



WLE600V5-27ESD

Wi-Fi 5 (802.11ac Wave 1) Single Band 5GHz Wireless Module

Hardware User Guide

Wi-Fi 5 / 802.11ac 5GHz Single Band	QCA9882 Qualcomm Atheros 'Peregrine'	MiniPCle Interface PCIe 1.1 Compatible	2×2 MIMO Up to 867 Mbps (5GHz)
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1. Introduction

Thank you for choosing the Compex WLE600V5-27ESD. This document provides complete hardware integration guidance for engineers and system developers deploying the WLE600V5-27ESD Wi-Fi 5 wireless module in embedded, industrial, and networking platforms.

The WLE600V5-27ESD is a single-band 5GHz Wi-Fi 5 (802.11ac Wave 1) wireless module based on the Qualcomm Atheros QCA9882 'Peregrine' series chipset. Built on the Qualcomm Atheros CUS223 reference design, the module delivers 2×2 MIMO operation in the 5GHz band through a standard MiniPCle (PCIe 1.1) host interface.

Key Highlights

- Qualcomm Atheros QCA9882 'Peregrine' Series chipset.
- High power output: up to 27dBm per chain.
- 5GHz, 2×2 MIMO, up to 867 Mbps physical data rate.
- Single Band 5GHz Wi-Fi 5 (802.11ac Wave 1) operation.
- MiniPCle interface with PCIe 1.1 host connectivity.
- Based on the Qualcomm Atheros CUS223 reference design.
- IEEE 802.11ac compliant; backward compatible with 802.11a/n.
- Supports up to 256-QAM modulation.
- Built-in ESD protection (ESD/EMP immunity threshold: 15KeV).
- Operating temperature: -20°C to 70°C (normal heatsink) or -40°C to 85°C (large heatsink).
Storage: -40°C to 90°C.
- CE, FCC & IC Certified; 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 × WLE600V5-27ESD Wi-Fi 5 wireless module

⚠ Note: External antennas (U.FL 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.

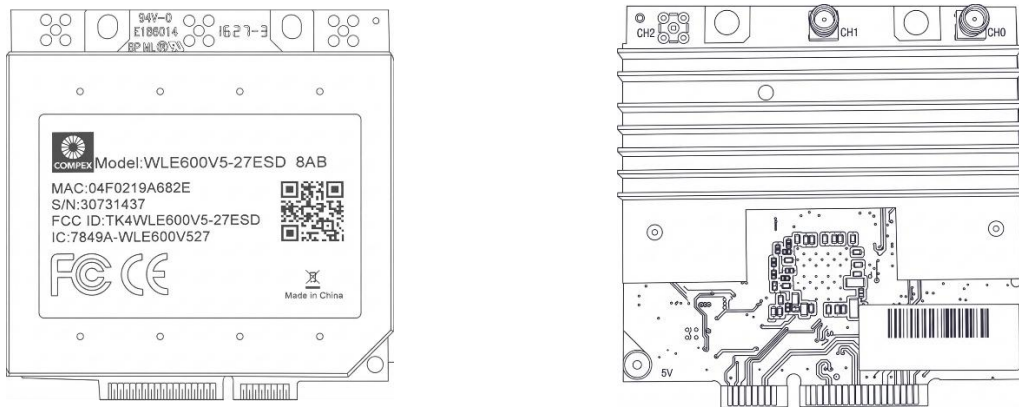
3. Hardware Overview

The WLE600V5-27ESD is a radio-only Wi-Fi 5 module designed to be installed into a host platform's MiniPCIe slot. To install on another slot such as an M.2 key slot, an M.2 key to MiniPCIe 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 1.1 interface.

