

edition: 0.2

number:

Multiple connected self-organizing network  
communication modules  
RXD-UR2EM-01

specification

document number

Total 12 pages

June 2024

---

## Signature page

	fiction	proofread	examine and verify	standardiz ation	
sign					
date					
countersign					
unit					
sign					
date					
unit					
sign					
date					
ratify _____					

Status page

order	edition	stage	Person making	Change the date	Status description/change number
1	0.2	S	Zheng Defu	2024.6.25	
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

---

## table of contents

1 Product introduction .....	1
2 Product features .....	1
3 Main application scenarios .....	1
4 Block diagram .....	2
5 Size of product .....	2
5.1 Module size .....	2
5.2 Product interface .....	3
5.2.1 Antenna interface .....	3
5.2.2 Debugging interface .....	3
5.2.3 Communication interface .....	4
5.3 Basic characteristics .....	5
5.3.1. Basic RF characteristics .....	5
5.3.2. Antenna performance .....	5
5.3.3. RF output power .....	8
5.3.4. RF receiving sensitivity .....	8
5.3.5. Communicating protocol .....	8
5.4 Principle block diagram .....	9
5.5 Function declaration .....	9
5.5.1 Relay mode function .....	9
5.5.2 Terminal mode function .....	10
6 Precautions to be Observed .....	11
7 QA .....	12

---

## 1 Product introduction

Wireless multi-connectivity self-organizing network photovoltaic motor communication module is a wireless communication product dedicated to industrial site collection and industrial equipment control. It supports relay communication and RS485 bus.

The product uses the Ewei interconnection technology, combined with the interconnection base station, to support RS485 data collection and upload, wireless sending of device control information to designated devices and other functions.

It can be applied to sensor timing collection, PLC equipment control, and can achieve wireless control of multi-node devices in industrial sites based on sensor and control information. At the same time, it can realize relay transmission to expand communication coverage, save wiring construction costs, achieve wireless multi-point information collection and equipment control, which can help simplify industrial site wiring, reduce implementation difficulty, and save renovation costs.

## 2 Product features

- Product features: RS485 Communication
- Product function: support 5V power supply, RS485 interface
- Application scenario: wireless on-site communication without wiring
- Other features: support for relay communication

