RFID Smart Handheld Terminal

F3 User Manual



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Chapter 1: Introduction and Appearance

1.1 Introduction

The F3 is a next-generation, ultra-slim, high-performance RFID handheld terminal. It integrates high-performance QR code scanning with UHF RFID read/write capabilities, making it suitable for a wide range of industries and meeting diverse needs for efficient, precise data collection.

Powered by a flagship 2.3GHz octa-core processor and high-speed, high-capacity memory, the device runs on the Android 15 operating system. With deep software-hardware optimization, it delivers smooth, stable performance and rapid command response, handling high-frequency, continuous operations with ease. It features a large 6-inch FHD ultra-high-definition Retina display, specifically optimized for outdoor use in bright light; the screen remains clearly visible even in intense sunlight, catering to both indoor and outdoor operational needs.

The device meets industrial IP67 ruggedness standards, offering excellent water and dust resistance and immunity to environmental interference. It is built to withstand complex, harsh industrial and outdoor conditions, ensuring superior stability and durability. For power, it utilizes a dual-battery system—combining a 5050mAh internal battery with a 5000mAh detachable handle battery—to support a full day of high-frequency, uninterrupted operation, effectively solving the battery life limitations of traditional devices and ensuring workflow continuity.

Equipped with a high-performance UHF antenna and upgraded professional anti-interference algorithms, the device accurately identifies electronic tags even in complex electromagnetic environments, effectively preventing missed reads or misreads. Leveraging a professional-grade read/write architecture, it supports high-speed reading/writing at 300 tags per second and 360° omnidirectional bulk reading with no blind spots. In open outdoor environments, the effective read range exceeds 20 meters, and it can read 3,000 tags in just 10 seconds, significantly boosting efficiency for bulk tasks such as asset inventory and cargo verification.

Combining a slim, lightweight design with powerful computing performance, industrial-grade ruggedness, long-lasting battery life, and efficient read/write capabilities, the F3 offers outstanding overall performance and versatility. It meets the rigorous operational demands of sectors such as defense, electric power, retail, linen laundry services, and fixed-asset management, making it ideal for high-precision, high-efficiency data collection tasks.

1.2 Illustrated Description of Appearance and Equipment

The RFID smart handheld terminal is equipped with various types of operation buttons—including physical keys, virtual function keys, and shortcut keys on the left and right sides—to accommodate different operating habits and usage scenarios.

1) Front panel: Three virtual function keys (from left to right: Back, Home, and Menu).
2) Left side: Three physical keys (from top to bottom): Power button, volume button, and customizable function key.
3) Right side: One customizable key.



Figure 1-1



Figure 1-2

Chapter: 2 Safety Precautions

2.1 Laser Safety



Do not stare directly at the scanning laser to avoid eye injury!

2.2 Battery safety

1) Charger Usage Guidelines
   The device must be charged using the official charger that came with it. Do not use fast charging adapters, USB power bank chargers, or any other non-official charging devices, as voltage or current mismatch can lead to overcharging, overheating, permanent damage, or safety risks.

2) Daily Charging and Power Management Recommendations
   To extend battery life, it is recommended to maintain the battery level between 30% and 80% during daily use. After the device is fully charged, disconnect the charger immediately to avoid prolonged exposure to 100% high voltage saturation.

3) Handling Idle Devices
   If the device will be idle for more than one month, please turn it off and charge it to approximately 50% before storing. Afterward, check and recharge to 50% every two months to prevent the battery from entering a deep discharge state due to self-discharge, which can lead to irreversible damage or even complete failure to recharge.

4) Ambient Temperature Requirements for Use and Charging
   Please use and charge the device within the appropriate ambient temperature range. Avoid operating in excessively cold, hot, or direct sunlight environments. Extreme temperatures will severely accelerate battery capacity degradation and may trigger the device's protection mechanisms.

5) Do not charge under high load. The device generates significant heat when

operating under high load (such as batch card reading, continuous data transfer, or running large applications). Do not use the device while charging for extended periods in such scenarios, as the cumulative heat generation can cause a rapid increase in battery temperature, accelerating aging and posing a safety hazard.

6) Handling Battery Abnormalities. If you find that the battery or device is bulging, leaking, abnormally hot, making unusual noises, or unable to charge, stop using it immediately and disconnect the charger. Do not disassemble or attempt to repair it yourself; contact after-sales technical support for safety testing and replacement.

7) Physical Safety and Storage Warnings. Avoid subjecting the device to strong impacts, punctures, or disassembly. When storing, place it in a dry, cool place, away from flammable materials, high-temperature sources, and humid environments.

8) Warranty Terms Related Reminders Battery performance degradation or device damage caused by using a non-standard charger, using in an unsuitable environment, or failing to comply with these specifications may not be covered under the product warranty.

Chapter 3: Quick Start

3.1 Battery Installation/Removal

Notice: Only the handle built-in battery of this device is detachable. Before removing the battery, power off the device and disconnect external power supply. Never remove the battery while the device is powered on, as this may damage hardware permanently.

1) Unscrew the fixing screw at the tail of the handle
2) Flip up the battery compartment cover, insert the battery flatly aligned with the positive/negative marks inside the compartment, ensure tight contact between battery and metal contacts
3) Close the battery compartment cover and tighten the fixing screw



Figure 3-1



Figure 3-2

Tips: Frequent disassembly may reduce component lifespan; avoid unnecessary battery removal and installation.

3.2 Power on and power off

Power on

1) You can turn on the machine by pressing and holding the power button 
In deep sleep mode, a short press of the power button will wake the system.

Power off

2) When the machine is turned on and not in sleep mode, press and hold the power button  until the option menu pops up in the middle of the vibration feedback screen. Select the power off option to shut down normally.

3.3 Install NANO SIM and Micro SD/TF card

1) Gently remove the SIM card tray from the right side using the SIM card eject tool.

2) Insert the SIM card and SD/TF card as indicated on the tray.

3) Smoothly push the tray back into the phone.



3.4 Direct Charging / Battery Charging Instructions

1) Always use the original power adapter and data cable for charging; third-party adapters may cause device damage or abnormal charging.
2) To charge the detached battery separately, use the original charging dock.
3) Connect the charger to mains power, then plug the Type-C cable into the device charging port.
4) Do not pull or force the Type-C port during operation to avoid damage to the device or charger.
5) Fully charge the attached battery before first use.
6) Do not remove the battery during charging.
7) The device will power off automatically when the battery is fully drained.

Chapter 4: Data Acquisition

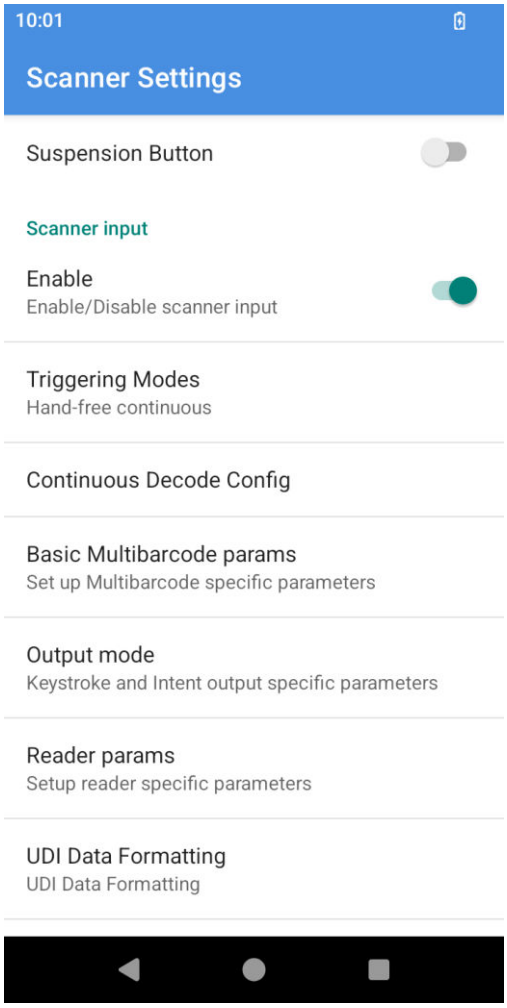
4.1 Barcode scanning

1) Locate this icon , on the PDA's main interface, open the app, and press the left/right scan button on the device to scan normally.

2) Click the settings button to configure basic scanning settings.

