



Quectel EM12xR-GL&EM160R-GL Module

Introduction

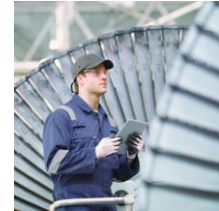
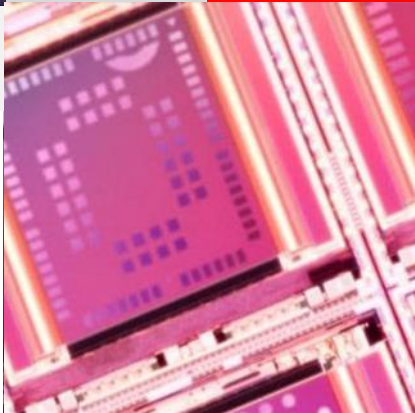
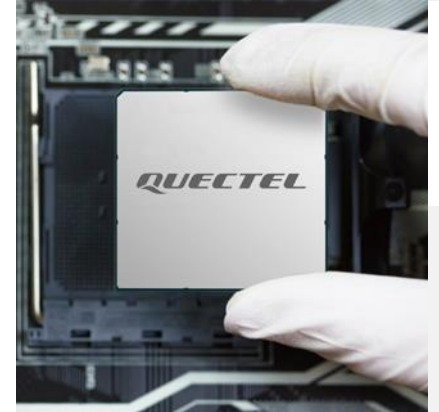
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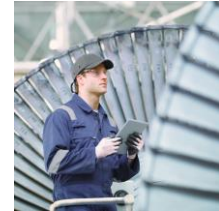
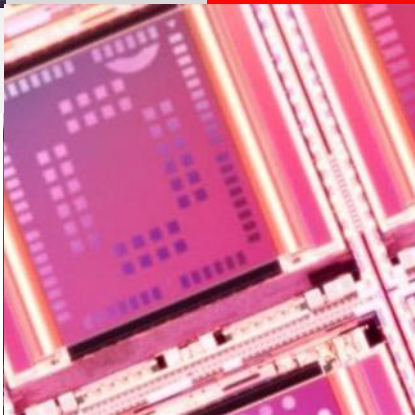
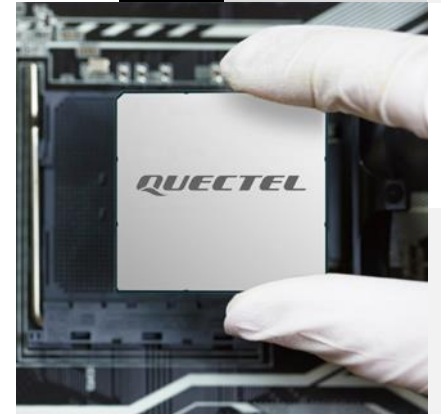
Overview

