



WPM530RJ

JustWiFi7™-Cat8 Embedded Board

Hardware User Guide

Wi-Fi 7 / 802.11be Tri-Band Support 2.4GHz + 5GHz + 6GHz	IPQ5322 Qualcomm Miami Series	QCN6274 Onboard Radio Waikiki Series	2×2 MU-MIMO OFDMA Support
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1. Introduction

Thank you for choosing the Compex WPM530RJ. This document provides complete hardware integration guidance for engineers and system developers deploying the WPM530RJ in embedded, industrial, and networking platforms.

The WPM530RJ is a compact, high-performance Wi-Fi 7 embedded board powered by Qualcomm's IPQ5322 'Miami' Series quad-core processor and the onboard QCN6274 'Waikiki' series tri-band radio. It delivers robust wireless networking across 2.4 GHz, 5 GHz, and 6 GHz bands via integrated 2×2 MU-MIMO OFDMA radios, with 10 Gigabit Ethernet uplink and USB-C Power Delivery input for flexible deployment.

Key Highlights

- Qualcomm IPQ5322 'Miami' Quad-Core ARM Cortex-A53 @ 1.5 GHz SoC for high-throughput network processing.
- Wi-Fi 7 (802.11be) tri-band concurrent — onboard QCN6274 'Waikiki' radio supporting 2.4 GHz, 5 GHz, and 6 GHz with 2×2 MU-MIMO OFDMA.
- 1× 10 Gigabit Ethernet RJ45 port for high-speed LAN/WAN connectivity.
- USB-C Power Delivery (PD) input — compatible with a standard 25 W USB-C phone charger.
- EasyMesh implemented in firmware for seamless mesh networking deployments.
- Supports long-range wireless deployment with adjustable ACK timeout.
- Compact form factor: 87 mm × 56 mm × 30.5 mm — ideal for integration into AI in-premise servers, security gateways, or standalone mesh nodes.
- OpenWrt 24.10 firmware with webUI and full SSH CLI access.
- REACH and RoHS compliant for global deployment.

Intended Use

The WPM530RJ is an engineering-grade embedded board intended for OEM/ODM integration and product development. Typical target applications include:

- 802.11be MU-MIMO OFDMA wireless access points.
- Internet of Things (IoT) gateways and network edge controllers.
- Miniature embedded platform for AI in-premise servers and security gateways.
- Standalone tri-band access points or EasyMesh mesh nodes.
- CPE (Customer Premises Equipment) and broadband gateway appliances.

2. Package Contents

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

Checklist

- 1 × WPM530RJ embedded board

⚠ Note: External antennas (U.FL pigtail cables), Ethernet cables, and power supply (USB-C PD) are not included unless specified in the order. Contact sales@compex.com.sg for accessory options.

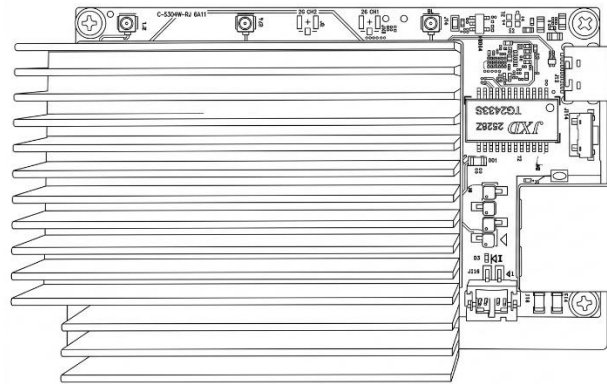
If any item is missing or damaged, contact Compex Technical Support (see Chapter 11) before proceeding.

3. Hardware Overview

The WPM530RJ is a fully integrated embedded networking platform based on the Qualcomm IPQ5322 SoC with an onboard QCN6274 tri-band Wi-Fi 7 radio. All networking processing — including routing, switching, and Wi-Fi stack management — is handled onboard.

