Quectel RM50xQ Series

IoT/eMBB-Optimized
5G Sub-6 GHz M.2 Module

Quectel RM50xQ are a series of 5G modules optimized specially for IoT/eMBB applications. Adopting the 3GPP Release 15 technology, it supports both 5G NSA and SA modes. Designed in an M.2 form factor, RM50xQ series modules are compatible with Quectel LTE-A Cat 6 module EM06, Cat 12 modules EM12-G/EM120R-GL/EM121R-GL, and Cat 16 module EM160R-GL, which facilitates customers' migration from LTE-A to 5G.

RM50xQ series are industrial-grade modules for industrial and commercial applications only.

The globally applicable RM50xQ series nearly covers all the mainstream carriers worldwide. The module supports Qualcomm® IZat™ location technology Gen9C Lite (GPS, GLONASS, BDS and Galileo). The integrated GNSS receiver greatly simplifies the 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 and PCIe drivers for Windows 7/8/8.1/10, Linux, Android) extend the applicability of the module to a wide range of eMBB and IoT applications such as industrial router, home gateway, STB, industrial laptop, consumer laptop, industrial PDA, rugged tablet PC, video transmission and digital signage.

Key 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 supported
- Multi-constellation GNSS receiver available for applications requiring fast and accurate fixes in any environment
- Feature refinements: DFOTA and VoLTE (optional)

5G NR Sub-6 Bands Supported

DL: LTE Cat 16–20
UL: LTE Cat 18

DL: max. 42 Mbps
UL: max. 5.76 Mbps

Embedded Abundant Protocols

M.2 Form Factor

Multi-constellation GNSS (Optional)

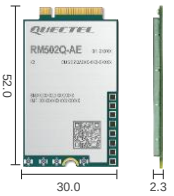
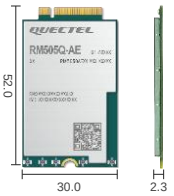
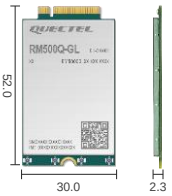
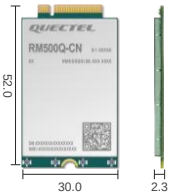
USB 3.1/PCIe 3.0 Super Speed Interface

Voice over LTE (Optional)

