Chengdu Ebyte Electronic Technology Co.,Ltd

Wireless Modem

User Manual



E90-DTU(400SL22P)

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1. Introduction

1.1 Brief introduction

E90-DTU (400SL22P) is a true high-quality industrial-grade wireless digital radio. The power supply supports 3-level protection, RS485 and RS232 support 4-level protection, and the RF port supports 4-level ESD protection. It can be used in industrial applications where the electromagnetic environment is more complicated. The radio adopts LORA spread spectrum technology, and its powerful anti-interference ability makes wireless communication more stable and reliable in the industrial field.

It has multiple transmission modes, working in the (410.125 ~ 493.125MHz) frequency band (default 433.125MHz), the radio provides transparent RS232/RS485 interface, supports 8 ~ 28V voltage input. LoRa direct-sequence spread spectrum technology will bring longer communication distances, and has the advantages of concentrated power density and strong anti-interference ability. The module has a software FEC forward error correction algorithm, which has high coding efficiency and strong error correction capability. In the case of sudden interference, it can actively correct the interfered data packets, greatly improving reliability and transmission distance. In the absence of FEC, such packets can only be discarded. The radio has data encryption function, and the data transmitted by the radio in the air has randomness. The data interception is meaningless through strict encryption and decryption algorithms; the packet length setting is supported, and different real-time and data packets are supported.

As a communication medium, wireless digital radio has the same scope as optical fiber, microwave and bright line: it provides real-time and reliable data transmission of monitoring signals in private networks under certain special conditions, with low cost and installation and maintenance. Convenient, strong diffraction ability, flexible network structure and long coverage. It is suitable for multi-point and location dispersion, complex geographical environment, etc. It can be connected with PLC, RTU, rain gauge, liquid level meter and other data terminals.

1.1.1 Features

- High-level port protection;
- Environmental field strength dynamic indication, data packet RSSI dynamic indication;
- Software and hardware dual watchdogs;
- Wireless air configuration;
- Waterproof, dust and moisture resistance;
- The product is easy to use and configured by the host computer;
- Using the latest LoRa technology, it has a longer distance and more powerful performance than traditional LoRa digital radio stations;
- Using military-grade LoRa modulation technology, with data encryption, the packet length is available for configuration;
- Large single package, single package is up to 240 bytes;
- Simple and efficient power supply design, support power adapter or crimping mode, support 8~28V power supply.
- Transmit power is up to 22dBm, multi-level adjustable, with all technical indicators meeting European industrial standards.
- Support LBT function, the transceiver automatically waits to send data according to the current ambient noise intensity. The communication success rate of the module in harsh environments is greatly improved.
- Remotely configure or read wireless module parameters by sending command packets wirelessly.

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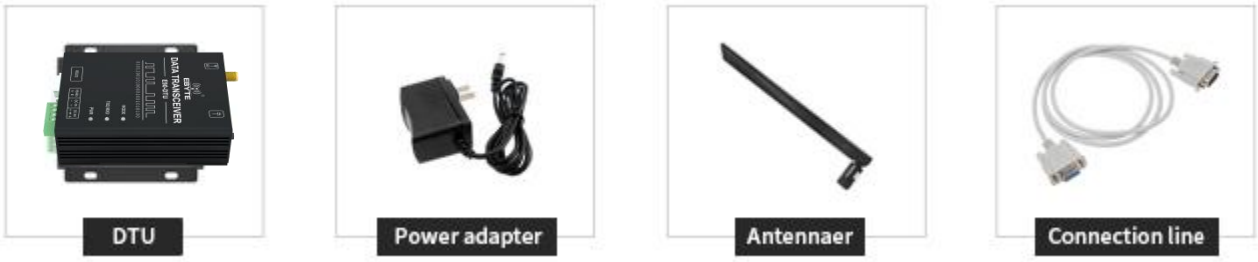
- Support communication key function to effectively prevent data from being intercepted;
- Multi-level relay networking can be realized , which effectively extends communication distance for ultra-long-distance communication.
- With temperature compensation circuit, the frequency stability is better than ±1.5PPM.
- Operating temperature range: -40 ° C ~ +85 ° C, to adapt to a variety of harsh working environment.
- All-aluminum alloy casing, compact size, easy installation and good heat dissipation; perfect shielding design, with good electromagnetic compatibility and strong anti-interference ability.
- Multiple protection functions such as power reverse connection protection, over-current protection, and antenna surge protection greatly increase the reliability of the device.
- Powerful software functions, all parameters can be programmed: such as power, frequency, air data rate, address ID, etc.
- Ultra-low power consumption, standby current is only 12V / 39mA (lower power consumption in power saving mode and sleep mode);
- with built-in hardware watchdog and precise time layout, once an exception occurs, the transceiver will automatically restart, and continue to work according to the previous parameters.

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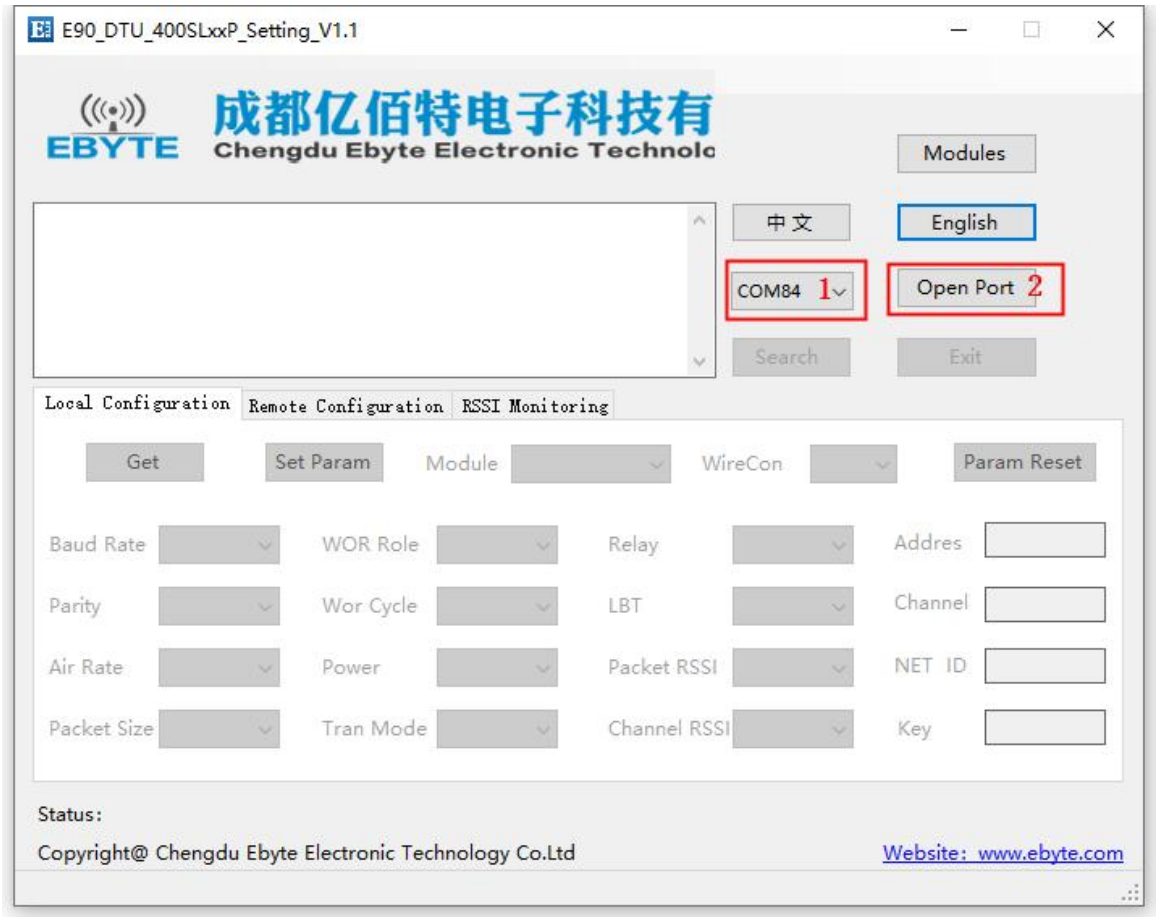
2. Quick Start

