X11

Data sheet



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Edit history

Version number	Modified date	author	Modifications
V1.0	August 10, 2024	Chen Xian	Initial version
V1.1	November 5, 2024	Chen Xian	Function description modification
V1.2	December 24, 2024	Chen Xian	Add external interface descriptions, dimension drawings, and aviation connector wiring sequence definitions.
V1.3	December 25, 2024	Chen Xian	Added photos of each accessory in the package list.
V1.4	December 25, 2024	Chen Xian	Template modification
V1.5	December 27, 2024	Chen Xian	Functional details description optimization
V1.6	February 6, 2025	Chen Xian	SMA interface description modified
V1.7	March 17, 2025	Chen Xian	Radio Protocol Modification

1. Product Introduction

The X11 smart antenna integrates multiple functions including RTK high-precision positioning, Bluetooth, radio, 4G communication, Wi-Fi, and TF card data storage. Its core capabilities include: providing centimeter-level positioning accuracy to ensure the reliability of positioning data; supporting short-range wireless communication such as Bluetooth and Wi-Fi for seamless device connectivity; supporting remote data transmission and network connectivity via 4G and radio to adapt to diverse application scenarios; built-in TF card storage for offline recording and management of critical data; and a rich interface design for easy integration with various devices.

This product is suitable for fields such as autonomous driving, drones, surveying and mapping, agricultural machinery, and marine vessels.

2. Product Features

- 4G Cat.1
- Full-band RTK positioning
- Bluetooth communication
- Wi-Fi communication
- Radio communication
- Handheld communication
- Online upgrade
- Built-in TF card slot
- Free switching between mobile station and base station

3. Product Specifications

Classification	Property	Description
Host Features	4G operating frequency band	LTE FDD B1/ 3/ 5/ 8
		LTE TDD B34/ 38/ 39/ 40/ 41
	Supported by operators	Universal
	Communication methods	TCP, UDP
	Bluetooth	Supports BLE 5.2
	Transmission distance	30 meters
	Radio transmission	Customization based on customer needs

	distance	
	Radio operating frequency band	Customization based on customer needs
	Radio Support Agreement	SOUTH, TT450S, MAC
	Wi-Fi	Customization based on customer needs
	Wi-Fi transmission distance	Customization based on customer needs
Electrical characteristics	Operating voltage	9V ~ 45V
	Operating current	≤600 mA @ DC12V
	Built-in backup power	5200 mAh @ 3.7V
	Working hours	≤ 10 hours (typical workload: 4G+RTK continuous working mode)
	charger	5V 1A
Environmental characteristics	Operating temperature	-20℃ ~ +75℃
	Storage temperature	-40℃ ~ +75℃
	Operating humidity	10% ~ 85% RH, non-condensing
Mechanical properties	Waterproof rating	IP66
	Main unit size	122×122×43.09 mm
	Main unit weight	375 grams
	Material	ABS+PC
GNSS characteristics	Supports constellations and frequencies	GPS: L1, L1C, L2C, L2P, L5
		BDS-2: B1I, B2I, B3I
		BDS-3: B1I, B3I, B1C, B2a, B2b
		GLONASS: G1, G2, G3

		Galileo: E1, E5a, E5b, E6
		QZSS: L1, L2C, L5
		SBAS: L1
		IRNSS*: L5
	RTK positioning accuracy	2cm ± 1ppm
	PPP positioning accuracy	≤50 cm (static open environment)
	Speed measurement accuracy	≤0.02m/s (1σ, PDOP≤4)
	Capture Time	Cold start ≤40 seconds
		Warm start ≤25 seconds
	Sensitivity	Tracking sensitivity: -155 dBm
		Acquisition sensitivity: -138 dBm
	Update rate	1~10Hz (default 1Hz)
	baud rate	115200~460800 bps (default 115200 bps)
	Data format	NMEA 0183
	Differential data	RTCM 3.3/3.2/3.1/3.0
other	Explosion-proof certification	We can assist clients with explosion-proof certification.