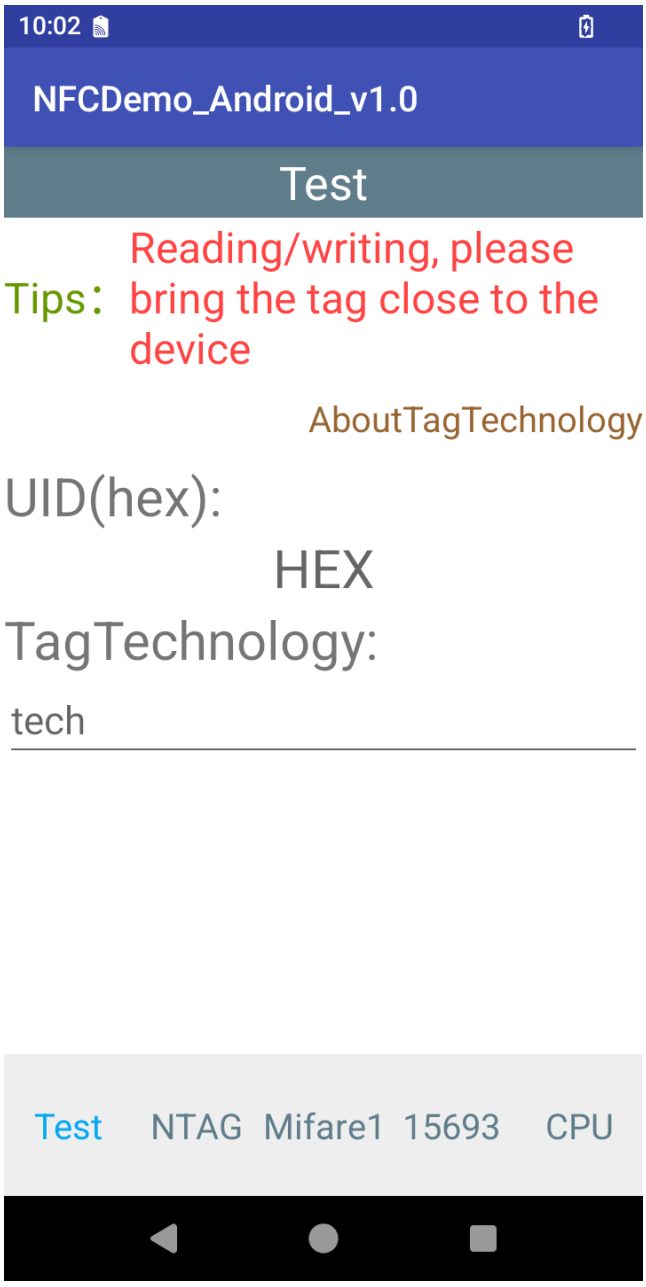
For more detailed feature information, please contact our technical support personnel, who will provide user manuals.





4.2 NFC reading

1) Locate this icon , on your desktop and tap to open the application.
2) Once open, you can perform the following tests: card test, NFC tag test, Mifare card test, 15693 test, CPU test, etc.



4.3 UHF

4.3.1 Menu Overview

1) On the home screen after powering on, locate the UHF application icon , and tap it to enter the UHF application.

2) Clicking the UHF icon  or , will bring up a menu containing options such as disk storage, LED tag storage, tag reading and writing, settings, temperature tags, help, and about. Selecting any option will take you to the corresponding interface, as shown in Figures 4-1 and 4-2.

