



379.00 EUR incl. 19% VAT, plus shipping

Support: Driver (Windows) | AT Commands Manual | Specifications

Quectel RM500Q-AE is a 5G module optimized specially for IoT/eMBB applications. Adopting the 3GPP Rel. 15 LTE technology, it supports both 5G NSA and SA modes. Designed in an M.2 form factor, RM500Q-AE is compatible with Quectel LTE-A Cat 6 module EM06, Cat 12 module EM12 and Cat 16 module EM160R-GL, which will facilitate customers to migrate from LTE-A to 5G.

The global version RM500Q-AE nearly covers all the mainstream carriers worldwide. The module supports Qualcomm® IZat™ location technology Gen8C Lite (GPS, GLONASS, BeiDou/Compass and Galileo). The integrated GNSS receiver greatly simplifies product design and provides quicker, more accurate and more dependable positioning capability.

A rich set of Internet protocols, industry-standard interfaces and abundant functionalities (USB/PCIe drivers for Windows 7/8/8.1/10, Linux, Android) extend the applicability of the module to a wide range of M2M and IoT applications such as industrial router, home gateway, STB, industrial laptop, consumer laptop, industrial PDA, rugged tablet PC, video surveillance and digital signage.

## Features

- 5G/4G/3G Multi-mode module with M.2 form factor, optimized for IoT and eMBB applications
- Worldwide 5G and LTE-A coverage
- · Both NSA and SA modes
- · Multi-constellation GNSS receiver available for applications requiring fast and accurate fixes in any environment
- Feature refinements: DFOTA and VoLTE (optional)

5G NR:

n1/n2/n3/n5/n7/n8/n12/n20/n25/n28/n38/n40/n41/n48/n66/n71/n77/n78/n79/LTE-FDD:

B1/B2/B3/B4/B5/B7/B8/B9/B12/B13/B14/B17/B18/B19/B20/B25/B26/B28/E

LTE-TDD: B34/B38/39/B40/B41/B42/B43/B48 LTE LAA: B46 (only support 2x2 MIMO) WCDMA: B1/B2/B3/B4/B5/B6/B8/B19

GNSS: GPS/GLONASS/BeiDou (Compass)/Galileo

Supply voltage range: 3.3–4.4 V Typical supply voltage: 3.7 V

Frequency Bands

Power Supply

## Quectel RM500Q-AE 3G/4G/LTE/5G M.2 NGFF Modem



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Transmitting Power

**Data Transmission** 

5G NR Features

Class 3 (24 dBm +1/-3 dB) for WCDMA bands

Class 3 (23 dBm ±2 dB) for LTE bands Class 3 (23 dBm ±2 dB) for 5G NR bands

Class 2 (26 dBm ±2 dB) for LTE B38/B40/B41/B42 bands HPUE

Class 2 (26 dBm +2/-3 dB) for 5G NR n41/n77/n78/n79 bands

**HPUE** 

5G SA Sub-6 Data Rate (Mbps): DL 2.1 Gbps; UL 900 Mbps 5G NSA Sub-6 Data Rate (Mbps): DL 2.5 Gbps; UL 650 Mbps

LTE Data Rate (Mbps): DL 1.0 Gbps; UL 200 Mbps WCDMA Data Rate (Mbps): DL 42 Mbps; UL 5.76 Mbps

Supports 3GPP Rel-15 Supported modulations:

Uplink: π/2-BPSK, QPSK, 16QAM, 64QAM and 256QAM Downlink: QPSK, 16-QAM, 64-QAM and 256-QAM

Supported MIMO:

Uplink: 2 x 2 MIMO\* on n41/n77/n78/n79

Downlink: 4 x 4 MIMO on

n1/n2/n3/n7/n25/n38/n40/n41/n48/n66/n77/

n78/n79

Supports SCS 15 kHz and 30 kHz Supports SA and NSA operation modes Supports Option 3x, 3a and Option 2

RG500Q-EA:

NSA: Max. 2.5 Gbps (DL)/650 Mbps (UL) SA: Max. 2.1 Gbps (DL)/900 Mbps (UL)

RG500Q-NA\*:

NSA: Max. 2.5 Gbps (DL)/650 Mbps (UL) SA: Max. 2.1 Gbps (DL)/450 Mbps (UL)

RG502Q-EA:

NSA: Max. 5.0 Gbps (DL)/650 Mbps (UL) SA: Max. 4.2 Gbps (DL)/900 Mbps (UL)

Supports 3GPP Rel-15

Supports up to CA Cat 16 FDD and TDD

Supported modulations:

Uplink: QPSK, 16-QAM, 64-QAM and 256-QAM Downlink: QPSK, 16-QAM, 64-QAM and 256-QAM Supports 1.4/3/5/10/15/20 MHz RF bandwidth

Supports DL 4 x 4 MIMO on

B1/B2/B3/B4/B7/B25/B30/B32/B34/B38/B39/

B40/B41/B42/B43/B46/B48/B66

RG500Q-EA:

LTE: Max. 1.0 Gbps (DL)/200 Mbps (UL)

RG500Q-NA\*:

LTE: Max. 1.0 Gbps (DL)/200 Mbps (UL)

