HAC-LAN480M
HAC-LAP480S

Data RF Module

Version 1.0

SHENZHEN HAC TELECOM TECHNOLOGY CO., LTD

Address   : Fl.6, Building 2, Jiuxiangling New Industry Park, No.4227, Xilihu Road, Nanshan, Shenzhen, China.
Tel   :   +86-755-23981078
Fax   :   +86-755-23981007
E-mail   :   webmaster@rf-module-china.com
Website   :   http://www.rf-module-china.com

Catalogue

I.　Summarization

LANM and LAP480S is the special RF module designed for PDA application. For LAP480S, it is small size and thin, it is easy to embed in the PDA for system terminal transmission. For LAN480M, it has several interface level, it's easy to connect with PC or other equipments for system server transmission. It is mainly used in wireless order dish system, voting machines, storage management, automatic data collection and so on, which are small, portable and battery-powered products.

II.　Dimension and Connecting Methods

1. Dimension of LAP480S
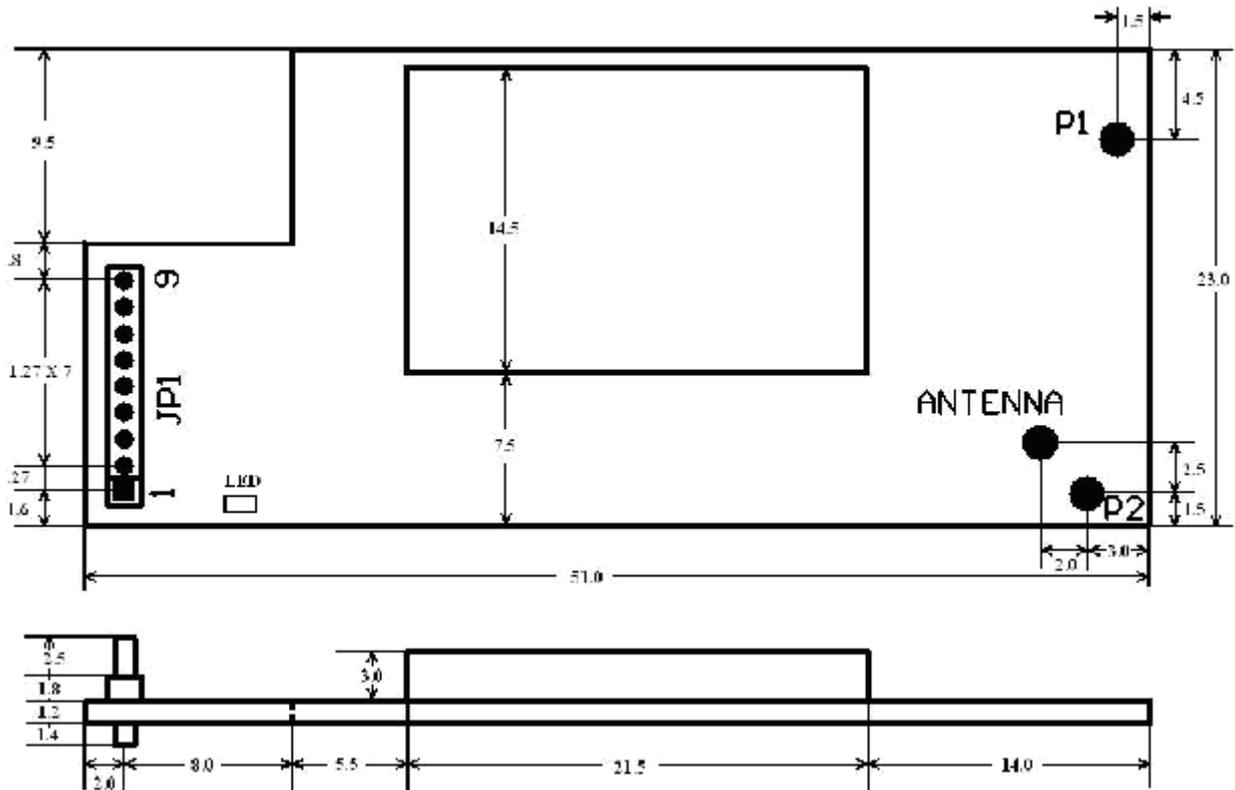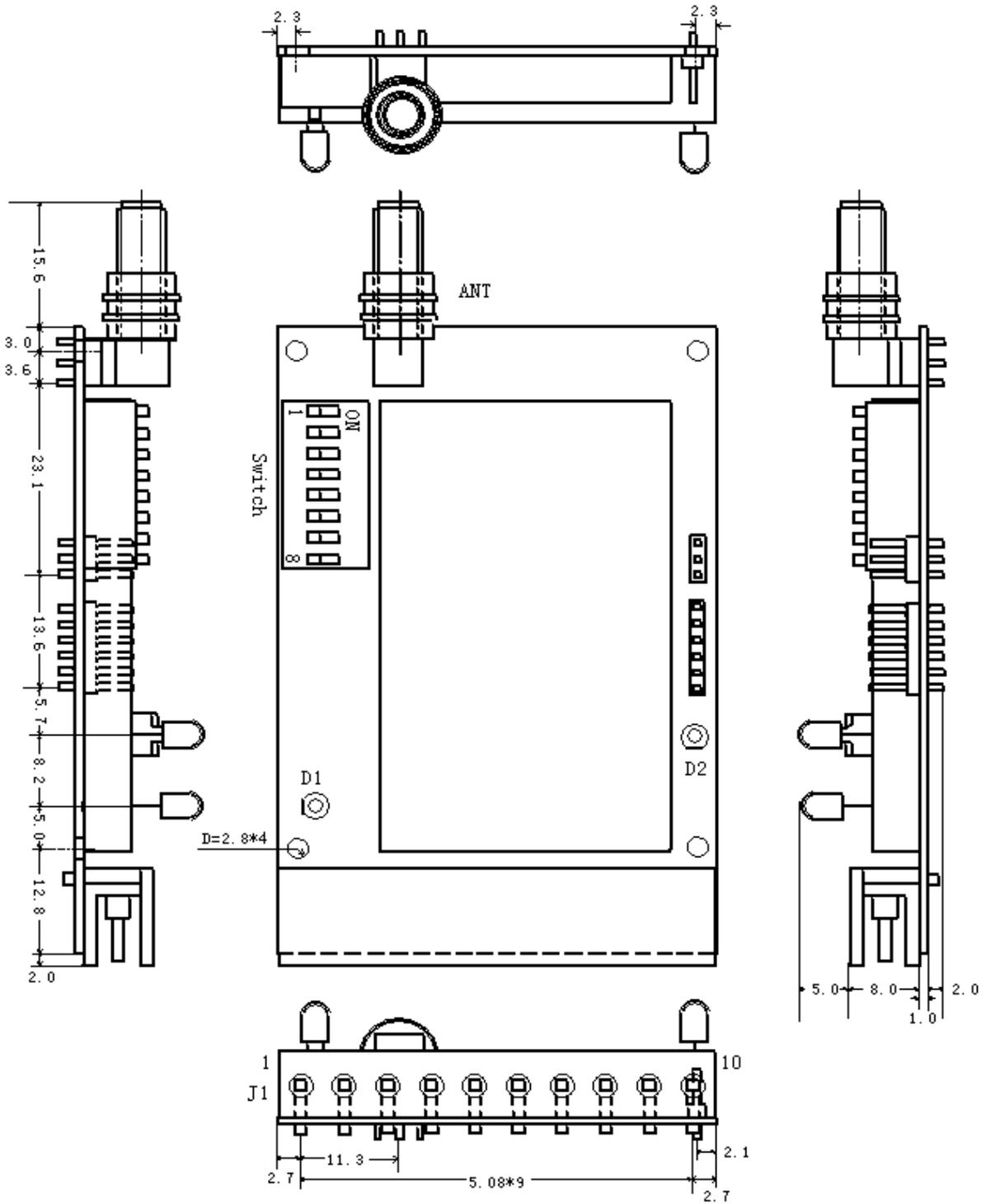
2. Pin Definition of LAP480S