You need to prepare items below,



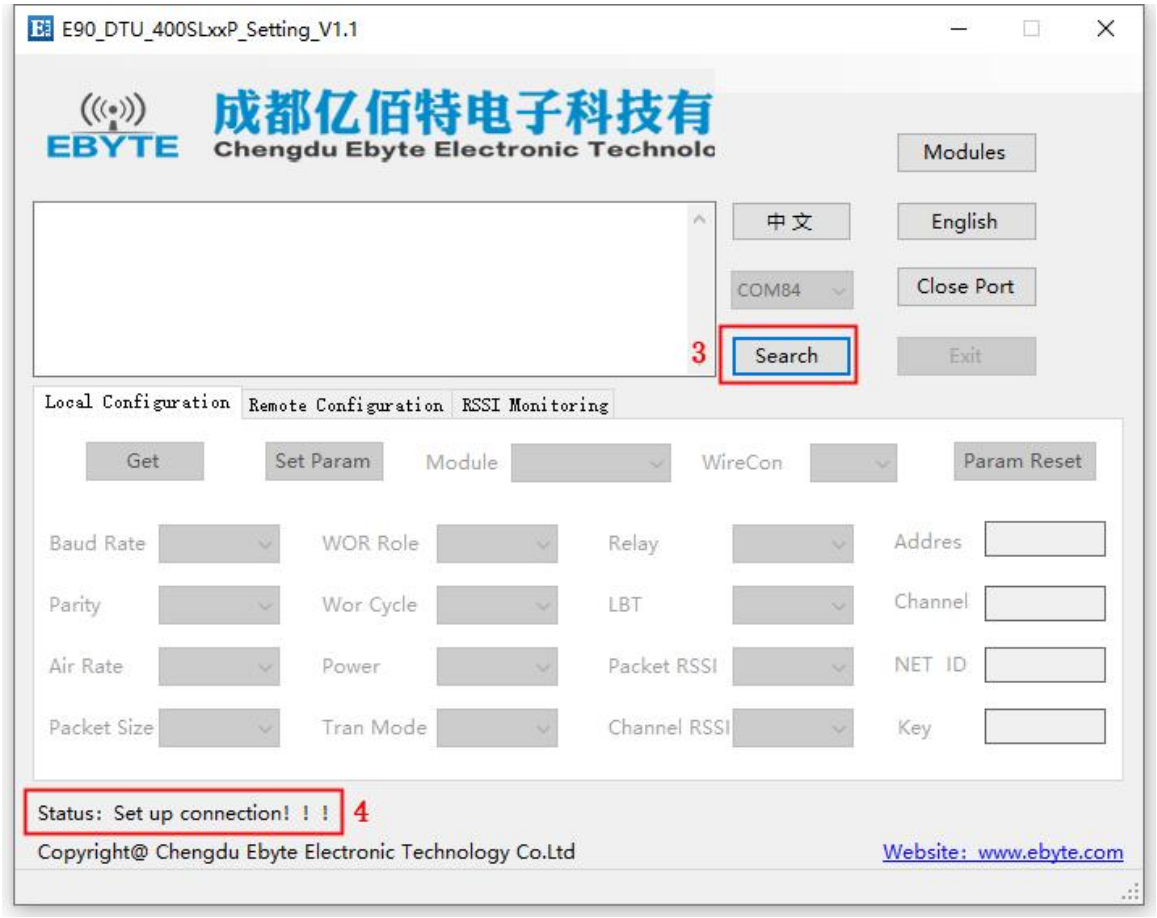
Note: The distance between two high-power DTUs should be more than 1 meter, otherwise it may cause damage!

1. First install the antenna for the digital radio station, and then use USB to RS-232 or USB to RS-485 to connect the computer to the digital radio station. The computer opens the host computer software, selects and opens the serial port, and clicks to search for the device (at this time the host computer The status bar shows: Establishing connection !!!).

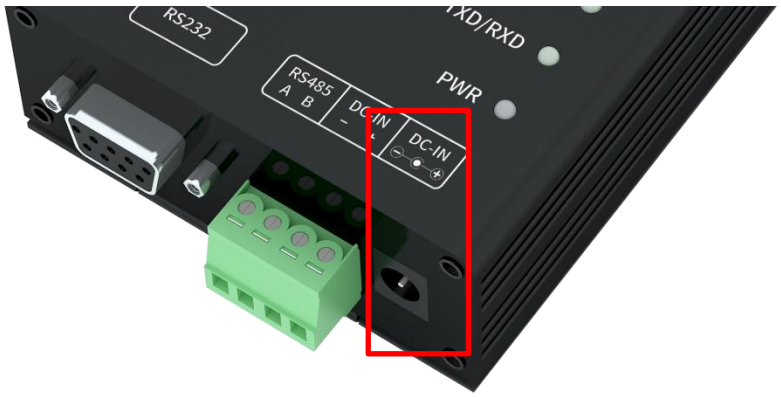


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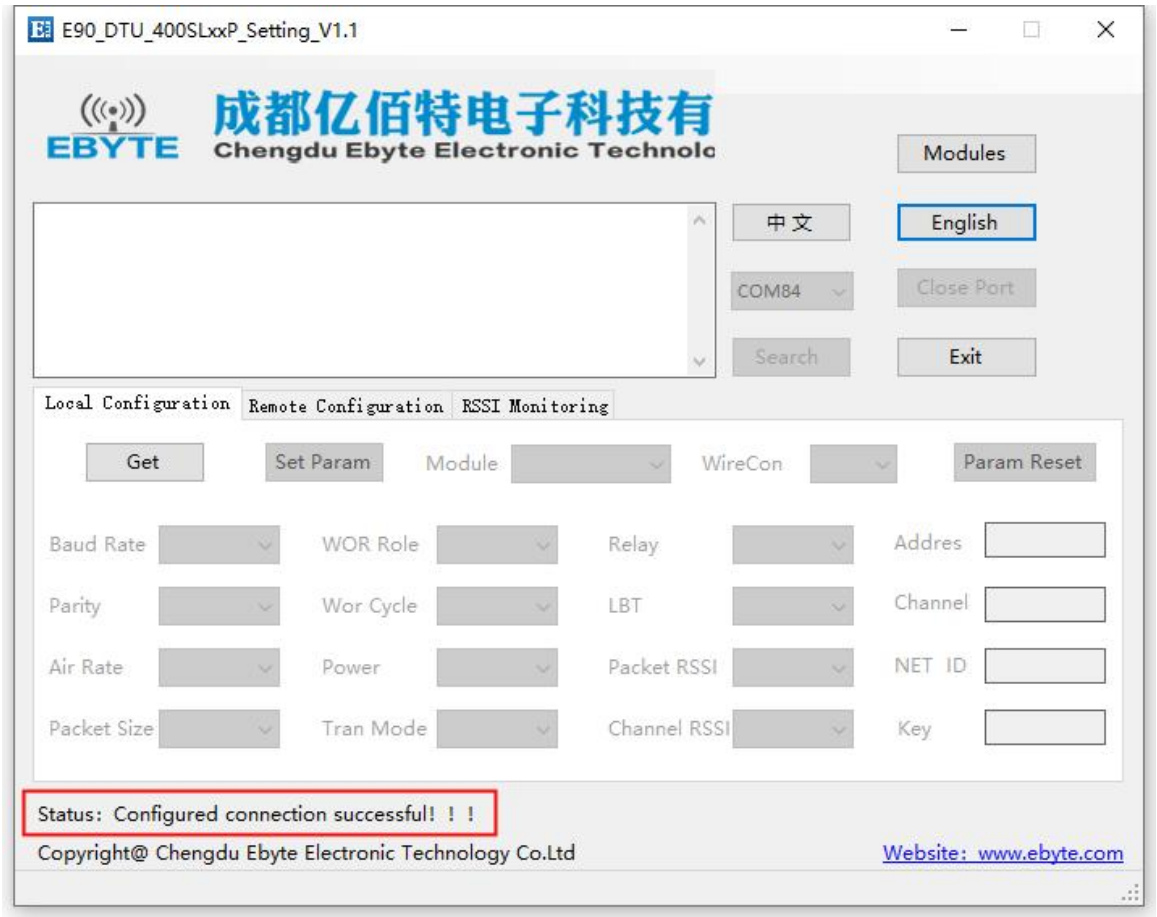


2. Then plug in the radio power, and the device will automatically connect with the host computer (the status bar of the host computer will display: The configuration connection is successful !!!)



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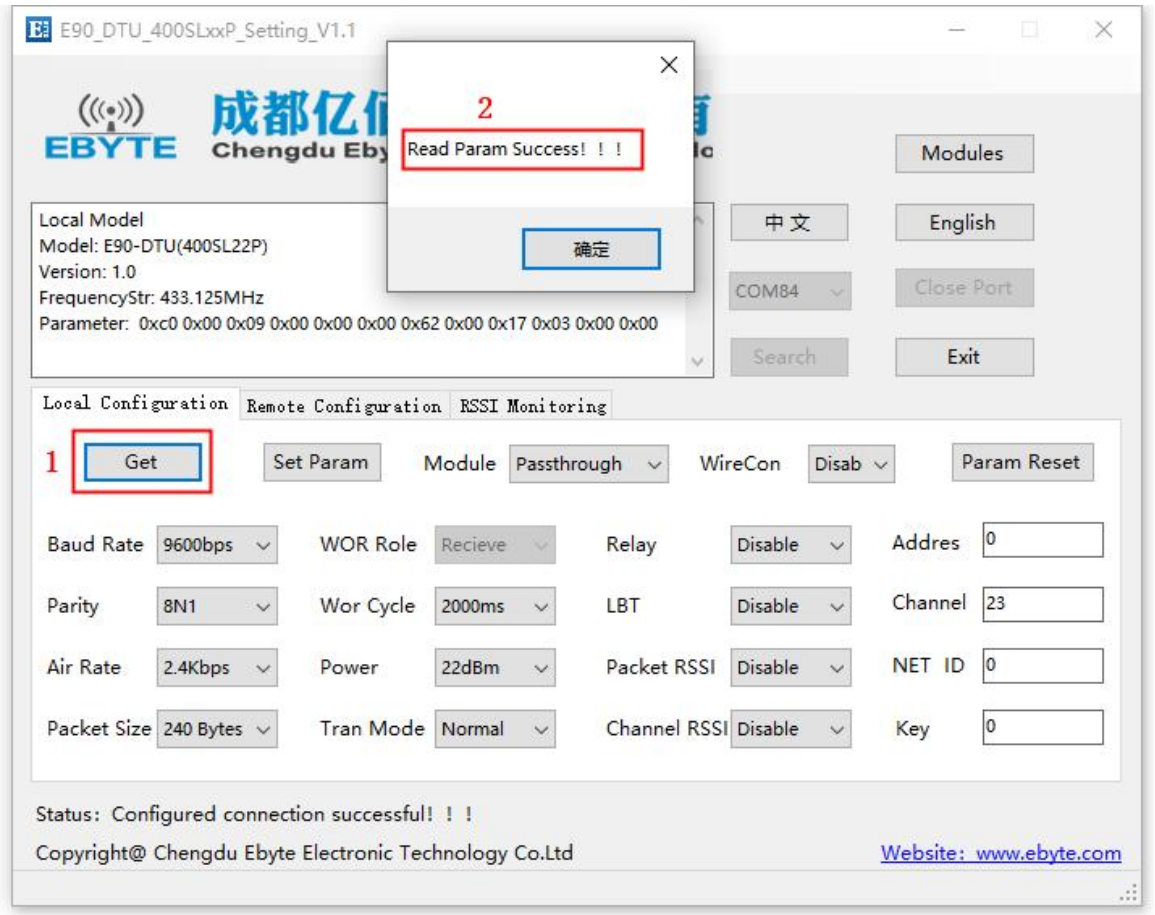


