AR1021X-NV5 Specification

Customer: _____

Description: AR1021X-NV5

Customer P/N: _____

Date: _____

Customer		
Approve	Auditing	Admit

Provider		
Approve	Auditing	Admit

Product Specification

802.11a /n USB AR1021X-Module

AR1021X-NV5

Version 1.0

Document release	Date	Modification	Approved
Version 1.0	2014-05-10	Initial release	

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1. Product Overview

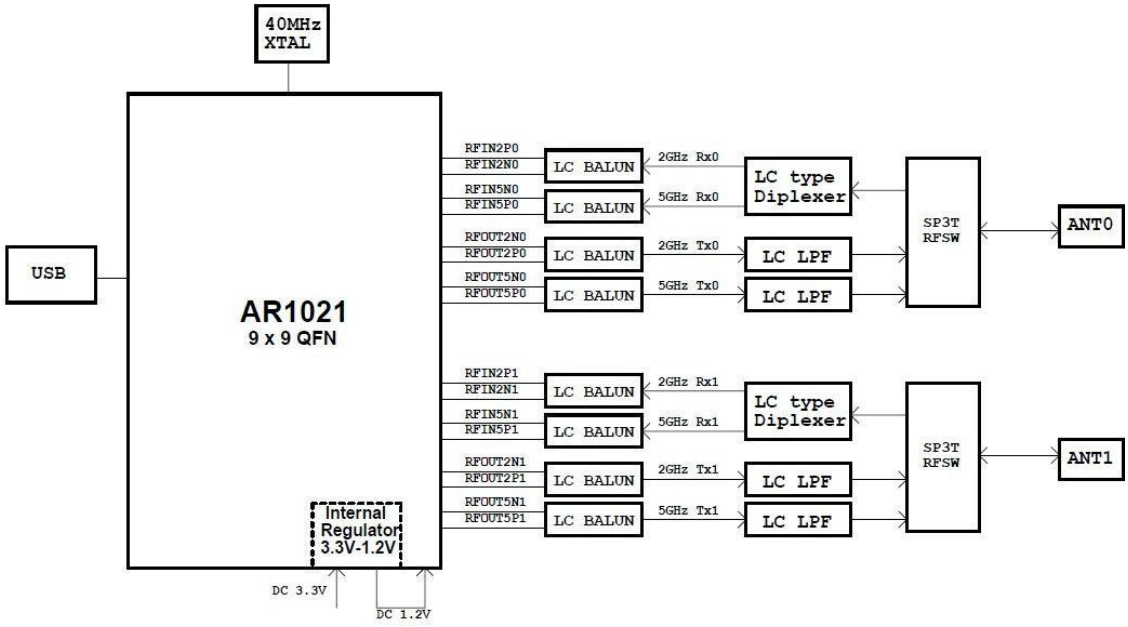
The module AR1021XNV5 provides wireless modem functionality for CE applications utilizing direct sequence spread spectrum and OFDM/CCK technology. The module supports IEEE 802.11a/n protocol. Data rate of up to 54Mbps for 802.11a and 144.4Mbps for 802.11n HT20,300Mbps for HT40.The module integrates all wifi functionality in a package friendly to low-cost PCB design, requiring only a external 3.3V power supply and connection to antenna.

The module is based on Qualcomm Atheros AR1021X which is highly integrated,system-on-a-chip solution for 5GHz IEEE 802.11n 2x2 MIMO WLAN with internal PA and LNA.

2. Module Hardware Overview

2.1 Block Diagram

The general Hardware architecture is shown below Figure:



Module Block Diagram

2.2 Features

- IEEE802.11a/n (2X2) based on Qualcomm Atheros AR1021X solution
- USB 2.0 Interface, High and Full Speeds supported
- Module is powered by the host with a 3.3V +/- 10% supply.
- Internal OTP memory for calibration data
- Advanced power management to minimize standby,sleep and active power
- Security support for WPS,WPA2,WPA,WAP and protected management frames
- Full 802.11e QoS support including WMM and U-APSD
- Support for the IEEE 802.11e,h,i,j
- WEP,TKIP,and AES hardware encryption
- Support Ad hoc and infrastructure mode

2.3 Interface

⑩ Interface

- **Interface: Half Hole**
- **Antenna: IPEX connector**

⑩ Pin definition

From Module TOP View

Pin Number	Symbol Name	Status	Pin Description
1	LED	O	LED indication
2	GND	P	Ground pad
3	USB_DP	I/O	USB D+ signal
4	USB_DN	I/O	USB D- signal
5	3.3V	P	Analog 3.3V power supply
6	CHIP_PWD_L	I	Reset, low active

