G2 GNSS Receiver Quick Guide

Please read the manual carefully and keep it properly for future maintenance.

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1 .Introduction to the G2

1.1 Exterior description

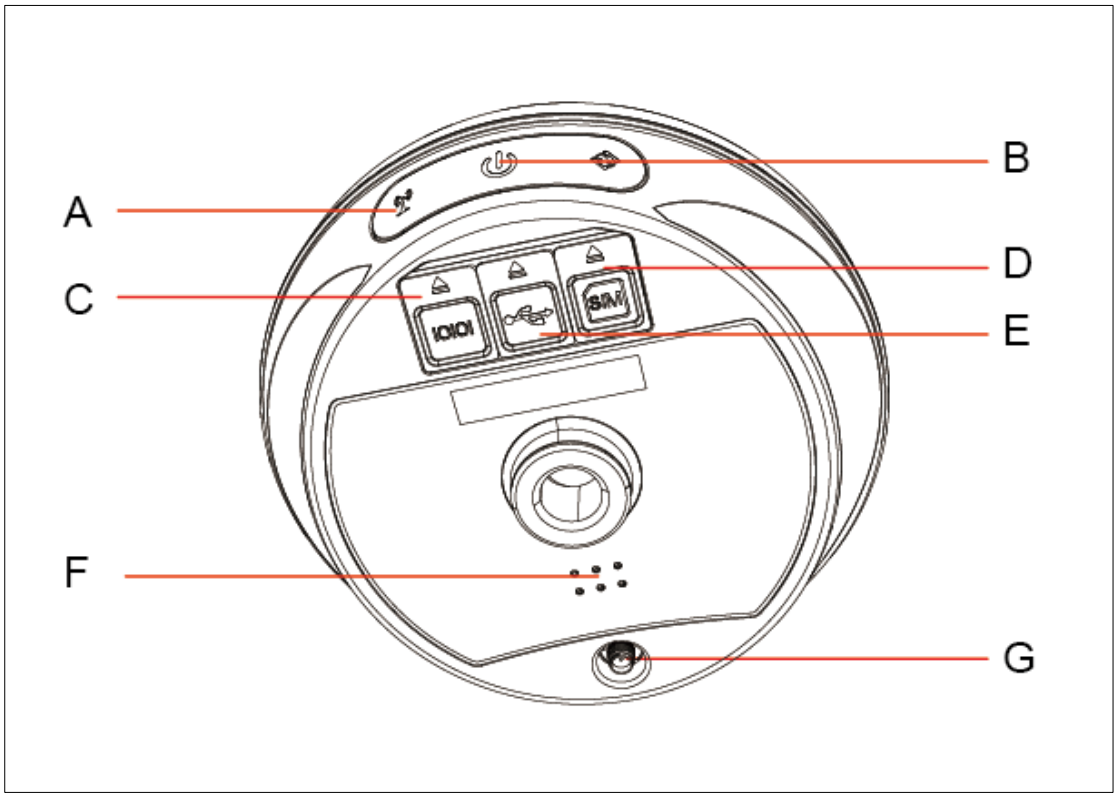

Figure 1

A、Satellite Indicator Light;

B、Power button;

C、7 Pin data connector (Serial/External Power);

D、SIM card compartment;

E、USB Type C Interface;

F、The loudspeaker hole;

G、UHF Antenna Port.

1.2 Operating Instructions

1.2.1 SIM card installation

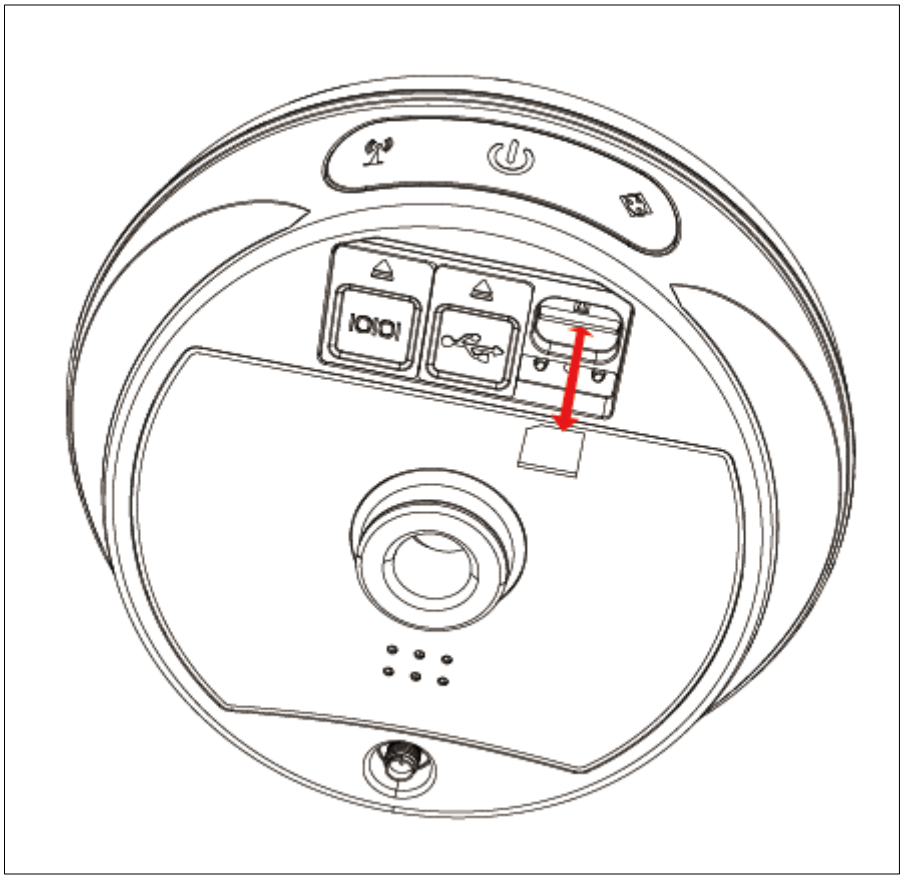

Figure 2

- Opening the dust plug.
- Install the SIM card according to the indication (SIM card chip is facing up, the notch is facing the receiver).
- Cover with dust plug.

1.2.2 The meaning of the instrument keys and indicator lights

Projects	Function	Role or status

	Battery level broadcast Switch	Short press to broadcast power; Long press to turn on/off.
	Data chain light	Rover mode: Blink when receiving differential data; Base mode: Blink when sending differential data.
	Satellite light	Rover/base station: 1 second interval flashing in the positioning state; Static mode: flashing according to sampling frequency.

Note: In the off state, short press the power button, and the power information can be calculated according to the number of lights on.

Figure 3

One flashing light represents 0~33% battery level (Figure 3).

Figure 4

Two flashing lights represent 33% to 66% battery level (Figure 4).

Figure 5

Three flashing lights represent 66% to 100% battery level (Figure 5).

1.2.3 Power on and off

Power on: Press and hold the power button until the voice prompts "waiting to start" and release, the device starts up, and the panel lights flash until the voice prompts "startup successful" and the device is turned on.

Shutdown: Press and hold the power button until the voice prompts "shutdown", the panel lights are all off, and the device is shut down.

Forced shutdown: When the device cannot be shut down normally due to an unexpected failure, press and hold the power button for 10 seconds to power off the device.

1.2.4 Charging equipment

The red light of the power supply is always on when charging, and the green light is always on when charging is complete.

The host supports MTK PE1.1/2.0 and PD protocol fast charging. Using a fast charging adapter for charging can shorten the charging time.

Note: For the safety of your device, please use the standard adapter in the package, or a brand adapter that complies with 3C certification to charge the host.

1.2.5 WEB access

The receiver supports Web access to the built-in page for viewing host information and upgrading firmware. The host's WIFI hot spot is turned on by default, and the hot spot name is the machine number SN. Users can access the hot spot with mobile phones, tablets, PCs and other devices, and then enter the URL: 10.10.10.10 in the browser to access the receiver Web UI. As shown in Figure 6.