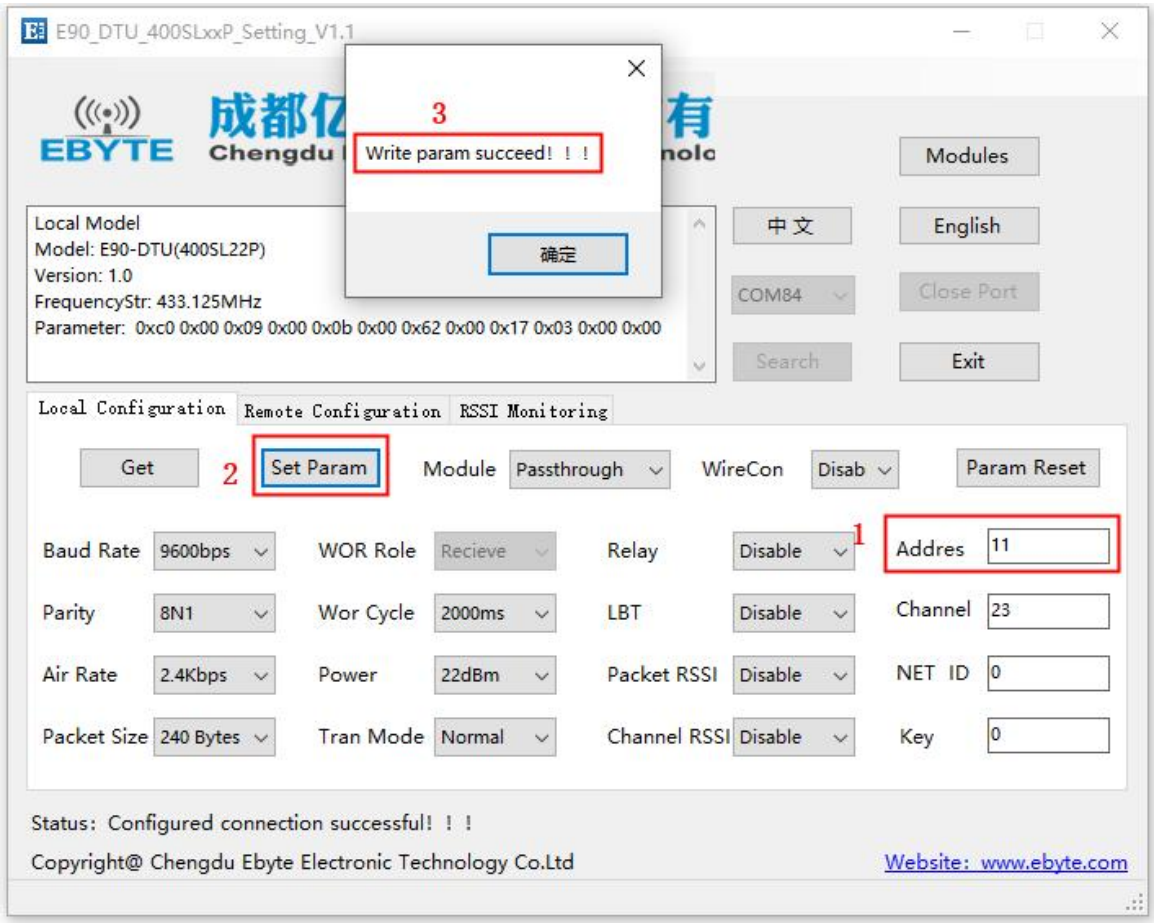
3. After the connection is established, you can use the host computer to configure the parameters of the radio, or remotely configure other module radios.

Please read the parameters before configuration. After selecting the parameters that need to be set and clicking the write parameter button, the parameters can be written into the radio, and it will take effect after exiting the configuration mode.

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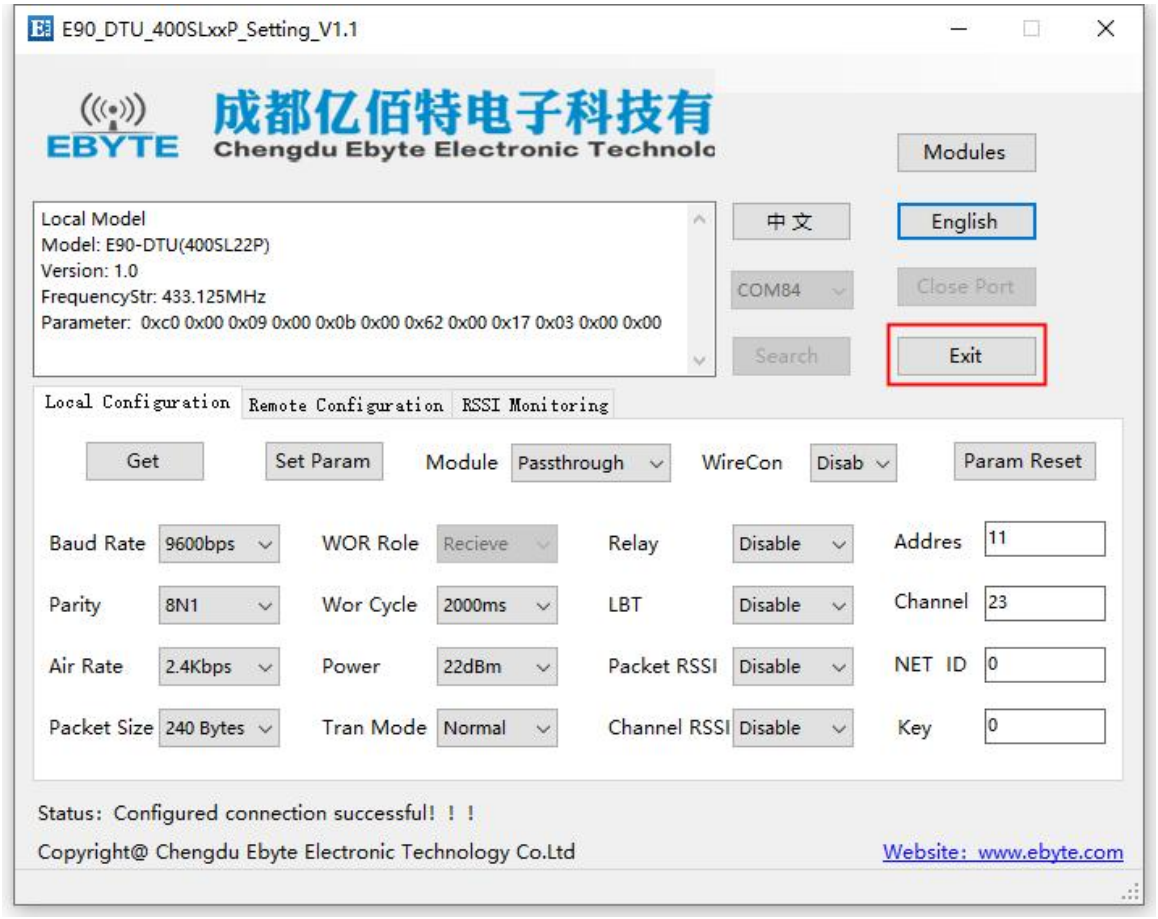




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3. After the parameters are configured, click the exit button, the radio will exit the connection and work according to the set working mode and parameters (no need to restart the radio);

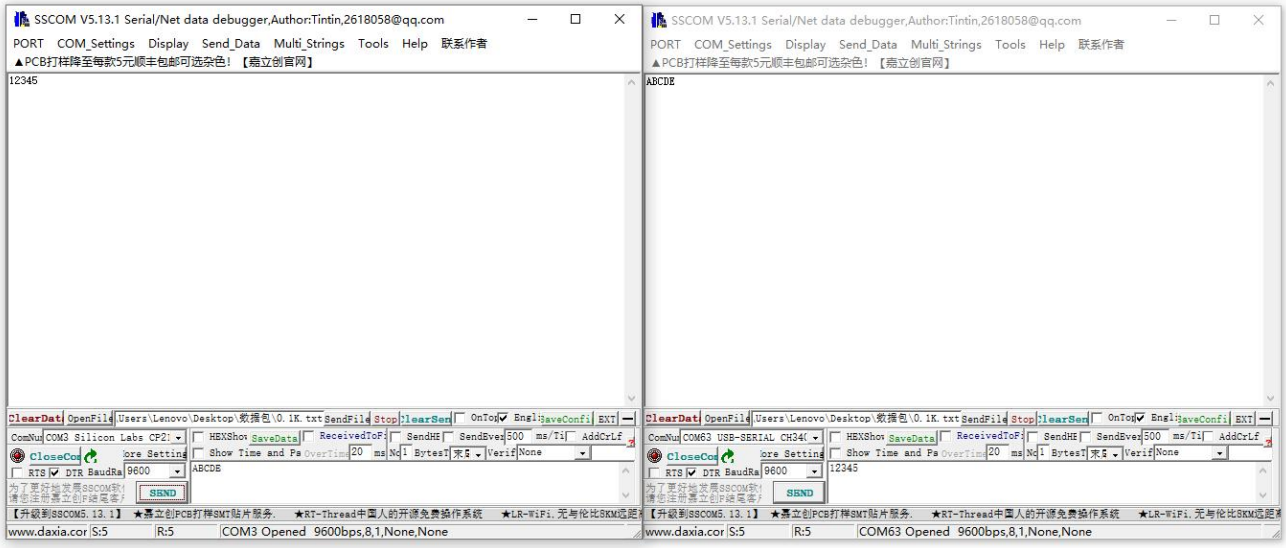


4. Communication test, start two serial port debugging assistants, select the serial port baud rate and verification method that are consistent with the radio parameters, and then realize the serial port transparent transmission (note: the parameters of the two radios need to be set the same);



