



Product Manual

IEEE802.11a/b/g/n/ac/ax 1T1R 2.4G/5G Dual with Integrated BTDM5.4

Project Name	AIC8800D WIFI Module
Main model	A68800A-UUBA
Version number	A
Customer's Part NO	
Customer	

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1. Introduction

1.1 Overview

The A68800A-UUBA is a module that supports dual-band Wi-Fi 6 and IEEE 802.11a/b/g/n/ac/ax MAC/ baseband /WLAN and Bluetooth. Supports 2.4G/5G with USB2.0 network interface controller, supports Bluetooth 2.1/4.2/5.4 with USB and UART interface controller, has one transmit and one receive path (1T1R).

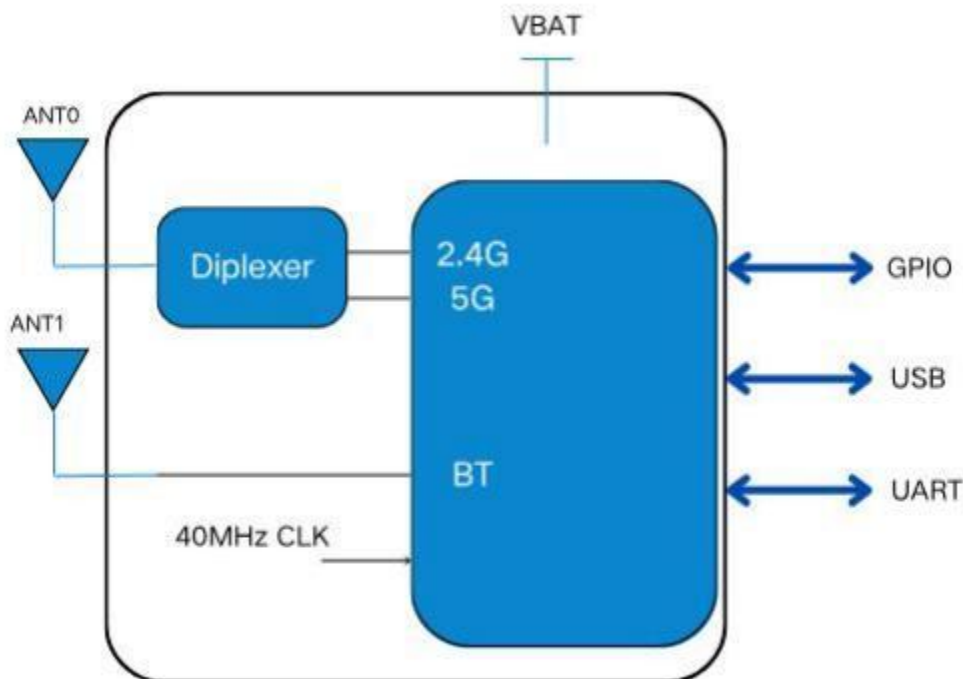


Figure1 A68800A-UUBA Block Diagram

1.2 Product Features

- Support 2.4GHz/5GHz Wi-Fi6
- Data rates up to 286.8Mbps with 20/40MHz bandwidth
- Support 5MHz/10MHz mode
- RX sensitivity -97dBmin 11b 1M mode
- Tx power up to 23dBm in 11b mode, 18dBm in HT/VHT/HE MCS7 mode
- Support STA, AP, Wi-Fi Direct modes concurrently
- Support STBC, beamforming
- Support Wi-Fi6 TWT
- Support Two NAV, Buffer Report, Spatial reuse, Multi-BSSID, intra-PPDU power save
- Support LDPC
- Support MU-MIMO,OFDMA

