WMX6218

Wi-Fi 5 802.11ac 2x2 dual-band Mini PCIe Module

Product Datasheet

Version: 0.1.0

2021/8/19

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Release Note

Version	Date	Description	Editor
v0.1.0	2021/8/19	Initial draft	Eddie Lin

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Contents

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1 Overview

WMX6218 is a highly integrated Dual-band WLAN + bluetooth5.0 2T2R MINI PCIE module designed base on Realtek RTL8822CE chipset. This module supports IEEE 802.11a/b/g/n/ac standard and provides the maximum PHY data rate up to 867Mbps, and supports 802.11ac MU-MIMO and 802.11n MIMO for 2.4/5G band, it can offer feature-rich wireless connectivity and reliable throughput from an extended distance. WMX6218 is designed by MINI PCIE form factor, the interface complies with PCI Express Base Specification Revision 2.1, and USB2.0 FS-mode for Bluetooth.

2 Feature

2.1 WLAN

- Compliant with IEEE 802.11a/b/g/n/ac
- Supports 2x2 Multi-User Multiple-Input Multiple-Output (MU-MIMO)
- Dual-band 2.4 GHz/5 GHz support
- 20 MHz/40 MHz channel bandwidth for 2.4 GHz
- 20 MHz/40 MHz/80 MHz channel bandwidth for 5 GHz
- Seamless antenna sharing with Bluetooth
- IEEE 802.11e QoS Enhancement (WMM)
- IEEE 802.11i (WPA, WPA2, WPA3). Open, shared key, and pair-wise key authentication services
- IEEE 802.11h DFS, TPC, Spectrum Measurement
- IEEE 802.11k Radio Resource Measurement
- WAPI (Wireless Authentication Privacy Infrastructure)

2.2 Bluetooth

- Bluetooth V5.0, V4.2, V4.1, V4.0, V3.0, V2.1+EDR
- Integrated MCU to execute Bluetooth protocol stack
- Supports all packet types in basic rate and enhanced data rate
- Enhanced BT/WIFI Coexistence Control to improve transmission quality in different profiles
- Dual Mode support: Simultaneous LE and BR/EDR

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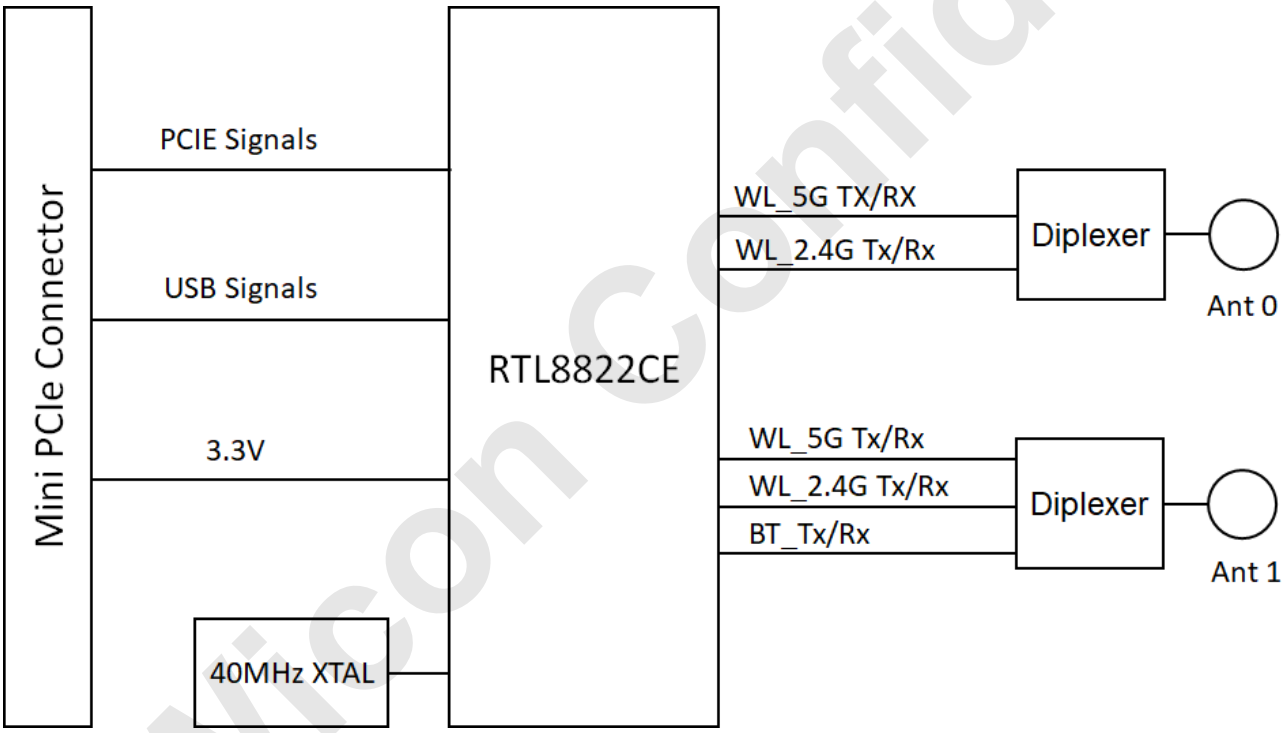
2.3 Security