Specification & Timeline

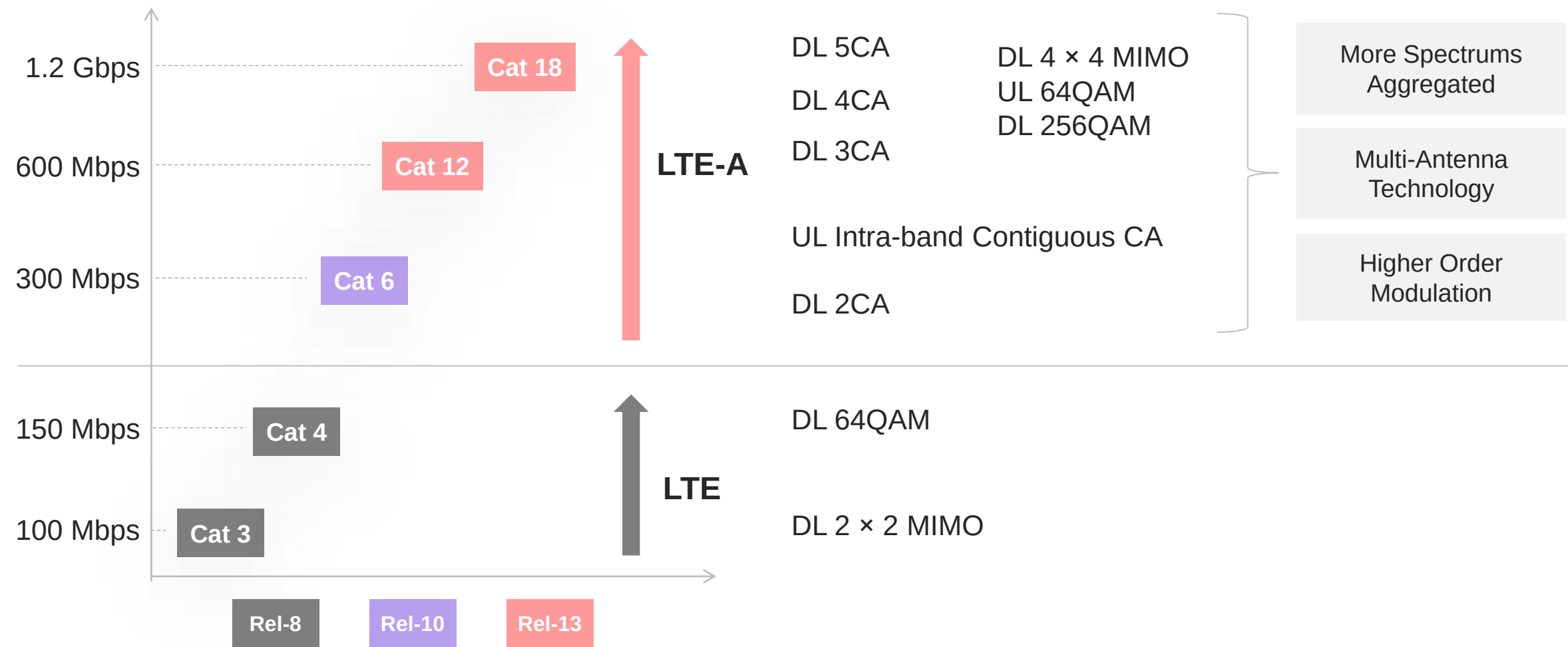
Software & Support

Typical Applications

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LTE-A Key Technology



LTE-A Module Overview



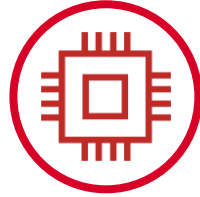
Cat 16/ 18	EG18  • SDX20 • Rel-12	EM160R  • SDX24 • Rel-14	
Cat 12	EG12  EM12  • SDX20 • Rel-12	EG512R  EM12xR  • SDX24 • Rel-14	EG120K  EM120K  • SDX12 • Rel-12 NEW
Cat 6	EG060W  • ASR1828 • Rel-10 • RGMII		EG060K  EG065K  EM060K  • SDX12 • Rel-12 NEW

LTE-A Module Portfolio



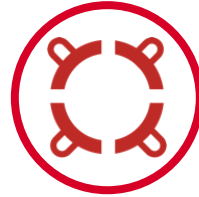
LTE-Advanced			
LGA, 42 × 38 mm		LGA, 39.5 × 37 mm	M.2, 30 × 42 mm
Cat 12/ 16/ 18		 EG18 (SDX20) • EA (EMEA/ APAC^① / Brazil) • NA (North America)	 EM120R/EM121R/EM160R (SDX24) • GL (Global)
	 EG512R (SDX24) • EA (EMEA/ APAC^① / Brazil)	 EG12 (SDX20) • GT (Global TDD 3.5 GHz) • EA (EMEA/ APAC^① / Brazil)	 EM12 (SDX20) • G (Global)
		 EG120K (SDX12) • EA (EMEA/ APAC^① / Brazil) • NA (North America) • LA (LATAM excl. Brazil) • JP (Japan)	 EM120K (SDX12) • GL (Global)
Cat 6	LGA, 31 × 28 mm		
	 EG065K (SDX12) • EA (EMEA/ APAC^① / LATAM) • NA (North America)	 EG060K (SDX12) • EA (EMEA/ APAC^① / Brazil) • GT (Global TDD 3.5 GHz) • NA (North America) • LA (LATAM excl. Brazil) • JP (Japan)	 EM060K (SDX12) • GL (Global) • NA (North America) • EA (EMEA/ APAC^① / Brazil)
		 EG060W (ASR1828) • EA (EMEA/ APAC^① / Brazil)	

EM12xR-GL/EM160R-GL Main Highlights



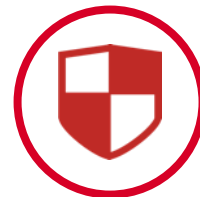
Compatible

- Pin-to-pin compatible with EM06/ EM060K-GL/ EM12-G modules, which ensures easy migration among the modules.



Optimized

- Support mainstream four-mode LTE-TDD/ LTE-FDD/ WCDMA/ DC-HSPA+ bands.
- Multiple-constellation positioning meets more customers' needs.



