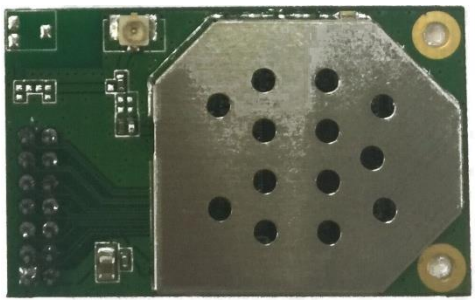
HF-A21

Embedded WiFi Module User Manual

V1.0



Overview of Characteristic

- ✧ **Support IEEE802.11b/g/n Wireless Standards**
- ✧ **Support TCP/UDP/HTTP Network Protocols**
- ✧ **Support UART/Ethernet Data Interface**
- ✧ **Support Work As STA/AP/AP+STA Mode**
- ✧ **Support Router/Bridge Mode Networking**
- ✧ **Support Internal/External Antenna Option**
- ✧ **Support AT+ Instruction Set for Configuration**
- ✧ **Support Friendly Web Configuration Page**
- ✧ **Support Heatbeat Signal**
- ✧ **Support Smart Link Application Tools**
- ✧ **Support UART Free/Auto-Frame Function**
- ✧ **Single +3.3V Power Supply**
- ✧ **Small Size: 25 x 40mm**
- ✧ **FCC/CE Certificated**

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HISTORY

Ed. V1.0 Created on 5-09-2016.

1. PRODUCT OVERVIEW

1.1. General Specification

Table 1 HF-A21 Module Technical Specifications

Class	Item	Parameters
Wireless Parameters	Certification	FCC/CE
	Wireless standard	802.11 b/g/n
	Frequency range	2.412GHz-2.462GHz
	Transmit Power	802.11b: +20 dBm (Max.)
		802.11g: +18 dBm (Max.)
		802.11n: +15 dBm (Max.)
	Receiver Sensitivity	802.11b: -89 dBm
		802.11g: -81dBm
		802.11n: -71dBm
	Antenna Option	External:I-PEX Connector
		Internal:On-board PCB antenna
Hardware Parameters	Data Interface	UART: 1200bps - 230400bps
		Ethernet: 10Mbps/100Mpbs
		GPIO,I2C
	Operating Voltage	3.3V (+/-5%)
	Operating Current	Avg:170mA Peak:400mA
	Operating Temperature	-40℃- 85℃
	Storage Temperature	-45℃- 125℃
	Dimensions and Size	25×40×8mm
Software Parameters	Network Type	STA /AP/AP+STA mode
	Security Mechanisms	WEP/WPA-PSK/WPA2-PSK/WAPI
	Encryption	WEP64/WEP128/TKIP/AES
	Work Mode	Transparent Transmission
	Serial command	AT+instruction set
	Network Protocol	TCP/UDP/ARP/ICMP/DHCP/DNS/HTTP
	Max. TCP Connection	32
	User Configuration	Web Server＋AT command config.
	User Application SW	Support customized application SW Provide SDK package Provide smart link tools

