Waveshare USB TO M.2 B KEY

Waveshare 5G Dongle Module USB 3.1 Adapter with Quad Antennas and Heatsink - User Manual

Model: USB TO M.2 B KEY

1. INTRODUCTION

This manual provides instructions for the Waveshare 5G Dongle Module, an adapter designed to integrate 5G modules with M.2 (NGFF) Key B interface into various host devices via a USB 3.1 Type A port. It includes quad antennas and an aluminum alloy heatsink for optimal performance and heat dissipation. Please note that the 5G module itself is not included and must be purchased separately.

Figure 1: Overview of the Waveshare 5G Dongle Module components.

2. FEATURES

- Supports 5G modules with M.2 (NGFF) Key B interface, compatible with SIMCom and Quectel 5G modules.

- Supports 5G modules with 3042/3052 form factor, such as SIM82XX and RM50XQ series 5G modules.

- USB 3.1 Type A port for connecting to PC, Raspberry Pi, or Jetson Nano host boards to enable high-speed 5G network access.

- Includes 4x SMA antenna connectors for easy antenna installation.

- Onboard SIM card slot for Nano SIM cards.

- Onboard power and network indicators, with multiple reserved pads, for checking module operating status and testing other functions.

- PCB ENIG process, with reserved multi-slots and positioning holes for integration.

- Comes with a customized aluminum alloy heatsink for effective heat dissipation, protection, and durability.

Features At A Glance

- Support 5G modules with M.2 (NGFF) Key B interface, compatible with SIMCom, Quectel, and Fibocom 5G modules
- Support 5G modules with 3042/3052 form factor, such as SIM82XX, and RM50XQ series 5G modules
- USB 3.1 Type A port for connecting to PC, Raspberry Pi, or Jetson Nano host board to enable high speed 5G network
- 4x SMA antenna connectors, easy to install the antenna
- Onboard SIM card slot for NANO SIM card
- Onboard power and network indicators, with multiple reserved pads, for checking module operating status and testing other functions
- PCB ENIG process, reserved multi slots and positioning holes for integration
- Comes with customized aluminum alloy heatsink, good heat dissipation, nice-looking, protective and durable

Features At A Glance

MODEL	SIM8202G-M2	SIM8262E-M2	SIM8262A-M2	RM500U-CNV	RM500Q-GL /RM502Q-AE	RM520N-GL	RM530N-GL
5G STANDARD	3GPP R15	3GPP R16		3GPP R15		3GPP R16	
APPLICABLE REGIONS	except Americas		Americas	China, EMEA, Asia-Pacific	RM500Q-GL: Global (except US) RM502Q-AE: Global (except China)	Global	
CHIP	Qualcomm Snapdragon X55	Qualcomm Snapdragon X62		UNISOC	Qualcomm Snapdragon X55	Qualcomm Snapdragon X62	

Figure 2: Key features and compatibility overview.

3. Setup and Installation

3.1 Package Contents Verification

Before proceeding with installation, please verify that all components are present in your package:

- Waveshare USB TO M.2 B KEY board

- Aluminum alloy heatsink

- Quad antennas

- USB 3.1 Type A cable (with auxiliary power option)

- SMA to IPEX adapter cables (for antenna connection)

- Screws and thermal pads

Note: A 5G module (e.g., SIMCom, Quectel) is NOT included and must be purchased separately.

3.2 Module Assembly

1. **Install the 5G Module:** Carefully insert your compatible 5G module (3042/3052 form factor) into the M.2 Key B slot on the Waveshare board. Secure it with the provided screws.

2. **Apply Thermal Pad and Heatsink:** Place the thermal pad onto the 5G module. Then, attach the aluminum alloy heatsink over the 5G module and secure it to the Waveshare board using the appropriate screws. Ensure good

contact for effective heat dissipation.

3. **Connect Antennas:** Connect the SMA to IPEX adapter cables to the 5G module's antenna ports and the SMA connectors on the Waveshare board. Then, screw the quad antennas onto the SMA connectors.

4. **Insert Nano SIM Card:** Locate the Nano SIM card slot on the board and insert your activated Nano SIM card.