3.1 Board Layout

The WPM530RJ features the following major components and connectors:

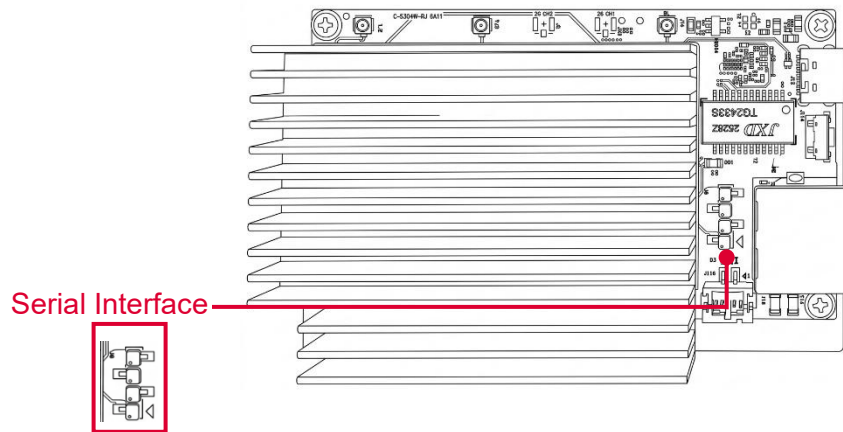


SoC	Qualcomm IPQ5322 'Miami', Quad-Core ARM Cortex-A53 @ 1.5 GHz
Reference Design	Qualcomm AP.MI01.2 + WK01.7
System Memory	512 MB DDR4 (1× 16-bit interface)
Flash Storage	128 MB NAND Flash + 4 MB NOR Flash
Onboard Radio	3 radios — tri-band concurrent (Qualcomm QCN6274 'Waikiki')
Ethernet Port	1× 10 Gigabit Ethernet RJ45 (LAN/WAN)
USB	1× USB Type-C (power supply only)
Serial / Debug	1× Serial Interface
Other I/O	1× Reset Button, 1× USB_Boot DIP Switch, 2× U.FL Connectors, 1× U.FL Connector for Bluetooth Antenna, 1x 2-Pin Fan Connector, 1x LED indicator
Dimensions (W x H x D)	89 mm × 57 mm × 31.6 mm

3.2 Connector Descriptions

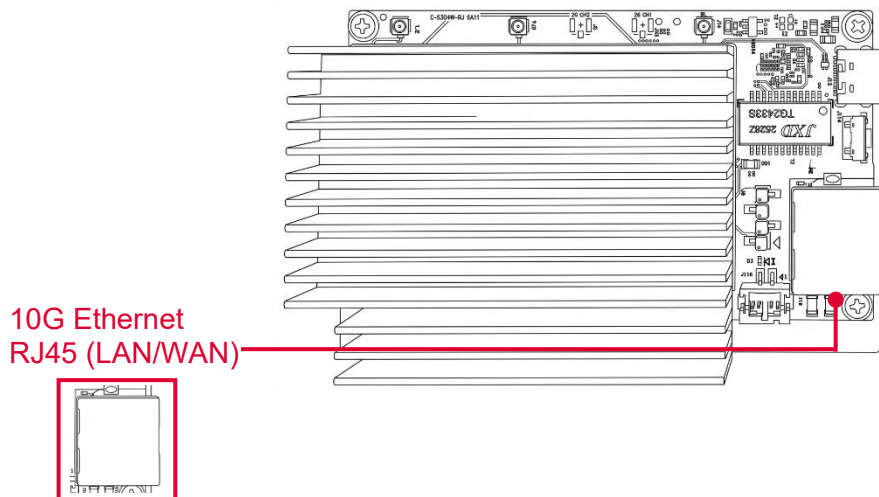
Serial Interface

- Onboard serial port for debug/console access at 115200 bps, 8N1.
- A Serial Converter (TTL to RS-232) may be required for standard serial debugging.



