



WLT206H

Wi-Fi 6E (802.11ax) Tri-Band Wireless Module

Hardware User Guide

Wi-Fi 6E / 802.11ax 2.4GHz + 5GHz + 6GHz Tri-Band	QCA2062 / 2066 Qualcomm Atheros 'Verona' Series	M.2 E Key Interface PCIe 3.0 Compatible	2×2 MU-MIMO Up to 2402 Mbps (6GHz)
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1. Introduction

Thank you for choosing the Compex WLT206H. This document provides complete hardware integration guidance for engineers and system developers deploying the WLT206H Wi-Fi 6E and Bluetooth wireless module in embedded, industrial, and networking platforms.

The WLT206H is a tri-band (2.4GHz/5GHz/6GHz) Wi-Fi 6E (802.11ax) wireless module with integrated Bluetooth 5.1, based on the Qualcomm Atheros QCA2062/2066 'Verona' series chipset. Built on the VER02.1 reference design, the module delivers 2×2 MU-MIMO WLAN operation plus Bluetooth connectivity through a standard M.2 E Key (PCIe 3.0) host interface, with Bluetooth carried over a USB1.1 host interface.

Key Highlights

- Qualcomm Atheros QCA2062/2066 'Verona' series chipset.
- Tri-band 2.4GHz/5GHz/6GHz Wi-Fi 6E (802.11ax) operation, 2×2 MU-MIMO with OFDMA.
- 2 spatial streams (4SS).
- Enables seamless integration of WLAN/Bluetooth and low energy technology.
- Provides a highly integrated System-on-Chip (SoC) for 802.11ax WiFi and Bluetooth (BT) Milan.
- 2.4GHz, up to 573.6 Mbps physical data rate.
- 5GHz, up to 1201 Mbps physical data rate.
- 6GHz, up to 2402 Mbps physical data rate.
- Integrated Bluetooth 5.1 + ANT+ IC (Bluetooth Milan ready) via a USB1.1 host interface; backward compatible with Bluetooth 1.2 and 2.x + EDR.
- Supports BT-WLAN coexistence and 5G/ISM coexistence.
- M.2 E Key interface with PCIe 3.0 host connectivity; Bluetooth carried over USB1.1.
- Based on the VER02.1 reference design.
- Supports up to 1024-QAM modulation (802.11ax OFDMA).
- Supports 64/128-bit WEP, WPA, WPA2, WPA3, and 802.1X security.
- Operating temperature: -20°C to 70°C. Storage: -40°C to 85°C.
- Driver support for Linux and Windows 10.

2. Package Contents

Verify the following items are included in the package before proceeding with installation:

Checklist

- 1 × WLT206H Wi-Fi 6E wireless module

⚠ Note: External antennas (MHF4 pigtail cables), host carrier board, and power supply are not included unless specified in the order. Contact sales@compex.com.sg for accessory options.

If any item is missing or damaged, contact Compex Technical Support (see Chapter 10) before proceeding.

3. Hardware Overview

The WLT206H is a radio-only Wi-Fi 6E and Bluetooth 5.1 module designed to be installed into a host platform's M.2 E Key slot. To install into a different slot type, a compatible adapter may be used. All wireless baseband and RF processing is handled onboard the module; the host platform supplies power and exchanges data over the PCIe 3.0 interface.

3.1 Module Layout

The WLT206H features the following major components and connectors:



Chipset	Qualcomm Atheros QCA2062/2066 'Verona' Series
Reference Design	VER02.1
Host Interface	M.2 E Key Interface with PCIe 3.0
RF Connectors	2× MHF4 Connectors (CH0, CH1)
Dimensions (W × H × D)	22mm × 30mm × 2.8mm

3.2 Connector Descriptions

M.2 E Key Edge Connector

- Standard M.2 E Key (PCIe 3.0) edge connector along the bottom edge of the module.
- Carries PCIe data lanes, 3.3V power input, I/O supply (1.8V or 3.3V), ground, and control signals to the host platform.
- Bluetooth is carried over a USB1.1 interface via the same M.2 E Key edge connector; no separate Bluetooth connector is required.