1.2. Hardware Introduction

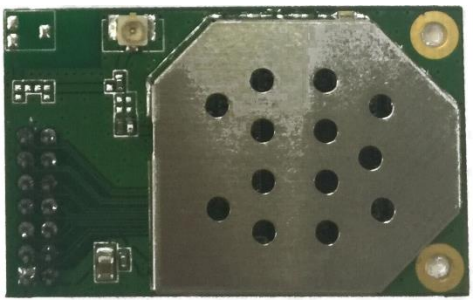


Figure 1. HF-A21 Appearance

1.2.1. Pins Definition

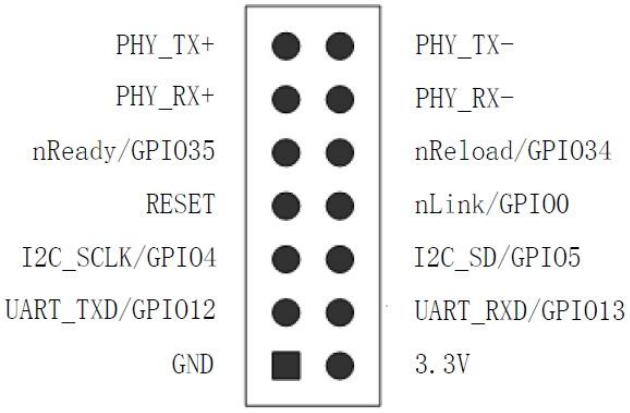


Figure 2. HF-A21 Pins Map

Table 2 HF-A21 Pins Definition

Pin	Description	Name	Direction	Note
1	Ground	GND	Power	
2	VCC	3.3V	Power	3.3V @ 350mA power input
3	UART Data Transmit	UART_TXD NOTE1	O	
	GPIO	GPIO12	I/O	
4	UART Data Receive	UART_RXD NOTE2	I	
	GPIO	GPIO13	I/O	
5	GPIO	GPIO4	I/O	
6	GPIO	GPIO5	I/O	
7	Module reset signal	RESET	I	“Low (0)” effective reset input. The reset duration should be kept more than 300ms
8	WiFi status Indication	nLink	O	“1”- WIFI connection available, “0”- No WIFI connection Can be configured as GPIO.
	GPIO	GPIO0	I/O	

9	Indicate the module status of power on process	nReady	O	“0” or “Palmodic Signal” - Finish module boot up process; “1” - Module boot up not finish. Can be configured as GPIO.
	GPIO	GPIO35	I/O	
10	Restore configuration	nReload	I	Module will Restore factory default configuration after set this pin “0” more than 3s, then set “1”.
	GPIO	GPIO34	I/O	
11	Ethernet Interface	PHY_RX+	I	Ethernet Data Interface, current driver mode.
12	Ethernet Interface	PHY_RX-	I	
13	Ethernet Interface	PHY_TX+	O	
14	Ethernet Interface	PHY_TX-	O	

Note1: These Pins should not add external pull-up resistor. It's configure pin for module bootup. There is pull-down resistor for UART_TXD. This pin must keep low when bootup.

Note2: UART_RXD has a 4.7K pulldown resistor.

1.2.2. Mechanical Size

HF-A21 modules physical size as follows:

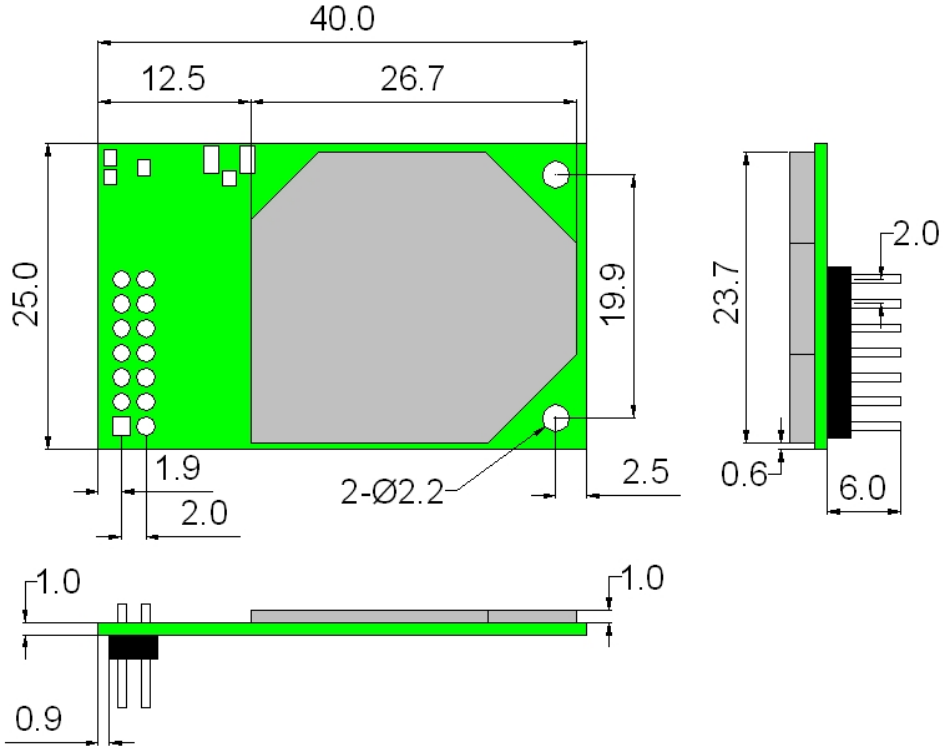


Figure 3. HF-A21 Mechanical Dimension

1.2.3. On-board Chip Antenna

HF-A11 module support internal ob-board chip antenna option. When costomer select internal antenna, you shall comply with following antenna design rules and module location suggestions:

- For customer PCB, RED color region (6x8mm) can't put componet or paste GND net;
- Antenna must away from metal or high components at least 10mm;
- Antenna can't be shieldedby any meal enclosure; All cover, include plastic, shall away from antenna at least 10mm;

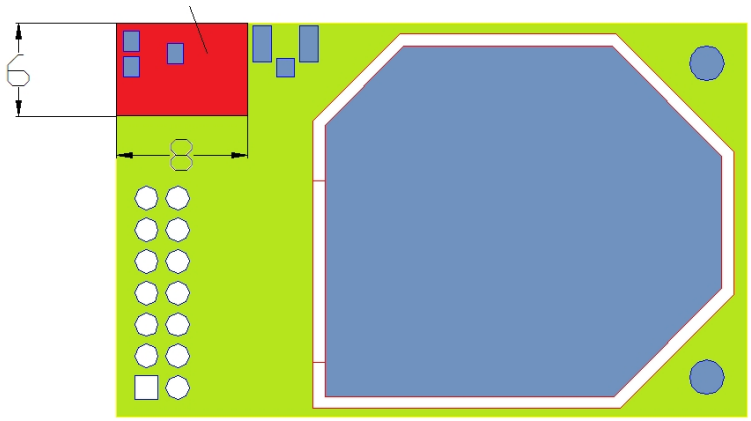


Figure 4. HF-A11 Chip Antenna Keep Out Region

High-Flying suggest HF-A11 module better locate in following region at customer board, which to reduce the effect to antenna and wireless signal, and better consult High-Flying technical people when you structure your module placement and PCB layout.

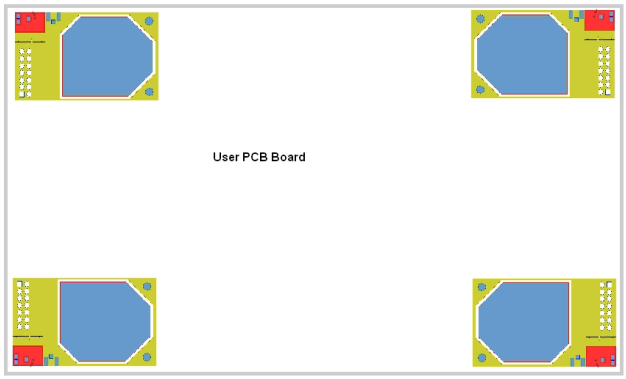


Figure 5. Suggested Module Placement Region

1.2.4. External Antenna

HF-A11 modules support internal antenna and external antenna option for user dedicated application. If user select external antenna, HF-A11 modules must be connected to the 2.4G antenna according to IEEE 802.11b/g/n standards.
The antenna parameters required as follows:

Table 3 HF-A11 External Antenna Parameters

Item	Parameters
Frequency range	2.4~2.5GHz
Impedance	50 Ohm
VSWR	2 (Max)
Return Loss	-10dB (Max)
Connector Type	I-PEX or populate directly

1.2.5. Evaluation Kit

High-Flying provides the evaluation kit to promote user to familiar the product and develop the detailed application. The evaluation kit shown as below, user can connect to HF-A21 module with the RS-232 UART port, 100M Eth port or Wireless port to configure the parameters, manage the module or do the some functional tests.

