# Milesight Field Tester

## FT101

User Guide

## Safety Precautions

Milesight will not shoulder responsibility for any loss or damage resulting from not following the instructions of this operating guide.

- The device must not be disassembled or remodeled in any way.
- Do not remove the battery of the device.
- Do not place the device and its accessories where the temperature or humidity is below/above the operating range.
- **Do not place the device close to objects with naked flames, otherwise it will explode.**
- The device must never be subjected to drops, shocks or impacts.
- Do not pull the antenna, detach them by holding the connectors.




For assistance, please contact

Milesight technical support:

Email: iot.support@milesight.com

Support Portal: support.milesight-iot.com

Tel: 86-592-5085280

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## Revision History

| Date | Doc Version | Description |
|---|---|---|
| July 19, 2024 | V 1.0 | Initial version |

# Contents

# 1. Product Introduction

## 1.1 Overview

Milesight Field Tester is a portable LoRaWAN® network testing device. With different kinds of antennas, it can support global LoRaWAN® frequencies to record the signal status and packet loss rate to monitor the network status from the field and verify the coverage of different LoRaWAN® gateways, to optimize the best places to deploy LoRaWAN®devices.

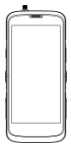
Equipped with a 5.72-inch touchscreen display, users are able to operate the signal test procedure and monitor the real-time network status friendly. With a built-in battery and type-C port, it can work for 8 hours and supports type-C power bank charge to bring the device everywhere easily.

## 1.2 Features

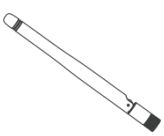
- Octa-core processor with Android system and big memory for flexible integration
- Built-in one-channel SX1262 LoRaWAN® module for signal test
- Support global LoRaWAN® frequencies with different antennas
- Compatible with any standard LoRaWAN® gateways and global mainstream network servers
- Support to get RSSI and SNR of the gateway and statistics of packet loss rate between gateway and nodes
- Support GNSS positioning to record the location of the test field
- Straightforward user interfaces presented on a 5.72-inch touchable LCD screen
- With a built-in rechargeable lithium battery that works for 8 hours
- Support real-time data backup and charge through a USB type-C port

