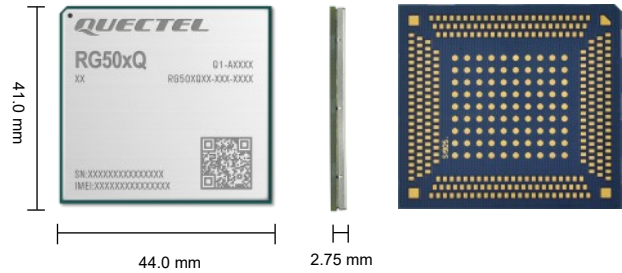


Quectel RG50xQ Series

IoT/M2M-Optimized

5G Sub-6 GHz LGA Module



Quectel RG50xQ is a series of 5G Sub-6 GHz LGA modules optimized specially for IoT and M2M applications. Adopting the 3GPP Rel-15 technology, it delivers maximum data rates up to 5 Gbps downlink and 900 Mbps uplink. It supports both 5G NSA and SA modes, Option 3x, 3a, 3 and Option 2 network architectures, which makes it backwards compatible with 4G/3G network. It is pin-to-pin compatible with Quectel LTE-A Cat 12 EG512R-EA module. It can meet customers' different application demands for high speed, large capacity, low latency, and high reliability etc.

RG50xQ series includes five variants: RG500Q-EA, RG502Q-EA, RG500Q-EU, RG501Q-EU, RG502Q-EU, RG500Q-GT, RG502Q-GT, RG500Q-CN. It supports Qualcomm® IZat™ location technology Gen9C Lite (GPS, GLONASS, BDS, Galileo and QZSS). 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 (USB 2.0/3.0/3.1, PCIe 3.0, RGMII, PCM, UART, etc.) and abundant functionalities (USB drivers for Windows 7/8/8.1/10, Linux and Android) extend the applicability of the module to a wide range of IoT and M2M applications such as business router, home gateway, STB, industrial laptop, consumer laptop, industrial PDA, rugged tablet PC and video surveillance.



Key Features

- ✓ Optimized for IoT and M2M applications with LGA form factor supported
- ✓ Worldwide 5G/4G/3G coverage
- ✓ Supported 5G NSA and SA modes
- ✓ Multi-constellation GNSS receiver available for applications requiring fast and accurate positioning in any environment
- ✓ Feature refinements: DFOTA and VoLTE (Optional)

| | | |
|---|--|--|
| 5G^{NR} 5G NR Sub-6 GHz Bands | 4G LTE LTE Cat 20 Max. 2.0 Gbps (DL) Max. 200 Mbps (UL) | 3G HSPA+ Max. 42 Mbps (DL) Max. 5.76 Mbps (UL) |
| Embedded Abundant Protocols | LGA LGA Form Factor | Multi-constellation GNSS |
| USB 3.1 High Speed Interface | PCIe PCIe 3.0 Interface | VOLTE Voice over LTE (Optional) |
| AT Quectel Enhanced AT Commands | | |