4. Main Functions of the Product

Classification	Function	Description	Functional status
Main functions	RTK positioning	This product supports the NTRIP protocol and achieves high-precision RTK positioning by receiving differential	✔

		signals from base stations, with an accuracy down to the centimeter level.	
	JT/T808	This product supports the Ministry of Transport industry standard JT/T 808-2013 "Communication Protocol and Data Format for Satellite Positioning System Terminals of Road Transport Vehicles".	✔
	SMS Configuration	This product supports remote adjustment of device operating parameters via SMS. Users can easily configure the device without connecting to a platform, making it convenient to operate.	✔
	Bluetooth configuration	This product supports connection to the device via Bluetooth from a mobile phone, allowing for easy adjustment of device operating parameters. It is simple to operate and convenient to use.	✔
	Serial port configuration	This product supports adjusting the device's operating parameters via an external aviation plug interface, providing a more flexible control method.	✔
	JT/T808 configuration	This product supports adjusting the device's operating parameters via the JT/T808 platform. Note: This function requires platform support.	✔
	Work mode	It supports switching between two working modes: mobile station and base station.	✔
	Online upgrade	This product supports online firmware upgrades.	✔

	Blind spot pass	When the device loses network access, the JT/T808 positioning data will be saved locally, and the data will be automatically pushed to the platform after the network is restored.	—
	Dual IP transmission	The device supports dual IP configuration, which can simultaneously push JT/T808 positioning data to two IP addresses.	—
	Handbook connection	This product supports Bluetooth connection to handheld devices.	✔
	Wi-Fi configuration	This product supports Wi-Fi connection via mobile phone, allowing you to easily control and adjust device parameters.	—
	TF card	TF cards are used to store device operation logs.	—
(Function status description: ✔ indicates that it has been implemented) —Indicates reservation)			

5. Product Indicator Light Definitions



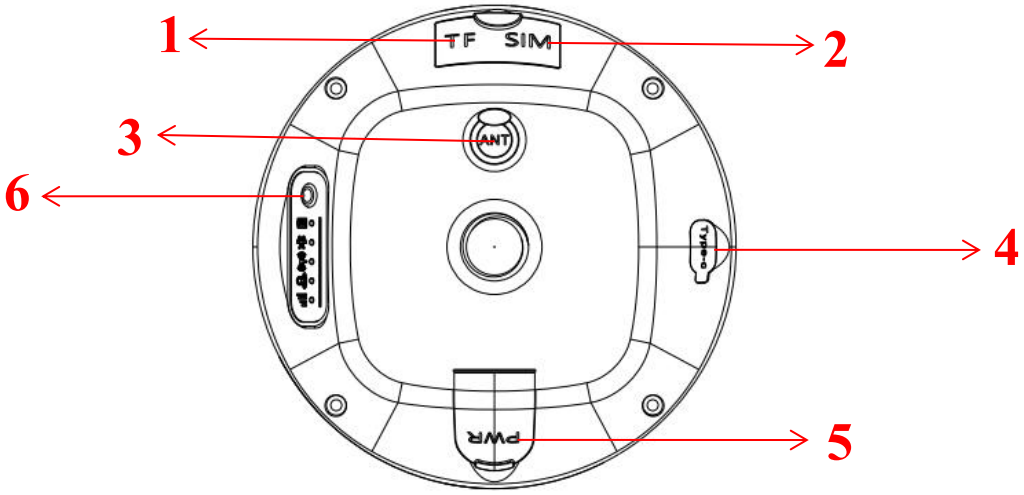
Indicator light diagram

X11 Smart Antenna

SN.	Icon	Indicator lights	color	Definition	LED display	Functional status
1		communicating	red	Cardless	2 seconds 1 flash	✔
				Searching online/Card overdue	Light on	✔
				Online registration successful	1 flash per second	✔
				Connection to server successful	flashes per second	✔
2		position	yellow	Unlocated	2 seconds 1 flash	✔
				2D positioning	1 flash per second	✔
				Single point solution	flashes per second	✔
				Floating-point solution	flashes per second	✔
				Fixed solution	Light on	✔
3		Radio station	green	Radio station not connected	Extinction	✔
				Radio station connected	Light on	✔
4		Bluetooth	blue	Bluetooth not connected	1 flash per second	✔
				Bluetooth	Light on	✔

				connected		
5		power supply	green	Power off	Extinction	✔
				Work	Light on	✔
(Function status description: ✔ indicates that it has been implemented) —Indicates reservation)						