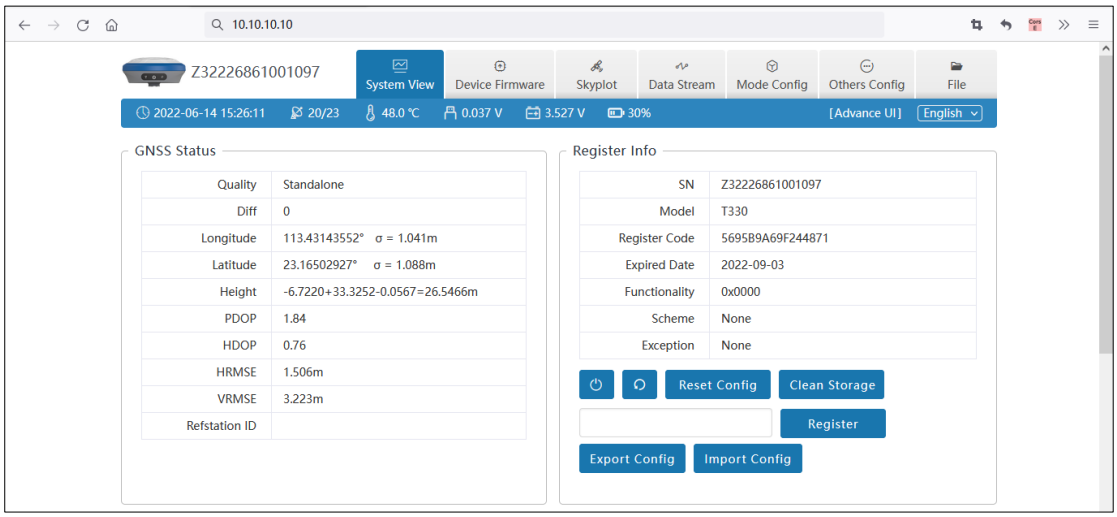

Figure 6

2 .P300 Data Controller

2.1 Overview

The P300 TD-LTE wireless computer is a rugged, multi-function wireless computer designed with a 5-inch sunlight readable HD touch screen and alphanumeric keypad, equipped with a powerful octa-core processor and Android operating system for perfect adaptability with measuring handbook software. G2 has professional IP68 grade protection, which is suitable for harsh outdoor environments. The large-capacity lithium battery can guarantee more than 10 hours of field work and complete multiple measurement tasks throughout the day (Figure 7).

Figure 7

2.2 Key features

- 5" sunlight-readable HD touchscreen;
- Octa-core 2.0GHz CPU;
- Pre-installed with Android 8.1 operating system
- 4GB RAM + 64GB ROM;
- 5 megapixel front + 13 megapixel rear camera;
- IP68 protection, waterproof/shockproof/dust proof;
- Wi-Fi, Bluetooth, NFC;
- 4G all-network support;
- 7000 mAh battery with 14 hours of battery life;
- Universal Type-C connector;
- Charging time: less than 4 hours (fast charging).

3 .LNT software operation

3.1 Connecting equipment

Run the LNT measurement software, execute [Configure]→ [Device Connect], select [RTK](Figure 8). For the device type, as shown in Figure 9, click [Search for Bluetooth devices], find the Bluetooth name of the corresponding device in the Bluetooth device list (the default is the host machine number), click [Start Connect], the connection progress box will ,pop up, indicating that the connection is in progress, and after the connection is successful, it will prompt that the connection is successful.

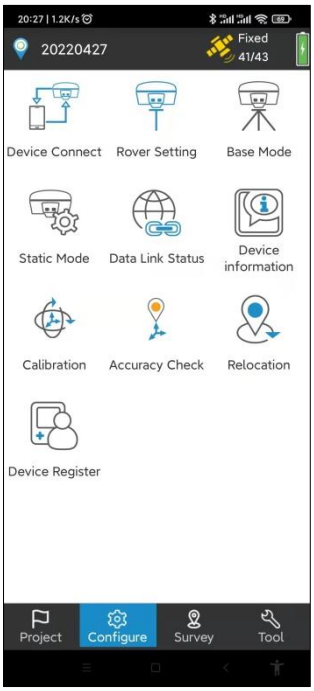

Figure 10

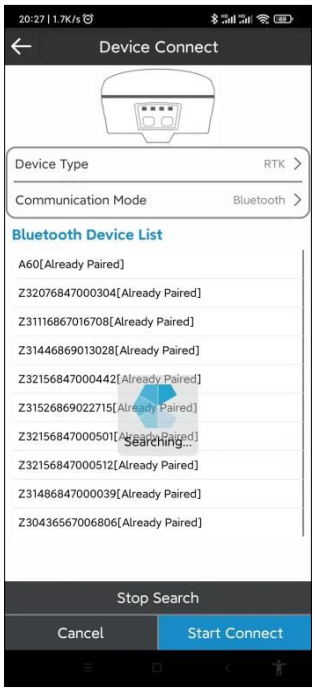

Figure 11

You can also connect the G2 through the NFC function of the mobile phone, put the NFC area of the mobile phone close to the gure 12), and in the pop-up window, click OK to connect (Figure 13).

Figure 14

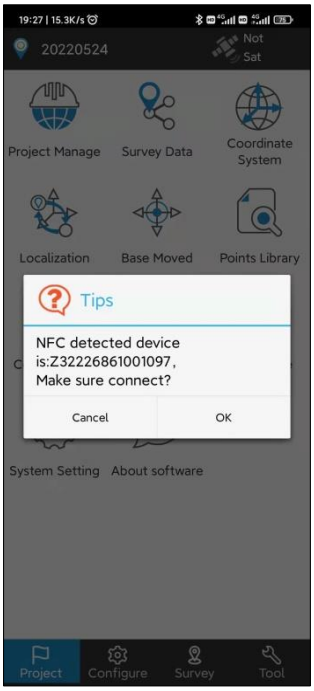

Figure 15

3.2 New Project

Execute [Project Manage](Figure 16) → [New], create a new project, enter the project name, others are additional information, which can be left blank, or filled in according to the actual data, and click [OK] (Figure 17). Jump to the coordinate system parameter interface. In China, the ellipsoid parameters are CGCS2000 by default, and the projection method is Gaussian projection. You can set the coordinate system for other parameters according to the actual operation requirements.

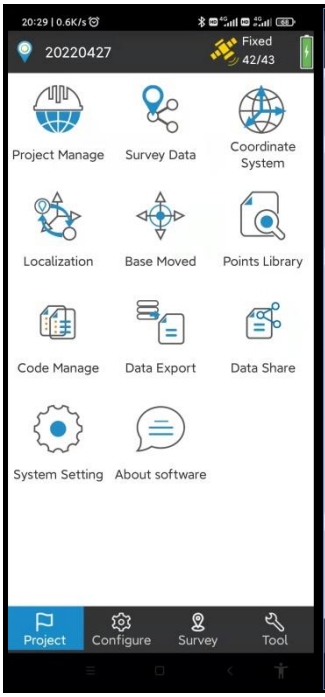

Figure 18

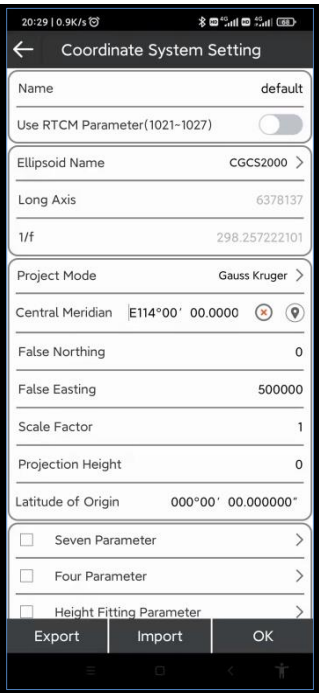

Figure 19

3.3 File import

Copy the data files to be imported to the LNT Survey APP folder, click [Project] → [Point Library] → [...], and select the corresponding file format and angle format to import (Figure 20, 21).

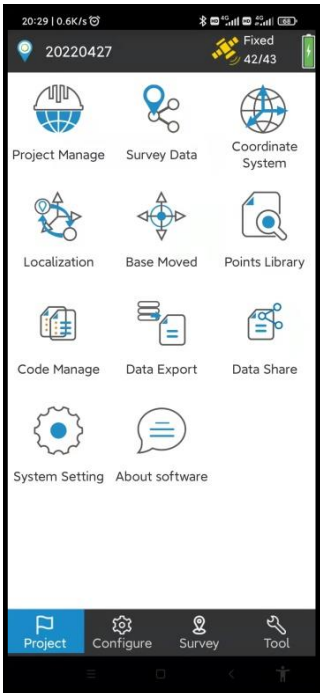

Figure 22

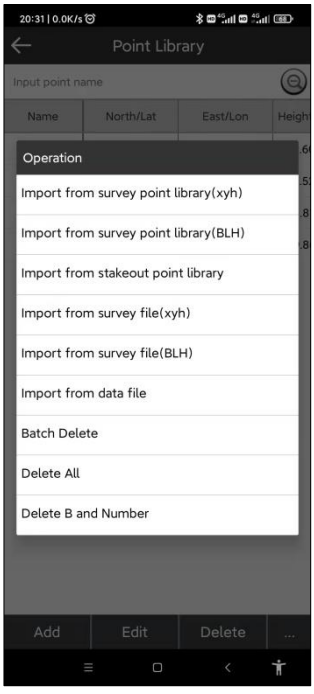

Figure 23

3.4 Document export

Execute [Project] → [Data Export], select the data file, angle format and file format, then click [Export]. Then we select the output file storage path, and click [Export], the data file is exported successfully (Figure 24, 25).

