WMX7402-3

WiFi 6 802.11ax 3x3 MU-MIMO
5GHz Single Band Module

Product Datasheet

Version: 0.2.4

2021/05/28

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Release Note

Version	Date	Description	Editor
v0.1.0	2020/10/20	Initial draft	Eddie Lin
v0.2.0	2021/4/23	Add Output Power & Sensitivity	Eddie Lin
v0.2.1	2021/5/10	Add Pin Define	Eddie Lin
v0.2.2	2021/5/14	Modified Electrical characteristics	Eddie Lin
v0.2.3	2021/5/21	Add RF Tool & Platform support	Eddie Lin
v0.2.4	2021/5/28	Modified part number	C.C.

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1 Overview

The WMX7402-3 enterprise module is a highly integrated wireless local area network (WLAN) mini PCIe module, the module based-on Qualcomm QCN9074 and that is an 802.11ax Wi-Fi 6 PCIe radio for Enterprise Access Points and Campus deployments.

2 Feature

2.1 General

- 5 GHz full band support
- 3x3/160 MHz 11ax PCIe Radio

2.2 WLAN

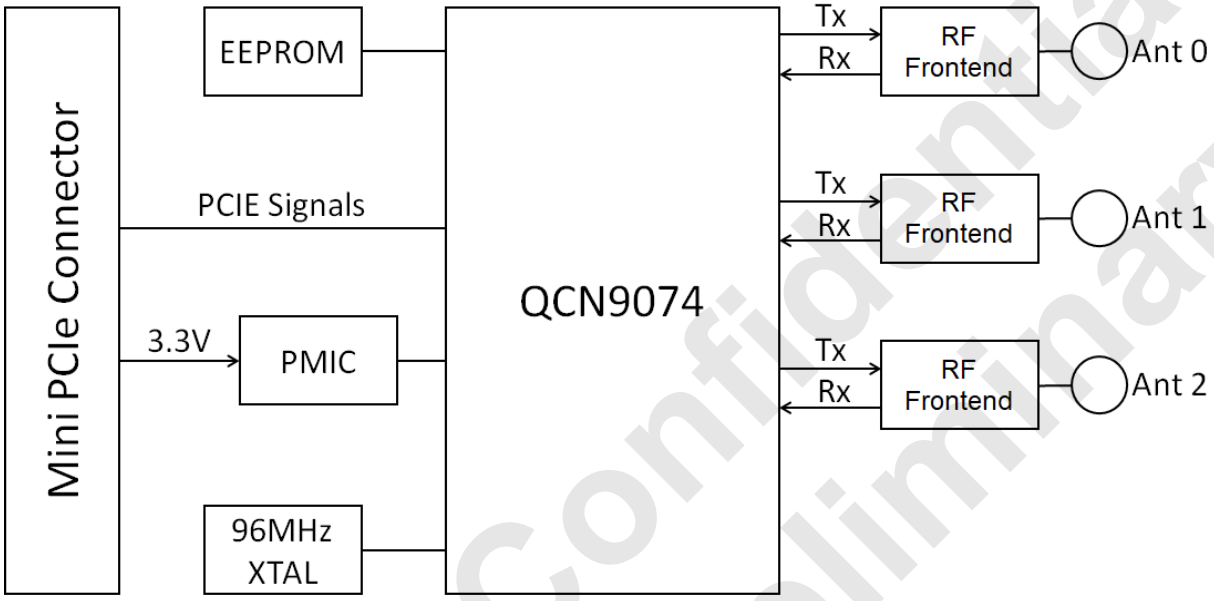
- Dual-synthesizer WLAN radio up to 160MHz bandwidth support
- Supports up to 512 simultaneously connected clients
- MU-MIMO for 802.11ac/ax and MU-OFDMA for 802.11ax
- Dynamic frequency selection (DFS)
- Supports up to 4096 QAM in all antenna and BW configurations, except for 3x3/160 that supports 1024 QAM
- Spatial reuse through BSS color, OBSS-PD, SRG and SRP
- Dynamic bandwidth switching
- Locationing (RSSI and RTT-based, 802.11REVmc compliant)
- Supports monitor mode

2.3 Security

- AES-CCMP at 128/256 bits
- AES-GCMP at 128/256 bits
- WEP, TKIP hardware encryption
- WAPI-2 hardware encryption
- WPA/WPA2-Personal/WPA2-Enterprise and WPA3 Personal
- FIPS ECB

3 System Specification

3.1 Block Diagram



3.2 Chip Solution

- Qualcomm QCN9074

3.3 Protocol & Interface

- PCIe Gen 3 interface for mini PCIe
- Antenna Port: U.FL connector x3 for 3T3R

3.4 Temperature

- Operating Temperature: -20°C to +70°C (TBD)
- Operating Temperature: -40°C to +85°C (I-Grade, TBD)
- 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/ax
- IEEE 802.11d, h, i, j, k, r, u, v, w and x