6. External Interfaces of the Product



SN.	Interface	Function	Status
1	TF card slot	Store local data	—
2	SIM card slot	SIM card slot communication	✔
3	SMA female	Radio antenna connector (SMA female	✔
4	Type-C	Charging port (data transfer function requires	✔
5	aviation plug	Data transmission (see Table 1 for line	✔
6	Power button	Press and hold for 3 seconds to turn on/off.	✔
(Function status description: ✔ indicates that it has been implemented) —Indicates reservation)			

Figure 1: Definition of aviation connector wiring sequence

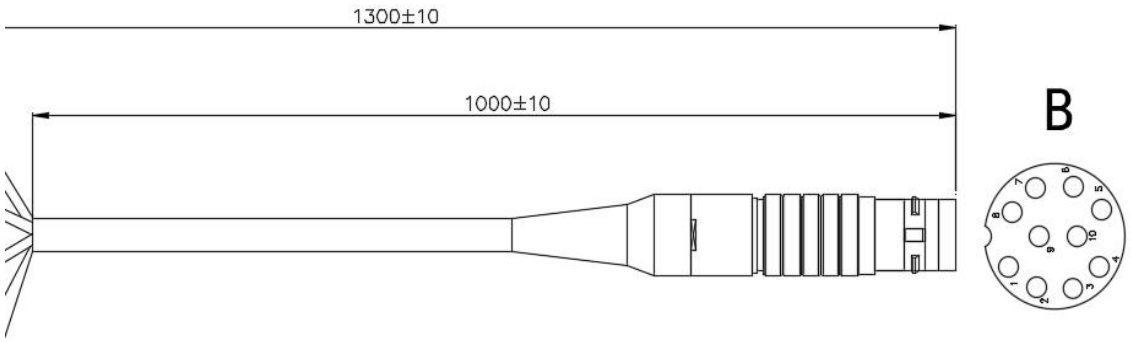
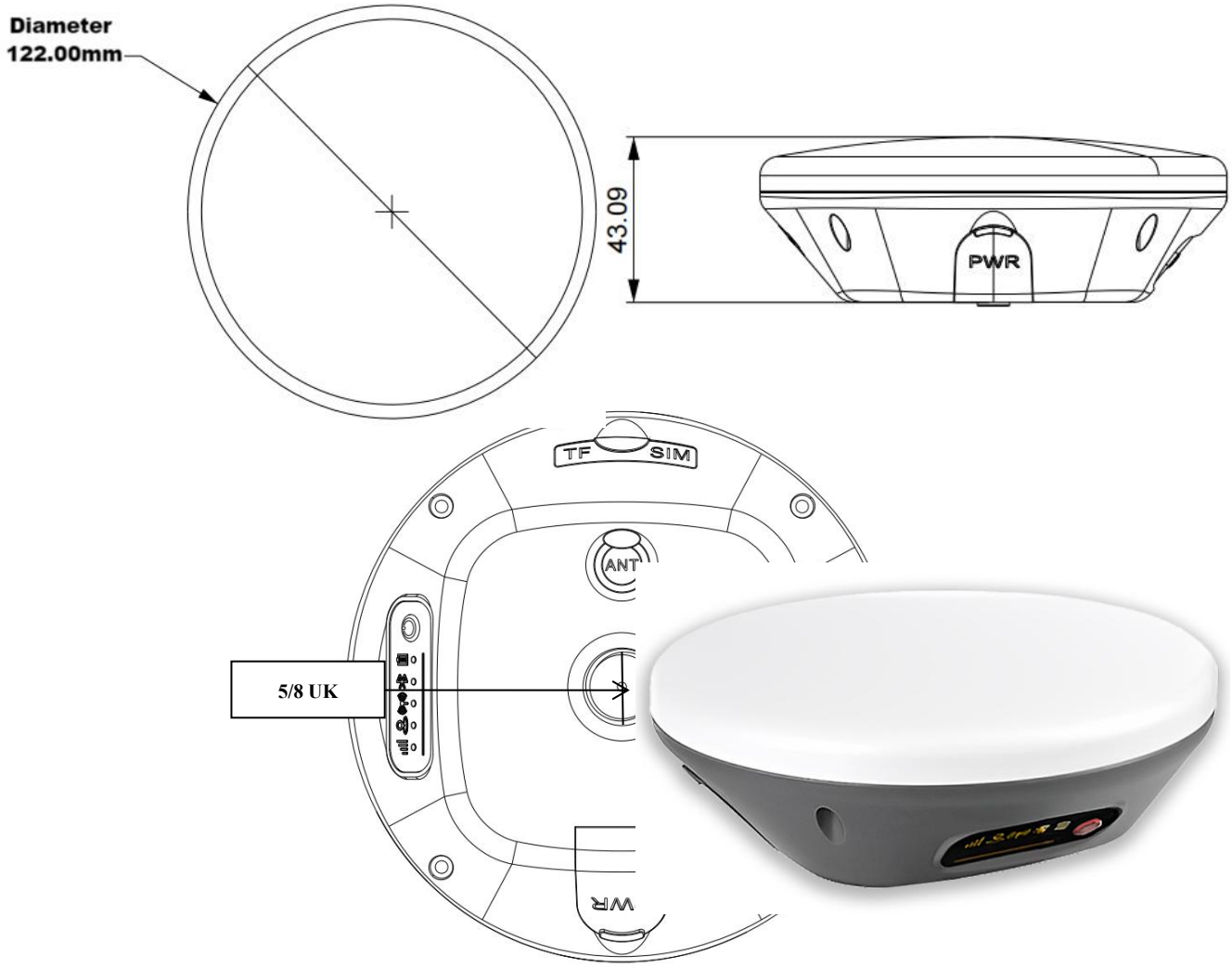


