

Ultra-high frequency RFID integrated antenna module RF100CA

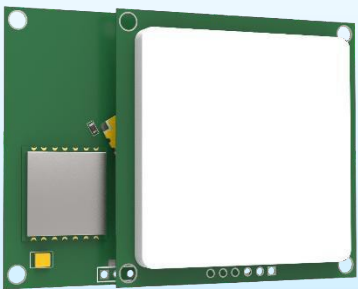
Product data sheetNo.: DSRF0725 Update Date: June 11, 2024 Version: V1.05

Product overview

RF100CA is a UHF RFID antenna integrated card reading module introduced by Xiaowang Technology, and the overall volume of ceramic antenna integrated with 915Mhz card reading module is reduced by 60%. At the same time, the product adopts industry-wide FPC connector, which can be easily installed in UHF handsets and card readers with limited size. The same performance and smaller size open up more application possibilities, and it is an excellent choice for solutions such as new retail intelligent warehousing and intelligent container sales.

Basic parameters product picture

Output	15~26dBm
power:	3.6~5V
power	2 m @ RF100CA-50
supply	6 m @ RF100CA-70
voltage:	Peak current is 300mA, and deep
card	sleep is 1uA.
reading	120ms
distance:	<10uA
	-40 C to+85 C
Power	-40°C to +105°C
consumptio	50×50mm(RF100CA-50)
n:	70×70mm(RF100CA-70)



Wake-up
Time Off
Current
Operating
Temperatu
re: Storage
Temperatu
re: Inch:

company
profile

Guangzhou Xiaowang Electronic Technology Co., Ltd. is a company specializing in the design, production and service of wireless communication scheme. The company has a first-class design team, uses advanced working methods and collects wireless design experience. The company has various practical modules in the industry and also provides customized services for customers.

Order information

product

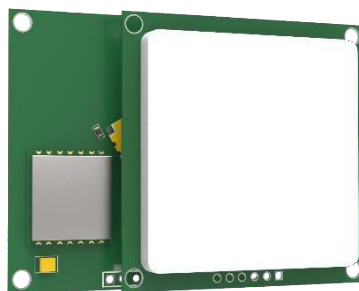
expl

RF100CA-50

50*50mm, the reading

copyright statement

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Version information

versi	modificat	Modify
V1.00	April 15, 2018	Create a document
V1.01	August 22, 2018	Supplement some pictures
V1.02	September 4, 2018	Correct some parameters
V1.03	September 13, 2018	Add the connection mode and description of row needle
V1.04	March 15, 2019	Correct the reading distance parameter of RF100CA-50.
V1.05	June 11th, 2024	Update pin description

eye record

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1. Hardware introduction

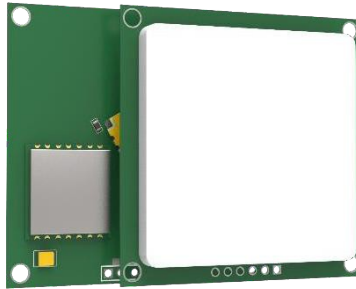


Figure 1-1 Product Physical Diagram

1.1 Pin definition

This product has two connection modes, and the pins are defined as follows:

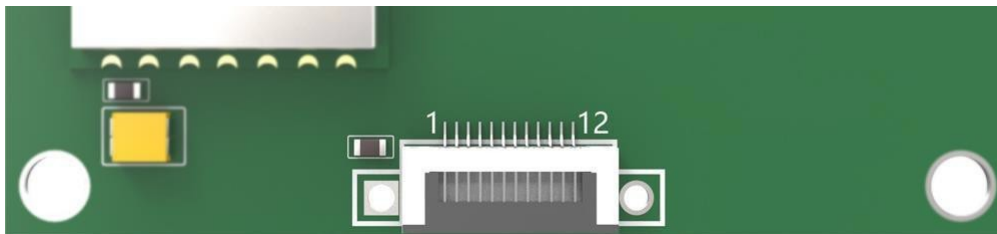


Figure 1-2 Line sequence of flexible cable seat

Table 1-1 Pin Definition of Flexible Ribbon Cable

PIN	definition	explain
one	5V	Power Supply
2	5V	
three	GND	landing
four	GND	
five	EN	Enable pin
six	5V	Power Supply
seven	RXD	TTL reception
eight	TXD	TTL transmission
nine	BELL_EN	Buzzer enabled
10	GND	landing
11	GND	landing
twelve	GND	landing

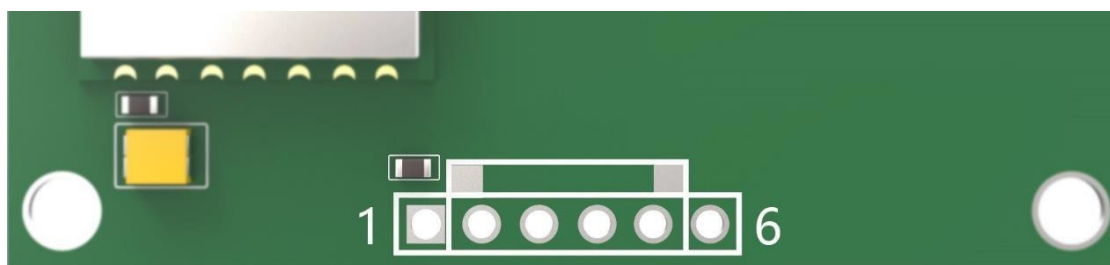


Figure 1-3 sewing sequence

Table 1-2 Pin Definition of Pin Arrangement

PIN	definition	explain
one	5V	Power Supply
2	GND	landing
three	EN	Enable pin
four	RXD	TTL reception
five	TXD	TTL transmission
six	BELL_EN	Buzzer enabled

1.2 Hardware connection

The use of RF100 module is very simple. You can configure the module and read the tag information by connecting the user circuit board with FPC flexible cable [or pin arrangement]. See Chapter 2 for specific configuration commands.