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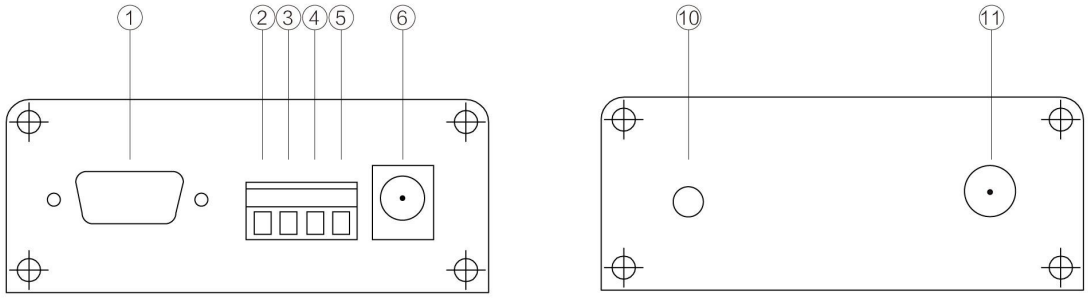


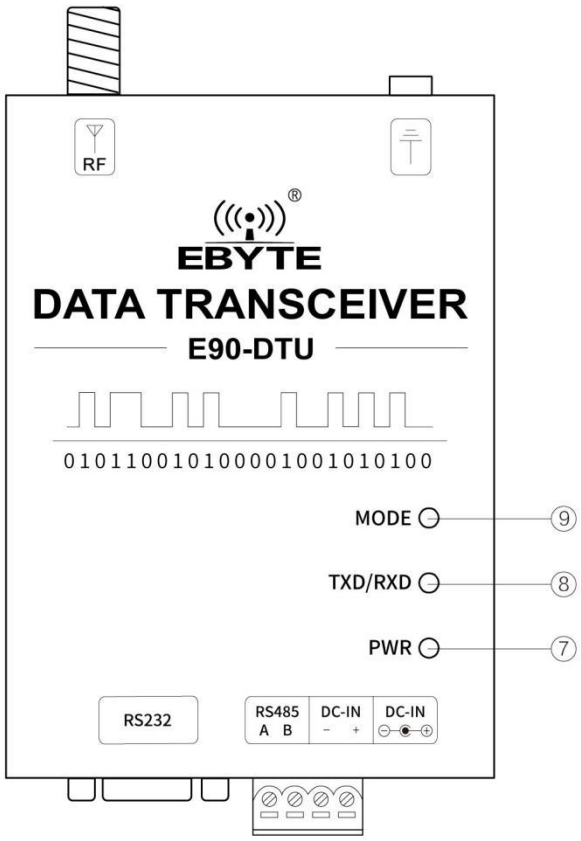
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3. Dimensions

3.1 Parts description





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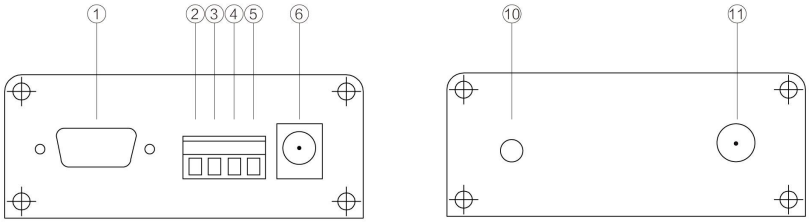
No.	Name	Function	Note
1	RS-232	RS-232 interface	Standard RS-232 interface
2	RS485 A	RS485 interfaceA	RS485 interface A is connected to device A interface
3	RS485 B	RS485 interfaceB	RS485 interface B is connected to device B interface
4	DC-IN -	Crimping power input negative	Power reference ground
5	DC-IN +	Crimping power input positive	Power input
6	DC-IN stand	DC socket 5.5*2.1mm	Power input
7	PWR-LED	Power Indicator	Red, lit when the power is on
8	TX/RX-LED	Data sending and receiving indicator	Green, blinking when sending data. Blue, blinking when receiving data.
9	MODE-LED	Status Indicator	Cyan light on: transparent transmission mode Blue light on: WOR send mode Green light on: Wor receive mode
10	Ground screw	Connect with the earth	Connect with the earth
11	Antenna interface	SMA-K interface	external thread, 10mm, 50Ωcharacteristic impedance

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4. Interface definition

4.1 Power interface



Users can choose ⑥ DC power interface,using the power adapter supply with the interface of the 5.5mm outer diameter , 2.5mm diameter ;

Also users can choose the VCC and GND terminal power supply from ② , both are optional；

It can also be powered by ⑤ VCC terminal and ④ GND terminal, just choose any one of the power supply modes;

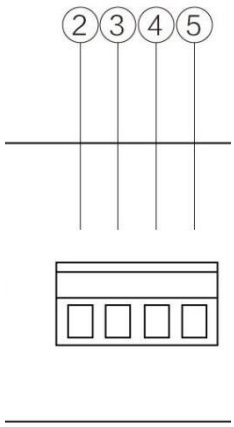
8 ~ 28V DC power supply, it is recommended to use 12V or 24V DC power supply for E90-DTU.

4.2 RS232

The E90-DTU can be connected to the device via RS-232 using the standard DB-9 interface.

4.3 RS485

E90-DTU can use ②485_A terminal and ③485_B terminal to connect RS-485 A terminal and B terminal of the device respectively.



Pin NO.	Definition	Function	Description
2	485_A	RS-485 interface， A interface	The RS-485 interface A is connected to the device

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			interface A
3	485_B	RS-485 interface， B interface	The RS-485 interface B is connected to the device interface B
4	GND	Crimping power interface, negative	The power supply negative pole is connected to the system ground and the housing
5	VCC	Crimping power interface, positive	8 ~ 28V DC, recommended 12V or 24V

Note: When the radio is connected to multiple devices, communication is not smooth, but it is not the case with a single device. Please try to connect a 120Ω matching resistor in parallel between the 485_A terminal and the 485_B terminal.

5. Technical specification

5.1 Model specification

Model No.	Frequency	TX power	Distance	Features	Recommended application
	Hz	**dBm**	**km**		
E90-DTU(400SL22P)	433.125M	22	5	LoRa，anti-interference	Suitable for transmission of fast speed in complex environment with data interference over a long distance

Note: Test condition: in clear and open air without shelters, 12V /2A power supply, 5dBi gain sucker antenna over 2 meters height from the ground, with the factory default parameters.

5.2 General specification parameter

No.	Item	Value	Note
1	Size	82*62*25 mm	See more in 3.*Dimensions*
2	Weight	237.8g	±4.5 g
3	Temperature	-40℃～+85℃	Meet industrial request
4	Antenna impedance	50Ω	Standard 50 Ω characteristic impedance
5	Supply voltage	8～28V DC	It is recommended to use 12V or 24V
6	Communication interface	RS232/RS485	Standard DB9 hole / 3.81 terminal block
7	Baud rate	Default 9600	From 1200~115200
8	Address	Default 0	65536 configurable address

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5.3 Frequency and channel numbers

Model No.	Default Frequency	Frequency Range	Channel Interval	Channel numbers
	Hz	Hz	Hz	
E90-DTU(400SL22P)	433.125M	410.125～493.125M	1M	84，half duplex

Note: In the same area when multiple data transceivers are communicating one to one at the same time , it is recommended to set the channel spacing between each group of data transceivers at 2MHz or more.

5.4 Transmitting power

Model No.	22dbm	17dbm	13dbm	10dbm
E90-DTU(400SL22P)	Default	√	√	√

Note: The lower the transmit power, the closer the transmission distance, but the working current won't be declined in exact proportion , it is recommended to use the maximum transmit power.

5.5 Air data rate

Model	Default	Levels	Air data rate (bps)
	bps		**bps**
E90-DTU(400SL22P)	2.4k	6	2.4、4.8、9.6、19.2、38.4、62.5k

Note: The higher the air data rate, the faster the transmission rate, the transmission distance is also closer; when the rate meets the requirements , the lower air data rate, the better quality.

5.6 Current

Model No.	Tx current mA		Stand-by current mA	
	12V	24V	12V	24V
E90-DTU(400SL22P)	88	46	39	22

Note: It is recommended to retain more than 50% of the current margin when selecting the power supply, which will help the data transceiver to work steadily for a long time.

5.7 TX and RX FIFO and sub-packing method

Model No.	Buffer	Sub-packing method
E90-DTU(400SL22P)	1000 bytes	Can be sub-packed to 32/64/128/240 byte each time via command

Note: 1. When the receiving data is more than a single packet capacity, the beyond part will be automatically assigned to the second transmission until it is completed;