# 2. Hardware Introduction

## 2.1 Packing List



1 ×
FT101 Device



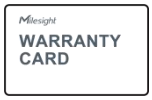
1 ×
1 x LoRaWAN®
Stubby Antenna

1 ×
Type-C Cable (1 m)
& Power Adapter

1 ×
Card Ejector Tool

1 × Screen Protector

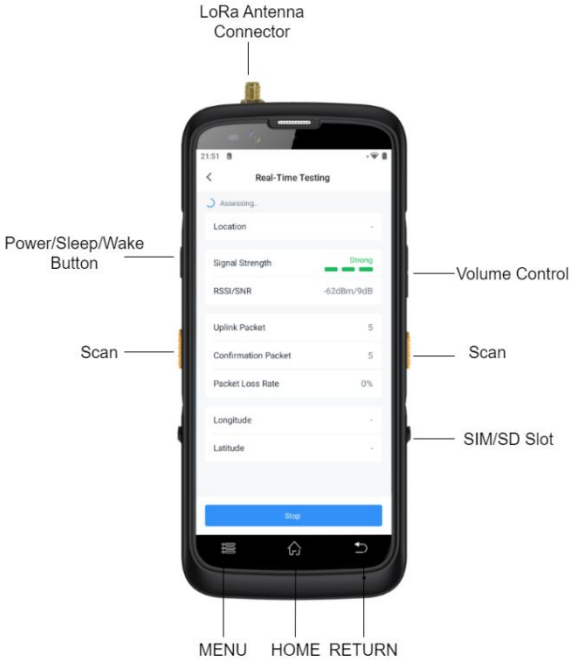
1 × Lanyard




1 × Warranty Card

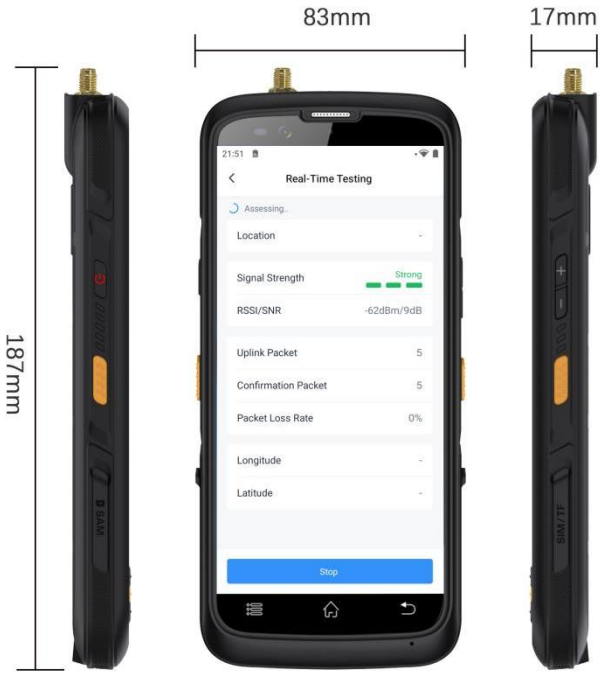
**If any of the above items is missing or damaged, please contact your sales representative.**

## 2.2 Hardware Overview



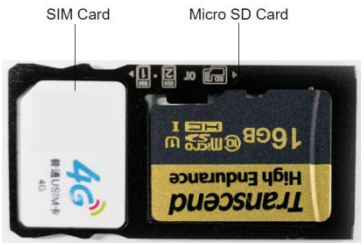


## 2.3 Dimensions (mm)




## 3. SIM/SD Card Installation (Alternative)

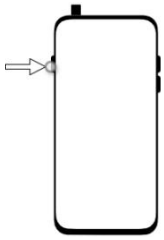
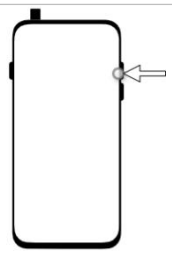
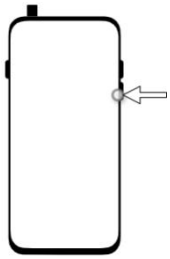
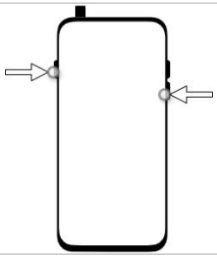
1. Remove the rubber plug of the slot, and use an ejector tool to push the contact point to pop up the card slot.
2. Insert the nano SIM card (4FF) or micro SD card, then turn the slot over and restore it back to the device.
3. Restore the rubber plug of the slot.

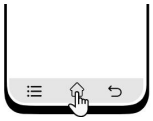
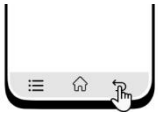
# 4. Operation Guide

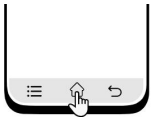
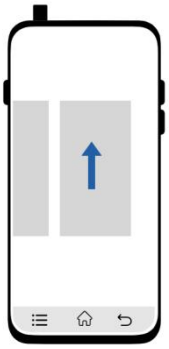
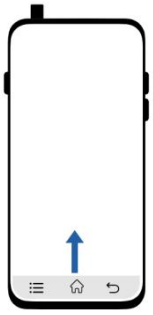
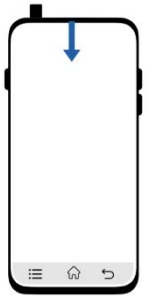
## 4.1 Basic Gestures and Shortcuts

### Button Shortcuts

| Item | Description |
|---|---|
|  | **Power On**: press and hold on the Power button for 3s until the screen lights. |
| | **Power Off or Restart**: press and hold on the Power button for 3s until the phone displays the Power off and Restart menu. |
|  | **Turn up the volume**: press the Volume up button. |
|  | **Turn down the volume**: press the Volume down button. |
|  | **Take a screenshot**: press the Volume down and Power buttons simultaneously. |

### Basic Gestures

| Item | Description |
|---|---|
|  | **Back to home screen**: tap the Home button once. |
|  | **Return to the previous screen**: tap Return button once. |
|  | **Access home screen edit mode**: tap Menu button once. |