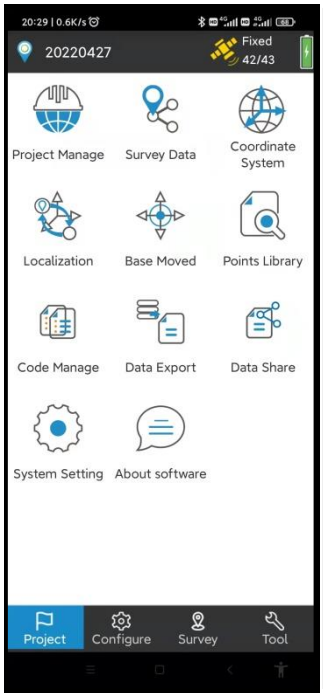

Figure 26

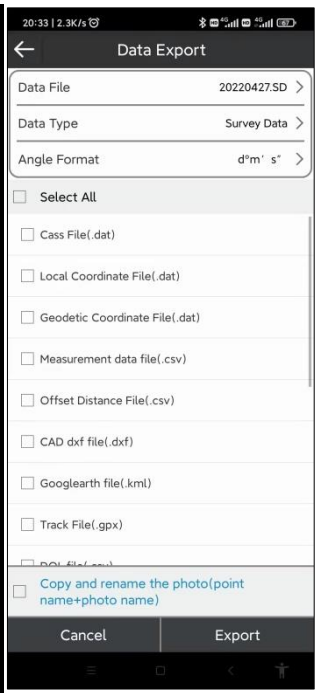

Figure 27

3.5 Parameter conversion

Example: four-parameter conversion.

3.5.1 Correctly configure the mobile station to obtain fixed state, click [Collect Point] to measure two known control points in the survey area as shown in Figure 28.

Figure 29

3.5.2 Execute [Project] → [Localization] (Figure 30), then click the […] button in the lower right corner, select [Calculate Option] in the pop-up window (Figure 31), and set the parameter settings (Figure 32).

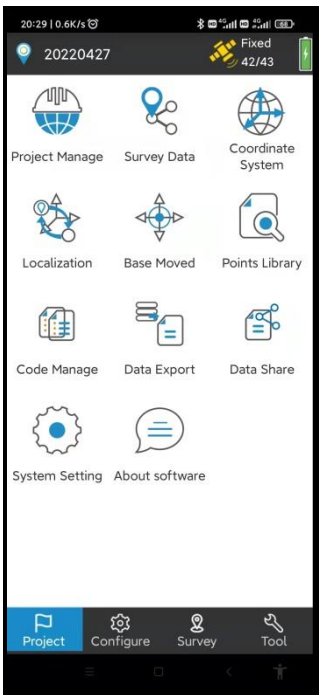

Figure 33

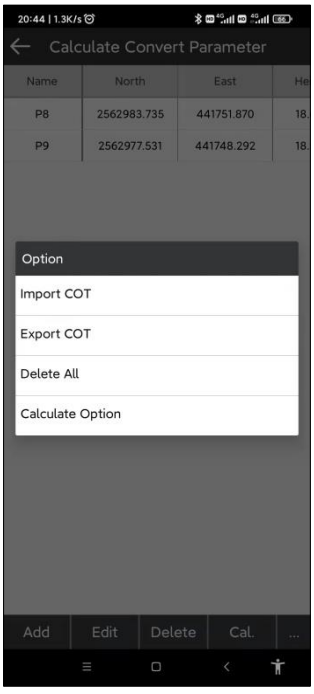

Figure 34

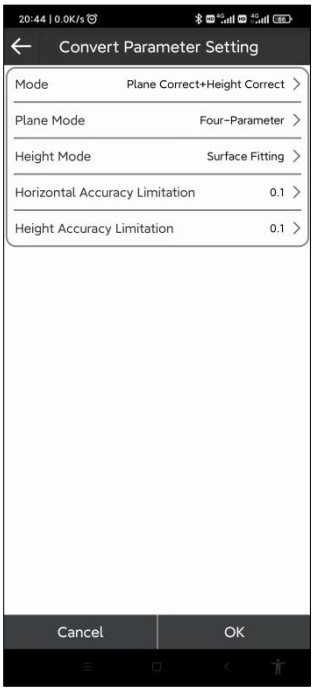

Figure 35

3.5.3 Return to the previous page, click [Add] in the lower left corner (Figure 36),

input the coordinates of the known control points in the local coordinate system, perform point measurement in the geodetic coordinates of the source coordinate system or select the coordinates of the measurement points from the point library (Figure 37), and add two sets of data. Then click Calculate Four Parameters (Figure 38), scroll down the parameter report page, as shown in the frame, the scale should be infinitely close to 1. After checking, click [Apply] to apply the coordinate transformation parameter results to the project (Figure 39).

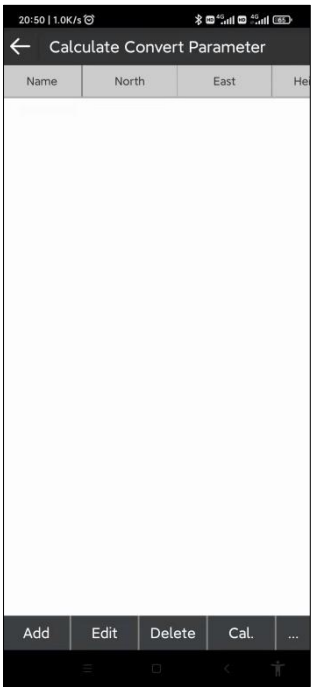

Figure 40

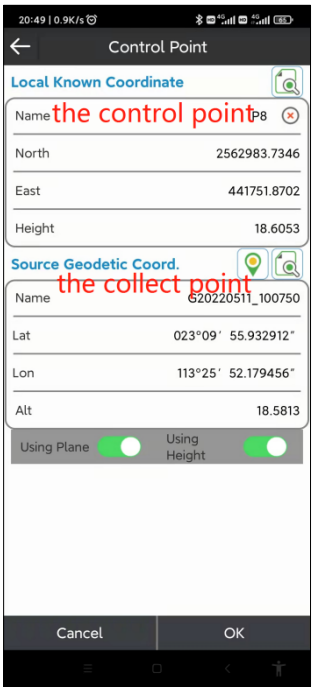

Figure 41

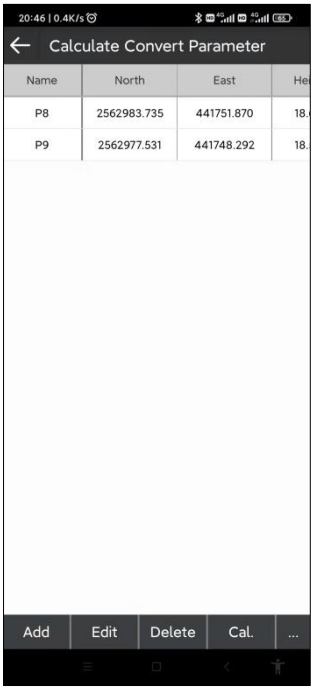

Figure 42

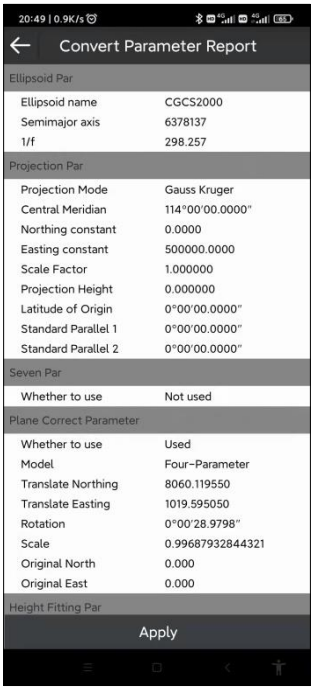

Figure 43

Note: In the parameter report, the plane conversion parameters and elevation conversion parameters can be checked.