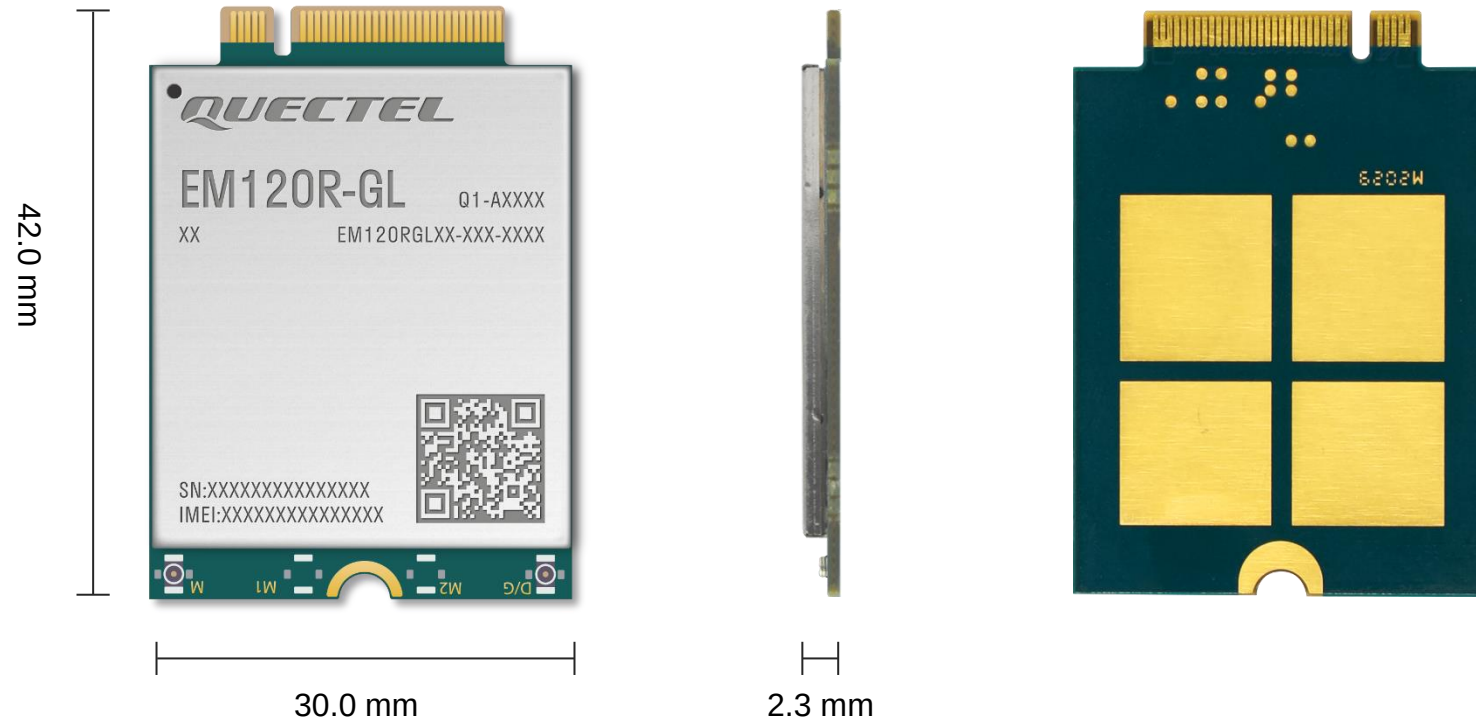
Reliable

- High stability meets Quectel quality standards with Qualcomm chips adopted.
- Meet the needs of the Internet of Things industry and pass certification in many countries or regions.

EM12xR-GL Mechanical Dimensions



Multi-Mode LTE-A Module (LTE Cat 12)