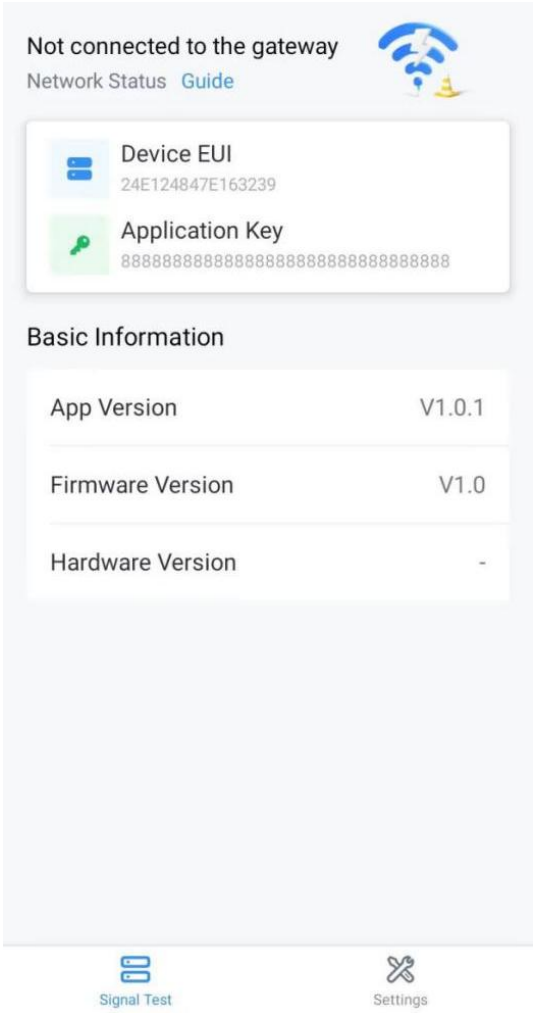
| | |
|---|---|
|  | **Recent tasks**: press and hold on Home button for a while to view recent tasks. |
|  | **Close an app**: When viewing recent tasks, swipe up on an app preview to close the app. |
|  | **Open Settings menu**: Swipe up from the bottom of home screen. |
|  | **Display notification and shortcut switches panel**: swipe down from the upper edge of the screen. |

## 4.2 Signal Test

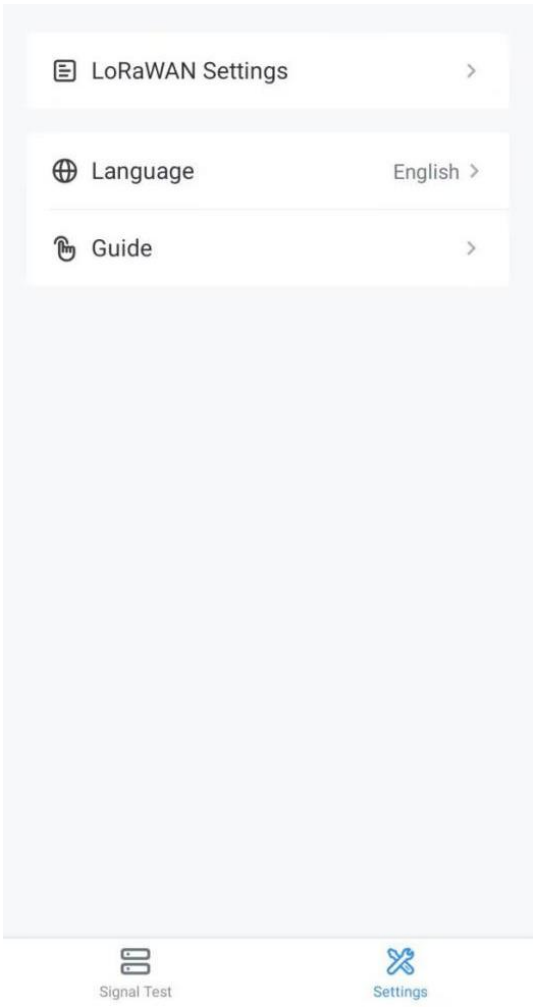
Milesight field tester is equipped with a Field Tester App for gateway signal test. This guide will take the Milesight UG65 gateway as an example to operate the signal test. Users can also connect this device to any standard LoRaWAN® network server.