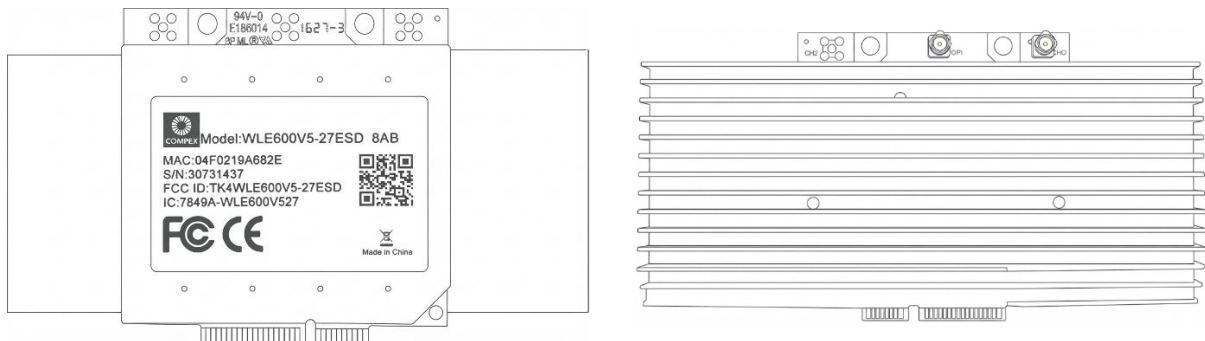
3.1 Module Layout

The WLE600V5-27ESD features the following major components and connectors:

Normal Heatsink:



Large Heatsink:

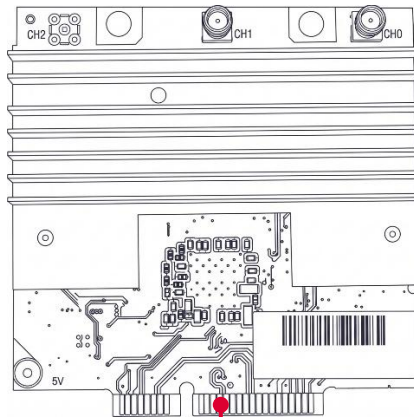


Chipset	Qualcomm Atheros QCA9882 'Peregrine' Series
Reference Design	Qualcomm Atheros CUS223
Host Interface	MiniPCle Interface with PCIe 1.1
RF Connectors	2× MMCX Connectors (CH0, CH1)
Dimensions (W × H × D)	50.0 × 51.0 × 12.5mm (normal heatsink) 95.0 × 51.0 × 13.0mm (large heatsink)

3.2 Connector Descriptions

MiniPCle Edge Connector

- Standard MiniPCle (PCIe 1.1) edge connector along the bottom edge of the module.
- Carries PCIe data lanes, 3.3V power input, ground, and control signals to the host platform, plus a 5V input for the module's PA (power amplifier) via pins 45, 47, 49 and 51, supplied through jumper J5 on the WPJ344/WPJ558 board, or alternatively via an external 5V power pin (see Section 6).

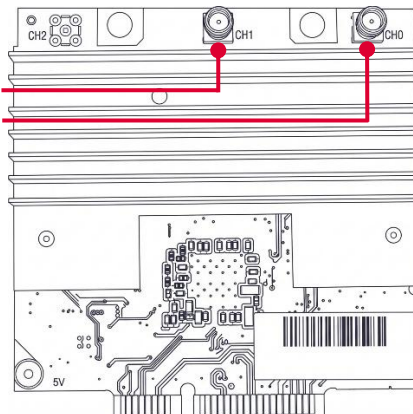


Mini PCIe Interface (for Power supply)



MMCX RF Connectors

- 2× MMCX Connectors (CH0 and CH1) located at the top edge of the module.
- CH0 and CH1 support 2×2 MIMO operation in the 5GHz band.
- Connect suitable external antennas rated for the 5GHz band.

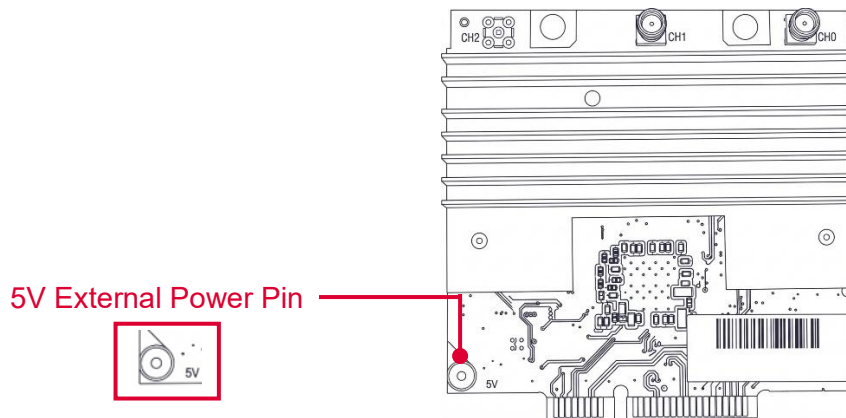


MMCX Connector – CH1
MMCX Connector – CH0



External Power Pin

- A dedicated 5V External Power Pin, separate from the MiniPCle edge connector, provides an alternative way to supply the 5V required by the module's PA (power amplifier).
- Use this External Power Pin only as an alternative to, not together with, the +5V pins (45, 47, 49, 51) on the MiniPCle edge connector supplied via jumper J5 on the WPJ344/WPJ558 board; do not enable both methods at the same time.



