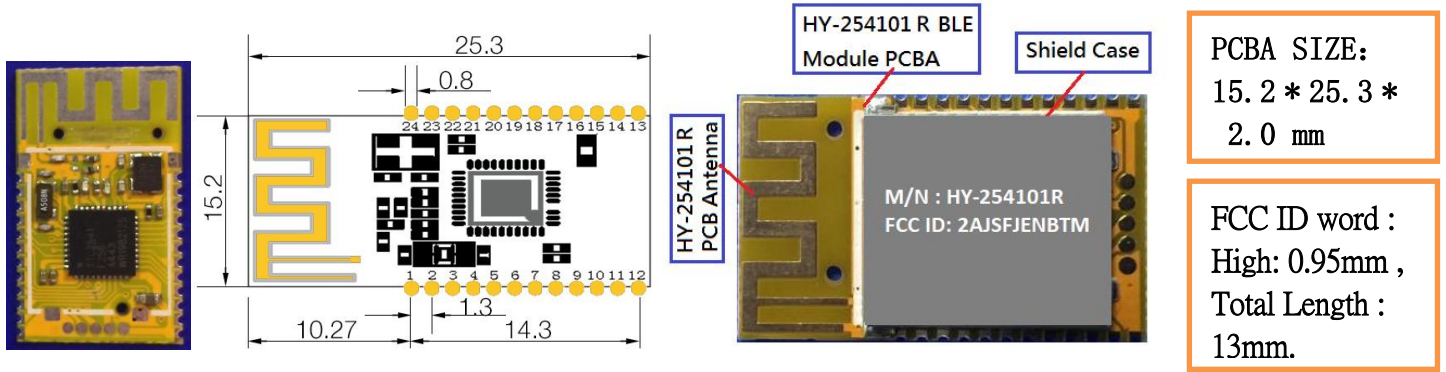
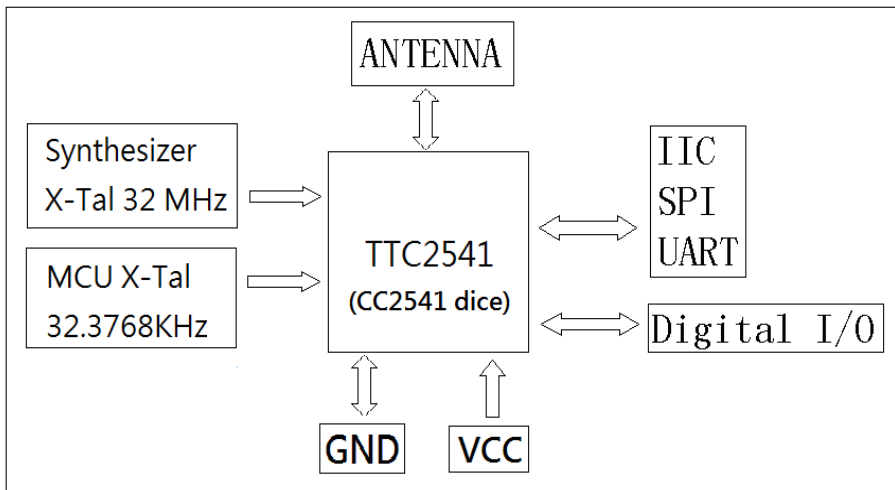


HY-254101R Use TTC2541 /TI CC2541 IC chip 24 pin BLE 4.0
Bluetooth module specifications. (FCC ID: 2AJSFJENBTM)

