

Qualcomm QCNCM865

Wi-Fi 7 + Bluetooth 5.4 Product Specification



1. Product Overview

The Qualcomm WCN7851 is a next-generation tri-band Wi-Fi 7 and Bluetooth 5.4 combo connectivity chipset. QCNCM865 is a commonly used Wi-Fi 7 network card or module product based on the WCN7851 platform. It is designed for high-performance wireless networking applications, offering ultra-high throughput, low latency, and advanced multi-band concurrency capabilities.

2. Key Features

- IEEE 802.11be (Wi-Fi 7) compliant, backward compatible with 802.11ax/ac/n/g/b/a
- Tri-band operation: 2.4GHz, 5GHz, and 6GHz
- 2x2 MU-MIMO architecture
- DBS (Dual-Band Simultaneous) and HBS (High-Band Simultaneous) support
- MLO (Multi-Link Operation) support for simultaneous multi-band data transmission
- Up to 320MHz channel bandwidth (6GHz band)
- Supports up to 4096-QAM modulation
- Integrated Bluetooth 5.4 with backward compatibility
- Optimized for low power consumption and high reliability

3. Wi-Fi Specifications

Wireless Standards: IEEE 802.11be / 802.11ax / 802.11ac / 802.11a / 802.11b / 802.11g / 802.11n

Frequency Bands: 2.4GHz, 5GHz, 6GHz

MIMO Configuration: 2x2 (2 Transmit / 2 Receive)

Channel Bandwidth: 2.4GHz: up to 40MHz; 5GHz: up to 160MHz; 6GHz: up to 320MHz

Modulation: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM, 4096-QAM

Maximum Data Rate: 2.4GHz: 574Mbps; 5GHz: 2400Mbps; 6GHz: 5800Mbps

Concurrent Operation: DBS: 2.4+5GHz or 2.4+6GHz; HBS: 5+6GHz

Advanced Features: OFDMA, MU-MIMO, Beamforming, Target Wake Time (TWT)

Security: WPA2, WPA3, Enhanced Open

4. Bluetooth Specifications

- Bluetooth Version: Bluetooth 5.4
- Supported Modes: Bluetooth Low Energy (BLE), Classic Bluetooth (backward compatible), ANT+
- Low Power & Long Battery Life: Extended wireless audio experience with 30–50% reduced power consumption
- Concurrent Audio Streams: Advanced dual Bluetooth functionality allows simultaneous audio streaming to multiple devices
- LE Audio Support: Personal audio sharing; broadcast mode for sharing streams with multiple listeners
- High-Quality Long-Range Audio: Optimized for clear audio over extended distances
- Multi-Stream Audio: Supports true wireless earbuds and multiple audio streams
- High-Level Software Integration: Supports Qualcomm® FastConnectXR™ software suite and Snapdragon Sound technologies for enhanced audio experience

5. Host Interface & Electrical Characteristics

Wi-Fi Host Interface: PCIe Gen3 x2

Bluetooth Host Interface: USB 2.0 (typical)

Operating Voltage: 3.3V DC

Antenna Configuration: 2 × external antennas (IPEX / MHF4 connector, module dependent)

Clock & Power Management: Integrated power management with low-power sleep modes

6. Mechanical & Form Factor (Module Dependent)

Common Form Factor: M.2 2230 Key-E

Alternative Packages: LGA modules depending on vendor

Typical Dimensions: 30 × 22 mm (M.2 2230)

7. Environmental Specifications (Typical)

Operating Temperature: 0°C to +65°C (module dependent)

Storage Temperature: -40°C to +85°C

Humidity: 5% to 95% RH (non-condensing)

8. Typical Applications

- Wi-Fi 7 M.2 network cards
- Laptop and desktop PCs
- Industrial and embedded systems
- High-performance wireless gateways and terminals