2. The data transceiver cannot receive data which is more than the buffer capacity;

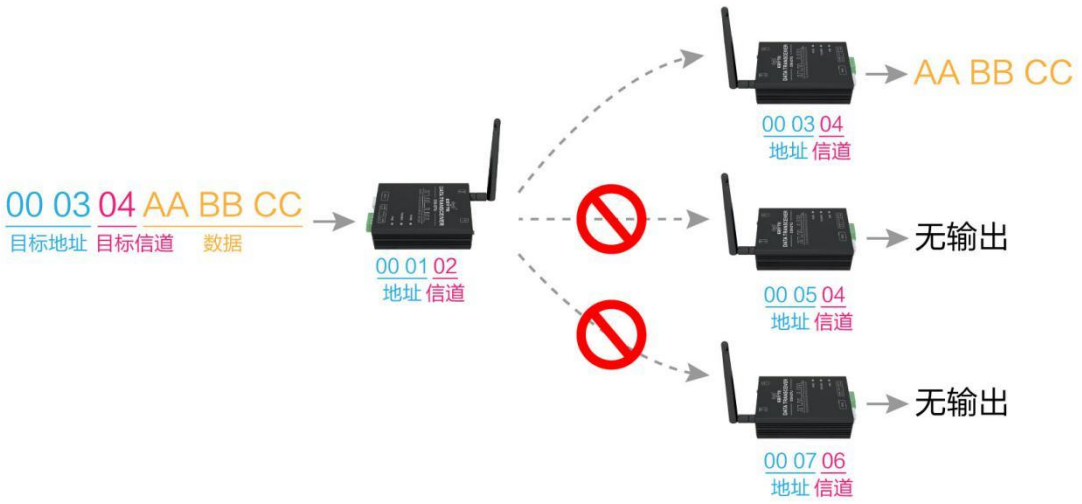
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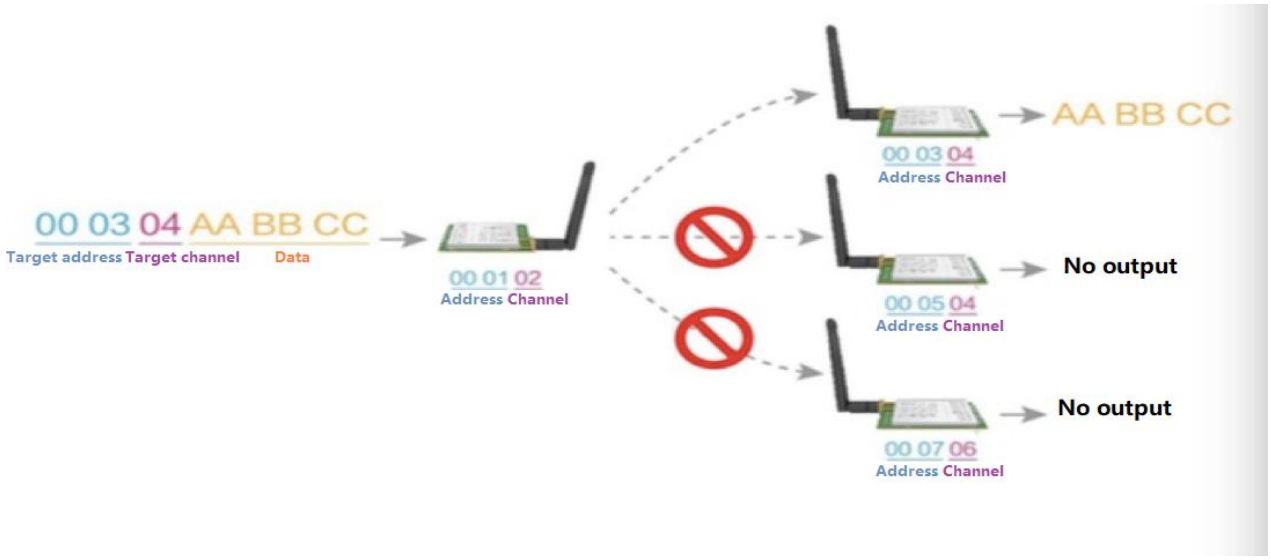
6. Function Description

6.1 Fixed Transmission（Hexadecimal）

During fixed-point transmission, the module recognizes the first three bytes of the serial data received as: Address high + address low + channel, and use it as a wireless transmission target.



6.2 Broadcast Transmission（Hexadecimal）



6.3 Broadcast Address

- For example: Set the address of module A as 0xFFFF and channel as 0x04;
- When module A is the transmitter (same mode, transparent transmission), all modules under channel 0x04 will

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receive the data, the purpose of broadcast is realized.

6.4 Monitor Address

- For example: Set the address of module A as 0xFFFF and channel as 0x04;
- When module A is the receiver, it can receive the data sent from all modules under channel 0x04. The purpose of monitor is realized.

7.Operating mode

The E90-DTU has three working modes, which are configured by the host computer software. Among them, when there is no demand for low power consumption and normal communication is required, it is recommended to configure the radio to the general mode (mode 0); the factory default setting is the general mode (Mode 0).

	Categories	Notes
Mode 0	Normal Mode	Serial port open, wireless open, transparent transmission (factory default mode), support special command air configuration.
Mode 1	Wor sending mode	WOR sender
Mode 2	WOR receiving mode	WOR receiver

- Note: if there is no need for low power consumption, there is no need to care about the wor receiving mode (mode 2).

7.1 Normal mode（Mode 0）

Type	**Software configuration module working in mode 0**
Transmitting	The user can input data through the serial port, and the module will start the wireless transmission.
Receiving	The wireless receiving function of the module is turned on, and the wireless data will be output through the serial port pin after receiving.

7.2 WOR sending mode（Mode 1）

Type	Software configuration module working in mode 1
Transmitting	When defined as a transmitter, a wake-up code will be automatically added for a certain period of time before transmission.
Receiving	It can receive data normally, and the receiving function is equivalent to mode 0

7.3 WOR receiving mode（Mode 2）

Type	Software configuration module working in mode 2
Transmitting	Wireless transmission off

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Receiving	Sleep at ordinary times. Periodically wake up to check whether there is data. If there is data, receive it and enter sleep after processing.

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8. Relay networking mode

No.	Relay mode description
1	After setting the relay mode through configuration, switch to the general mode and the relay starts to work.
2	In the relay mode, ADDH and ADDL are no longer used as module addresses, but are forwarded to the NETID respectively. If one network is received, it is forwarded to the other network. The repeater's own network ID is invalid.
3	In the relay mode, the serial port of the relay module cannot send and receive data and cannot perform low-power operation.
4	When the user enters other modes from mode 3 (sleep mode) or during the reset process, the module will reset the user parameters, during which AUX outputs low level.

Relay network rules:

1. Forwarding rules. The relay can forward data in both directions between two NETIDs.

2. In relay mode, ADDH \ ADDL is no longer used as the module address, and is forwarded and matched as NETID.

3. In the relay mode, please do not send more than the set single packet sub-byte

As shown in the figure:

① Primary relay

"Node 1" has a NETID of 08.

"Node 2" has a NETID of 33.

ADDH \ ADDL of relay 1 is 08 and 33 respectively.

So the signal sent by node 1 (08) can be forwarded to node 2 (33)

At the same time, node 1 and node 2 have the same address, so the data sent by node 1 can be received by node 2.

② Secondary relay

The ADDH \ ADDL of relay 2 is 33,05, respectively.

So relay 2 can forward the data of relay 1 to the network NETID: 05.

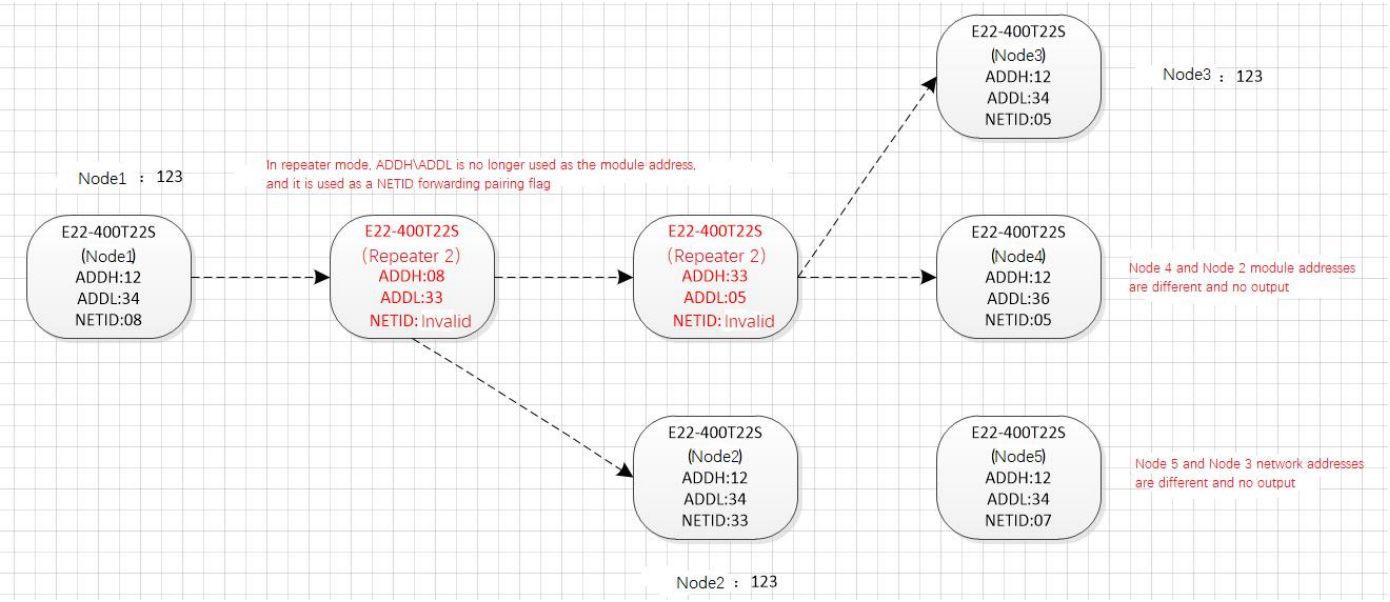
Thus node 3 and node 4 can receive node 1 data. Node 4 normally outputs data. Node 3 and Node 1 have different addresses, so no data is output.

③ Two-way relay

As shown in the figure, the data sent by node 1 can be received by nodes 2 and 4, and the data sent by node 2 and 4 can also be received by node 1.

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When users use the host computer to configure the relay mode, they need to pay special attention. Because each parameter in the host computer is a decimal display mode, the module address and network ID need to be converted when filling in. For example, if the network ID entered by the transmitting end A is 02 and the network ID entered by the receiving end B is 10, when the relay end R sets the module address, it will convert the hexadecimal value 0X020A to a decimal value 522 as the relay end R to fill Module address. That is, the module address value to be filled in by the relay rat this time is 522.