1. Launch the Field Tester App, and find the device EUI and application key information.

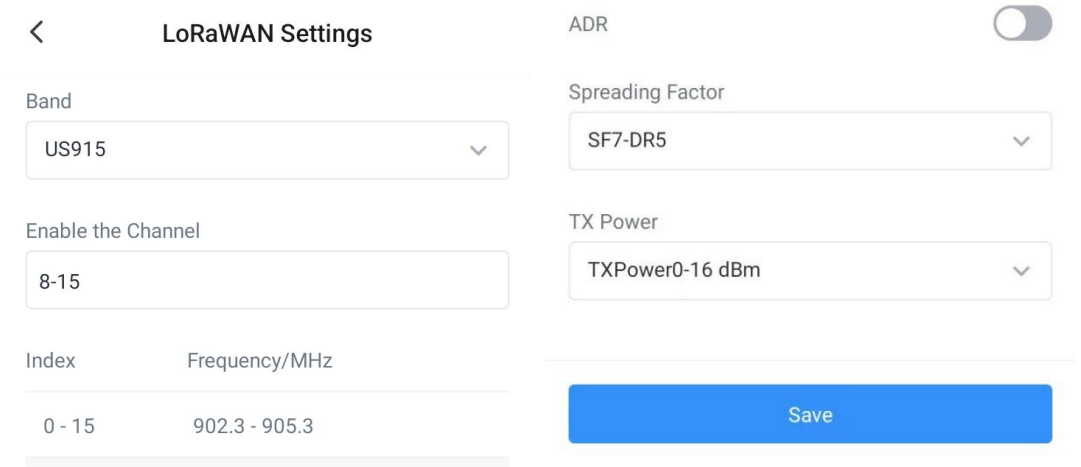
**Note:** the app EUI (join EUI) is fixed as 24E124C0002A0001.




2. Configure the LoRaWAN® settings of this field tester.



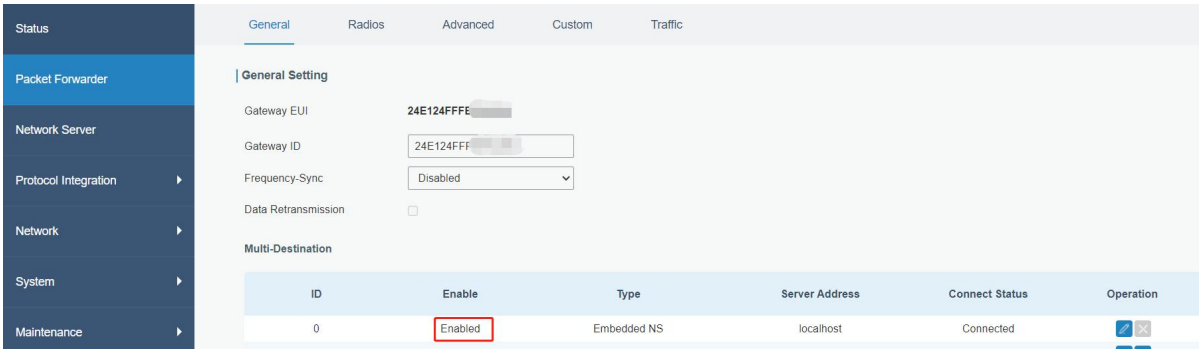

Ensure that the frequency channels match the testing gateway and configure the related parameters as required.

