Chengdu Ebyte Electronic Technology Co.,Ltd

Wireless Modem

User Manual



E95-DTU(433C30-485)

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1. Introduction

1.1. Brief Introduction

E95-DTU (433C30-485) has a variety of transmission methods, works in the (425 ~ 450.5Mhz) frequency band (default 433Mhz), the radio provides a transparent RS485 interface, uses a plastic shell, rail-type installation structure, supports 8 ~ 28V (DC) voltage input. It has the advantage of strong anti-interference ability.

E95-DTU (433C30-485) is a digital radio that adopts ultra-narrowband modulation technology. Due to its advanced modulation method, the communication distance and communication stability are greatly improved. On the basis of the original built-in power amplifier (PA) and low noise amplifier (LNA), the maximum transmit power reaches 1W and the receiving sensitivity is also improved to a certain extent. The overall communication stability is compared with no power amplifier and low noise amplifier. Noise amplifier products have been greatly improved.

Different from traditional digital radios, E95-DTU (433C30-485) is specially developed for Modbus application scenarios. The feature of unlimited package length can replace communication cables and is the most worry-free choice for Modbus wireless upgrades. The radio works in the 433MHz frequency band, and the communication distance can reach 3km . As a communication medium, wireless digital radio has a certain scope of application like optical fiber, microwave and open wire: it provides real-time and reliable data transmission of monitoring signals in private networks under certain special conditions, with low cost, installation and maintenance. It has the characteristics of convenience, strong diffraction ability, flexible network structure and long coverage. It is suitable for occasions such as many and scattered points and complex geographical environment. It can be connected with PLC, RTU, rain gauge, liquid level gauge and other data terminals.

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1.2. Features

- Support high-speed continuous and uninterrupted transmission, data is not divided into packets, unlimited data packet length, adapt to Modbus protocol;
- It is optimized for Modbus and can directly replace the RS485 cable;
- Simple and high-efficiency power supply design, support power adapter or pressure line method, support 8 ~ 28V power supply;
- The transmit power is up to 1W , and it can be adjusted in multiple levels, and all technical indicators meet European industrial standards;
- Adopt temperature compensation circuit, the frequency stability is better than ± 1.5PPM ;
- Working temperature range : -40 ℃～+85 ℃, suitable for various harsh working environments,

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real industrial grade products;

- All aluminum alloy shell, compact size, easy installation, good heat dissipation; perfect shielding design, good electromagnetic compatibility, strong anti-interference ability;
- Multiple protection functions such as power reverse connection protection, over-connection protection, antenna surge protection, etc., greatly increase the reliability of the radio;
- Powerful software functions, all parameters can be set by programming : such as power, frequency, air rate, address ID , etc.;
- Built-in watchdog with precise time layout. Once an exception occurs, the module will automatically restart and continue to work according to the previous parameter settings.
- It adopts flame retardant plastic shell and guide rail type installation structure, which is convenient and efficient to install;
- Using a hidden button to switch the working mode to avoid false triggering, and the operation of the equipment is more reliable;

1.3. Quick Start

① Need to prepare 2 E95-DTU (433C30-485)



② First install the antenna for the digital radio, and then install the power supply, and the user uses the power adapter to supply power;