- WEP, Shared key support
- WPA/WPA2 PSK
- WPA3-SAE (Personal)
- AES/TKIP hardware encryption
- WAPI-2 hardware encryption

3 System Specification

3.1 Block Diagram



3.2 Chip Solution

- Realtek RTL8822CE

3.3 Protocol & Interface

- PCIe 2.1 interface for WLAN
- USB 2.0 interface for Bluetooth
- Antenna Port: U.FL/MHF1 compatible connector x2 for 2T2R

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3.4 Temperature

- Operating Temperature: -40°C to +85°C
- Storage Temperature: -40°C to +135°C

3.5 Humidity

- Operating Humidity (non-condensing): 5% ~ 95%
- Storage Humidity (non-condensing): 5% ~ 90%

4 WLAN Specification

4.1 WLAN Standard

- IEEE 802.11a/b/g/n/ac

4.2 Band Width

- 20 MHz/40 MHz channel bandwidth for 2.4 GHz
- 20 MHz/40 MHz/80 MHz channel bandwidth for 5 GHz

4.3 Data Rate

- 2.4GHz
  802.11n HT40 2SS: 300Mbps
- 5GHz
  802.11n HT40 2SS:300Mbps
  802.11ac VHT160 2SS: 866.7Mbps

4.4 Modulation

- 802.11n:
  OFDM (BPSK, QPSK, 16-QAM, 64-QAM)
- 802.11ac:
  OFDM (BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM)

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4.5 Features

Category	Description
Basic HT/VHT (802.11 a/b/g/n/ac) Support	2.4/5 GHz STA Mode Soft AP/Hotspot Mode 20/40/80 MHz Channel Width
Encryption/Decryption	WEP TKIP AES
Security Modes	Open / Shared Key WPA-PSK/WPA2-PSK WPA3-SAE (Personal)
Feature Set	P2P WiFi-Direct

4.6 Output Power & Sensitivity

2.4GHz

2.4GHz 802.11n				
Data Rate		Tx ± 2dB	Tx ± 2dB(2TX)	Rx Sensitivity ± 2dB
HT20	MCS 0	16dBm	19dBm	-92dBm
	MCS 7	16dBm	19dBm	-73dBm
HT40	MCS 0	16dBm	19dBm	-90dBm
	MCS 7	16dBm	19dBm	-70dBm

5GHz

5GHz 802.11an/ac				
Data Rate		Tx ± 2dB	Tx ± 2dB(4TX)	Rx Sensitivity ± 2dB
HT20	MCS 0	16dBm	19dBm	-91dBm
	MCS 7	16dBm	19dBm	-70dBm
HT40	MCS 0	16dBm	19dBm	-88dBm
	MCS 7	16dBm	19dBm	-68dBm
VHT80	MCS 0	14dBm	16dBm	-85dBm
	MCS 9	14dBm	16dBm	-60dBm

