VF-9342 V2.0

Product Specification

Module

Version 2.0

Document release	Date	Modification	Approved
Version1.0			
Version2.0		Change board outline,add the LED indicating lamp	

CONTENTS

1. Product Overview

The module VF-AP22-9342 is really a complete , nice and small form factor 802.11a Wi-Fi Solution optimized for low power, low-cost, and highly integrated AP and consumer electronic devices, the module integrates all Wi-Fi functionality in a package friendly to low-cost PCB design, requiring only a few external 3.3V and 5V power,and connection to antenna.

he module based on the single chip AR9342 which integrates an 802.11n 2x2 MIMO MAC/BB/ radio with internal PA and LNA. It supports 802.11n operations up to 150 Mbps for 20MHZ and 300 Mbps for 40MHZ,and 80211a data rates.

The module support AP mode and client mode at the same time and include mass service application software to reduce the research and design work of customer.

1.1 Regulation of Each Countries

The Product must be complied with the radio requirement of

-USA: FCC Part15C compatible

-EN 300328, EN301489 certified before marketing Europe.

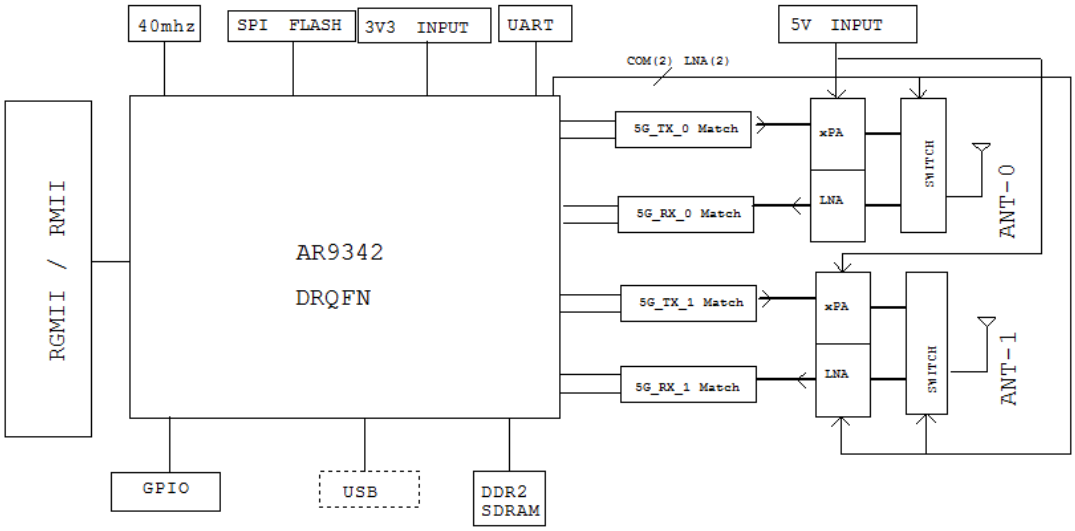
-Japan TELEC certified before marketing Japan

Certification ID Number		
Country	Standard	ID/MARK
US	FCC P15C	TBD
CE	EN 300328 V1.7.1/ 301489-1and-17/60950-1	TBD
JAPAN	ARIB-T66/T33	TBD

2. Module Hardware Overview

2.1 Block Diagram

The general Hardware architecture is shown below Figure:



Module Block Diagram

2.2 Features

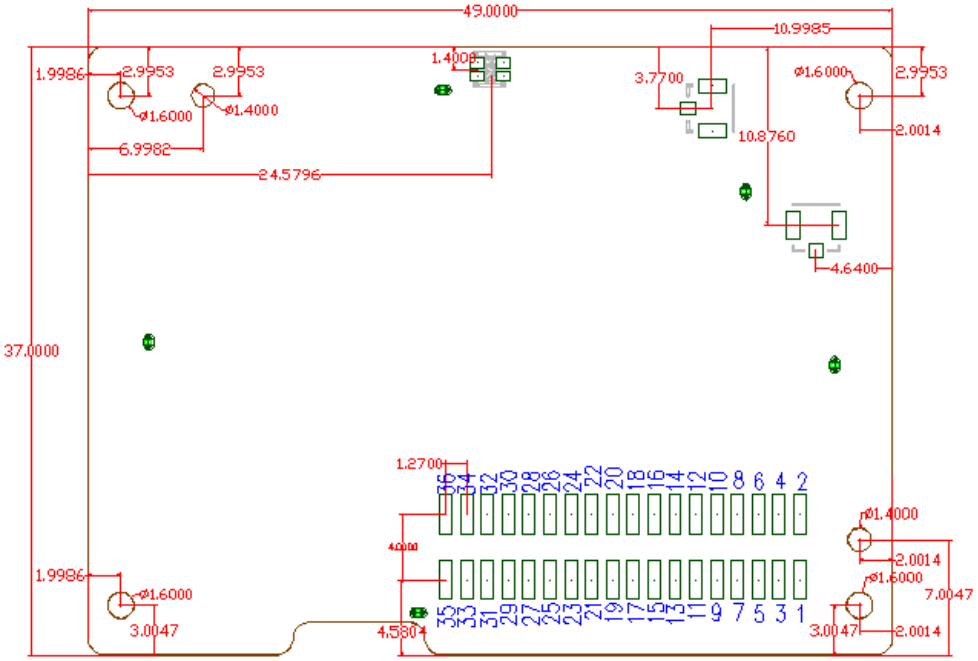
- 74Kc MIPS processor with 64 KB I-Cache and 32 KB D-Cache operating at up to 533 MHz.
- DD2 memory up to 512 Mb.
- SPI NOR Flash memory up to 64Mb.
- MII/RMII/RGMII interface.
- High-speed UART for console support.
- One USB 2.0 controller with built-in MAC/ PHY supports Host or Device mode.
- GPIO/LED support.

2.3 Interface

◆ Interface

- **36pin DIP connector**
- **Antenna: IPEX connector**

◆ Pin definition



From Module TOP View

Pin Number	Symbol Name	Status	Pin Description
1	PA_5V	P	5V input 1000mA,
2	PA_5V	P	5V input 1000mA
3	GND	P	GROUND
4	GND	P	GROUND
5	3.3V	P	3.3V input 1000mA, recommended voltage 3.3V, Min2.97V, MAX 3.63V
6	3.3V	P	3.3V input 1000mA, recommended voltage 3.3V, Min2.97V, MAX 3.63V
7	SYS_LED(GPIO_14)	I/O	SYstem_led/General Purpose Input Output
8	GPIO_16	I/O	General Purpose Input Output

9	WLAN_LED(GPIO_12)	I/O	WLAN_LED/General Purpose Input Output
10	GPIO_15	I/O	General Purpose Input Output
11	USB_LED(GPIO_11)	I/O	USB_LED/General Purpose Input Output
12	GPIO13	I/O	General Purpose Input Output
13	USB_DP	IA/OA	SignalUSB D+ signal; carries USB data to and from the USB 2.0 PHY
14	UART_TX	O	Serial data output
15	USB_DM	IA/IO	SignalUSB D- signal; carries USB data to and from the USB 2.0 PHY
16	UART_RX	I	Serial data input
17	GND	P	GROUND
18	GND	P	GROUND
19	EMDC	O	Management control interface clock
20	EMDIO	I/O	Management control interface data
21	ERX_CLK	I	Receive clock
22	ERX_EN	I	Receive enable
23	ERXD3	I	Receive data
24	ERXD0	I	Receive data
25	ETX_CLK	O	Transmit clock
26	ERXD1	I	Receive data
27	ETX_EN	O	Transmit enable
28	ERXD2	I	Receive data
29	ETXD2	O	Transmit data
30	ETXD0	O	Transmit data
31	ETXD3	O	Transmit data
32	ETXD1	O	Transmit data
33	GND	P	GROUND
34	GND	P	GROUND
35	3V3	P	3.3V input 1000mA, recommended voltage 3.3V, Min2.97V, MAX 3.63V
36	RESET	I	external power on reset , it has an internal 10 K pull up resistance,the external pull low effective.