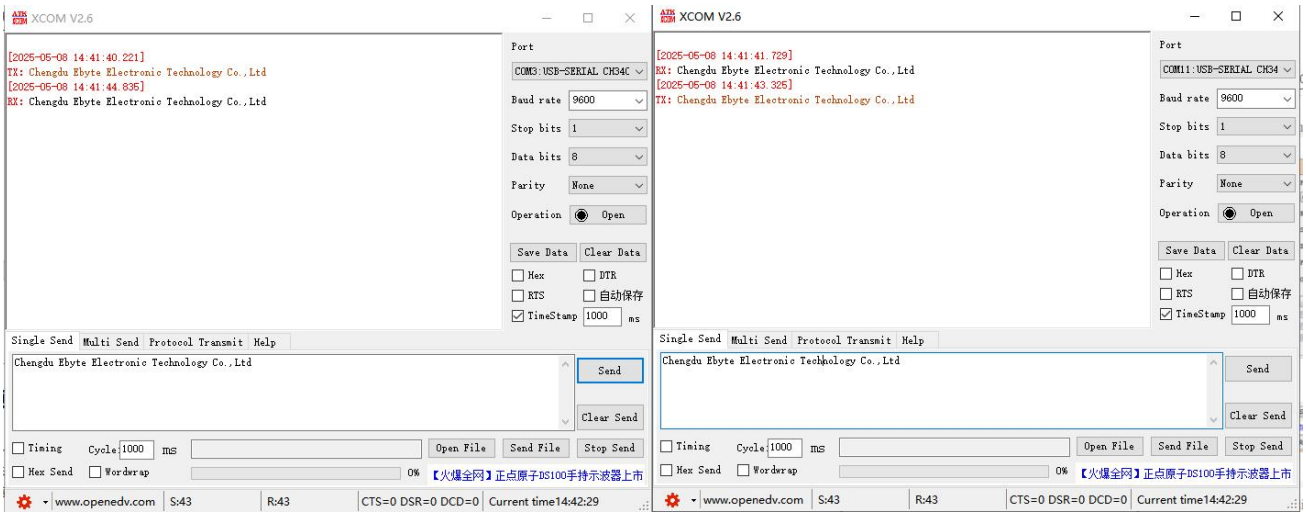
③ USB to RS485/RS232 or other methods to connect the computer to the digital radio;



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④ 2 serial port debugging assistants, select the serial port baud rate to be 9600bps (default) , and the verification method to be 8N1 , then the serial port transparent transmission can be realized;



If the customer needs to switch the working mode, it can be controlled by the Mode button to switch between different working modes (M0 indicator light, M1 indicator light). Press and hold the Mode button for 1ms and then release it to switch the mode once. The details of the mode switch are shown in the following table :

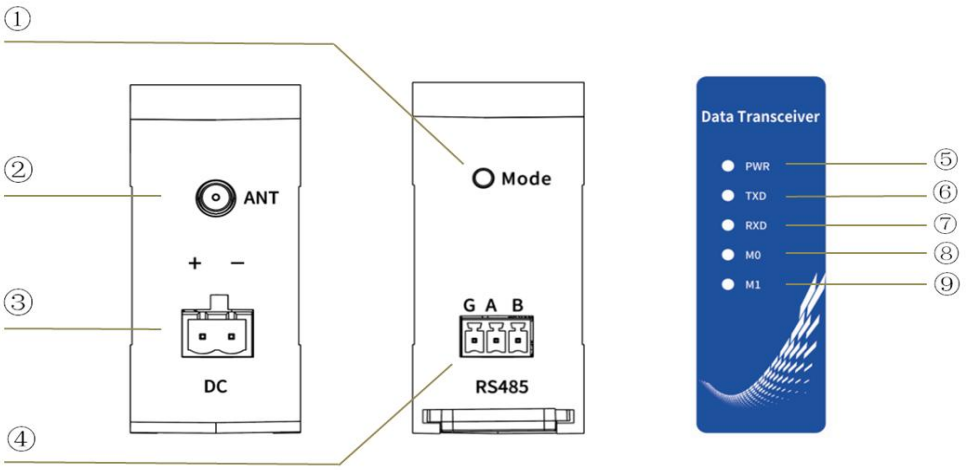
Model	Name	M1	M0	Notes
Mode 0	General mode	light goes off	light goes off	Serial port open, wireless open, transparent transmission (factory default mode)
Mode 1	Reserved mode	light goes off	light on	Meaningless, both serial and wireless are closed
Mode 2	Command mode	light on	light goes off	Radio can be programmed using configuration software
Mode 3	Sleep mode	light on	light on	The module goes to sleep, the serial port and the module are closed

Note: The radio has the function of power-down save mode (the factory default setting is transparent transmission mode), the user needs to switch the corresponding mode according to the M1 and M0 indicators (effective immediately).