4.2 Frequency Range

- Support full 5GHz frequency range: 4900MHz - 5925MHz

4.3 Band Width

- Supports 5/10 MHz in 4.9 GHz (Public Safety band)
- Supports 20/40/80/160 MHz in 5 GHz

4.4 Data Rate

- 5 GHz bands, the maximum PHY rate of 3603 Mbps is achieved in 802.11ax 3x3/160 MHz native operation.
- Maximum data rates of band-width
  20MHz: 143Mbps for 1x1, 429Mbps for 3x3
  40MHz: 287Mbps for 1x1, 861Mbps for 3x3
  80MHz: 600Mbps for 1x1, 1800Mbps for 3x3
  160MHz: 1201Mbpx for 1x1, 3603Mbps for 3x3

4.5 Modulation

- 802.11n:
  OFDM (BPSK, QPSK, 16-QAM, 64-QAM)
- 802.11ac:
  OFDM (BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM)
- 802.11ax:
  OFDM (BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM)

4.6 Output Power & Sensitivity (TBD)

802.11a			
Data Rate	**Tx ± 2dB**	**Tx ± 2dB(3TX)**	**Rx Sensitivity ± 2dB**
6Mbps	19dBm	24dBm	-94dBm
24Mbps	18dBm	23dBm	-91dBm
54Mbps	18dBm	23dBm	-90dBm

802.11ac				
Data Rate		**Tx ± 2dB**	**Tx ± 2dB(3TX)**	**Rx Sensitivity ± 2dB**
VHT20	MCS 0	18dBm	23dBm	-94dBm
	MCS 1	18dBm	23dBm	-91dBm
	MCS 2	18dBm	23dBm	-90dBm
	MCS 3	18dBm	23dBm	-86dBm
	MCS 4	18dBm	23dBm	-83dBm
	MCS 5	16dBm	21dBm	-80dBm
	MCS 6	16dBm	21dBm	-77dBm
	MCS 7	15dBm	20dBm	-75dBm
	MCS 8	14dBm	19dBm	-71dBm
VHT40	MCS 0	18dBm	23dBm	-91dBm
	MCS 1	18dBm	23dBm	-88dBm
	MCS 2	18dBm	23dBm	-85dBm
	MCS 3	18dBm	23dBm	-82dBm
	MCS 4	18dBm	23dBm	-79dBm
	MCS 5	16dBm	21dBm	-75dBm
	MCS 6	16dBm	21dBm	-73dBm
	MCS 7	15dBm	20dBm	-72dBm
	MCS 8	14dBm	19dBm	-69dBm
	MCS 9	13dBm	18dBm	-66dBm

VHT80	MCS 0	18dBm	23dBm	-91dBm
	MCS 1	18dBm	23dBm	-88dBm
	MCS 2	18dBm	23dBm	-85dBm
	MCS 3	18dBm	23dBm	-82dBm
	MCS 4	18dBm	23dBm	-79dBm
	MCS 5	16dBm	21dBm	-75dBm
	MCS 6	16dBm	21dBm	-73dBm
	MCS 7	15dBm	20dBm	-72dBm
	MCS 8	14dBm	19dBm	-69dBm
	MCS 9	13dBm	18dBm	-66dBm
VHT160	MCS 0	18dBm	23dBm	-91dBm
	MCS 1	18dBm	23dBm	-88dBm
	MCS 2	18dBm	23dBm	-85dBm
	MCS 3	18dBm	23dBm	-82dBm
	MCS 4	18dBm	23dBm	-79dBm
	MCS 5	16dBm	21dBm	-75dBm
	MCS 6	16dBm	21dBm	-73dBm
	MCS 7	15dBm	20dBm	-72dBm
	MCS 8	14dBm	19dBm	-69dBm
	MCS 9	13dBm	18dBm	-66dBm

802.11ax				
Data Rate		**Tx ± 2dB**	**Tx ± 2dB(3TX)**	**Rx Sensitivity ± 2dB**
HE20	MCS 0	18dBm	23dBm	-94dBm
	MCS 1	18dBm	23dBm	-91dBm
	MCS 2	18dBm	23dBm	-90dBm
	MCS 3	18dBm	23dBm	-86dBm
	MCS 4	18dBm	23dBm	-83dBm
	MCS 5	16dBm	21dBm	-80dBm
	MCS 6	16dBm	21dBm	-77dBm
	MCS 7	15dBm	20dBm	-75dBm
	MCS 8	14dBm	19dBm	-71dBm
	MCS 9	13dBm	18dBm	-71dBm
	MCS 10	13dBm	18dBm	-71dBm
	MCS 11	11dBm	16dBm	-71dBm

