AI-Link

WIFI-2-Q379UWP1

WiFi Module

Integrated Bluetooth 2.1+EDR/3.0+HS/4.2

Features:

- **Reserving System**
  IEEE Std. 802.11a
  IEEE Std. 802.11b
  IEEE Std. 802.11g
  IEEE Std. 802.11n
  IEEE Std. 802.11ac
  Bluetooth 2.1+EDR/3.0+HS/4.2
- **Chip Solution**
  Qualcomm9379-7
- **Size**
  33.0mm x70.0mm x 6.0mm

Model Overview:

Model	Standard	Rate	Band	Antenna	Power
WIFI-2-Q379UWP1	IEEE 802.11a/b/g/n/ac	866.7Mbps	2.4G/5G	Internal Antennas Design	5V
	BT2.1+EDR/3.0+HS/4.2	3Mbps	2.4G		

Sichuan AI-Link Technology Co.,Ltd.
Add: Anzhou,Industrial park,Mianyang,Sichuan
Web: http://www.changhong.com

1. Introduction

WIFI-2-Q379UWP1 module design is based on Qualcomm9379-7 solution, The QCA9379-7 is a highly integrated single chip which has built in a 2x2 dual-band wireless LAN radio and Bluetooth radio. It includes Bluetooth EDR and LE radio which complies with Bluetooth v2.1+EDR, v3.0+HS, and v4.2. The Module is a highly integrated MAC/BBP and 2.4/5GHz PA/LNA single chip which supports a 866.7Mbps PHY rate. The Module is designed to support standard-based features in the areas of security, quality of service, and international regulations, giving end users the greatest performance anytime and in any circumstance. This documentation describes the engineering requirements specification.

1.1 RF module Overview

The general HW architecture for the module is shown in Figure 1. This WLAN Module design is based on Qualcomm QCA9379-7. It is a highly integrated single-chip MIMO(Multiple In Multiple Out) Wireless LAN (WLAN) network interface controller complying with the 802.11 specification and Bluetooth over USB interface. It combines a MAC, a 2T2R capable baseband, and RF in a single chip. An intelligent Wi-Fi/Bluetooth coexistence algorithm is implemented to provide the best harmonized Wi-Fi and Bluetooth radio performance.