a. The definition of 9-pin JP1 of LAP480S

NO.	Name	Function	Direction/Level	Remarks
1	TxD	UART output	Output/TTL	Connect with RxD of user
2	Reset	Reset signal	Input/TTL	Negative pulse reset
3	Vcc	3.0~3.3V	Input	
4	GND	Ground		
5	SLP_EN	Sleep function enable	Input/TTL	high level sleep
6	SLFT_EN	Self-testing enable	Input/TTL	Low level to enter self-testing state
7	AIR_BUSH	Busy signal	Output/TTL	High level means transmitting in the air
8	CHS_EN	Set enable	Input/TTL	Low level to enter the setting state
9	RxD	UART input	Input/TTL	Connect with TxD of users

Note: The interface level range for all the interfaces: For high level '1', it is 0.7VCC~VCC+0.3V, for low level '0', it is -0.3V~0.1VCC.

b. P1 and P2 is the fixing and supporting point for LAP480S module. ANTENNA is the antenna connecting point. This module can be used with small size spring antenna, it is easy to embed into the PDA.

3. Dimension of LAN480M

4. Pin Definition of LAN480M

The definition of 10-pin JP1 of LAN480M

NO.	Name	Function	Remarks
1	GND	Ground	
2	VCC	11.0~15.0V	
3	RxD_TTL	Data input of TTL level	
4	TxD_TTL	Data output of TTL level	
5	RxD_RS232	Data input of RS232 level	RS-232 port
6	TxD_RS232	Data output of RS232 level	RS-232 port
7	A_RS485	A port of RS485 level	RS-485 port
8	B_RS485	B port of RS485 level	RS-485 port
9	CHS_EN	Setting enable input	Low level is effective.
10	Reset	Reset input	More than 10ms negative pulse reset.

III. Communication Rate and Interface

The communication rate can be 9600bps or 19200bps. The data format is 8N1 (one start bit, 8 data bit, no parity, one stop bit). If users enable the FEC through command, the interface baud rate is 9600bps; disable the FEC, the interface baud rate is 19200bps. The default value is 9600bps (enable FEC). All the data are transmitted according to the transparent format.

IV. Channel and Other Parameters

The setting control pin for LAP480S is the 8th pin of JP1 (CHS_EN), and the setting control pin for LAM480M is 9th pin of JP1 (CHS_EN). When CHS_EN= 0, they will enter the setting state, users send the command to the module through serial port, and the module will return command after finish command.

The setting command is two bytes, the first byte is command word, it means command. The second byte is for parameter. If the parameter is number, it will be HEX code. Please refer to the following table for more information.

Name	Command word	Parameter	Remarks
信道设置命令	C(43H)	00~3FH	设置信道并保存到 EEPROM
信道设置命令	c(63H)	00~3FH	设置信道但不保存
调制方式设置	M(4DH)	F(46H) 或 者 R(52H)	F:2FSK； L:RC2FSK

FEC 使能设置	S(53H)	Y(59H) 或 者 N(4EH)	Y:打开 FEC；N:关闭 FEC
RSSI 读取	R(52H)	R(52H)	该命令就是 2 个 R(RR)

V.   The Naming methods for HAC-LAN480 Series

The type naming method for HAC-LAN480 Series is shown as follow:

'HAC'- the title of manufacturer: Shenzhen HAC Telecom Technology Co., Ltd

'L' - Low power, the transmission power is less than or equal to 30dBm

'A' - The name of products series

'N'- The narrowband products

'480' – The working frequency band, the center frequency of the working frequency band

'S' – The type name of this series: S is default standard type

VI. How to use HAC-LAN480 Series

HAC-LAN480 offers three interface methods which include RS-232, RS-485 and UART/TTL level interface. It can connect with PC, RS232/RS485 devices, SCM or other UART components directly. The using method is as follow:

1. Power supply

The voltage range of power supply is +11.0~15.0V DC. Please use better ripple factor. If