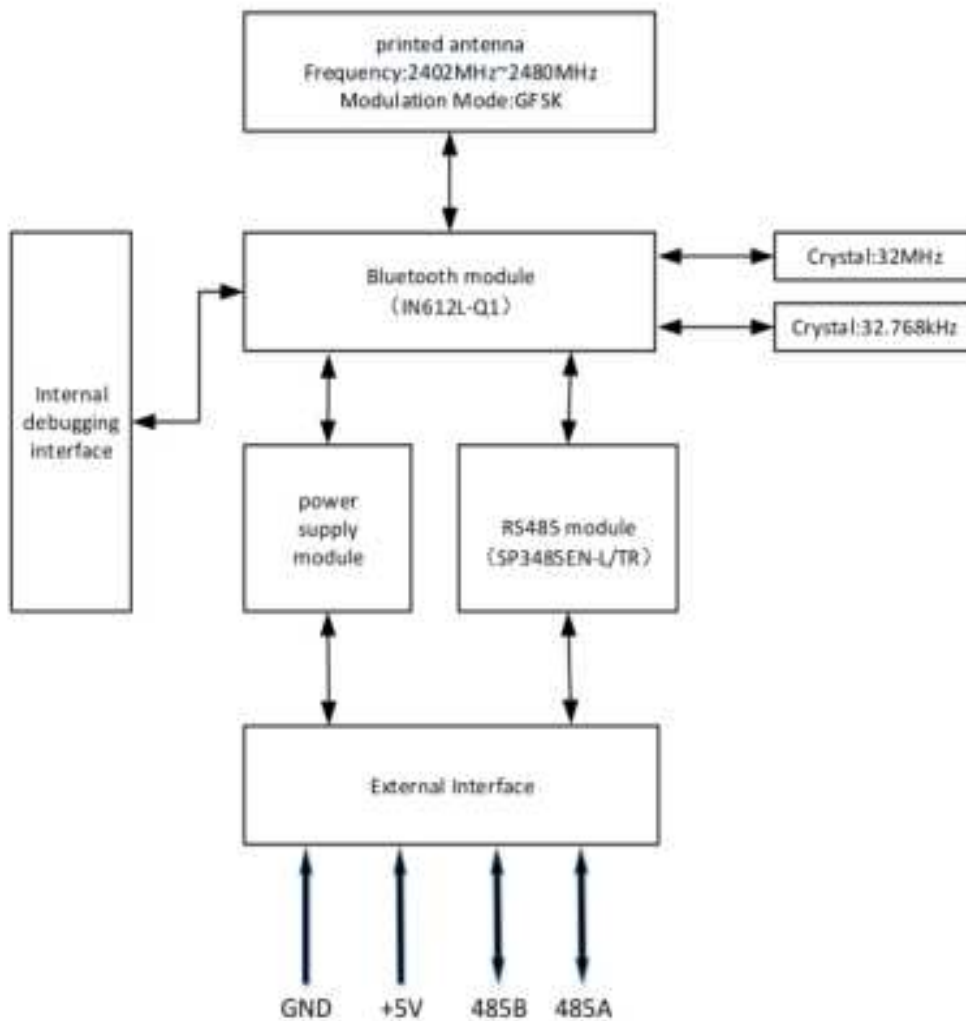
## 3 Main application scenarios

In conjunction with ZhiXinDa communication positioning base stations, it can achieve RS485 data collection and upload as well as wireless device control information transmission. Suitable for sensor timed collection and PLC equipment control, based on sensor and control information, it realizes wireless control of multi-node devices in industrial sites. This method can reduce cabling

---

costs, simplify on-site wiring, reduce implementation difficulty, and save renovation costs.

#### 4 Block diagram



#### 5 Size of product

##### 5.1 Modulesize

60\*130\*30mm, line length 1200mm



## 5.2 Product interface

### 5.2.1 Antenna interface

Parameter item	define
Antenna interface	Built-in board PCB antenna

### 5.2.2 Debugging interface

Internal debugging interface type: 2.54mm1x8P test point

The internal debugging interface is defined as follows:

order number	parameter	define
PIN 1	REST	reset
PIN 2	UART_TX	Debug serial port sending
PIN 3	UART_RX	Debug serial port reception
PIN 4	+3.3V	+3.3 V power supply
PIN 5	GND	the earth
PIN 6	SWDCLK	Debug interface-clock
PIN 7	SWDIO	Debug interface-data
PIN 8	BOOT	Start mode Settings

---

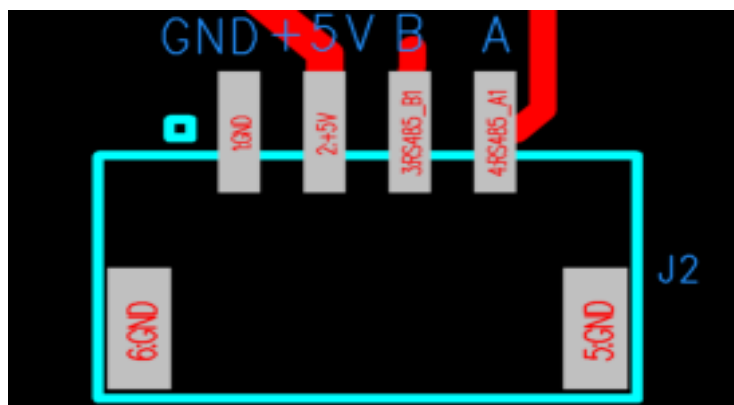
### 5.2.3 Communication interface

Interface model: HX20007-4AWB flat tape clip (2.00mm1x4P flat tape installation)

The communication interface is defined as follows:

order number	parameter	define
PIN 9	GND	source GND
PIN 10	+5V	Power supply +5V
PIN 11	485B	Communication interface 485 B
PIN 12	485A	Communication interface 485 A

Interface matching connector model selection: PH series with a spacing of 2.00mm1x4P



The connection diagram is as follows:





---

### 5. 3 Basic characteristics

#### 5. 3. 1. Basic RF characteristics

Parameter item	define
service frequency	2.4GHz ISM band
Wireless standards	2.4G private protocol
rate of data signalling	1Mbps
Antenna interface	Built-in onboard antenna

