

An aerial night view of a city with a network overlay. The city is illuminated with blue and white lights, and a complex network of glowing blue lines and nodes is superimposed over the scene, representing a global communication network. The background is dark, making the city lights and network nodes stand out.

QUECTEL

Quectel EM12xR-GL&EM160R-GL Module

Introduction

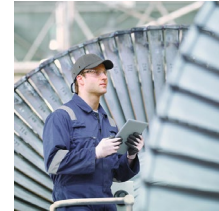
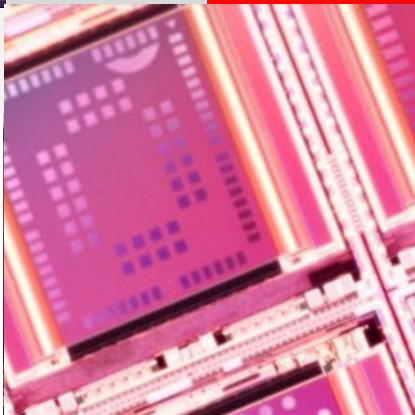
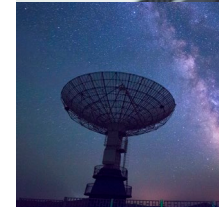
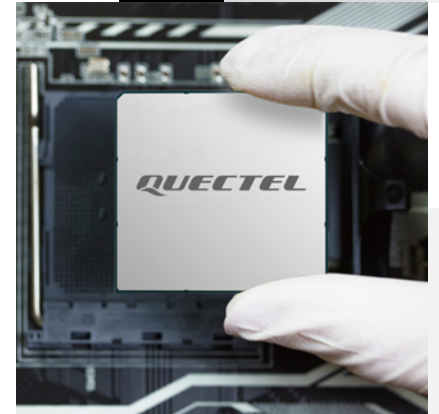
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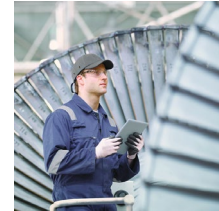
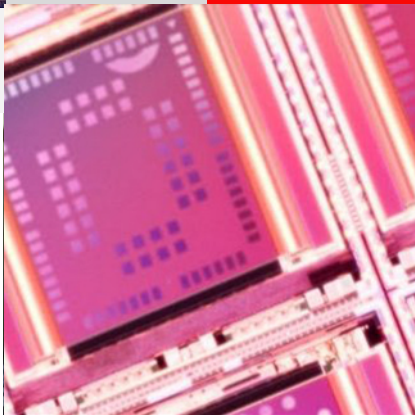
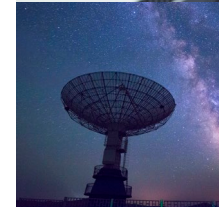
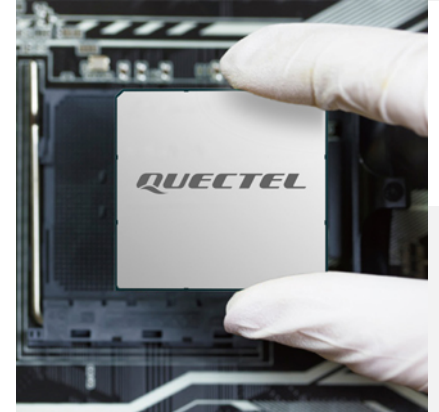
LTE-Advanced Pro Roadmap

Highlights & Specifications

Technical Details

Applications

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LTE-A/ LTE-A Pro Roadmap



Cat 16/18

Qualcomm



EG18 Series



EM160R-GL

Cat 12

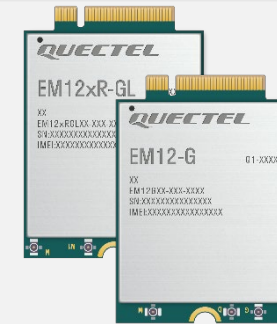
Qualcomm



EG120K-EA
EG12 Series



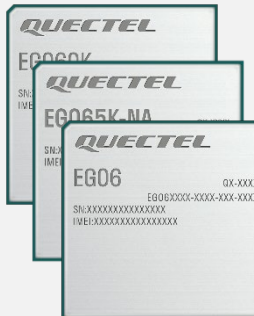
EG512R-EA



EM12xR-GL
EM12-G

Cat 6

Qualcomm



EG060K-EA
EG065K-NA
EG06 Series



EP06 Series



EM060K-GL
EM06 Series

• Q4/21

ASR



EG060V-EA

Compatible Design

Compatible Design

• Qx/YY Estimated Engineering Sample Time

LTE-A Pro Module Overview (Cat 12/16/18)



