

User manual
802.11a/b/g/n mini-PCI Module
WMIA-198Nv2
(Atheros AR9220)



Version:0.90

Revised History

Version	Purpose	Date	Editor
0.90	Initial Doc	2010/12/10	Jane Jian

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1. Product Features

- Atheros AR9220
- 2 antennas to support 2T2R
- WEP, WPA, WPA2
- Driver Support: Linux2.6 above

2. Product Specification

2.1 Main Chipset

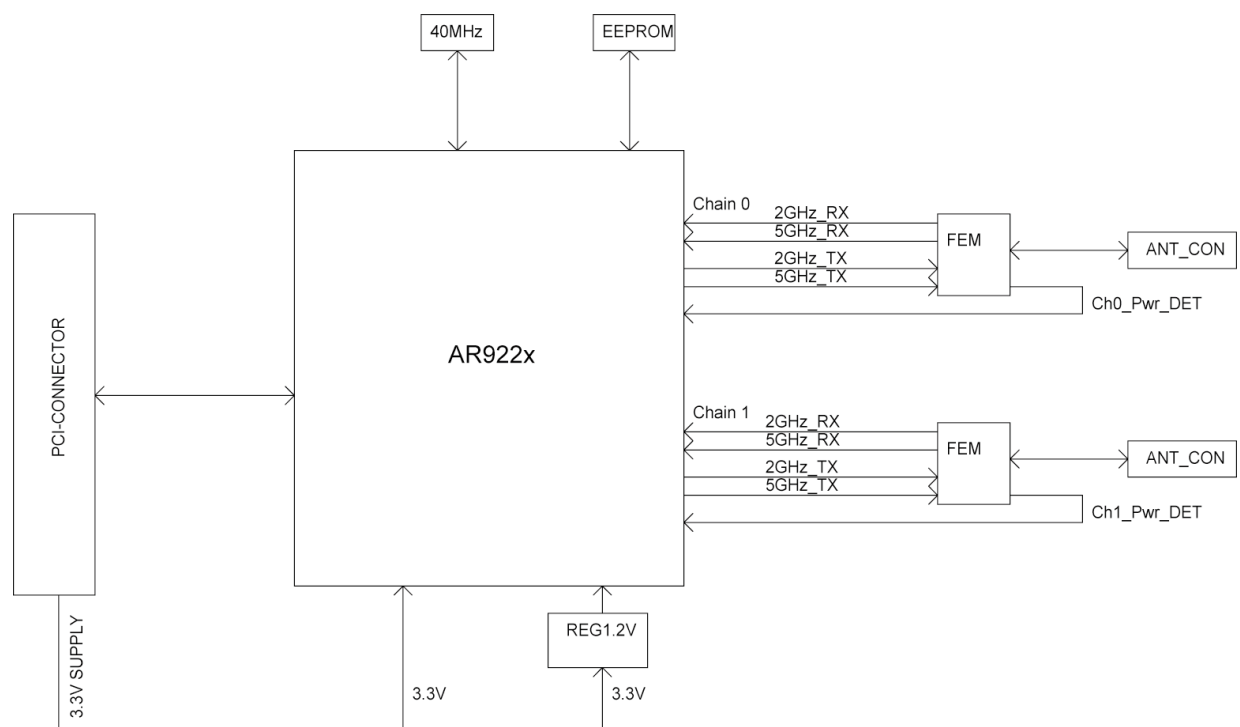
MAC/BB/RF: Atheros AR9220

2.2 Function Specification

Interface	●32-bit mini-PCI Type III A,
LEDs	NA
Antenna	●2x UFL antenna connectors, 2T2R
Input Power	●DC 3.3V $\pm$ 0.1V
Data Rate	●802.11b: 11, 5.5, 2, 1 Mbps; ●802.11g: 54, 48, 36, 24, 18, 12, 9, 6 Mbps ●802.11a: 54, 48, 36, 24, 18, 12, 9, 6 Mbps ●802.11n: Up to 300Mbps

Operating Frequency	●2.412GHz~ 2.472GHz ISM Band (Subject to Local Regulations) ●5.18GHz ~ 5.825GHz(Subject to Local Regulations)		
Transmit Output Power (Tolerance: ± 1.5 dBm)	802.11b: 16dBm	802.11g: 17dBm	802.11gn: 2.4G: 18dBm (HT20)@2Tx 16dBm (HT40)@2Tx
		802.11a: 15dBm	802.11an: 5G: 13dBm (HT20)@2Tx 11dBm (HT40)@2Tx
Receive Sensitivity (Tolerance: ± 2 dBm)	802.11b: 8%PER ●-91dBm @11Mbps	802.11g: 10% PER ●-77dBm @54Mbps	802.11gn: 2.4GHz 10%PER ●-74dBm@MCS7,HT20 ●-73dBm@MCS7,HT40
		802.11a: 10% PER ●-76dBm @54Mbps	802.11an: 5GHz 10%PER ●-73dBm@MCS7,HT20 ●-69dBm@MCS7,HT40
Power consumption	Tx Mode:(Continue) 800 mA $\pm$ 100mA	Rx Mode : (Continue) 300mA $\pm$ 50mA	Standby Mode: TBD
Security	WEP, WPA, WPA2		
Driver	Linux2.6 above		