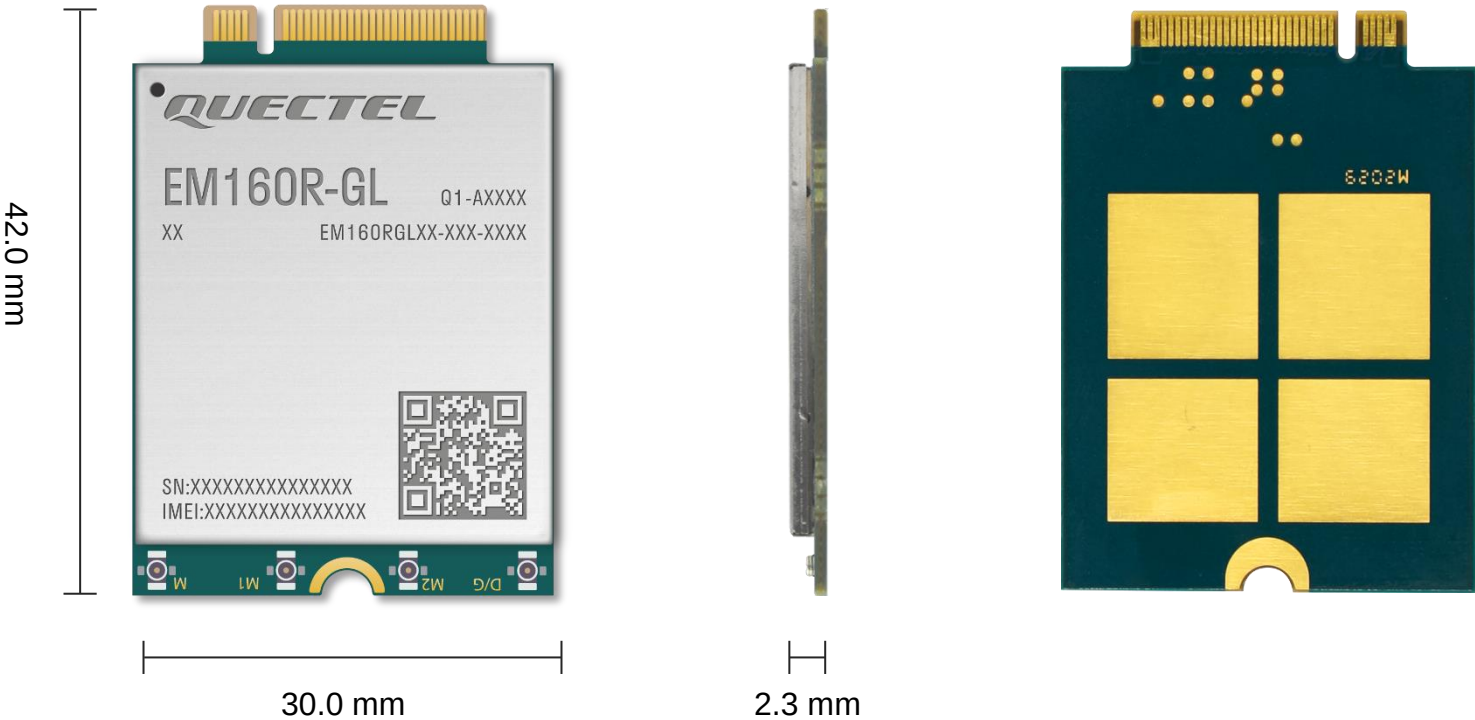
Length: 42.0 mm (± 0.15 mm)
Width: 30.0 mm (± 0.15 mm)
Height: 2.3 mm (± 0.08 mm)
M.2 Package, Key-B

1. The picture above is for reference only. For actual product appearance and label information, please refer to Quectel's module.
2. EM12xR-GL refers to EM120R-GL and EM121R-GL.

EM160R-GL Mechanical Dimensions



Multi-Mode LTE-A Module (LTE Cat 16)



Length: 42.0 mm (± 0.15 mm)
Width: 30.0 mm (± 0.15 mm)
Height: 2.3 mm (± 0.08 mm)
M.2 Package, Key-B

The picture above is for reference only. For actual product appearance and label information, please refer to Quectel's module.



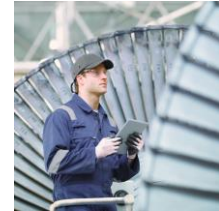
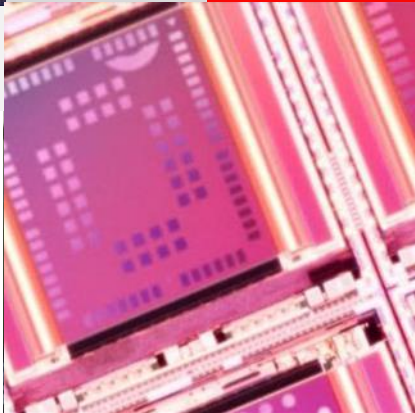
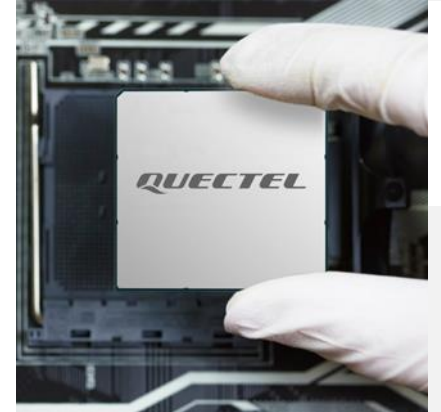
Overview