The scale parameter is generally infinitely close to 1. If the value does not match, please check the operation whether there is any operation error or coordinate error in the process.

3.6 Point Calibration

Execute [Project] → [Base Moved], click [Convert Parameter calculate] below (Figure 44). Enter the known plane coordinates, and click on the geodetic coordinates for more acquisition methods, which include "positioning acquisition" and "point library acquisition", after the input is completed, click [Cal.](Figure 45). After the calculation is completed, click [OK] to enable the base station translation parameters (Figure 46).

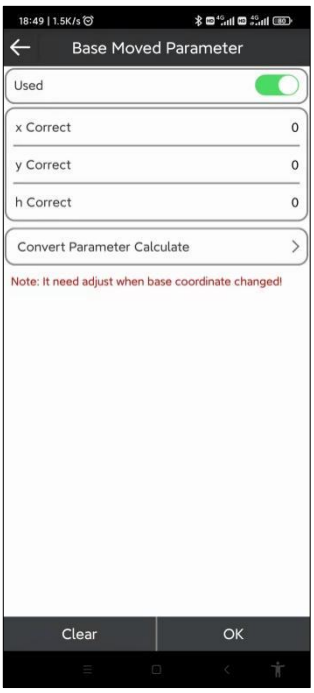

Figure 47

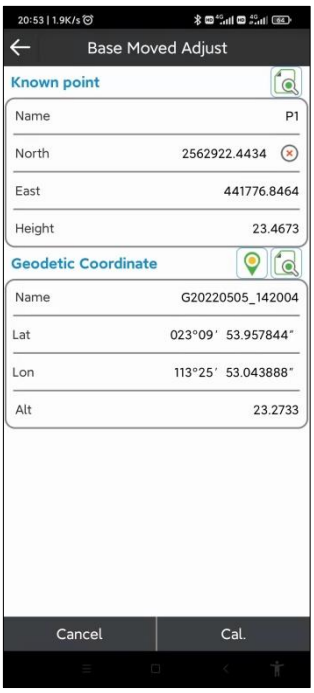

Figure 48

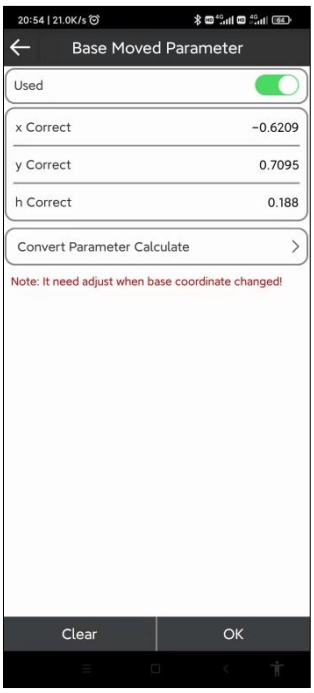

Figure 49

3.7 Rover mode setting

Execute [Configure] → [Rover Settings], and select [Built-in Network], [Mobile Phone Network] or [Built-in Radio] for the data link mode.

3.7.1 Select [Built-in Network], for a specific SIM card (private network card or some IoT cards), you need to fill in the corresponding APN parameters, the general SIM card can be left blank here, and then fill in the corresponding CORS information (or from the CORS list Select from the library), click to obtain the access point list (Figure 50). Because it is in the parameter setting stage, the internal network of the host has not been successfully started, and the access point cannot be obtained at this time, you can first use the mobile network to obtain the access point to select. Then click [OK] to complete the setting of the working mode (Figure 51).

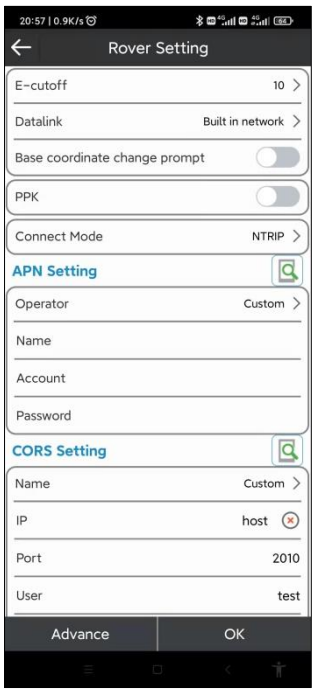

Figure 52

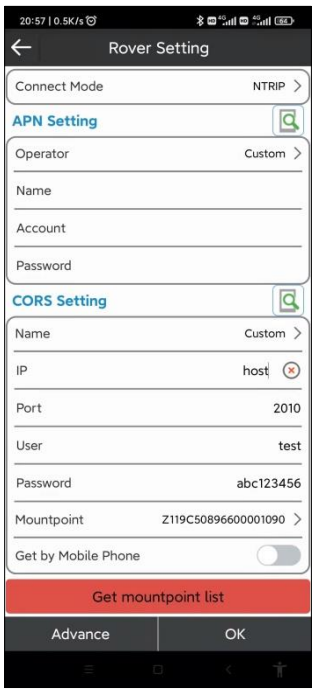

Figure 53

3.7.2 Select [Mobile Phone Network], after filling in the IP, port, user name and information of the CORS station, you can directly use the mobile network to obtain the access point list for selection (Figure 54).

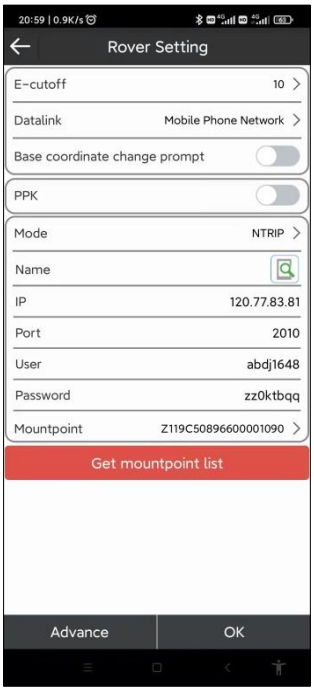

Figure 55

3.7.3 Select [Built-in radio], you need to connect the UHF radio antenna under the host (Figure 56), and then select the corresponding radio frequency and communication protocol (Figure 57).

Figure 58

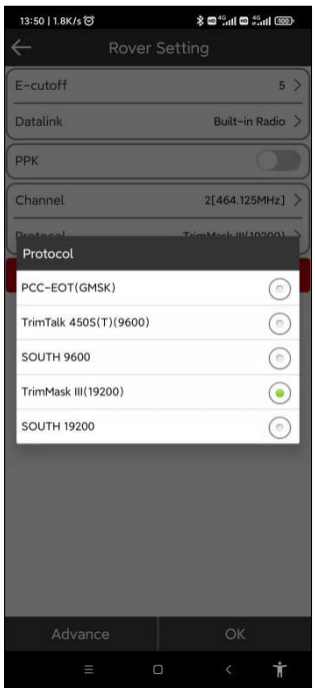

Figure 59

3.8 Static mode setting

3.8.1 Execute [Configure] → [Static Mode], set PDOP limit value, altitude cutoff angle, sampling interval, antenna information and other parameters, click [OK] to start storing static data (Figure 60, 61).