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9. Configuration instructions on computer

9.1 Configuration considerations

(1) after the data transmission station is powered on, there is a self-test time of 3 seconds. During the self-test time, the status light appears blue and flashes rapidly. At this time, use the configuration software to search for the device and connect the device to the computer, and the device will enter the configuration mode (the status light appears blue and flashes once in 1 second). Parameters can be modified by configuration software.

Note: how to establish a connection and enter configuration mode for configuration? Please see 2. Quick start

(2) If no connection is established within the 3 second self-test time, the radio will enter the working mode after the self-test time, the digital radio status light will show different colors according to different working modes, and the configuration software cannot search at this time. device. If you need to reconfigure, you can only reconnect the power, so that the device enters the configuration mode in the self-test state.

9.2 Factory default parameters

model	Frequency	Address	Channel	Air Rate	Baud Rate	Serial Format	Transmit Power
E90-DTU (400SL22P)	433.125MHz	0x0000	0x23	2.4kbps	9600	8N1	1W

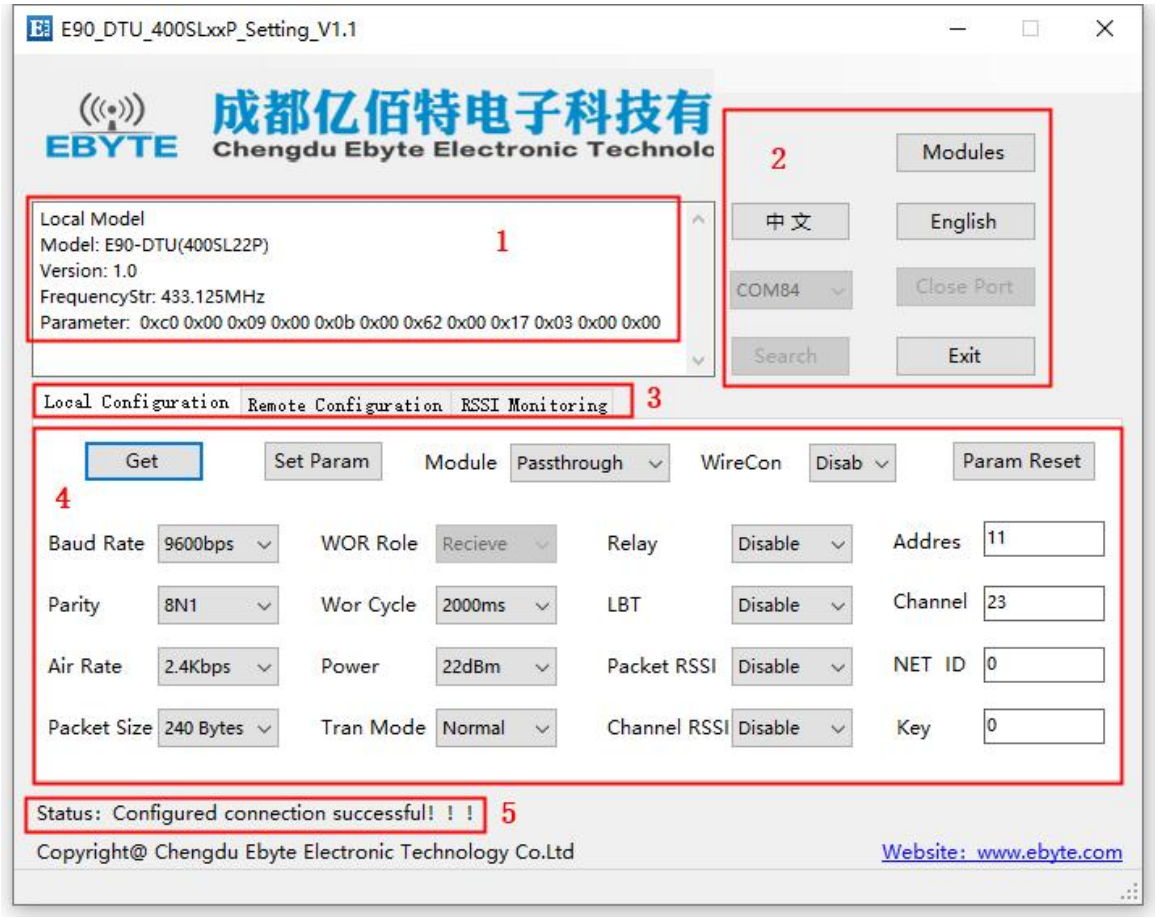
9.3 Configuration software and parameter description

The following figure shows the display interface of the host computer with E90-DTU configuration.

No.	Name	Description
1	Information Bar	Display basic information of the connected station
2	Connection area	Used to select a serial port to establish a connection and switch between Chinese and English
3	Function switching bar	Used to switch between 3 main configuration functions
4	Configure the ribbon	Used to read and configure parameters
5	Status Bar	Display status information

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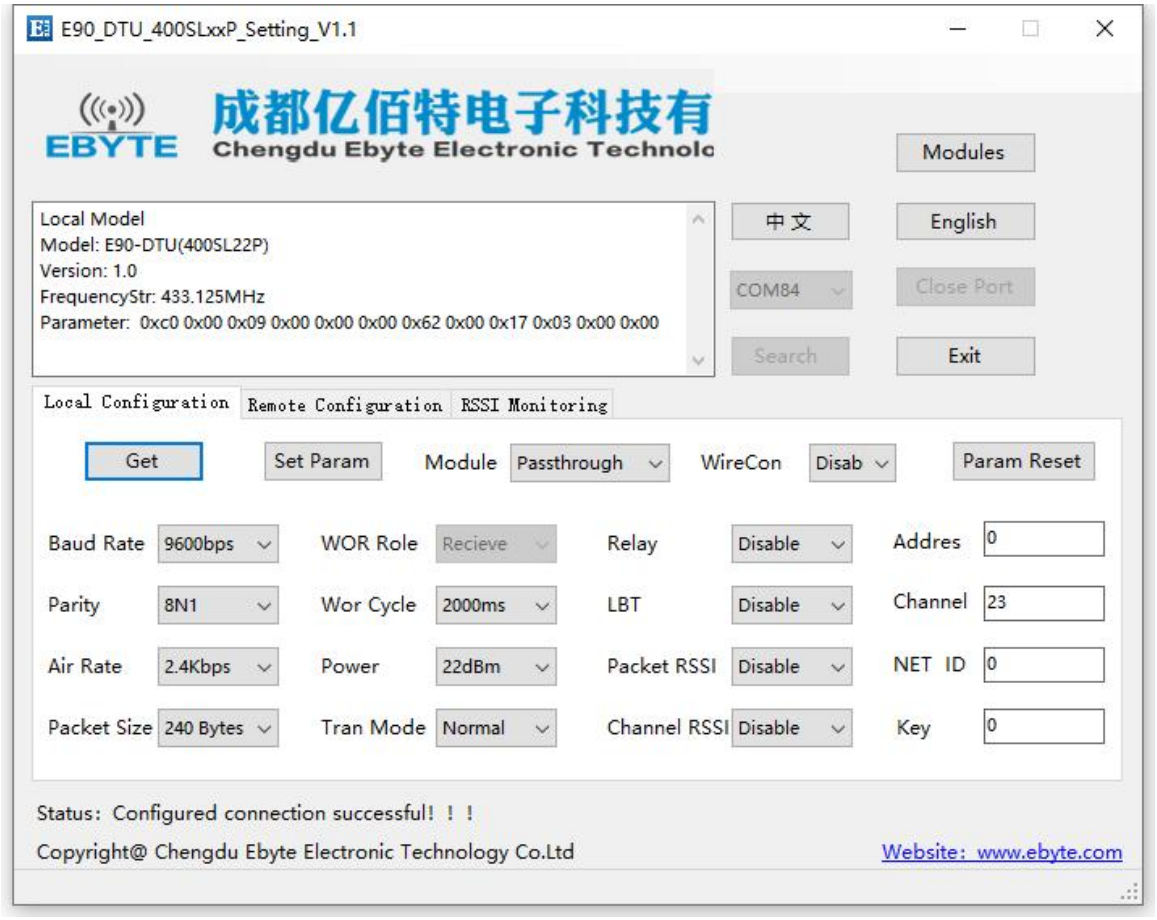
Three main configuration function descriptions

No.	Name	Description
1	Local configuration	See Figure 1 below to configure the radio's own operating parameters
2	Remote configuration	See Figure 2 below. It is used to remotely configure or read the parameters of other radio stations or E22 modules. The configured radio stations or modules are required to be in transparent transmission mode and enabled by wireless configuration. Consistent with own station. Immediately after configuration
3	RSSI real-time monitoring	Note: During remote configuration, if the airspeed is set to 0.3K, the reading and writing speed will be slightly slower, please be patient