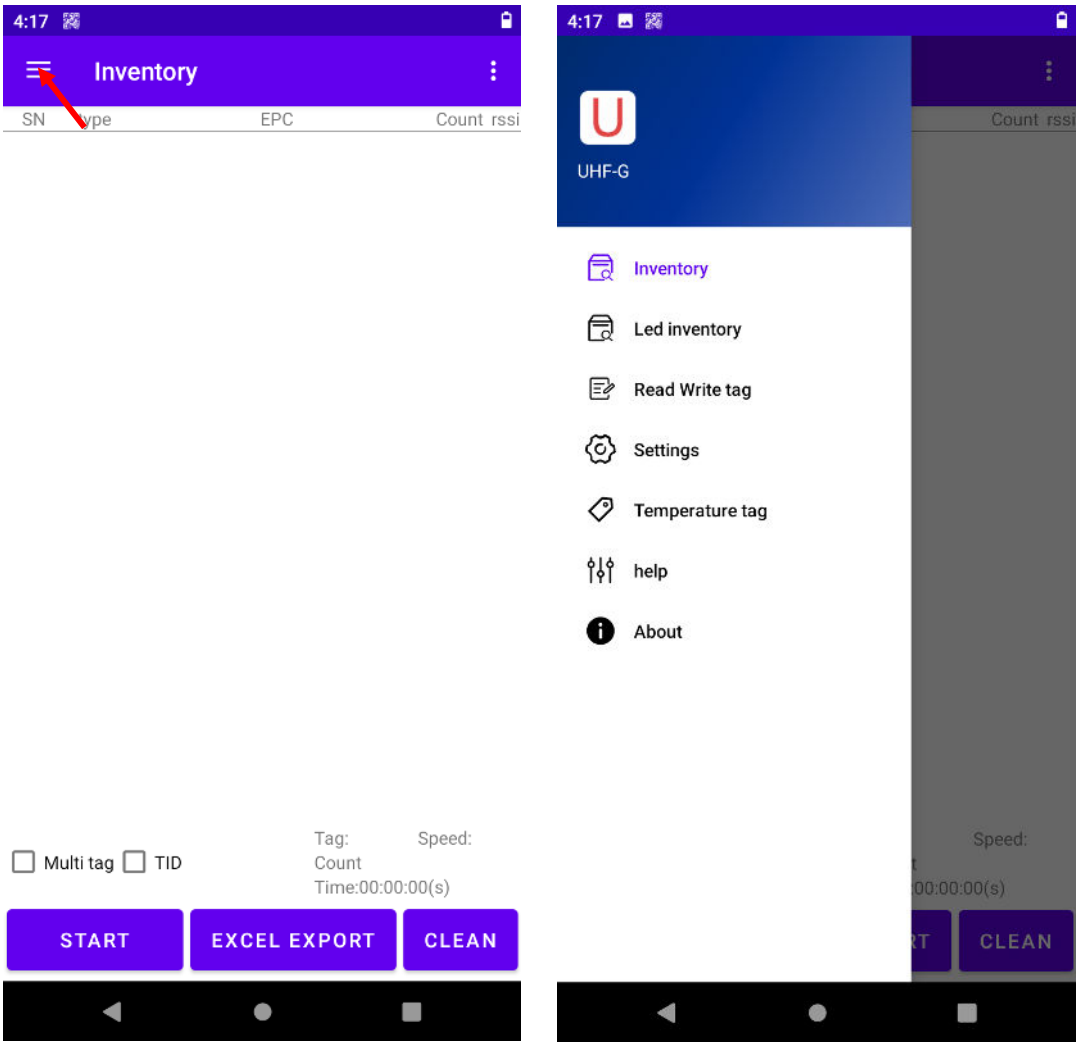


Figure 4-1

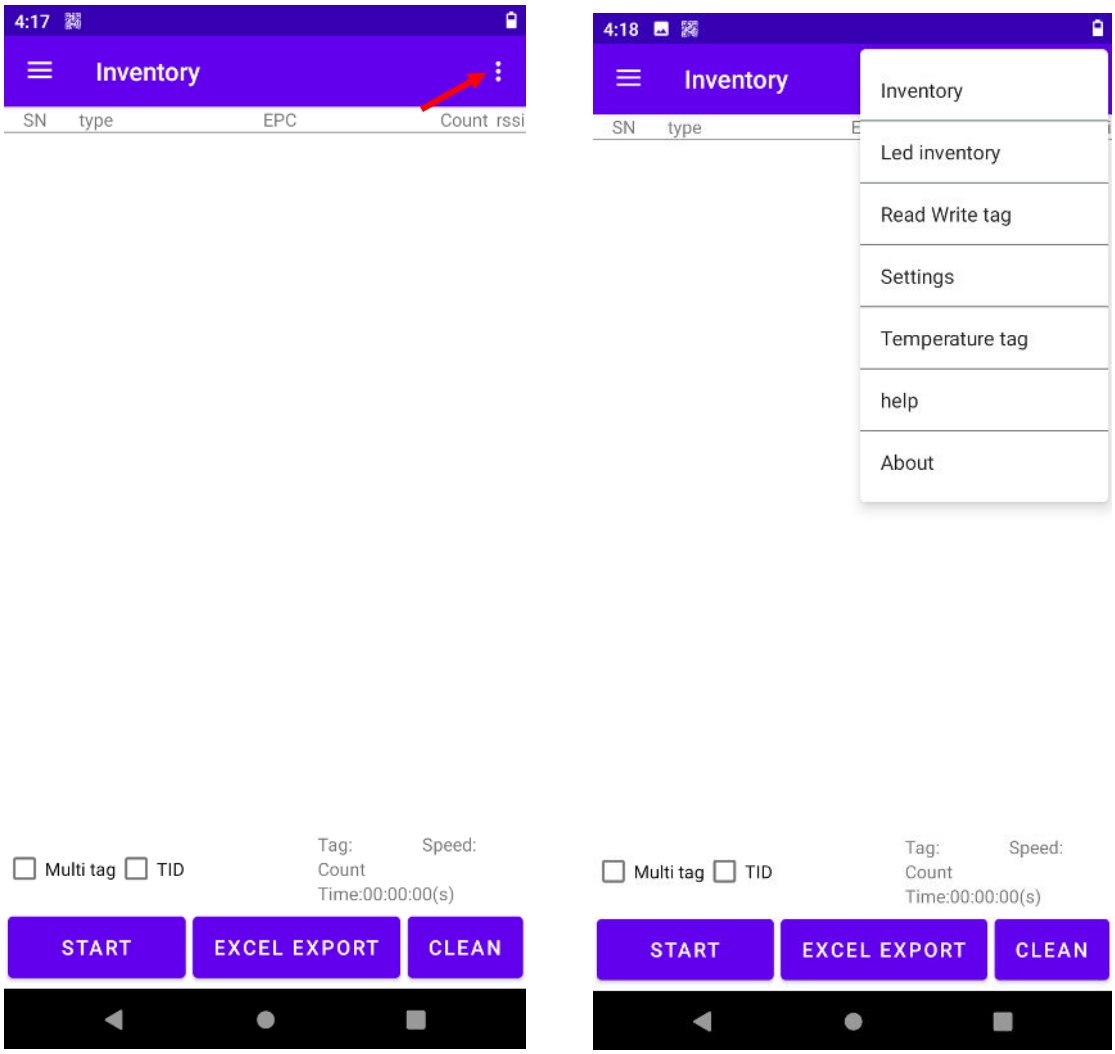

4:17
Inventory
SN type EPC Count rssi
Multi tag TID
Tag: Speed:
Count
Time:00:00:00(s)
START
EXCEL EXPORT
CLEAN
4:18
Inventory
SN type
Inventory
Led inventory
Read Write tag
Settings
Temperature tag
help
About
Multi tag TID
Tag: Speed:
Count
Time:00:00:00(s)
START
EXCEL EXPORT
CLEAN

Figure 4-2

4.3.2 Inventory

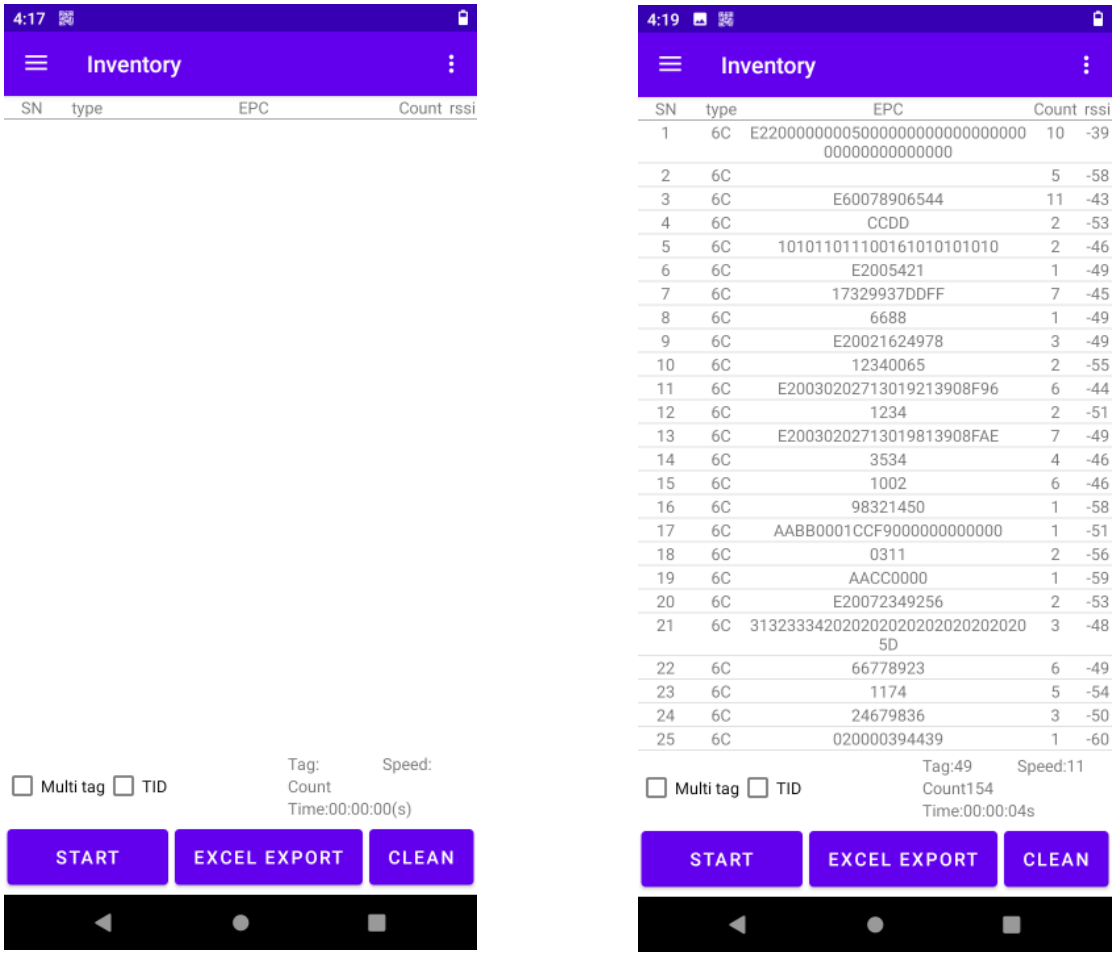


Figure 4-3

1) Multi-Label: Selecting this option initiates multi-label tag reading of the EPC.
2) TID: Selecting this option allows the device to display the TID code while reading the tag, as shown in Figure 4-4.
3) Start Inventory: Clicking "Start Inventory" begins reading tag information; the default is to retrieve the EPC code. (Starting and stopping inventory can also be done using the buttons on the handle.)
4) EXCEL Export: After obtaining the EPC code, clicking "EXCEL Export" saves the EPC information as an XLS document. Successful saving will display the document's save path, as shown in Figure 4-5.
5) Clear Screen: Clicking this option clears the current tag retrieval data.
6) Number of Tags: Displays the total number of tags currently retrieved.
7) Speed: Displays the current tag retrieval speed.
8) Number of Attempts: Displays the total number of tag retrieval attempts, as shown in Figure 4-6.
9) Time: Displays the total time taken to retrieve the current tag.
10) Number of Times: Displays the current number of times the tag has been

found, as shown in Figure 4-7.

11) RSSI: Displays the signal strength when the tag is found.