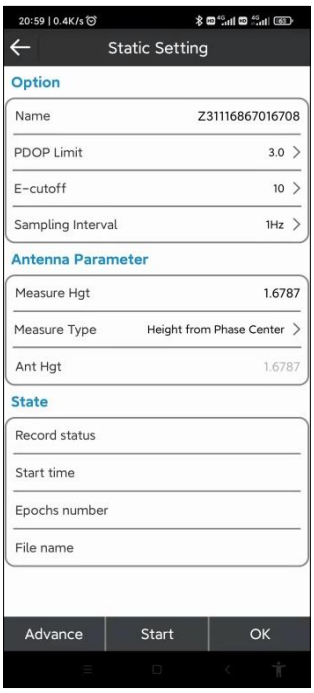

Figure 62

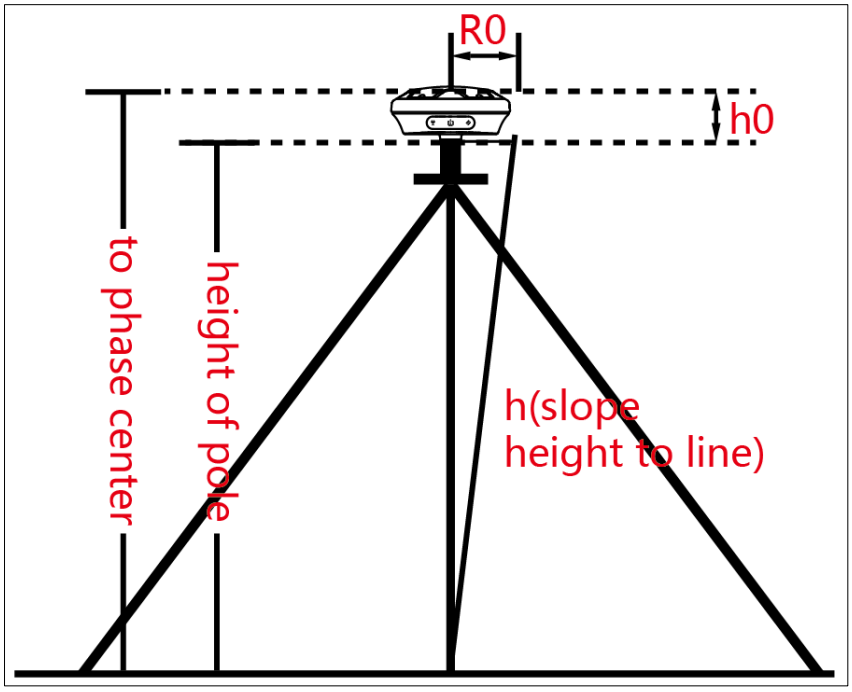

Figure 63

3.8.2 Static file downloads

Log in to the receiver web page (see 1.2.5 for details), click [File] (Figure 64). Find the folder corresponding to the time to download the static data (Figure 65).

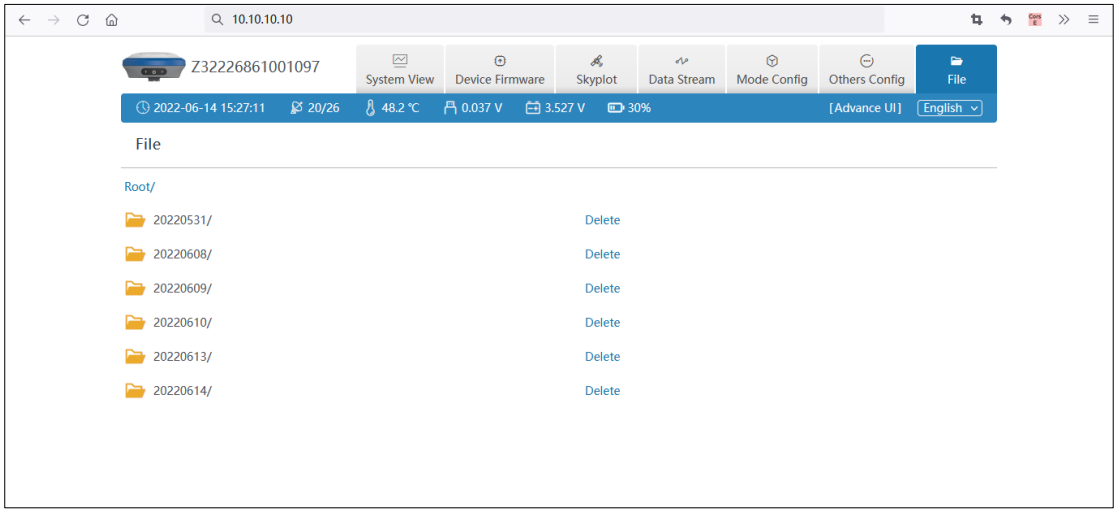

Figure 66

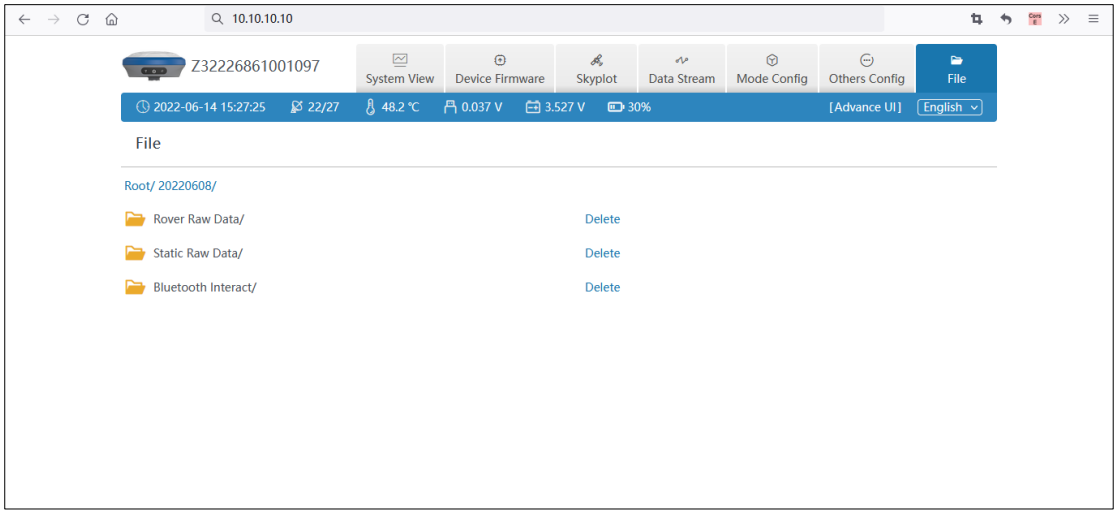

Figure 67

3.9 Base station mode setting

Execute [Configure] → [Base Mode], and select [Built-in Network], [Built-in Radio] or [External Radio] for the data link mode.

3.9.1 Select [Built-in network]. For a specific SIM card (private network card or some IoT cards), you need to fill in the corresponding APN parameters, and the general

SIM card can be left blank, and then fill in the corresponding CORS information (Figure 68).

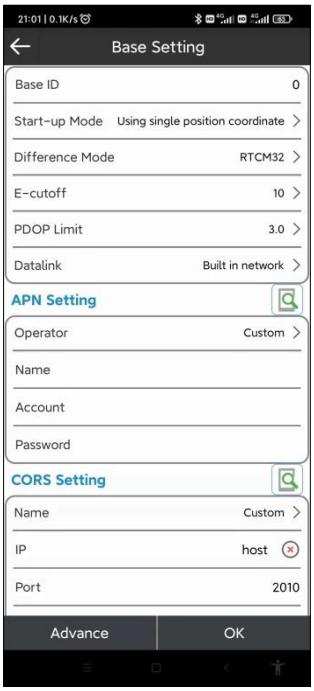

Figure 69

3.9.2 Select [Built-in radio], you need to connect the UHF radio antenna under the host (Figure 70), and then select the corresponding radio frequency and communication protocol (Figure 71).

Figure 72

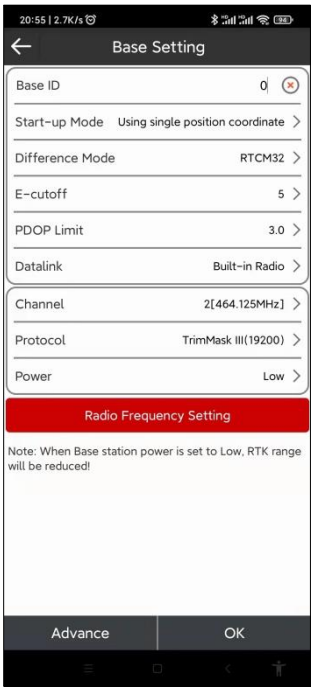

Figure 73

3.9.3 Configuration of the G2 connected to an external large radio.

3.9.3.1 Preparation

Prepare the following tools: PENTAX PDR-450B, radio antenna, big 7-core radio connection cable L0614-15, G2 base station, G2 rover station, power supply (12V), tripod.

3.9.3.2Instrument set-up.

(1) Erection of base station.