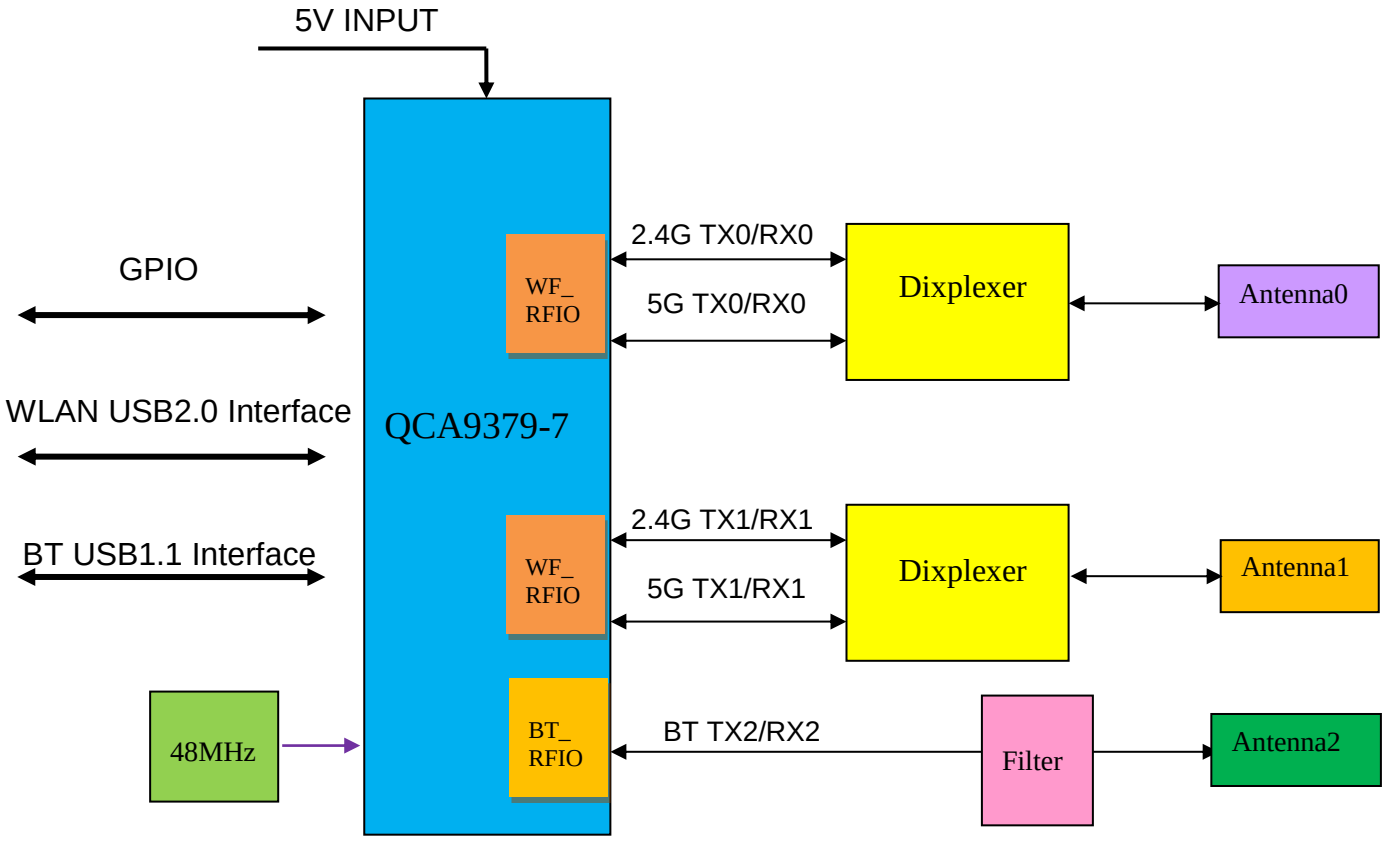


Figure 1 WIFI-2-Q379UWP1 Block Diagram

1.2 Specification reference

This specification is based on additional references listed below.

_ IEEE Std. 802.11a
_ IEEE Std. 802.11b
_ IEEE Std. 802.11g
_ IEEE Std. 802.11n
_ IEEE Std. 802.11ac
_ Bluetooth 2.1+EDR/3.0+HS/4.2

1.3 System Functions

Table1: General Specification as below:

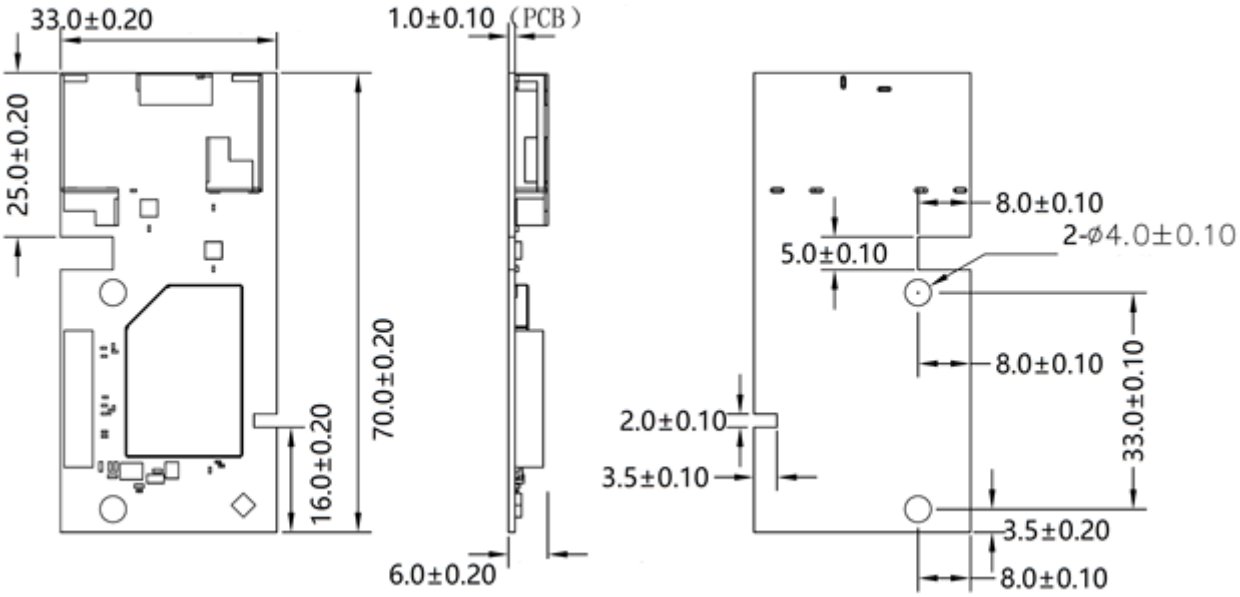
Main Chipset	Qualcomm QCA9379-7
Operating Frequency	2.4G/5G
WiFi Standard	802.11a/b/g/n/ac (2x2)
Bluetooth	2.1+EDR/3.0+HS/4.2
Modulation	WIFI:11b: DBPSK, DQPSK and CCK and DSSS 11a/g: BPSK, QPSK, 16QAM, 64QAM and OFDM 11n: BPSK, QPSK, 16QAM, 64QAM and OFDM 11ac: BPSK, QPSK, 16QAM, 64QAM,256QAM and OFDM BT: FHSS,GFSK,DPSK,DQPSK
Data rates	11b: 1, 2, 5.5 and 11Mbps 11a/g: 6, 9, 12, 18, 24, 36, 48 and 54 Mbps 11n: MCS0~15, up to 300Mbps 11ac: MCS0~9, Nss=2, up to 866.7Mbps
Form factor	13pins ,
Host Interface	USB 2.0 for WLAN and USB 1.1 for BT
PCB Stack	6-layers design
Dimension	Typical，33mm x 70mm x 6mm
Antenna	Internal Antennas Design
Operation Temperature	0℃ to +70℃
Storage Temperature	-15℃ to +45℃
Operation Voltage	5V +/-10%