Table 1: Definition of Aviation Connector Wiring Sequence

Serial Number	color	Function	Functional status
1	red	Power input (DC 9-45 V)	✔
2	black	GND	✔
3	blue	MCU RX (RS23 2-level 9600bps)	✔
4	green	MCU TX (RS23 2-level 9600bps)	✔
5	yellow	GNSS TX (RS23 2-level 1152 00bps)	✔
6	orange color	GNSS RX (RS23 2-level 1152 00bps)	✔
7	Purple	BOOT0 (Firmware upgrade mode control)	✔
8	brown	Reserved	—
9	grey	Reserved	—
10	White	Reserved	—
(Function status description: ✔ indicates that it has been implemented) —Indicates reservation)			

7. Product Dimension Drawing



8. Product Appearance Drawings



Bottom view

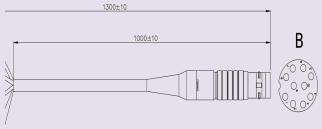
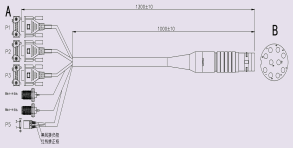


Front view



Bottom view

9. Packing List

SN.	Name	QTY	Unit	Remark	Image
1	terminal equipment	1	tower	Standard configuration	
2	Aviation connector harness bare wire	1	strip	Standard configuration	
3	Aviation connector harness to DB9 1 to 3 splitter	1	strip	Optional	
4	RS232 to USB cable harness	1	strip	Optional	
5	Type-C USB cable harness	1	strip	Optional	
6	Magnetic base	1	indivual	Optional	

10. After-sales service

(1) For equipment damage during the warranty period caused by non-human factors or product quality issues, please contact the distributor promptly.

(2) We will not repair damage caused by unauthorized disassembly by customers or by force majeure (such as floods or fires).

(3) After the warranty period expires, for any product damage or malfunction caused by use, a repair material cost will be charged.

(4) We provide free consultation and technical services for product purchase, use, and installation.

11. Instructions for Use

11.1 SIM Card Installation

After the SIM card is installed, press and hold for 3 seconds to power on.



Push the SIM card into the card slot.

