WLWE7002E5-27

Wi-Fi 7 (802.11be) High Power Single-Band Wireless Module

Hardware User Guide

Wi-Fi 7 / 802.11be 5GHz High Power Single Band	**QCN9274-I** Qualcomm Waikiki Series	**MiniPCIe Interface** PCIe 3.0 Compatible	**2×2 MU-MIMO** Up to 4323Mbps

Updated: 20260930

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1. Introduction

Thank you for choosing the Compex WLWE7002E5-27. This document provides complete hardware integration guidance for engineers and system developers deploying the WLWE7002E5-27 Wi-Fi 7 wireless module in embedded, industrial, and networking platforms.

The WLWE7002E5-27 is a high-power single-band Wi-Fi 7 (802.11be) wireless module based on the Qualcomm QCN9274-I 'Waikiki' series chipset (industrial grade). Built on the WK01.5 reference design, the module delivers 2×2 MU-MIMO operation in the 5GHz band through a standard MiniPCIe (PCIe 3.0) host interface.

Key Highlights

- Qualcomm QCN9274-I 'Waikiki' series chipset for industrial-grade deployments.
- 5GHz, 2×2 MU-MIMO, up to 688 Mbps physical data rate.
- Backward compatible with 802.11a/n/ac/ax devices in the 5GHz band.
- MiniPCIe interface with PCIe 3.0 host connectivity.
- Based on the WK02.2 reference design.
- Supports up to 4096-QAM (4K-QAM) modulation.
- Operating temperature: -20°C to 70°C (customized heatsink solutions available for extended industrial temperature requirements upon request).
- FCC, CE, IC certified, and REACH and RoHS compliant for global deployment.

2. Package Contents

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

Checklist

- 1 × WLWE7002E5-27 Wi-Fi 7 wireless module

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

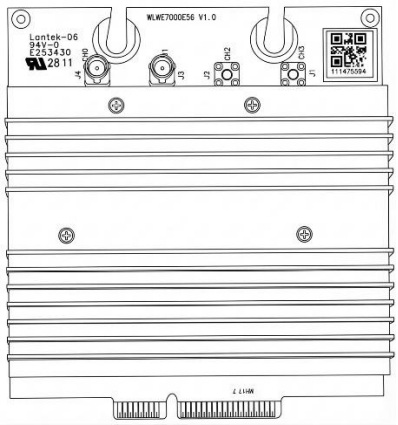
If any item is missing or damaged, contact Compex Technical Support (see Chapter 10) before proceeding.

3. Hardware Overview

The WLWE7002E5-27 is a radio-only Wi-Fi 7 module designed to be installed into a host platform's MiniPCIe 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 WLWE7002E5-27 features the following major components and connectors:

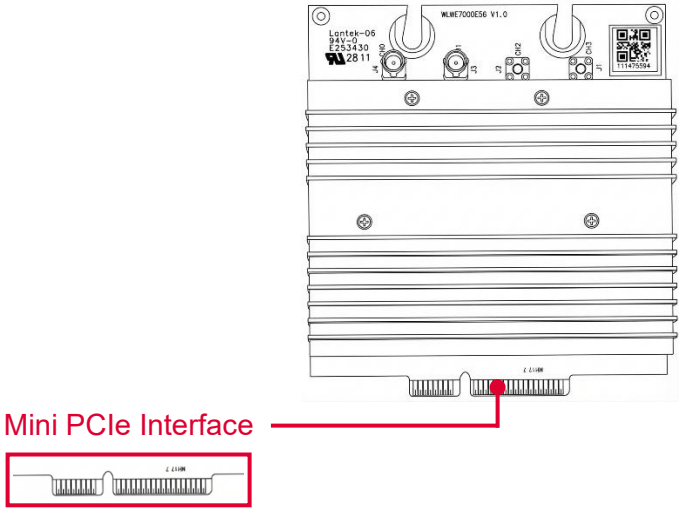


Chipset	Qualcomm QCN9274-I 'Waikiki' series (Industrial grade)
Reference Design	WK01.5
Host Interface	MiniPCIe Interface with PCIe 3.0
RF Connectors	2× MMCX Connectors (CH0, CH1)
System Memory	2Mbit serial I²C bus EEPROM
Dimensions (W × H × D)	57mm × 62.7mm × 14.2mm