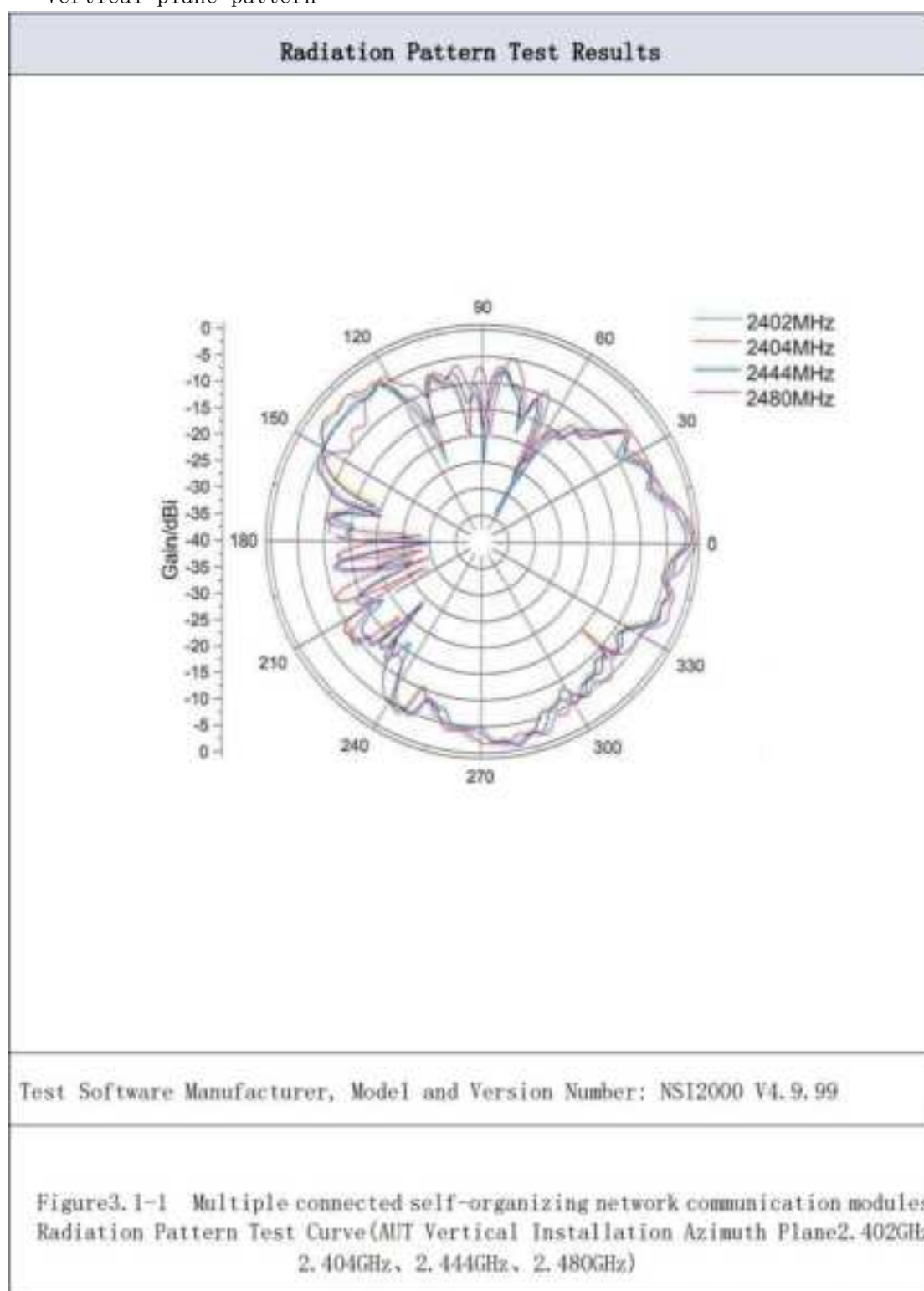
#### 5. 3. 2. Antenna performance

##### 5.3.1.1.Antenna gain

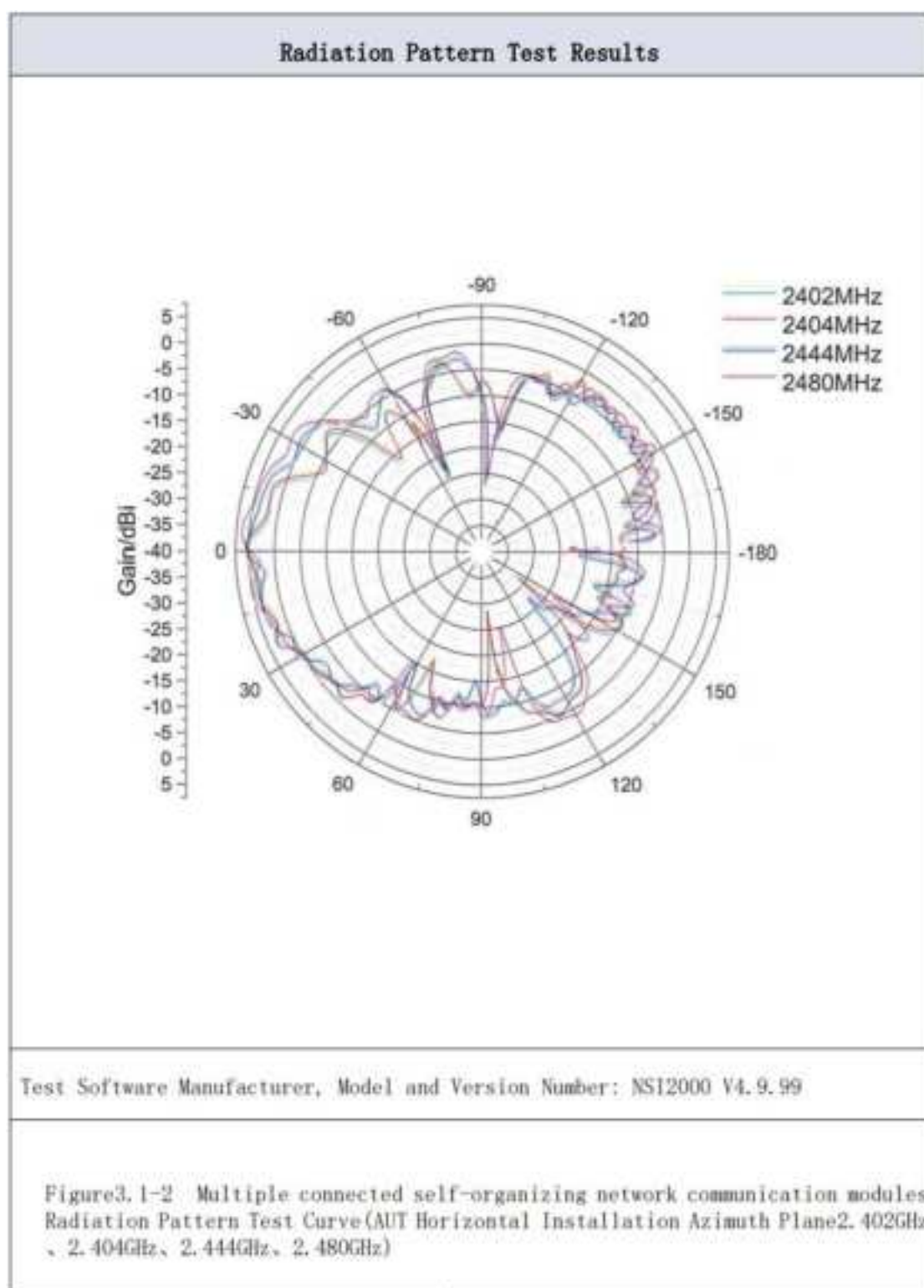
Test Item		Test Result	Unit
Antenna gain	2402MHz	5.324	dBi
	2404MHz	5.474	dBi
	2444MHz	5.329	dBi
	2480MHz	6.279	dBi

### 5.3.1.2. Antenna Radiation Pattern

Vertical plane pattern