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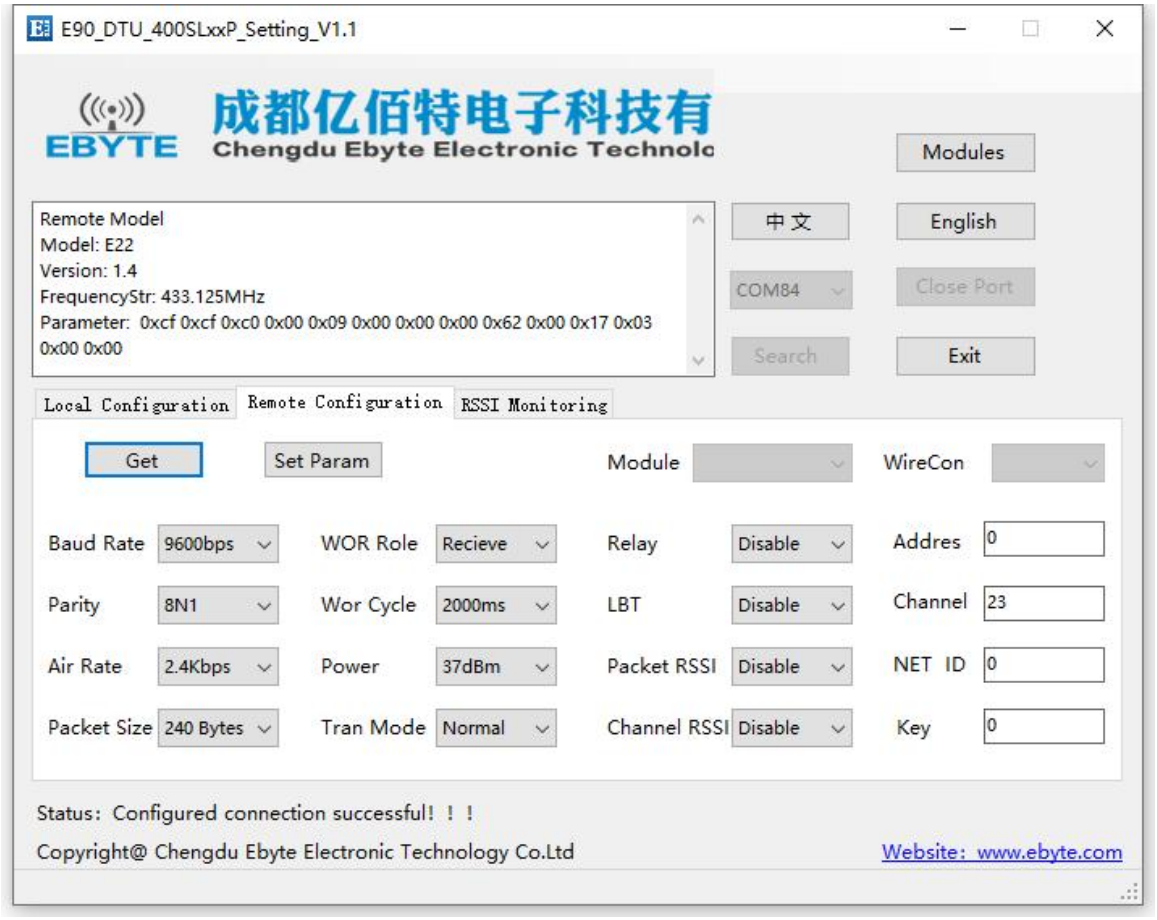
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Local configuration



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Remote configuration



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RSSI real-time monitoring



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9.4 Configuration parameter description of upper computer



No.	Name	Option	Description
1	Reading parameters	(Click)	After establishing a connection with the device, click the Read Parameters button to read the existing working parameters of the DTU
2	Write parameters	(Click)	After selecting the parameters to be configured, click the write parameter button, and the configured parameters will be written into the DTU.
3	Mode selection	Transparent mode (default)	Sending: The user can input data through the serial port, and the module will start transmitting these data wirelessly. Receiving: After receiving the wireless data, the module will output these data through the serial port TXD pin.
		WOR send mode	Sending: The wake-up code will be automatically added for a certain period of time before transmitting. Receiving: Receive function is equivalent to transparent transmission mode
		WOR receiving mode	Sending: wireless transmission is off, Receiving: Usually in sleep, periodically wake up to detect if there is data, if yes, receive data, and then go to sleep after processing. Used with the WOR send mode
4	Configured	No (default)	DTU cannot be wirelessly configured by other modules or radios

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	wirelessly		
		Yes	DTU can be wirelessly configured by other modules or radios
5	reset	(Click)	Click the Restore Factory Settings button, the parameters of the module will be restored to factory settings
6	Baud rate	1200	DTU serial baud rate
		2400	
		4800	
		9600 (default)	
		19200	
		38400	
		57600	
		115200	
7	WOR role	Receiver (changes with the working mode of the WORLD)	The module cannot transmit data and works in the WOR listening mode. The monitoring period is described below (WOR cycle), which can save a lot of power consumption.
		Sender (changes with the working mode of the Wor)	The module is turned on for transmission and reception, and adds a certain time wake-up code when transmitting data.
8	Relay enable	Off (default)	
		turn on	After the relay function is enabled, if the target address is not the module itself, the module will start a forwarding; To prevent data from being transmitted back, it is recommended to use it in conjunction with fixed-point mode; that is, the destination address and the source address are different.
9	Module address	Input, range 0-65535 (default 0)	Address of the module Note: When the module address is equal to FFFF, it can be used as a broadcast and monitoring address, that is, the module will not perform address filtering at this time.
10	Parity	8N1 (default)	DTU serial parity check
		8O1	
		8E1	
11	WOR cycle	500 ms	The longer the WOR monitoring interval cycle time, the lower the average power consumption, but the greater the data delay;
		1000 ms	
		1500 ms	
		2000 ms (default)	
		2500 ms	
		3000 ms	
		3500 ms	
		4000 ms	
12	LBT enabled	Off (default)	
		turn on	After enabling, wireless data will be monitored before transmission, which can avoid interference to some extent, but may cause data delay;

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13	Frequency channel	Input, range 0-83 (default 23)	The maximum lingering time of LBT is 2 seconds, and it will be issued when it reaches 2 seconds.
14	Air speed	2.4 Kbps (default)	The air speed of both communication parties must be the same; The higher the air speed, the smaller the delay and the shorter the transmission distance.
		4.8 Kbps	
		9.6 Kbps	
		19.2 Kbps	
		38.4 Kbps	
		62.5 Kbps	
15	Module power	Off (default)	Module transmit power Power and current are non-linear, and the power supply has the highest efficiency at maximum power; The current does not decrease in proportion to the decrease in power.
		turn on	
		Input, range 0-83 (default 23)	
		0.3 Kbps	
16	Data RSSI	1.2 Kbps	
		2.4 Kbps (default)	After being enabled, the module will receive the wireless data and output through the serial port TXD, followed by an RSSI strength byte.
17	Network ID	Off (default)	Network address, used to distinguish the network; When communicating with each other, they should be set to the same.
18	Sub-contract length	turn on	The data sent by the user is less than the length of the sub-packet, and the serial port output of the receiving end appears as an uninterrupted continuous output; The data sent by the user is longer than the packet length, and the serial port on the receiving end will be packetized and output.
		Input, range 0-83 (default 23)	
		0.3 Kbps	
		1.2 Kbps	
19	transfer method	2.4 Kbps (default)	Sending: The user can input data through the serial port, and the module will start transmitting these data wirelessly. Receiving: After receiving the wireless data, the module will output these data through the serial port TXD pin.
		Off (default)	During fixed-point transmission, the module recognizes the first three bytes of the serial data received as: Address high + address low + channel, and use it as a wireless transmission target.
20	Channel RSSI	turn on	
		turn on	After being enabled, the C0 C1 C2 C3 instruction can be sent to read the register in the transmission mode or the WOR transmission mode; Register 0x00: current ambient noise RSSI; Register 0X01: RSSI when data was last received Instruction format: C0 C1 C2 C3 + start address + read length; Return: C1 + address + read length + read effective value; for example: send C0 C1 C2 C3 00 01 Returns C1 00 01 RSSI (address can only start from 00, read length is 1)
21	Key	Input, range: 0-65535 (default 0, none)	Write only, read returns 0; Used for encryption to avoid interception of wireless data in the air by similar modules;

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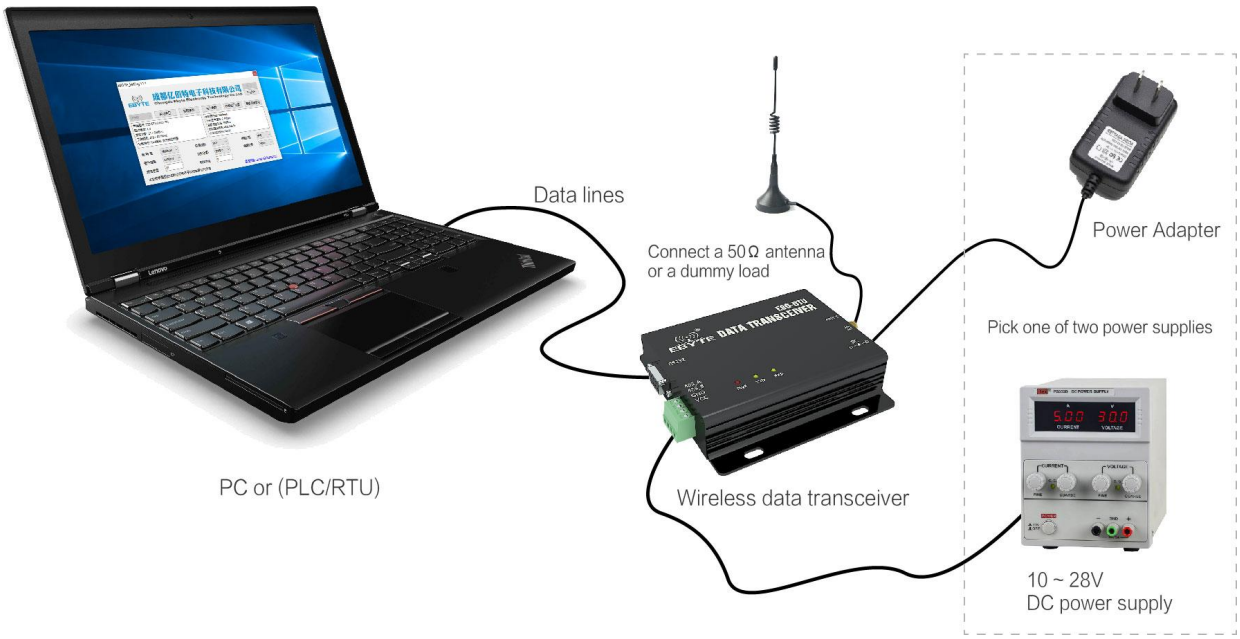
			The module will use these two bytes as a calculation factor to transform and encrypt the airborne wireless signal.

