GC4BT-X81 Series

Bluetooth Module User Manual

Rev-1.0 2016.01

FCC ID: 2AK4U-GC4BT-X81

GC4BT-X81SeriesBluetooth Model User Maual

Products Selection Guide

Part Number	Description
GC4BT-X81MA	GreenCHIP Master Device of Transmit transparently
GC4BT-X81SA	GreenCHIP Slave Device of Transmit transparently

Technical consultation

Nanjing Lichao Electronic Technology Co.Ltd.
Room 2406 Jingang Building A Heyan Road 251 Nanjing China
ZIP:210028
Tel: 0086-25-83306839/83310926
Fax: 0086-25-83737785
Website:http://www.dycmcu.com/

目录

1 Function features

The low-power Bluetooth module of GREENCHIP X Series is a High-performance Io T transceiver which developed by GREENCHIP. It use the interface of stamp hole, and its full-port output can perfectly support your application and development without cumbersome RF hardware design、development and production, which is very practical and convenient. The perfect data transmission software can even meet your rapid developing requirement, reduce the software cost and shorten the developing cycle.

The module need an external antenna. The product has many advantages such as low power consumption, small size, strong anti-interference capability, etc.

2. Electical characters

Table 2-1 Module Specifications

Parameter	SPECIFICATION			Remarks
Supply Voltage	1.9~3.6V(Typical3.3V)			High Voltage will damage the module; The voltage too low will Communication error
Frequency Resolution	2.400~2.4835GHz			
Current Consumption	Transmit	13.4mA	@+2dBm	
		12.1mA	@ 0dBm	
		10.1mA	@-6dBm	
	Receive	16.5mA		
	Deep sleep	<3uA		
	Power down	<0.3uA		
Output Power Range	-20~+2dBm			programmable
Operating Temperature	-40~85℃			
Storage Temperature	-40~125℃			
Channel	40			Three broadcast channel, Thirty-seven data channel
Modulation technology	GFSK			Support Adaptive Frequency Hoping
communication	Support BLE protocol			
IO Control Level	0~VCC			
RX Channel Bandwidth	1Mbps			
Transmission Distance	≈50m			relate to the gain of external antenna
Interface type	1.27mil SMT Stamp hole			
Upgrade method	OTA upgrade			

Note: the electric parameters is test at 25℃±3℃.
[transmission distance] is influenced by facors such as the surrounding environment,airhumidity.for reference only

3. Pin assignment

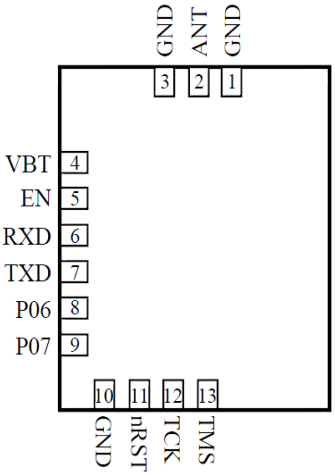


Fig 4-1 Model Pin Diagram

4. Pin Description

No	Name	Type	Default Functions	Description
1	GND	POWER	GND	Ground，All GND Pin need to be connected together.
2	ANT	AO	ANT	Antenna output Signal
3	GND	POWER	GND	
4	VBT	POWER	VBT	Power Supply(3.3V)
5	EN	I/O	EN	Transmission En : Level-triggered mode ,active-low,with internal pull-up: 0：The module starts broadcasting,until connected to the mobile device. 1：Immediately enterdeepsleepmode,regardless of the module's current state
6	RXD	I/O	RXD	Data receiver input pin fouart
7	TXD	I/O	TXD	Data transmitter output pin fouart
8	P06	I/O	P06	
9	P07	I/O	P07	
10	GND	POWER	GND	
11	nRST	I/O	RESTORE/IO	Rstore the factory Settings： Whithin 30 seconds after power on ,and keep this pin low for 5s,the system will restore some parameters.if keep this pin low for 20s,the model will restore all parameters.
12	TCK	I/O	TCK	Debug Mode:Clock Signal
13	TMS	I/O	TMS	Debug Mode:Data Signal