Specification & Timeline

Software & Support

Typical Applications

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EM12xR-GL Specifications

42.0 mm × 30.0 mm × 2.3 mm
M.2 Module
LTE Cat 12 : 600M DL/150M UL



Variant		EM120R-GL	EM121R-GL
Category		DL/UL: 12 /13	DL/UL: 12 /13
LTE	LTE-FDD	B1/ 2/ 3/ 4/ 5/ 7/ 8/ 12/ 13/ 14/ 17 ^① / 18/ 19/ 20/ 25/ 26/ 28/ 29 ^② / 30/ 32 ^② / 66	B1/ 2/ 3/ 4/ 5/ 7/ 8/ 12/ 13/ 14/ 17 ^① / 18/ 19/ 20/ 25/ 26/ 28/ 29 ^② / 30/ 32 ^② / 66
	LTE-TDD	B38/ 39/ 40/ 41/ 42/ 43/ 46 ^② (LAA)/ 48(CBRS)	B38/ 39/ 40/ 41/ 42/ 43/ 46 ^② (LAA)/ 48(CBRS)
	DL 2CA	Intra-band and Inter-band	Intra-band and Inter-band
	DL 3CA	Intra-band and Inter-band	Intra-band and Inter-band
	DL 256QAM	Supported	Supported
	UL 2CA	Intra-band	Intra-band
	UL 64QAM	Supported	Supported
UMTS	WCDMA	B1/ 2/ 3/ 4/ 5/ 6/ 8/ 19	B1/ 2/ 3/ 4/ 5/ 6/ 8/ 19
Embedded GNSS (Optional)		Supported/ L1	Supported/ L1 + L5
PCIe Interface		Supported	Supported
USB 3.0 Interface		Supported	Supported
eSIM (Optional)		Supported / Built-in eSIM	Supported / Built-in eSIM
Region		Global	Global
Certification	Carrier	Vodafone/ British Telecom/ Verizon/ AT&T/ T-Mobile/ Sprint/ China Mobile/ China Unicom/ NTT DOCOMO/ SoftBank [®] / KDDI/ Telstra / Swisscom/ Rakuten	AT&T/ Verizon
	Regulatory	GCF/ CE/ FCC/ PTCRB/ IC/ Anatel/ IFETEL/ SRRC/ NAL/ CCC/ KC/ NCC/ JATE/ TELECOM/ RCM/ ICASA	GCF/ CE/ FCC/ PTCRB/ IC/ RCM

①: B17 is supported through MFBI + B12.

②: LTE-FDD B29/ 32 and LTE-TDD B46 support Rx only and are only for secondary component carrier.

③: Currently, SoftBank certification is only supported for PC applications.

EM160R-GL Specifications

42.0 mm × 30.0 mm × 2.3 mm
M.2 Module
LTE Cat 16 : 1000M DL/150M UL



Variant		EM160R-GL
Category		DL/UL: 16 /13
LTE	LTE-FDD	B1/ 2/ 3/ 4/ 5/ 7/ 8/ 12/ 13/ 14/ 17 ^① / 18/ 19/ 20/ 25/ 26/ 28/ 29 ^② / 30/ 32 ^② / 66
	LTE-TDD	B38/ 39/ 40/ 41/ 42/ 43/ 46 ^② (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 4 bands
	DL 4 × 4 MIMO	B1/ 2/ 3/ 4/ 7/ 25/ 30/ 32 ^② / 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
Embedded GNSS (Optional)		Supported
PCIe Interface		Supported
USB 3.0 Interface		Supported
eSIM (Optional)		Supported / Built-in eSIM
Region		Global
Certification	Carrier	Vodafone/ British Telecom/ Verizon/ AT&T/ T-Mobile/ Sprint/ China Mobile/ China Unicom/ NTT DOCOMO/ SoftBank ^③ / KDDI/ Telstra/ Swisscom
	Regulatory	GCF/ CE/ FCC/ PTCRB/ IC/ Anatel/ IFETEL/ SRRC/ NAL/ CCC/ KC/ NCC/ JATE/ TELEC/ RCM/ ICASA

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①: B17 is supported through MFBI + B12.

②: LTE-FDD B29/ 32 and LTE-TDD B46 support Rx only and are only for secondary component carrier.

③: Currently, SoftBank certification is only supported for PC applications.

EM120R-GL Certification



Project Stage

EM120R-GL MP

MP: Software and hardware design has reached mass production stage

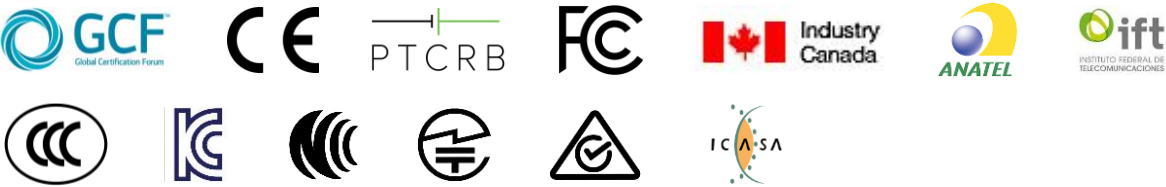
Carrier

Vodafone/ British Telecom/ AT&T/ T-Mobile/ Sprint/ Verizon/
China Mobile/ China Unicom/ NTT DOCOMO/ SoftBank^①/ KDDI/ Telstra/ Swisscom/ Rakuten Completed