Horizontal plane pattern



---

### 5. 3. 3. RF output power

Parameter item	least value	representative value	crest value	unit
RF average output power	-	6	7	dBm

### 5. 3. 4. RF receiving sensitivity

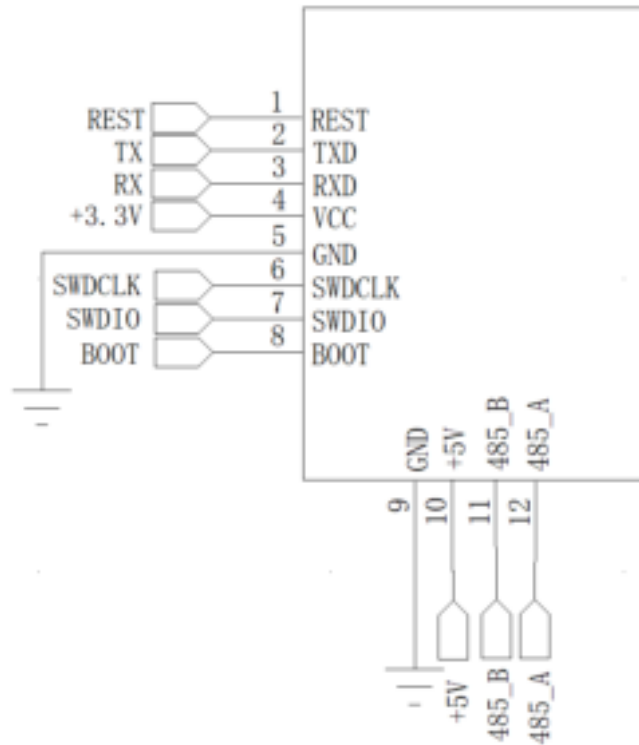
Parameter item	least value	representative value	crest value	unit
RX sensitivity 1Mbps	-	-9 5	-	dBm