5.Typical application

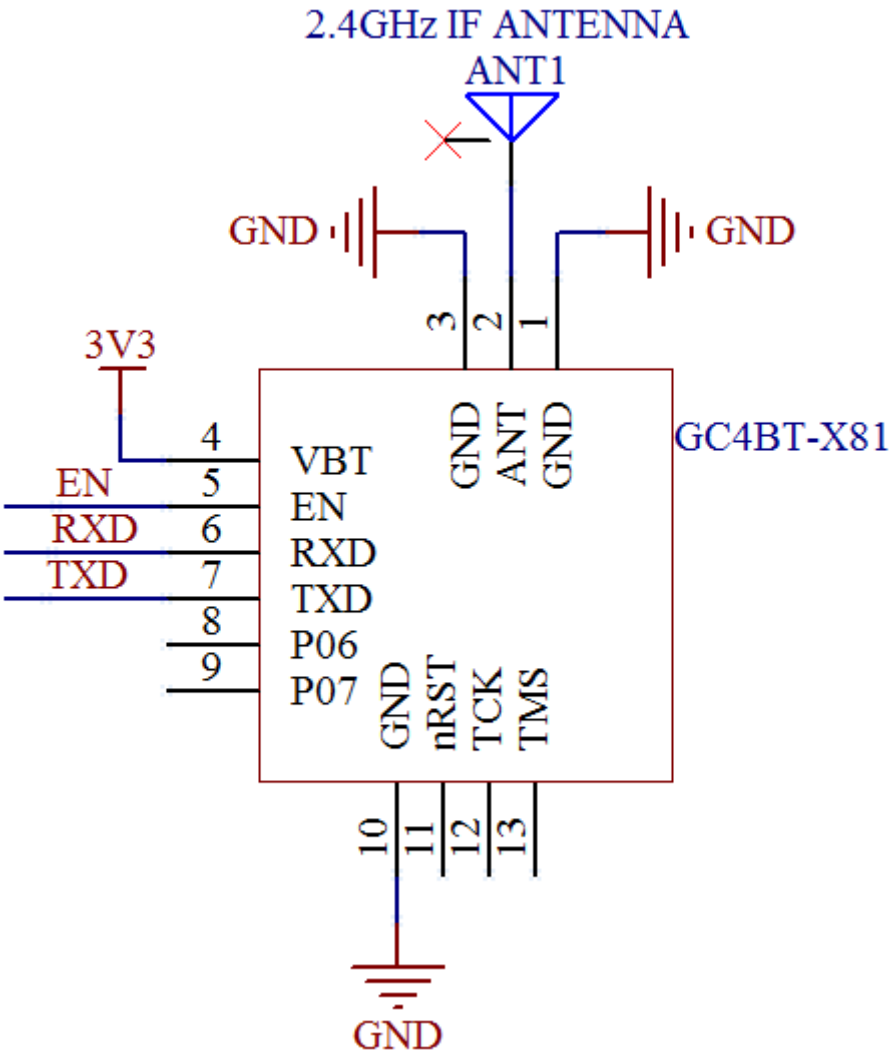


Fig 6-1 TransmissionTypical application Diagram

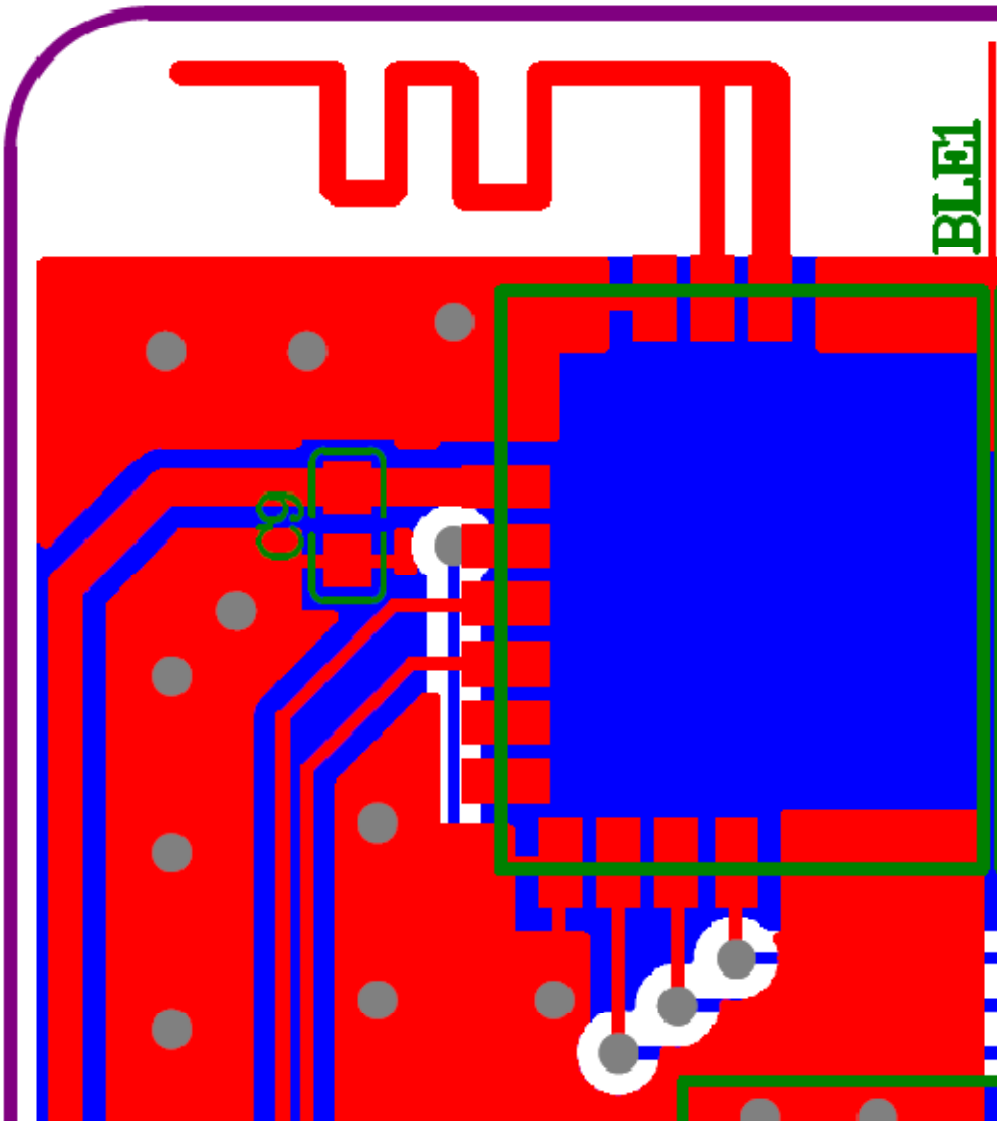
6. Compliance with FCC Requirements:

1. The use of this module is for health-care products made by JIANGSU YUYUE MEDICAL EQUIPMENT & SUPPLY CO., LTD. only and may not be used in any other products.
2. This module does not contain any user serviceable parts and must be returned to JIANGSU YUYUE MEDICAL EQUIPMENT & SUPPLY CO., LTD. for a replacement module.
3. The final host / module combination may also need to be evaluated against the FCC Part 15B criteria for unintentional radiators in order to be properly authorized for operation as a Part 15 digital device.
4. The host product with the module installed must be evaluated for simultaneous transmission requirements.

7. installation instructions

The GC4BT-X81 transceiver module has been granted limited modular approval for fixed locations. The module is designed specifically for and operates exclusively within health-care products made by JIANGSU YUYUE MEDICAL EQUIPMENT & SUPPLY CO., LTD. In order to ensure proper integration into the final product and maintain compliance with the rules and regulations under which this module has been granted certification, the following requirements must be followed.

We recommend placing the module on the edge or corner of the PCB board. It is best to reserve a space of 6×18mm on the board for bluetooth antenna. As shown below:



7.1 Power supply requirements

The external power must be connected to modem power pads.

Parameter	Min.	Typ.	Max.	Unit
Supply Voltage	1.9	3.3	3.6	V
Operating Temperature	-40		85	℃