11.2 Charging Method



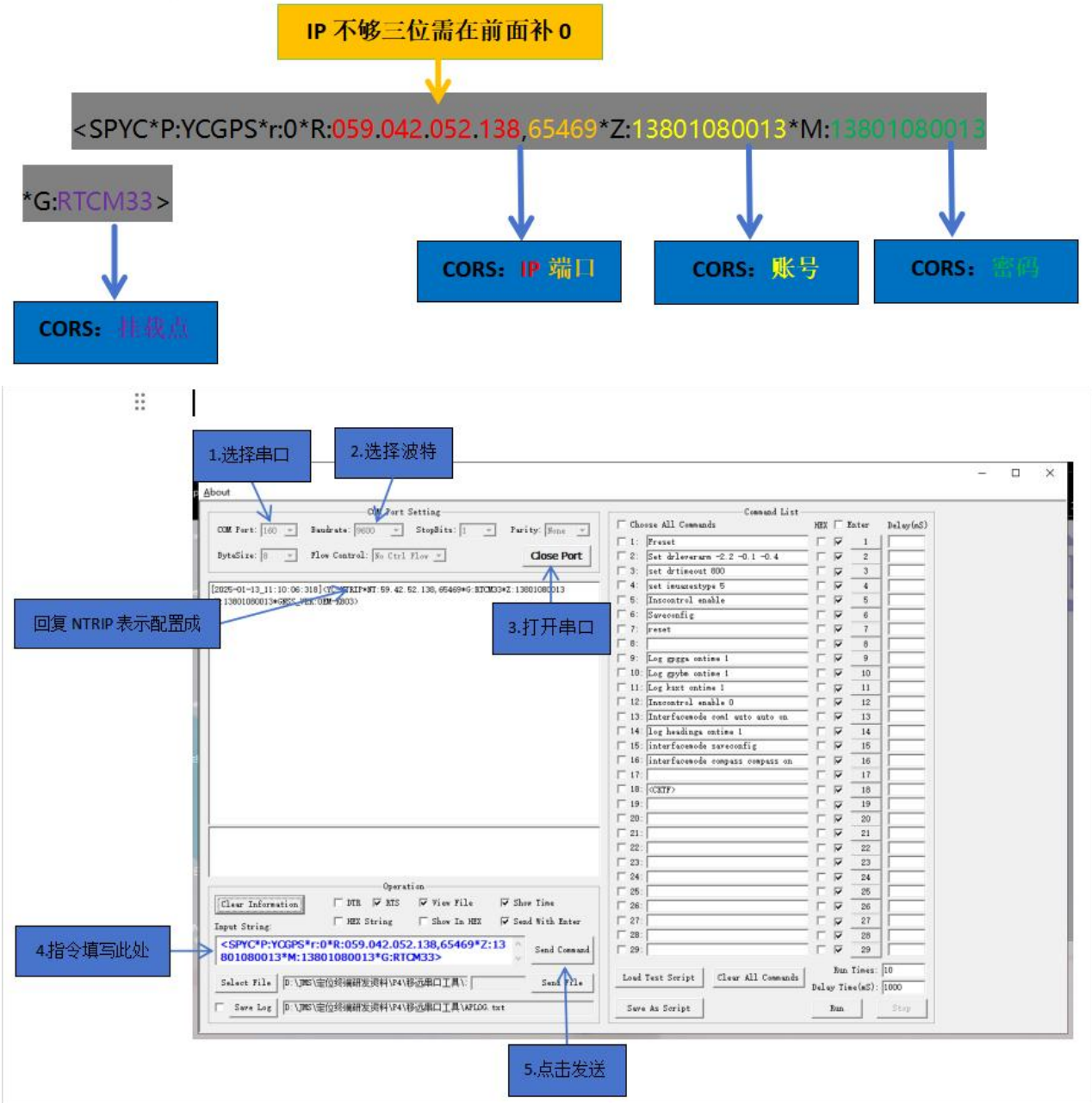
A. Connect the "aviation plug " to the terminal;

B. Connect the red and black wires to a DC 9V ~ 45V power supply. The power indicator light will stay on when charging is in progress.

11.3 Configure NTRIP account (MCU serial port method)

A. The blue and green wires on the device are for the MCU serial port, with a baud rate of 9600. If connection to a computer is required , an RS232 to USB adapter cable must be used . See "Table 1: Aviation Connector Wiring Sequence Definition" for details.