5G DONGLE MODULE

M.2 TO USB 3.1 port

Support SIMCom & Quectel 5G Module

* Note: the 5G module is NOT included in the USB TO M.2 B KEY kit and needs be purchased separately. It is recommended to select the kits with 5G module, please refer to the Kit Selection table for more details.

Figure 3: Fully assembled 5G Dongle Module with antennas and heatsink.

3.3 Connecting to a Host Device

Connect the assembled 5G Dongle Module to your host device (PC, Raspberry Pi, Jetson Nano) using the provided

USB 3.1 Type A cable. If your 5G module has high power consumption, use the auxiliary power supply cable by connecting both USB male ports to your host device or a suitable power source.
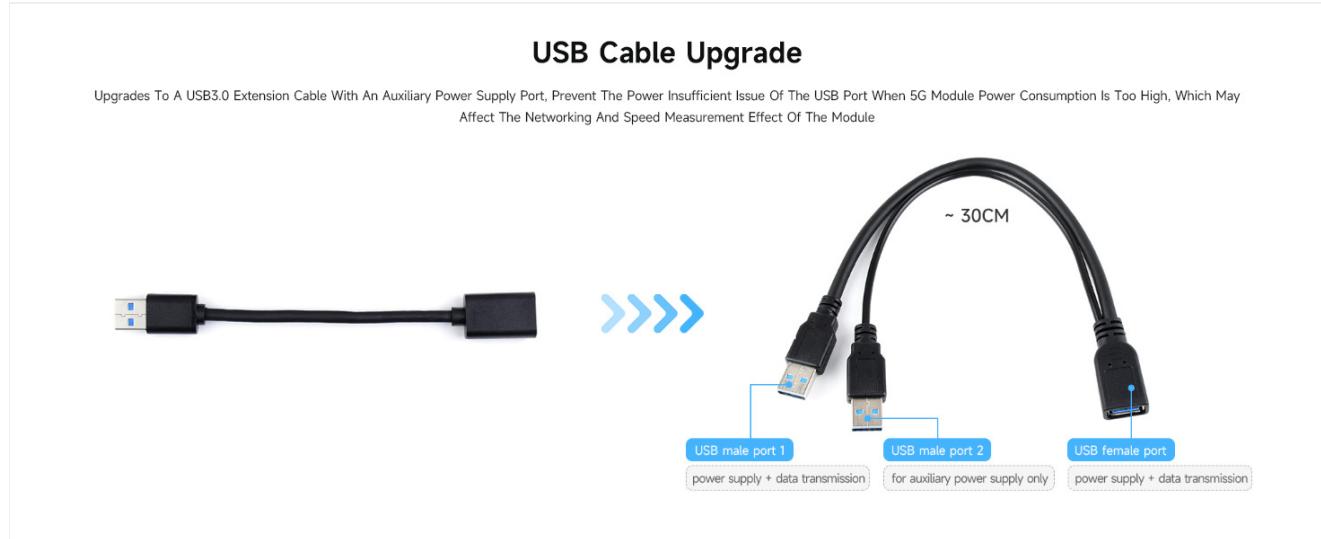
Figure 4: Connection examples with various host devices.
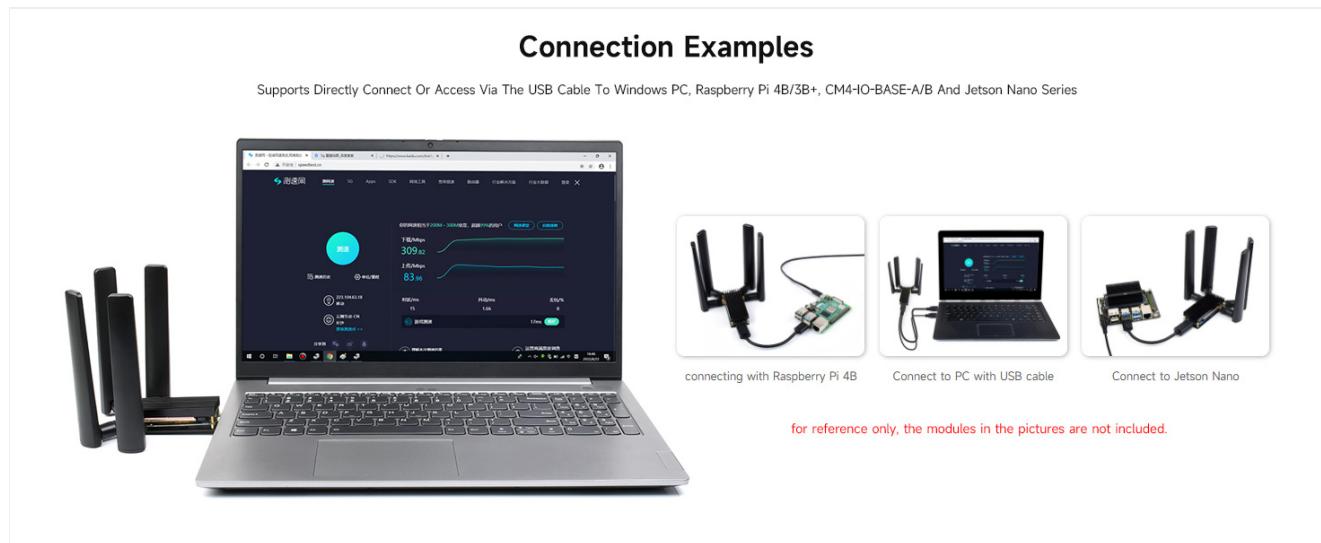
Figure 5: USB cable with auxiliary power for high-power 5G modules.