7.2 Power consumption

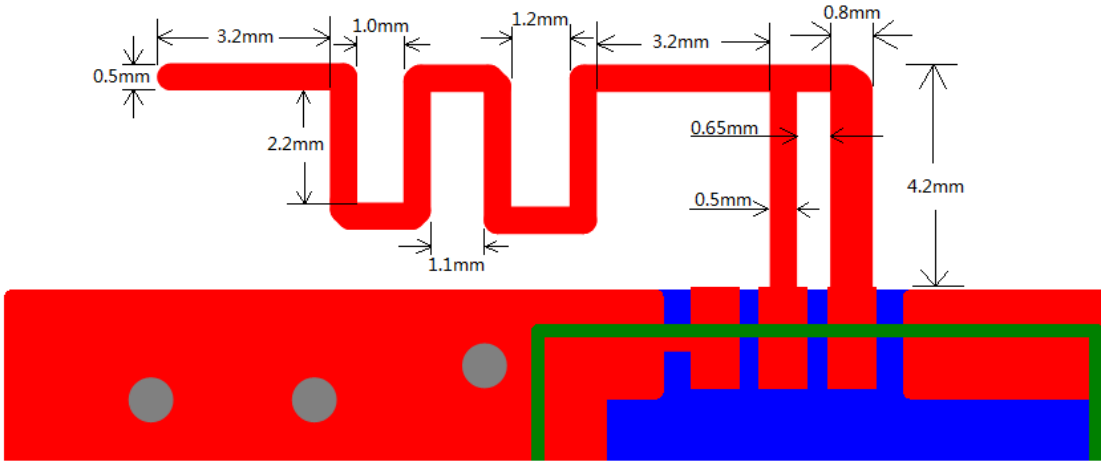
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply Voltage Range	V_{DD}	Supply voltage	1.9	3.3	3.6	V
Current Consumption	I	Power down mode	-	0.2	0.3	μA
		Sleep:RC32K active	-	3	6	μA
		Sleep:RC32K off	-	2	4	μA
		TX current @ +2dBm	-	13.4	-	mA
		TX current @ 0dBm	-	12.1	-	mA
		RX current	-	16.5	-	mA

7.3 Bluetooth Antenna description

7.3.1 GC4BT-X81 module provides a Bluetooth antenna pad named ANT, pin definition listed below.

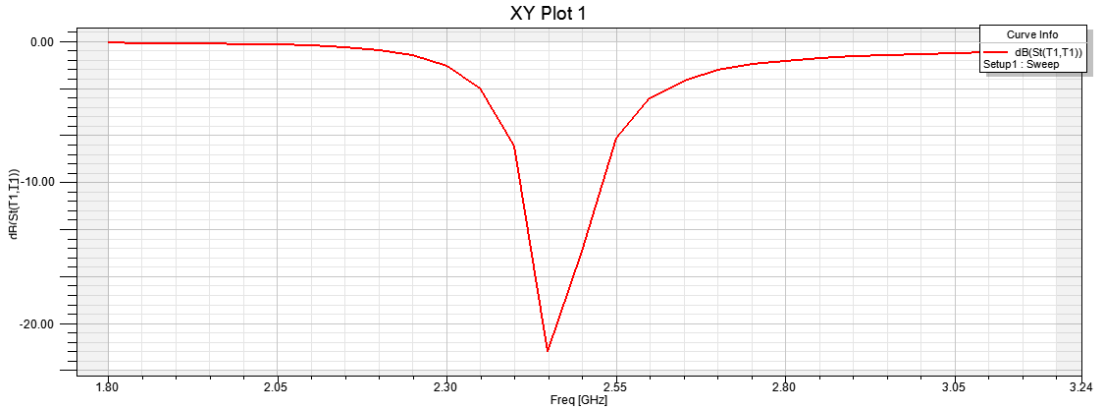
Pin #	Name	Description
TP1,3	GND	Ground for Antenna
TP2	ANT	2.4GHz Antenna

For Bluetooth antenna, we used 2.4GHz inverted F PCB antenna. It is a compact, high performance antenna and almost no cost. Antenna dimensions are as follows:



Only this trace antenna design is authorized for compliance with FCC Requirements, and other trace antenna designs must be approved under a Class II permissive change.

The basic parameters of this 2.4GHz Inverted F antenna are as follows.