Pin	Definition	Instruction	Level	Connection with terminal	Remarks
1	GND	Ground			
2	VCC	Power supply		Input	+11.0~15.0VDC
3	RxD_TTL	UART/Rx	TTL	Input	0 or 5.0V
4	TxD_TTL	UART/Tx	TTL	Output	0 or 5.0V
5	RxD_RS232	RxD	RS-232	Input	±5.0~9.0V
6	TxD_RS232	TxD	RS-232	Output	±5.0~9.0V
7	A_RS485	A	RS-485	Input/ Output	0 ~ 5.0V
8	B_RS485	B	RS-485	Input/ Output	0 ~ 5.0V
9	NC			Not connect	Unconnected
10	Reset	Negative reset	TTL	Input	Negative pulse reset

HAC-LAN480 needs to share power supply and ground with other equipment, please use single point access method. If possible, the signal is insulated by optocoupler, the power supply is insulated by transformer, so that it can get the best communication results, and it is steady and reliable.
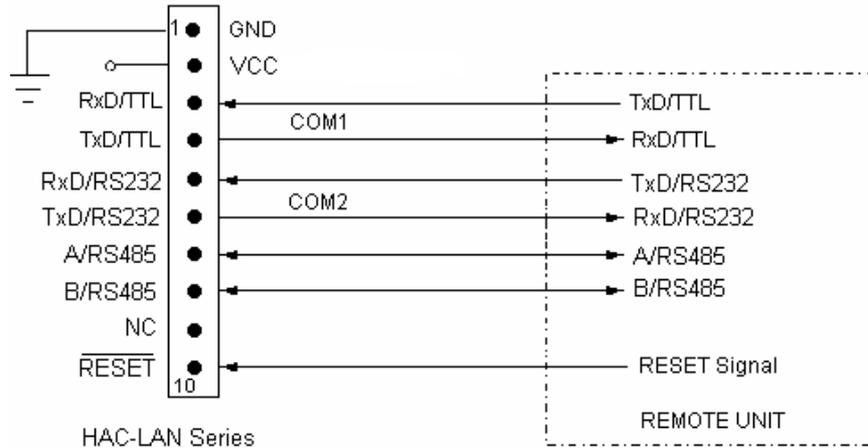
2. The definition of connector

a. HAC-LAN480 offers one 10-pin connector (PHOENIX). Their definitions and Connection methods with terminals are shown in Table 1.

Table 1: Pin Definitions and connection methods

Note: The reset negative pulse must be more than 10μA.

b. The connection schematic diagram between HAC-LAN480S and terminal.

CONNECT SKETCH MAP

3. Setting the baud rate, interface and data format

Before placing the order, users should select the type of LAN480 according to their requests. Before using the module, users should need to make some simple configurations to confirm the channel frequency, interface mode, baud rate, data format and so on according to your needs. There is a group of 8-bit DIP switch in HAC-LAN480S, defined as SW87654321 respectively. If the DIP switch is in the ON position, it means '0'. If the DIP switch is in the OFF position, it means '1', the configuration is shown as Table 2.

Table 2: The definition of SW switch

NO.	Name	Function	Remarks
SW8	F_S	Channel setting	SW8765= 0000（0 channel）
SW7			SW8765= 1111（15 channel）
SW6			The four DIP switches are used to decide the channels.
SW5			There are 16 channels to choose. SW8 is the high bit.
SW4	V_S		SW4=0: 8n1（No parity）；SW4=1: 8e1（Even parity）
SW3	SP_S	Communication baud	SW32=00: 1200bps； SW32=01: 2400bps；
SW2		rate setting	SW32=10: 4800bps； SW32=11: 9600bps
SW1	P_S	Choose the	SW1=0: 250mW； SW1=1: 500mW；（default）
		transmitting power	SW1=0: 500mW； SW1=1: 1W；（customize）

Note 1: The air baud rate is equal to the interface baud rate.

Note 2: Any changes of the switches except SW1 are effective when the modules have been

electrified or reset.