Figure 1-4 Three-wire connection, all tag information can be obtained by only one instruction.

1.3 leading indicator

- Protocol support: ISO 18000-6c/EPC Gen2;
- Communication protocol: TTL serial port;

- Communication interface: FPC12
- Baud rate: 115200bps; ;
- Frequency range: 840 ~ 928 MHz;
- Work area support: US, Canada and other regions following U.S. FCC.
 Europe and other regions following ETSI EN 302 208 Mainland China
 Japan Korea
 Malaysia
 Taiwan
- The module size is 50× 50 mm (RF 100ca-50) 70× 70 mm (RF 100ca-70).
- The transmitting power is 15 DBM and 26 DBM, and the software is adjustable.
- Reading distance: under open conditions, 2m @ RF100CA-50, 6m @ RF100CA-70.
- The module is in off mode: the leakage is less than 10uA.
- The module is in deep sleep mode: the power consumption is less than 300uA.
- The module is in standby mode: the power consumption is about 32mA.
- Module continuous inventory mode: the power consumption is about 220mA-320mA, depending on different parameters such as inventory times per second, Q value and tag number.
- When the module sends continuous wave, the power consumption is about 320mA.
- Multi-label reading > 50 sheets/second
- Startup time < 120ms
- Working humidity: within 95% (-25°C)