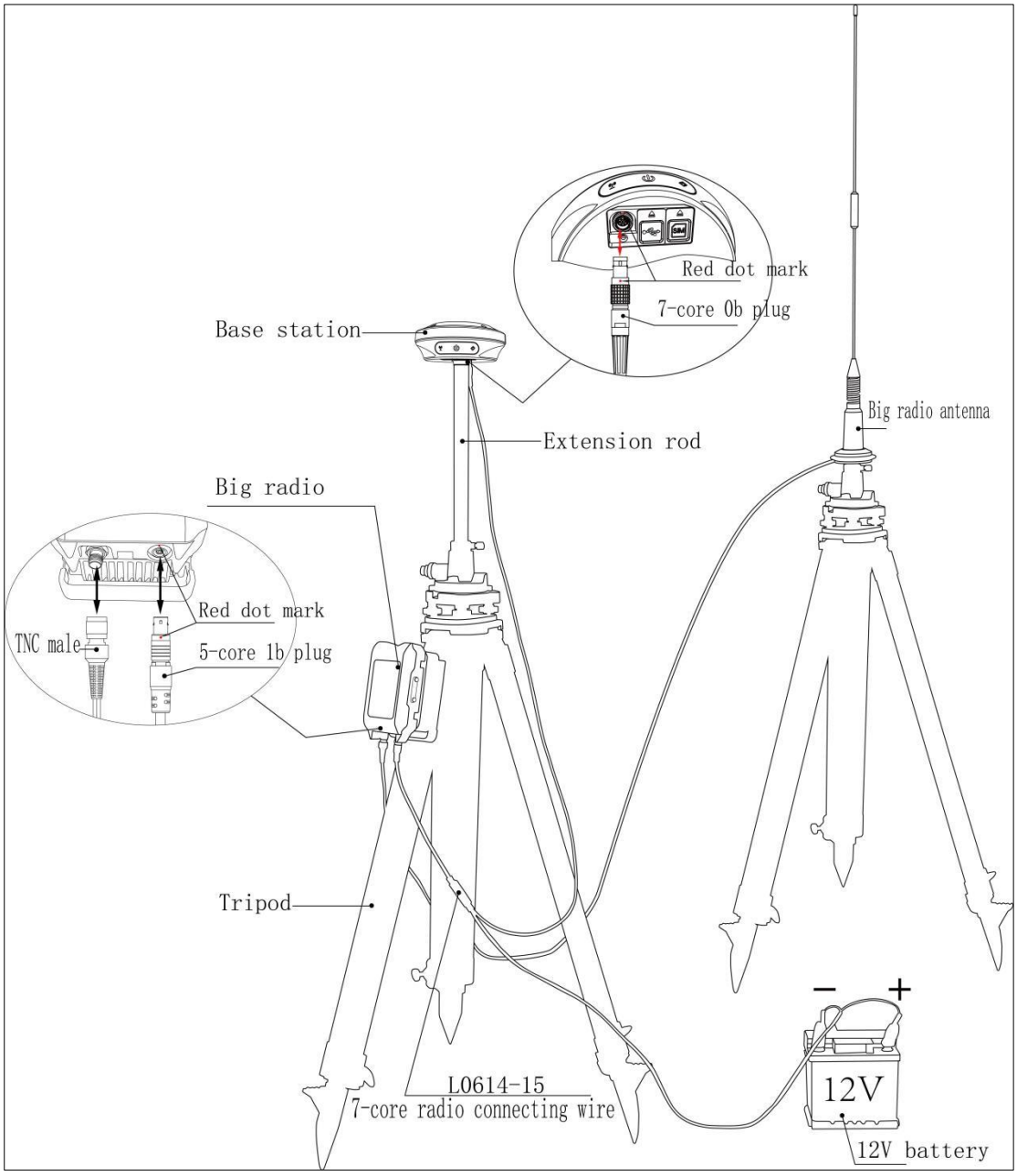

Figure 74

①Set up a tripod. It is better to put the tripod of the radio antenna higher, and keep the distance of more than three meters between two tripods.

②Fix the base and base station receiver, install the radio antenna, and hang the radio on the tripod. The radio antenna interface is connected to the antenna port of PENTAX PDR-450B, the five-core head of the seven-core radio cable is connected to the five-core interface of PENTAX PDR-450B, and the seven-core head of the seven-core radio cable is connected to the G2 base station IOIOI Seven-core interface, the crocodile clip of the seven-core radio cable is connected to the positive and negative poles of the power supply (red is positive and black is negative). After connecting, you can see that the PENTAX PDR-450B is turned on, and the POWER light is on (Figure 75).

③Turn on the base station receiver, open the LNT App, connect the G2 host, set the base station mode to the external radio data link, and set the serial port baud rate to 115200 (Figure 76).

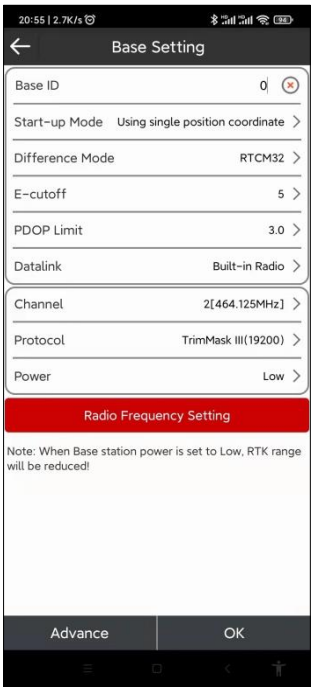

Figure 77

④Connect the radio to the power supply, click on the PENTAX PDR-450B button interface, set the radio frequency to 464.125MHz, select TrimMask III (19200) as the protocol, and set the serial port baud rate to 115200 (Figure 78 and 79). (The serial

port baud rate needs to be consistent with the base station receiver for normal communication).

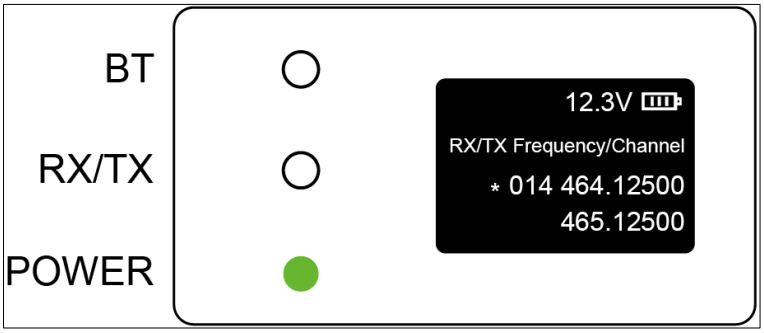

Figure 80

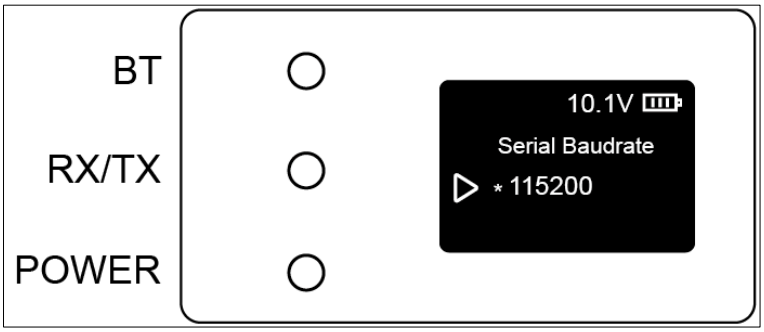

Figure 81

⑤ Check the station light, the RX/TX indicator light is red, indicating that data is being sent normally (Figure 82).

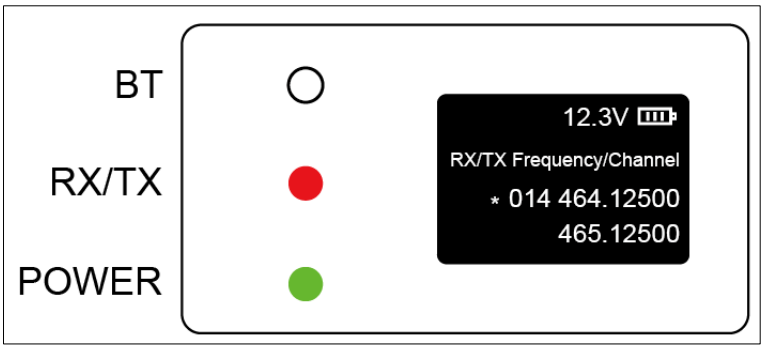

Figure 83

(2) Operation of rover station.

Figure 84

The G2 rover station is powered on and fixed on the carbon fiber centering pole (Figure 85). During measurement, set the working mode to built-in radio, set the frequency to 464.125MHz, and select TrimMask III (19200) for the protocol (Figure 86). (Note: The frequency, air baud rate and PENTAX PDR-450B must be the same, so that the radio can be received. signal; and the G2 needs to be connected to the radio antenna as a mobile station). After the differential light of the mobile station flashes and the LNT measurement APP "fixed", the measurement and sampling work can be carried out. The LNT App displays the following screen (Figure 87).