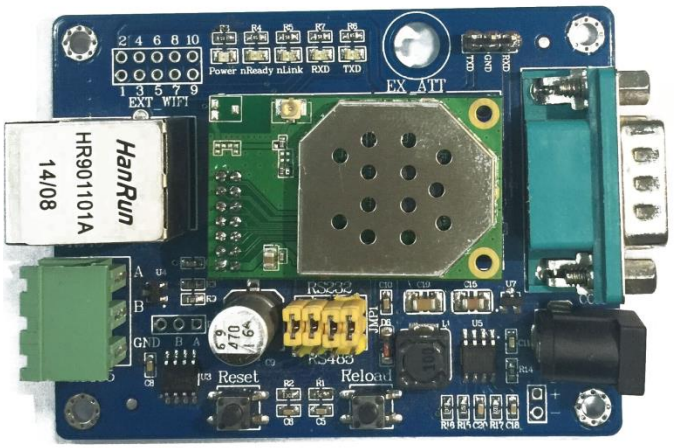


Figure 6. HF-A21 Evaluation Kit

The external interface description for evaluation kit as follows:

Table 4 HF-A21 Evaluation Kit Interface Description

Function	Name	Description
External Interface	DC jack	5~18V power input connector
	3-Pin	3-Pin RS485 interface(Reserved)
	DB9	Male serial jack of 9-pin,and used to connect to PC
	RJ-45	100M Eth Interface
	Module	2x7 2mm DIP connector
LED	Power (Red)	3.3V Power Indicator
	TXD	TXD Indicator
	RXD	RXD Indicator
	Ready	nReady/GPIO Indicator
	Link	nLink/GPIO Indicator
Button	Reset	Used to reset the module.
	Reload	Module restore to factory default configuration.

1.2.6. Order Information

Base on customer detailed requirement, HF-A21 series modules provide different variants and physical type for detailed application.