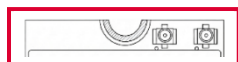
M.2 E Key Interface (for Power supply)



MHF4 RF Connectors

- 2× MHF4 Connectors (CH0, CH1) located at the top edge of the module; both support the 2.4GHz and 5GHz bands (optional 6GHz).
- CH0 carries the WLAN and Bluetooth signal path (shared antenna); CH1 carries WLAN only.
- Together, CH0 and CH1 support 2×2 MU-MIMO WLAN operation.
- Connect suitable external antennas rated for the 2.4GHz, 5GHz, and 6GHz bands in use.

MHF4 Connectors – CH1
MHF4 Connectors – CH0



3.3 Hardware Pinouts

M.2 E Key Slot Pin Assignment

Top side		Bottom side	
1	GND	2	VDD_3V3
3	NC	4	VDD_3V3
5	NC	6	WL_LED_3P3
7	GND	8	BT_PCM_CLK
9	NC	10	BT_PCM_SYNC
11	NC	12	BT_PCM_OUT
13	NC	14	BT_PCM_IN
15	NC	16	BT_LED_3P3
17	NC	18	GND
19	NC	20	UART_WAKE_HOST
21	NC	22	BT_UART_TXD
23	NC		
Mechanical key E			
17	NC	18	GND
19	NC	20	W_DISABLE_1V8
21	GND	22	PERST_3v3
23	PCIE0_RX0_N	24	VDD_3V3
25	PCIE0_RX0_P	26	GND
27	GND	28	NC
29	GND	30	NC
31	PCIE0_TX0_N	32	NC
33	PCIE0_TX0_P	34	GND
35	GND	36	NC
37	NC	38	NC
39	NC	40	GND
41	NC	42	NC
43	GND	44	NC
45	NC	46	NC
47	NC	48	NC
49	NC	50	GND
51	NC	52	VDD_3V3

4. Radio Module Specifications

4.1 Wi-Fi Capability

Wi-Fi Standards	2.4GHz: 802.11b/g/n/ax 5GHz: 802.11a/n/ac/ax 6GHz: 802.11a/n/ac/ax
Bands	Tri-Band 2.4GHz + 5GHz + 6GHz
MIMO Configuration	2×2 MU-MIMO
Max Physical Data Rate	2.4GHz: up to 573.6 Mbps 5GHz: up to 1201 Mbps 6GHz: up to 2402 Mbps
Frequency Range	2.4GHz: 2.412 ~ 2.472GHz 5GHz: 5.150 ~ 5.825GHz 6GHz: 5.925 ~ 7.125GHz (subject to local regulations)
Modulation Techniques	802.11b: DSSS (DBPSK, DQPSK, CCK) 802.11a/g: OFDM (BPSK, QPSK, 16-QAM, 64-QAM) 802.11n: OFDM (BPSK, QPSK, 16-QAM, 64-QAM) 802.11ac: OFDM (BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM) 802.11ax: OFDMA (BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM)
Channel Spectrum Widths	QCA2062: Supports 20/40MHz at 2.4GHz Supports 20/40/80MHz at 5GHz QCA2066: Supports 20/40MHz at 2.4GHz Supports 20/40/80/160MHz at 5GHz Supports 20/40/80/160/320MHz at 6GHz
TX Power	Max 16dBm per chain @ 2.4GHz, 5GHz & 6GHz
RF Connectors	2× MHF4 Connectors (CH0, CH1)
Security	64/128-bit WEP, WPA, WPA2, WPA3, 802.1X

4.2 Bluetooth Capability

Bluetooth Standard	Bluetooth 5.1 (Bluetooth Milan ready); backward compatible with Bluetooth 1.2 and 2.x + EDR
Bluetooth Data Rate	2 Mbps
Bluetooth Host Interface	USB1.1 (via the M.2 E Key edge connector)
Coexistence	Supports BT-WLAN coexistence and 5G/ISM coexistence
Shared Antenna	Bluetooth shares the CH0 MHF4 antenna port with WLAN

4.3 Notes & Recommendations

- Use external antennas rated for the 2.4GHz, 5GHz, and 6GHz bands on both MHF4 connectors to fully utilize the 2x2 MU-MIMO capability and to support 6GHz if the QCA2066 SKU is used.
- The QCA2062 SKU covers 2.4GHz+5GHz operation; the QCA2066 SKU adds 6GHz WiFi 6E support, either as 2.4GHz+5GHz or 5GHz+6GHz concurrent operation.
- Refer to the Linux or Windows 10 driver/SDK documentation supplied by Compex or Qualcomm for channel and regulatory domain configuration.
- Actual throughput will vary depending on host platform, driver configuration, channel width, and RF environment.