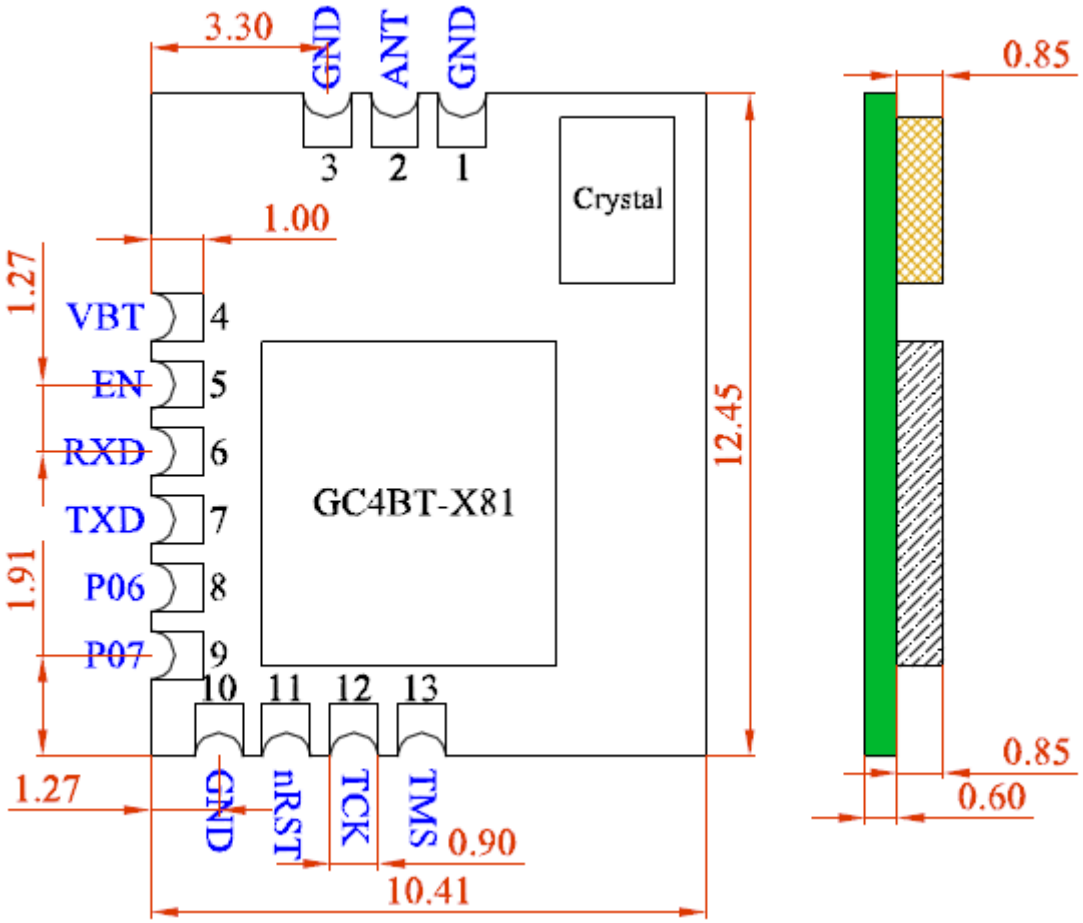
Parameter Description	***Value***
Center Frequency	2.45GHz
Impedance	50Ω
Antenna Radiation	Omni-directional
Average Gain	1 dB
Reflection	<-15 dB
Bandwidth	>100MHz

The length of the IFA(Inverted F Antenna), should be a strong factor in resonant frequency(center frequency). The higher the frequency the shorter the antenna, the lower the frequency the longer the antenna. In general, 2.45GHz frequency, the corresponding length is approximately 20mm. And it will also affect the impedance of antenna.
The height of the IFA, should be a small fraction of resonant frequency. The radiation properties and impedance are not a strong function of this parameter. Space permitting, height should not be less than 4mm.

7.3.2 Test procedures for design verification and production test procedures for ensuring compliance.

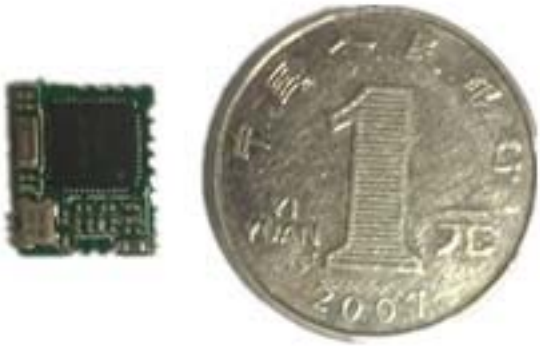
The module has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application.
The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in stand-up position (Z axis) and the worst case was recorded in Report No: RXA1701-0005RF02R1.