Ethernet Port(RJ45)

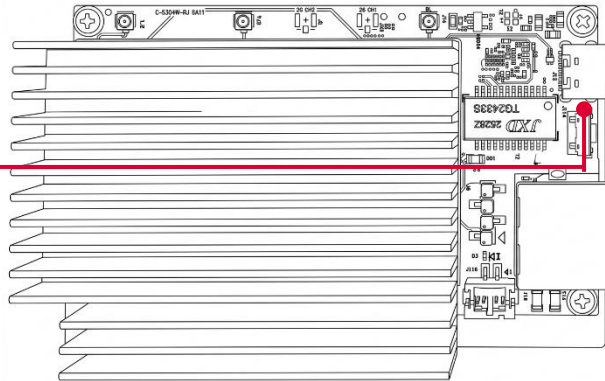
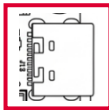
- Supports auto-MDI/MDIX and auto-negotiation.



Power Connector — USB Type-C

- Supports USB-C Power Delivery (PD).
- Operating voltage: 9V or 12V.

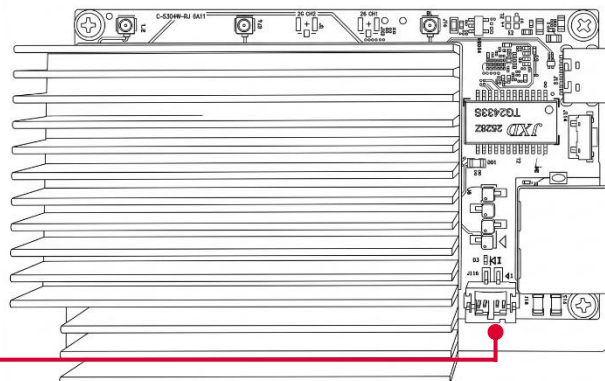
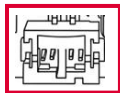
Type-C Connector
(for Power supply)



2-Pin Fan Connector

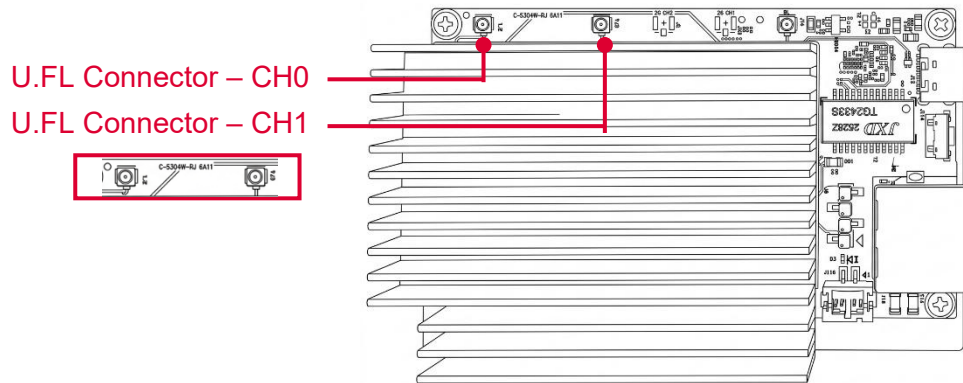
- Thermal Management control, adjust fan speed based on real time temperature.