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1. 4. Description of each department

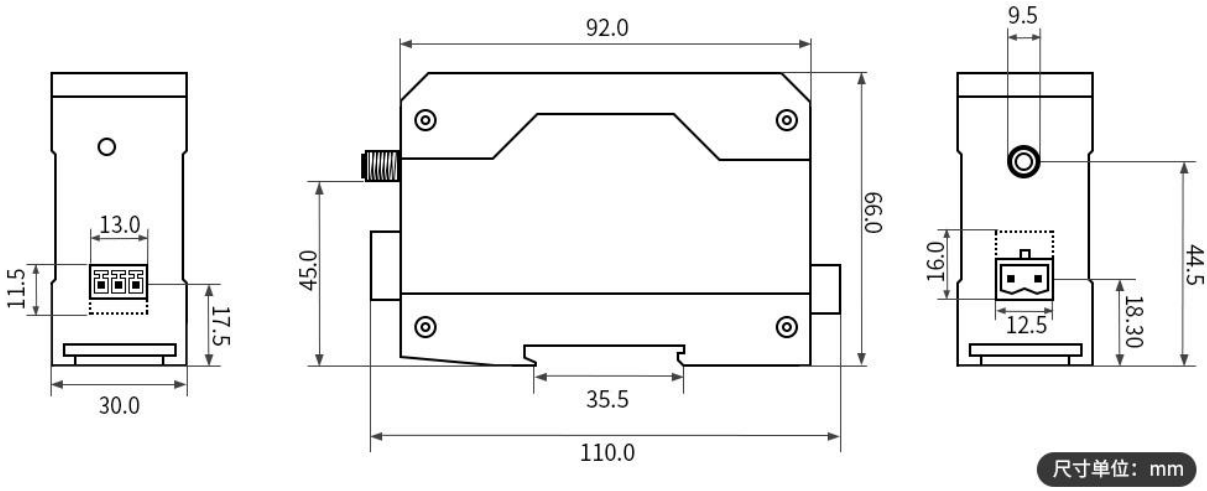


No.	Name	Function	Remark
1	Mode	Mode switch button	Working mode switching control
2	ON	RF interface	SMA-K , male thread inner hole
3	DC	Power interface	DC power input port, crimped port
4	RS485	RS485 communication port	Standard RS485 interface
5	PWR	Power Indicator	Lights up when the power is turned on
6	TXD	Send indicator	Blinks when sending data
7	RXD	Receive indicator	Blinks when receiving data
8	MO	Mode indicator	Working mode indicator
9	M1	Mode indicator	Working mode indicator

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1.5. Installation Dimensions

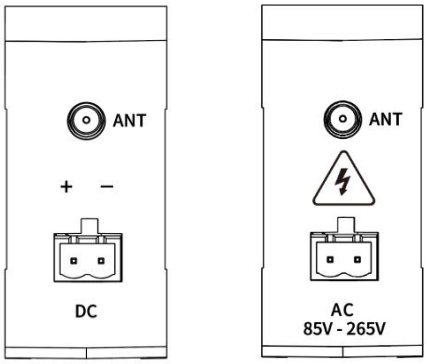


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2. Interface definitio

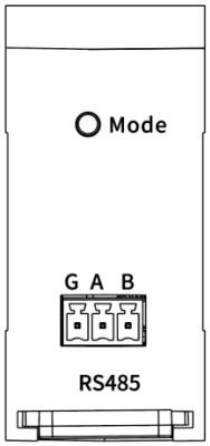
2. 1. Power interface description



E95-DTU (433C30-485) can be powered by 8 ~ 28V (DC) power supply, and the wiring port is connected by wiring terminal (2 Pin).

2. 2. Communication interface description

E95-DTU (433C30-485) can be connected to the device through RS485 using the terminal block .



No.	Standard Definition	Function	Remark
1	G	Signal ground	Anti-interference, grounding
2	A	RS485 bus A interface	The RS485 interface A interface is connected to the device A interface
3	B	RS485 bus B interface	RS485 interface B interface is connected to device B interface

★ Note: When the radio is connected with multiple devices, the communication is not smooth, but there is

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no such phenomenon when a single device is connected. Please try to connect a 120 Ω resistor in parallel between the 485_A terminal and the 485_B terminal.

3. Technical indicators

3. 1. Specifications

Model	Working frequency	Transmit power	Reference distance	Specifications	Recommended application
	MHz	dBm	KM		
E95-DTU(433C30-485)	425 ～450.5	30	3	High-speed continuous transmission	Suitable for applications with a large amount of data, supports Moudbus

★ Note: In sunny weather, open environment without obstruction, 12V/1A power supply, 5dBi suction cup antenna, the antenna height is 2 meters from the ground, and the factory default parameters are used.