### 5. 3. 5. Communicating protocol

Parameter item	content
code	8-bit binary
start bit	1 bit
data bit	8 bits
parity check bit	No parity check bits
stop bit	1 bit
error check	CRC (Redundant cyclic code)
Baud rate	9600、19200,38400,57600,115200

---

## 5.4 Principleblock diagram



## 5.5 Function declaration

### 5.5.1 Relay mode function

Features	functional description
Relay forwarding	After the terminal is configured as a relay node, it should relay the communication information of the sub node according to the configuration information on the basis of retaining the original communication capability
Data caching	Data caching is set up at the relay node to ensure that data can be transmitted in subsequent communications when a node is temporarily disconnected.
Packet acknowledgment	Each relay node sends a confirmation signal after receiving the data packet to ensure that the source node knows that the data has been successfully transmitted.
Automatic retransmission	In case of data packet transmission failure, automatic retransmission mechanism can be set to ensure that data can be effectively transmitted

---

Signal strength monitoring	Nodes can regularly monitor the signal strength of surrounding nodes to dynamically adjust the selection of relay nodes and optimize the communication link
Packet loss handling	Monitor and process packet loss and ensure data integrity through retransmission or other mechanisms

#### 5.5.2 Terminal mode function

Features	functional description
Control commands are issued	The control command can also be issued to the target node through multi-level jump, so as to ensure the reliable transmission of the command
Data acquisition and encapsulation	Data is collected from sensors or devices and encapsulated into packets
Data segmentation and assembly	Divide the big data into small segments to facilitate transmission through multiple levels of links, and then reassemble them at the target node
Data compression and optimization	In uplink communication, data can be compressed and optimized to reduce the load of data transmission
Packet sequence number	Assign a sequence number to each data packet to ensure the order and integrity of the data
Packet acknowledgment	After receiving the data packet, the target node sends a confirmation signal to the source node to ensure the status of data transmission
Data caching and retransmission	In case of transmission failure, the relay node or the target node can buffer the data and perform automatic retransmission
Priority management	For different types of data, priority can be set to ensure that critical data is transmitted first

---

## 6 Precautions to be Observed

The working environment of the product is -30°C ~ 60°C, away from the fire source and strong electromagnetic interference source.

This device complies with part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

This device is verified to comply with part 15 of the FCC Rules for use with cable television service.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

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.

This equipment complies with radio frequency exposure limits set forth by the FCC for an uncontrolled environment.

This equipment should be installed and operated with a minimum distance of 10 cm between the device and the user or bystanders.

This device must not be co-located or operating in conjunction with any other antenna or transmitter.

This radio transmitter (IC: XXXX–ZZZZZ) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for

---

use with this device.

(Antenna Type: 2.4G built-in on-board antenna、Antenna Gain<6.5)

Le présent émetteur radio (IC: XXXX-ZZZZZZ) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal. Les types d'antenne non inclus dans cette liste, et dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

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; and
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

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.

This equipment complies with radio frequency exposure limits set forth by the Innovation, Science and Economic Development Canada for an uncontrolled environment.

This equipment should be installed and operated with a minimum distance of 20 cm between the device and the user or bystanders.

This device must not be co-located or operating in conjunction with any other antenna or transmitter.

Cet équipement est conforme aux limites d'exposition aux radiofréquences définies par la Innovation, Sciences et Développement économique Canada pour un environnement non contrôlé.

Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre le dispositif et l'utilisateur ou des tiers.

CAN ICES-3 (\*)/NMB-3(\*)

## 7 QA

The factory has passed the ISO9001 quality system certification. Each product has been tested strictly (transmitting power test, sensitivity test, power consumption test, stability test, aging test, etc.).