2-Pin Fan Connector



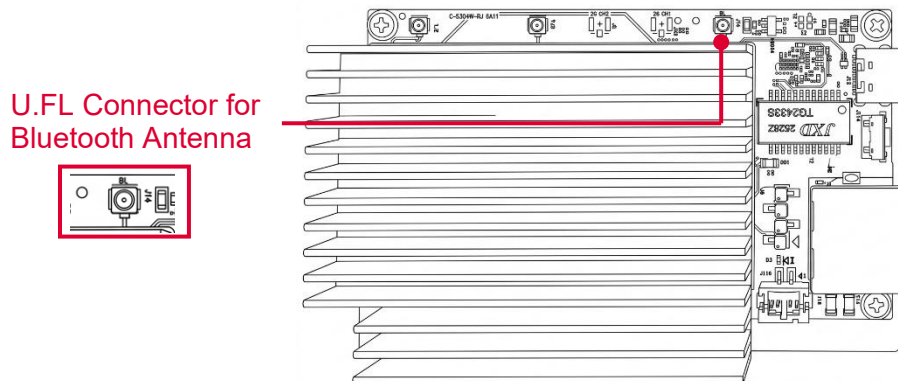
U.FL RF Connectors

- 2× U.FL connectors (CH0, CH1) for external antenna connection to the onboard tri-band radio.
- Both connectors are shared across all three bands (2.4 GHz, 5 GHz, 6 GHz) concurrently.
- Always terminate all U.FL connectors with antennas or 50 Ω loads before applying power.



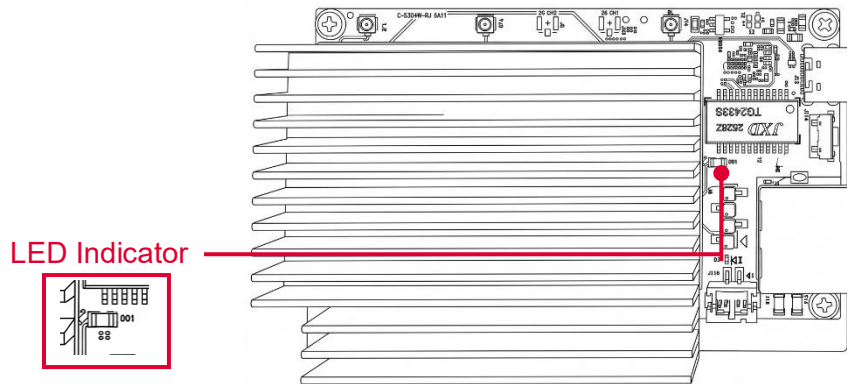
U.FL Connector for Bluetooth Antenna

- Onboard Bluetooth interface for auxiliary connectivity.



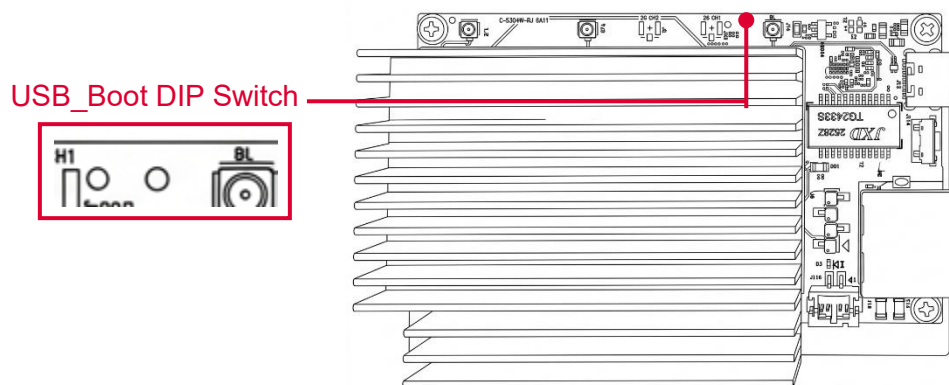
LED Indicator(RGB)

- LED indicator for status monitoring. Green: Board powered on; White: System initializing/booting; turns back to green after boot is complete.



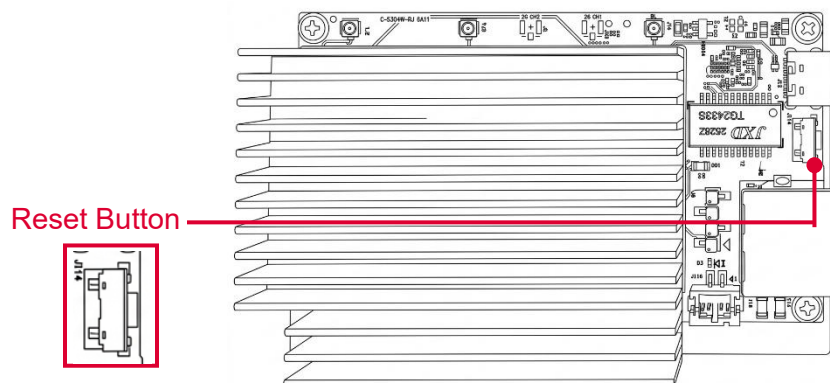
USB_Boot DIP Switch

- Jumper not installed: Normal boot operation.
- Jumper installed: Force boot from USB.