Note:

- *I/O* A digital bidirectional signal
- *I* A digital input signal
- *O* A digital output signal
- *P* A power or ground signal
- *OA* An analog output signal
- *IA* Analog input signal
- *IH* Input signals with weak internal pull-up,to prevent signals from floating when left open
- NC no connection should be made to this pin

3. Electrical Specification

3. 1 Recommended operating rating

Element	Symbol	Min	Typ	Max	Unit
DC supply voltage	VDD_3.3V	3.0	3.3	3.6	(V)
DC supply voltage	5V	3.3	5	5.3	V

3. 2 DC Characteristics

Symbol	Parameter	Min	Typ	Max	Unit
VDD_3.3V	Continuous Tx Current 5GHz(Dual Chain)	--	630	--	(mA)
VDD_3.3V	Continuous Rx Current 5GHz(Dual Chain)	--	370	--	(mA)
PA_5V	Continuous Tx Current 5GHz(Dual Chain)	--	720	--	(mA)
PA_5V	Continuous Rx Current 5GHz(Dual Chain)	--	90	--	(mA)

3. 3 Environment Storage Condition

Environment condition	
Temperature	Operating Temperature: -10 deg.C ~70 deg.C
	Storage Temperature: -40 deg.C ~80 deg.C
Humidity	Operating Humidity: 5% ~95% (Non-condensing)
	Storage Humidity: 5% ~95% (Non-condensing)

4. RF Specification

4. 1 IEEE 802.11a

Items	Contents			
Specification	IEEE 802.11a			
Modulation technique	OFDM			
Channel	5180 ~ 5825MHz			
Data rate	6,9,12,18,24,36,48,54Mbps			
TX Characteristics	Min.	Typ.	Max.	Unit
1. Power Levels(SISO)				
1)Target Power@6Mbps	20	22	24	dBm
2)Target Power@9Mbps	20	22	24	dBm
3)Target Power@12Mbps	20	22	24	dBm
4)Target Power@18Mbps	20	22	24	dBm
5)Target Power@24Mbps	20	22	24	dBm
6)Target Power@36Mbps	20	22	24	dBm
7)Target Power@48Mbps	18	20	22	dBm
8)Target Power@54Mbps	16	18	20	dBm
2. Frequence Error	-20	-	+20	ppm
3. Modulation Accuracy(EVM)@Target Power			limt	
1) 6Mbps	-		-5	dB
2) 9Mbps	-		-8	dB
3) 12Mbps	-		-10	dB
4) 18Mbps	-		-13	dB
5) 24Mbps	-		-16	dB
6) 36Mbps	-		-19	dB
7) 48Mbps	-		-22	dB
8) 54Mbps	-	-31	-25	dB
RX Characteristics	Min.	Typ.	limt	Unit
4. Minimum Input Level Sensitivity				
1) 6Mbps(PER < 10%)	-	-92	-82	dBm
2) 9Mbps(PER < 10%)	-	-90	-81	dBm
3) 12Mbps(PER < 10%)	-	-88	-79	dBm
4) 18Mbps(PER < 10%)	-	-86	-77	dBm
5) 24Mbps(PER < 10%)	-	-82	-74	dBm
6) 36Mbps(PER < 10%)	-	-80	-70	dBm
7) 48Mbps(PER < 10%)	-	-74	-66	dBm
8) 54Mbps(PER < 10%)	-	-72	-65	dBm
5. Maximum Input Level (PER < 10%)	-30	-	-	dBm