8. Product size drawing



*Unremarked tolerances accord with the standard of GB/T1804-m

9. Product figure



10. Packaging Information

1、Each 1pcs Modules are used tape packaging. The width of Tape is 44mm. The tape cover with a transparent cover. The width of cover is 37.5mm

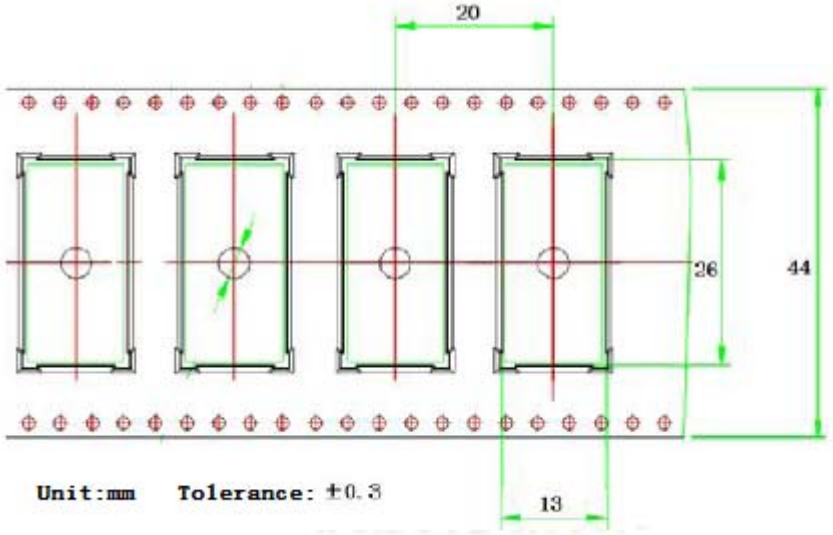


Fig 9-1 Tape Package Size drawing

2、 There are 900 PCS of each volume, each volume use PET/AL/PP material antistatic bag packaged into a bag, bag inside diameter 42 cm * 45 cm.

3、Each bag packed into a box with paper boxes,paper box size is 36.5cm*36.5cm*6cm.

4、Packed with box,5 boxes in a carton.Carton size is 37.5cm*37.5cm*32cm.Each Carton has4500pcs Model altogether.

Fig9-2 Full Container Package schematic drawing

11. Revison History

Vision	Record	Data
1.0	Original Version	2016.01.21

11. Business Contact

Nanjing Lichao Electronic Technology Co.Ltd.
Room 2406 Jingang Building A Heyan Road 251 Nanjing China
ZIP:210028
Tel: 0086-25-83306839/83310926
Fax: 0086-25-83737785
Website:http://www.dycmcu.com/

12. Disclaimer

The emergence of information contained in the published specification was believe to be right, however, the company for the use of the specilication is not responsible. In this paper, application purpose mentioned are just used to do that, the company dose not warrant or represent these not further modify the appilication would be appropriate, do not recommend its products for use in be- -cause of failure or other reasons may cause harm to the human body place. This product dose notauthorize the use of lifesaving, sustaining device or system as the key device. The company has right to modify product withoutpriornotice. For the latest information, please refer to our web site http://www.dycmcu.com.

13. Standards and Regulatory Compliance

13.1 Standards and certification

The EUT conforms to the following standards and certification requirements:

BT BLE

FCC

❒ 47 CFR Part 1 - RF radiation exposure limits

❒ 47 CFR Part 2 - Equipment authorization

❒ 47 CFR Part C - BT

13.2 FCC certification requirements.

According to the definition of mobile and fixed device is described in Part 2.1091(b), this device is a mobile device.

And the following conditions must be met:

1. The EUT is a mobile device; maintain at least a 20 cm separation between the EUT and the user's body and must not transmit simultaneously with any other antenna or transmitter.

2. The device is only for fixed operation mode. (A Class II Change would be required for near-body Host applications.)

3.A label with the following statements must be attached to the host end product: This device contains FCC ID: 2AK4U-GC4BT-X81.

4.To comply with FCC regulations limiting both maximum RF output power and human exposure to RF radiation, maximum antenna gain (including cable loss) must not exceed:

❒BT BLE band <0dBi

5. This module must not transmit simultaneously with any other antenna or transmitter

6. The host end product must include a user manual that clearly defines operating requirements and conditions that must be observed to ensure compliance with current FCC RF exposure guidelines.