Reset Button

- Press reset button once to trigger WPS pairing.
- Press and hold for 10 seconds to restore factory default settings.



3.3 Hardware Pinouts

GPIO Pin	Function
GPIO_8	NAND_DATA3
GPIO_9	NAND_DATA2
GPIO_10	NAND_DATA1
GPIO_11	NAND_DATA0
GPIO_12	NAND_CS_N
GPIO_13	NAND_CLK
GPIO_14	SPI_CLK
GPIO_15	SPI_MOSI
GPIO_16	SPI_MISO
GPIO_17	SPI_CS_N
GPIO_18	UART_RX
GPIO_19	UART_TX
GPIO_20	RST_OUT_N
GPIO_21	core_voltage_control[0]
GPIO_22	LG1_RST_N
GPIO_23	core_voltage_control[1]
GPIO_24	NC
GPIO_25	BT_boot
GPIO_26	BT_PWR_EN
GPIO_27	MHT_MDC
GPIO_28	MHT_MDIO
GPIO_29	FAN_CONT
GPIO_30	LEDR

GPIO Pin	Function
GPIO_31	LEDG
GPIO_32	LEDB
GPIO_33	BLE_TXD
GPIO_34	LG1_INT_N
GPIO_35	BLE_RXD
GPIO_36	LG_GPS_PPS_OUT
GPIO_37	SW_RST
GPIO_38	NC
GPIO_39	FAN_SET
GPIO_40	WSI_CLK_5>2
GPIO_41	WSI_DAT_5>2
GPIO_42	WSI_CLK_2>5
GPIO_43	USB_SEL
GPIO_44	NC
GPIO_45	NC
GPIO_46	PCIE1_CLK_REQ_GPIO46
GPIO_47	PCIE1_RSTn_GPIO47
GPIO_48	PCIE1_WAKE_GPIO48
GPIO_49	WDIS_PCIE1_5G
GPIO_50	NC
GPIO_51	NC
GPIO_52	WSI_DAT_2>5

Ethernet Port Pin Assignment

Pin	Signal	Pin	Signal
1	LG1_PX_P_0	2	LG1_PX_N_0
3	LG1_PX_P_1	4	LG1_PX_P_2
5	LG1_PX_N_2	6	LG1_PX_N_1
7	LG1_PX_P_3	8	LG1_PX_N_3
9	GND	10	GND

UART Pin Assignment

Pin	Signal
1	VDD_3V3
2	UART_TX
3	UART_RX
4	GND

LED Pin Assignment (DD1)

Colour	GPIO
RED	GPIO_L30
GREEN	GPIO_L31
BLUE	GPIO_L32

4. Radio Module Specifications

4.1 Wi-Fi Capability

The WPM530RJ features an integrated onboard tri-band Wi-Fi 7 radio via the Qualcomm QCN6274 'Waikiki' chipset. No external M.2 radio module is required.

Wi-Fi Standard	IEEE 802.11be (Wi-Fi 7) — backward compatible with 802.11ax/ac/n/a/g/b
Radio Chipset	Qualcomm QCN6274 'Waikiki'
Frequency Bands	2.4 GHz, 5 GHz, 6 GHz (tri-band concurrent)
Frequency Range	2.4 GHz: 2.412–2.472 GHz 5 GHz: 5.180–5.825 GHz 6 GHz: 5.945–7.125 GHz
MIMO Configuration	2×2 MU-MIMO per band
OFDMA	DL/UL OFDMA supported
Channel Widths	2.4 GHz: 20/40 MHz 5 GHz: 20/40/80/160/240 MHz 6 GHz: 20/40/80/160/320 MHz
Max TX Power (2.4 GHz)	22 dBm per chain / 25 dBm (2 chains)
Max TX Power (5 GHz)	17 dBm per chain / 20 dBm (2 chains)
Max TX Power (6 GHz)	17 dBm per chain / 20 dBm (2 chains)
Security	WPA3-Personal, WPA3-Enterprise, OWE, WPA2 (backward compatible)
Operating Modes	AP, Station (Client)
EasyMesh	Implemented in firmware
DFS Support	Yes