Regulatory

GCF/ CE/ PTCRB/ FCC/ IC/Anatel/ IFETEL/ SRRC/ NAL/ CCC/ KC/ NCC/ JATE/ TELEC/ RCM/ ICASA Completed



EM121R-GL Certification



Project Stage

EM121R-GL

MP

MP: Software and hardware design has reached mass production stage

Carrier

AT&T/ Verizon

Completed



Regulatory

GCF/ CE/ PTCRB/ FCC/ IC/ RCM

Completed



EM160R-GL Certification



Project Stage

EM160R-GL MP

MP: Software and hardware design has reached mass production stage

Carrier

Vodafone/ British Telecom/ AT&T/ T-Mobile/ Sprint/ Verizon/
China Mobile/ China Unicom/ NTT DOCOMO/ SoftBank^①/ KDDI/ Telstra/ Swisscom/ Rakuten **Completed**



Regulatory

GCF/ CE/ PTCRB/ FCC/ IC/Anatel/ IFETEL/ SRRC/ NAL/ CCC/ KC/ NCC/ JATE/ TELEC/ RCM/ ICASA **Completed**





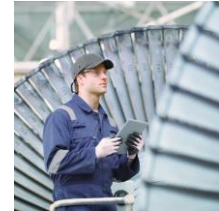
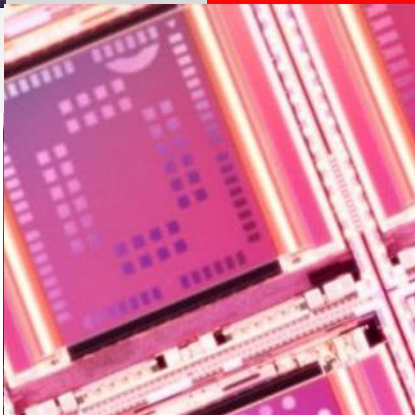
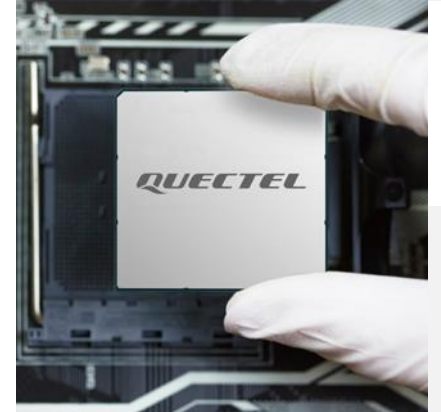
Overview

Specification & Timeline

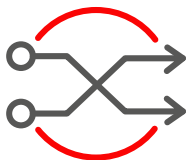
Software & Support

Typical Applications

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Software Advantages

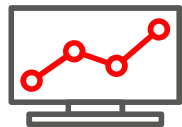


USB Serial Drivers

Windows 7/8/8.1/10/11
WinCE 5.0/6.0/7.0*
Linux 2.6–6.5
Android 4.x–13.x

Quality Guarantee

Reliable network protocols
Steady flash protection mechanism
Superior audio algorithms



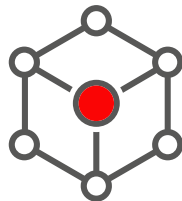
NDIS/ MBIM/ QMI_WWAN/PCIE MHI Drivers

NDIS Driver: Windows 7/8/8.1/10/11
MBIM Driver: Windows 8/8.1/10/11,
Linux 3.18–6.5
QMI_WWAN Driver: Linux 3.4–6.5
PCIE MHI Driver: Windows 10/11,
Linux 2.6–6.5