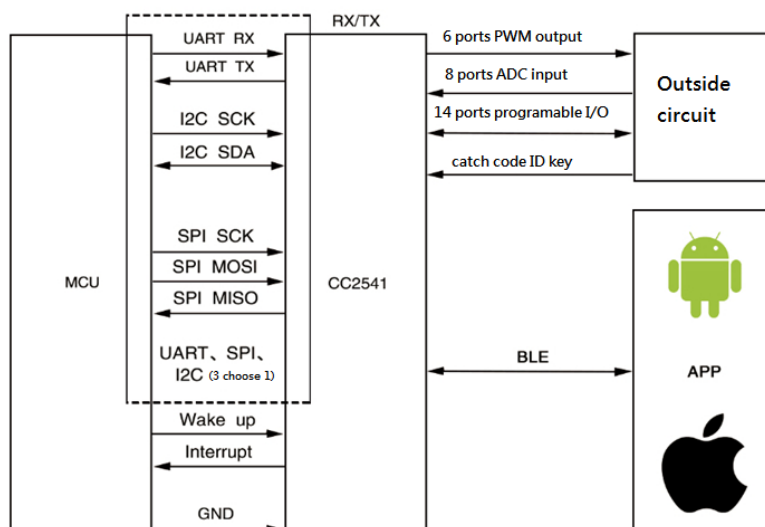
(1). Dimensions Size :



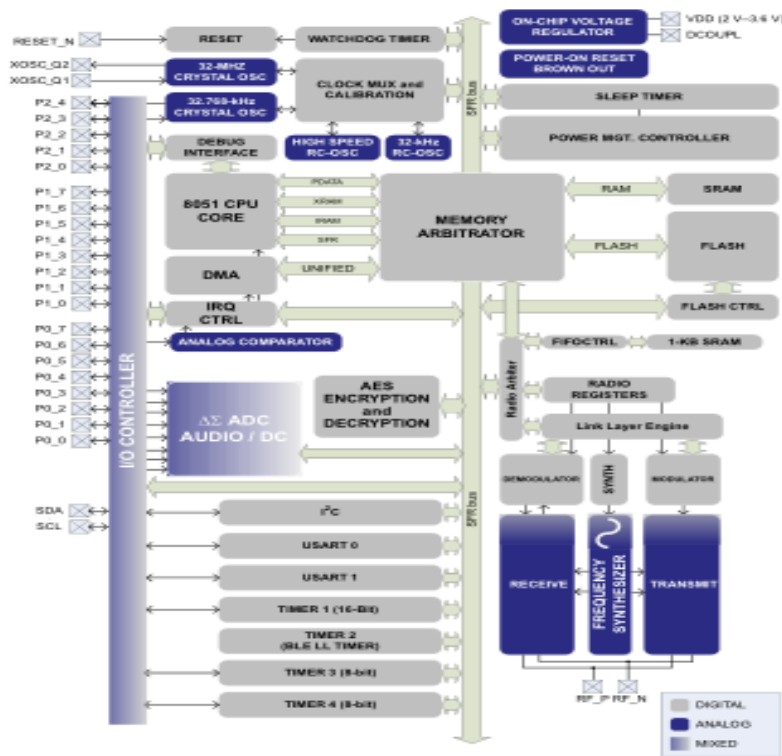
(2). block diagram :