1.4 Module size

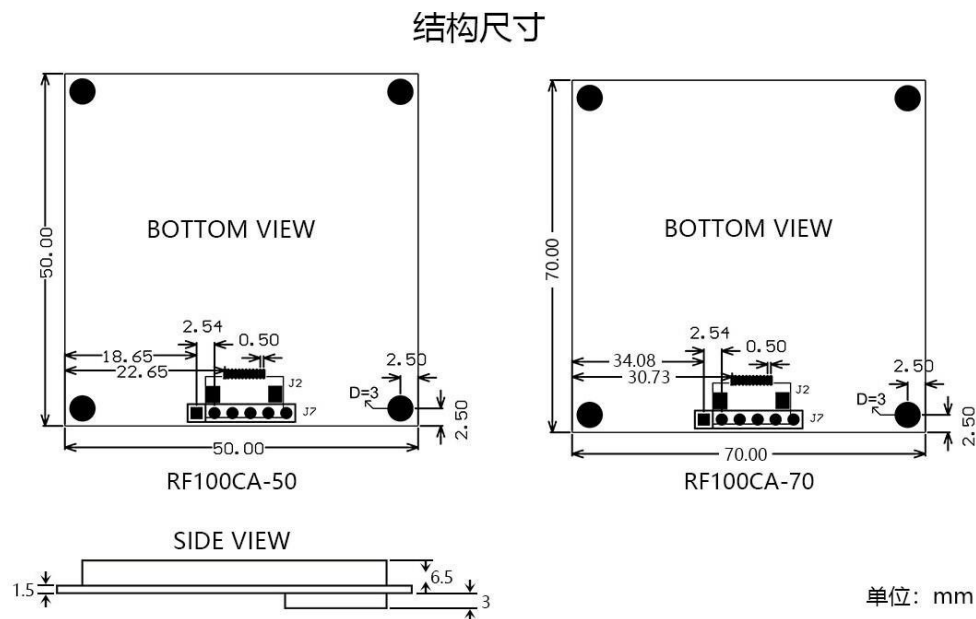
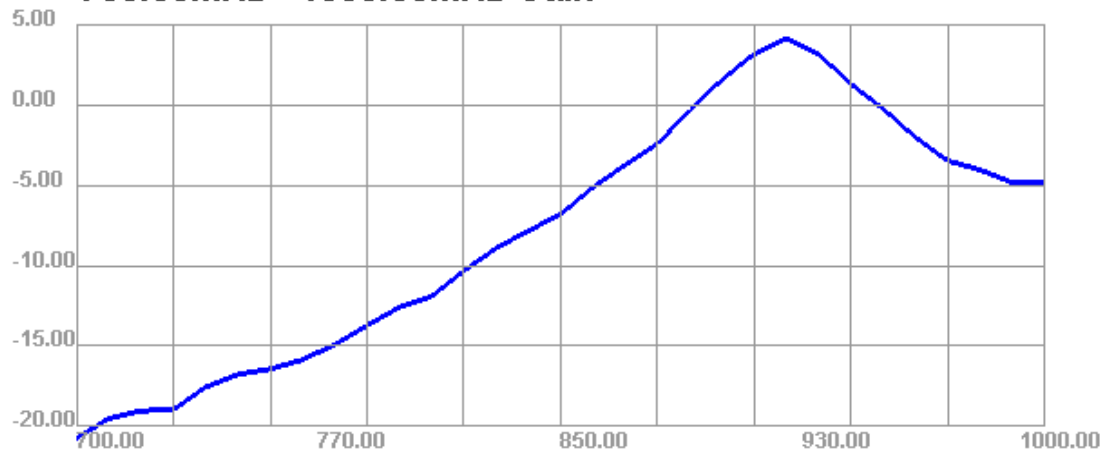
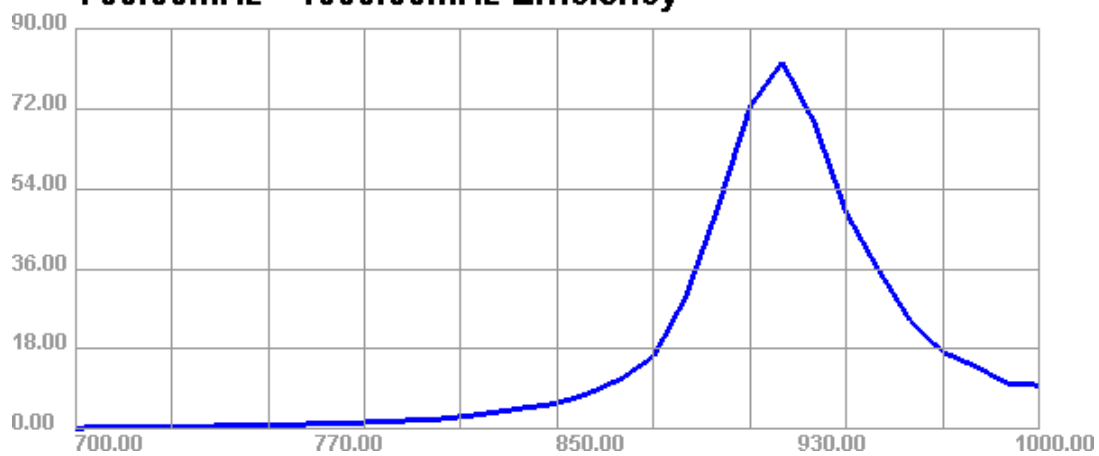
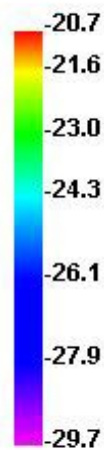
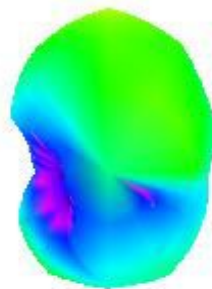
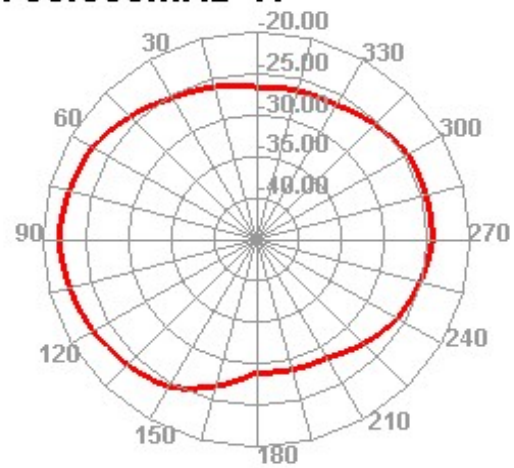
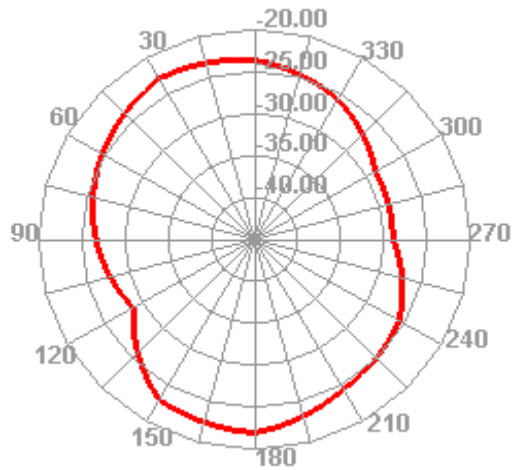
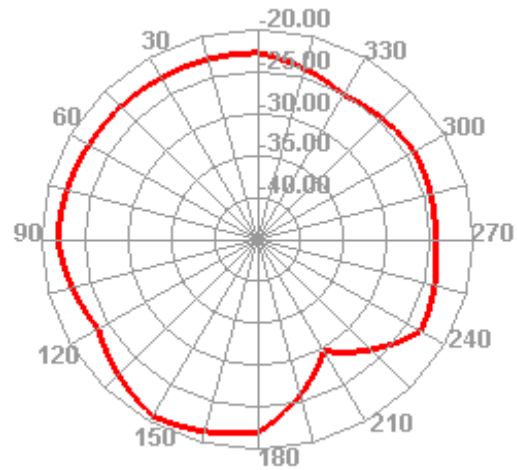
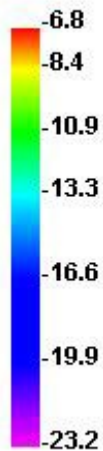
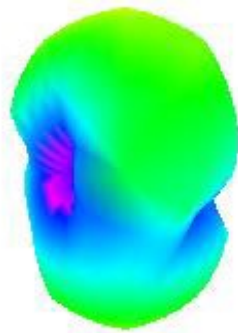
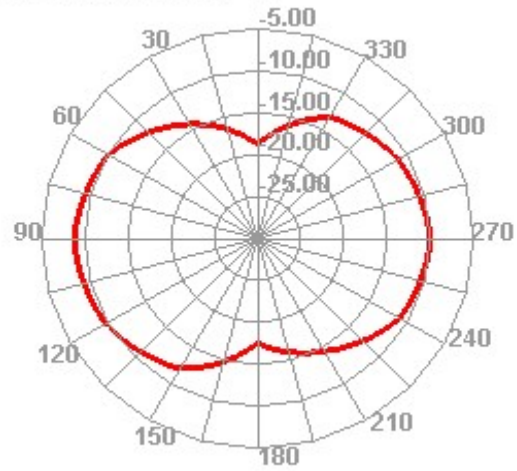
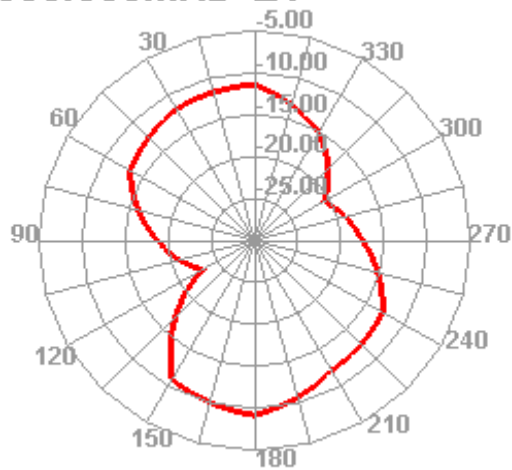
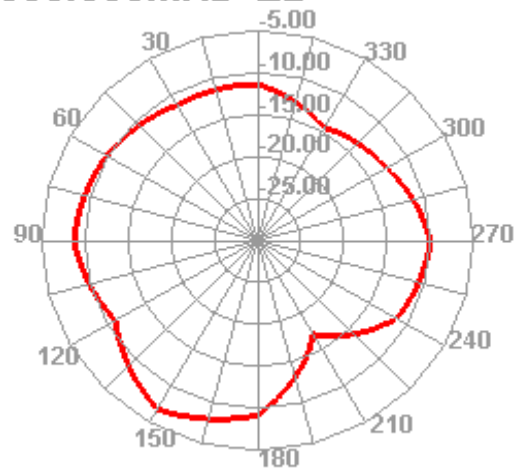


