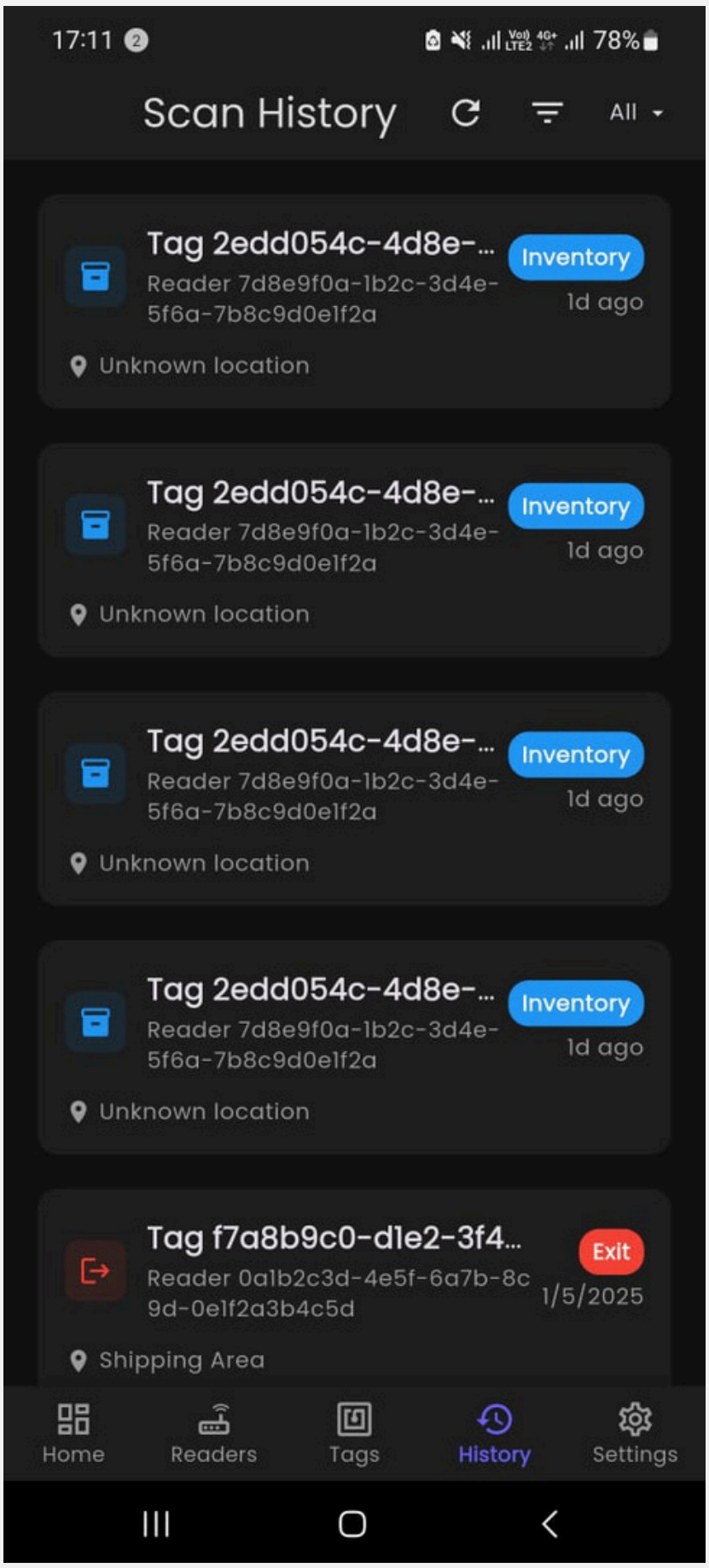
Step 3 : In the "ESP12F Setup" section, tap "Configure ESP12F WiFi" and select "Open web portal at 192.168.4.1" to set up the WiFi connection.



Step 4 : Afrer cilcking the scan button the user will be able to scan tags



Step 5 : Tap History to review recent scans



Step 6 : User will get a notification saying the scannig was done successfully.