2. Mechanical Specification

2.1 Mechanical Outline Drawing

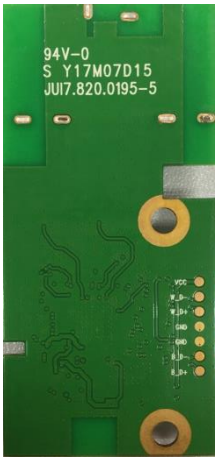
Typical Dimension (W x L): 33.0mmx 70.0mm x 6.0mm

General tolerance: ±0.15mm



TOP VIEW **BOTTOM VIEW**

2.2 Product Picture



TOP VIEW **BOTTOM VIEW**

2.3 Pin definition

No	Define	description
1	WIFI_REG_ON	WLAN enable，active high
2	BT_HOST_WAKE	Bluetooth wakeup the host，active high
3	WL_VCC	WLAN 5V input
4	WI-FI DN	WIFI USB D-/DN
5	WIFI DP	WIFI USB D+/DP
6	GND	Ground
7	3D_SYNC	Frame sync signals from TV to sync with 3D glass via Bluetooth
8	Reset	Bluetooth enable，active high
9	WLAN_DEV_WAKE	WIFI wakeup the host, active high
10	BT_VCC	BT 5V input
11	BTDN	BT USB D-/DN
12	BTDP	BT USB D-/DP
13	GND	Ground

3. Electrical Specification

This Specification is based-on conductive DVT testing result. The extreme condition include overall temperature (0℃,+25℃,+40℃) and overall voltage (4.5V,5.0V,5.5V).

3. 1 IEEE 802.11g/a Section:

Items	Contents				
Specification	IEEE802.11g & IEEE802.11a				
Mode	BPSK, QPSK, 16QAM, 64QAM and OFDM				
Channel	CH1 to CH13 @ 11g CH36 to CH165 @ 11a				
Data rate	6, 9, 12, 18, 24, 36, 48, 54Mbps				
TX Characteristics	Min.	Typ.	Max.	Unit	Remark
1. Power Levels					
1) 14.5dBm Target (For Each antenna port) @ 11g 54Mbps	12	14.5	16	dBm	
2) 13.5dBm Target (For Each antenna port) @ 11a 54Mbps	12	13.5	15	dBm	
2. Spectrum Mask @ Target Power					
1) at fc +/-11MHz	-	-	-20	dBr	
2) at fc +/-20MHz	-	-	-28	dBr	
3) at fc > +/-30MHz	-	-	-40	dBr	
3. Constellation Error(EVM) @ Target Power					
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	-	-	-25	dB	
4. Frequency Error					
1) IEEE802.11g	-25	-	25	ppm	
2) IEEE802.11a	-30		30	ppm	
RX Characteristics	Min.	Typ.	Max.	Unit	
5. Minimum Input Level Sensitivity(each chain)					
1) 6Mbps (PER ≦10%)	-	-	-82	dBm	
2) 9Mbps (PER ≦10%)	-	-	-81	dBm	
3) 12Mbps (PER ≦10%)	-	-	-79	dBm	
4) 18Mbps (PER ≦10%)	-	-	-77	dBm	
5) 24Mbps (PER ≦10%)	-	-	-74	dBm	
6) 36Mbps (PER ≦10%)	-	-	-70	dBm	
7) 48Mbps (PER ≦10%)	-	-	-66	dBm	
8) 54Mbps (PER ≦10%)	-	-	-65	dBm	
6. Maximum Input Level (PER ≦10%)					
1) IEEE802.11g	-20	-	-	dBm	
2) IEEE802.11a	-30			dBm	

3.2 IEEE 802.11b Section:

Items	Contents				
Specification	IEEE802.11b				
Mode	DBPSK, DQPSK and CCK and DSSS				
Channel	CH1 to CH13				
Data rate	1, 2, 5.5, 11Mbps				
TX Characteristics	Min.	Typ.	Max.	Unit	Remark
1. Power Levels(Calibrated)					
1) 17dBm Target (For Each antenna port) @1Mbps~11Mbps	16	17.5	19	dBm	
2. Spectrum Mask @ Target Power					
1) fc +/-11MHz to +/-22MHz	-	-	-30	dBr	
2) fc > +/-22MHz	-	-	-50	dBr	
3. Constellation Error(EVM) @ Target Power					
1) 1Mbps	-	-	-10	dB	
2) 2Mbps	-	-	-10	dB	
3) 5.5Mbps	-	-	-10	dB	
4) 11Mbps	-	-20	-10	dB	
4. Frequency Error	-25	-	25	ppm	
RX Characteristics	Min.	Typ.	Max.	Unit	
5. Minimum Input Level Sensitivity(each chain)					
1) 1Mbps (FER ≦8%)	-	-83	-76	dBm	
2) 2Mbps (FER ≦8%)	-	-80	-76	dBm	
3) 5.5Mbps (FER ≦8%)	-	-79	-76	dBm	
4) 11Mbps (FER ≦8%)	-	-76	-76	dBm	
6. Maximum Input Level (FER ≦8%)	-10	-	-	dBm	

3.3 IEEE 802.11n HT20 Section:

Items	Contents				
Specification	IEEE802.11n HT20 @ 2.4G IEEE802.11n HT20 @ 5G				
Mode	BPSK, QPSK, 16QAM, 64QAM and OFDM				
Channel	CH1 to CH13 @ 2.4G CH36 to CH165 @ 5G				
Data rate (MCS index)	MCS0/1/2/3/4/5/6/7/8/9/10/11/12/13/14/15				
TX Characteristics	Min.	Typ.	Max.	Unit	Remark
1. Power Levels					
1) 14.5dBm Target (For Each antenna port) @ 2.4G/MCS7	13	14.5	16	dBm	
2) 13.5dBm Target (For Each antenna port) @ 5G/MCS7	12	13.5	15	dBm	
2. Spectrum Mask @ Target Power					
1) at fc +/-11MHz	-	-	-20	dBr	
2) at fc +/-20MHz	-	-	-28	dBr	
3) at fc > +/-30MHz	-	-	-45	dBr	
3. Constellation Error(EVM) @ Target Power					
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	-	-	-28	dB	
4. Frequency Error					
1) IEEE802.11n HT20 @ 2.4G	-25	-	25	ppm	
2) IEEE802.11n HT20 @ 5G	-20	-	20	ppm	
RX Characteristics	Min.	Typ.	Max.	Unit	
5. Minimum Input Level Sensitivity(each chain)					
1) MCS0 (PER ≦10%)	-	-	-82	dBm	
2) MCS1 (PER ≦10%)	-	-	-79	dBm	
3) MCS2 (PER ≦10%)	-	-	-77	dBm	
4) MCS3 (PER ≦10%)	-	-	-74	dBm	
5) MCS4 (PER ≦10%)	-	-	-70	dBm	
6) MCS5 (PER ≦10%)	-	-	-66	dBm	
7) MCS6 (PER ≦10%)	-	-	-65	dBm	
8) MCS7 (PER ≦10%)	-	-	-64	dBm	
6. Maximum Input Level (PER ≦10%)					
1) IEEE802.11n HT20 @ 2.4G	-20	-	-	dBm	
2) IEEE802.11n HT20 @ 5G	-30	-	-	dBm	