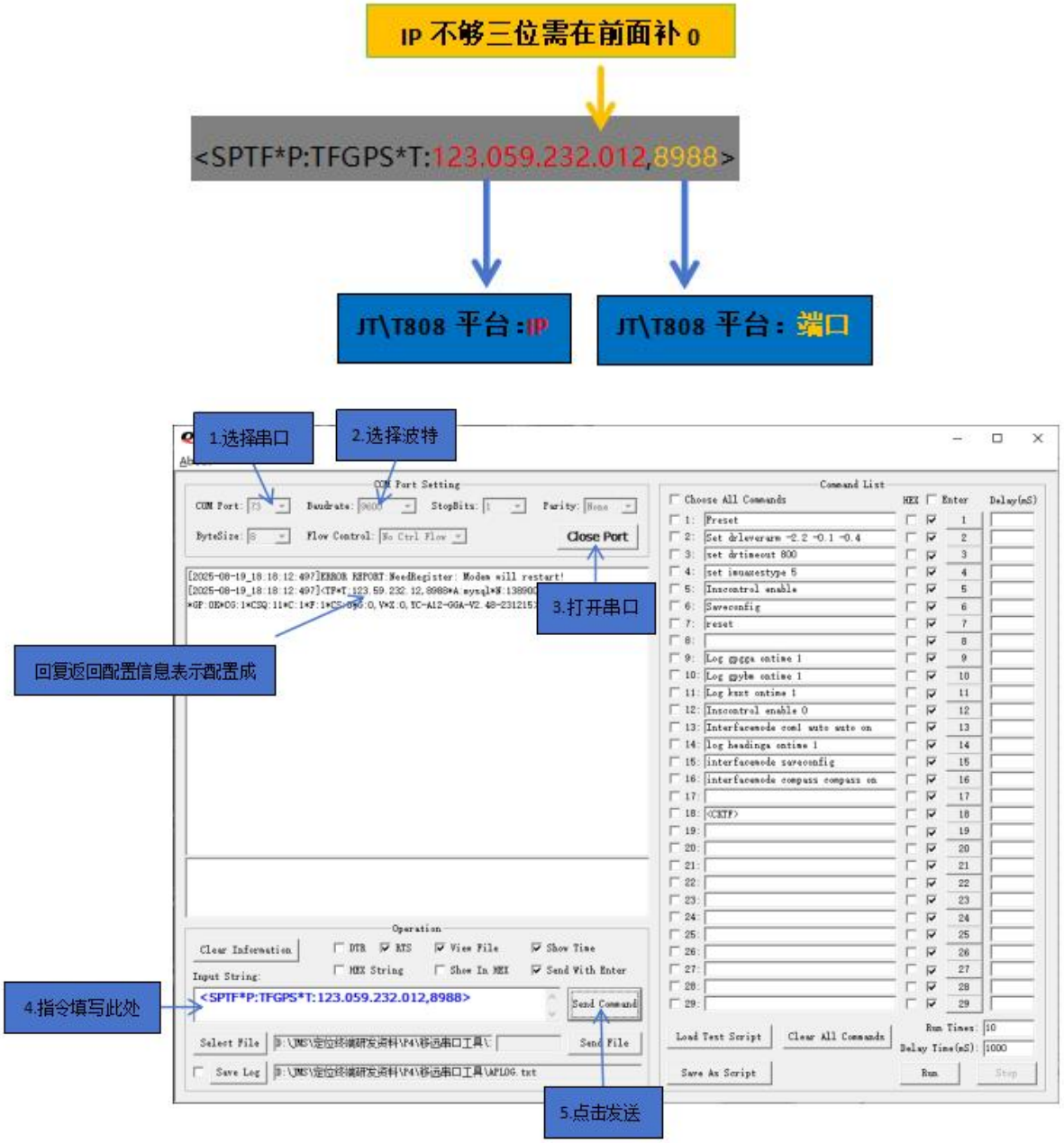
B. The example instructions should be modified according to the implementation details;



11.4 Configuring the JT/T808-2013 Platform (MCU Serial Port Method)

A. The blue and green wires on the device are for the MCU serial port, with a baud rate of 9600. If connection to a computer is required , an RS232 to USB cable must be used . See "Table 1: Aviation Connector Wiring Sequence Definition" for details.