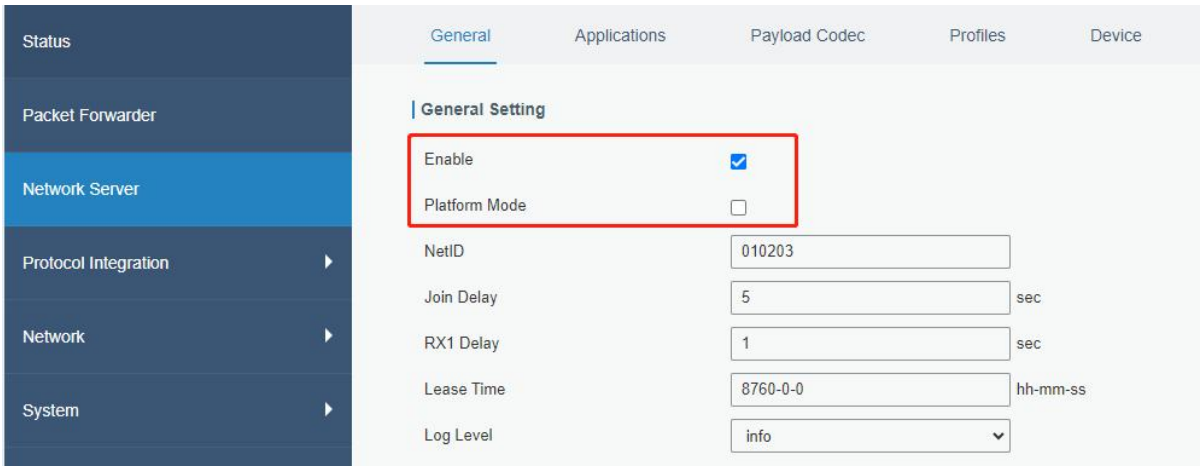



| Parameters | Description |
|---|---|
| Band | Select the frequency plan to send uplinks. If the band is one of CN470/AU915/US915, enter the index of the channel to enable in the input |

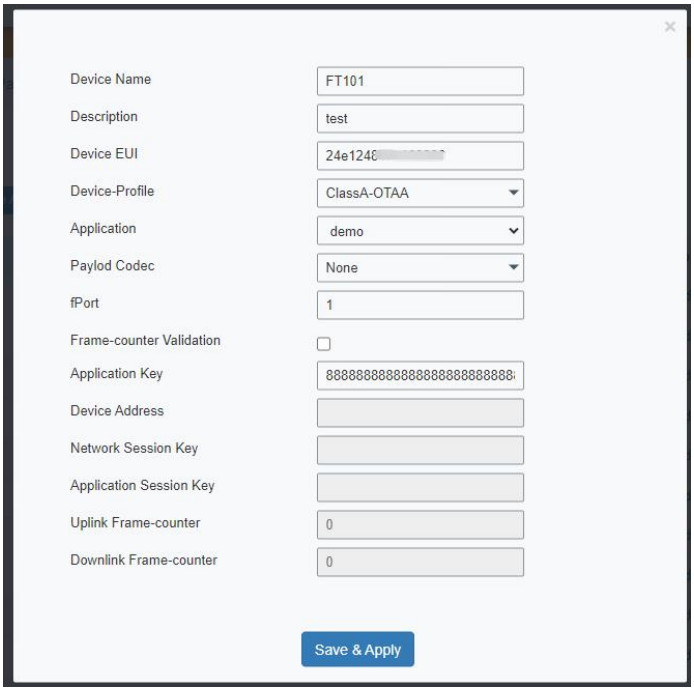
| | |
|---|---|
| | box, making them separated by commas.<br>**Examples:**<br>1, 40: Enabling Channel 1 and Channel 40<br>1-40: Enabling Channel 1 to Channel 40<br>1-40, 60: Enabling Channel 1 to Channel 40 and Channel 60<br>All: Enabling all channels<br>Null: Indicate that all channels are disabled |
| ADR Mode | Allow the network server to adjust datarate of the device. |
| Spread Factor | If ADR is disabled, the device will send data via this spread factor. |
| Tx Power | Transmit power of the device. |