4.2 Notes & Recommendations

- The QCN6274 radio operates concurrently across all three bands — no additional radio module is required.
- For 6 GHz band operation, verify local regulatory approval in your target market before deployment.
- Attach heatsinks or thermal pads to the module if operating in high-ambient-temperature environments ($>40^{\circ}\text{C}$).
- For best throughput in the 6 GHz band with EHT320, use high-gain directional antennas and clear line-of-sight.
- Never operate the module with RF ports left open (unterminated). Always attach antennas or $50\ \Omega$ termination loads to all U.FL connectors before applying power. Open RF ports during transmission may permanently damage the radio front-end.

5. Mechanical Specifications

5.1 Board Dimensions

Dimensions (W × H × D)	89 mm × 57 mm × 31.6 mm
PCB Thickness	Standard (multi-layer PCB)

5.2 Environmental Ratings

Operating Temperature	-20°C to 55°C
Storage Temperature	-40°C to 90°C
Operating Humidity	5% to 95%, Non-Condensing
Storage Humidity	Max. 90%

5.3 Mounting & Installation Notes

- Allow sufficient clearance around the board for airflow and RF management.
- Route Ethernet and antenna cables away from high-frequency signal traces.
- Use appropriate standoffs for mechanical stability.
- Ensure adequate RF antenna routing to external antenna connectors via U.FL pigtail cables.

6. Power Specifications

6.1 Power Requirements

Operating Voltage	9V or 12V (via USB Type-C connector)
Power Input Standard	USB-C Power Delivery (PD)
Power Consumption (Max)	18W (Max)

6.2 Power Delivery Protection

- Over-Voltage Protection: Protects against supply voltage surges above rated input.
- Over-Current Protection: Automatically limits current draw to safe levels.
- Reverse Polarity Protection: Guards against incorrect power connection polarity.
- Short Circuit Protection: Prevents PCB damage from momentary short circuits.
- ESD Protection: TVS diodes on all external-facing interface pins.

6.3 Notes & Recommendations

- Ensure the supply can deliver stable voltage under peak load conditions (up to 18 W).
- A USB-C Power Delivery (PD) compatible charger is required. Using an incompatible or underpowered supply may cause the device to reboot continuously. Exceeding the rated input voltage will permanently damage the board and void the warranty.

7. Installation & Integration

Follow these steps carefully to set up or install the WPM530RJ.

7.1 Pre-Installation Checklist

- Verify package contents (Section 2).
- Ensure a USB-C PD compliant power supply (9 V / 18 W minimum) is available.
- Prepare antenna pigtail cables for the U.FL connectors for Wi-Fi operation.
- Prepare Ethernet cables (Cat5e minimum; Cat6A or Cat8 recommended for 10GbE).
- Ground yourself with an ESD wrist strap before handling the board.

7.2 Power Connection

- Connect a USB-C PD compliant power supply (see Section 6 for power requirements) to the USB Type-C connector.
- Apply power. The Power/Status LED should illuminate within 3 seconds. Boot completes within approximately 30–60 seconds.

7.3 Ethernet Connection

- Connect an Ethernet cable to the 10 GbE RJ45 port as required for your network topology.
- Once connected, the Ethernet interface will be available for network configuration.
- Configure IP addressing — static or DHCP — as required (see Section 8 for default settings).
- Verify the link LED for the Ethernet port to confirm connectivity.