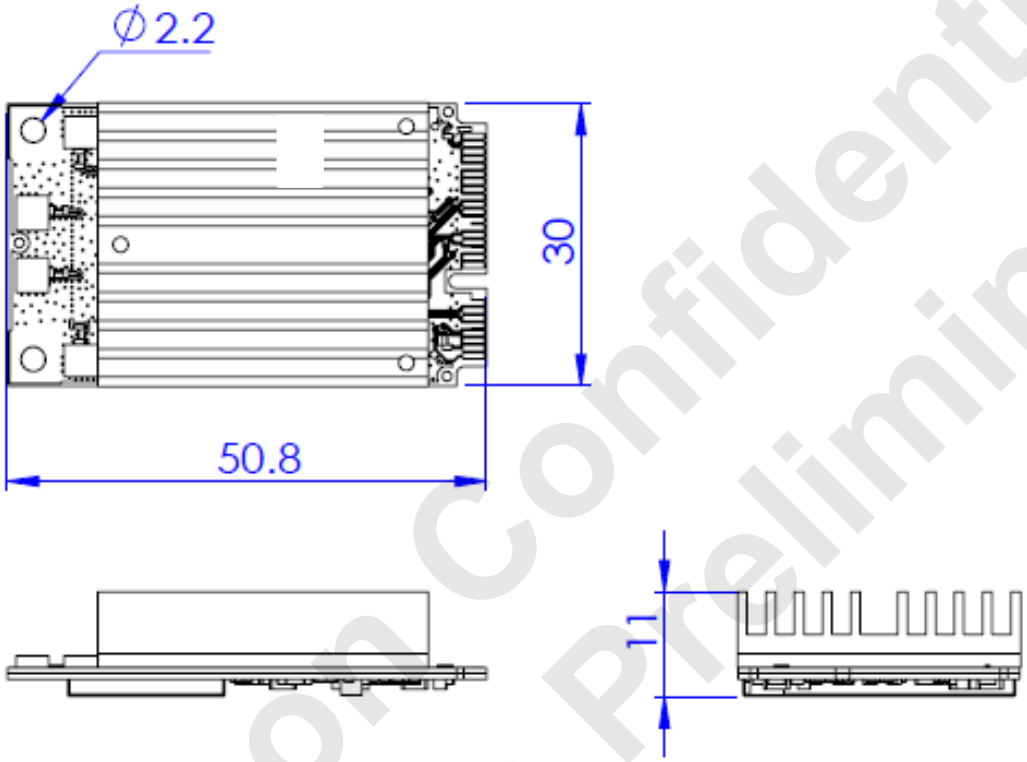
HE40	MCS 0	18dBm	23dBm	-91dBm
	MCS 1	18dBm	23dBm	-88dBm
	MCS 2	18dBm	23dBm	-85dBm
	MCS 3	18dBm	23dBm	-82dBm
	MCS 4	18dBm	23dBm	-79dBm
	MCS 5	16dBm	21dBm	-75dBm
	MCS 6	16dBm	21dBm	-73dBm
	MCS 7	15dBm	20dBm	-72dBm
	MCS 8	14dBm	19dBm	-69dBm
	MCS 9	13dBm	18dBm	-66dBm
	MCS 10	13dBm	18dBm	-66dBm
	MCS 11	11dBm	16dBm	-66dBm
	MCS 12	10dBm	15dBm	-66dBm
	MCS 13	10dBm	15dBm	-66dBm
HE80	MCS 0	18dBm	23dBm	-91dBm
	MCS 1	18dBm	23dBm	-88dBm
	MCS 2	18dBm	23dBm	-85dBm
	MCS 3	18dBm	23dBm	-82dBm
	MCS 4	18dBm	23dBm	-79dBm
	MCS 5	16dBm	21dBm	-75dBm
	MCS 6	16dBm	21dBm	-73dBm
	MCS 7	15dBm	20dBm	-72dBm
	MCS 8	14dBm	19dBm	-69dBm
	MCS 9	13dBm	18dBm	-66dBm
	MCS 10	13dBm	18dBm	-66dBm
	MCS 11	11dBm	16dBm	-66dBm
	MCS 12	10dBm	15dBm	-66dBm
	MCS 13	10dBm	15dBm	-66dBm

