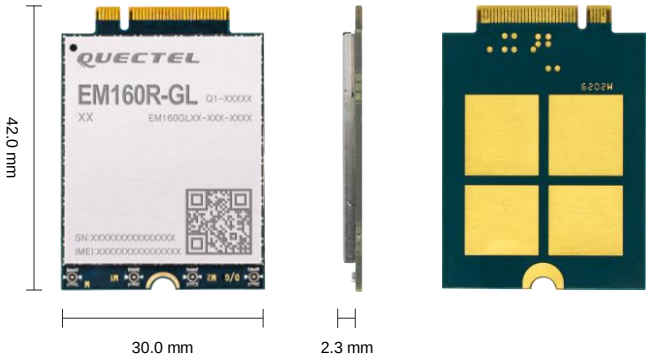
Quectel EM160R-GL

LTE-A Cat 16 M.2 Module



Quectel EM160R-GL is an LTE Advanced Category 16 module. Adopting the 3GPP Release 14 technology, it supports a theoretical downlink peak data rate of 1.0 Gbps and a theoretical uplink peak data rate of 150 Mbps. Designed in M.2 form factor, the module is compatible with Quectel LTE-A Cat 6 module EM06, Cat 12 modules EM12-G/ EM120R-GL/EM121R-GL, which facilitates customers' migration between different modules.

EM160R-GL is designed for global market and nearly covers all the mainstream carriers worldwide. The module supports Qualcomm® IZat™ location technology Gen9-VT (GPS, GLONASS, BDS and Galileo). The integrated GNSS 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 (PCIe interface/USB drivers for Windows, Linux, Android/optional built-in eSIM) extend the applicability of the module to a wide range of applications such as industrial router, home gateway, STB, industrial laptop, consumer laptop, industrial PDA, rugged tablet PC, and digital signage.

Key Features

- LTE-A Cat 16 module with M.2 form factor
- Support DL 5 Carrier Aggregation and 256QAM
- Worldwide LTE-A and UMTS/HSPA+ coverage
- Support PCIe Gen2 interface for PC/Laptop application
- Built-in eSIM (optional), DSSA
- Low power mode
- Multi-constellation GNSS receiver available for applications requiring fast and accurate fixes in any environment
- MIMO technology meets demands for data rate and link reliability in modem wireless communication systems

4G LTE
DL: LTE Cat 16
UL: LTE Cat 13

3G HSPA+
Max. 42 Mbps (DL)
Max. 5.76 Mbps (UL)

M.2
M.2 Form Factor

Embedded Abundant Protocols

PCIe Gen2 Interface

Multi-constellation GNSS (Optional)

USB 2.0/3.0 High Speed Interface

AT
Quectel Enhanced AT Commands

Version: 1.2 | Status: Released

Quectel EM160R-GL

LTE Cat 16		EM160R-GL
Region/Operator		Global
Package		M.2 Package, Key-B
Dimensions		42.0 mm × 30.0 mm × 2.3 mm
Weight		6.8 g
Temperature Range		
Operation Temperature		-25 °C to +75 °C
Extended Temperature		-40 °C to +85 °C
Frequency Bands		
LTE	**LTE-FDD**	B1/ 2/ 3/ 4/ 5/ 7/ 8/ 12/ 13/ 14/ 17/ 18/ 19/ 20/ 25/ 26/ 28/ 29①/ 30/ 32①/ 66
	LTE-TDD	B38/ 39/ 40/ 41/ 42/ 43/ 46① (LAA)/ 48 (CBRS)
	DL 2CA	Intra-band and Inter-band
	DL 3CA	Intra-band and Inter-band
	DL 4CA	Intra-band and Inter-band
	DL 5CA	Intra-band and Inter-band within 5 bands
	DL 4 × 4 MIMO	B1/ 2/ 3/ 4/ 7/ 25/ 30/ 32①/ 38/ 39/ 40/ 41/ 66
	DL 256QAM	Supported
	UL 2CA	Intra-band
	UL 64QAM	Supported
UMTS	**WCDMA**	B1/ 2/ 3/ 4/ 5/ 6/ 8/ 19
GNSS		GPS/GLONASS/BDS/Galileo (Optional)
Certifications		
Regulatory		**Global:** GCF **Europe:** CE **North America:** PTCRB **America:** FCC **Canada:** IC **Brazil:** Anatel **Mexico:** IFETEL **China:** SRRC/ NAL/ CCC **Taiwan, China:** NCC **South Korea:** KC **Japan:** JATE/ TELEC **Australia/New Zealand:** RCM **South Africa:** ICASA
Carrier		**Europe:** Vodafone/ British Telecom/ Swisscom **America:** Verizon/ AT&T/ T-Mobile/ Sprint **China:** China Mobile/ China Unicom **Japan:** NTT DOCOMO/ SoftBank②/ KDDI **Australia:** Telstra TBD
Others*		WHQL
Data Rate (Max.)		
LTE		1.0 Gbps (DL); 150 Mbps (UL)
UMTS	**DC-HSDPA**	42 Mbps (DL)
	DC-HSUPA	5.76Mbps (UL)
	WCDMA	384 kbps (DL); 384 kbps (UL)
Enhanced Features		
MIMO: DL 4 × 4, 4 × 2, 2 × 2		●
(U)SIM Card Detection & Hot Plug		●
Built-in eSIM		○
DSSA: Dual SIM, Single Active		●
DFOTA: Delta Firmware Over-the-Air		●
Embedded GNSS		○