- Support DCM, Mid-amble, UORA
- Support WEP/WPA/WPA2/WPA3-SAE Personal, MFP

1.3 Applications

- NOTE-BOOK
- TV
- Tablet PC
- Set-Top box

2. GENERAL SPECIFICATION

2.1 WiFi RF Specifications

Features	Descriptions
Main Chip	AIC8800D40
Frequency Range	2400 ~ 2483.5MHz / 5180MHz ~ 5250MHz / 5745MHz ~ 5825MHz
Main Interface	WiFi:USB2.0
Standards	WiFi: IEEE 802.11a/b/g/n/ac/ax
Modulation	WiFi: 802.11b: DBPSK/DQPSK/CCK 802.11g: OFDM/BPSK/QPSK/16-QAM/64-QAM 802.11a: BPSK/QPSK/16-QAM/64-QAM/256-QAM 802.11n: QPSK/16-QAM/64-QAM/256-QAM 802.11ac: 1024-QAM 802.11ax: BPSK/QPSK/16-QAM/64-QAM/256-QAM-1024-QAM
Transmit Output Power (Tolerance: ± 1.0 dBm)	WiFi: 2.4G 802.11b@11Mbps 4 dBm 802.11g@54Mbps 3 dBm 802.11n@MCS7 4dBm 802.11ax@ MCS11 4 dBm 5.1G 802.11a@54Mbps 5 dBm 802.11n@MCS7 6dBm



	802.11ac@MCS9 6dBm 802.11ax@MCS11 6dBm 5.8G 802.11a@54Mbps 6dBm 802.11n@MCS7 5dBm 802.11ac@MCS9 6dBm 802.11ax@MCS11 6dBm
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EVM	802.11b /11Mbps : EVM $\leq$ -13dB 802.11a/g 54Mbps : EVM $\leq$ -25dB 802.11n /MCS7 : EVM $\leq$ -28dB(2.4G/5.8G) 802.11ac /MCS9 : EVM $\leq$ -32dB(5.8G) 802.11ax /MCS11 : EVM $\leq$ -35dB(2.4G/5.8G)		
Receiver Sensitivity 2.4G	802.11b@8% PER Receive maximum level $\geq$ -10 11Mbps $\leq$ -86dBm		
	802.11g@10% PER Receive maximum level $\geq$ -20 54Mbps $\leq$ -74dBm		
	802.11n@10% PER Receive maximum level $\geq$ -20 MCS7_HT20 $\leq$ -72dBm MCS7_HT40 $\leq$ -70dBm		
	802.11ax@10% PER Receive maximum level $\geq$ -20 MCS11_HT20 $\leq$ -64dBm MCS11_HT40 $\leq$ -59dBm		
Receiver Sensitivity 5.8G	802.11a@10% PER Receive maximum level $\geq$ -30 54Mbps $\leq$ -71dBm		
	802.11n@10% PER Receive maximum level $\geq$ -30 MCS7_HT20 $\leq$ -69dBm MCS7_HT40 $\leq$ -67dBm		
	802.11ac@10% PER Receive maximum level $\geq$ -30 MCS8_HT20 $\leq$ -64dBm MCS9_HT40 $\leq$ -61dBm		
	802.11ax@10% PER Receive maximum level $\geq$ -30 MCS11_HT20 $\leq$ -59dBm MCS11_HT40 $\leq$ -54dBm		
Operating Channel	WiFi 2.4GHz: 11: (Ch. 1-11) – United States(North America) 13: (Ch. 1-13) – Europe 14: (Ch. 1-14) – Japan WiFi 5.8GHz:		
	Band range	Operating Channel Numbers	Channel center frequencies(MHz)
	5150MHz~5250MHz	36	5180
		40	5200
		44	5220
		48	5240



	5725MHz~5850MHz	149	5745
		153	5765
		157	5785
		161	5805
		165	5825
Media Access Control	WiFi: CSMA/CA withACK		
Network Architecture	WiFi: Ad-hoc mode (Peer-to-Peer) Infrastructure mode Software AP WiFi Direct		
Security	WiFi: WEP, TKIP, AES, WPA, WPA2, WPA3		
Antenna	External		
OS Supported	Android / Linux		
Dimension	Typical L13.0 mm *W12.2 mm *H1.8mm (+/-0.3mm)		

2.2 BT RF Specifications

Feature	Description
Bluetooth Standard	Bluetooth 2.1+EDR/3.0/4.x/5.3/5.4
Modulation	BT:GFSK; $\pi/4$ -DQPSK; 8-DPSK
Frequency Band	2.400~2.483.5GHz