3.4 IEEE 802.11n HT40 Section:

Items	Contents				
Specification	IEEE802.11n HT20 @ 2.4G IEEE802.11n HT20 @ 5G				
Mode	BPSK, QPSK, 16QAM, 64QAM and OFDM				
Channel	CH3 to CH11 @ 2.4G CH38 to CH163 @ 5G				
Data rate (MCS index)	MCS0/1/2/3/4/5/6/7/8/9/10/11/12/13/14/15				
TX Characteristics	Min.	Typ.	Max.	Unit	Remark
1. Power Levels (Calibrated)					
1) 13.5dBm Target (For Each antenna port) @ 2.4G/MCS7	12	13.5	15	dBm	
2) 12.5dBm Target (For Each antenna port) @ 5G/MCS7	11	12.5	14	dBm	
2. Spectrum Mask @ Target Power					
1) at fc +/-21MHz	-	-	-20	dBr	
2) at fc +/-40MHz	-	-	-28	dBr	
3) at fc > +/-60MHz	-	-	-45	dBr	
3. Constellation Error(EVM) @ Target Power					
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	-	-	-28	dB	
4. Frequency Error					
1) IEEE802.11n HT20 @ 2.4G	-25	-	25	ppm	
2) IEEE802.11n HT20 @ 5G	-20	-	20	ppm	
RX Characteristics	Min.	Typ.	Max.	Unit	
5. Minimum Input Level Sensitivity(each chain)					
1) MCS0 (PER ≦10%)	-	-	-79	dBm	
2) MCS1 (PER ≦10%)	-	-	-76	dBm	
3) MCS2 (PER ≦10%)	-	-	-74	dBm	
4) MCS3 (PER ≦10%)	-	-	-71	dBm	
5) MCS4 (PER ≦10%)	-	-	-67	dBm	
6) MCS5 (PER ≦10%)	-	-	-63	dBm	
7) MCS6 (PER ≦10%)	-	-	-62	dBm	
8) MCS7 (PER ≦10%)	-	-	-61	dBm	
6. Maximum Input Level(PER ≦10%)					
1) IEEE802.11n HT20 @ 2.4G	-20	-	-	dBm	
2) IEEE802.11n HT20 @ 5G	-30	-	-	dBm	

3.5 IEEE 802.11ac Section:

Items	Contents						
Specification	IEEE802.11ac						
Mode	BPSK, QPSK, 16QAM, 64QAM ,256QAM and OFDM						
Channel	CH36 to CH165 VHT20 CH38 to CH163 VHT40 CH42 to CH157 VHT80						
Data rate (MCS index)	MCS0/1/2/3/4/5/6/7/8/9						
TX Characteristics	Min.	Typ.	Max.			Unit	Remark
1. Power Levels (Calibrated)							
1) 12.5dBm Target (For Each antenna port) @VHT20 MCS8	11	12.5	14			dBm	
2) 10.5dBm Target (For Each antenna port) @VHT40 MCS9	9	10.5	12			dBm	
3) 9.5dBm Target (For Each antenna port) @VHT80 MCS9	8	9.5	11			dBm	
2. Spectrum Mask @ Target Power							
1) at fc +/-11MHz /20MHz/30MHz	-	-	-20			dBr	
2) at fc +/-21MHz /40MHz/60MHz	-	-	-28			dBr	
3) at fc +/-41MHz /80MHz/120MHz	-	-	-40			dBr	
3. Constellation Error(EVM) @ Target Power							
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	-	-	-27			dB	
9) MCS8			-30			dB	
10) MCS9			-32			dB	
4. Frequency Error	-10	-	10			ppm	
RX Characteristics	Min.	Typ.	Max.			Unit	
5. Minimum Input Level Sensitivity(each chain)			VHT20	VHT40	VHT80		
1) MCS0 (PER ≦10%)	-	-	-82	-79	-76	dBm	
2) MCS1 (PER ≦10%)	-	-	-79	-76	-73	dBm	
3) MCS2 (PER ≦10%)	-	-	-77	-74	-71	dBm	
4) MCS3 (PER ≦10%)	-	-	-74	-71	-68	dBm	
5) MCS4 (PER ≦10%)	-	-	-70	-67	-64	dBm	
6) MCS5 (PER ≦10%)	-	-	-66	-63	-60	dBm	
7) MCS6 (PER ≦10%)	-	-	-65	-62	-59	dBm	
8) MCS7 (PER ≦10%)	-	-	-64	-61	-58	dBm	
9) MCS8 (PER ≦10%)	-	-	-59	-56	-53	dBm	
10) MCS9 (PER ≦10%)	-	-	-57	-54	-51	dBm	
6. Maximum Input Level(PER ≦10%)	-30	-	-			dBm	