Quectel Enhanced AT Commands

Version: 1.2 | Status: Released

Quectel RM50xQ Series

5G Sub-6		RM500Q-AE	RM502Q-AE	RM505Q-AE	RM500Q-GL	RM500Q-CN
Region/Operator		Global (Except for China)	Global (Except for China)	Global (Except for China)	Global (except for United States)	China
Dimensions (mm)						
Weight (g)		8.7	8.7	8.7	8.7	8.9
Supply Voltage Range		3.135–4.4 V, typical 3.7 V	3.135–4.4 V, typical 3.7 V	3.135–4.4 V, typical 3.7 V	3.135–4.4 V, typical 3.7 V	3.135–4.4 V, typical 3.7 V
Power Consumption		80 μA @ Power down 4.2 mA @ Sleep 32 mA @ USB 2.0, Idle 52 mA @ USB 3.0, Idle	80 μA @ Power down 4.2 mA @ Sleep 32 mA @ USB 2.0, Idle 55 mA @ USB 3.0, Idle	82 μA @ Power down 4.2 mA @ Sleep 32 mA @ USB 2.0, Idle 52 mA @ USB 3.0, Idle	70 μA @ Power down 4.0 mA @ Sleep 32 mA @ USB 2.0, Idle 54 mA @ USB 3.0, Idle	78 μA @ Power down 4.1 mA @ Sleep 32 mA @ USB 2.0, Idle 52 mA @ USB 3.0, Idle
Temperature Range						
Operation Temperature		-30 °C to +75 °C	-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	-40 °C to +85 °C
Frequency Bands						
5G NR	NSA	n1/ 2/ 3/ 5/ 7/ 8/ 12/ 20/ 25/ 28/ 38/ 40/ 41/ 48/ 66/ 71/ 77/ 78/ 79	n1/ 2/ 3/ 5/ 7/ 8/ 12/ 20/ 25/ 28/ 38/ 40/ 41/ 48/ 66/ 71/ 77/ 78/ 79	n1/ 2/ 3/ 5/ 7/ 8/ 12/ 20/ 25/ 28/ 38/ 40/ 41/ 48/ 66/ 71/ 77/ 78/ 79	n41/ 77/ 78/ 79	n41/ 78/ 79
	SA	n1/ 2/ 3/ 5/ 7/ 8/ 12/ 20/ 25/ 28/ 38/ 40/ 41/ 48/ 66/ 71/ 77/ 78/ 79	n1/ 2/ 3/ 5/ 7/ 8/ 12/ 20/ 25/ 28/ 38/ 40/ 41/ 48/ 66/ 71/ 77/ 78/ 79	n1/ 2/ 3/ 5/ 7/ 8/ 12/ 20/ 25/ 28/ 38/ 40/ 41/ 48/ 66/ 71/ 77/ 78/ 79	n1/ 2/ 3/ 5/ 7/ 8/ 12/ 20/ 25/ 28/ 38/ 40/ 41/ 48*/ 66/ 71/ 77/ 78/ 79	n1/ 28/ 41/ 78/ 79
LTE	LTE-FDD	B1/ 2/ 3/ 4/ 5/ 7/ 8/ 12(17)/ 13/ 14/ 18/ 19/ 20/ 25/ 26/ 28/ 29/ 30/ 32/ 66/ 71	B1/ 2/ 3/ 4/ 5/ 7/ 8/ 12(17)/ 13/ 14/ 18/ 19/ 20/ 25/ 26/ 28/ 29/ 30/ 32/ 66/ 71	B1/ 2/ 3/ 4/ 5/ 7/ 8/ 12(17)/ 13/ 14/ 18/ 19/ 20/ 25/ 26/ 28/ 29/ 30/ 32/ 66/ 71	B1/ 2/ 3/ 4/ 5/ 7/ 8/ 12/ 13/ 14/ 17/ 18/ 19/ 20/ 25/ 26/ 28/ 29/ 30/ 32/ 66/ 71	B1/ 3/ 5/ 8
	LTE-TDD	B34/ 38/ 39/ 40/ 41/ 42/ 43/ 48	B34/ 38/ 39/ 40/ 41/ 42/ 43/ 48	B34/ 38/ 39/ 40/ 41/ 42/ 43/ 48	B34/ 38/ 39/ 40/ 41/ 42/ 43/ 48	B34/ 38/ 39/ 40/ 41
	LAA	B46 (only support 2 × 2 MIMO)	B46 (only support 2 × 2 MIMO)	B46 (only support 2 × 2 MIMO)	B46	-
UMTS	WCDMA	B1/ 2/ 3/ 4/ 5/ 6/ 8/ 19	B1/ 2/ 3/ 4/ 5/ 6/ 8/ 19	B1/ 2/ 3/ 4/ 5/ 6/ 8/ 19	B1/ 2/ 3/ 4/ 5/ 6/ 8/ 19	B1/ 8
GNSS (Optional)		GPS/GLONASS/BDS/Galileo	GPS/GLONASS/BDS/Galileo	GPS/GLONASS/BDS/Galileo	GPS/GLONASS/BDS/Galileo	GPS/GLONASS/BDS/Galileo
Certifications						
Carrier		Deutsche Telecom/ AT&T/ T-Mobile/ Telstra/ Verizon*	Deutsche Telecom/ AT&T/ T-Mobile/ Verizon/ Telstra	Deutsche Telecom/ AT&T/ T-Mobile/ Verizon/ Telstra	Deutsche Telecom/ China Telecom/ China Mobile/ China Unicom/ KT/ SKT/ LGU+	China Telecom/China Mobile/ China Unicom[TBD]
Regulatory		GCF/ CE/ PTCRB/ FCC/ IC/ NCC/ JATE/ TELEC/ RCM	GCF/ CE/ PTCRB/ FCC/ IC/ JATE/ TELEC/ RCM	GCF/ CE/ PTCRB/ FCC/ IC/ JATE/ TELEC/ RCM	GCF/ CE/ SRRC/ NAL/ CCC/ KC/ RCM	SRRC/ NAL/ CCC
Others		RoHS/WHQL	RoHS/WHQL	RoHS/WHQL	RoHS/WHQL	RoHS/WHQL
Data Rate (Max.) ①						
5G SA Sub-6		DL 2.1 Gbps; UL 450 Mbps	DL 4.2 Gbps; UL 450 Mbps	DL 2.1 Gbps; UL 450 Mbps	DL 2.1 Gbps; UL 900 Mbps	DL 2.1 Gbps; UL 900 Mbps
5G NSA Sub-6		DL 2.5 Gbps; UL 600/650 Mbps ②	DL 5.0 Gbps; UL 600/650 Mbps ②	DL 2.5 Gbps; UL 600/650 Mbps ②	DL 2.5 Gbps; UL 600/650 Mbps ②	DL 2.5 Gbps; UL 525/550 Mbps ③
LTE		DL 1.0 Gbps; UL 200 Mbps	DL 2.0 Gbps; UL 200 Mbps	DL 1.0 Gbps; UL 200 Mbps	DL 1.0 Gbps; UL 200 Mbps	DL 1.0 Gbps; UL 200 Mbps
WCDMA		DL 42 Mbps; UL 5.76 Mbps	DL 42 Mbps; UL 5.76 Mbps	DL 42 Mbps; UL 5.76 Mbps	DL 42 Mbps; UL 5.76 Mbps	DL 42 Mbps; UL 5.76 Mbps
Interface						
(U)SIM		x 1	x 1	x 2 (Dual SIM Single Standby)	x 2 (Dual SIM Single Standby)	x 2 (Dual SIM Single Standby)
USB 2.0		x 1	x 1	x 1	x 1	x 1
USB 3.0/3.1		x 1	x 1	x 1	x 1	x 1
PCIe 3.0		x 1	x 1	x 1	x 1	x 1
PCM		x 1	x 1	x 1	x 1	x 1
Antenna		Cellular: × 3 Cellular + GNSS L1: × 1	Cellular: × 3 Cellular + GNSS L1: × 1	Cellular: × 4 GNSS L1&L5: × 1	Cellular: × 3 Cellular + GNSS L1: × 1	Cellular: × 2 Cellular + GNSS L1: × 1 Cellular + GNSS L5: × 1
Voice						
Digital Audio & VoLTE		○	○	○	○	○
Enhanced Features						
eSIM		○	○	○	○	○
DTMF*		●	●	●	●	●
DFOTA		●	●	●	●	●
(U)SIM Card Detection		●	●	●	●	●

NOTE:
1. ①: The presented data rates are theoretical only, and the actual value depends on network conditions.
2. ②: 600 Mbps is the typical value; while 650 Mbps is the theoretical data rate when the UL 256QAM of both LTE and 5G NR are enabled (LTE UL 256QAM in EN-DC is disabled by default and has not been deployed by operators, and it is not fully tested).
3. ③: 525 Mbps is the typical value; while 550 Mbps is the theoretical data rate when the UL 256QAM of both LTE and 5G NR are enabled (LTE UL 256QAM in EN-DC is disabled by default and has not been deployed by operators, and it is not fully tested).
4. ●: Supported; ○: Optional.
5. *: Under development/in progress.
6. TBD: To Be Determined.

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