3.2 Connector Descriptions

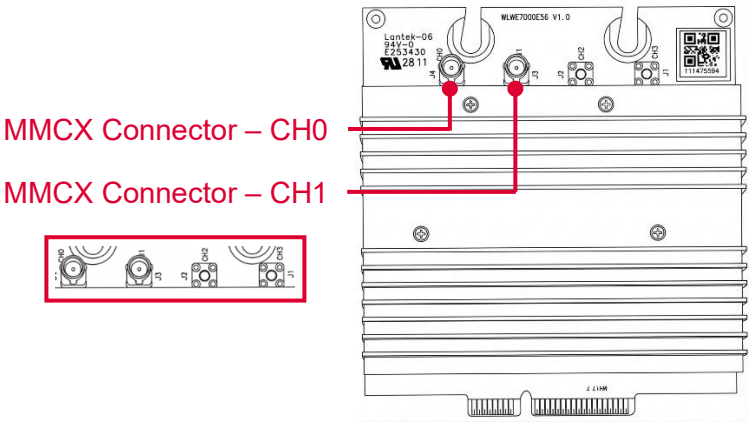
Mini PCIe Edge Connector

- Standard MiniPCIe (PCIe 3.0) edge connector along the bottom edge of the module.
- Carries PCIe data lanes, mandatory 3.3V power input, ground, and control signals to the host platform, plus a 5V input for the PA.



MMCX RF Connectors

- 2× MMCX Connectors (CH0 and CH1) located at the top edge of the module.
- CH0 and CH1 jointly support 2×2 MU-MIMO operation in the 2.4GHz band.
- Connect suitable external antennas rated for the 2.4GHz band.



3.3 Hardware Pinouts

MiniPCIe Slot Pin Assignment

Top side		Bottom side	
1	PCIE0_WAKE_3P3_N	2	VDD_3V3
3	NC	4	GND
5	NC	6	NC
7	PCIE0_CLKREQ_3P3_N	8	NC
9	GND	10	NC
11	PCIE0_REFCLK_N	12	NC
13	PCIE0_REFCLK_P	14	NC
15	GND	16	NC
Mechanical key MiniPCIe			
17	NC	18	GND
19	NC	20	WLAN_DISABLE_3P3_N
21	GND	22	PCIE0_PERST_3P3
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	GND	38	NC
39	VDD_3V3	40	GND
41	VDD_3V3	42	NC
43	GND	44	NC
45	VDD_5V	46	NC
47	VDD_5V	48	NC
49	VDD_5V	50	GND
51	VDD_5V	52	VDD_3V3

4. Radio Module Specifications

4.1 Wi-Fi Capability

Wi-Fi Standards	802.11a/n/ac/ax/be
Bands	5GHz Single Band
MIMO Configuration	2×2 MU-MIMO
Max Physical Data Rate	up to 4323 Mbps
Frequency Range	4.920 ~ 5.825GHz
Modulation Techniques	OFDMA: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM, 4096-QAM
Channel Spectrum Widths	Supports 20/40/80/160/240MHz at 5GHz
TX Power	Max 27dBm per chain @ 5GHz
RF Connectors	2× MMCX Connectors (CH0, CH1)

4.2 Notes & Recommendations

- Use external antennas rated for the 5GHz band on both MMCX connectors to fully utilize the 2×2 MU-MIMO capability.
- Refer to the Linux 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)	57mm × 62.7mm × 14.2mm
Mounting Hole Diameter	Ø3.0mm
Form Factor	Standard MiniPCIe with heatsink

5.2 Environmental Ratings

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

5.3 Mounting & Installation Notes

- Secure with the mounting screw at the designated Ø3.0mm mounting hole, if provided by the host chassis.
- Ensure adequate airflow or thermal contact with the heatsink fins for sustained high-throughput operation.