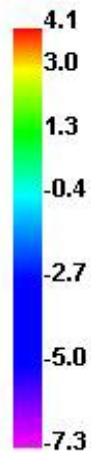
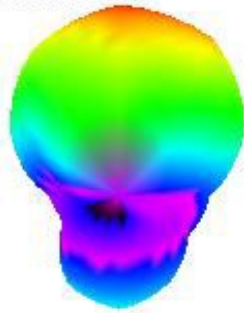
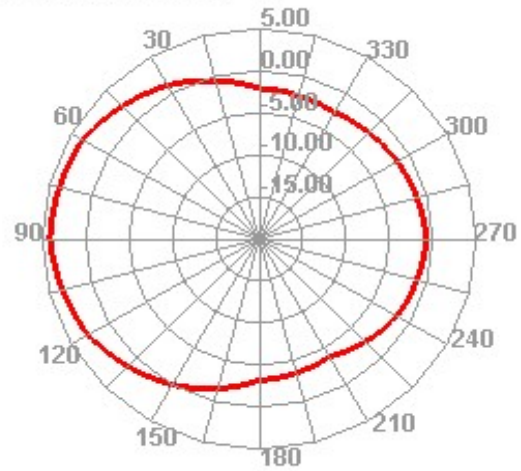
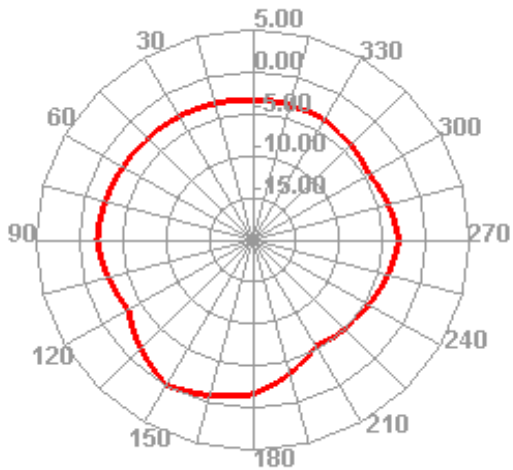
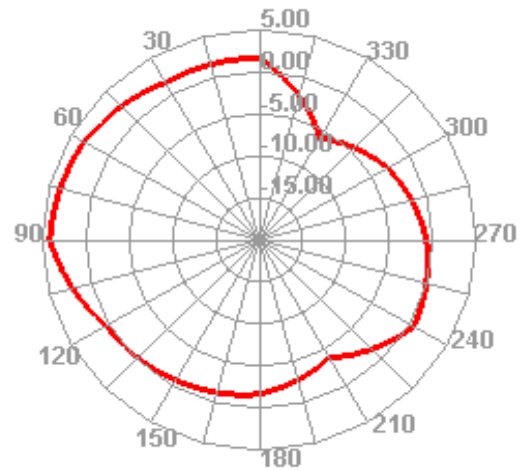
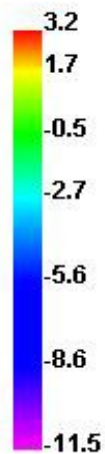
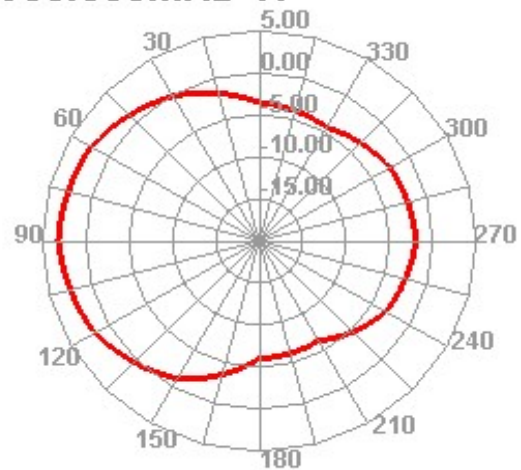
Figure 1-5 Product Dimension Diagram