For portable devices, in addition to the conditions 3 through 6 described above, a separate approval is required to satisfy the SAR requirements of FCC Part 2.1093

If the device is used for other equipment that separate approval is required for all other operating configurations, including portable configurations with respect to 2.1093 and different antenna configurations.

For this device, OEM integrators must be provided with labeling instructions of finished products. Please refer to KDB784748 D01 v07, section 8. Page 6/7 last two paragraphs:

A certified modular has the option to use a permanently affixed label, or an electronic label. For a permanently affixed label, the module must be labelled withan FCC ID - Section 2.926 (see 2.2 Certification (labelling requirements) above). The OEM manual must provide clear instructions explaining to the OEM the labelling requirements,options and OEM user manual instructions that are required (see next paragraph).

For a host using a certified modular with a standard fixed label, if (1) the module's FCC ID is notvisible when installed in the host, or (2) if the host is marketed so that end users do not havestraightforward commonly used methods for access to remove the module so that the FCC ID ofthe module is visible; then an additional permanent label referring to the enclosed module:"Contains Transmitter Module FCC ID:2AK4U-GC4BT-X81" or "Contains FCC ID: 2AK4U-GC4BT-X81" mustbe used. The host OEM user manual must also contain clear instructions on how end users canfind and/or access the module and the FCC ID.

The final host / module combination may also need to be evaluated against the FCC Part 15B criteria for unintentional radiators in order to be properly authorized for operation as a Part 15 digital device.

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. In cases where the manual is provided only in a form other than paper, such as on a computer disk or over the Internet, the information required by this section may be included in the manual in that alternative form, provided the user can reasonably be expected to have the capability to access information in that form.

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.

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.

The host manufacturer is responsible for additional testing to verify compliance as a composite system. When testing the host device for compliance with Part 15 Subpart B, the host manufacturer is required to show compliance with Part 15 Subpart B while the transmitter module(s) are installed and operating. The modules should be transmitting and the evaluation should confirm that the module's intentional emissions are compliant (i.e. fundamental and out of band emissions). The host manufacturer must verify that there are no additional unintentional emissions other than what is permitted in Part 15 Subpart B or emissions are complaint with the transmitter(s) rule(s).

13.3 FCC RF exposure requirements

1. Radiated transmit power must be equal to or lower than that specified in the FCC Grant of Equipment Authorization for FCC ID: 2AK4U-GC4BT-X81.

2. To comply with FCC regulations limiting both maximum RF output power and human exposure to RF radiation, maximum antenna gain (including cable loss) must not exceed:

   ❒BLE<0dBi

3. This module must not transmit simultaneously with any other antenna or transmitter.

4. To ensure compliance with all non-transmitter functions the host manufacturer is responsible for ensuring compliance with the module(s) installed and fully operational. For example, if a host was previously authorized as an unintentional radiator under the Declaration of Conformity procedure without a transmitter certified module and a module is added, the host manufacturer is responsible for ensuring that the after the module is installed and operational the host continues to be compliant with the Part 15B unintentional radiator requirements.

Declaration of Conformity

We, GREENCHIPS (HONGKONG) LIMITED, located in Room 1401,Tower A,Jingang mansion,251 Heyan Road, Nanjing, China,
declares that the product

BLE Module

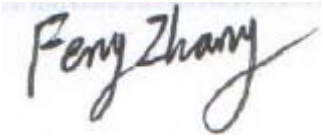
TypeGC4BT-X81**,**

Supporting**Bluetooth BLE,**

satisfies all the technical regulations applicable to the product within the scope of Council Directive 1999/5/EC:

Safety	EN 60950-1:2006/A11:2009/A1:2010/A12:2011/A2:2013
EMC	EN 301 489-1 V1.9.2, EN 301 489-17 V2.2.1,
Radio	EN 300 328 V1.9.1
Health	EN 50360:2001/A1:2012, EN 50566:2013 EN 62209-1:2006, EN 62209-2:2010, EN 62479:2010

We hereby declare that all essential radio test suites have been carried out and that the above product is in conformity to all the essential requirements of Directive 1999/5/EC.

Signature: 

Print name: Feng Zhang

Date: 2017-2-16

Company: GREENCHIPS (HONGKONG) LIMITED

Address: Room 1401,Tower A,Jingang mansion,251 Heyan Road, Nanjing, China

CE 1177