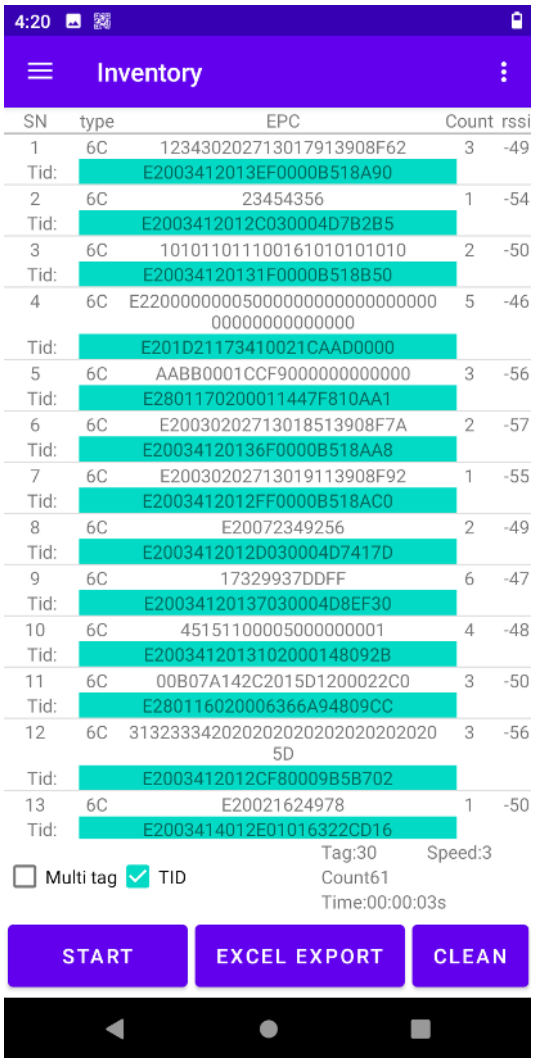


Figure 4-4

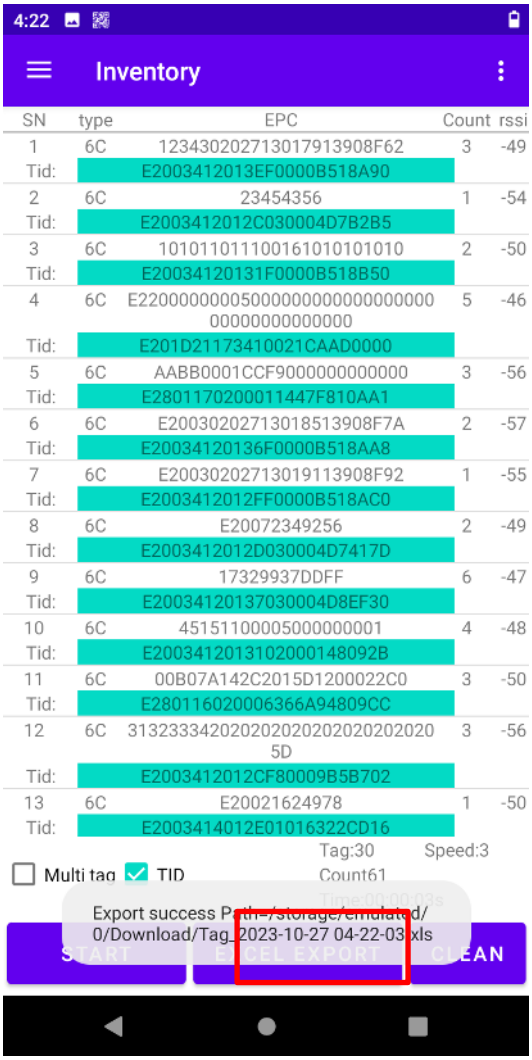


Figure 4-5

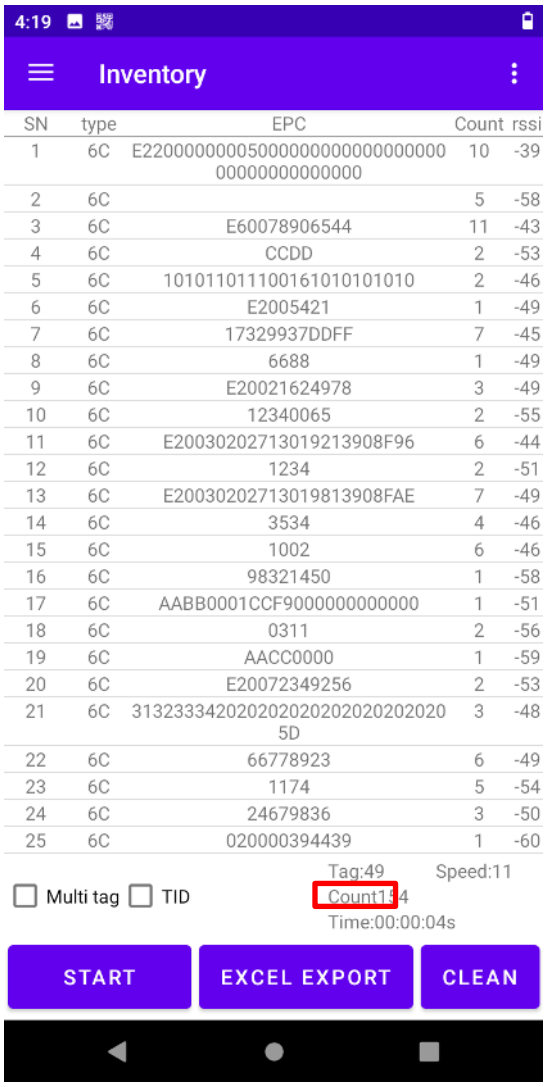


Figure 4-6

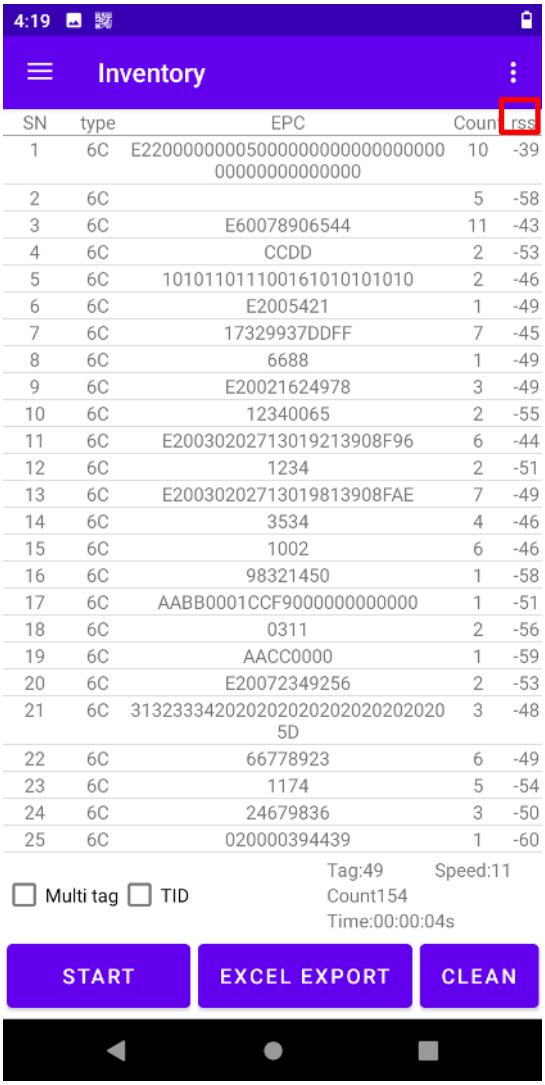
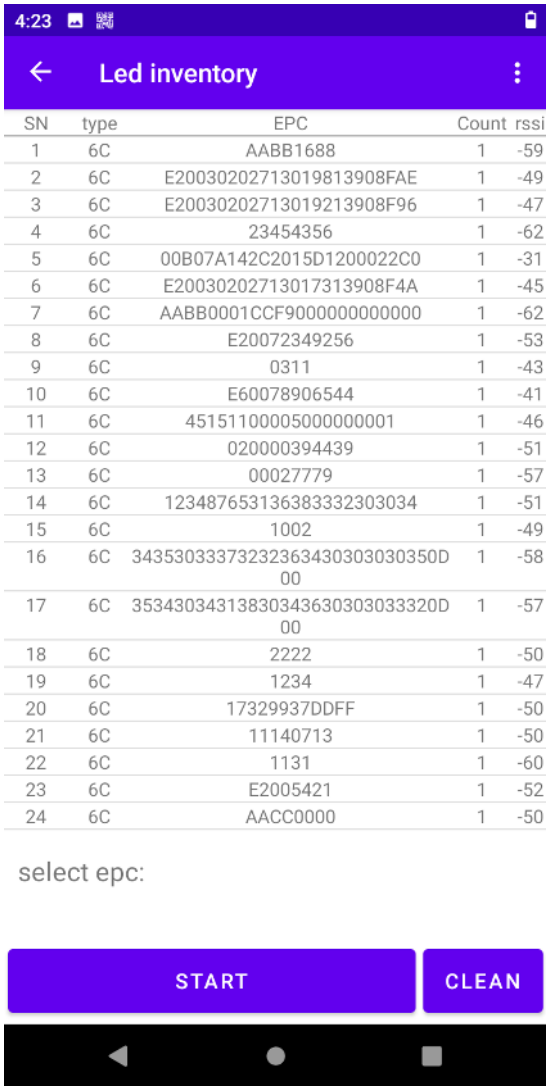


Figure 4-7

4.3.3 LED Label Inventory

1) Click "Start Inventory," and the device will search for cards according to the set operating method.
2) Start Inventory: Clicking "Start Inventory" will begin reading LED tag information; the default is to obtain the EPC code. (Start and stop inventory can also be done using the buttons on the handle.)
3) Clear Screen: Clicking this will clear the current card search data.
4) Single Illuminated EPC Number: Displays the EPC number of the currently illuminated tag.
5) Number of Times: Displays the number of times the tag has been searched.
6) RSSI: Displays the signal strength when the tag was found.





4.3.4 Read and write tags

1) Tag Selection:
Allows you to select read tags for reading and writing operations.