NOTE:
1. ①: For secondary component carrier only.
2. ②: Currently, SoftBank certification is only supported for PC applications.
3. *: Under development/In progress.
4. ●: Supported; ○: Optional.

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Quectel EM160R-GL

LTE Cat 16		EM160R-GL
SMS		
Point-to-point MO and MT		●
SMS Cell Broadcast		●
Text and PDU Mode		●
3GPP/3GPP2		●
Windows OS SMS Push Feature		●
Software Features		
3GPP		3GPP E-UTRA Release 14
AT Command		3GPP TS27.007 Quectel Enhanced AT Commands
Protocols		QMI/ MBIM/ NITZ/ PING/ HTTP/ HTTPS
Drivers	**MBIM Driver**	Windows 10
	USB Serial Driver	Windows 7/8/8.1/10 Linux 2.6/3.x/4.x/5.x Android 4.x/5.x/6.x/7.x/8.x/9.x/10.x
	RIL Driver	Android 4.x/5.x/6.x/7.x/8.x/9.x/10.x
	NDIS Driver	Windows 7/8/8.1/10
	ECM Driver*	Linux 2.6/3.x/4.x/5.x
	Gobinet Driver	Linux 2.6/3.x/4.x/5.x
	QMI_WWAN Driver	3.x (3.4 or later)/ 4.x/5.x
	PCIE MHI Driver	Windows 10 Linux 3.10–5. 10
Interfaces		
(U)SIM Interfaces (1.8/3.0 V)		× 2
USB 2.0/3.0, supporting Slave Mode		× 1
PCIe Interface		× 1
PCM*		× 1
Control and Indication Interfaces*		× 7 (Airplane mode control, GNSS control, Wake-up control*, RF status indication, etc.)
Cellular/WLAN COEX UART Interface*		× 1
Antenna Tuner Control Interfaces*		× 2
Configuration Pins		× 4
Antenna Interfaces		× 4 (Main, Rx-diversity/GNSS, MIMO1, MIMO2)
Electrical Features		
Supply Voltage Range		3.135–4.4 V, typ. 3.7 V
Transmitting Power		**USB Mode** • LTE-FDD: Class 3 (23 dBm ±2 dB) • LTE-TDD: - B41 HPUE: Class 2 (25.5 dBm +1/-2 dB) - Other bands: Class 3 (23 dBm ±2 dB) • WCDMA: Class 3 (24 dBm +1/-3 dB) **PCIe Only Mode** • LTE-FDD: - B30: Class 3 (22 dBm +1/-2 dB) - Other bands: Class 3 (24 dBm +1/-2 dB) • LTE-TDD: - B41: Class 3 (23 dBm +1/-2 dB) - B42/ 43/ 48: Class 3 (21 dBm +1/-2 dB) - B41 HPUE: Class 2 (25.5 dBm +1/-2 dB) - Other bands: Class 3 (24 dBm +1/-2 dB) • WCDMA: Class 3 (24 dBm +1/-3 dB)
Power Consumption		**USB Mode** 66 μA @ Power down 1.78 mA @ Sleep (**AT+CFUN=0**, USB Suspend) 24.75 mA @ Idle (PF = 64, USB Active) **PCIe Only Mode** 66 μA @ Power down 2.38 mA @ Sleep (**AT+CFUN=0**, Modern standby) 15.38 mA @ Idle (PF = 64, PCIe Active)

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2. ●: Supported; ○: Optional.

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