3.3 Hardware Pinouts

MiniPCle Slot Pin Assignment

Top side		Bottom side	
1	WAKE_L	2	+3.3V
3	ANT_A	4	GND
5	GPIO4	6	NC
7	CLKREQ_L	8	NC
9	GND	10	NC
11	REFCLK-	12	NC
13	REFCLK+	14	NC
15	GND	16	NC
Mechanical key MiniPCle			
17	NC	18	GND
19	NC	20	W_DISABLE_L
21	GND	22	RESET
23	PERn0	24	+3.3V
25	PERp0	26	GND
27	GND	28	NC
29	GND	30	NC
31	PETn0	32	NC
33	PETp0	34	GND
35	GND	36	USB_D-
37	NC	38	USB_D+
39	+3.3V	40	NC
41	+3.3V	42	NC
43	GND	44	LED_WLAN_L
45	+5V	46	NC
47	+5V	48	NC
49	+5V	50	GND
51	+5V	52	+3.3V

GPIO Pin Assignment

GPIO Pin	Function	GPIO Pin	Function
GPIO_0	WLAN_DISABLE_L	GPIO_1	LED_WLAN_L
GPIO_19	ANT_A	GPIO_20	ANT_B

4. Radio Module Specifications

4.1 Wi-Fi Capability

Wi-Fi Standards	802.11a/n/ac
Bands	5GHz Single Band
MIMO Configuration	2×2 MIMO
Max Physical Data Rate	up to 867 Mbps
Frequency Range	5.150 ~ 5.825GHz
Modulation Techniques	BPSK, QPSK, DBPSK, DQPSK, 16-QAM, 64-QAM, 256-QAM
Channel Spectrum Widths	Supports 20/40/80MHz at 5GHz
TX Power	Max 27dBm per chain @ 5GHz
RF Connectors	2× MMCX Connectors (Chain0, Chain1)
Supported Standards	IEEE 802.11d, e, h, i, k, r, v and w
Advanced RF Features	Spatial Multiplexing, Cyclic-Delay Diversity (CDD), Low-Density Parity Check (LDPC) Codes, Maximal Ratio Combining (MRC), Space Time Block Code (STBC)

4.2 Notes & Recommendations

- Use external antennas rated for the 5GHz band on both MMCX connectors.
- Refer to the CompexWRT (Atheros reference wireless drivers) or OpenWRT/LEDE (ath10k wireless drivers) documentation for channel and regulatory domain configuration. Supported on WPJ344.
- This module supports Dynamic Frequency Selection (DFS); ensure local regulatory requirements for DFS channels are met before deployment.
- 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)	50.0 × 51.0 × 12.5mm (normal heatsink) 95.0 × 51.0 × 13.0mm (large heatsink)
Form Factor	Standard MiniPCle with heatsink (normal or large heatsink option)

5.2 Environmental Ratings

Operating Temperature (Normal Heatsink)	-20°C to 70°C
Operating Temperature (Large Heatsink)	-40°C to 85°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 hole if the host chassis provides one.
- A grounding cable is included with the module; connect it to ensure proper ESD protection.
- Ensure adequate airflow around the heatsink for sustained high-throughput operation.

6. Power Specifications

6.1 Power Requirements

Operating Voltage	3.3V DC + 5V (5V compulsory)
Power Consumption	7.5W (Max)
Power Source	3.3V via MiniPCle edge connector (mandatory); 5V for the module's PA (power amplifier) via pins 45, 47, 49, 51 on the edge connector, enabled by jumper J5 on WPJ344/WPJ558 board, or alternatively via external 5V power pin (5V is compulsory)

6.2 Power Delivery Protection

- The host platform must supply regulated 3.3V and 5V power (see Section 6.1 for supply methods), both with short-circuit/overcurrent protection.
- Ensure the host power rail can supply the module's peak 7.5W power consumption without voltage droop.