B. The instruction example can be modified according to the implementation (this parameter can be configured selectively);



11.5 Configure NTRIP account (SIM card SMS method)

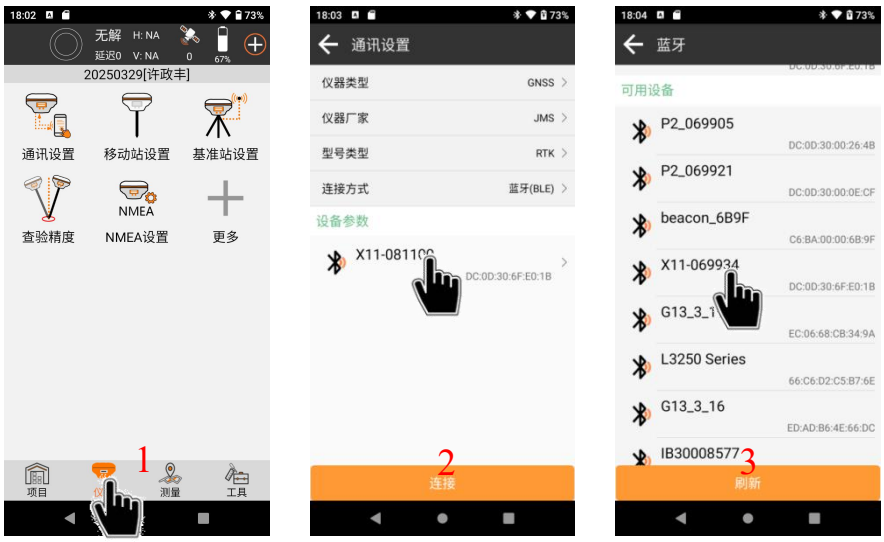
A. Press and hold the power button on the device for 3 seconds until the device powers on. After powering on, observe the flashing of the red communication light. If the red light flashes once per second, it indicates that the device has successfully recognized the SIM card and completed the dialing process.

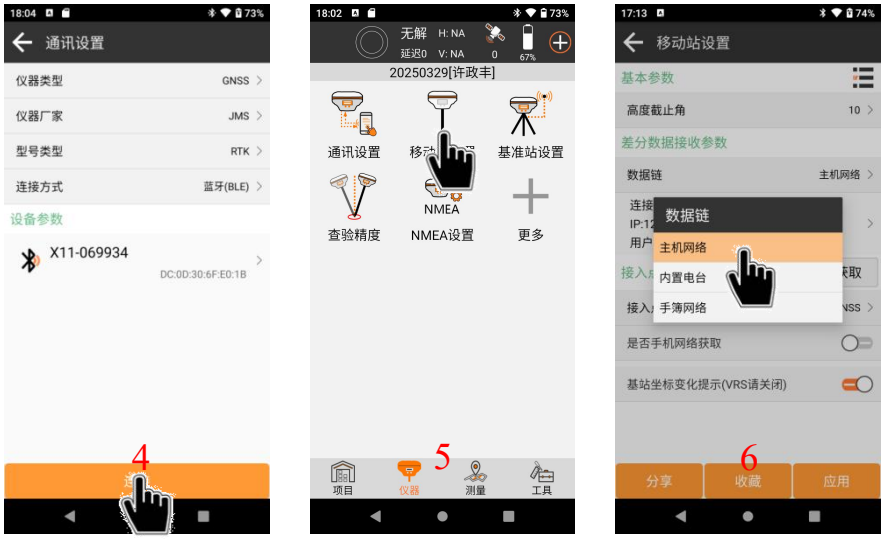
B. Open the SMS editing interface on your phone. Send the command via SMS to the device's SIM card number. After receiving the configuration command, the device will reply with a confirmation SMS, indicating that the command has been successfully received and executed.