Note:

- ✧ *Blue pin--On all layer*
- ✧ *Red pin--On the bottom side*

3. Electrical Specification

3.1 Recommended operating rating

Element	Symbol	Min	Typ	Max	Unit
DC supply voltage	UV+	3.0	3.3	3.6	(V)

3.2 DC Characteristics

Symbol	Parameter	Min	Typ	Max	Unit
STBY 3.3V	Supply voltage	3.0	3.3	3.6	(V)
	Power Saving	--	450	--	(uA)
	Standby	--	112	--	(mA)
	Continuous Tx Current 5GHz(Dual Chain)	--	480	--	(mA)
	Continuous Rx Current 5GHz(Dual Chain)	--	60	--	(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	14	16	18	dBm
2)Target Power@9Mbps	14	16	18	dBm
3)Target Power@12Mbps	14	16	18	dBm
4)Target Power@18Mbps	14	16	18	dBm
5)Target Power@24Mbps	14	16	18	dBm
6)Target Power@36Mbps	12	14	16	dBm
7)Target Power@48Mbps	10	12	14	dBm
8)Target Power@54Mbps	9	11	13	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. Frequence Error	-20	-	+20	ppm
4. Modulation Accuracy(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	-	-30	-25	dB
RX Characteristics	Min.	Typ.	Max.	Unit
5. Minimum Input Level Sensitivity				
1) 6Mbps(PER < 10%)	-	-94	-90	dBm
2) 9Mbps(PER < 10%)	-	-93	-89	dBm
3) 12Mbps(PER < 10%)	-	-92	-88	dBm
4) 18Mbps(PER < 10%)	-	-89	-85	dBm
5) 24Mbps(PER < 10%)	-	-86	-82	dBm
6) 36Mbps(PER < 10%)	-	-82	-78	dBm
7) 48Mbps(PER < 10%)	-	-78	-74	dBm
8) 54Mbps(PER < 10%)	-	-77	-71	dBm
6. 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	14	16	18	dBm
2)Target Power@MCS1	13	15	17	dBm
3)Target Power@MCS2	13	15	17	dBm
4)Target Power@MCS3	13	15	17	dBm
5)Target Power@MCS4	12	14	16	dBm
6)Target Power@MCS5	11	13	15	dBm
7)Target Power@MCS6	10	12	14	dBm
8)Target Power@MCS7	8	10	12	dBm
2. Spectrum Mask@14dBm				
1) at fc ± 11MHz	-	-	-20	dBr
2) at fc ± 20MHz	-	-	-28	dBr
3) at fc > ± 30MHz	-	-	-45	dBr
3. Frequence Error	-20	-	+20	ppm
4. Modulation Accuracy(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	-	-30	-28	dB
RX Characteristics	Min.	Typ.	Max.	Unit
5. Minimum Input Level Sensitivity				
1) MCS0(PER < 10%)	-	-93	-89	dBm
2) MCS1(PER < 10%)	-	-91	-87	dBm
3) MCS2(PER < 10%)	-	-88	-84	dBm
4) MCS3(PER < 10%)	-	-83	-79	dBm
5) MCS4(PER < 10%)	-	-80	-76	dBm
6) MCS5(PER < 10%)	-	-76	-72	dBm
7) MCS6(PER < 10%)	-	-75	-70	dBm
8) MCS7(PER < 10%)	-	-73	-67	dBm
6. Maximum Input Level (PER < 10%)	-30	-	-	dBm

4. 3 IEEE 802.11n HT40(5G)