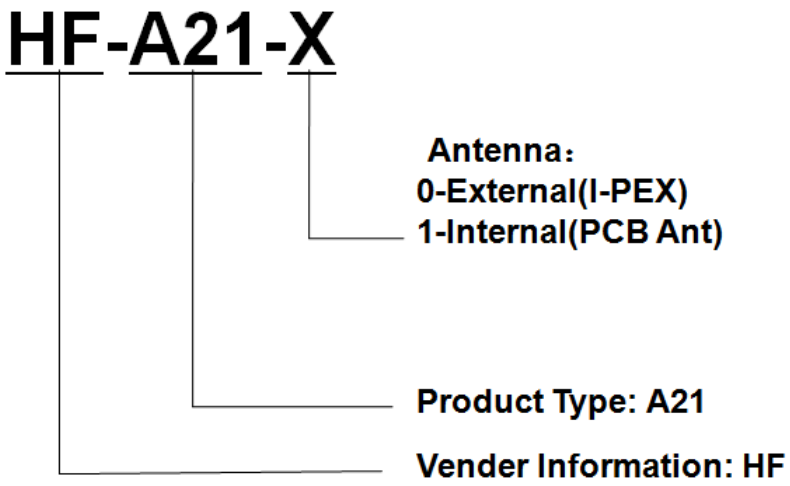


Figure 7. HF-A21 Order Information

1.3. Hardware Reference Design

1.3.1. Hardware Typical Application

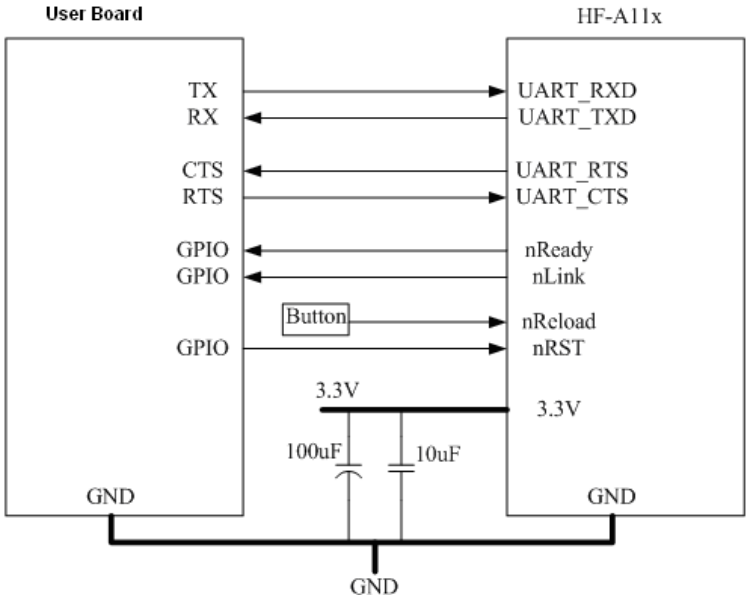


Figure 8. HF-A11 Hardware Typical Application

Notes：

nRST- Module hardware reset signal. Input. Logics “0” effective.

There is 100K Ohm pull-up resister internal. When module power up or some issue happened, MCU need assert nRST signal “0” at least 300ms, then set” 1” to keep module fully reset.

nReady- Module boot up ready signal. Output. Logics “0” effective.
There is 4.7K Ohm pull-up resister internal. The module will output “0” “or “Palmodic Signal” after normal boot up. This signal used to judge if module finish boot up and ready for application or working at normal mode.

nLink- Module WIFI connection indication. Output.
There is 4.7K Ohm pull-up resister internal. When module connect to AP (STA mode) or some WiFi STA connect to module (AP mode), the module will output “0”. This signal used to judge if module already at WiFi connection status.

nReload- Module restore to factory default configuration.Input. Logics “0” effective.
User can assert nReload signal “0” more than 3’s through button or MCU pin, then release, module will restore to factory default configuration and re-start boot up process. User need add 4.7K~10K Ohm pull-up resister external the module. If not use this function, then can use AT command AT+FRLDEN=off to disable it.

UART_TXD/RXD- UART port data transmit and receive signal.

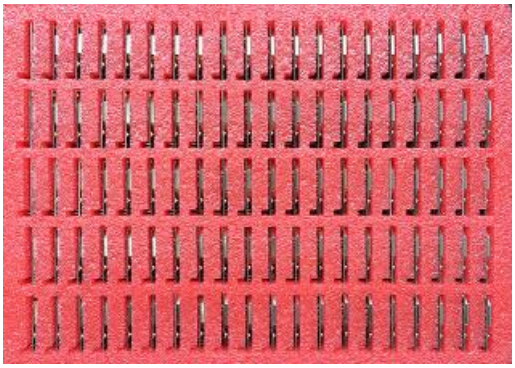
1.4. Typical Application

Refer to HF-A21-SMT user manual for detailed application and module usage.