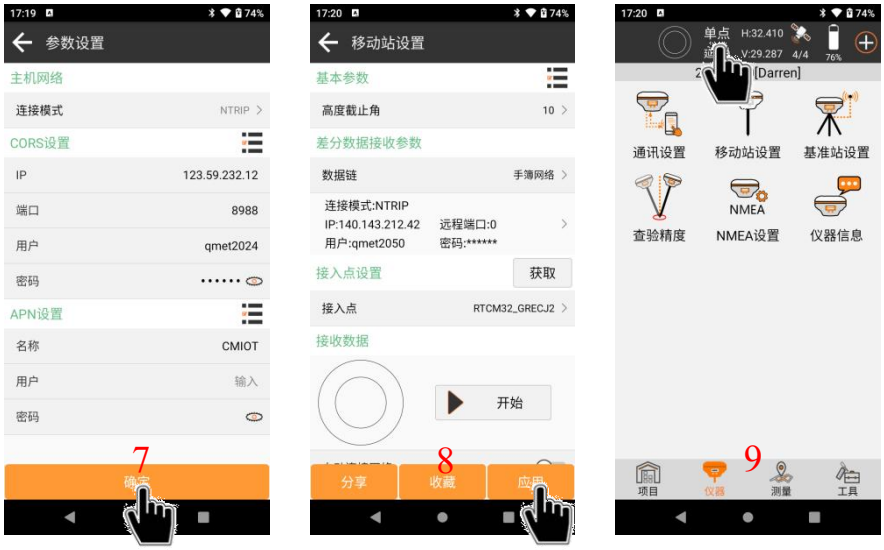


11.6 App Configuration X11 Mobile Station Working Mode

A. Install the program XSurvey_V1.0.20250510.apk on an Android phone.

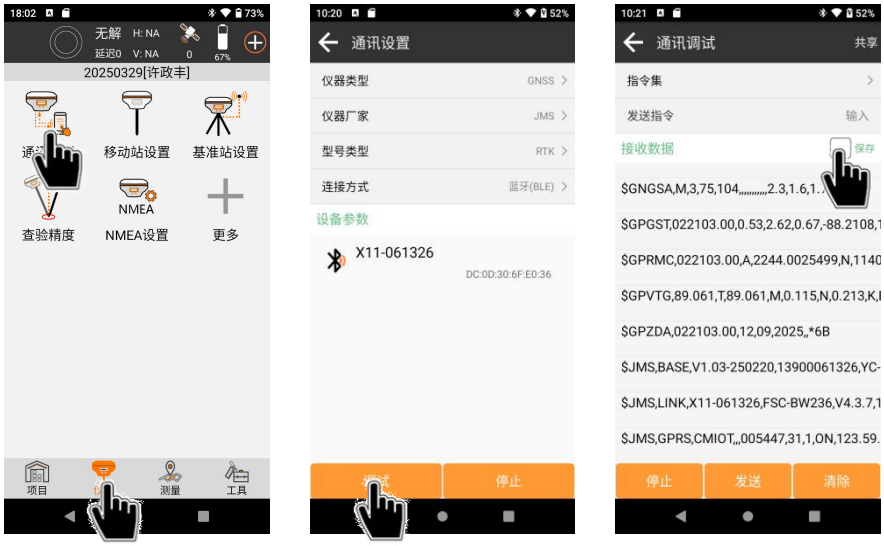






Following the steps above will configure the device for NTRIP and set it to mobile station mode. Moving it to an open outdoor area will then convert it to a fixed solution.

11.7 Method for Saving Raw X11 NMEA Data in an App



By following the above steps, you can save the log data and NMEA raw data during the X11's operation to the local device. Copying them to a computer can then be used for problem analysis.

12. Common Problem Analysis and Troubleshooting

Fault phenomenon	Cause Analysis	processing method
The platform is not online.	SIM card service suspended due to unpaid bills	Contact your internet service provider to pay your bill.
	SIM card contact problem	Reinstall SIM card
	Incorrect online parameter settings	Refer to section 11.4 for setup instructions.
	SIM card locked	Contact your network operator to unlock your SIM card.
	The device is located in a basement/tunnel/with weak signal.	Leave the area with poor signal

	Replacing the device will cause the device to lock.	Contact your network operator to unlock.
Unable to locate	The equipment is installed indoors/by a window/in a parking lot.	Leave the above areas and go to an open outdoor area.
	Antenna not installed/Antenna face not facing upwards	Adjust antenna placement
Unable to fix the solution	SIM card service suspended due to unpaid bills	Contact your internet service provider to pay your bill.
	SIM card contact problem	Reinstall SIM card
	RTK account settings error	Refer to section 11.3 for setup instructions.
	RTK mount point configuration error	The default mount point uses the WGS84 coordinate system.

13. Explanation of Differences Among Products in the Same Series

Product Model	Positioning solution	Function Description
X11	All-Star Full-Frequency	Default version
X11P	All-Star Full-Frequency	Support PPP