3. 2. General Specifications

No.	Name	Specification	Remark
1	Size	92*66*30 mm	See installation dimensions for details
2	Weight	95 g	Weight tolerance 5g
3	Operating temperature	-40 ℃～+85 ℃	Industrial grade
4	Voltage	8～28V（DC）	12V or 24V recommended
7	Communication interface	RS485	3.81 Terminals
8	Baud rate	Factory default 9600	Baud rate range 1200 ~ 115200
9	Address code	Factory default 0	A total of 65536 address codes can be set

3. 3. Frequency range and number of channels

Model	**Default frequency**	**Frequency range**	**Channel spacing**	**Number of channels**
	Hz	**Hz**	**Hz**	
E95-DTU(433C30-485)	433M	425 ～450.5M	100K	256, half duplex

★ Note: In the same area, multiple groups of digital radio stations are used for one-to-one communication at

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the same time. It is recommended that each group of digital radio stations should be set with a channel interval of more than 2MHz.

3.4. Transmit power level

Model	1W	500mW	250mW	125mW
E95-DTU(433C30-485)	Factory default	√	√	√

★ Note: The lower the transmit power, the shorter the transmission distance, but the working current will not decrease proportionally. It is recommended to use the maximum transmit power.

3.5. Air rate level

Model	Default air rate	Number of levels	Air speed level
	bps		bps
E95-DTU(433C30-485)	N/A	N/A	Not adjustable, the air rate will automatically adapt to the baud rate

★ Note: The higher the air rate setting, the faster the transmission rate and the closer the transmission distance; therefore, if the rate meets the requirements for use, it is recommended that the airspeed be as low as possible.

3.6. Current parameters

Model Specifications	TX Current mA		Standby Current mA	
	12V	24V	12V	24V
E95-DTU(433C30-485)	308	154	23	13

★ 50% of the current margin when selecting the power supply , which is conducive to the long-term stable operation of the radio.

3.7. Length of delivery and subcontracting

Model	Size	Subcontracting
E95-DTU(433C30-485)	Unlimited single input (baud rate ≤ 57600)	Continuous transmission, data is not divided into packets, unlimited data packet length

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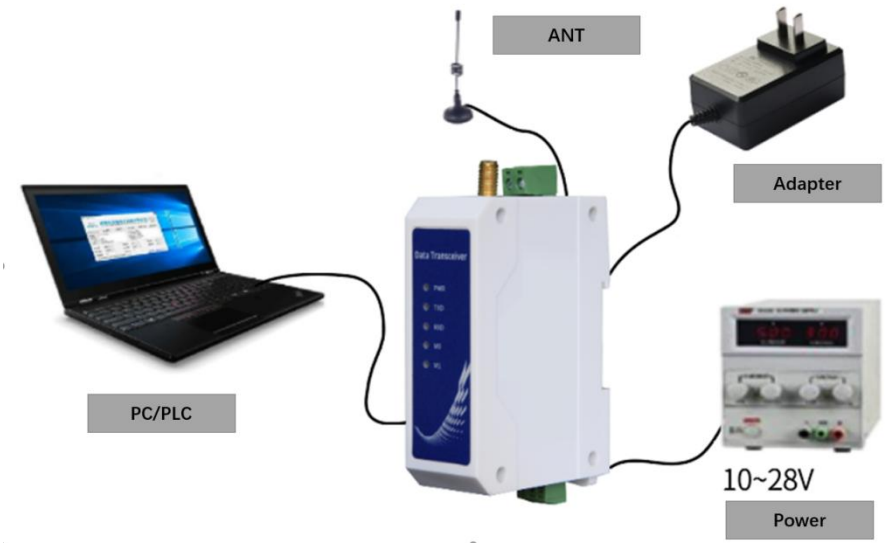
4. Working mode

E95-DTU has four working modes. If normal communication is required, you need to configure the radio to transparent transmission mode (mode 0) by pressing the button.

The default setting of the radio is transparent transmission mode (mode 0).