8. Configuration

The WPM530RJ runs an OpenWrt 24.10-based firmware stack and is configured via the webUI management interface or SSH/serial console command line.

8.1 Default Settings

Default Management IP	192.168.1.1
Default Subnet	192.168.1.0/24
Web UI Port	80 (HTTP) / 443 (HTTPS)
Default Username	admin
Default Password	password
SSH Access	Port 22 (enabled by default)
Default Mode	Router / Access Point
Firmware	OpenWrt 24.10

8.2 Accessing the Web Interface

- Connect a PC to the WPM530RJ's Ethernet port.
- Set the host PC's Ethernet adapter to a static IP address in the 192.168.1.x range (e.g. 192.168.1.10, subnet 255.255.255.0).
- Open a web browser and navigate to <http://192.168.1.1>.
- Log in with username **admin** and the password **password**.
- The OpenWrt webUI will load, providing access to network and system configuration.

8.3 Wireless Configuration

Wireless settings can be configured via the webUI, or via SSH/serial console using UCI commands or by directly editing the configuration files.

- Via SSH: Connect using PuTTY or any SSH client, entering the IP address 192.168.1.1 and port 22.
- Via Serial Console: Connect via the Serial Interface at 115200 bps, 8N1 using a TTL serial converter.
- Wireless configuration files are located at /etc/config/wireless.
- Use UCI commands to modify wireless settings, for example:

```
uci set wireless.wifi0.disabled='0'
```

```
uci set wireless.wifi0.htmode='EHT40'
```

```
uci commit wireless
```

```
wifi
```
- Use iw dev to verify radio status after applying changes.

9. Troubleshooting

Power/Status LED not lit	Check USB-C power supply is PD-compliant and rated for 9 V / 18 W or higher. Verify USB-C connector is fully seated. Confirm supply provides sufficient current for the board.
Ethernet link not established	Verify Ethernet cable is fully seated in RJ45 port. Confirm link partner supports 10GbE. Try a different cable.
Cannot access web interface	Confirm host PC IP is set to 192.168.1.x/24. Disable any VPNs or firewall rules blocking 192.168.1.1. Verify Ethernet link LED is active.
Wi-Fi SSIDs not visible	Check that antenna cables are attached to both U.FL connectors. Confirm board has completed boot (~60 sec). Use <code>iw dev</code> or <code>uci show wireless</code> to verify wireless radio settings are enabled.
Poor Wi-Fi throughput	Verify antenna orientation and placement. Avoid metal obstructions near antennas. Ensure correct channel and bandwidth settings are applied via UCI.
Board overheating	Attach heatsinks to SoC. Ensure adequate airflow clearance. Verify ambient temperature is within operating range (-20 to +55°C).
Board not booting	Attempt firmware recovery via USB_Boot port. Ensure power supply meets PD requirements. Check Serial Interface console output at 115200 bps for boot errors.
Firmware upgrade fails	Do not power off during update. Use a wired Ethernet connection for firmware upload. Reset to factory defaults before upgrading if previously modified.
Factory Reset	To restore factory default settings: •Press and hold the RESET button for 10 seconds while the board is powered on. •Go to webUI > System > Reset Board. •Alternatively, via SSH or serial console, run: <code>rm -rf /overlay/*</code> <code>reboot</code> The board will reboot and restore all settings to factory defaults. This process takes approximately 60 seconds.

10. Safety Precautions

Electrical Safety

- Disconnect power before connecting or disconnecting cables.
- Never exceed the rated input voltage (9 V DC). Overvoltage will permanently damage the board.
- Verify the power supply is USB-C PD compliant and correctly rated before connecting.
- Keep the board away from conductive materials that may cause short circuits.

RF / Antenna Safety

- Never operate the board with RF ports left open (unterminated). Always attach antennas or 50 Ω termination loads to all U.FL connectors.
- Maintain a minimum safety distance of 20 cm from the antennas during normal operation.
- For 6 GHz operation, ensure regulatory approval and proper certification for your target market.
- Do not modify antennas or RF circuitry. Unauthorized modifications will void regulatory compliance.