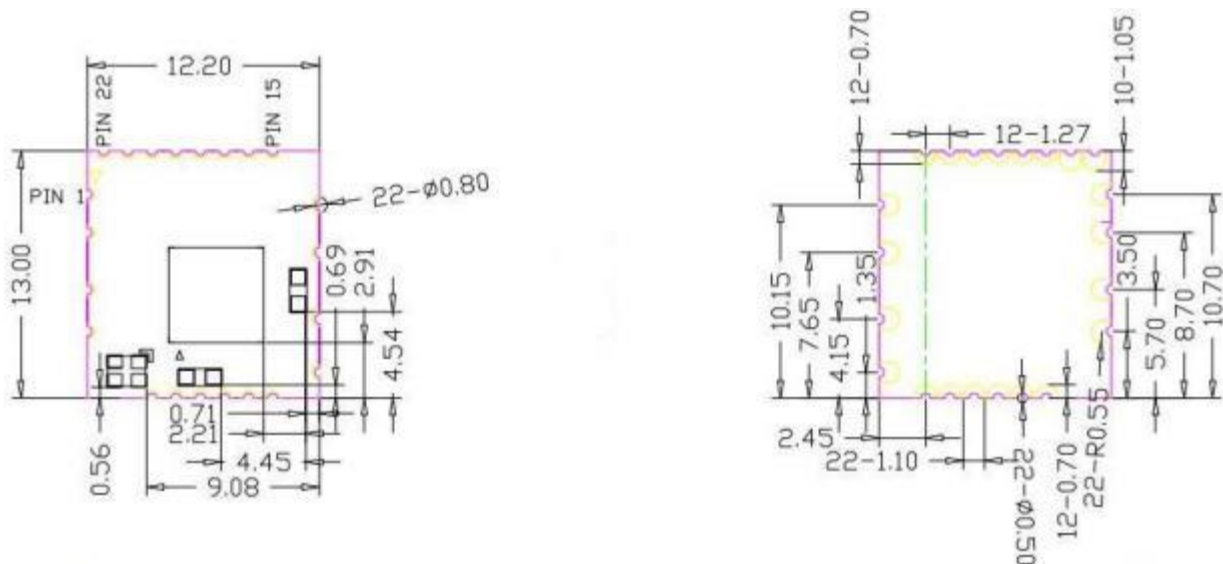
Channel numbers	79 (0~78)		
Main Interface	USB/UART		
	Min	Typical	Max
Output Power (Class 1.5)	0dBm		10dBm
Sensitivity @ BER=0.1% for GFSK (1Mbps)		-88dBm	
Sensitivity @ BER=0.01% for $\pi/4$ -DQPSK (2Mbps)		-88 dBm	
Sensitivity @ BER=0.01% for 8DPSK (3Mbps)		-81 dBm	

2.3 Operating Conditions

Parameter	Min.	Typ.	Max.	Unit
Operating Temperature	-20	-	+80	°C
Operating Humidity	10	-	90	%
VBAT	3.0	3.3	3.6	V