(3). Working mode schematic



(4): IC Block Diagram



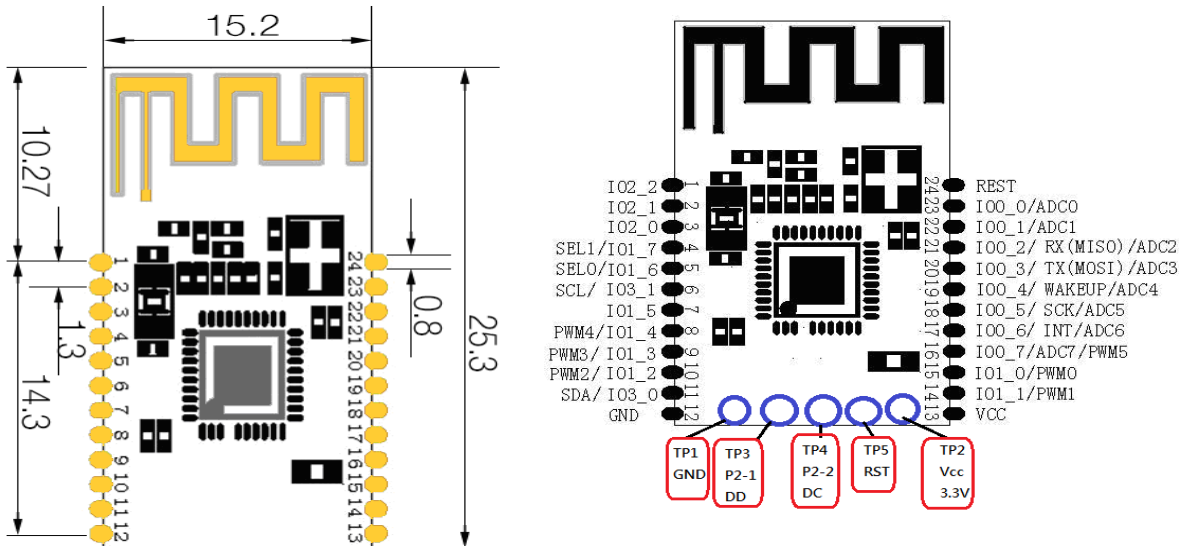
(5). Electrical characteristics

(With $T_a = 25\text{ }^\circ\text{C}$, $V_{DD} = 3.3\text{V}$, standard measure: 1Mbps, 250KHz GFSK modulation, Bluetooth Low energy mode.)

1. Modulation Mode: GFSK;
2. Frequency range: 2402~2480MHZ (2.4G ISM band);
3. Transmit power setting: $-20 \sim 0\text{ dBm}$ (programmable via software);
4. Operating ambient temperature range: $-40\text{ }^\circ\text{C} \sim +85\text{ }^\circ\text{C}$;
5. The storage temperature range: $-40\text{ }^\circ\text{C} \sim +125$;
6. The power supply voltage: $2.0 \sim 3.6\text{VDC}$;
7. Receiver sensitivity: -94dBm typical (direct test from IC RF out);
8. Receiving mode current (high gain setting): 20.02 mA (typical);
9. Transmit mode current (at 0dBm output setting): 18.2 mA (typical);
10. MCU law active current (only 32MHz operation of X-tal OSC): 6.7 mA (typ);
11. Power mode 1: The current consumption: (under MCU standby mode, the wake-up time = 4uS); $I = 270\text{uA}$ (Typical);
12. Power mode 2: THE current consumption in sleep mode. timer activate / enable, wake-up time can by the programming software setting): $I = 1\text{uA}$ (typ);
13. Power mode 3: The current consumption : (Low power deep sleep mode, via the hardware initiative wake): $I = 0.5\text{uA}$ (Typical);

(6).Module pin definition and description of input and output ports

(6-1) HY-254101R (PCB Antenna) pin map



(6-2) Pin function table (Not shown in the I/O pin functions ,Please see (6-3) input and output ports description)

PinNo.	Function	Function Description
1	I02_2 / DC	Digital I/O port 2_2 / Debug clock
2	I02_1 / DD	Digital I/O port 2_1 / Debug data
3	I02_0	Digital I/O port 2_0
4	I01_7 / SEL1	Digital I/O port 1_7 MCU communication mode select, See table(5-3) Communication protocol mode selection, I/O setting Table
5	I01_6 / SELO	Digital I/O port 1_6 MCU communication mode select, See table(5-3) Communication protocol mode selection, I/O setting Table
6	I03_1 / I2C SCL	Digital I/O port 3_1 IIC serial Clock (SCL) can be used as I2C clock pin or digital I/O. Leave floating if not used. If grounded disable pull up
7	I01_5	Digital I/O port 1_5
8	I01_4 / PWM4	Digital I/O port 1_4 / PWM port 4