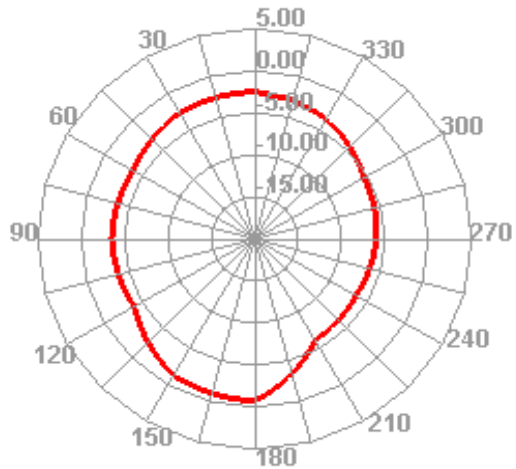
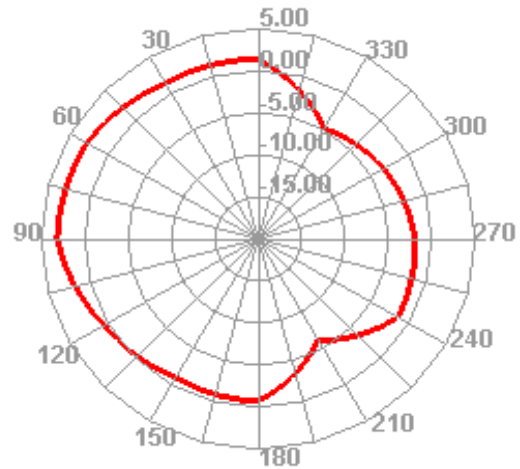
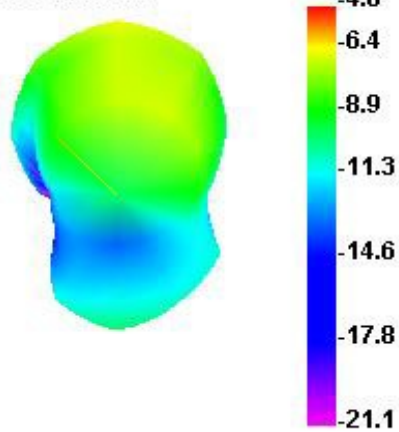
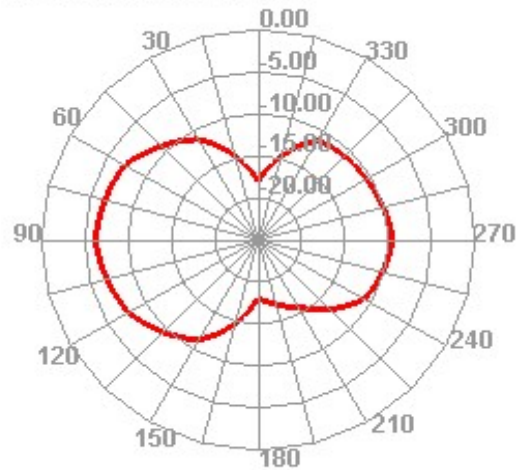
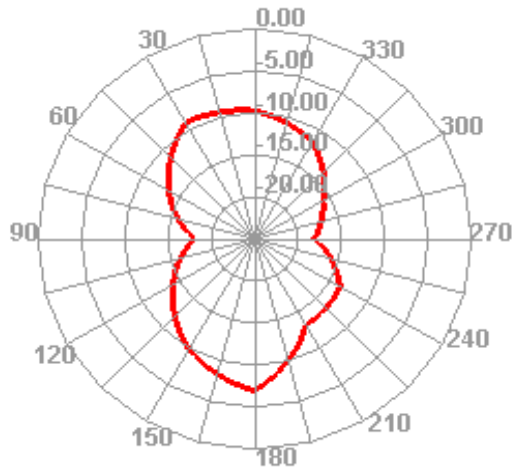
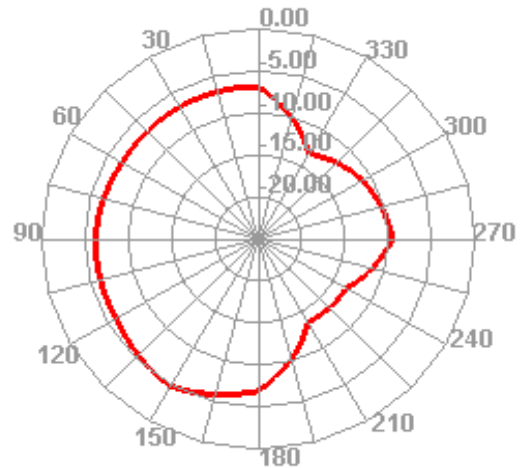
1.5 performance parameter

Passive Test For 700										
Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)	Gain (dBd)	UHS (%)	DHS (%)	Max (dB)	Min (dB)	Attenut Hor	Attenut Ver
seven hundred	0.35	-24.57	-20.73	-22.88	0.175	0.175	-20.73	-29.7	40.07	40.55
710	0.41	-23.86	-19.5	-21.65	0.204	0.208	-19.5	-29.59	39.82	40.11
720	0.49	-23.13	-19.02	-21.17	0.242	0.244	-19.02	-30.51	39.66	39.9
730	0.55	-22.61	-18.95	-21.1	0.278	0.27	-18.95	-31.01	39.59	39.7
740	0.71	-21.51	-17.55	-19.7	0.36	0.346	-17.55	-30.76	39.58	39.34
750	0.89	-20.5	-16.77	-18.92	0.456	0.434	-16.77	-30.73	39.43	39.05
760	0.94	-20.27	-16.42	-18.57	0.482	0.457	-16.42	-28.89	39.27	38.82
770	1.13	-19.46	-15.85	-18	0.587	0.545	-15.85	-27.23	39.29	38.83
780	1.33	-18.78	-14.91	-17.06	0.677	0.648	-14.91	-25.29	39.24	38.71
790	1.57	-18.05	-13.73	-15.88	0.779	0.787	-13.73	-24.73	39.18	38.56
eight hundred	1.93	-17.15	-12.6	-14.75	0.926	1.002	-12.6	-24.09	40.04	39.42
810	2.09	-16.79	-11.91	-14.06	0.951	1.142	-11.91	-23.57	40.03	39.34
820	2.83	-15.48	-10.31	-12.46	1.245	1.588	-10.31	-22.82	39.96	39.19
830	3.74	-14.27	-8.91	-11.06	1.62	2.121	-8.91	-22.77	40.32	39.74
840	4.84	-13.15	-7.83	-9.98	2.136	2.703	-7.83	-23.26	40.32	39.74
850	5.84	-12.34	-6.81	-8.96	2.642	3.196	-6.81	-23.15	39.99	39.53
860	8.16	-10.88	-5.12	-7.27	3.723	4.44	-5.12	-22.67	39.7	39.35
870	11.38	-9.44	-3.73	-5.88	5.357	6.022	-3.73	-22.59	39.55	39.26
880	16.37	-7.86	-2.44	-4.59	7.819	8.552	-2.44	-20.36	39.96	39.68
890	29.72	-5.27	-0.32	-2.47	14.43	15.293	-0.32	-16.66	40.14	39.71
900	49.82	-3.03	1.57	-0.58	24.62	25.205	1.57	-12.65	40.24	40.04
910	72.37	-1.4	3.19	1.04	36.495	35.876	3.19	-8.84	40.35	40.45
920	82.44	-0.84	4.12	1.97	43.094	39.349	4.12	-7.28	40.43	40.7
930	68.87	-1.62	3.16	1.01	37.628	31.243	3.16	-11.48	40.35	40.84
940	48.52	-3.14	1.3	-0.85	26.858	21.657	1.3	-15.81	39.97	40.62
950	35.75	-4.47	-0.24	-2.39	19.392	16.363	-0.24	-16.1	40.03	40.8
960	24.23	-6.16	-2.03	-4.18	12.681	11.549	-2.03	-15.15	39.88	40.54
nine hundred and seventy	17.39	-7.6	-3.48	-5.63	8.839	8.55	-3.48	-17.71	40.06	40.6
980	14.18	-8.48	-4.03	-6.18	6.993	7.188	-4.03	-19.55	40.13	40.56
990	10.4	-9.83	-4.83	-6.98	5.04	5.356	-4.83	-21.04	40.36	40.76
1000	9.9	-10.04	-4.79	-6.94	4.769	5.128	-4.79	-21.07	41.47	41.67