3. Mechanical Specification

3.1 Outline Drawing (Unit: $\pm 0.3\text{mm}$)



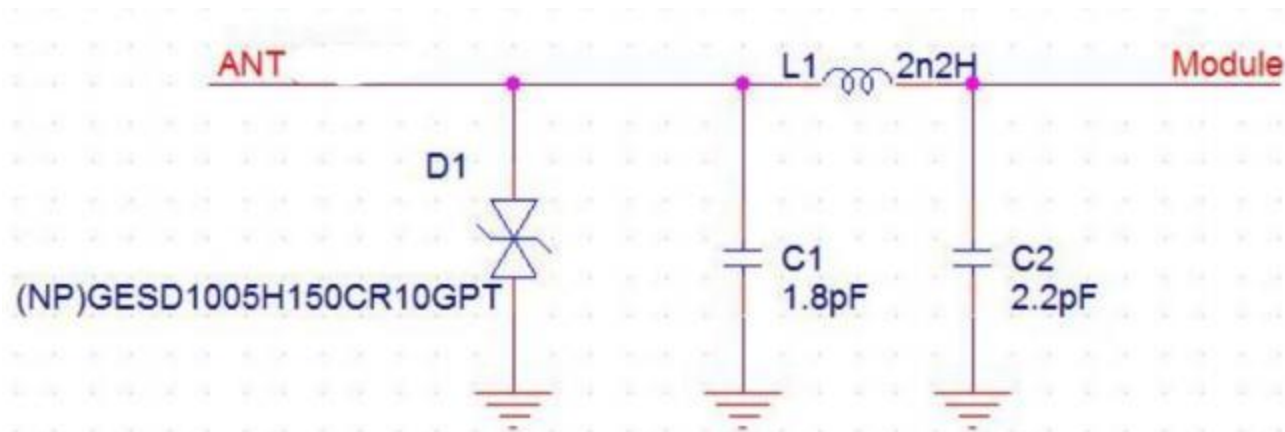
3.2 PIN Assignment

Pin #	Name	Description
1	GND	Ground



2	WLAN_BT_ANT	WIFI(2.4G+5G)(1 antenna) WIFI(2.4G+5G)&BT(2 antenna)
3	WLAN_ANT	BT(2 antenna) NC(1 antenna)
4	GND	Ground
5	UART1_RTS	UART1_RTS
6	UART1_CTS	UART1_CTS
7	UART1_TX	UART1_TX
8	UART1_RX	UART1_RX
9	HOST_WAKE_BT	HOST_WAKE_BT, High active
10	BT_WAKE_HOST	BT_WAKE_HOST, High active
11	VBAT	Voltage Input of Main Power Supply
12	USB_DM	USB_DM
13	USB_DP	USB_DP
14	GND	Ground
15	NC	Keep Floating
16	NC	Keep Floating
17	NC	Keep Floating
18	PWR_EN	Power Enable/Disable, High active
19	HOST_WAKE_WL	HOST_WAKE_WL, High active
20	WL_WAKE_HOST	WL_WAKE_HOST, High active
21	UART0_TX	UART0_TX
22	UART0_RX	UART0_RX

3.3WIFI RF Circuit reference pictures



NOTE: Antenna design requirements

1. RF-line need 50Ω single line impedance;
2. Layout is arc line or straight line;
3. Parameter need adjustment according to different antenna;
4. Please antenna close to the WIFI module, its farthest distance can not exceed 20 mm.

Note: Please be sure to add a TVS tube at the end of the welding antenna to prevent ESD static damage to the WIFI module (as shown in the above reference circuit).

4. Environmental Requirements

4.1 Operating& Storage Conditions

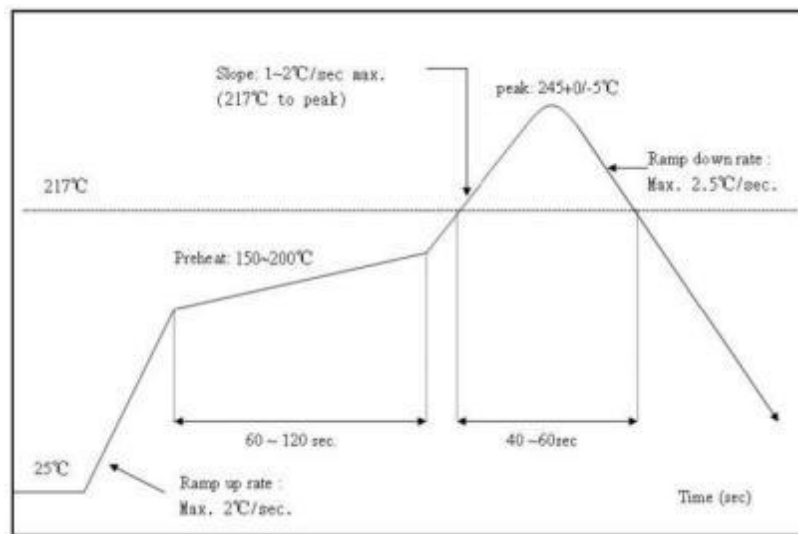
Operating	Temperature: -20°C to +80°C
	Relative Humidity: 10-85% (non-condensing)
Storage	Temperature: -20°C to +60°C (non-operating)
	Relative Humidity: 5-90% (non-condensing)

4.2 Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature : <250. C

Number of Times : ≤ 2 times



4.3 Patch WIFI modules installed before the notice:

WIFI module installed note:

1. Please press 1 : 1 and then expand outward proportion to 0.7 mm, 0.18 mm thickness When open a stencil
2. Take and use the WIFI module, please insure the electrostatic protective measures.
3. Reflow soldering temperature should be according to the customer the main size of the products, such as the temperature set at 250+5 °C for the MID motherboard.

About the module packaging, storage and use of matters needing attention are as follows:

1. The module of the reel and storage life of vacuum packing: 1). Shelf life: 8 months, storage environment conditions: temperature in: < 40 °C, relative humidity: < 90% r.h.
2. The module vacuum packing once opened, time limit of the assembly:
Card: 1) check the humidity display value should be less than 30% (in blue), such as: 30% ~ 40% (pink), or greater than 40% (red) the module have been moisture absorption.
2) factory environmental temperature humidity control: $\leq 30\text{ }^{\circ}\text{C}$, $\leq 60\%$ r.h..
3) Once opened, the workshop the preservation of life for 168 hours.
3. Once opened, such as when not used up within 168 hours:
1) The module must be again to remove the module moisture absorption.
2) The baking temperature: 125 °C, 8 hours.
3) After baking, put the right amount of desiccant to seal packages.