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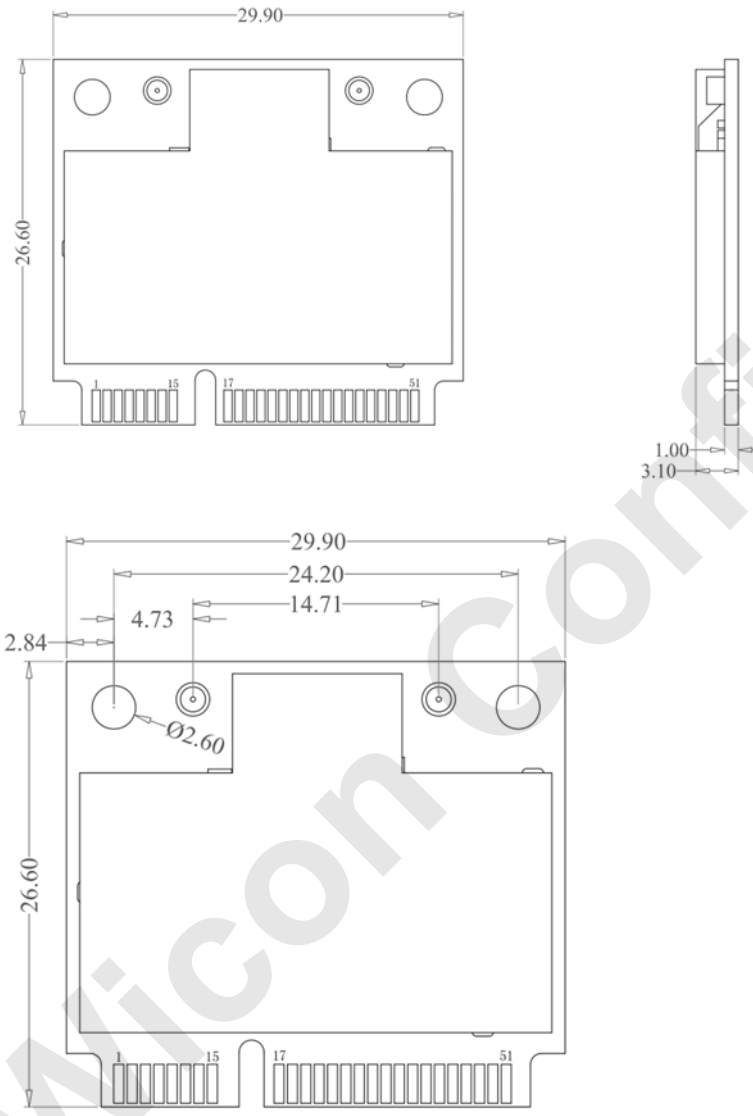
5 Mechanical Specification

5.1 Mechanical Outline Drawing



General tolerance: ±0.2mm

5.2 Dimension

- Mini PCIe half-size
- Typical Dimension: (W)29.9mm x (L)26.6mm x (H)3.1mm

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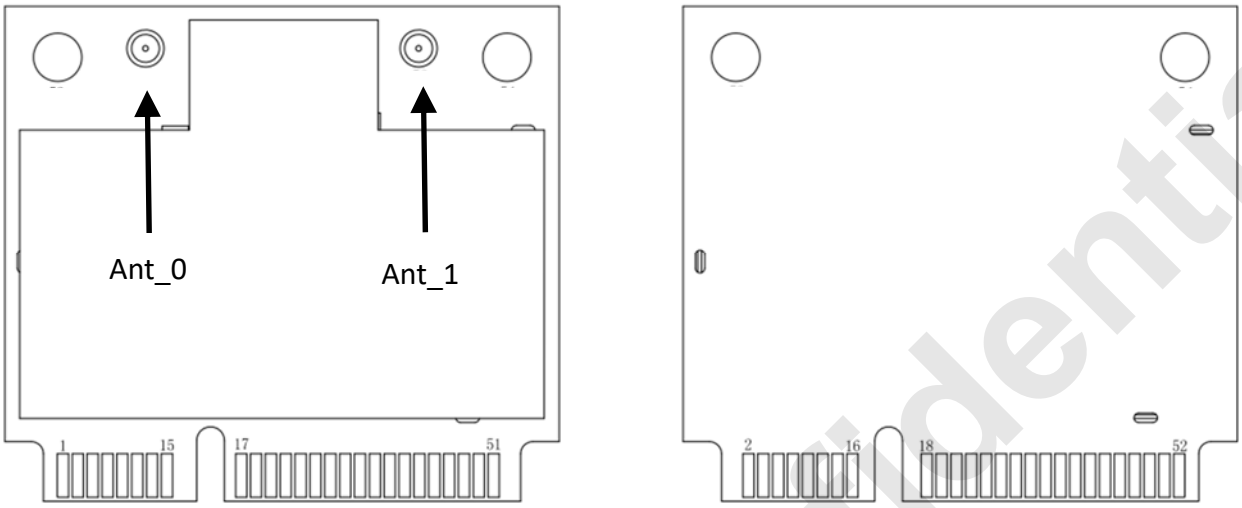
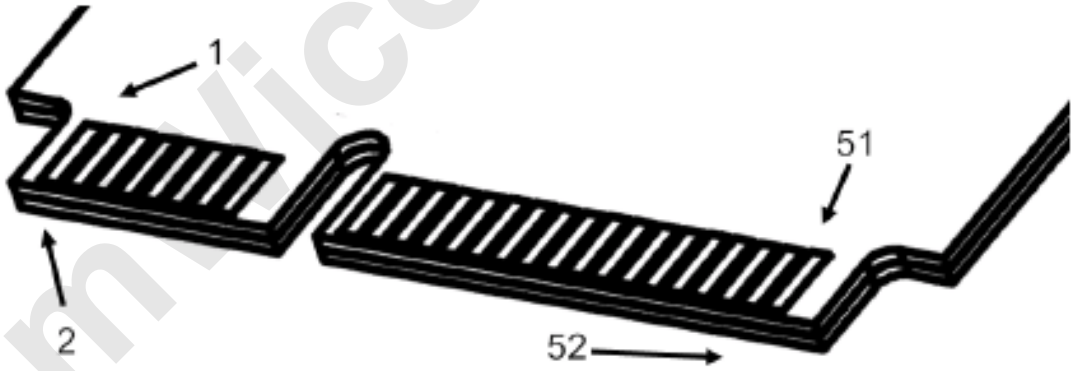
5.3 Connector