4.2 IEEE 802.11n HT20(5G)

Items	Contents			
Specification	IEEE 802.11a/n HT20			
Modulation technique	OFDM			
Channel	5180 ~ 5825MHz			
Data rate	MCS0 ~ MCS15			
TX Characteristics	Min.	Typ.	Max.	Unit
1. Power Levels				
1)Target Power@MCS0	20	22	24	dBm
2)Target Power@MCS1	20	22	24	dBm
3)Target Power@MCS2	20	22	24	dBm
4)Target Power@MCS3	20	22	24	dBm
5)Target Power@MCS4	20	22	24	dBm
6)Target Power@MCS5	19	21	23	dBm
7)Target Power@MCS6	16	18	20	dBm
8)Target Power@MCS7	14	16	18	dBm
2. Frequence Error	-20	-	+20	ppm
3. Modulation Accuracy(EVM)@Target Power			limt	
1) MCS0	-		-5	dB
2) MCS1	-		-10	dB
3) MCS2	-		-13	dB
4) MCS3	-		-16	dB
5) MCS4	-		-19	dB
6) MCS5	-		-22	dB
7) MCS6	-		-25	dB
8) MCS7	-	-31.6	-28	dB
RX Characteristics	Min.	Typ.	limt	Unit
4. Minimum Input Level Sensitivity				
1) MCS0(PER < 10%)	-	-92	-82	dBm
2) MCS1(PER < 10%)	-	-90	-79	dBm
3) MCS2(PER < 10%)	-	-88	-77	dBm
4) MCS3(PER < 10%)	-	-86	-74	dBm
5) MCS4(PER < 10%)	-	-82	-70	dBm
6) MCS5(PER < 10%)	-	-80	-66	dBm
7) MCS6(PER < 10%)	-	-74	-65	dBm
8) MCS7(PER < 10%)	-	-70	-64	dBm
5. Maximum Input Level (PER < 10%)	-30	-	-	dBm

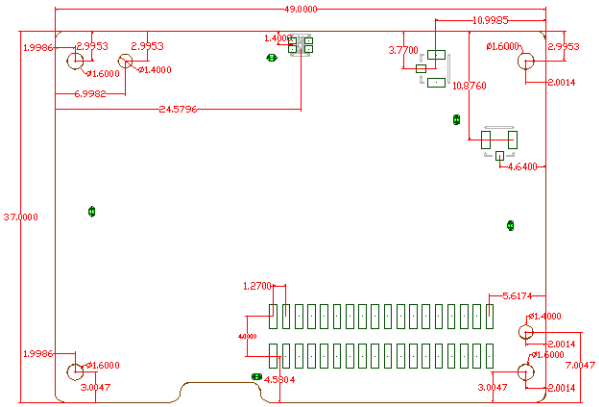
4.3 IEEE 802.11n HT40(5G)

Items	Contents			
Specification	IEEE 802.11a/n HT40			
Modulation technique	OFDM			
Channel	5190 ~ 5815MHz			
Data rate	MCS0 ~ MCS15			
TX Characteristics	Min.	Typ.	Max.	Unit
1. Power Levels				
1)Target Power@MCS0	20	22	24	dBm
2)Target Power@MCS1	20	22	24	dBm
3)Target Power@MCS2	20	22	24	dBm
4)Target Power@MCS3	20	22	24	dBm
5)Target Power@MCS4	20	22	24	dBm
6)Target Power@MCS5	19	21	23	dBm
7)Target Power@MCS6	16	18	20	dBm
8)Target Power@MCS7	14	16	18	dBm
2. Frequence Error	-20	-	+20	ppm
3. Modulation Accuracy(EVM)@Target Power			limt	
1) MCS0	-		-5	dB
2) MCS1	-		-10	dB
3) MCS2	-		-13	dB
4) MCS3	-		-16	dB
5) MCS4	-		-19	dB
6) MCS5	-		-22	dB
7) MCS6	-		-25	dB
8) MCS7	-	-32	-28	dB
RX Characteristics	Min.	Typ.	limt	Unit
4. Minimum Input Level Sensitivity				
1) MCS0(PER < 10%)	-	-90	-79	dBm
2) MCS1(PER < 10%)	-	-89	-76	dBm
3) MCS2(PER < 10%)	-	-87	-74	dBm
4) MCS3(PER < 10%)	-	-86	-71	dBm
5) MCS4(PER < 10%)	-	-82	-67	dBm
6) MCS5(PER < 10%)	-	-80	-63	dBm
7) MCS6(PER < 10%)	-	-74	-62	dBm
8) MCS7(PER < 10%)	-	-70	-61	dBm
5. Maximum Input Level (PER < 10%)	-30	-	-	dBm