五. PACKING INFORMATION

5.1 Blister packaging

Top

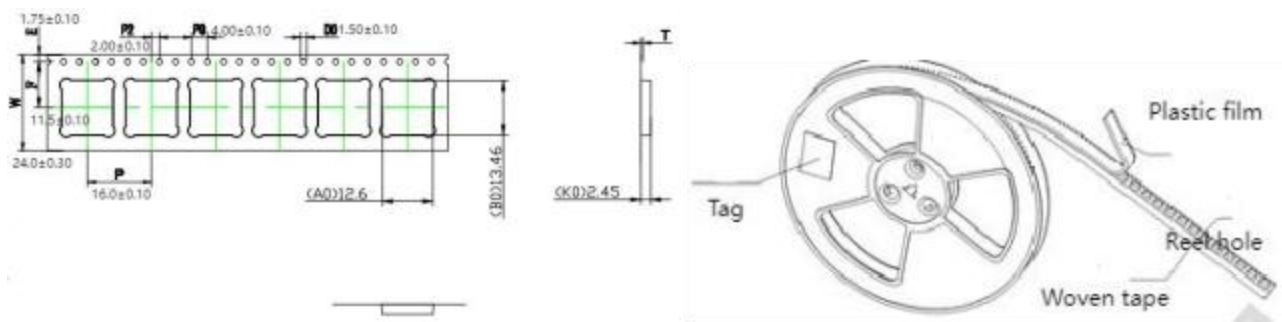


Bottom



Put the product into the load belt, one roll of load belt can put 1700PCS, one roll with an aluminum foil bag, into the humidity card, desiccant together packaging, 5 rolls for a box, a box of 8500PCS.

Humidity sensitivity class: MSL3



Note: Shenzhen MiaoMing may make improvements and/or changes in this document or in the product described in this document at any time. This document could include technical inaccuracies or typographical errors.

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THE END



2.2 List of applicable FCC rules

FCC Part 15.247, FCC Part 15.407, FCC Part 2.1093

2.4 Limited module procedures

Shenzhen MiaoMing Intelligent Technology Co.,Ltd will retain control over the final installation of the modular such that compliance of the end product is assured. In such cases, an operating condition on the limit modular approval for the module must be only approved for use when installed in devices produced by a specific manufacturer. If any hardware modify or RF control software modify will be made by host manufacturer. C2PC or new certificate should be apply to get approval, if those change and modification made by host manufacturer not expressly approved by the party responsible for compliance ,then it is illegal.

2.7 Antennas

This product has a external antennas. The antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

No .	Antenna Type	Frequency Range	Gain	Impedance
1	Integral Antenna	2400MHz~2483.5MHz	3.02dBi	50ohm
		5180MHz ~ 5250MHz	1.57dBi	
		5745MHz ~ 5825MHz	3.03dBi	

FCC Warning

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.

NOTE 1: Any changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance.

This module certified that complies with RF exposure requirement under mobile or fixed condition, this module is to be installed only in mobile or fixed applications.

A mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. Transmitting devices designed to be used by consumers or workers that can be easily re-located, such as wireless devices associated with a personal computer, are considered to be mobile devices if they meet the 20 centimeter separation requirement.

A fixed device is defined as a device is physically secured at one location and is not able to be easily moved to another location.

Note 2: Any modifications made to the module will void the Grant of Certification, this module is limited to OEM installation only and must not be sold to end-users, end-user has no manual instructions to remove or install the device, only software or operating procedure shall be placed in the end-user operating manual of final products.

Note 3: Additional testing and certification may be necessary when multiple modules are used.

Note 4: The module may be operated only with the antenna with which it is authorized. Any antenna that is of the same type and of equal or less directional gain as an antenna that is authorized with the intentional radiator may be marketed with, and used with, that intentional radiator.

Note 5: For all products market in US, OEM has to limit the operation channels in CH1 to CH11 for 2.4G band by supplied firmware programming tool. OEM shall not supply any tool or info to the end-user regarding to Regulatory Domain change.