Thermal Safety

- Operating the board above 55°C ambient temperature may cause thermal shutdown or permanent damage. Ensure adequate cooling is installed.
- Do not obstruct ventilation around the board.
- Allow the board to cool down before handling after extended operation.

ESD Precautions

- Handle the board only at a properly grounded ESD workstation.
- Wear an ESD wrist strap connected to ground at all times when handling the board.
- Store the board in its original ESD protective bag when not in use.
- Avoid touching PCB traces, IC pads, or connector pins directly.

11. Technical Support

Compex Systems Pte Ltd provides engineering and technical support for the WPM530RJ. 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 (WPM530RJ)	https://compex.com.sg/shop/embedded-board/802-11be-embedded-board/justwifi7-wpm530rj-wifi7-11be-ipq5322-qcn6274-cat8/
Qualcomm Design Centre	Qualcomm Authorized Design Centre (ADC) since 2014

Before contacting support, please:

- Review this user guide and the Troubleshooting section (Section 9).
- Note the firmware version (visible in webUI: System > Software).
- Record the MAC address of the board (visible on PCB label or in webUI).
- 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.

12. Full Specifications

Model Number	WPM530RJ
SoC	Qualcomm IPQ5322 'Miami', Quad-Core ARM Cortex-A53 @ 1.5 GHz
Reference Design	Qualcomm AP.MI01.2 + WK01.7
System Memory	512 MB DDR4 (1× 16-bit interface)
NAND Flash	128 MB
NOR Flash	4 MB / 8 MB
Onboard Radio	Qualcomm QCN6274 'Waikiki' — tri-band concurrent
Wi-Fi Standard	IEEE 802.11be (Wi-Fi 7) — backward compatible to 802.11a/b/g/n/ac/ax
MIMO	2×2 MU-MIMO OFDMA per band
Frequency Bands	2.4 GHz, 5 GHz, 6 GHz (tri-band concurrent)
Frequency Range	2.4 GHz: 2.412–2.472 GHz 5 GHz: 5.180–5.825 GHz 6 GHz: 5.945–7.125 GHz
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Max TX Power (5 GHz)	17 dBm per chain / 20 dBm (2 chains)
Max TX Power (6 GHz)	17 dBm per chain / 20 dBm (2 chains)
Ethernet Port	1× 10 Gigabit Ethernet RJ45 (LAN/WAN)
USB	1× USB Type-C (power supply only)
Serial Debug	1× Serial Interface
Other I/O	1× Reset Button, 1× USB_Boot, 2× U.FL Connectors, 1× Bluetooth (BT)
Power Interface	USB Type-C (USB-C Power Delivery)
Operating Voltage	9V or 12V
Max Power Consumption	18 W
EasyMesh	Implemented in firmware

DFS Support	Yes
Dimensions (W × H × D)	89 mm × 57 mm × 31.6 mm
Operating Temperature	-20°C to +55°C
Storage Temperature	-40°C to +90°C
Humidity	5–95% non-condensing (operating); Max 90% (storage)
OS / Firmware	OpenWrt 24.10 (webUI + SSH CLI)
Certification	REACH & RoHS Compliant
Ordering Codes	WPM530-RJ 6A01PR8512BR-TE (8 MB NOR) WPM530-RJ 6A01PR4512BR-TE (4 MB NOR)

13. Regulatory Information

Declaration of Conformity

The WPM530RJ is designed to comply with applicable regional regulatory requirements. End-product manufacturers are responsible for obtaining all necessary regulatory certifications (e.g., FCC, CE, IMDA) for their final product in each target market. The WPM530RJ is provided as an embedded board for OEM/ODM integration and does not carry end-product regulatory approval.

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.

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). These regulations restrict the use of hazardous substances in electrical and electronic equipment.

Disposal & Recycling

Do not dispose of this product in unsorted municipal waste. 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 authorized recycling facility or contact Compex Systems for take-back options.

Legal Notices

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