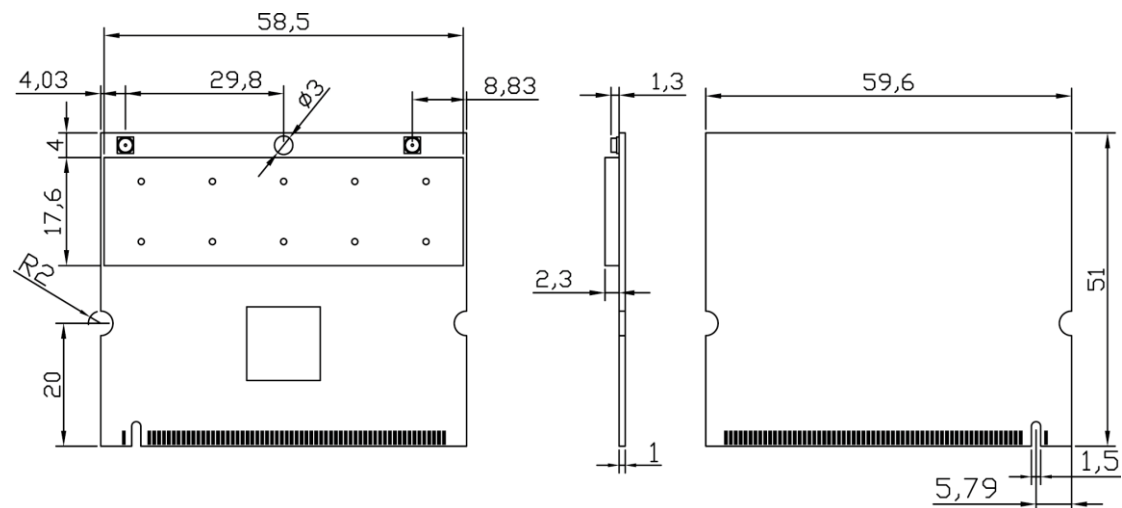
2.3 Block Diagram



2.4 Mechanical Drawing

Dimension: 58.5x51x3.3mm ($\pm 0.15\text{mm}$)

Weight: 10g



2.5 Transmit Power & Receive Sensitivity

	Data rate	Tx Output Power (±1.5dBm)	Receive Sensitivity (±2dBm)
802.11n, 2.4GHz HT20	MCS0	20dBm	-92dBm
	MCS1	20dBm	-91dBm
	MCS2	20dBm	-89dBm
	MCS3	20dBm	-85dBm
	MCS4	20dBm	-82dBm
	MCS5	20dBm	-80dBm
	MCS6	19dBm	-78dBm
	MCS7	18dBm	-74dBm
802.11n, 2.4GHz HT40, @2Tx	MCS0	20dBm	-91dBm
	MCS1	20dBm	-88dBm
	MCS2	20dBm	-87dBm
	MCS3	20dBm	-84dBm
	MCS4	19dBm	-81dBm
	MCS5	18dBm	-78dBm
	MCS6	17dBm	-77dBm
	MCS7	16dBm	-73dBm
802.11n, 5GHz HT20, @2Tx	MCS0	19dBm	-91dBm
	MCS1	19dBm	-89dBm
	MCS2	19dBm	-87dBm
	MCS3	19dBm	-83dBm
	MCS4	18dBm	-80dBm
	MCS5	18dBm	-76dBm
	MCS6	17dBm	-75dBm
	MCS7	13dBm	-73dBm
802.11n, 5GHz HT40, @2Tx	MCS0	18dBm	-88dBm
	MCS1	18dBm	-86dBm
	MCS2	18dBm	-84dBm
	MCS3	18dBm	-81dBm
	MCS4	17dBm	-78dBm
	MCS5	17dBm	-73dBm
	MCS6	15dBm	-72dBm
	MCS7	11dBm	-69dBm
802.11a, 5GHz	6Mbps	17dBm	-91dBm
	9Mbps	17dBm	-91dBm
	12Mbps	17dBm	-90dBm
	18Mbps	17dBm	-88dBm
	24Mbps	17dBm	-84dBm
	36Mbps	17dBm	-81dBm
	48Mbps	15dBm	-77dBm
	54Mbps	15dBm	-76dBm
802.11g, 2.4GHz	6Mbps	20dBm	-93dBm
	9Mbps	20dBm	-92dBm
	12Mbps	20dBm	-91dBm
	18Mbps	20dBm	-89dBm
	24Mbps	20dBm	-87dBm
	36Mbps	20dBm	-83dBm
	48Mbps	19dBm	-79dBm
	54Mbps	17dBm	-77dBm
802.11b, 2.4GHz	1 ~ 11Mbps	16 ~ 18dBm	

3. EEPROM Information

Reg Domain	ETSI1_WORLD
Reg Domain Code	0x37
Device ID	TBD
Vendor ID	TBD

4. Environmental

4.1 Operation

Operating Temperature: 0 ~ +60°C

Relative Humidity: 15% ~ 95% (non-condensing)

4.2 Storage

Temperature: -20 ~ +80 C

4.3 Operation power

DC 3.3V $\pm$ 0.1V

Federal Communication Commission Interference Statement

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 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 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.

IMPORTANT NOTE:

Radiation Exposure Statement:

The product comply with the US portable RF exposure limit set forth for an uncontrolled environment and are safe for intended operation as described in this manual. The further RF exposure reduction can be achieved if the product can be kept as far as possible from the user body or set the device to lower output power if such function is available.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Country Code selection feature to be disabled for products marketed to the US/CANADA

(When the device is indoor use, below sentence add)

Operation of this device is restricted to indoor use only

This device is intended only for OEM integrators under the following conditions:

- 1) The transmitter module may not be co-located with any other transmitter or antenna,
- 2) 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.

As long as 2 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

IMPORTANT NOTE

In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID can not 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: **CM6-WMIA198N**".

Manual Information to the End User

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.