700.00MHz - 1000.00MHz Gain**700.00MHz - 1000.00MHz Efficiency****700.000MHz****700.000MHz H**

700.000MHz E1**700.000MHz E2****850.000MHz****850.000MHz H****850.000MHz E1****850.000MHz E2**

920.000MHz**920.000MHz H****920.000MHz E1****920.000MHz E2****930.000MHz****930.000MHz H**

930.000MHz E1**930.000MHz E2****1000.000MHz****1000.000MHz H****1000.000MHz E1****1000.000MHz E2**

2. protocol

RF100CA chip is built with 8-bit 8051 MCU, 256-byte internal memory, 16-byte program memory and three timers (Timer2 is used for baud rate generator, Timer0 is used for frequency hopping timing control, and Timer1 can be used by users). At the same time, the built-in data RAM of 8Kbyte is shared by 8051MCU and digital demodulation circuit. When receiving the data returned by the tag, the data RAM cannot be accessed by MCU.

2.1 Brief introduction of firmware instructions

Instruction frame format: firmware instructions are composed of frame header, frame type, instruction code, instruction data length, instruction parameters, check code and frame tail, all of which are expressed in hexadecimal. For example:

Header	Type	Command	PL(MSB)	PL(LSB)	Parameter	Checksum	End
BB	00	07	00	01	01	09	7E

Frame Header:	0xBB
Frame type:	0x00
Command code command:	0x07
Instruction parameter length PL:	0x0001
Instruction Parameter:	0x01
Check digit Checksum:	0x09
End of frame:	0x7E

The check bit Checksum is the cumulative sum from the frame Type type to the last instruction Parameter parameter, and only the lowest byte (LSB) of the cumulative sum is taken.

2.2 Instruction frame type

Type	Description
0x00	Command frame: sent by upper computer to RF100 chip.
0x01	Response frame: sent back to the upper computer by RF100 chip.
0x02	Notification frame: sent back to the upper computer by RF100 chip.

Each instruction frame has a corresponding response frame. The response frame indicates whether the instruction has been executed.

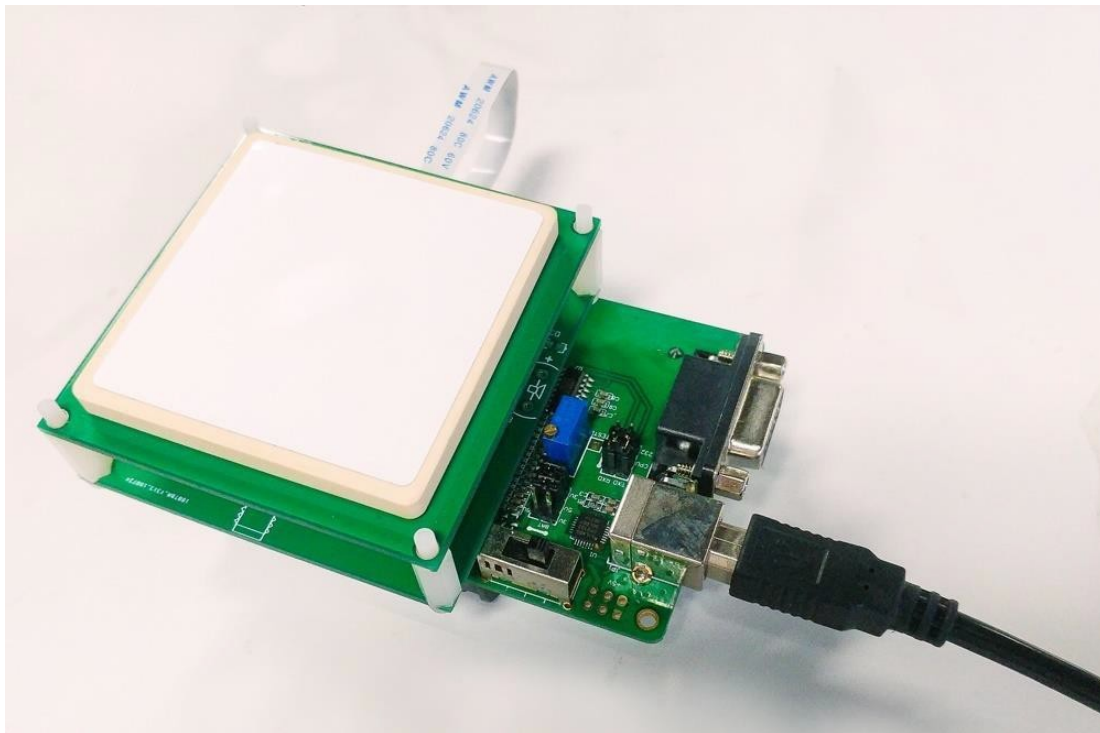
Single polling instruction and multiple polling instruction also have corresponding notification frames. The number of notification frames sent is sent to the upper computer by MCU according to the reading situation. When the reader reads a tag, it sends a notification frame, while when the reader reads multiple tags, it sends multiple notification frames.