3. Navigate to the web GUI of Milesight gateway to enable embedded NS mode.

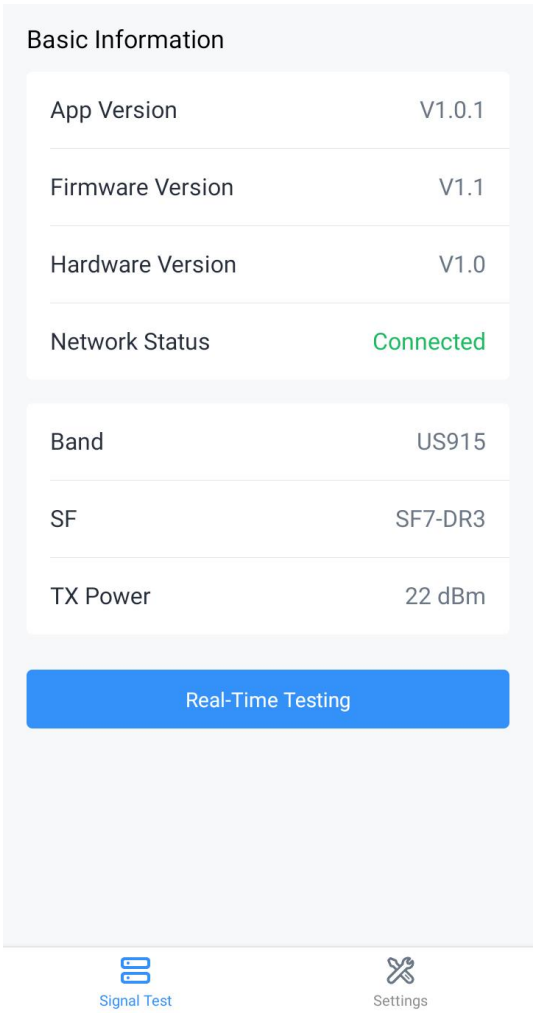


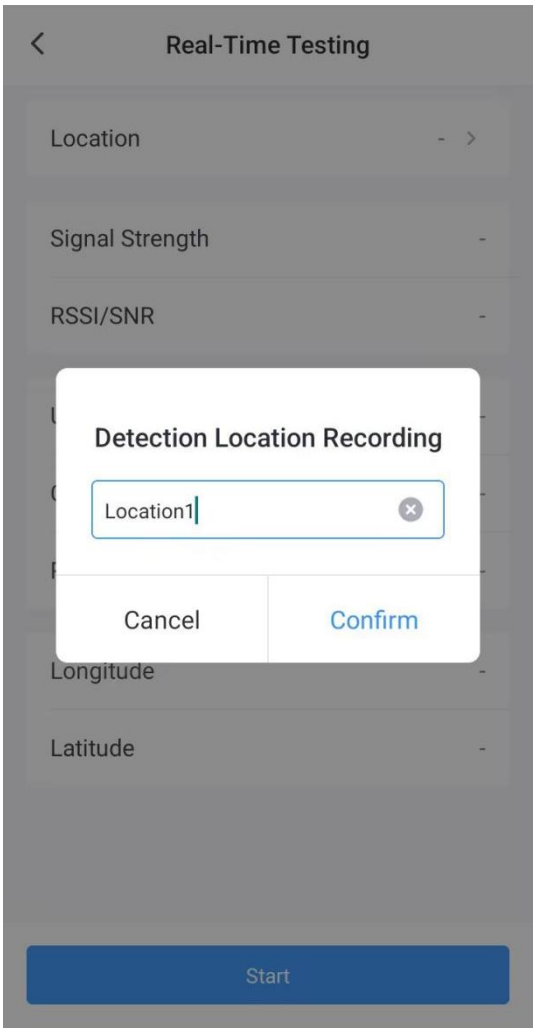

4. Navigate to **Network Server > Device** page to add the field tester to the gateway. The profile type should be set as **OTAA-Class A**.