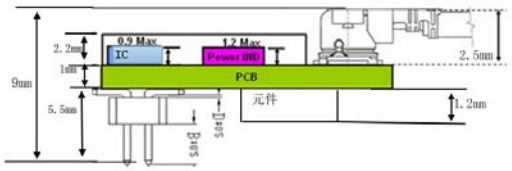
5.Mechanical Specifications

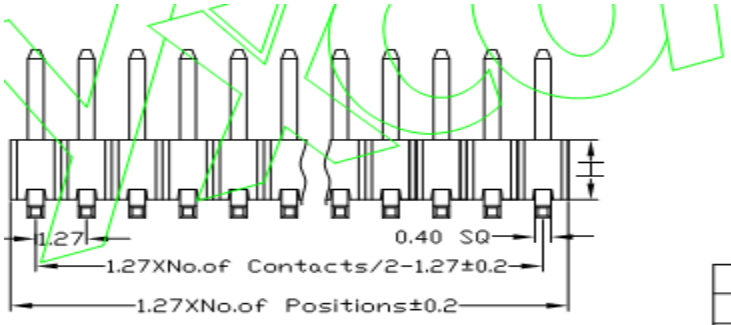
PCB Assembly Dimension:

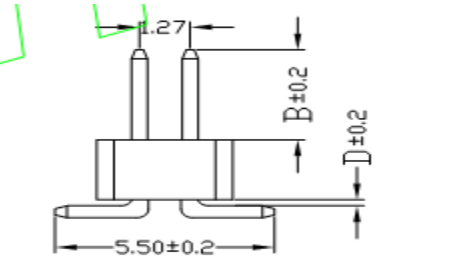
- Dimension (W x L x H): 37mm x 49mmx9mm
- PCB: 4 layer High Tg-FR4 design



Unit:MM From Module TOP View







Dimension antitheses list

ITEM	D		B			H		
Standard	0	1.2	1.8	3.0	4.0	1.6	2.0	2.54

1.27mm connector

Regulatory information for the OEMs and Integrators

The guidelines described within this document are provided to OEM integrators installing 5G module in notebook and tablet PC host platforms. Adherence to these requirements is necessary to meet the conditions of compliance with FCC rules, including RF exposure. When all antenna type and placement guidelines described herein are fulfilled the 5G Module may be incorporated into notebook and tablet PC host platforms with no further restrictions. If any of the guidelines described herein are not satisfied it may be necessary for the OEM or integrator to perform additional testing and/or obtain additional approval. The OEM or integrator is responsible to determine the required host regulatory testing and/or obtaining the required host approvals for compliance

. 5G module are intended for OEMs and host integrators only.

. The 5G Module must be operated with an access point that has been approved for the country of operation.

. Changes or modification to 5G Module by OEMs, integrators or other third parties is not permitted. Any changes or modification to 5G Module by OEMs, integrators or other third parties will void authorization to operate This module is not masked, and the end user needs to increase the mask.

Information to Be Supplied to the End User by the OEM or Integrator

The following regulatory and safety notices must be published in documentation supplied to the end user of the product or system incorporating the Amplified 5G Module, in compliance with local regulations.

Host system must be labeled with "Contains FCC ID: 2AKA79342 ", FCC ID displayed on label.

The 5G Module must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product. Intel Corporation is not responsible for any radio or television interference caused by unauthorized modification of the devices included with the wireless adapter kit or the substitution or attachment of connecting cables and equipment other than that specified by Intel Corporation. The correction of interference caused by such unauthorized modification, substitution or attachment is the responsibility of the user. Intel Corporation and authorized resellers or distributors are not liable for any damage or violation of government regulations that may arise from the user failing to comply with these guidelines.

This device has been evaluated and shown compliant with the FCC RF Exposure limits under fixed exposure conditions (antennas are greater than 20cm from a person’s body)when installed in certain specific configurations.

The host system shall have a label showing: Contains FCC ID: 2AKA79342

This product only used external antenna, The gain of antenna : 5.0dBi

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

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 device and its antenna(s) must not be co-located or operating in conjunction with any other antenna

or transmitter.

15.105 Information to the user.

(b) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the 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. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

The availability of some specific channels and/or operational frequency bands are country dependent and are

firmware programmed at the factory to match the intended destination.

The firmware setting is not accessible by the end user.

For 5180~5240MHz, this device is only used for indoor.