No.	category	M1	M0	Remark
Mode 0	General mode	light goes off	light goes off	Serial port open, wireless open, transparent transmission (factory default mode)
Mode 1	Reserved mode	light goes off	light on	Meaningless, both serial and wireless are closed
Mode 2	Command mode	light on	light goes off	Radio can be programmed using configuration software
Mode 3	Sleep mode	light on	light on	The module goes to sleep, the serial port and the module are closed

5. Program the radio



Mode	M1	M0	Remark
Configuration mode	Light	Lights off	Radio can be programmed using configuration software (fixed 9600, 8N1)

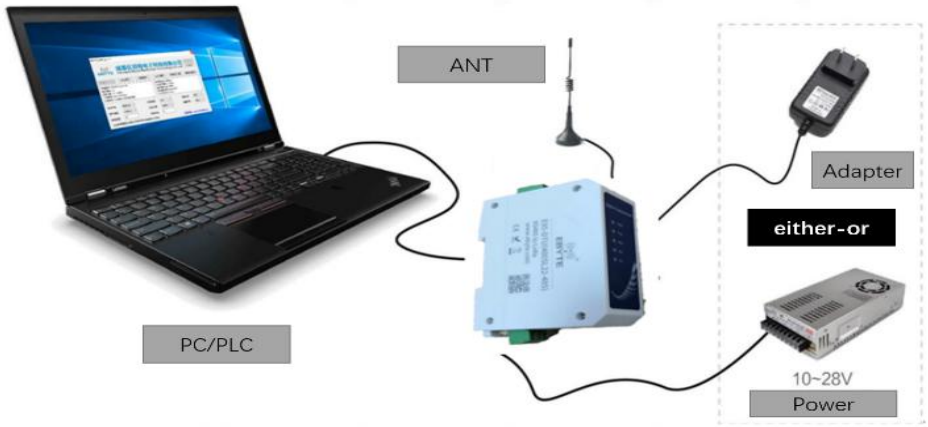
1. Programming can only be performed in a specific working mode (see the table above). If the programming fails, please confirm whether the working mode of the radio is correct.

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2. If you don't need complex programming to open the E95 (433C30-485) configuration software, you can modify the relevant parameters.