4. OPERATING INSTRUCTIONS

4.1 System Compatibility

The Waveshare 5G Dongle Module supports Windows and Linux operating systems. After connecting the module, your system should detect the new hardware.

4.2 Driver Installation

Depending on your specific 5G module and operating system, you may need to install drivers. Refer to the documentation provided with your 5G module or visit the Waveshare official website for driver downloads and detailed setup guides for your specific module and OS combination.

4.3 Network Connection

Once drivers are installed and the module is recognized, configure your network settings according to your operating system's instructions to establish a 5G network connection. The onboard power and network indicators will provide visual feedback on the module's operational status.

Figure 6: Multi-system support and heatsink function.

5. MAINTENANCE

The Waveshare 5G Dongle Module is designed for durability. To ensure its longevity and optimal performance:

- Keep the device clean and free from dust. Use a soft, dry cloth for cleaning.
- Avoid exposing the module to extreme temperatures, humidity, or direct sunlight.
- Ensure the heatsink remains clear of obstructions to allow for proper airflow and heat dissipation.
- Handle the module and its components with care to prevent physical damage to connectors or the PCB.

6. TROUBLESHOOTING

6.1 Module Not Recognized by Host Device

- **Check Connections:** Ensure the USB cable is securely connected to both the dongle and the host device.
- **Auxiliary Power:** If using a high-power 5G module, ensure the auxiliary power USB cable is also connected to provide sufficient power.
- **Driver Installation:** Verify that the correct drivers for your specific 5G module are installed on your operating system. Refer to the 5G module manufacturer's website or Waveshare's support resources.
- **Module Seating:** Ensure the 5G module is correctly seated in the M.2 Key B slot and secured.

6.2 Overheating Issues

- **Heatsink Installation:** Confirm the aluminum alloy heatsink is properly installed with the thermal pad making good contact with the 5G module.
- **Airflow:** Ensure the heatsink is not obstructed and has adequate airflow.
- **Power Supply:** Insufficient power can sometimes lead to instability and heat. Use the auxiliary power cable if needed.

6.3 No Network Signal

- **Antenna Connections:** Verify that all four antennas are securely connected to the SMA connectors and that the IPEX cables are properly attached to the 5G module.
- **SIM Card:** Ensure the Nano SIM card is correctly inserted and activated with a valid data plan.

- **5G Module Compatibility:** Confirm that your 5G module is compatible with the network bands available in your region.
- **Software Configuration:** Check your operating system's network settings and the 5G module's software for correct APN settings and network selection.

6.4 Missing or Damaged Parts

If you find any parts missing or damaged upon arrival, please contact your vendor or Waveshare support immediately for assistance.