3.6 Bluetooth Section:

Items	Contents				
Specification	BT2.1+EDR/4.2/5.0				
Mode	FHSS,GFSK,DPSK,DQPSK				
Number of Channel	79 Channels				
Frequency Band	2.402 GHz ~2.480GHz				
	Min.	Typ.	Max.	Unit	Remark
1. Output Power	7.5	9	-	dBm	
2.Gain step	2	4	8	dB	
3. Receiver sensitivity (BER ≦0.1%)	-	-93.5	-80	dBm	
4. Maximum usable signal (BER ≦0.1%)	-	-5	-		
5. C/I co-channel (BER<0.1%)	-	4	11	dB	
6. C/I 1MHz (BER<0.1%)	-	-14	0	dB	
7. C/I 2MHz (BER<0.1%)	-	-42	-30	dB	
8. C/I≥3MHz (BER<0.1%)	-	-49	-40	dB	
9. C/I Image channel (BER<0.1%)	-	-25	-9	dB	
10. C/I Image 1MHz (BER<0.1%)	-	-50	-20	dB	
11. Inter-modulation	-	-13	-	dB	
12. Out-of-band blocking					
1). 30MHz to 2000MHz	-10	-	-	dBm	
2). 2000MHz to 2399MHz	-27	-	-	dBm	
3). 2498MHz to 3000MHz	-27	-	-	dBm	
4). 3000MHz to 12.75GHz	-10	-	-	dBm	
13. Modulation characteristics					
1). Δf1avg	140	157	175	KHz	
2). Δf2max (For at least 99.9% of all Δf2max)	115	140	-	KHz	
3). Δf1avg /Δf2avg	0.8	0.98	-	KHz	
14. ICFT	-75	±20	+75	KHz	
15. Carrier frequency drift					
1). One slot packet (DH1)	-25	±15	+25	KHz	
2). Two slot packet (DH3)	-40	±15	+40	KHz	
3). Five slot packet (DH5)	-40	±15	+40	KHz	
4). Max drift rate	-	6	20	KHz/50us	
16. TX output spectrum(20dB bandwidth)	-	922	1000	KHz	
17. In-Band spurious emission					
1). ±2MHz offset	-	-45	-20	dBm	
2). ±3MHz offset	-	-48	-40	dBm	
3). >±3MHz offset	-	-48	-40	dBm	

4. Current consumption

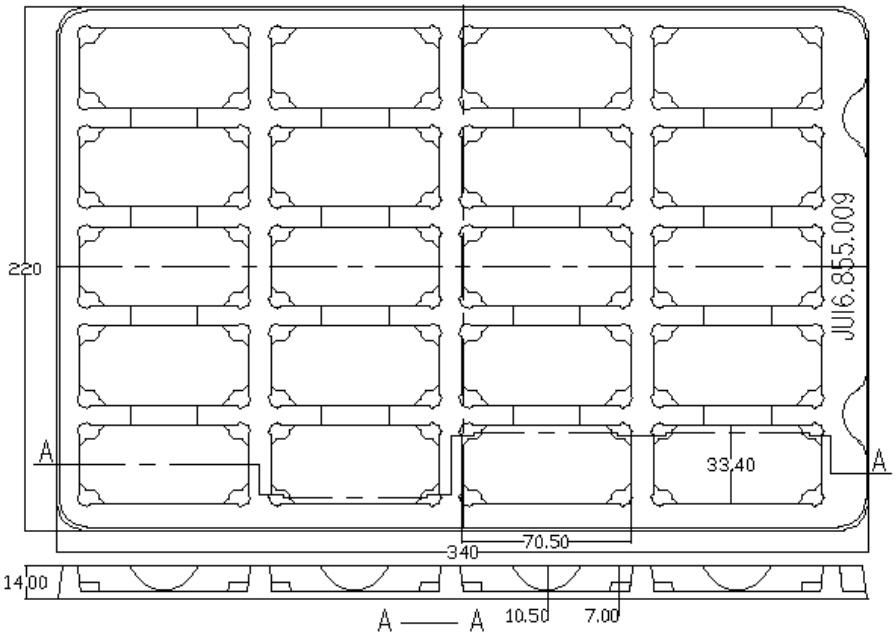
Description	Average current（mA）
Wi-Fi Standby mode current	30mA
BT Standby mode current:	15mA
Power Saving Mode	2.2mA
Wi-Fi cont. TX mode	610mA
Wi-Fi cont. Rx mode	260mA
BT cont. TX mode	50mA
BT cont. Rx mode	25mA