See the document RF100CA Module Agreement Manual for detailed agreement and meaning explanation.

3. Software reading and writing examples

3.1 Hardware connection

Power on the RF100CA evaluation board and place the tag within 1 meter above the ceramic antenna.



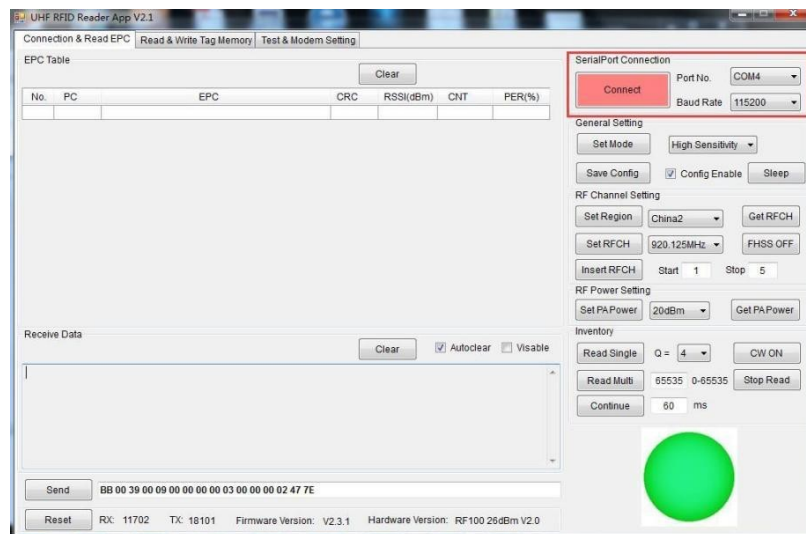
3.2 Software connection

Open the software RFID _ reader _ GUI _ v2.1. As shown in the following figure:



RFID_Reader_G
UI_V2.1

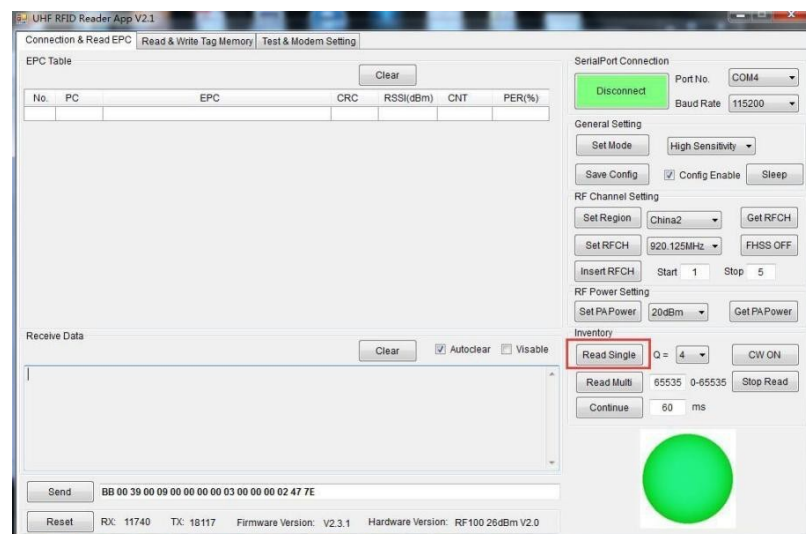
After selecting the serial port, the baud rate is 115200, and click the Connect button, as shown in the following figure:



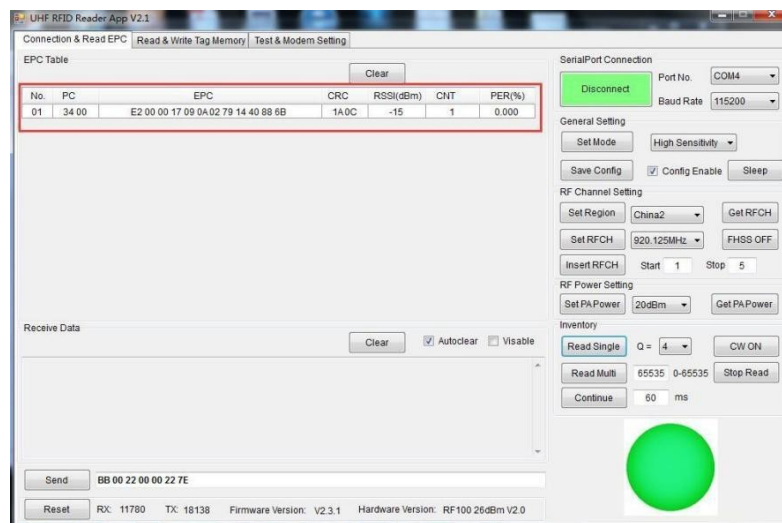
After connecting, the button on the lower right turns green;

3.3 ReadEPCinformation

Click the button read single;