Pin Name	Description
Ant_0	RF Antenna for WiFi 2.4GHz/5GHz
Ant_1	RF Antenna for WiFi 2.4GHz/5GHz and Bluetooth

5.4 Pin Assignment



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PIN #	Pin Name	Design Status	PIN #	Pin Name	Design Status
1	WAKE#	WL_PCIE_WAKE	2	+3.3Vaux	3V3
3	COEX1	NC	4	GND	GND
5	COEX2	NC	6	+1.5V	NC
7	CLKREQ#	WL_PCIE_CLKREQ	8	UIM_PWR	NC
9	GND	GND	10	UIM_DATA	NC
11	REFCLK-	WL_PCIE_REFCLKN	12	UIM_CLK	NC
13	REFCLK+	WL_PCIE_REFCLKP	14	UIM_RESET	NC
15	GND	GND	16	UIM_VPP	NC
17	Reserved	NC	18	GND	GND
19	Reserved	NC	20	W_DISABLE#	WL_DISABLE
21	GND	GND	22	PERST#	WL_PCIE_RST
23	PERn0	WL_PCIE_RXN	24	+3.3Vaux	NC
25	PERp0	WL_PCIE_RXP	26	GND	GND
27	GND	GND	28	+1.5V	NC
29	GND	GND	30	SMB_CLK	NC
31	PETn0	WL_PCIE_TXN	32	SMB_DATA	NC
33	PETp0	WL_PCIE_TXP	34	GND	GND
35	GND	GND	36	USB_D-	BT_USB_DM
37	Reserved	GND	38	USB_D+	BT_USB_DP
39	+3.3Vaux	BT_DISABLE	40	GND	GND
41	+3.3Vaux	SUSCLK	42	LED_WWAN	NC
43	GND	GND	44	LED_WLAN	WL_LED
45	RESERVED	NC	46	LED_WPAN	BT_LED
47	RESERVED	NC	48	+1.5V	NC
49	RESERVED	NC	50	GND	GND
51	RESERVED	NC	52	+3.3Vaux	3V3

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Pin Define

Design Name	I/O	Description
WL_PCIE_RST	I	Input signal for functional reset to the card
WL_PCIE_WAKE	O	This signal is used to request the system from a sleep / suspended state to service a function-initiated wake event
WL_PCIE_CLKREQ	O	Output for reference clock request signal
WL_PCIE_REFCLKP	I	Input signal for PCIe differential reference clock (100MHz)
WL_PCIE_REFCLKN	I	
WL_PCIE_RXP	I	PCIe x1 differential receive pair
WL_PCIE_RXN	I	
WL_PCIE_TXP	O	PCIe x1 differential transmit pair
WL_PCIE_TXN	O	
SUSCLK	I	32.768KHz clock supply input that is provided by PCH to reduce power and cost for the module.
BT_USB_DP	I/O	USB Transmitter/Receiver Differential Pair for BT
BT_USB_DM	I/O	
BT_DISABLE	I	Reserved for definition with future revisions of this specification.
WL_DISABLE	I	Input and active low signal. This signal is used by the system to disable radio operation. When implemented, this signal requires a pull-up resistor on the card
BT_LED	O	Bluetooth LED
WL_LED	O	WLAN LED

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5.5 Product Picture

5.6 Label Define

6 Electrical characteristics

6.1 Power Consumption

- Max power consumption 3W(25°C)

6.2 Operating Voltage

- 3.3V

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7 Software & Driver

7.1 Driver Support

- Windows:
  Windows 10 (32bit/64bit)
- Linux:
  Kernel 2.6.24 ~ 5.4
- Android
  4.4, 6.x, 7.0, 8.0, 9.x and 10.x

7.2 Platform Support List

- x86
- ARM
- MIPS

7.3 RF Tool

- RF test tool consultant service available

8 Certification

TBD

9 Package

TBD

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10 Ordering Information

10.1 Main Parts

Part Number	Description
WMX6218	WiFi 5 802.11ac 2x2 dual-band Mini PCIe Module

10.2 Accessories

Part Number	Description
ATD6251	Dipole 2dBi Antenna 2.4GHz/5GHz
AC12001	Cable U.FL/MHF1 to SMA, 200mm

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