6. Schematic diagram of connection in test and practical application

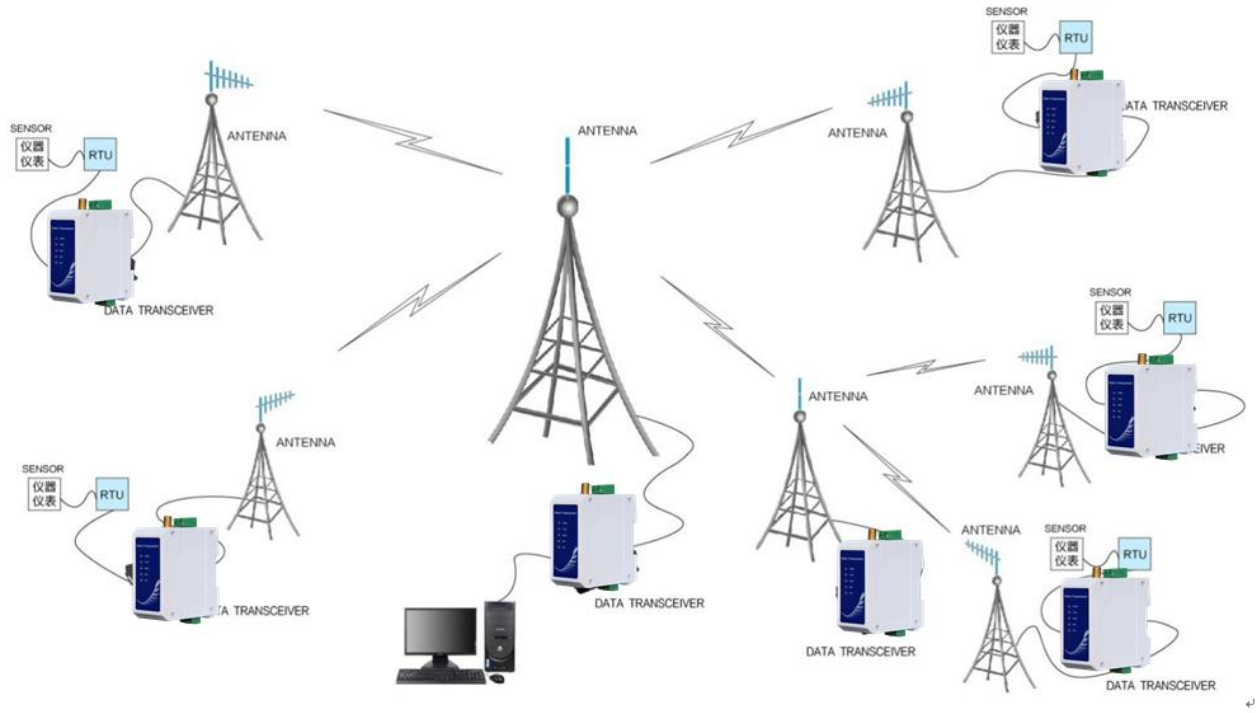


7. Application

Ebyte digital radio is suitable for all kinds of point-to-point, point-to-multipoint wireless data transmission systems, such as smart home, Internet of Things transformation, power load monitoring, distribution network automation, hydrology and hydrological forecasting, water pipe network monitoring, urban street lights Monitoring, air defense alarm control, railway signal monitoring, centralized control of railway water supply, monitoring of oil and gas supply pipeline network, GPS positioning system, remote meter reading, electronic crane scale, automatic target reporting, earthquake forecasting, fire prevention, environmental monitoring and other industrial automation system, as shown below:

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8. Notes

1. Please keep the warranty card of this equipment in a safe place. The warranty card has the factory number (and important technical parameters) of the equipment, which is of great reference value for the user's future maintenance and new equipment.
2. During the warranty period, if the radio station is damaged due to the quality of the product itself rather than man-made damage or natural disasters such as lightning strikes, it will enjoy free warranty; please do not repair it by yourself. If there is a problem, please contact our company. Ebyte provides First-class after-sales service.
3. Do not operate the radio in the vicinity of some flammable places (such as coal mines) or explosive dangerous objects (such as detonators for detonation).
4. suitable DC regulated power supply should be selected, which requires strong anti-high-frequency interference, small ripple, and sufficient load capacity; it is best to have functions such as overcurrent, overvoltage protection and lightning protection to ensure data transmission. The radio works normally.
5. Do not use it in a working environment that exceeds the environmental characteristics of the digital radio, such as high temperature, humidity, low temperature, strong electromagnetic fields or environments with large dust.
6. Do not let the digital radio station be in a state of full-load transmission continuously, otherwise it may burn out the transmitter.
7. The ground wire of the digital radio station should be well connected with the ground wire of the external equipment (such as PC , PLC , etc.) and the ground wire of the power supply, otherwise it is easy to burn out the communication interface, etc.; do not plug or unplug the serial port with power on.
8. When testing the digital radio, it is necessary to connect a matching antenna or a 50 Ω dummy load,

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otherwise the transmitter will be easily damaged; if the antenna is connected, the distance between the human body and the antenna should be more than 2 meters to avoid injury. Never touch the antenna while transmitting.

9. Wireless data transmission stations often have different communication distances in different environments, and 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 50 % or more of the communication distance margin.
10. If the measured communication distance is not ideal, it is recommended to analyze and improve the communication distance from the antenna quality and the installation method of the antenna. You can also contact support@cdebyte.com for assistance .
11. When selecting a power supply, in addition to retaining 50% of the current margin as recommended, it should be noted that the ripple should not exceed 100mV .
12. Wireless communication products need to be connected to an impedance-matched antenna to work properly. Even a short-term test cannot be omitted. If the product is damaged due to this reason, it will not be covered by the warranty.

9. Important Statement

1. Ebyte reserves the right of final interpretation and modification of all contents in this manual.
2. Due to the continuous improvement of the hardware and software of the product, this manual may be changed without prior notice, and the latest version of the manual shall prevail.
3. Everyone is responsible for protecting the environment: In order to reduce the use of paper, this manual is only printed in Chinese, and the English manual only provides electronic documents. If necessary, please download it from our official website; in addition, if it is not specially requested by users, users can order in bulk We only provide product manuals according to a certain proportion of the order quantity, and not every digital radio is matched with it, please understand.

10. Revise history

Version	Revision Notes	Maintenance man
1.0	initial version	Li
1.1	error correct	BIN

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