9	I01_3 / PWM3	Digital I/O port 1_3 / PWM port 3
10	I01_2 / PWM2	Digital I/O port 1_2 / PWM port 2
11	I03_0 / I2C SDA	Digital I/O port 3_0 I2C serial Data (SDA) Can be used as I2C data pin or digital I/O. Leave floating if not used. If grounded disable pull up
12	GND	BLE module grounding pin
13	VCC	BLE module power supply pin, voltage range of 2.0 ~ 3.6V
14	I01_1 / PWM1	Digital I/O port 1_1 20mA drive capability / PWM port 1
15	I01_0 / PWM0	Digital I/O port 1_0 20mA drive capability / PWM port 0
16	I00_7	Digital I/O port 0_7
	ADC7	ADC port 7
	PWM5	PWM port 5
17	I00_6	Digital I/O port 0_6
	INT	Interrupt output pin
	ADC 6	ADC port 6
18	I00_5	Digital I/O port 0_5
	SPI SCK	SPI Bus clock signal
	ADC 5	ADC port
19	I00_4	Digital I/O port 0_4
	WAKEUP	BLE wake up pin, Low/ wake up, High / BLE module automatically sleep
	ADC4	ADC port 4
20	I00_3	Digital I/O port 0_3
	UART TX	UART Serial data bus output
	SPI MOSI	SPI Master Out , Slave input
	ADC3	ADC port 3
21	I00_2	Digital I/O port 0_2
	UART RX	UART Serial data bus input
	SPI MISO	SPI Master input , Slave output
	ADC2	ADC port 2

22	I00_1 / ADC1	Digital I/O port 0_1 / ADC PORT 1
23	I00_0 / ADC0	Digital I/O port 0_0 / ADC PORT 0
24	Reset	BLE hardware reset pin (Low: reset)

Pin Function Description (The module following collectively "BLE"):

- a. UART: serial bus, the default baud rate 9600bps, a single packet transmission is less than 17 bytes, package transmission intervals greater than 20ms.
- b. SPI: SPI bus interface, support for less than 2M / S data transmission rate, a single packet transmission is less than 17 bytes, package transmission intervals greater than 20ms.
- c. IIC: IIC bus interface, support more than 22K / S, less than 400K / S data transmission rate, a single packet transmission is less than 8 bytes, package transmission intervals greater than 20ms.
- d. RX: serial bus data input.
- e. MOSI: Master output, Slave input.
- f. MISO: Master input, Slave output.
- g. SCK: SPI bus clock signal.
- h. SDA: IIC data.
- i. SCL: IIC clock.
- j. WAKEUP: BLE wake up pin, Low_wake up, High/ BLE module automatically sleep.
- k. SEL0 ~ SEL1: MCU and BLE communication mode selection pin. Specific details, see "(5-3) communication protocol mode selection, I/O setting table".
- l. REST: BLE hardware reset pin, Low_reset.
- m. VCC: BLE module power supply pin voltage range DC 2.0~3.6V.
- n. GND: BLE module ground pin.

(6-3) .Communication protocol mode selection, I/O setting Table

No.	Channel Select PIN status		Communication interface state			Remark
	SEL1	SEL0	UART	SPI	IIC	
1	0	0	OK	X	X	1. Command mode Please contact the Vendor.
2	0	1	OK	X	X	
3	1	0	X	OK	X	
4	1	1	X	X	OK	2. Description: 0 is Low, 1 is high
5	X	X	OK	X	X	

UART mode: SEL1=0, SEL0=0 or SEL1=0, SEL0=1 or SEL0, SEL1 floating.

SPI mode: SEL1=1, SEL0=0

IIC mode: SEL1=1, SEL0=1

(6-4) : Input and output ports Description

Input / utput Register pin No.								
I/O Port register	7	6	5	4	3	2	1	0
I00	16	17	18	19	20	21	22	23
I01	4	5	7	8	9	10	14	15
I02	NC	NC	NC	NC	NC	1	2	3
I03	NC	NC	NC	NC	NC	NC	6	11

Note: BITx=0, Low level out ; BITx=1 Highlevel out

Direction Register pin No.								
Direction Register	7	6	5	4	3	2	1	0
DIR0	16	17	18	19	20	21	22	23
DIR1	4	5	7	8	9	10	14	15
DIR2	NC	NC	NC	NC	NC	1	2	3
DIR3	NC	NC	NC	NC	NC	NC	6	11