2) Read/Write Tag:
Select a found tag, choose the read/write tag area, enter the corresponding read/write tag conditions, and click the read/write tag to complete the read/write tag operation.

a) Select Read/Write Tag Area: You can select the PASSWORD area, User area, EPC area, or TID area.

b) Start Address: Used in conjunction with the read/write tag to select the address to read or write.

c) Length: Used in conjunction with the read/write tag to select the length to read or write.

d) Access Password: Used in conjunction with the read/write tag to specify the password used when reading or writing to the card.

e) Write Data: Used in conjunction with the write tag to display the currently written tag content. (Tag data format requirements: Each string must be 4 characters long. The length entered must correspond to the string being written. For example, entering a length of 2 means writing 8 strings: 12345678.)

f) Read Data: Used in conjunction with the tag reader to display the currently read tag data.

g) Read Tag: Reads data from a specified position. The read data is displayed in the "Read Data" field above the "Read Tag" button.

h) Write Tag: Writes data to a specified position. Enter the data to be written in the "Write Data" field above the "Write Tag" button.

i) Clear Screen: Clears the contents of the "Read Data" box above the "Read Tag"/"Write Tag" button.

j) The RFID tag storage is divided into four independent storage blocks (Banks): Reserved, EPC (Electronic Product Code), TID (Tag Identification Number), and User.

i. RESERVER area: 8 bytes (4 words) in size. The first 4 bytes (2 words) are the destroy password (used to destroy tags, generally not used), and the last 4 bytes (2 words) are the access password (used for writing data and locking operations). The default value is: 0000 0000 (destroy password) 0000 0000 (access password). The destroy password cannot be destroyed by default and needs to be changed.

ii. TID Area: 12 bytes (6 words) in size, "read-only, not writable," pre-written at the factory, serving as the tag's unique identifier and product category identification number. Each manufacturer's TID number is different.

iii. EPC Area Read/Write Precautions:

a) EPC is the Electronic Product Code for identifying the tag object. The difference between EPC and TID is that EPC can be manually written and modified by the user (modifying the EPC changes the tag's EPC, requiring a re-entry of the tag).
b) The EPC area's data structure is as follows: the first word is the check digit, the second word is the length control, and the subsequent words are the data storage location. During entry, the EPC is displayed based on the length indicated by the length control digit.
c) When actually writing data to the EPC, the starting address is filled with 1, meaning data is written starting from the length control digit. The check digit is automatically calculated and does not need to be manually written.
d) Calculation of length control bits: EPC data length * 2 = i; Convert i to hexadecimal representation, then add 00 to the end of the converted result. The final result is the data of the length control bits.
For example: 0001, i = 4 * 2 = 8 ---> 08 ---> 0800, the length control bit is 0800. The program calculates: byte[] newEPCByte = Tools.HexString2Bytes(newEPC); byte[] pcByte = new byte[] { 0x00, 0x00 }; pcByte[0] = (byte) (newEPCByte.length * 4); String pc = Tools.Bytes2HexString(pcByte, 2));
e) The length is filled according to the actual length of the data to be written. For example: 0001, the length is 1 word, 4 bits (note that the data bit length must be a multiple of 4), plus the length control bit 0800, the length is filled in as 2 in the software; Example: 0001 Starting Address: 1, Length: 2, Data: 08000001
iv. USER Area: The length of this memory is determined by each electronic tag manufacturer. User-defined data (in hexadecimal format) can be written to the USER area.

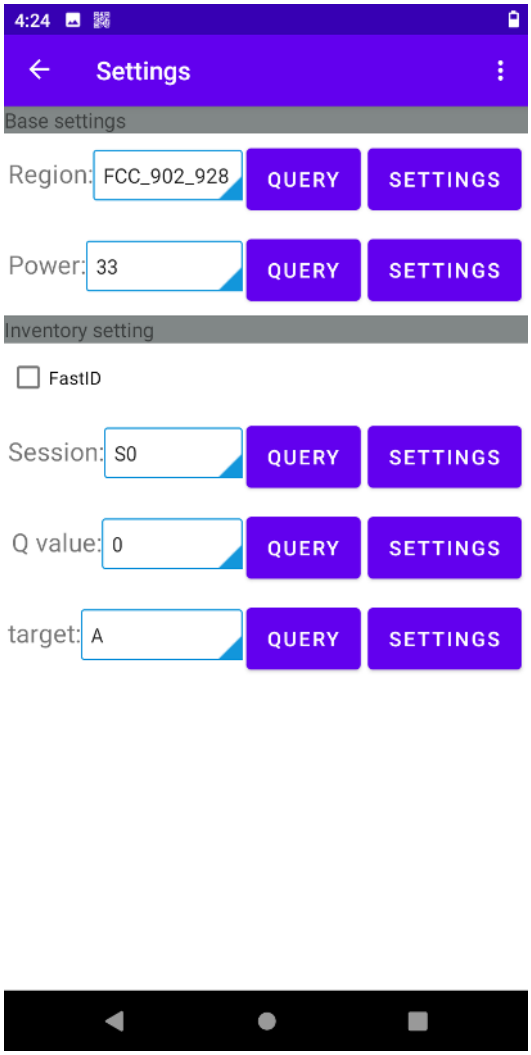
3) Modify EPC:
Enter a two-byte EPC number and click the "Modify EPC" button. A message will appear indicating that the new EPC number has been successfully modified.

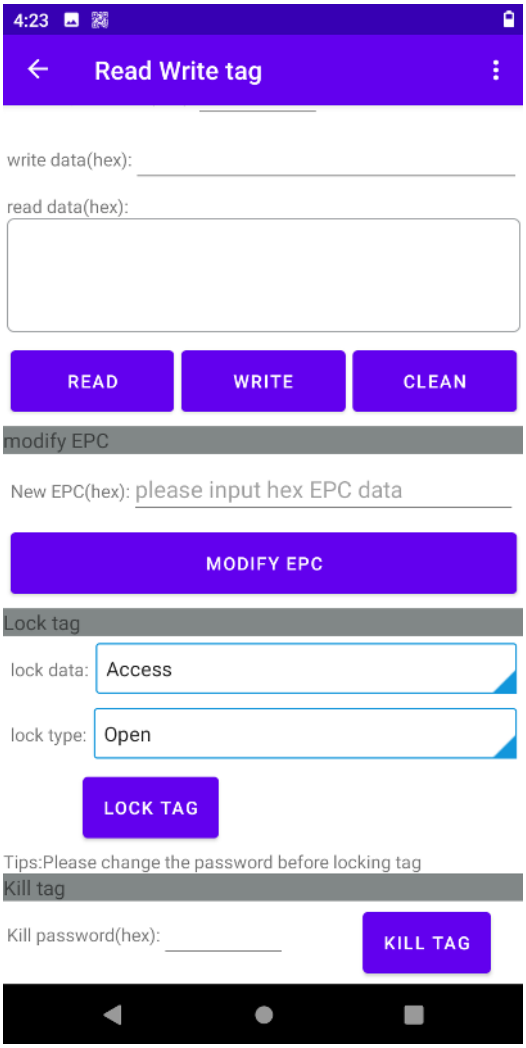
4) Lock Tag:
Once the tag is locked, the default password (eight zeros) cannot be used to write to the tag; only a user-defined password can be used.
a) Locked Area: Locks a specific area of the tag. Options include the EPC area, TID area, and USER area.
b) Access Password & Destroy Password: Locks the tag password. The default password is eight zeros. The first four bytes of the password area are the destroy password, and the last four bytes are the access password.
c) Lock Type: Locks the tag. Options include Open, Locked, and Permanent Lock (cannot be unlocked after the operation).

5) Destroy Tag Destroy

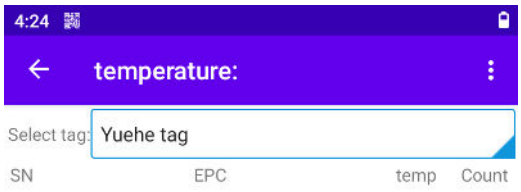
this tag (a destroyed tag is permanently invalid and cannot be recovered; please use with caution).

a) Destroy Password: (First 4 bytes of the password area) First, modify the destroy password in the password area to a non-zero value, then use the modified password to perform the operation. (The destroy password must be non-zero to take effect).





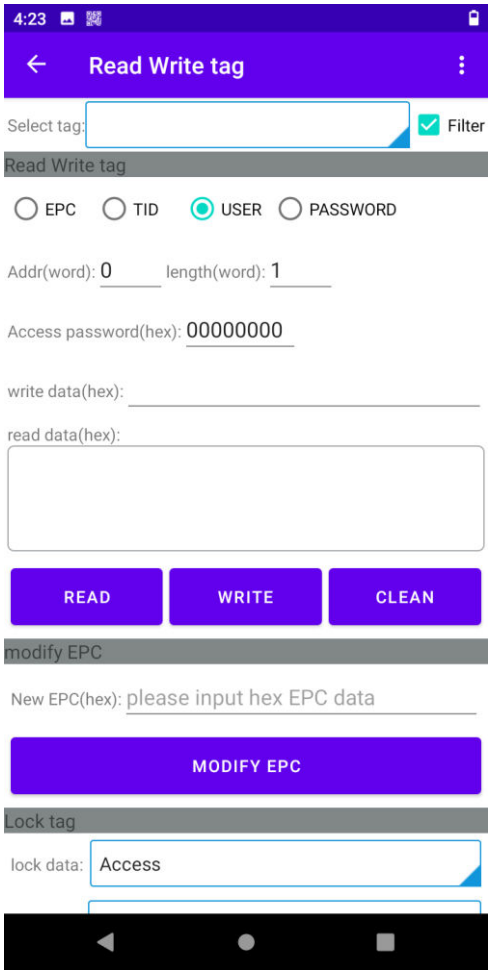
4.3.5 Temperature label





1) Tag Selection: Select the tag type.
2) Read Tag: Click "Read Tag" to start reading temperature tag information. The default is to obtain the EPC code. (Reading and stopping tag reading can also be done using the buttons on the controller.)
3) Clear Screen: Click to clear the current tag search data.
4) Temperature: Displays the temperature when the current tag was read.
5) Number of Times: Displays the number of times the current tag has been searched.