Version: 1.5 | Status: Released

Quectel RG50xQ Series

| 5G Sub-6 | RG500Q-EA&RG502Q-EA | RG500Q-EU&RG501Q-EU&RG502Q-EU | RG500Q-CN | RG500Q-GT&RG502Q-GT |
|---------------------------------|---|---|---|--|
| Region/Operator | EMEA/APAC | EMEA, APAC, Australia ,Brazil | China | Global |
| Dimensions (mm) | 41.0 × 44.0 × 2.75 | 41.0 × 44.0 × 2.75 | 44.0 × 41.0 × 2.75 | 44.0 × 41.0 × 2.75 |
| Weight (g) | 11.0 | 11.0 | 11.0 | 11.0 |
| Temperature Range | | | | |
| Operating Temperature | -30 °C to +75 °C | -30 °C to +75 °C | -30 °C to +75 °C | -30 °C to +75 °C |
| Extended Temperature | -40 °C to +85 °C | -40 °C to +85 °C | -40 °C to +85 °C | -40 °C to +85 °C |
| Frequency Bands ① | | | | |
| 5G NR NSA | n1/n3/n5/n7/n8/n20/n28/n38/n40/n41/ | n1/n3/n5/n7/n8/n20/n28/n38/n40/n41/n77/ | n41/n78/n79 | - |
| 5G NR SA | n1/n3/n5/n7/n8/n20/n28/n38/n40/n41/ | n1/n3/n5/n7/n8/n20/n28/n38/n40/n41/n77/ | n1/n28/n41/n78/n79 | n78 |
| LTE-FDD | B1/B3/B5/B7/B8/B18/B19/B20/B26/B28/ | B1/B3/B5/B7/B8/B20/B28/B32 | B1/B3/B5/B8 | - |
| LTE-TDD | B34/B38/B39/B40/B41/B42/B43 | B38/B40/B41/B42/B43 | B34/B38/39/B40/B41 | B42/B43 |
| LAA | - | - | - | - |
| WCDMA | B1/B3/B5/B6/B8/B19 | B1/B5/B8 | B1/B8 | - |
| MIMO | DL: 4 × 4 UL ②: 2 × 2 | DL: 4 × 4 UL ②: 2 × 2 | DL: 4 × 4 UL ②: 2 × 2 | DL: 4 × 4 UL ②: 2 × 2 |
| GNSS | GPS/GLONASS/BDS/Galileo/QZSS (Optional) | GPS/GLONASS/BDS/Galileo/QZSS (Optional) | GPS/GLONASS/BDS/Galileo/QZSS (Optional) | - |
| Certifications | | | | |
| Carrier | RG500Q-EA: South Korea: LGU+/KT/SKT Australia: Telstra* China: China Telecom/China Mobile/ China Unicom RG502Q-EA: TBD | TBD | China: China Telecom/China Mobile/ China Unicom* | TBD |
| Regulatory | RG500Q-EA: China: SRRC/ NAL/ CCC South Korea: KC Japan: JATE/TELEC Europe: CE Australia/New Zealand: RCM RG502Q-EA: Europe: CE Australia/New Zealand: RCM | RG500Q-EU: Europe: CE Australia/New Zealand: RCM RG501Q-EU: Global: GCF Europe: CE Australia/New Zealand: RCM RG502Q-EU: Europe: CE Australia/New Zealand: RCM | China: SRRC/NAL/CCC | Europe: CE Australia/New Zealand: RCM |
| Others | RoHS | RoHS | RoHS | RoHS |
| Max. Data Transmission ③ | | | | |
| 5G SA Sub-6 GHz | RG500Q-EA: 2.1 Gbps (DL)/ 900 Mbps (UL) RG502Q-EA: 4.2 Gbps (DL)/ 900 Mbps (UL) | RG500Q-EU: 2.1 Gbps (DL)/ 900 Mbps (UL) RG501Q-EU: 2.1 Gbps (DL)/ 900 Mbps (UL) RG502Q-EU: 4.2 Gbps (DL)/ 900 Mbps (UL) | 2.1 Gbps (DL)/ 900 Mbps (UL) | RG500Q-GT: 2.1 Gbps (DL)/ 900 Mbps (UL) RG502Q-GT: 4.2 Gbps (DL)/ 900 Mbps (UL) |
| 5G NSA Sub-6 GHz | RG500Q-EA: 2.5 Gbps (DL)/ 650 Mbps (UL) RG502Q-EA: 5.0 Gbps (DL)/ 650 Mbps (UL) | RG500Q-EU: 2.5 Gbps (DL)/ 650 Mbps (UL) RG501Q-EU: 3.3 Gbps (DL)/ 650 Mbps (UL) RG502Q-EU: 5.0 Gbps (DL)/ 650 Mbps (UL) | 2.5 Gbps (DL)/ 550 Mbps (UL) | - |
| LTE | RG500Q-EA: 1.0 Gbps (DL)/ 200 Mbps (UL) RG502Q-EA: 2.0 Gbps (DL)/ 200 Mbps (UL) | RG500Q-EU: 1.0 Gbps (DL)/ 200 Mbps (UL) RG501Q-EU&RG502Q-EU: 2.0 Gbps (DL)/ 200 Mbps (UL) | 800 Mbps (DL)/ 200 Mbps (UL) | RG500Q-GT: 700 Mbps (DL)/ 116 Mbps (UL) RG502Q-GT: 1.2Gbps (DL)/ 116 Mbps (UL) |
| UMTS | 42 Mbps (DL)/ 5.76 Mbps (UL) | 42 Mbps (DL)/ 5.76 Mbps (UL) | 42 Mbps (DL)/ 5.76 Mbps (UL) | - |
| Interfaces | | | | |
| (U)SIM | × 2, 1.8/2.95 V | × 2, 1.8/2.95 V | × 2, 1.8 V/2.95 V | × 2, 1.8 V/2.95 V |
| eSIM | - | MFF2 (Optional) | MFF2 (Optional) | MFF2 (Optional) |
| UART | × 3 | × 3 | × 3 | × 3 |
| SD Card | × 1 | × 1 | × 1 | × 1 |
| USB 2.0/3.0/3.1 | × 1 | × 1 | × 1 | × 1 |
| PCIe 3.0 | Gen3, Lane × 2 | Gen3, Lane × 2 | Gen3, Lane × 2 | Gen3, Lane × 2 |
| RGMI | × 1 | × 1 | × 1 | × 1 |
| PCM* | × 1 | × 1 | × 1 | × 1 |
| I2S* | × 1 | × 1 | × 1 | × 1 |
| I2C | × 1 | × 1 | × 1 | × 1 |
| SPI | × 1 | × 1 | × 1 | × 1 |
| ADC | ● | ● | ● | ● |
| RESET_N | ● | ● | ● | ● |
| GPIOs (QuecOpen®) | ● | ● | ● | ● |
| Wi-Fi | ● | ● | ● | ● |
| Antennas | Cellular: 6 + 2 (n79) GNSS: × 1 | Cellular: × 4 + 2 (Optional) GNSS: × 1 | Cellular: 4 GNSS: × 1 | Cellular: 4 |