Figure 88

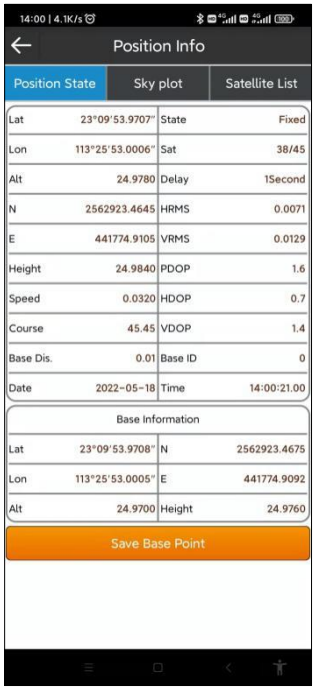

Figure 89

3.10 Collect Point

Select [Survey] → [Collect Point] (Figure 90).

Figure 91

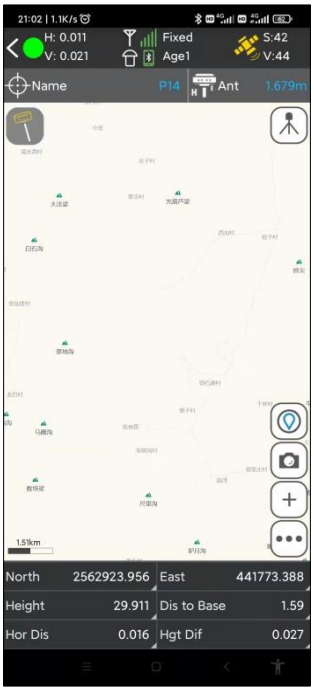

Figure 92

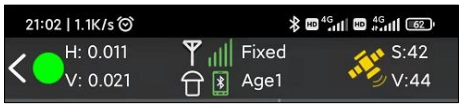

Figure 93

In the top column of the point measurement interface (Figure 94 and 95), you can view the current status information of the host (H: horizontal accuracy, V: elevation accuracy, host solution status, differential delay, S: number of available satellites, V: number of visible satellites, power information). The bottom column of this interface displays the point name currently to be collected, as well as the antenna height parameter settings. There are six display columns at the bottom of this interface. The display order and display content of these display columns can be set according to your own needs (The stored coordinates of the measurement will not change), click on a display column, you can replace it with other display content.

As shown in Figure 96, click the display bar below, a selection box will appear, and you can select the content to be displayed. The contents that can be displayed here mainly include: north coordinate, east coordinate, elevation, longitude, latitude, geodetic height, speed, time, upper gear slant distance, upper gear horizontal distance, upper point height difference and base station distance (Figure 97).

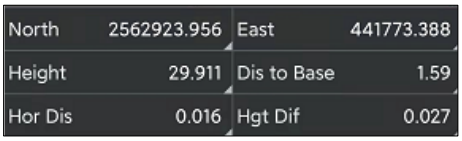

Figure 98

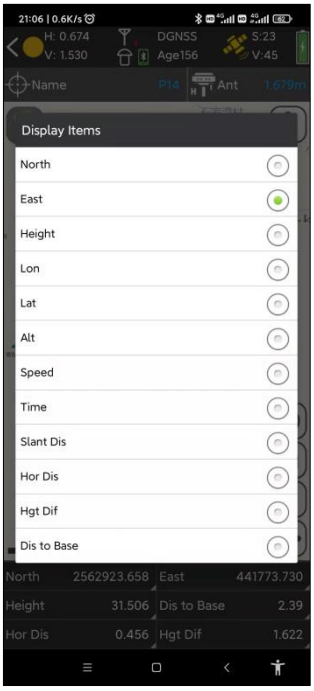

Figure 99

Enter the [Collect Point] interface (Figure 100), set the antenna information in the upper right, click the "+" icon or to collect points, click the "· · ·" icon, and select the icon to see the point data (Figure 101).

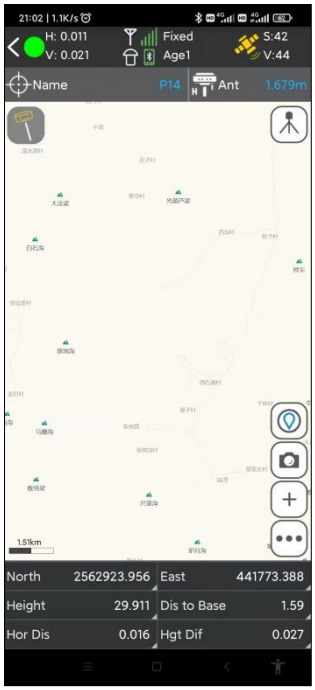

Figure 102

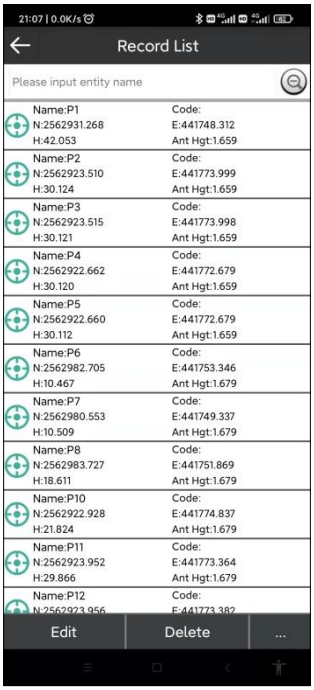

Figure 103

The meaning of each icon in the point measurement page is as follows:

	Control point measurement: At present, RTK technology can be applied to primary and secondary traverse, root traverse measurement and root elevation measurement. Since RTK data has certain contingency, we have implemented the function of control point measurement to improve the reliability of the data.
	Set the acquisition parameters for the control point measurement.
	Photo taking: the measurement site is photographed and comments can be added.
	Locate: Click on the locate icon to locate the map to the current device location.
	Full view: Click on the full image icon to display all measurement points in the view.
	View: View the point coordinates of the current project "Coordinate Management Library", which is the same as the "Measurement Data" function in "Project".
	Settings: Set the current acquisition parameters, including state limit, HRMS limit, VRMS limit, PDOP limit, delay limit, and smoothing points.
	Collect point, line, area and other data
	Quick collection points

3.11 Stake Point

Execute 【Survey】→【Stake Point】(Figure 104), click the flag icon on the upper right to enter the stakeout point library (Figure 105). Click the "..." icon in the lower right corner to import the point just measured from the measurement point library and perform the stakeout operation (Figure 106). When the host reaches fixed state, you can see the distance between the current coordinate point and the known point (Figure 107).

Figure 108

Figure 109

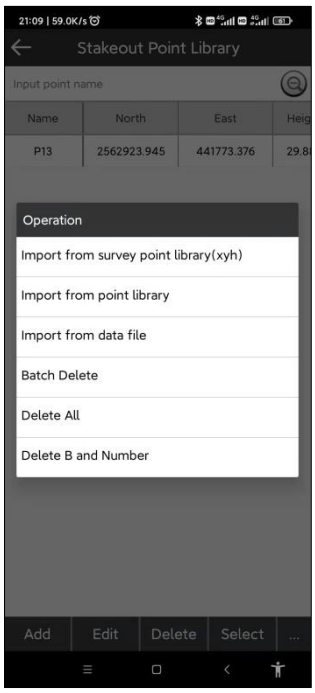

Figure 110

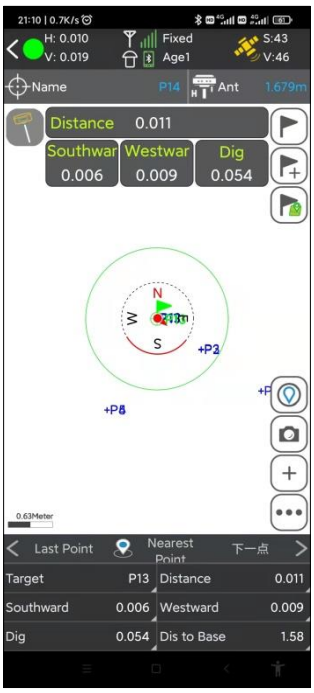

Figure 111

3.12 Tilt measurement

Tilt measurement requires the host with inertial navigation function. The host with this function can do:

1.It can ensure that the accuracy of the host is maintained within 2cm in the 60° tilt range;

2.The calibration process is simple, just shake the centering rod back and forth in place;

3.Supports centering rod calibration to eliminate measurement errors caused by the curvature of the centering rod.