Note 3: The SW2 and SW3 switches are not effective in the LAN480H type.

4. Channel configuration for HAC-LAN480S:

HAC-LAN480S offers 16 channels. User can use four DIP switches to set the channel, and the channel frequency is as follow table3:

Table 3: Channel frequency

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
0	472.350	4	473.550	8	474.750	12	475.950
1	472.650	5	473.850	9	475.050	13	476.250
2	472.950	6	474.150	10	475.350	14	476.550
3	473.250	7	474.450	11	475.650	15	476.850

4. Power and sending/receiving data indicator

Power indicator light D1: After the module has been electrified, the red light is bright, it means the power has been normal access.

Sending/receiving indicator light D2 (DATA IN and DATA OUT): Two colors LED light. When the module receives the data from air and outputs the data to external equipments through serial port, the green light flicker. When the module receives the data from serial port, it is on the state of transmitting, the red light flicker.

6. Dimension sketch map (Unit: mm):
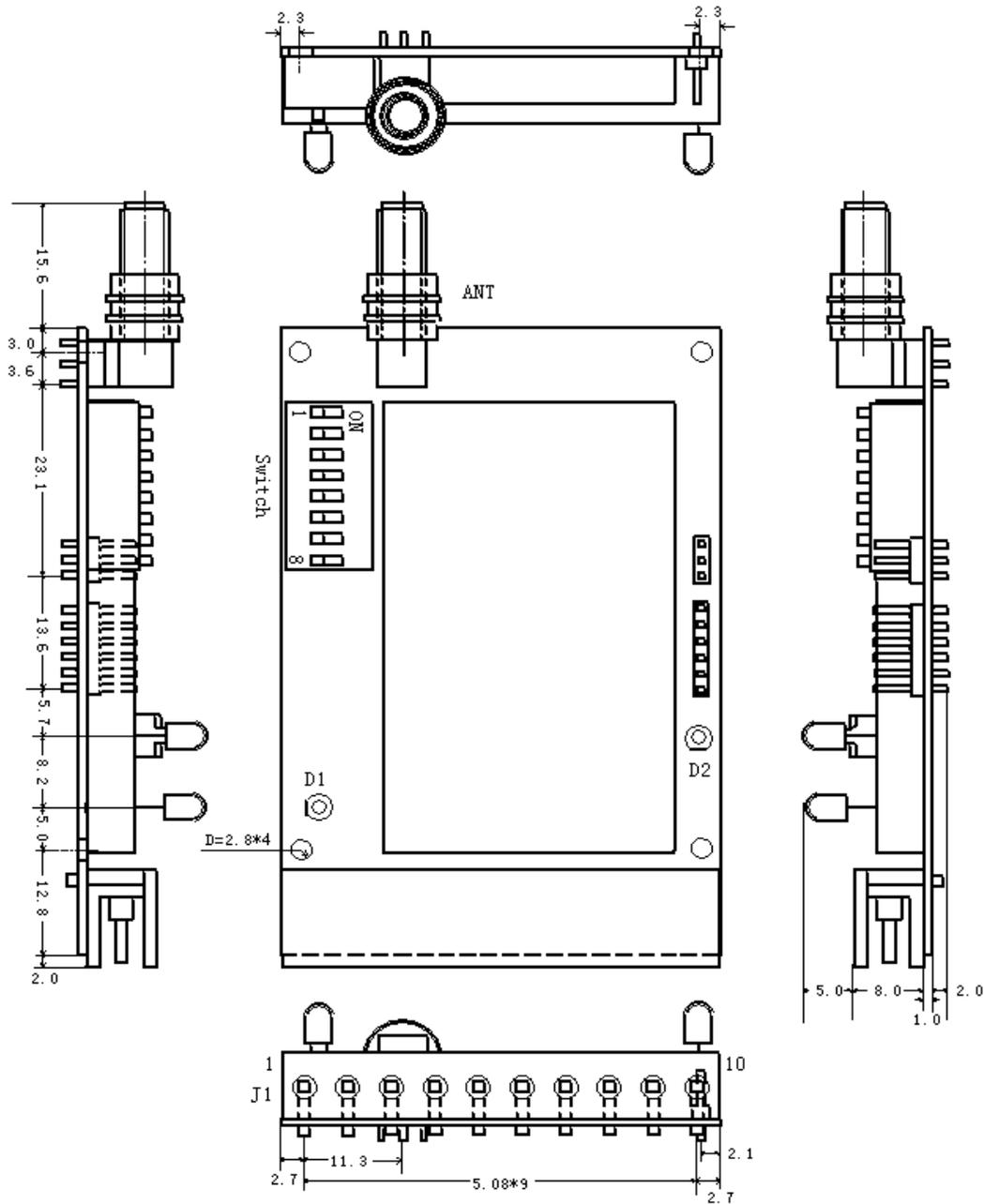
VII. Networking Application of HAC-LAN480 Series