HE160	MCS 0	18dBm	23dBm	-91dBm
	MCS 1	18dBm	23dBm	-88dBm
	MCS 2	18dBm	23dBm	-85dBm
	MCS 3	18dBm	23dBm	-82dBm
	MCS 4	18dBm	23dBm	-79dBm
	MCS 5	16dBm	21dBm	-75dBm
	MCS 6	16dBm	21dBm	-73dBm
	MCS 7	15dBm	20dBm	-72dBm
	MCS 8	14dBm	19dBm	-69dBm
	MCS 9	13dBm	18dBm	-66dBm
	MCS 10	13dBm	18dBm	-66dBm
	MCS 11	11dBm	16dBm	-66dBm
	MCS 12	10dBm	15dBm	-66dBm
	MCS 13	10dBm	15dBm	-66dBm

5 Mechanical Specification

5.1 Mechanical Outline Drawing

TBD

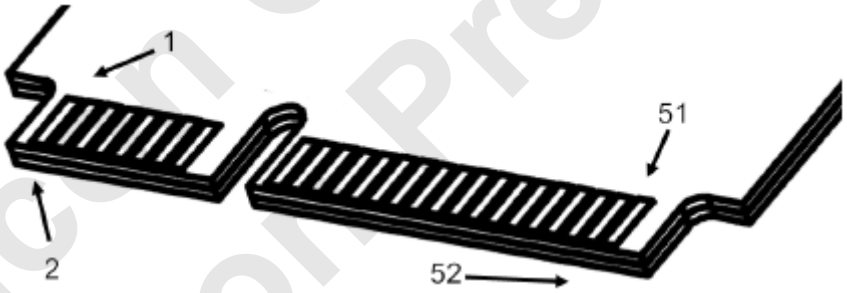


General tolerance: ±0.2mm

5.2 Dimension

- Mini PCIe full size
- Typical Dimension: (W)30.0mm x (L)50.8mm x (H)11.0mm (TBD)

5.3 Pin Assignment



PIN#	Pin Name	Design Status	PIN#	Pin Name	Design Status
1	WAKE#	WAKE	2	+3.3Vaux	VDDC33
3	COEX1	CHP_PWD	4	GND	GND
4	COEX2	NC	6	NC	NC
7	CLKREQ#	VLKREQ	8	NC	NC
9	GND	GND	10	NC	NC
11	REFCLK-	REFCLK-	12	NC	NC
13	REFCLK+	REFCLK+	14	NC	NC
15	GND	GND	16	NC	NC

17	Reserved	NC	18	GND	GND
19	Reserved	NC	20	W_DISABLE#	WLAN_DISABLE
21	GND	GND	22	PERST#	RESET
23	PERn0	PERn0	24	+3.3Vaux	VDD33
25	PERp0	PERp0	26	GND	GND
27	GND	GND	28	+1.5V	NC
29	GND	GND	30	SMB_CLK	NC
31	PETn0	PETn0	32	SMB_DATA	NC
33	PETp0	PETp0	34	GND	GND
35	GND	GND	36	USB_D-	NC
37	GND	NC	38	USB_D+	NC
39	+3.3Vaux	VDD33	40	GND	GND
41	+3.3Vaux	VDD33	42	LED_WWAN	NC
43	GND	GND	44	LED_WLAN	WLAN_LED
45	RESERVED	NC	46	LED_WPAN	NC
47	RESERVED	NC	48	+1.5V	NC
49	RESERVED	NC	50	GND	GND
51	RESERVED	NC	52	+3.3Vaux	VDD33

5.4 Product Picture

TBD

5.5 Label Define

TBD

6 Electrical characteristics

6.1 Power Consumption

- Max power consumption 9W (25°C) (TBD)

6.2 Operating Voltage

- Mini PCIe 3.3V

7 Software & Driver

7.1 Driver Support

- Qualcomm platform with QSDK
- Open driver ATH11K

7.2 Platform Support List

- IPQ8074 (Verified)
- (TBD)

7.3 RF Tool

- RF test tool consultant service available

8 Certification

TBD

9 Package

TBD

10 Ordering Information

10.1 Main Parts

Part Number	Description
WMX7402-3	802.11ax, 3x3, 5G, Enterprise WiFi Module, QCN9074-0
WMX7402-3I	802.11ax, 3x3, 5G, Enterprise WiFi Module, I-Grade, QCN9074-1 (TBD)
WMX7402-3H	802.11ax, 3x3, 5G, Standard WiFi Module, QCN9024-0 (Planning)

10.2 Accessories (TBD)

Part Number	Description
ATD6251	Dipole Antenna 2dBi 2.4GHz/5GHz
ATD6351	Dipole Antenna 3dBi 2.4GHz/5GHz
ATD6551	Dipole Antenna 5dBi 2.4GHz/5GHz

AC11501	Cable IPEX to SMA, 150mm