6.3 Notes & Recommendations

- Use a host platform with a stable, well-regulated 3.3V MiniPCle power rail. Use a host platform with a stable, well-regulated 3.3V MiniPCle power rail and a stable, regulated 5V supply for the module's PA (see Section 6.1 for supply methods).
- Avoid hot-plugging the module; always power down the host before installation or removal.
- For high-duty-cycle deployments, verify thermal dissipation is adequate at sustained 7.5W operation.

7. Installation & Integration

7.1 Pre-Installation Checklist

- Power off and disconnect the host platform before installation.
- Verify the host platform provides a MiniPCle slot compatible with PCIe 1.1.
- Prepare two external antennas rated for the 5GHz band with MMCX connectors or pigtail adapters.

7.2 Module Installation

- Align the WLE600V5-27ESD module's gold-finger edge connector with the host MiniPCle 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 is supplied automatically through the MiniPCle edge connector; no separate power cable is required. Connect the 5V PA supply using one of the methods described in Section 6.1.
- Confirm the host platform's MiniPCle slot delivers a stable 3.3V supply, and that the chosen 5V PA supply path is stable, 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 MiniPCle slot and the retaining screw (if present) is secured. •Confirm the host platform's MiniPCle slot supports PCIe 1.1, provides 3.3V power, and that the 5V PA supply (see Section 6.1) is present. •Check that the appropriate CompexWRT (Atheros reference wireless drivers) or OpenWRT/LEDE (ath10k wireless drivers) package is installed; supported on WPJ344.
No Wireless Signal / Weak RF Performance	•Verify external antennas are securely connected to the CH0 and CH1 MMCX connectors. •Confirm antennas are rated for the 5GHz band. •Check for physical damage to MMCX 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 operating range (-20°C to 70°C with normal heatsink, or -40°C to 85°C with large heatsink).

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.
- This module has built-in ESD/EMP protection rated to a 15KeV immunity threshold; use proper ESD (electrostatic discharge) precautions, including a grounded wrist strap, when handling the module.
- Do not operate the module without antennas connected to all MMCX connectors, as this may damage the transmitter.
- Operation in DFS channels is subject to local regulatory requirements — see Section 12 for details.
- 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 WLE600V5-27ESD. 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 (WLE600V5-27ESD)	https://compex.com.sg/shop/wifi-module/802-11ac-wave-1/wle600v5-27esd-2/
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	WLE600V5-27ESD
Chipset	Qualcomm Atheros QCA9882 'Peregrine' Series
Reference Design	Qualcomm Atheros CUS223
Host Interface	MiniPCle Interface with PCIe 1.1
Operating Voltage	3.3V + 5V (5V compulsory)
Power Consumption	7.5W (Max)
Wireless	2×2 5GHz 802.11a/n/ac, max 27dBm per chain 2× MMCX Connectors
Frequency Range	5GHz: 5.150 ~ 5.825GHz
Modulation Techniques	BPSK, QPSK, DBPSK, DQPSK, 16-QAM, 64-QAM, 256-QAM
Channel Spectrum Widths	Supports 20/40/80MHz at 5GHz
Operating System	ComplexWRT (Atheros reference wireless drivers) or OpenWRT/LEDE (ath10k wireless drivers); supported on WPJ344
Certification	CE, FCC & IC Certified, REACH & RoHS Compliance
Environmental Temperature	Operating: -20°C to 70°C (normal heatsink) Operating: -40°C to 85°C (large heatsink) Storage: -40°C to 90°C
Environmental Humidity	Operating: 5% to 95%, Non-Condensing Storage: Max. 90%
Dimensions (W × H × D)	50.0 × 51.0 × 12.5mm (normal heatsink) 95.0 × 51.0 × 13.0mm (large heatsink)
ESD Sensitivity	Built-in ESD/EMP protection, immunity threshold: 15KeV

12. Regulatory Information

Declaration of Conformity

The WLE600V5-27ESD is CE, FCC and IC Certified and designed to comply with applicable regional regulatory requirements. The WLE600V5-27ESD 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., CE, FCC, 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.

5GHz DFS Band Restrictions

Operation in DFS (Dynamic Frequency Selection) channels within the 5 GHz band is subject to national regulatory authority requirements. Manufacturers must ensure compliance with local regulations before enabling DFS channels. Unauthorized use of restricted frequency bands may be illegal and could cause harmful interference to radar and other services.

CE, FCC & IC Certified, 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.

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