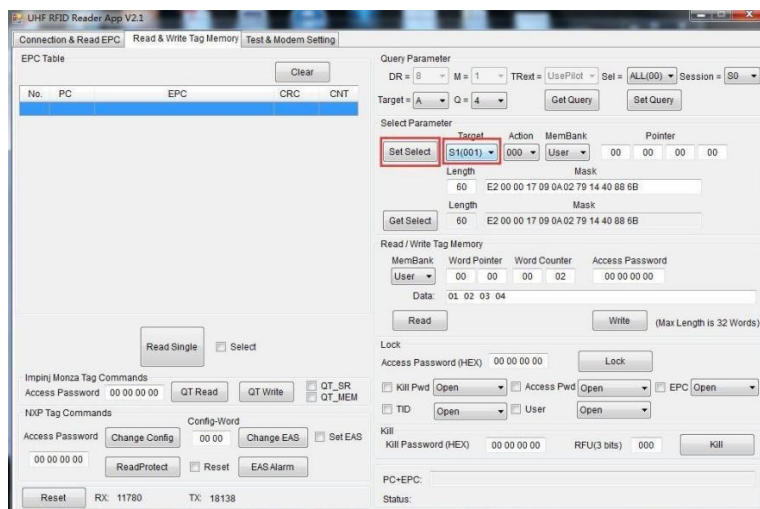
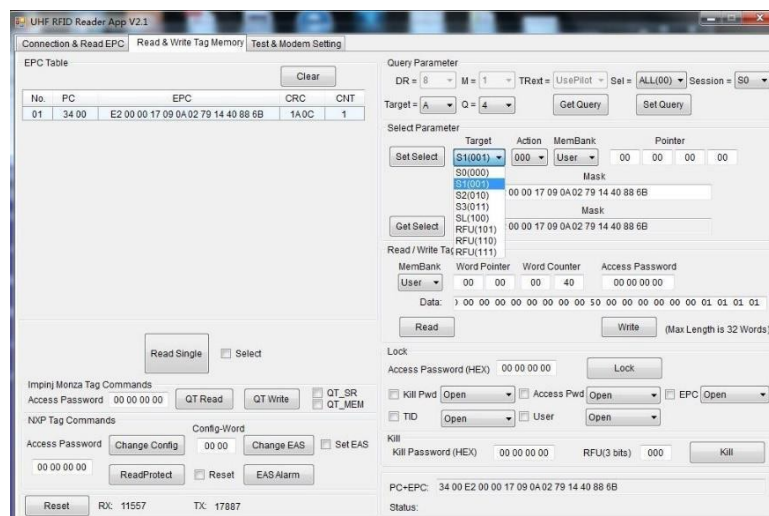
The read information appears, indicating that the reading is normal;



3.4 Read-write Memory test

1. Write test

Select the Read & Write Tag Memory page, and the Target selects S1(001);



Set the parameters according to the red box above; If it is already set, it can be left unchanged; Click the Write button enclosed in red box:

Read / Write Tag Memory

MemBank	Word Pointer	Word Counter	Access Password
User	00	00	00 00 00 00

Data: 01 02 03 04

Read Write (Max Length is 32 Words)

Lock

Access Password (HEX) 00 00 00 00 Lock

☐ Kill Pwd Open ☐ Access Pwd Open ☐ EPC Open

☐ TID Open ☐ User Open

Kill

Kill Password (HEX) 00 00 00 00 RFU(3 bits) 000 Kill

PC+EPC: 34 00 E2 00 00 17 09 0A 02 79 14 40 88 6B

Status: Write Memory Success

If successful, the green text Write Memory Success in the red box at the bottom of the figure will appear.

2. Reading test

Click the Read button to read Memroy's information. If it is successful, Read Memory Success will

Read / Write Tag Memory

MemBank	Word Pointer	Word Counter	Access Password
User	00	00	00 00 00 00

Data: 01 02 03 04

Read Write (Max Length is 32 Words)

Lock

Access Password (HEX) 00 00 00 00 Lock

☐ Kill Pwd Open ☐ Access Pwd Open ☐ EPC Open

☐ TID Open ☐ User Open

Kill

Kill Password (HEX) 00 00 00 00 RFU(3 bits) 000 Kill

PC+EPC: 34 00 E2 00 00 17 09 0A 02 79 14 40 88 6B

Status: Read Memory Success

appear below.

4. Learn more about Xiaowang applications

Xiaowang Technology is a provider of Internet of Things basic platform, products and solutions, which can realize rapid networking transmission of various industrial data. The following is an application case of the products. Click the link to enter official website for details.



[ZigBee wireless intelligent street lamp](#)



[Intelligent manufacturing monitoring system](#)

[Restaurant personnel positioning system](#)



[ZigBee warehouse positioning](#)



[ZigBee intelligent fishery](#)



[ZigBee 5 km long-distance transmission scheme](#)



[ZigBee Intelligent Bus Communication System](#)



[ZigBee wireless serial port](#)



[Unattended monitoring of substation](#)



[Intelligent medicine basket solution](#)

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6. After-sales service and technical support

Before ordering products, please contact Xiaowang Electronic Sales Office or distributor to get the latest specifications. The documents containing the order number and other electronic documents of Xiaowang mentioned in this document can be accessed by visiting Guangzhou Xiaowang Electronics.

Limited to the company's official website www.cells-net.com Get.

The product has been used. There is a problem in the process, please First, confirm the fault with the technicians. If you need to return to the factory for repair, please clearly indicate the fault phenomenon in the repair form, fill in the contact information of the company or individual, and send it back with the product.

Fixed line: 4000823969 020-82186181

Technical Support/Sales Tel: 18027107116 (Mr.

Liu) Technical Support Email: Fae@cells-net.com

Sales mailbox: [Sales@cells-](mailto:Sales@cells-net.com)

net.com Technical support QQ:

2301079163

Sales QQ: 3496006498

Company Address: Room B4-1, Building 1, Innovation, Tsinghua Science Park, Shilou Town, Panyu District, Guangzhou.

IC Caution:

English:

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

French:

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence.

L'exploitation est autorisée aux deux conditions suivantes :

1. L'appareil ne doit pas produire de brouillage;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

FCC:

This device complies with part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

To maintain compliance with RF Exposure guidelines, This equipment should be installed and operated with minimum distance between 20cm the radiator your body: Use only the supplied antenna.