Special Features

DTMF: Dual-tone Multi-frequency
DFOTA: Delta Firmware Upgrade
Over-the-Air



Flexible Applications

Digital Audio and VoLTE
(U)SIM Card Detection

Abundant Protocols

QMI/MBIM/NITZ/PING

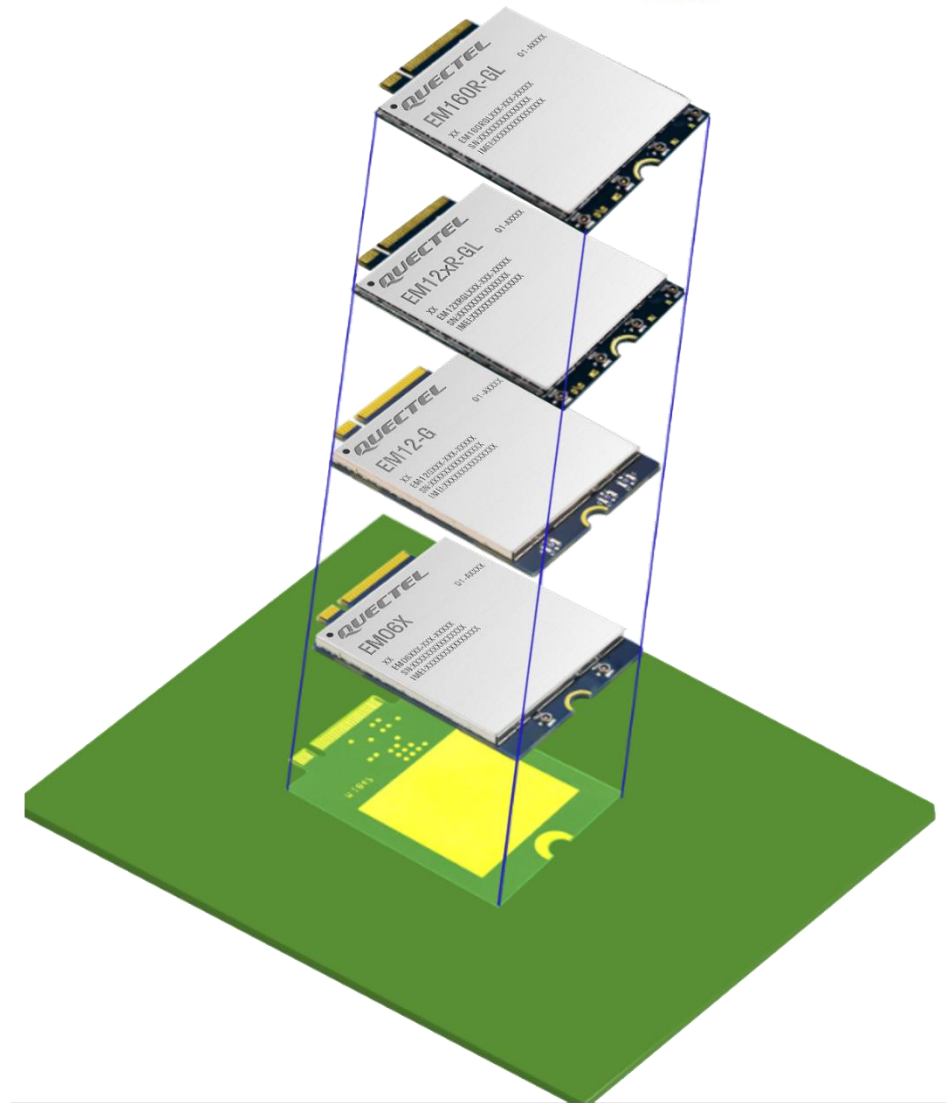


M.2 Series Footprint Compatibility



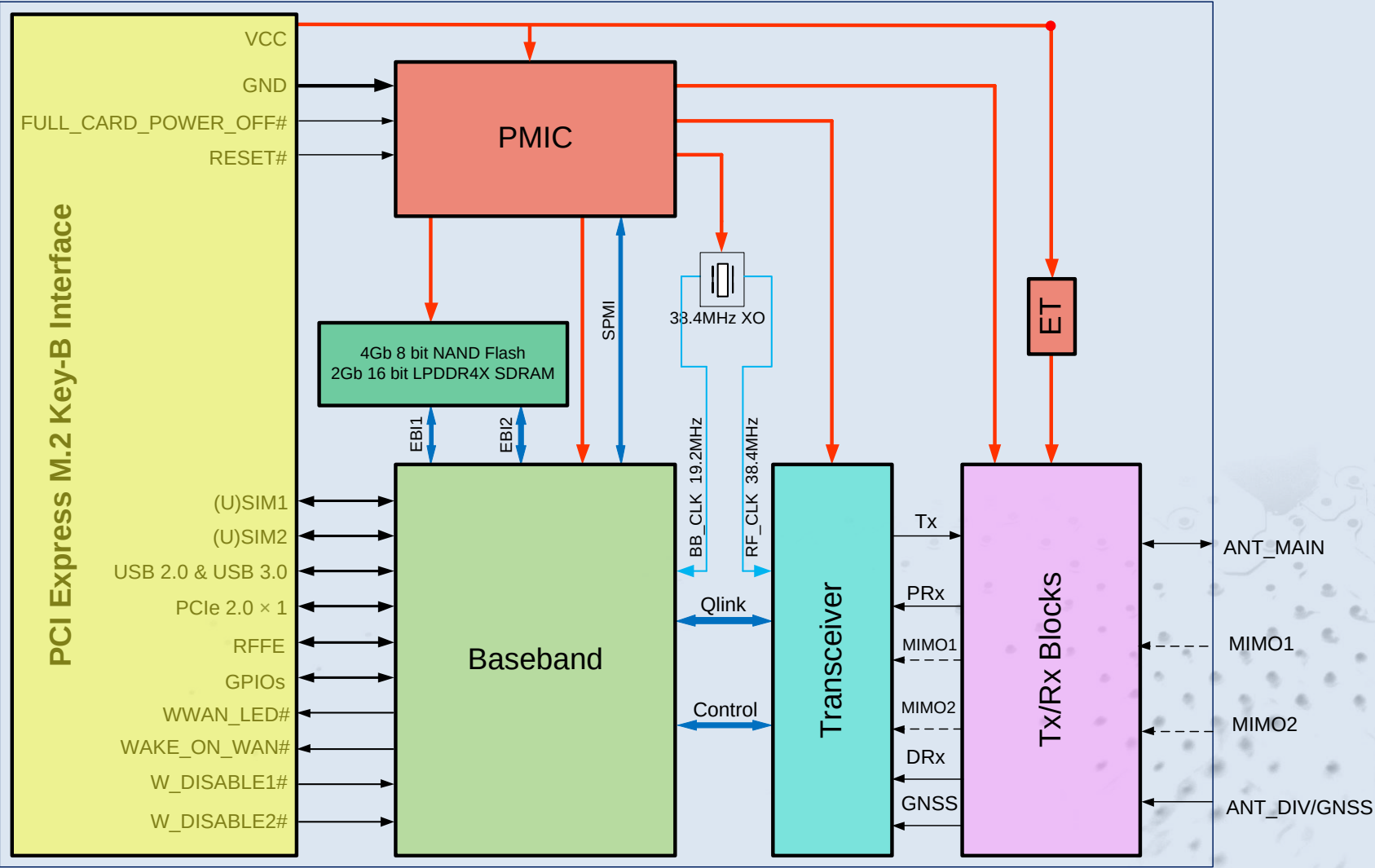
Quectel EM12xR-GL/EM160R-GL module is compatible with the following LTE-A modules:

- Quectel LTE Cat 6 EM06/EM060K-GL series modules
- Quectel LTE Cat 12 EM12-G module



1. EM12xR-GL refers to EM120R-GL and EM121R-GL.
2. The compatibility diagram shown above is for illustration purpose only.
3. The actual label design of the modules may be different.

Hardware Block Diagram



1. The block diagram is for reference only and varies among different modules.
2. MIMO1 and MIMO2 antennas are only applicable to the EM160R-GL module.



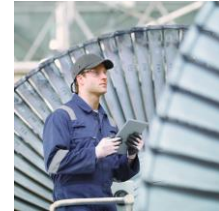
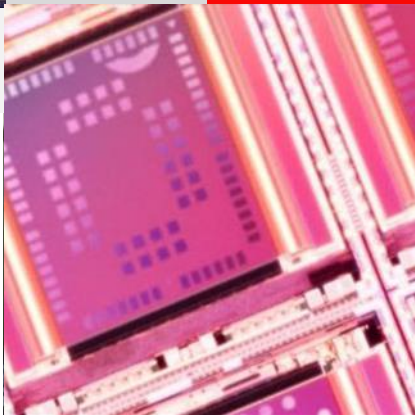
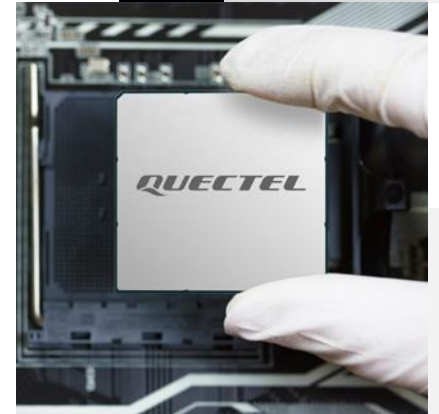
Overview

Specification & Timeline

Software & Support

Typical Applications

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Typical Applications – Fixed Wireless Access



Fixed Wireless Access

- Home Gateway
- Industrial Router
- CPE
- DTU
- Enterprise Gateway
- Mobile Hotspot

Typical Applications – Mobile Broadband Devices



Mobile Broadband Devices

- Consumer Laptop
- Industrial Tablet
- High-Definition Live Broadcast
- AR/VR

Typical Applications – Industrial Automation



Industrial Automation

- Automated Guided Vehicle
- Remote Control
- Smart Grid
- Smart Mine
- Robot



**We are a global IoT solutions provider,
backed by outstanding support and
services, to deliver a smarter world.**

- Unbeatable choice from the broadest module portfolio in the world
- High quality range of off-the-shelf and customized antennas
- Superb support with the largest R&D team in the industry
- Continuous innovation in 5G, LPWA, Automotive, and Smart module technology
- A passionate, dedicated team of "Quectelers" ensures our customers always come first

Thank You

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