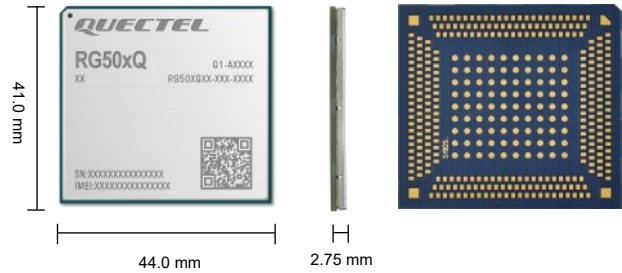


Quectel RG50xQ Series

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, and it is backwards compatible with 4G and 3G networks. 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 eight variants: RG500Q-EA, RG502Q-EA, RG500Q-EU, RG501Q-EU, RG502Q-EU, RG500Q-GT, RG502Q-GT and 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 , 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 PDA, rugged tablet PC, video transmission and digital signage .



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

Version: 1.7 | 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 (excl. China/ Japan)/ Brazil	China	Global TDD 3.5 GHz
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/ 3/ 5/ 7/ 8/ 20/ 28/ 38/ 40/ 41/ 77/ 78/ 79	n1/ 3/ 5/ 7/ 8/ 20/ 28/ 38/ 40/ 41/ 77/ 78	n41/ 78/ 79	-
5G NR SA	n1/ 3/ 5/ 7/ 8/ 20/ 28/ 38/ 40/ 41/ 77/ 78/ 79	n1/ 3/ 5/ 7/ 8/ 20/ 28/ 38/ 40/ 41/ 77/ 78	n1/ 28/ 41/ 78/ 79	n78
MIMO	DL 4 × 4: n1/ 3/ 7/ 38/ 40/ 41/ 77/ 78/ 79 UL ^② 2 × 2: n41/ 77/ 78/ 79	DL 4 × 4: n1/ 3/ 7/ 38/ 40/ 41/ 77/ 78 UL ^② 2 × 2: n41/ 77/ 78	DL 4 × 4: n1/ 41/ 78/ 79 UL ^② 2 × 2: n41/ 78/ 79	DL 4 × 4: n78 UL ^② 2 × 2: n78
LTE-FDD	B1/ 3/ 5/ 7/ 8/ 18/ 19/ 20/ 26/ 28/ 32	B1/ 3/ 5/ 7/ 8/ 20/ 28/ 32	B1/ 3/ 5/ 8	-
LTE-TDD	B34/ 38/ 39/ 40/ 41/ 42/ 43	B38/ 40/ 41/ 42/ 43	B34/ 38/ 39/ 40/ 41	B42/ 43
DL 4 × 4 MIMO	B1/ 3/ 7/ 32/ 34/ 38/ 39/ 40/ 41/ 42/ 43	B1/ 3/ 5/ 7/ 20/ 28/ 32/ 38/ 40/ 41/ 42	B1/ 41	B42/ 43
LAA	-	-	-	-
WCDMA	B1/ 3/ 5/ 6/ 8/ 19	B1/ 5/ 8	B1/ 8	-
GNSS (Optional)	GPS/ GLONASS/ BDS/ Galileo/ QZSS	GPS/ GLONASS/ BDS/ Galileo/ QZSS	GPS/ GLONASS/ BDS/ Galileo/ QZSS	-
Certifications				
Carrier	RG500Q-EA: China: China Telecom/ China Mobile / China Unicom South Korea: LGU+/ KT/ SKT RG502Q-EA: TBD	TBD	China: China Telecom/China Mobile	TBD
Regulatory	RG500Q-EA: Europe: CE China: SRRC/ NAL/ CCC South Korea: KC Japan: JATE/TELEC 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
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: 1.2 Gbps (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/ 2.95 V	× 2, 1.8/ 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
RGMII	× 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:

- * : Under development.
- ①: For CA bands, see *Quectel_RG50xQ_Series_CA&EN-DC_Features* for details.
- ②: Only supported in 5G SA mode.
- ③: 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).
- TBD: To Be Determined.

Quectel RG50xQ Series

5G Sub-6	RG500Q-EA&RG502Q-EA	RG500Q-EU&RG501Q-EU&RG502Q-EU	RG500Q-CN	RG500Q-GT&RG502Q-GT
Audio				
Voice (Optional)	Digital Audio and VoLTE (Voice over LTE)	Digital Audio and VoLTE (Voice over LTE)	Digital Audio and VoLTE (Voice over LTE)	Digital Audio and VoLTE (Voice over LTE)
Enhanced Features				
DTMF*	●	●	●	●
DFOTA	●	●	●	●
(U)SIM Card Detection	●	●	●	●
Drivers				
USB Serial Driver	Windows 7/ 8/ 8.1/ 10/ 11 Linux 2.6–6.5 Android 4.x–13.x	Windows 7/ 8/ 8.1/ 10/ 11 Linux 2.6–6.5 Android 4.x–13.x	Windows 7/ 8/ 8.1/ 10/ 11 Linux 2.6–6.5 Android 4.x–13.x	Windows 7/ 8/ 8.1/ 10/ 11 Linux 2.6–6.5 Android 4.x–13.x
PCIe MHI Driver	Linux 3.10-6.5	Linux 3.10-6.5	Linux 3.10-6.5	Linux 3.10-6.5
GNSS Driver	Android 4.x–13.x	Android 4.x–13.x	Android 4.x–12.x	-
RIL Driver	Android 4.x–13.x	Android 4.x–13.x	Android 4.x–12.x	Android 4.x–13.x
USB NDIS Driver	Windows 7/ 8/ 8.1/ 10/ 11	Windows 7/ 8/ 8.1/ 10/ 11	Windows 7/ 8/ 8.1/ 10/ 11	Windows 7/ 8/ 8.1/ 10/ 11
USB MBIM Driver	Windows 8/ 8.1/ 10/ 11 Linux 3.18–6.5	Windows 8/ 8.1/ 10/ 11 Linux 3.18–6.5	Windows 8/ 8.1/ 10/ 11 Linux 3.18–6.5	Windows 8/ 8.1/ 10/ 11 Linux 3.18–6.5
USB GobiNet Driver	Linux 2.6–6.5	Linux 2.6–6.5	Linux 2.6–6.5	Linux 2.6–6.5
USB RNDIS Driver*	Windows 7/ 8/ 8.1/ 10/ 11 Linux 2.6–6.5	Windows 7/ 8/ 8.1/ 10/ 11 Linux 2.6–6.5	Windows 7/ 8/ 8.1/ 10/ 11 Linux 2.6–6.5	Windows 7/ 8/ 8.1/ 10/ 11 Linux 2.6–6.5
USB ECM Driver	Linux 2.6–6.5	Linux 2.6–6.5	Linux 2.6–6.5	Linux 2.6–6.5
USB QMI_WWAN Driver	Linux 3.4–6.5	Linux 3.4–6.5	Linux 3.4–6.5	Linux 3.4–6.5
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/ 40/ 41/ 42/ 43 bands HPUE ^④ Class 2 (26 dBm +2/-3 dB) for 5G NR n41/ 77/ 78/ 79 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/ 77*/ 78 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/ 78/ 79 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/ 43 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

NOTE:

- *: Under development.
- ④ : HPUE only supports single carrier.