4.3.6 set up



1) Basic Parameter Settings
   a) Operating Frequency Band: Allows querying and setting the current device's operating frequency band.
   b) Output Power: Allows querying and setting the power of the current SIM card search antenna.
2) Query Parameters Relevant operating parameters for SIM card search.
   a) FastID: When enabled, the device reads data from EPC data to EPC+ID data (this function is not supported by some tags).
   b) Session: For different tag quantities and placement environments, it is generally recommended to select SO/S1.
   c) Q Value: Allows querying and setting the tag's Q value.
   d) Storage Method: Allows querying and setting the tag storage method.

Chapter 5: Communications and GPS

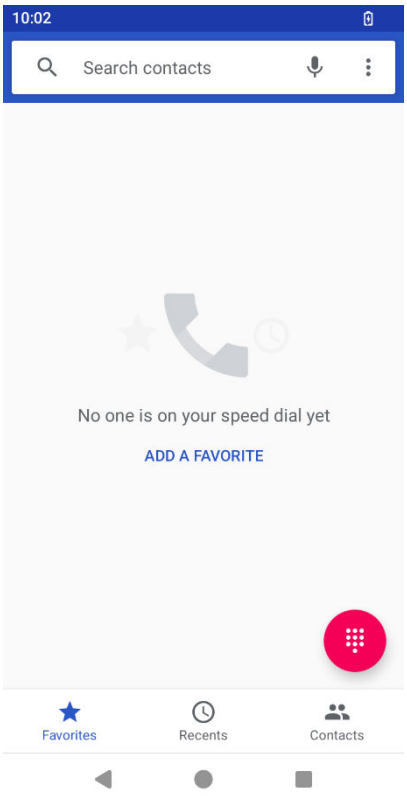
5.1 Dial

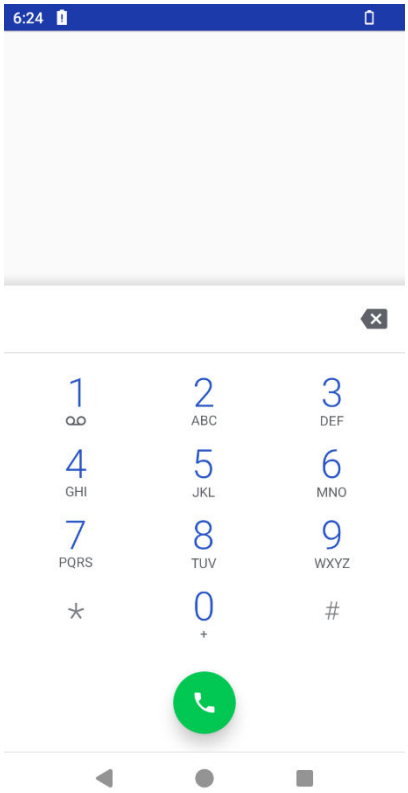
1) Click on the icon ：The bottom of this page contains three parts: speed dial, call history, and contacts.

2) Click on the right side ，Enter the dialing interface, press the number keys, and enter the phone number

3) Tap ，make a phone call

4) tap ，End the call





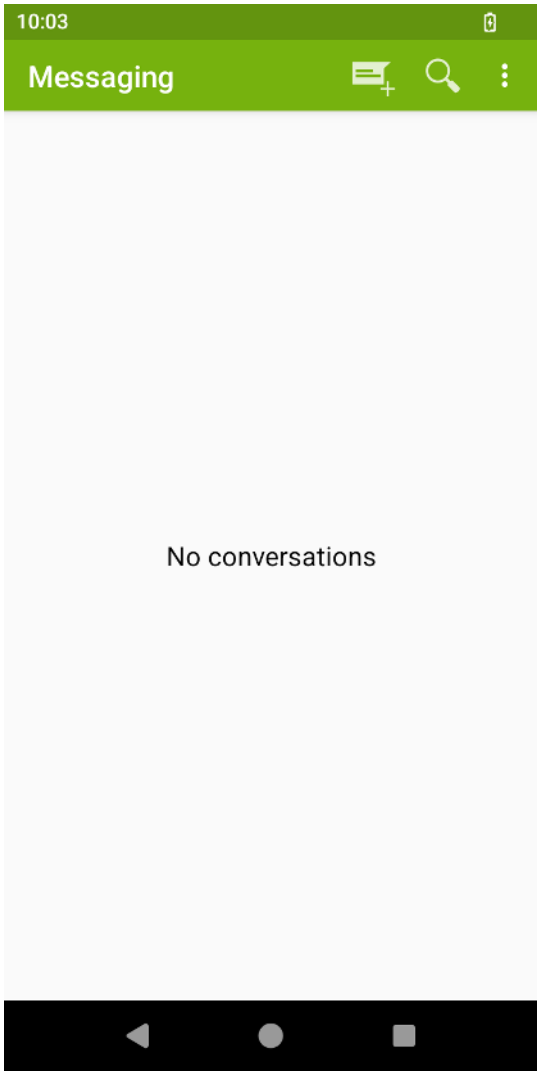
5.2 Text message

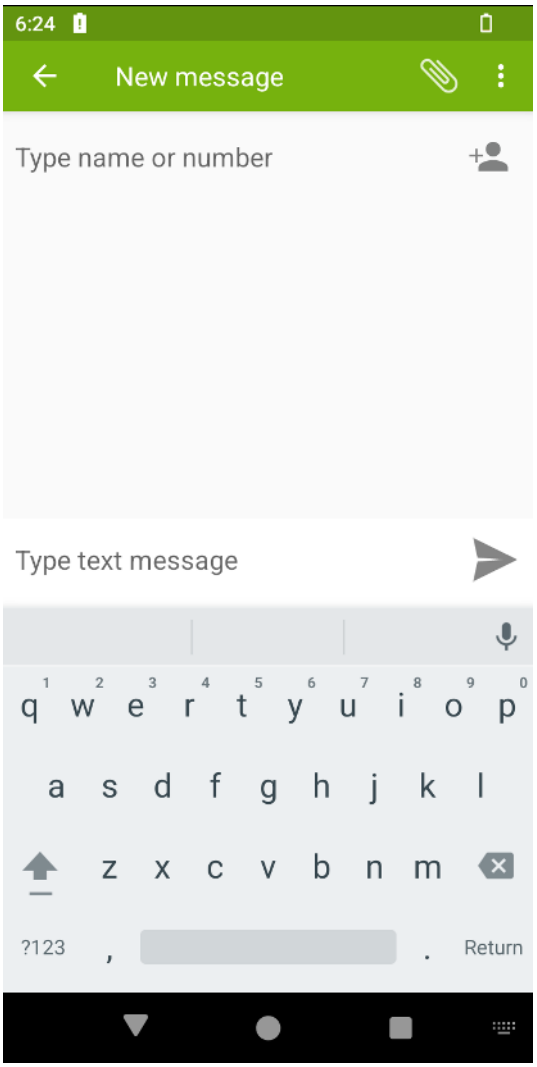
1) Tap , Open the SMS window

2) Tap , Enter a new conversation

3) After the recipient confirms their phone number or name, they can input text for SMS communication

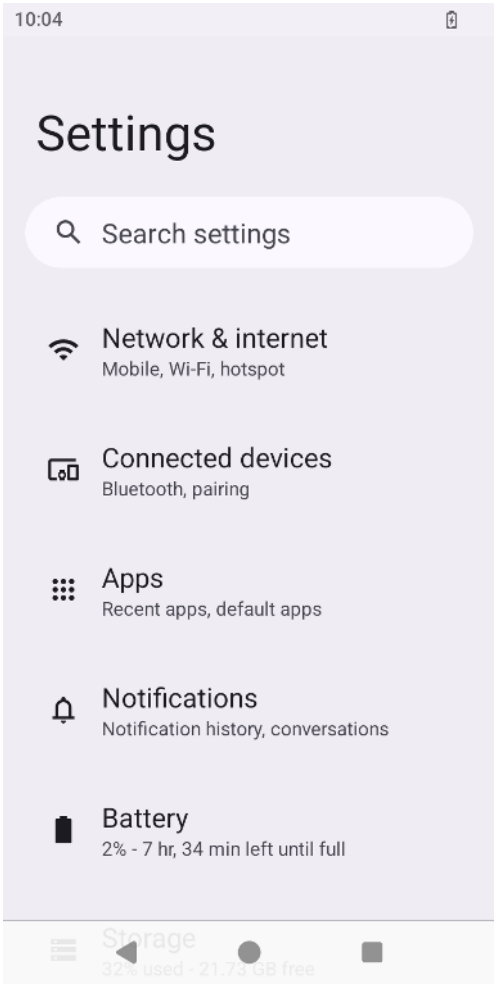
4) Tap Add pictures, videos, etc;Tap , Insert common phrases.