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10. Programming the modem

10.1 Connection diagram



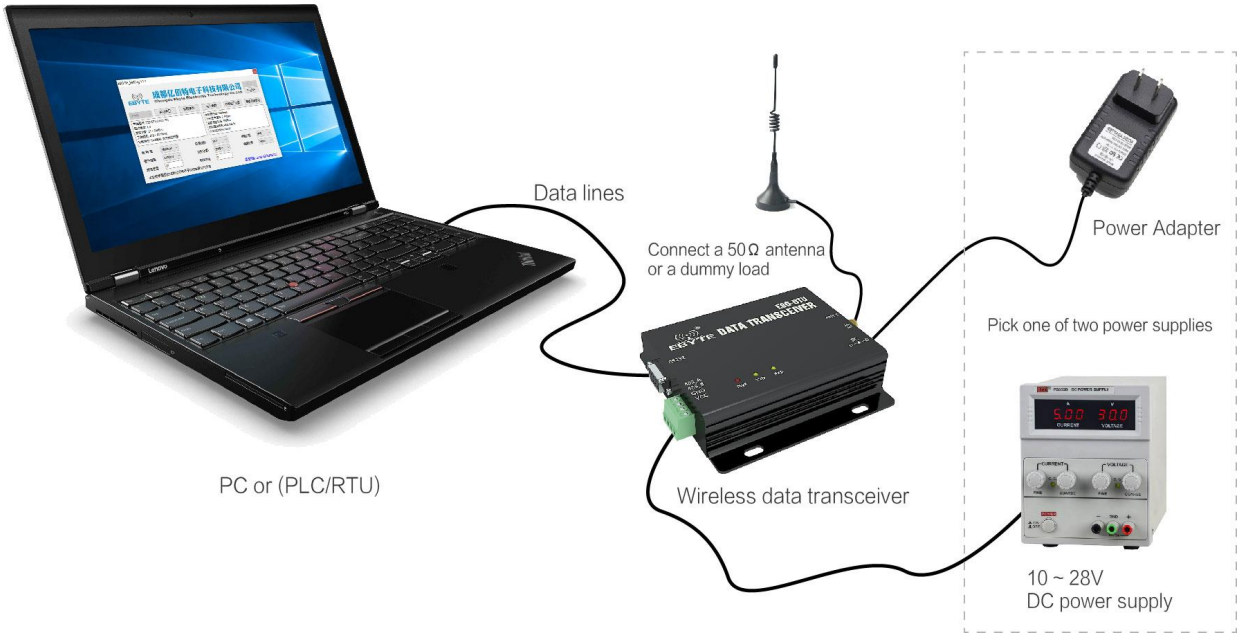
1、Configuration can only be performed within 3 seconds after power-on. If it fails, please confirm whether it has entered configuration mode.

2.If no complicated programming is needed to open the E90-DTU SL digital radio configuration software, you can modify the relevant parameters.

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11. Connection diagram in test and practical application



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12.E90-DTU(SL Series)

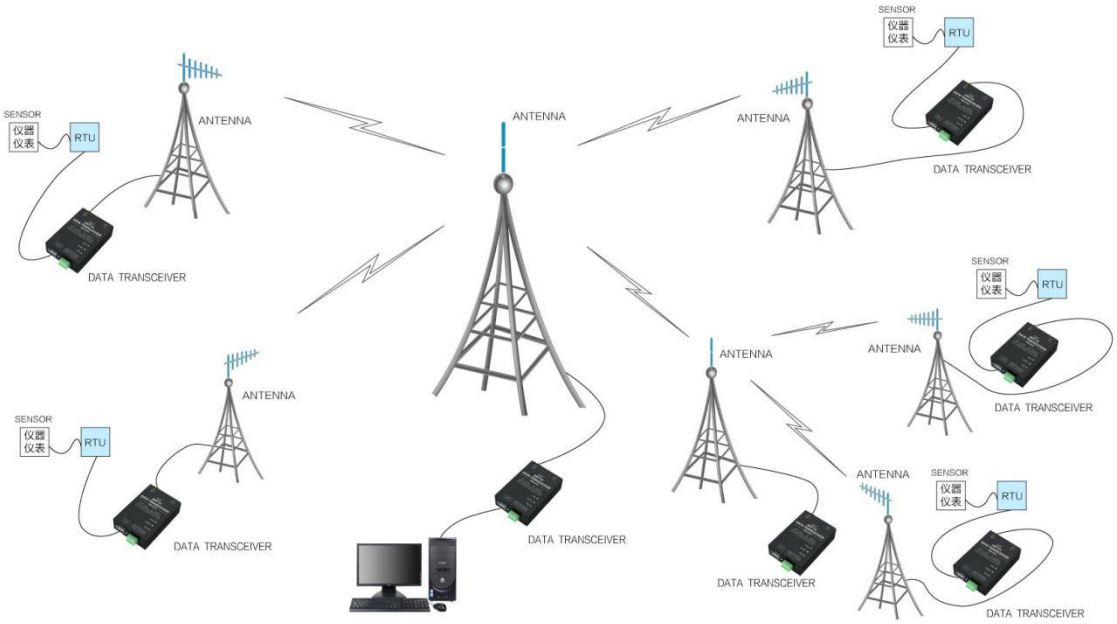
Model No.	Interface	Frequency Hz	TX Power **W**	Distance **km**	Features
E90-DTU(230SL22)	RS232 RS485	230M	0.16	5	Low frequency LoRa，ultra strong diffraction ability for complex environment
E90-DTU(230SL30)	RS232 RS485	230M	1	10	Low frequency LoRa，ultra strong diffraction ability for complex environment
E90-DTU(400SL22)	RS232 RS485	433\470M	0.16	5	LoRa,wireless configuration，networking transmission, long distance, anti-inference
E90-DTU(400SL22)	RS232 RS485	433\470M	1	10	LoRa,wireless configuration，networking transmission, long distance, anti-inference
E90-DTU(900SL22)	RS232 RS485	868\915M	0.16	5	LoRa,wireless configuration，networking transmission, long distance, anti-inference
E90-DTU(900SL30)	RS232 RS485	868\915M	1	10	LoRa,wireless configuration，networking transmission, long distance, anti-inference
E90-DTU(170L30)	RS232 RS485	170M	1	8	LoRa, super strong penetration diffraction
E90-DTU(433L30)	RS232 RS485	433M	1	8	LoRa,long distance anti-interference
E90-DTU(433L37)	RS232 RS485	433M	5	20	LoRa, 20km ultra long distance, anti-interference
E90-DTU(433C30)	RS232 RS485	433M	1	3	High-speed continuous transmission，ModBus protocol
E90-DTU(433C33)	RS232 RS485	433M	2	4	High-speed continuous transmission，ModBus protocol
E90-DTU(433C37)	RS232 RS485	433M	5	10	High-speed continuous transmission, support ModBus protocol, long distance
E90-DTU(230N27)	RS232 RS485	230M	0.5	5	Low frequency narrow band，for complex environment
E90-DTU(230N33)	RS232 RS485	230M	2	8	Low frequency narrow band，for complex environment
E90-DTU(230N37)	RS232 RS485	230M	5	15	Low frequency narrow band，for complex environment，strong diffraction ability

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13.Application field

The data transceiver of CDEBYTE is applied for all kinds of point to point, one point to multiple points wireless data transmission system, such as smart home, Internet of things transformation, power load monitoring, distribution network automation, hydrological and hydrological forecasting, water pipe network monitoring, urban street lamps Monitoring, air defense alarm control, railway signal monitoring, centralized control of railway water supply, oil supply pipe network monitoring, GPS system, remote meter reading, electronic crane, automatic reporting, seismic forecasting, fire prevention, environmental monitoring and other industrial automation system, as shown below:



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14.Operation notes

- Please keep the warranty card of this device properly. The warranty card has the factory number (and important technical parameters) of the device. It has important reference value for future maintenance and new equipment.
- During the warranty period, if the radio is damaged due to the quality of the product instead of man-made damage or natural disasters such as lightning strikes, enjoy the free warranty; users are advised not to repair it by themselves, please contact our company if there is a problem. Yibaite provides first-class After sales service.
- The device may not be operated in the vicinity of some flammable places (such as coal mines) or explosive dangerous objects (such as detonators for detonators).
- Appropriate DC stabilized power supply should be selected, which requires strong anti-high frequency interference, small ripple, and sufficient load capacity; it also has functions such as overcurrent, overvoltage protection and lightning protection to ensure data transmission.
- Do not use it in a working environment that exceeds the environmental characteristics of data transceiver, such as high temperature, humidity, low temperature, strong electromagnetic field or dusty environment.
- Do not let the data transceiver continuously be in full-load transmission state, otherwise the transmitter may be burned out.
- The ground wire of the data transceiver should be well connected with that of the external equipment (such as PC, PLC, etc.) and of the power supply. Otherwise, it is easy to burn the communication interface; do not plug or unplug the serial port when electrified.
- When testing the data transceiver, it must be connected with a matching antenna or a 50Ω dummy load, otherwise it will easily damage the transmitter; if the antenna is connected, the distance of the human body from the antenna should preferably exceed 2 meters to avoid injury and cut. Do not touch the antenna while launching.
- Wireless digital radio stations often have different communication distances in different environments. The communication distance is often affected by temperature, humidity, obstacle density, obstacle volume, and electromagnetic environment; in order to ensure stable communication, it is recommended to reserve more than 50% Communication distance margin.
- If the measured communication distance is not ideal, it is recommended to check the antenna quality and the installation method of the antenna. You can also contact support@cdebyte.com for assistance.
- Power supply is required to remain 50% of current, it should be noted that the ripple should not exceed 100mV.
- Wireless communication products need to be connected with an impedance matching antenna to work properly, even for short-term testing.

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Revision history

Version	Description	Issued by
1.0	Initial version	-
1.1	Format revision	Ren
1.2	Content revision	LY
1.3	Content revision	Xxn
1.4	Content revision	Hao

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