6. Power Specifications

6.1 Power Requirements

Operating Voltage	3.3V DC + 5V DC (both required)
Power Consumption	8.5W (Max)
Power Source	3.3V supplied via the MiniPCIe card slot (mandatory; VDD_3V3 pins 2, 24, 39, 41, 52)
PA Power Supply (5V)	5V required to power the module's PA, through the MiniPCIe gold-finger VDD_5V pins (45, 47, 49, 51)

6.2 Power Delivery Protection

- The host platform's MiniPCIe card slot must provide regulated 3.3V power with short-circuit/overcurrent protection. A 5V supply for the module's PA must also be provided through the MiniPCIe gold-finger VDD_5V pins.
- Ensure the host power rail can supply the module's peak 8.5W power consumption without voltage droop.

6.3 Notes & Recommendations

- 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 8.5W operation.

7. Installation & Integration

7.1 Pre-Installation Checklist

- Power off and disconnect the host platform before installation.
- Verify the host platform provides a MiniPCIe slot compatible with PCIe 3.0.
- Prepare two external antennas rated for the 5GHz band with MMCX connectors.

7.2 Module Installation

- Align the WLWE7002E5-27 module's gold-finger edge connector with the host MiniPCIe 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

- Power is supplied automatically through the MiniPCIe edge connector; no separate power cable is required.
- Confirm the host platform's MiniPCIe slot delivers stable 3.3V and 5V supplies before powering on.

7.4 Antenna Connection

- Connect external antennas to the CH0 and CH1 MMCX 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 MiniPCIe slot and the retaining screw (if present) is secured. •Confirm the host platform's MiniPCIe slot supports PCIe 3.0 and provides 3.3V power, and that the 5V PA supply (gold-finger pins) is present. •Check that the appropriate Linux driver/SDK package is installed on the host.
No Wireless Signal / Weak RF Performance	•Verify external antennas are securely connected to CH0 and CH1 MMCX connectors. •Confirm antennas are rated for the 5GHz bands in use. •Check for physical damage to MMCX connectors or antenna cables.
Overheating or Unexpected Shutdown	•Ensure adequate airflow or thermal contact with the heatsink fins for sustained high-throughput operation. •Confirm ambient temperature is within the rated operating range (-20°C to 70°C).

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.
- Do not operate the module without an antenna connected, 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 WLWE7002E5-27. 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 (WLWE7002E5-27)	-
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	WLWE7002E5-27
Chipset	Qualcomm QCN9274-I 'Waikiki' series for Industrial grade
System Memory	2Mbit serial I²C bus EEPROM
Reference Design	WK01.5
Host Interface	MiniPCIe Interface with PCIe 3.0
Operating Voltage	3.3V DC + 5V DC (both required)
Power Consumption	8.5W (Max)
Wireless	2×2 5GHz 802.11a/n/ac/ax/be, max 27dBm per chain 2× MMCX Connectors
Frequency Range	4.920 ~ 5.825GHz
Modulation Techniques	OFDMA: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM, 4096-QAM
Channel Spectrum Widths	Supports 20/40/80/160/240MHz at 5GHz
Operating System	Linux
Certification	FCC, CE, IC Certified, REACH & RoHS Compliance
Environmental Temperature	Operating: -20°C to 70°C Storage: -40°C to 90°C
Environmental Humidity	Operating: 5% to 95%, Non-Condensing Storage: Max. 90%
Dimensions (W × H × D)	57mm × 62.7mm × 14.2mm

12. Regulatory Information

Declaration of Conformity

The WLWE7002E5-27 is FCC, CE, and IC certified and designed to comply with applicable regional regulatory requirements. The WLWE7002E5-27 is a component-level radio module intended for integration into end products. End-product manufacturers are responsible for obtaining all necessary regulatory certifications (e.g., FCC, CE, IC, or other applicable regional approvals) for their final product in each target market, including any additional certifications required for the complete host platform assembly.

REACH & RoHS Compliance

This product is manufactured in compliance with REACH Regulation (EC) No 1907/2006 and RoHS Directive 2011/65/EU (amended by 2015/863/EU), restricting the use of hazardous substances in electrical and electronic equipment.

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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