NOTE:

- * means under development.
- ① For CA bands, see *Quectel_RG50xQ_Series_CA&EN-DC_Features* for details.
- ② means only supported in 5G SA mode.
- ③ means theoretical data rates and the actual data rates depend on the network condition.
NSA UL 650 Mbps is the theoretical max data rate when the UL 256QAM of both LTE and 5G NR are enabled (the LTE UL 256QAM in EN-DC is disabled by default and has not been deployed by operators, and it is not fully tested).
- ④ HPUE only supports single carrier.

Quectel RG50xQ Series

| 5G Sub-6 | RG500Q-EA&RG502Q-EA | RG500Q-EU&RG501Q-EU&RG502Q-EU | RG500Q-CN | RG500Q-GT&RG502Q-GT |
|------------------------------------|--|--|--|---|
| Voice | | | | |
| Voice | Digital Audio and VoLTE (Voice over LTE) (Optional) | Digital Audio and VoLTE (Voice over LTE) (Optional) | Digital Audio and VoLTE (Voice over LTE) (Optional) | Digital Audio and VoLTE (Voice over LTE) (Optional) |
| Enhanced Features | | | | |
| DTMF* | ● | ● | ● | ● |
| DFOTA | ● | ● | ● | ● |
| (U)SIM Card Detection | ● | ● | ● | ● |
| Drivers | | | | |
| USB Serial Driver | Windows 7/8/8.1/10, Linux 2.6–5.15, Android 4.x–11.x | Windows 7/8/8.1/10, Linux 2.6–5.15, Android 4.x–11.x | Windows 7/8/8.1/10, Linux 2.6–5.15, Android 4.x–11.x | Windows 7/8/8.1/10, Linux 2.6–5.15, Android 4.x–11.x |
| PCIe MHI Driver | Linux 3.10-5.15 | Linux 3.10-5.15 | Linux 3.10-5.15 | Linux 3.10-5.15 |
| GNSS Driver | Android 4.x–12.x | Android 4.x–12.x | Android 4.x–12.x | - |
| RIL Driver | Android 4.x–12.x | Android 4.x–12.x | Android 4.x–12.x | Android 4.x–12.x |
| USB NDIS Driver | Windows 7/8/8.1/10 | Windows 7/8/8.1/10 | Windows 7/8/8.1/10 | Windows 7/8/8.1/10 |
| USB MBIM Driver | Windows 10, Linux 3.18–5.15 | Windows 10, Linux 3.18–5.15 | Windows 10, Linux 3.18–5.15 | Windows 10, Linux 3.18–5.15 |
| USB GobiNet Driver | Linux 2.6–5.15 | Linux 2.6–5.15 | Linux 2.6–5.15 | Linux 2.6–5.15 |
| USB RNDIS Driver* | Windows 10, Linux 2.6–5.15 | Windows 10, Linux 2.6–5.15 | Windows 10, Linux 2.6–5.15 | Windows 10, Linux 2.6–5.15 |
| USB ECM Driver | Linux 2.6–5.15 | Linux 2.6–5.15 | Linux 2.6–5.15 | Linux 2.6–5.15 |
| USB QMI_WWAN Driver | Linux 3.4–5.15 | Linux 3.4–5.15 | Linux 3.4–5.15 | Linux 3.4–5.15 |
| Electrical Features | | | | |
| Supply Voltage Range | 3.3–4.3 V, typ. 3.8 V | 3.3–4.3 V, typ. 3.8 V | 3.3–4.3 V, typ. 3.8 V | 3.3–4.3 V, typ. 3.8 V |
| Output Power | 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/B43 bands HPUE ^④ Class 2 (26 dBm +2/-3 dB) for 5G NR n41/n77/n78/n79 bands HPUE ^④ | 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 B42 bands HPUE ^④ Class 2 (26 dBm +2/-3 dB) for 5G NR n41/n77*/n78 bands HPUE ^④ | 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/-3 dB) for 5G NR n41/n78/n79 bands HPUE ^④ | 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 B42/B43 bands HPUE ^④ Class 2 (26 dBm +2/-3 dB) for 5G NR n78 bands HPUE ^④ |
| Power Consumption (Typical) | 0.045 mA @ Power off 1.5 mA @ Sleep 20.1 mA @ Idle | 0.045 mA @ Power off 2.0 mA @ Sleep 30 mA @ Idle | 0.045 mA @ Power off 2.0 mA @ Sleep 30 mA @ Idle | 0.045 mA @ Power off 2.0 mA @ Sleep 30 mA @ Idle |

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