5. Mechanical Specifications

5.1 Module Dimensions

Dimensions (W × H × D)	22mm × 30mm × 2.8mm
Form Factor	Standard M.2 E Key, no heatsink

5.2 Environmental Ratings

Operating Temperature	-20°C to 70°C
Storage Temperature	-40°C to 85°C
Operating Humidity	5% to 95%, Non-Condensing
Storage Humidity	5% to 90%

5.3 Mounting & Installation Notes

- Secure with the mounting screw at the designated mounting hole, if provided by the host chassis.
- Ensure adequate airflow around the module for sustained high-throughput operation.
- Confirm ambient temperature remains within the -20°C to 70°C operating range for reliable operation.

6. Power Specifications

6.1 Power Requirements

Operating Voltage	3.3V DC + I/O supply of 1.8V or 3.3V
Power Consumption	6W (Max)
Power Source	3.3V supplied via the M.2 E Key card slot (mandatory; VDD_3V3 pins 2, 4, 72, 74)

6.2 Power Delivery Protection

- The host platform's M.2 E Key card slot must provide regulated 3.3V power and I/O supply (1.8V or 3.3V) with short-circuit/overcurrent protection.
- Ensure the host power rail can supply the module's peak 6W power consumption without voltage droop.

6.3 Notes & Recommendations

- Use a host platform with a stable, well-regulated 3.3V M.2 E Key power rail and I/O supply.
- Avoid hot-plugging the module; always power down the host before installation or removal.
- For high-duty-cycle or industrial deployments, verify thermal dissipation is adequate at sustained 6W operation.
- The I/O supply voltage (1.8V or 3.3V) must match the host platform's logic level; confirm compatibility before installation.

7. Installation & Integration

7.1 Pre-Installation Checklist

- Power off and disconnect the host platform before installation.
- Verify the host platform provides a M.2 E Key slot compatible with PCIe 3.0.
- Prepare two external antennas rated for the 2.4GHz, 5GHz, and 6GHz bands (to cover 6GHz operation if using the QCA2066 SKU) with MHF4 connectors or pigtail adapters.

7.2 Module Installation

- Align the WLT206H module's gold-finger edge connector with the host M.2 E Key slot.
- Insert at a slight angle (typically 15–20°) and press down firmly until fully seated.
- Rotate the module flat and secure with the mounting screw if provided by the host chassis.

7.3 Power Connection

- 3.3V power and I/O supply are provided automatically through the M.2 E Key edge connector; no separate power cable is required.
- Confirm the host platform's M.2 E Key slot delivers a stable 3.3V supply and correct I/O voltage before powering on.

7.4 Antenna Connection

- Connect external antennas to the CH0 and CH1 MHF4 connectors.
- Ensure antenna cables are routed without sharp bends to avoid signal loss or connector damage.

8. Troubleshooting

Module Not Detected	•Verify the module is fully seated in the M.2 E Key slot and the retaining screw (if present) is secured. •Confirm the host platform's M.2 E Key slot supports PCIe 3.0 and provides 3.3V power and the correct I/O voltage. •Check that the appropriate Linux or Windows 10 driver package is installed on the host.
No Wireless Signal / Weak RF Performance	•Verify external antennas are securely connected to the CH0 and CH1 MHF4 connectors. •Confirm antennas are rated for the 2.4GHz, 5GHz and 6GHz bands in use. •Check for physical damage to MHF4 connectors or antenna cables.
Overheating or Unexpected Shutdown	•Ensure adequate airflow around the module for sustained high-throughput operation. •Confirm ambient temperature is within the rated -20°C to 70°C operating range.
Bluetooth Not Detected / Pairing Issues	•Confirm the Bluetooth driver is installed and enabled on the host (Linux or Windows 10). •Verify the CH0 MHF4 antenna is connected, since Bluetooth shares this antenna path with WLAN. •Check that the USB1.1 interface used for Bluetooth is properly enumerated by the host platform.