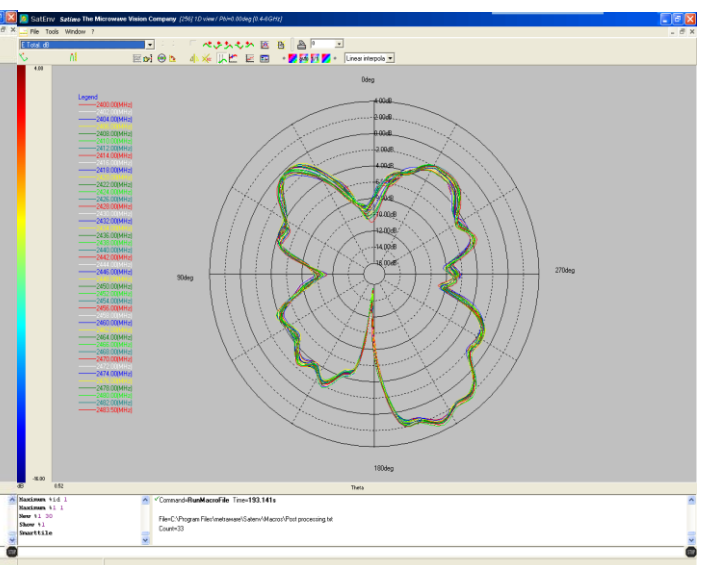
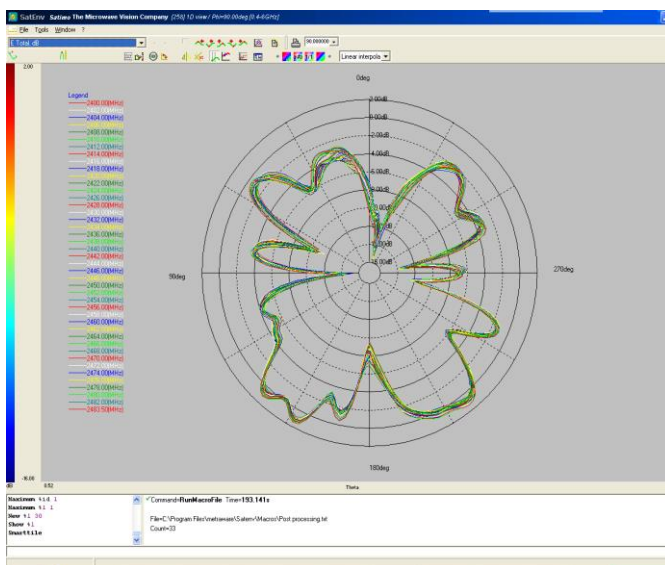
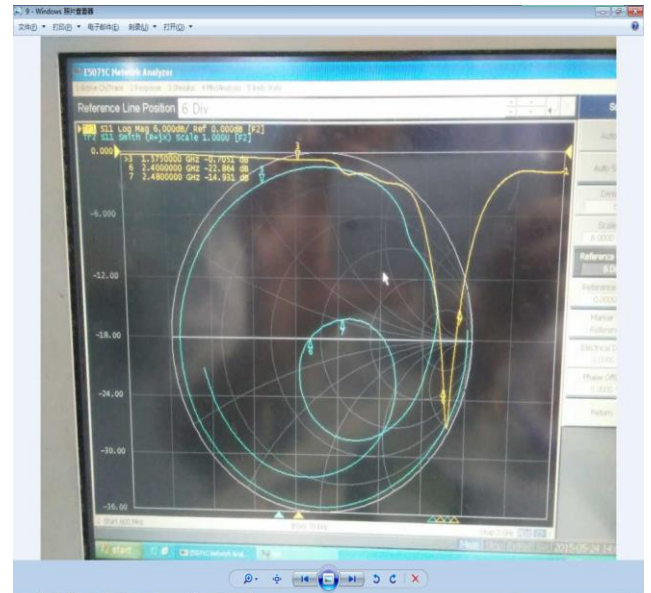
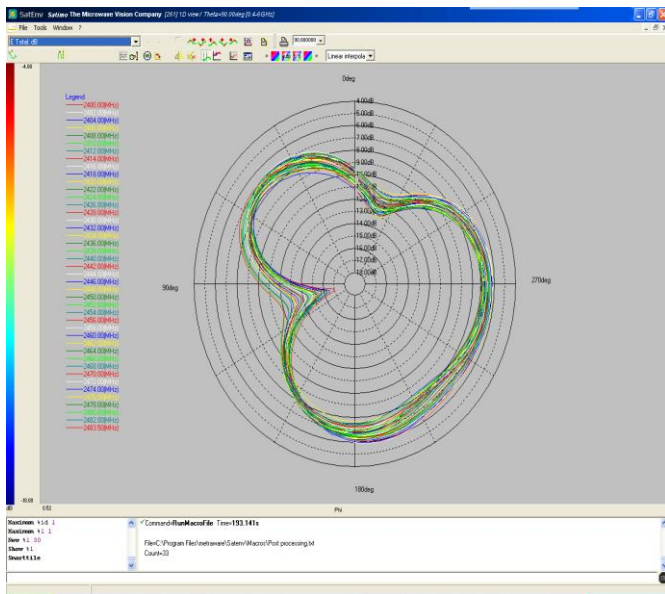
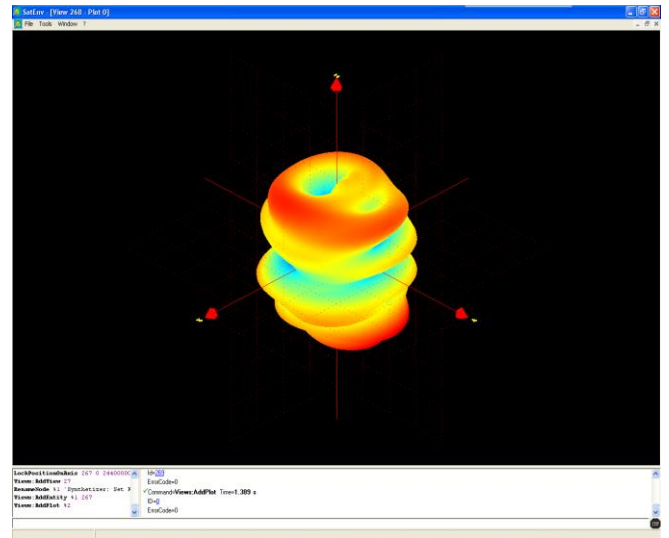
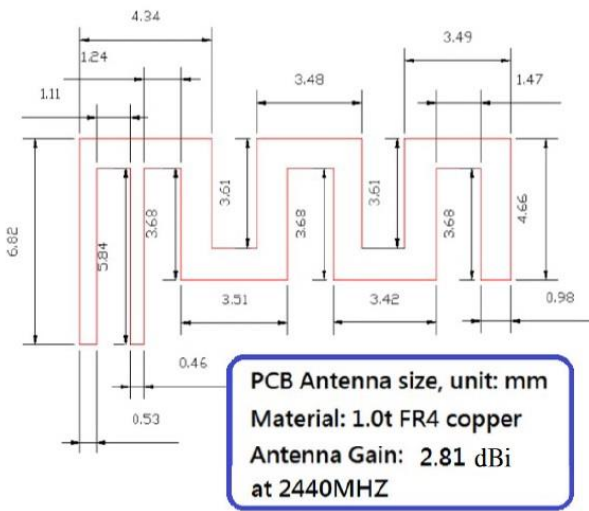
Note: BITx = 0 is corresponds port input , BITx = 1 is corresponds port output .

PWM port pin No.					
PWM5	PWM4	PWM3	PWM2	PWM1	PWM0
16	8	9	10	14	15

ADC port pin No.							
ADC7	ADC6	ADC5	ADC4	ADC3	ADC2	ADC1	ADC0
16	17	18	19	20	21	22	23

Note: The Blue Numbers of the corresponding port pin No. applications of all kinds, For example:I00/bit0 or ADC0 pin is corresponding module pin No.23

(7). Antenna size and data



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.

changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Please notice that if the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: **“Contains FCC ID: 2AJSFJENBTM”** any similar wording that expresses the same meaning may be used.

Note: The OEM integrator is responsible for ensuring that the host product which is installed and operating with the module is in compliant with Part 15B unintentional Radiator requirements, please note that For a Class B digital device or peripheral, the instructions furnished the user manual of the end - user product shall include the following or similar statement, placed in a prominent location in the text of the host product manual:

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 FCC radiation exposure limits set forth for an uncontrolled environment. The module is installation in portable application; A separate approval is required for transmit with other antenna.