3.12.1 Operating instructions for the tilt measurement function

Click [Survey] → [Collect Point], click the upper right corner to input the antenna height parameter (centering pole height), and then turn on the tilt measurement icon in the upper left corner to enable the tilt measurement function. It is red when it is turned on (Figure 112). In the state, shake back and forth for 5~10s, then rotate 90°, continue to shake the centering rod back and forth, until the tilt measurement icon turns green, and the tilt measurement can be performed (Figure 113).

Figure 114

Figure 115

3.12.2 Use of the mainframe for tilt measurement

1. When the tilt measurement is turned on, sometimes the tilt icon will change from green to red with movement and rotation. At this time, the centering rod needs to be shaken before the measurement, and the point can be collected until the icon turns green;

2. During the tilt measurement process, the icon will turn red when the inclination angle is greater than 60°, and the accuracy of the points collected at this time cannot be guaranteed to be 2cm;

3. When calibrating the centering rod, you need to set the antenna height parameters first, otherwise the calibration data will be wrong;

4. The initialization of the tilt measurement can only be completed in the fixed state.

4 .Host Registration and Software Licensing

4.1 Host registration

The host registration code is a valid time code to authorize the host to use the positioning function. If the registration code expires, the host will not be able to locate. Note: Before entering the registration code, you need to connect to the host that needs to be registered.

When the host registration code expires, after connecting the host with the software, the location information page will not display real-time data (Figure 116-117).

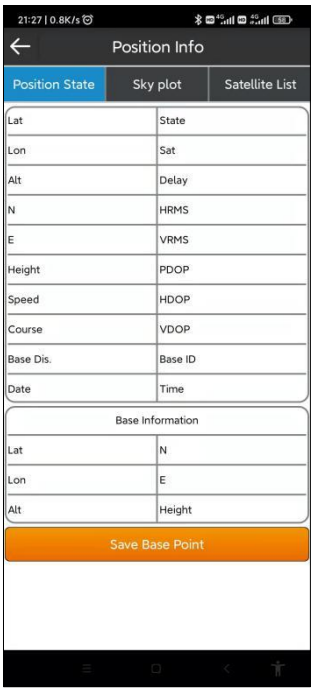

Figure 118

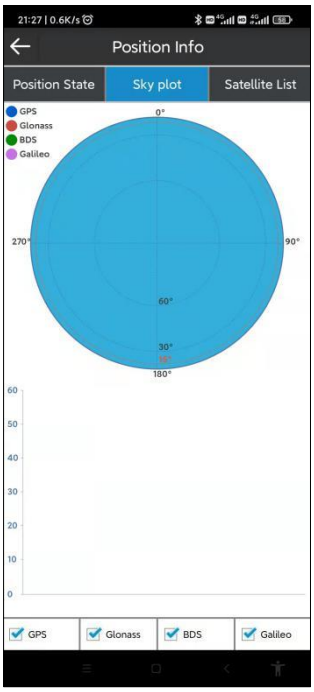

Figure 119

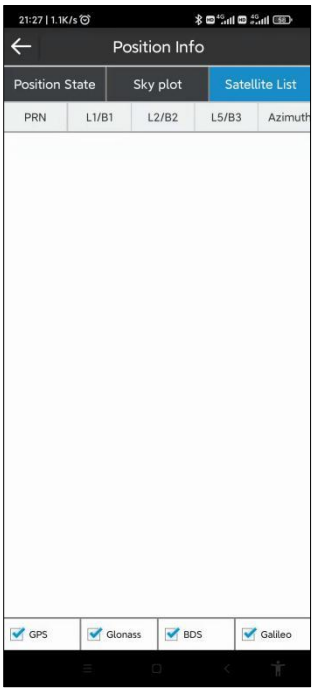

Figure 120

When it is found that the host registration code has expired, then we need to enter a new registration code, execute [Configure](Figure 121)→ [Device Register], enter the new registration code in the box for entering the registration code or scan the QR code to register, and click "Register" (Figure 122).

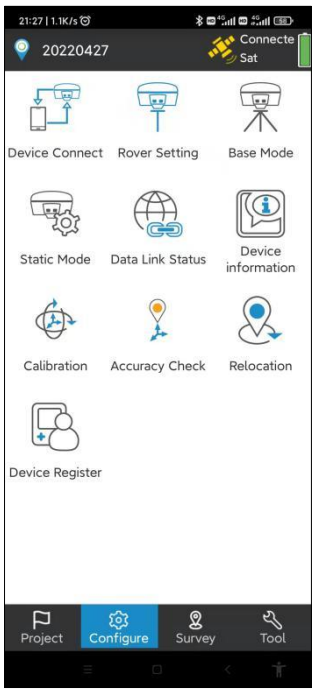

Figure 123

Figure 124

4.2 Software Licensing

The LNT license Code is the authorization code to use most of the functions of the LNT software, if the licence code expires, most of the functions of the software will not be available. Note: The software must be connected to the host computer to be authorized before the license code can be entered.

The LNT measurement authorization code is the authorization code for using most of the functions of the LNT measurement software. If the authorization code expires, most functions of the software will not be available. Note: Before entering the authorization code, the software must be connected to the host that needs to be authorized.

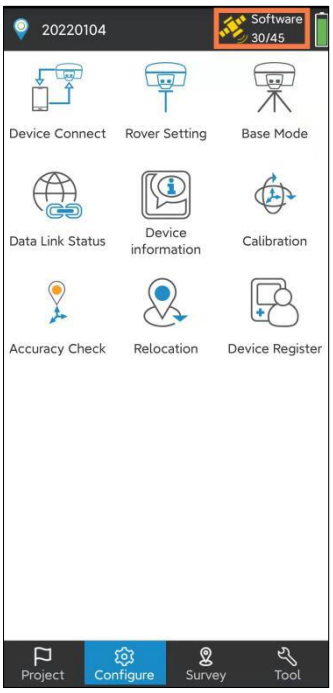

Figure 125

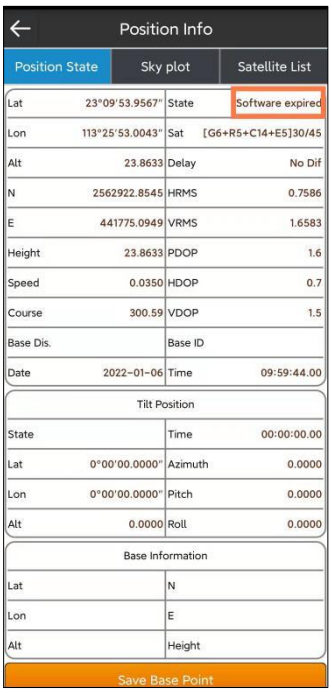

Figure 126

When the upper right corner of the [Configure] main interface prompts "software expired"(Figure 127, 128), then we need to enter a new registration code. Execute [Project] → [About Software], as shown in Figure 129, enter the new registration code in the box for entering the registration code or scan two QR code registration (Figure 130), click "Register" (Figure 131).

Figure 132

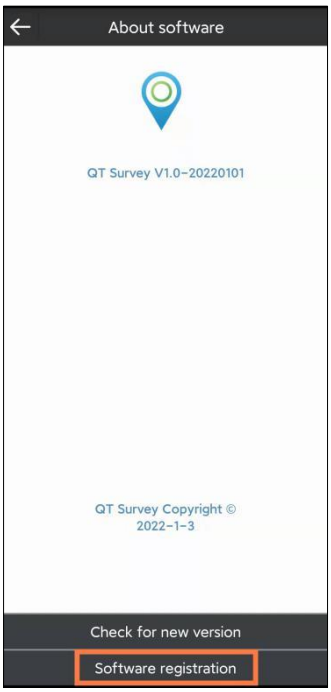

Figure 133

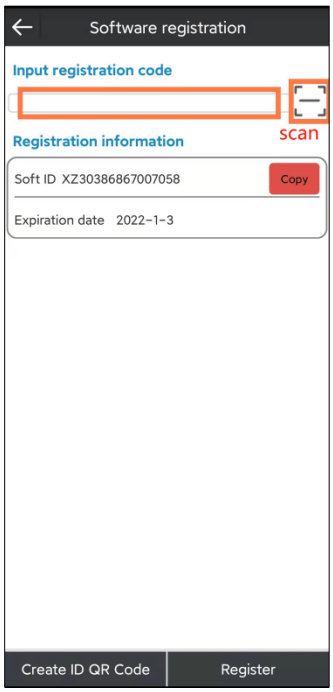

Figure 134