9. Safety Precautions

- Always power off and disconnect the host system before installing or removing the module.
- Handle the module by its edges; avoid touching the gold-finger connector or RF components.
- Use proper ESD (electrostatic discharge) precautions, including a grounded wrist strap, when handling the module.
- Operation in the 6GHz band is subject to regulatory approval — see Section 12 for details.
- Do not operate the module without antennas connected to both active MHF4 connectors, as this may damage the transmitter.
- Do not attempt to modify or repair the module; contact Compex Technical Support for service.

10. Technical Support

Compex Systems Pte Ltd provides engineering and technical support for the WLT206H. For technical assistance, integration support, or to report a hardware issue, please contact:

Company	Compex Systems Pte Ltd
Headquarters	Singapore
Sales Enquiries	sales@compex.com.sg
Technical Support	https://compex.com.sg/support-downloads/
Website	https://compex.com.sg
Product Page (WLT206H)	https://compex.com.sg/shop/wifi-module/wlan-bluetooth-modules-wifi-6/wlt206h-wifi6-ble5-1-11ax-qca2062-qca2065/
Qualcomm Design Centre	Qualcomm Authorized Design Centre (ADC) since 2014

Before contacting support, please:

- Note the firmware version (visible via webUI: System > Software, or via SSH/serial console: `cat /etc/openwrt_release`)
- Record the MAC address of the board (visible on PCB label).
- Describe the issue with steps to reproduce, observed symptoms, and host platform details.

For sample requests, pre-production evaluations, or OEM/ODM partnership enquiries, contact the Compex sales team at sales@compex.com.sg.

11. Full Specifications

Model	WLT206H
Chipset	Qualcomm Atheros QCA2062/2066 'Verona' Series
Reference Design	VER02.1
Host Interface	M.2 E Key Interface with PCIe 3.0
Operating Voltage	3.3V DC + I/O supply of 1.8V or 3.3V
Power Consumption	6W (Max)
Wireless	2.4GHz 802.11b/g/n/ax, max 16dBm per chain 5GHz 802.11a/n/ac/ax, max 16dBm per chain 6GHz 802.11a/n/ac/ax, max 16dBm per chain 2× MHF4 Connectors
Frequency Range	2.4GHz: 2.412 ~ 2.472GHz 5GHz: 5.150 ~ 5.85GHz 6GHz: 5.925 ~ 7.125GHz (subject to local regulations)
Modulation Techniques	802.11b: DSSS (DBPSK, DQPSK, CCK) 802.11a/g/n: OFDM (BPSK, QPSK, 16-QAM, 64-QAM) 802.11ac: OFDM (BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM) 802.11ax: OFDMA (BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM)
Channel Spectrum Widths	QCA2062: 20/40MHz at 2.4GHz 20/40/80MHz at 5GHz QCA2066: 20/40MHz at 2.4GHz 20/40/80/160MHz at 5GHz 20/40/80/160/320MHz at 6GHz
Operating System	Linux, Windows 10
Environmental Temperature	Operating: -20°C to 70°C Storage: -40°C to 85°C
Environmental Humidity	Operating: 5% to 95%, Non-Condensing Storage: Max. 90%
Dimensions (W × H × D)	22mm × 30mm × 2.8mm
Security	64/128-bit WEP, WPA, WPA2, WPA3, 802.1X

12. Regulatory Information

Declaration of Conformity

The WLT206H is a component-level radio module intended for integration into end products. This document does not list specific regulatory certifications for the module; end-product manufacturers are responsible for obtaining all necessary regulatory certifications (e.g., FCC, CE, IC, REACH, RoHS, or other applicable regional approvals) for their final product in each target market, including any additional certifications required for the complete host platform assembly. Contact Compex Technical Support to confirm current certification status.

6GHz Band Restrictions

Operation in the 6 GHz frequency band is subject to national regulatory authority approval. Manufacturers must ensure compliance with local regulations before enabling 6 GHz radio operation. Unauthorized use of restricted frequency bands may be illegal and could cause harmful interference to other services.

Disposal & Recycling

This product is subject to the Waste Electrical and Electronic Equipment (WEEE) Directive. At the end of its service life, return the product to an authorised recycling facility or contact Compex Systems for take-back options.

Legal Notices

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