2. PACKAGE INFORMATION

5.1 Shipping Information

TRAY
Size: 370*270*40 mm

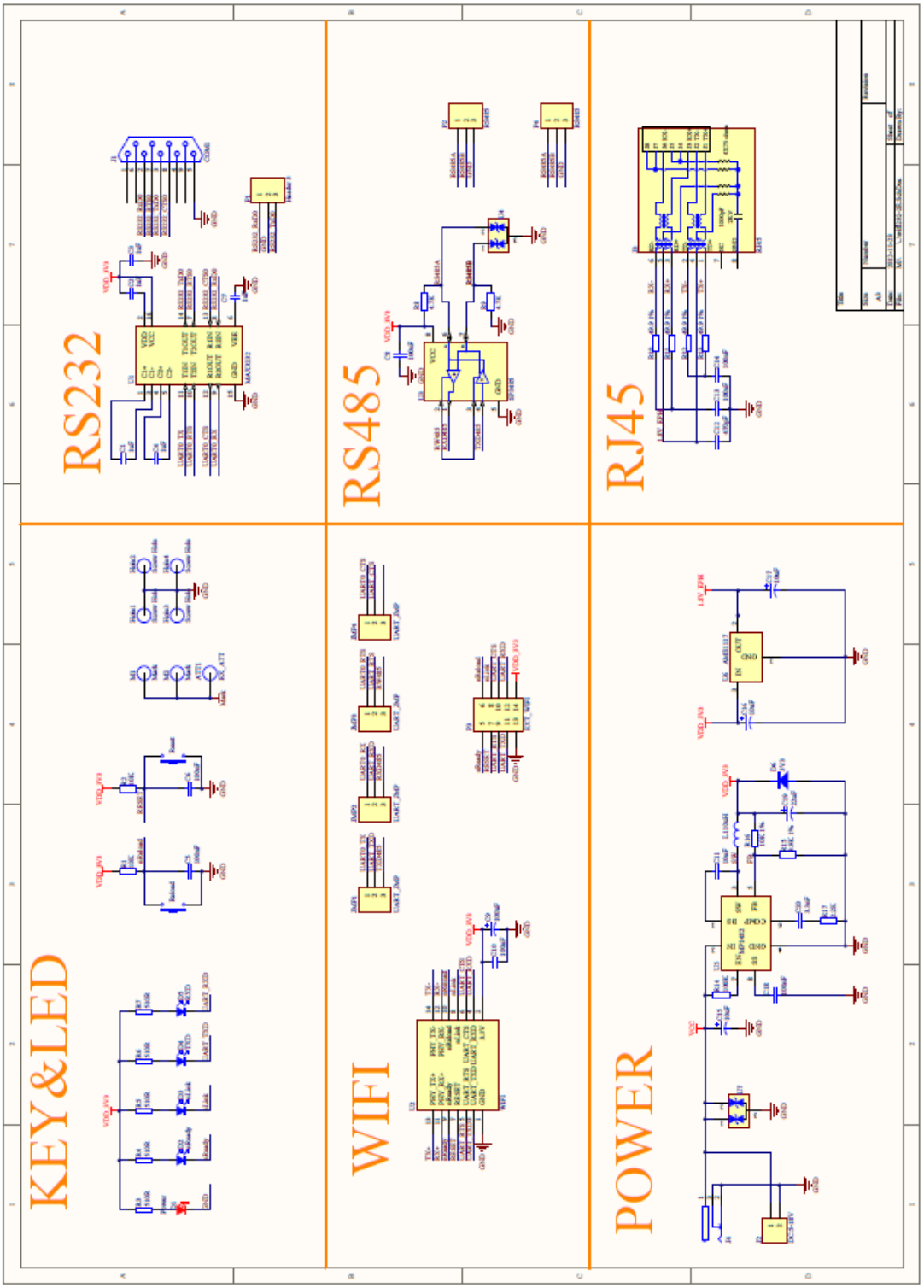


BOX
Size: 370*270*160 mm(inside)

Figure 9. Shipping Information

Note:
1 tray = 100pcs
1 box = 4 trays = 4 * 100 pcs = 400pcs

APPENDIX A: EVB REFERENCE DESIGN



APPENDIX B: CONTACT INFORMATION

Address: Room 1002,Building 1,No.3000,Longdong Avenue,Pudong New Area,Shanghai,China, 201203
Web: www.hi-flying.com
Service Online: 400-189-3108
Mail Contact: sales@hi-flying.com

FCC STATEMENT

1. 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.

Warning: 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.

FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.
This equipment should be installed and operated with minimum distance 20cm between the radiator & your body

FCC INFORMATION (additional)

OEM INTEGRATION INSTRUCTIONS:
This device is intended only for OEM integrators under the following conditions: The module must be installed in the host equipment such that 20 cm is maintained between the antenna and users, and the transmitter module may not be co-located with any other transmitter or antenna. The module shall be only used with the internal antenna(s) that has been originally tested and certified with this module. As long as 3 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

Validity of using the module certification:
In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization for this module in combination with the host equipment is no longer considered valid and the FCC ID of the module cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End product labeling:
The final end product must be labeled in a visible area with the following: “Contains FCC ID: 2ACSVHF-A21”.

Information that must be placed in the end user manual:
The OEM integrator has to be aware
not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

Antenna Specification:

Type: Chip Antenna

Model: HF-A21

Brand: High-Flying

Gain: 2.0dBi

END OF DOCUMENT