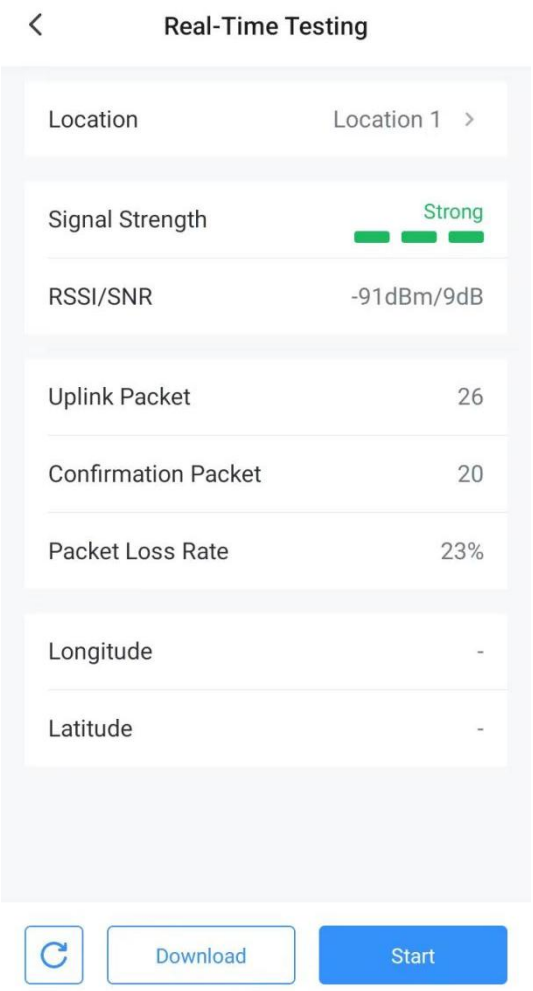

After adding, the field tester will show network status is connected. Click **Real-Time Testing** to start the signal test.



5. Customize a name to record the detection location, then the device will send the confirmed packets to the network server every 6s and record the testing results including signal values, packet report status, etc.




6. Click **Stop** to stop the testing and download the test results on the App as a CSV log file to the device. You can also click **Start** to continue the testing.

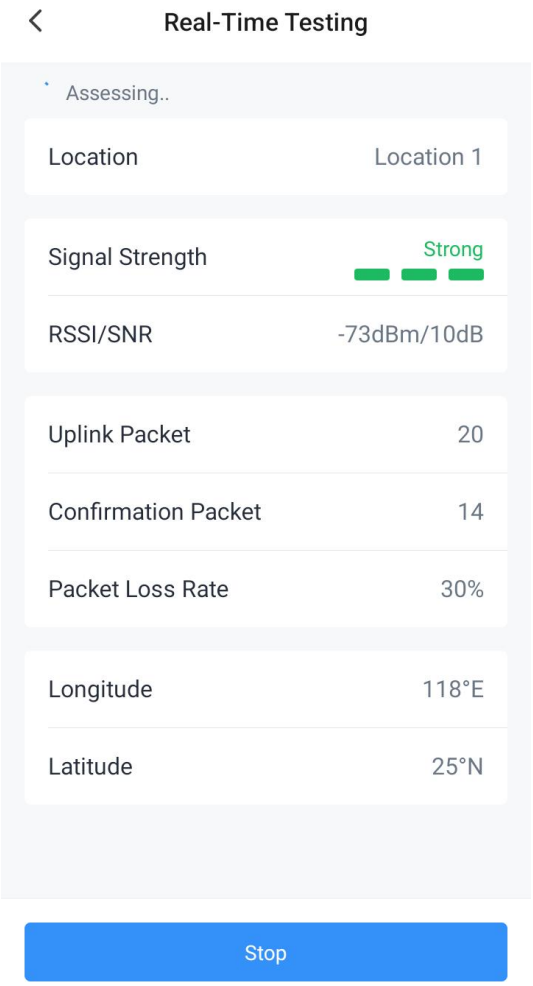



| Tx Cnt | Time | RSSI (dBm) | SNR (dB) | Signal | UPlink Pac | Confirm Pa | Packet Los | Longitude | Latitude | Location | SF | TX Power (dBm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2024-07-02 11:50:23 | - | - | Abnormal | 1 | 0 | 100 | - | - | Location1 | SF7-DR3 | 22 |
| 2 | 2024-07-02 11:50:30 | -20 | 11 | Strong | 2 | 1 | 50 | - | - | Location1 | SF7-DR3 | 22 |
| 3 | 2024-07-02 11:50:36 | -26 | 10 | Strong | 3 | 2 | 33 | - | - | Location1 | SF7-DR3 | 22 |
| 4 | 2024-07-02 11:50:43 | -22 | 12 | Strong | 4 | 3 | 25 | - | - | Location1 | SF7-DR3 | 22 |
| 5 | 2024-07-02 11:50:49 | -23 | 11 | Strong | 5 | 4 | 20 | - | - | Location1 | SF7-DR3 | 22 |
| 6 | 2024-07-02 11:50:56 | -24 | 11 | Strong | 6 | 5 | 17 | - | - | Location1 | SF7-DR3 | 22 |
| 7 | 2024-07-02 11:51:02 | - | - | Abnormal | 7 | 5 | 29 | - | - | Location1 | SF7-DR3 | 22 |
| 8 | 2024-07-02 11:51:08 | - | - | Abnormal | 8 | 5 | 38 | - | - | | SF7-DR3 | 22 |