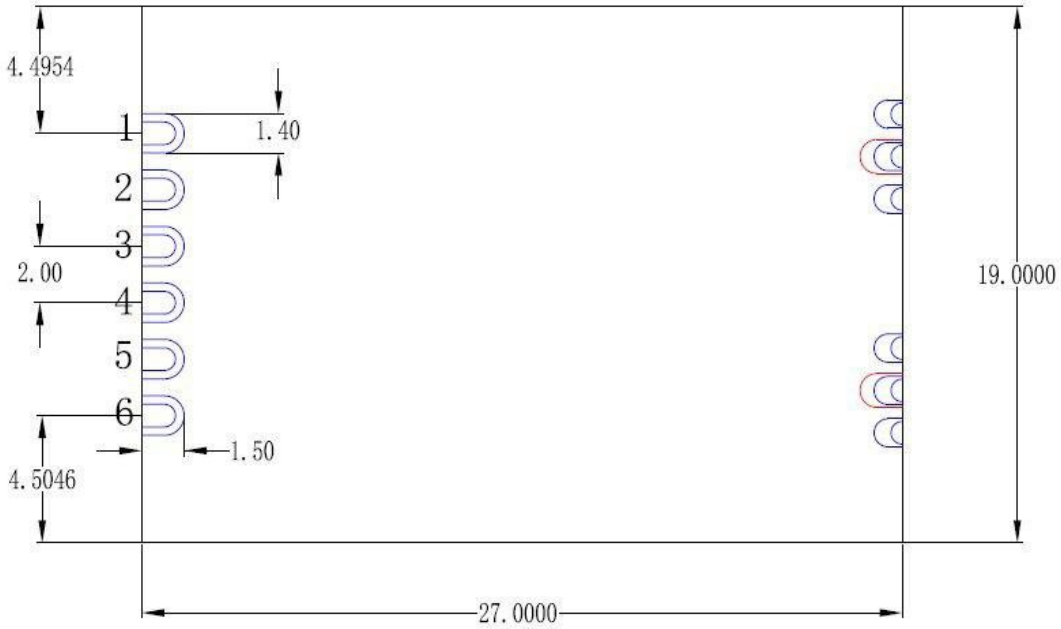
Items	Contents			
Specification	IEEE 802.11a/n HT40			
Modulation technique	OFDM			
Channel	5190 ~ 5815MHz			
Data rate	MCS0 ~ MCS15			
TX Characteristics	Min.	Typ.	Max.	Unit
1. Power Levels				
1)Target Power@MCS0	12	14	16	dBm
2)Target Power@MCS1	11	13	15	dBm
3)Target Power@MCS2	11	13	15	dBm
4)Target Power@MCS3	11	13	15	dBm
5)Target Power@MCS4	11	13	15	dBm
6)Target Power@MCS5	10	12	14	dBm
7)Target Power@MCS6	9	11	13	dBm
8)Target Power@MCS7	7	9	11	dBm
2. Spectrum Mask@14dBm				
1) at fc ± 11MHz	-	-	-20	dBr
2) at fc ± 20MHz	-	-	-28	dBr
3) at fc > ± 30MHz	-	-	-45	dBr
3. Frequence Error	-20	-	+20	ppm
4. Modulation Accuracy(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	-	-31	-28	dB
RX Characteristics	Min.	Typ.	Max.	Unit
5. Minimum Input Level Sensitivity				
1) MCS0(PER < 10%)	-	-89	-85	dBm
2) MCS1(PER < 10%)	-	-87	-83	dBm
3) MCS2(PER < 10%)	-	-84	-80	dBm
4) MCS3(PER < 10%)	-	-80	-76	dBm
5) MCS4(PER < 10%)	-	-77	-73	dBm
6) MCS5(PER < 10%)	-	-73	-69	dBm
7) MCS6(PER < 10%)	-	-71	-67	dBm
8) MCS7(PER < 10%)	-	-70	-64	dBm
6. Maximum Input Level (PER < 10%)	-30	-	-	dBm

5.Mechanical Specifications

PCB Assembly Dimension:

Dimension (L x W x H): L:19.0mm* W:27.0mm * H:2.3 mm

Solder joints used by the module is connected to the terminal device.
Size of connection position is shown in the figure below:



Note: 5180-5240MHz can only be used indoors

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.

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, 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.

This module meets the requirements of FCC part 15C(15.407).it specifically establish the Bandwidth, Output Power, Radiated Spurious Emission, Power Spectral Density, Restricted Band of Operation and Band Edge, Out of Band Emissions. It is U.FL connect to the antenna, antenna gain 3dBi, antenna gain tolerance:0.5dB

The antenna cannot be removed , Unconventional interface, The module with trace antenna designs, and This manual has been shown the layout of trace design, antenna, connectors, and isolation requirements.

This module It’s complies with FCC RF radiation exposure limits set forth for an uncontrolled environment.

This module is designed to comply with the FCC statement, FCC ID is: **ZLJTOP-AR1021**.

The host system using this module, should have label in a visible area indicated the following texts: "Contains FCC ID: **ZLJTOP-AR1021**.

TOPLINKST TECHNOLOGY COMPANY LIMITED can increase the utility of our modular transmitters by providing instructions that simulates or characterizes a connection by enabling a transmitter.

The module without unintentional-radiator digital circuity, so the module does not require an evaluation by FCC Part 15 Subpart B. The host shoule be evaluated by the FCC Subpart B.