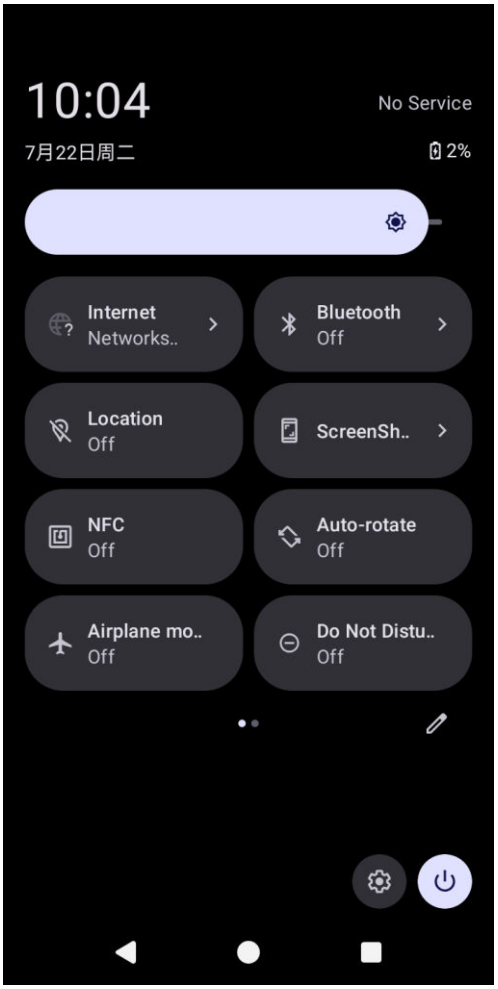




5.3 Network Connection

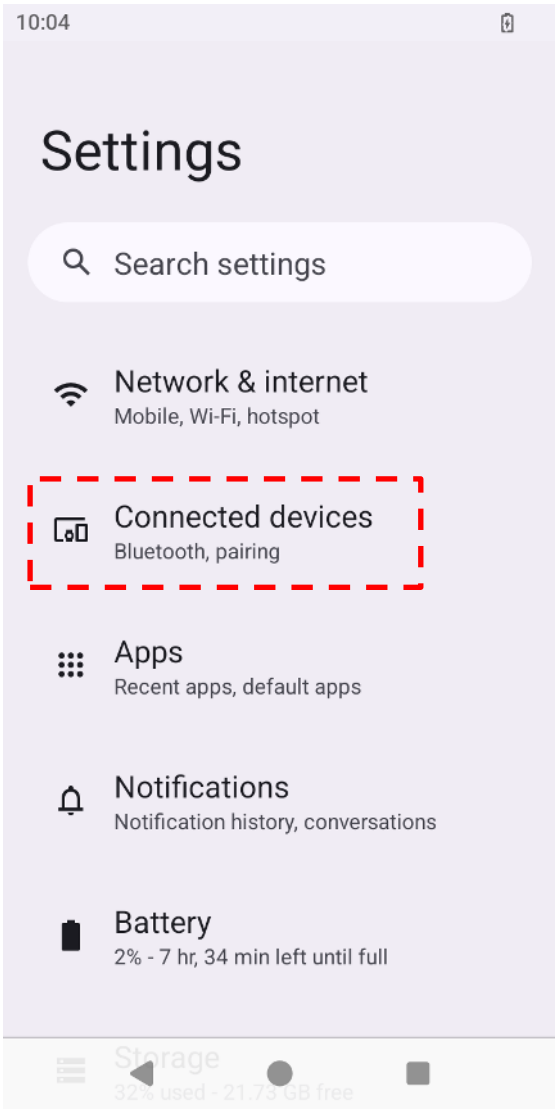
1) Access the device's "Settings" menu.
2) Select the "Network & Internet" option.
3) Tap "Internet" to enter the wireless network management interface.
4) Turn on the "WLAN" switch. The system will automatically scan and list available networks.
5) Select the desired wireless network from the list.
6) Enter the correct password (if required) according to the network requirements to complete the connection.
7) Alternatively, you can pull down the notification bar at the top of the screen (quick settings panel), tap the "Internet" icon, and then select the target network from the pop-up list and enter the password to quickly connect.

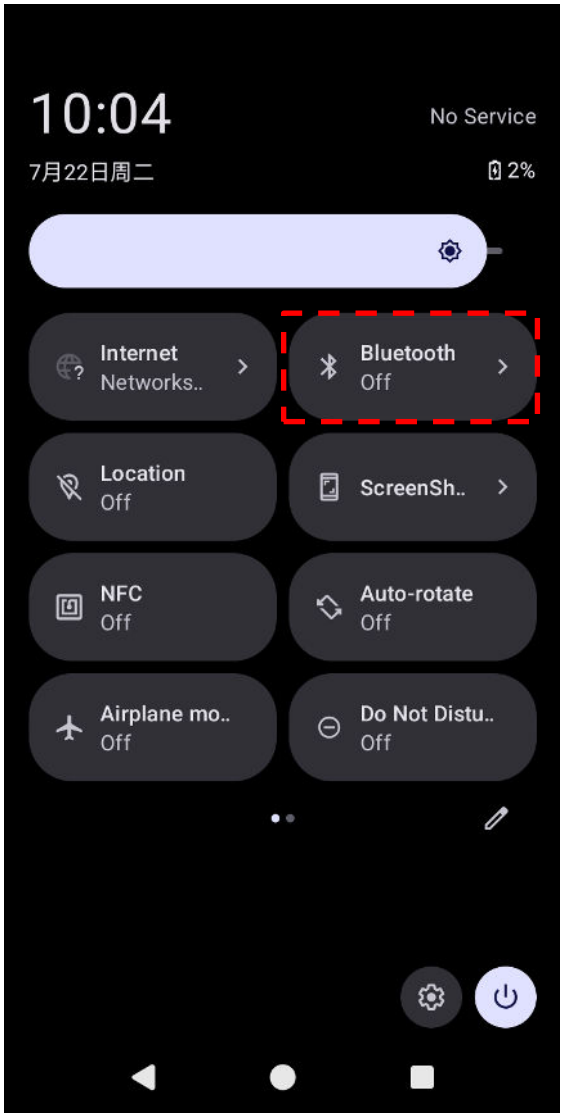




5.4 Bluetooth Connection

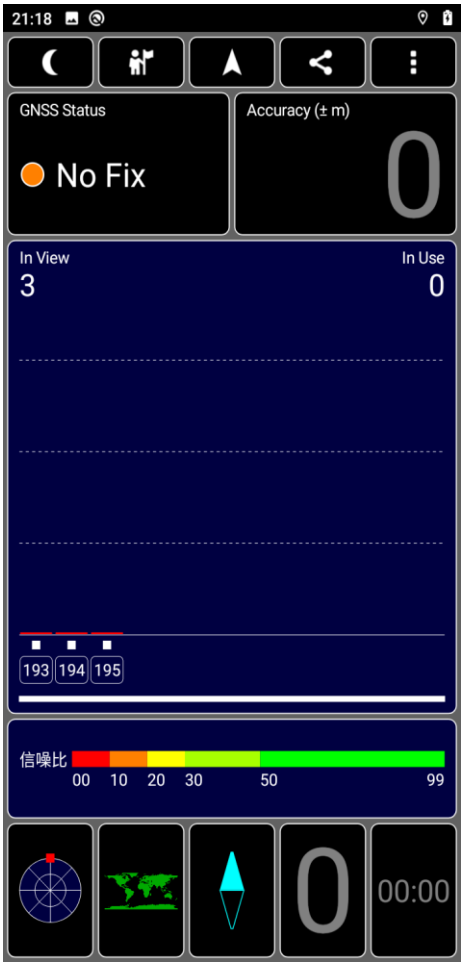
1) Access the device's "Settings" menu.
2) Select the "Connected Devices" option.
3) Tap "Connection Preferences" to enter the management interface.
4) Tap "Bluetooth," then turn on the "Use Bluetooth" switch to use the Bluetooth function normally.
5) You can also enable Bluetooth by pulling down the notification bar (quick settings panel) at the top of the screen and tapping the "Bluetooth" icon.