The communication channel of HAC-LAN480 is half duplex, which is mostly suitable for the communication mode of point to multi-point. Under this mode, one master station must be set, and all of the rest are slave stations with a unique address. The coordination of communication is controlled by master station that uses data frames containing address code to transmit data or command. All of slave stations will receive the data and command and compare the received address code with local address code. If they are different, the data will be dismissed without any response. If they are same, it means the data is sent to the local. Slave station will make different responses according to the transmitted data or command and

send back the data as response. All these jobs must be performed by upper level protocol, which will assure that there is only one transmitter in transmitting mode in the communication network at any transient moment so as to avoid the cross-interference.

HAC-LAN480 transceivers can also be used for point-to-point communication with easier operation. For the programming of serial port, all you have to do is to remember that its communication mode is half duplex and always to observe the time sequence of come-and-go for receiving and transmitting.

VIII. Technical specification of HAC-LAN480 Series

Frequency range　　　: 472~486MHz

Frequency Stability　: ≤±**2.5**PPm

Modulation mode　　: GFSK/RC2FSK

Channel interval　　　: 300KHz

Channel bandwidth　: ≤25KHz

Channel　　　　　　: 16

Transmission power　: 250mW/500mW (optional , customize 500mW/ 1W)

Receiving sensitivity　: -122dBm @ 1200bps (1% BER）

RF data rate　　　　: 1200/2400/4800/9600bps (optional), 19200bps (customize)

Interface data format　: 8E1/8N1 (optional)

Temperature　　　　: -40℃~80℃ （Industry)

Power supply　　　　: +11.0 ~ 15.0VDC

Transmitting current　: ≤300mA (the transmission power is 24dBm)

　　　　　　　　　　　≤380mA (the transmission power is 27dBm)

　　　　　　　　　　　≤420mA (the transmission power is 30dBm)

Receiving current　　: ≤50mA

Humidity　　　　　: 10%~90% relative humidity without condensation

Dimension　　　　　: 76 mm X51.2mm x16mm

Note: The sleep current of HAC-LAN480S is a little large, so we recommend that you don't use the sleep function. Our standard products don't have the sleep function.

IX. The fittings for HAC-LAN480 Series

1. Standard configuration

a. The standard antenna for HAC-LAN480 is a 10cm helical antenna called HAC-LX480-10-ZSMA.

b. Fixing end for connection

If the users have difficulties in fixing the products because of the dimension, you can order the products without the fixing end.

2. Other optional antenna

HAC-LAN480 can be used with SMA antenna joint to meet the antenna requests of users. Users need to use the 50Ω impedance and the working frequency of antenna must be the same as the module. If you order outdoor omni-directional antenna or directional antenna with high gain, it will increase the coverage greatly. In addition, the order antenna is required to stand 1w transmitting power. And the V.S.W.R is less than 1.5.

a. Users can customize the little magnetic antenna called HAC-XP480S-300H-SMA with high performance price ratio. It is an antenna with 300cm antenna feeder. It is high gain and convenient to installation.

b. If users use outdoor omni-directional antenna or directional antenna with high gain, it will enhance the coverage of the module greatly.