## 4.3 Location

Milesight Field Tester supports to record the coordinates of outdoor location when signal test. This should ensure the location service is enabled in the Settings page of the device and the location permission is allowed for the Field Tester App.

**Note:** when the device is located indoors, the GNSS will not work. Please insert a SIM card to get location information based on cellular base stations.




## 5. Maintenance

- Keep the device and its accessories dry. If the device sprayed the water, clean the surface with a dry soft cloth. Do not use an external heating device (such as a microwave oven) to dry it.
- Power off the device and disconnect the power adapter when cleaning the device.
- Do not clean the device and its accessories with strong chemicals, strong detergents or solvents. To clean the device, wipe it with a soft moistened cloth. Use another soft, dry cloth to wipe dry.
- When installing a SIM card or micro SD card, keep the device clean to prevent impurities from entering the device.
- The response speed of the screen will become slow at a low temperature, which is a normal phenomenon and does not affect the performance.
- It is not suggested to charge the device when the environment temperature is over 45°C or below -10°C.

- Charge the device every 3 months if it is not used for an extended period.

# 6. Communication Protocol

FT101 device will report two types of packets:

1. **Basic Information:** reports whenever it joins the network.

| Channel | Type | Byte | Description |
|---|---|---|---|
| ff | 01(Protocol Version) | 1 | 01=>V1 |
| | 09 (Hardware Version) | 2 | 02 10=>V2.1 |
| | 0a(Software Version) | 2 | 01 01=>V1.1 |
| | 0b (Power On) | 1 | Device is on |
| | 16 (Device SN) | 8 | 16 digits |

**Example:**

| **ff0bff ff0101 ff166746d48016300014 ff090110 ff0a0101** | | | | | |
|---|---|---|---|---|---|
| **Channel** | **Type** | **Value** | **Channel** | **Type** | **Value** |
| ff | 0b (Power On) | ff (Reserved) | ff | 01 (Protocol Version) | 01 (V1) |
| **Channel** | **Type** | **Value** | **Channel** | **Type** | **Value** |
| ff | 16 (Device SN) | 6746d48016300014 | ff | 09 (Hardware Version) | 0100 (V1.0) |
| **Channel** | **Type** | **Value** | | | |
| ff | 0a (Software Version) | 0101 (V1.1) | | | |

2. **Signal test packet:** reports when starting real-time testing.

**Example:**

| **0e00** |
|---|

# Signal Quality Guidelines

| Signal Quality | SF | SNR |
|---|---|---|
| Strong | SF7 | ≥ 5 |
| | SF8 | |
| | SF9 | |
| | SF10 | |
| | SF11 | |
| | SF12 | |
| Medium | SF7 | 0 ≤ SNR <5 |

| | | |
|---|---|---|
| | SF8 | |
| | SF9 | |
| | SF10 | |
| | SF11 | |
| | SF12 | |
| Weak | SF7 | -3 ≤ SNR < 0 |
| | SF8 | -5 ≤ SNR < 0 |
| | SF9 | -6 ≤ SNR < 0 |
| | SF10 | -8 ≤ SNR < 0 |
| | SF11 | -9 ≤ SNR < 0 |
| | SF12 | -10 ≤ SNR < 0 |
| Abnormal | SF7 | < -3 |
| | SF8 | < -5 |
| | SF9 | < -6 |
| | SF10 | < -8 |
| | SF11 | < -9 |
| | SF12 | < -10 |

**-END-**