7. SPECIFICATIONS

Feature	Detail
Model Number	USB TO M.2 B KEY
Hardware Interface	USB 3.1 Type A
Compatible Modules	5G modules with M.2 (NGFF) Key B interface (3042/3052 form factor), e.g., SIMCom, Quectel SIM82XX, RM50XQ series
Antenna Connectors	4x SMA
SIM Card Slot	Nano SIM
Data Link Protocol	USB
Data Transfer Rate	5 Gigabits Per Second
Compatible Devices	PC, Raspberry Pi, Jetson Nano
Heatsink Material	Aluminum Alloy
Package Dimensions	7.17 x 5.31 x 1.81 inches
Item Weight	8.4 ounces (0.24 Kilograms)

	FREQUENCY BAND					
Sub-6G	n1, n2, n3, n5, n7, n8, n12, n20, n28, n38, n40, n41, n66, n71, n77, n78, n79	n1, n3, n5, n7, n8, n20, n28, n38, n40, n41, n77, n78, n79	n2, n5, n7, n12, n13, n14, n25, n30, n41, n48, n66, n71, n77, n78, n79	5G NR NSA: n41, n78, n79; 5G NR SA: n1, n3, n5, n8, n28, n41, n77, n78, n7	RM500Q-GL: n41, n77, n78, n79; RM502Q-AE (5G NR NSA): n1, n2, n3, n5, n7, n8, n12, n20, n25, n28, n38, n40, n41, n48, n66, n71, n77, n78, n79	5G NR NSA:n1, n2, n3, n5, n7, n8, n12, n13, n14, n18, n20, n25, n26, n28, n29, n30, n38, n40, n41, n48, n66, n70, n71, n75, n76, n77, n78, n79
LTE-FDD	B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B29, B30, B32, B66, B71	B1, B3, B5, B7, B8, B18, B19, B20, B26, B28, B32	B2, B4, B5, B7, B12, B13, B14, B25, B26, B29, B30, B66, B71	B1, B2, B3, B5, B7, B8	B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B29, B30, B32, B66, B71	
LTE-TDD	B34, B38, B39, B40, B41, B42, B43, B48	B38, B39, B40, B41, B42, B43	B41, B46, B48	B34, B38, B39, B40, B41	B34, B38, B39, B40, B41, B42, B43, B48	
LAA	-				B46	
WCDMA	B1, B2, B3, B4, B5, B8	B1, B5, B8	B2, B4, B5	B1, B2, B5, B8	B1, B2, B3, B4, B5, B6, B8, B19	B1, B2, B4, B5, B8, B19
GNSS	RM500U-CNV: does not support GNSS RM500Q-GL, RM502Q-AE: supports GPS / GLONASS / BeiDou(Compass) / Galileo SIM8202G-M2, SIM8262X-M2, RM5X0N-GL: supports GPS / GLONASS / BeiDou(Compass) / Galileo / QZSS					

Note: 5G module is optonal. This table only lists some supported models after actual testing, and the pin compatibility should be tested if used with other models.

Figure 7: Detailed table of compatible 5G modules and their specifications.

Multiple Size Compatibility

Compatible With 3042 / 3052 Form Factor

3052

3042
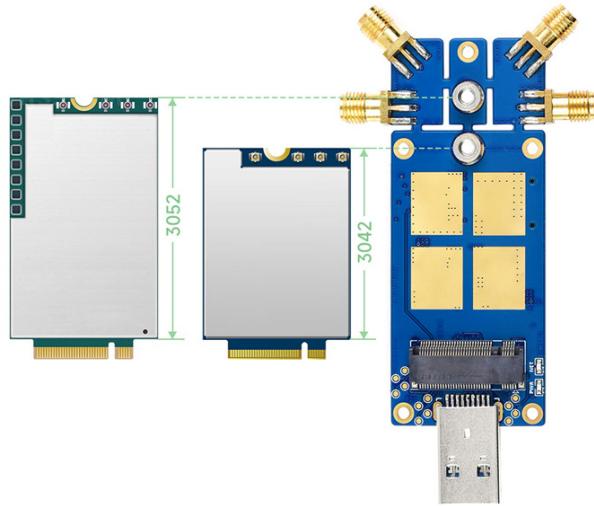
Figure 8: Multiple size compatibility for M.2 modules.

8. WARRANTY AND SUPPORT

Specific warranty information for the Waveshare 5G Dongle Module is not provided in this document. For warranty details, technical support, or further assistance, please refer to the official Waveshare website or contact their customer service directly. Keep your purchase receipt for warranty claims.