5. Software Requirements

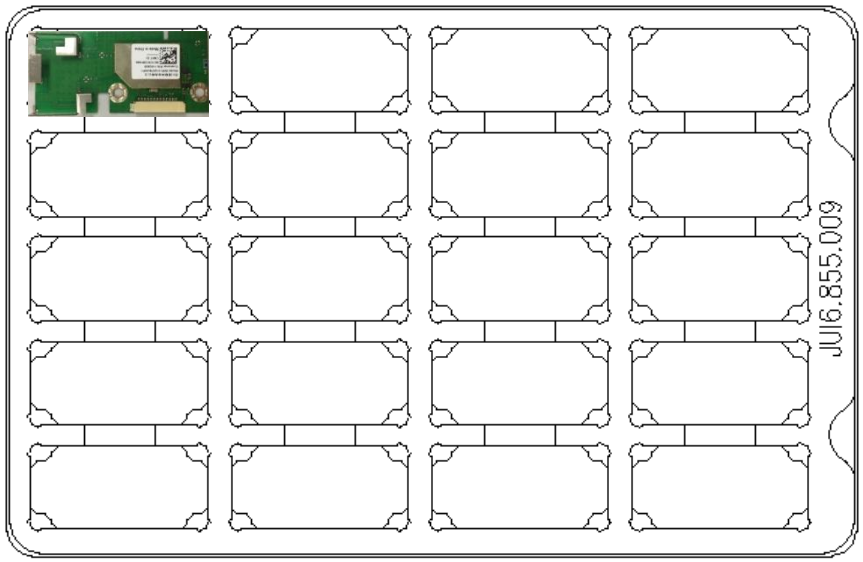
The driver supports the following operating systems: Linux, Microsoft Windows XP, Vista and Win7.
Mfg. software tool is QDART