5.5 GPS

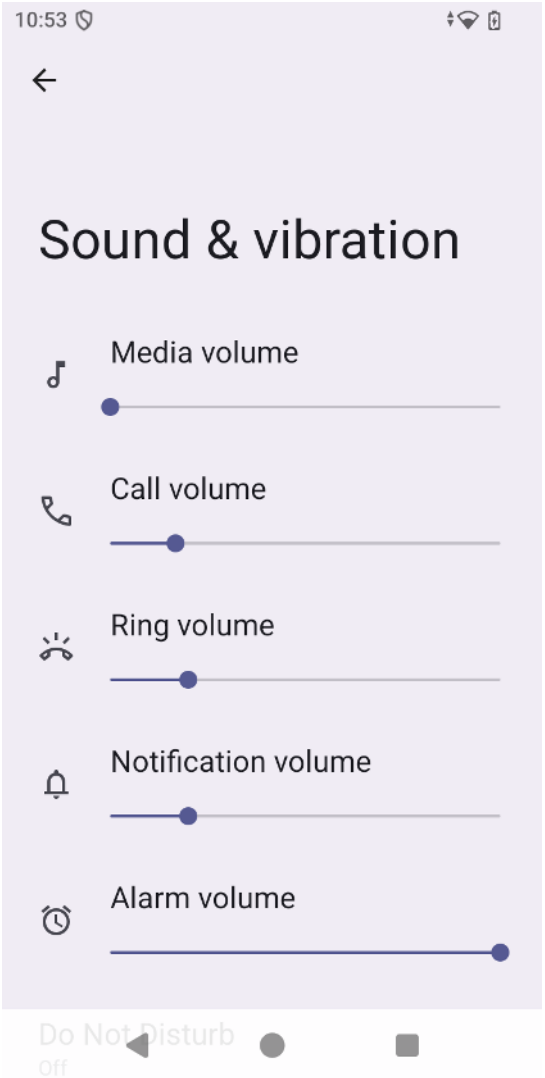
1) Click on the icon , open the "GPS positioning test".
2) Set GPS parameters to obtain GPS data information.

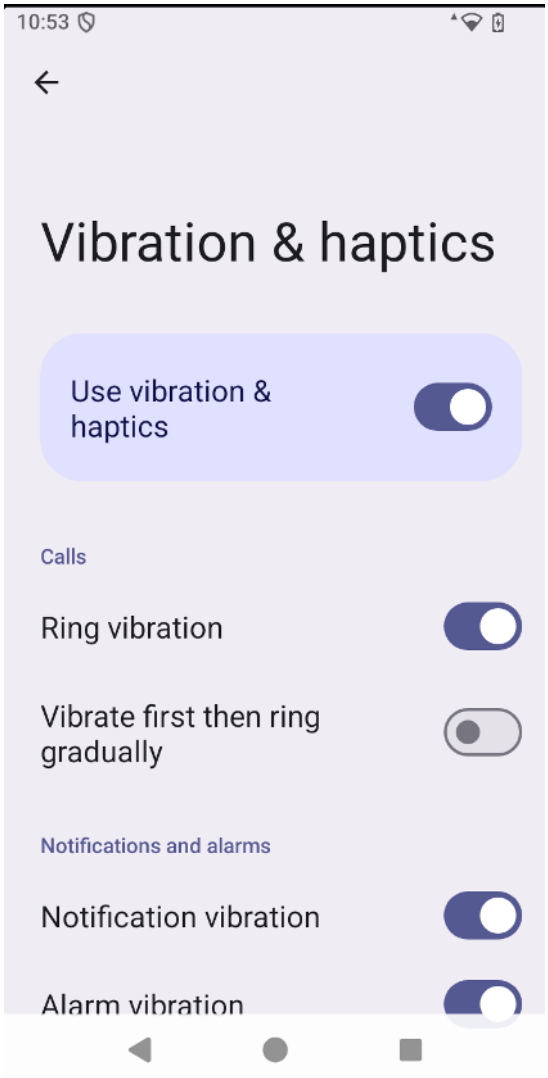


Chapter 6: Setup and Management

6.1 Volume adjustment

1) Find this icon in settings:  : You can set the volume, ringtone and notification sound, and turn the following functions on or off: ring vibration, dial keypad tone, touch notification sound, charging notification sound, lock screen notification sound and touch vibration.





6.2 Power and Battery Management

1) Due to the fact that the battery only has a small amount of power for testing purposes when it leaves the factory, it is important to charge the machine before using it.

2) Charging the battery through a power adapter takes about 4 hours or more for the first charge. The LED light stays on red during charging and turns green when the battery is fully charged.

3) The optimal operating temperature is room temperature of 18-25℃.

   Temperatures below -10 or above 50℃ will not charge the battery.

4) If the wireless network service or data collection program is enabled, the battery power will be significantly reduced. It is recommended to turn off the program when not using this function to save power.

5) Enter the 3C Battery Monitor Proprogram to understand the battery status.



Tip: If the product is not used for a long time, please charge the whole machine at least once every two months.

Chapter 7: Equipment Maintenance

7.1 Troubleshooting

Common faults and solutions

Fault 1: The device cannot start
Fault description: After the user presses the power button, the device does not respond and cannot start.
Troubleshooting steps:
●Check if the device has battery life, and if necessary, charge or replace the battery.
●If the above steps do not solve the problem, it is recommended to backup the data and restore the factory settings.

Fault 2:Equipment experiencing lagging phenomenon
Fault description: The device experiences lag, no response, and other phenomena during operation, which affects its use. Troubleshooting steps:
●Check the device memory to ensure it is not overloaded. You can try clearing the cache or closing other applications.
●Check the device memory to ensure it is not overloaded. You can try clearing the cache or closing other applications.
●Check the device for viruses or malicious software, and if necessary, run antivirus software for scanning.
● If the above steps do not solve the problem, it is recommended to backup the data and restore the factory settings.

Fault 3: The device cannot connect to the network
Fault description: The device cannot connect to Wi Fi or mobile networks.
Troubleshooting steps:
●Check if the device has turned on the Wi Fi switch or mobile data switch
●Check if the device is within the signal coverage range and try to connect close to the signal source.
●If it is a Wi Fi network issue, try restarting the Wi Fi router or entering the WiFi password again to connect.
●If it is a mobile network issue, you can try replacing the SIM card or contacting the operator for consultation.
●If the above steps do not solve the problem, it is recommended to backup the data and restore the factory settings.

Fault 4: Abnormal display on the device screen
Fault description: Abnormal display phenomena such as splash screen and

flashing screen appear on the device screen
Troubleshooting steps:
●Check if the equipment has been physically damaged by external factors. If necessary, seek assistance from professional maintenance personnel.
●Try restarting the device to see if it can solve the issue of abnormal display.
●Check if the device needs to update the system or application, and if so, update it.
●If the above steps do not solve the problem, it is recommended to backup the data and restore the factory settings.

Fault 5: The device cannot be charged
Fault description: After the device is connected to the power adapter and powered on, the charging light does not light up and the device screen has no response
Troubleshooting steps:
●Replace the power adapter for charging and eliminate any issues with the power adapter and charging cable;
●If the user has purchased a matching charging dock, try charging with the dock to see if it can be charged, because when the battery is completely empty, the battery will enter a sleep state and needs to be activated by charging with the dock.
●When using the Ethernet charging dock for charging, please turn off the internet switch on the dock.
●If the above steps do not solve the problem, it is recommended to backup the data and restore the factory settings.
●The above steps did not solve the problem. It is recommended to contact after-sales service for further processing.

7.2 Precautions

1) During the troubleshooting process, it is essential to follow the steps to avoid operational errors that may cause more serious problems

2) If the user is unable to successfully resolve the issue, it is recommended to contact after-sales service or professional repair personnel for assistance. Do not disassemble the equipment or use improper repair methods without authorization.

3) When troubleshooting, users should pay attention to their own safety and avoid personal injury caused by improper maintenance.

4) This troubleshooting manual is only applicable to the troubleshooting of common faults, and more complex issues require professional maintenance personnel to handle.

7.3 Preventive measures for faults

1) **Regular maintenance and cleaning**
   Regularly clean the surface and heat dissipation holes of the product to avoid the accumulation of dust and dirt that may affect its performance.

2) **Proper use of power adapter**
   Use a power adapter that meets the requirements to avoid overloading the power supply and ensure the stability of the power supply.

3) **Prevent the product from getting damp**
   The product should avoid prolonged exposure to humid environments such as kitchens, bathrooms, etc. to prevent circuit short circuits or component corrosion.

4) **Prevent product collision**
   Avoid external impacts or drops on the product to prevent internal components from becoming loose or damaged.

5) **Timely backup of data**
   Regularly backup important data to prevent data loss or irreparable situations.

Chapter 8: Explanation of Secondary Development

If you need a secondary development package or other technical assistance, please contact your corresponding business manager or technical engineer.

Chapter 9: Disclaimer

Disclaimer: All contents of this manual, including but not limited to operation instructions, function descriptions and technical diagrams, are provided for general reference only and do not constitute a guarantee of specific device configurations. The manufacturer reserves the right to modify product design and specifications without prior notice. Actual device functions and performance shall prevail based on the physical product you purchased.