RG502Q-EA:

LTE: Max. 2.0 Gbps (DL)/200 Mbps (UL)

Supports 3GPP Rel-9 DC-HSDPA, HSPA+, HSDPA, HSUPA and

**WCDMA** 

Supports QPSK, 16-QAM and 64-QAM modulations

DC-HSDPA: Max. 42 Mbps HSUPA: Max. 5.76 Mbps

WCDMA: Max. 384 kbps (DL)/384 kbps (UL)

Supports

QMI/TCP\*/UDP\*/FTP\*/HTTP\*/NTP\*/PING\*/HTTPS\*/SMTP\*/

MMS\*/FTPS\*/SMTPS\*/SSL\* protocols

LTE Features

**UMTS** Features

Internet Protocol Features

## Quectel RM500Q-AE 3G/4G/LTE/5G M.2 NGFF Modem

[http://www.cartft.com/catalog/il/3020]



**UART Interfaces** 

Text and PDU modes Point-to-point MO and MT SMS SMS cell broadcast SMS storage: ME by default (U)SIM Interfaces Supports SIM/USIM cards: 1.8/2.95 V Supports two digital audio interfaces: PCM\* and I2S 2) WCDMA: AMR/AMR-WB **Audio Features** LTE: AMR/AMR-WB Supports echo cancellation and noise suppression Supports 16-bit linear data format Supports long frame synchronization and short frame synchronization **PCM** Interface Supports master and slave modes, but must be in master mode for long frame synchronization Supports 16-bit linear data format I2S is commonly used as a 4-wire DAI (normally I2S\_MCLK is not used in the design) in Hi-Fi, STB and portable devices. The Tx and Rx lines **I2S** Interface used for audio transmission, while the bit clock and left/right clock synchronize the link. I2S is flexible in that either the controller or codec can drive (master) the bit clock and left/right clock lines. Can be multiplexed to PCM function Compliant with USB 3.1 and 2.0 specifications, with maximum transmission rates of up to 10 Gbps on USB 3.1 and 480 Mbps on USB 2.0 Used for AT command communication, data transmission, GNSS output, software debugging and firmware upgrade Supports USB serial drivers for: Windows 7/8/8.1/10, Linux 2.6-5.4, Android 4.x–9.x **USB** Interface USB Serial Driver: Windows 7/8/8.1/10, Linux 2.6-5.4, Android 4.x/5.x/6.x/7.x/8.x/9.x/10 GNSS Driver: Android 4.x/5.x/6.x/7.x/8.x/9.x/10 RIL Driver: Android 4.x/5.x/6.x/7.x/8.x/9.x/10 NDIS Driver: Windows 7/8/8.1/10 MBIM Driver: Windows 7/8/8.1/10, Linux 3.18-5.4 GobiNet Driver: Linux 2.6-5.4 QMI\_WWAN Driver: Linux 3.4-5.4 Main UART: Used for AT command communication Baud rate: 115200 bps by default Supports RTS and CTS hardware flow control Debug UART:

> Used for BT communication Baud rate: 115200 bps

Baud rate: 115200 bps

Used for Linux console and log output

COEX UART:

BT UART:

Used for WWAN/WLAN coexistence algorithms

## Quectel RM500Q-AE 3G/4G/LTE/5G M.2 NGFF Modem

Compliant with PCI Express Specification Revision 3.0

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Firmware Upgrade

PCIe Interface Supports 2 lanes, 8 Gbps/lane Can be used to connect an external WLAN IC Supports 5G NR/LTE/WCDMA Rx-diversity Rx-diversity Gen9C Lite of Qualcomm Supports dual-band GNSS: L1 and L5 **GNSS Features** Protocol: NMEA 0183 Data update rate: 1 Hz Antenna Tuner Control GRFC interface dedicated for external antenna tuner Interface Compliant with 3GPP TS 27.007, 27.005 and Quectel enhanced AT AT Commands commands Two pins NET\_MODE\* and NET\_STATUS to indicate network **Network Indication** connectivity status Eight cellular antenna interfaces (ANT0-ANT7) and one GNSS Antenna Interfaces antenna interface (ANT\_GNSS) **Physical Characteristics** 52.0mm x 30.0mm x 2.3mm, 8.4g Standard operating temperature range: -20 to 60°C Operating temperature range: -30 °C to +75 °C To meet this operating temperature range, you need to ensure effective thermal dissipation, for example, by adding passive or active heatsinks, heat pipes, vapor chambers, etc. Within this range, the module can meet 3GPP specifications. Extended temperature range: -40 °C to +85 °C To meet this extended temperature range, you need to ensure effective thermal dissipation, for Operating Temperature example, by adding passive or active heatsinks, heat pipes, vapor chambers, etc. Within this range, the module remains the ability to establish and maintain functions such as voice, SMS, emergency call, etc., without any unrecoverable malfunction. Radio spectrum and radio network are not

Storage temperature range: -40 °C to +90 °C

influenced, while one or more specifications, such as Pout, may

exceeding the specified tolerances of 3GPP. When the temperature

temperature level, the module will meet 3GPP specifications again.

USB 2.0 and DFOTA

undergo a reduction in value,

returns to the normal operating