6. Package

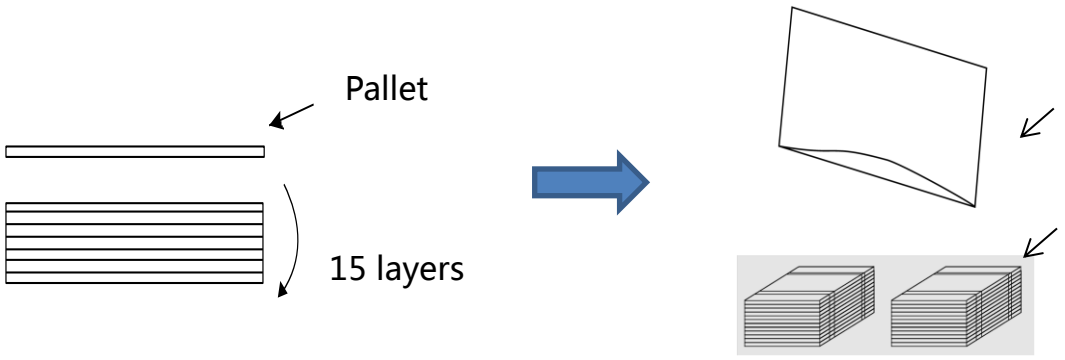
Pallet size：

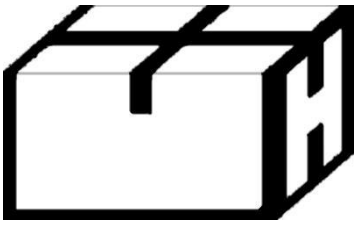


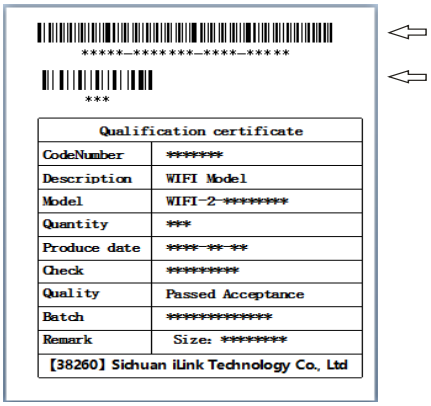
Line of production



Packing desrciption:







Other requirements are subject to the standard of hisense.

FCC Statement

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.

Any 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, usesand 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 causeharmful interference to radio or television reception, which can be determined by turning theequipment off and on, the user is encouraged to try to correct the interference by one or more ofthe 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.

The modular can be installed or integrated in mobile or fix devices only. This modular cannot be installed in any portable device .

FCC Radiation Exposure Statement

This modular complies with FCC RF 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. This modular must be installed and operated with a minimum distance of 20 cm between the radiator and user body.
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 Transmitter Module FCC ID:2AOKI-WIFI2Q379UWP1 Or Contains FCC ID:2AOKI-WIFI2Q379UWP1”
When the module is installed inside
another device, the user manual of the host must contain below warning statements;
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.
(2) This device must accept any interference received, including interference that may cause undesired operation.
2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.

IC STATEMENT

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:
(1) This device may not cause interference.
(2) This device must accept any interference, including interference that may cause undesired operation of the device
Cet appareil contient des émetteurs / récepteurs exemptés de licence conformes aux RSS (RSS) d'Innovation, Sciences et Développement économique Canada. Le fonctionnement est soumis aux deux conditions suivantes :
(1) Cet appareil ne doit pas causer d'interférences.
(2) Cet appareil doit accepter toutes les interférences, y compris celles susceptibles de provoquer un fonctionnement indésirable de l'appareil.

IC Radiation Exposure Statement

The modular can be installed or integrated in mobile or fix devices only. This modular cannot be installed in any portable device.

This modular complies with IC RF 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 t ransmitter. This modular must be installed and operated with a minimum distance of 20 cm between the radiator and user body. Cette modulaire doit être installé et utilisé à une distance minimum de 20cm entre le radiateur et le corps de l'utilisateur.

If the IC 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 IC: 23460-WFQ379UWP1 "

when the module is installed inside another device, the user manual of this device must contain below warning statements;
1. This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:
(1) This device may not cause interference; and
(2) This device must accept any interference, including interference that may cause undesired operation of the device.
2. Cet appareil contient des émetteurs / récepteurs exemptés de licence conformes aux RSS (RSS) d'Innovation, Sciences et Développement économique Canada. Le fonctionnement est soumis aux deux conditions suivantes :
(1) Ce dispositif ne peut causer d'interférences ; et
(2) Ce dispositif doit accepter toute interférence , y compris les interférences qui peuvent causer un mauvais fonctionnement de l'appareil.

The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product

NB Statement

Herby,Sichuan AI-Link Technology Co., Ltd.declares that this WiFi Module, WIFI-2-Q379UWP1 is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU.

In accordance with Article 10(2) and Article 10(10), this product allowed to be used in all EU member states.

Use the WiFi Module in the environment with the temperature between 0℃ and 60℃

Operation Frequency:
For BT/BLE:
2402MHz~2480MHz
For 2.4G WIFI:
2412MHz~2472MHz (802.11b/802.11g/802.11n(HT20))
2422MHz~2462MHz (802.11n(HT40))
For 5G WIFI:
5150MHz-5350MHz, 5470MHz-5725MHz, 5745MHz-5825MHz

Max output power:
BT: 0.0048W
BLE: 0.0008W
Wifi(2.4G): 0.0637W
Wifi(5G): 0.0596W

Manufacturer: Sichuan AI-Link Technology Co., Ltd.
Address: Anzhou, Industrial park, Mianyang, Sichuan, China
Tel: +86-0816-2438701
Fax: +86-0816-2438701
E-mail: caixia.hu@changhong.com