Cat 16/ Cat 18



EG18 Series

- LGA Form Factor
- Variants:
 - EA
 - NA



EM160R-GL

- M.2 Form Factor
- Variant:
 - GL

Cat 12



EG12 Series

- LGA Form Factor
- Variants:
 - GT
 - EA



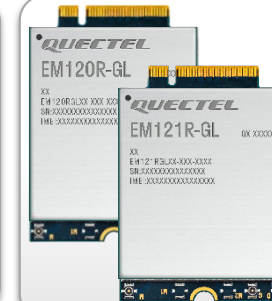
EG512R-EA

- LGA Form Factor
- Variant:
 - EA



EM12-G

- M.2 Form Factor
- Variant:
 - G



EM12xR-GL

- M.2 Form Factor
- Variant:
 - EM120R-GL
 - EM121R-GL Engineering Sample



EG120K-EA

- LGA Form Factor
- Variant:
 - EA Engineering Sample

• Qx/YY Estimated Engineering Sample Time



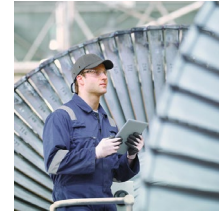
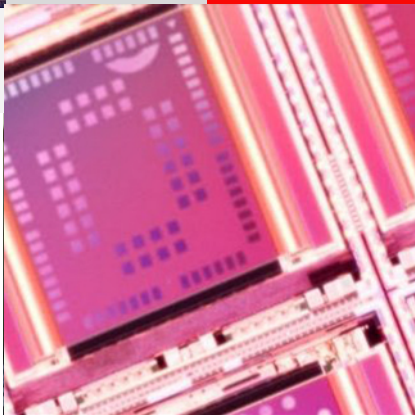
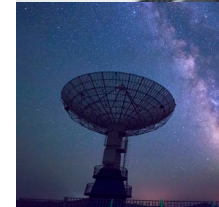
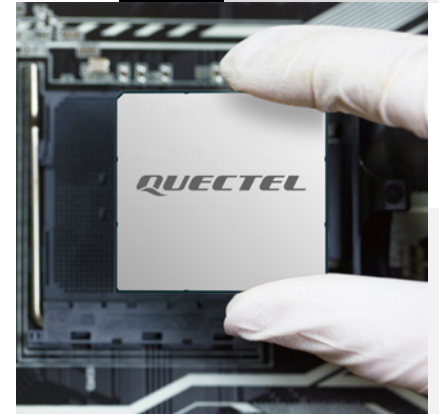
LTE-Advanced Pro Roadmap

Highlights & Specifications

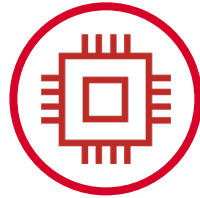
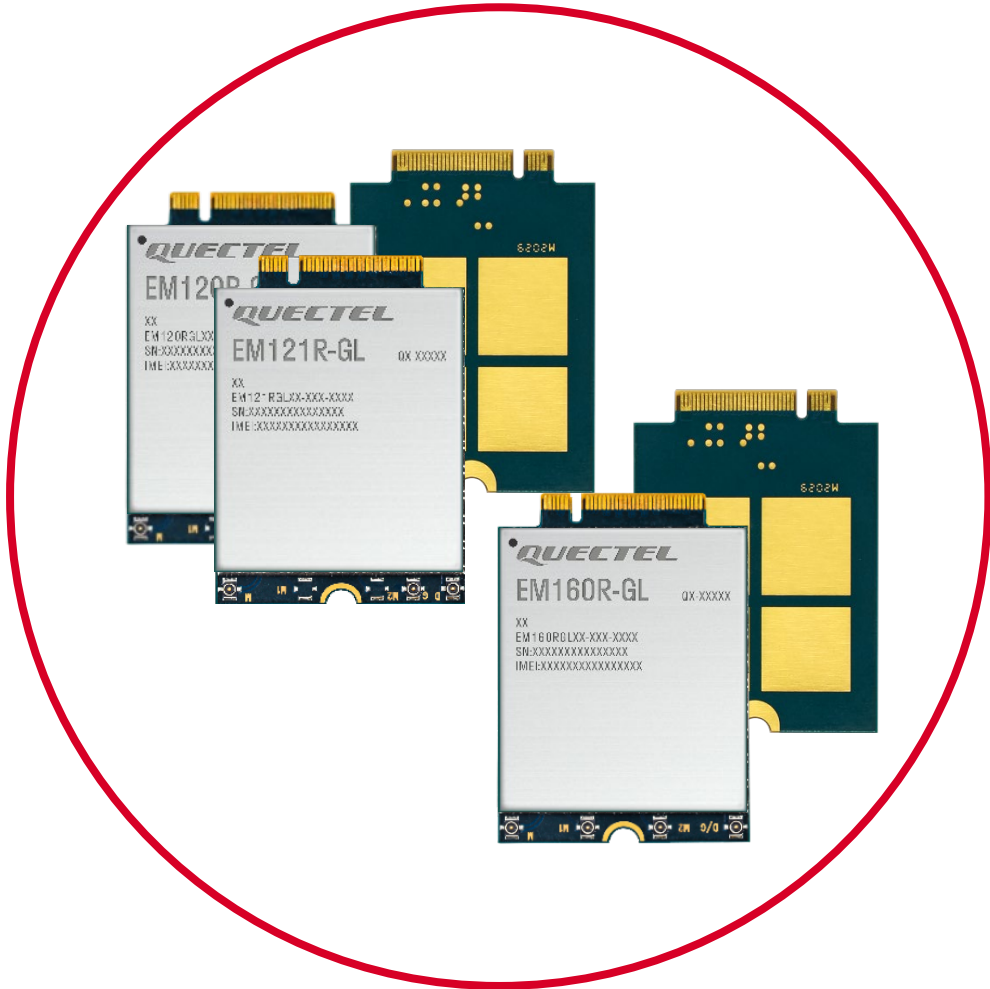
Technical Details

Applications

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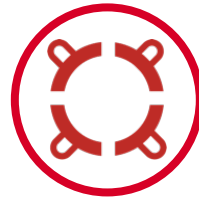


EM12xR-GL/EM160R-GL Main Highlights



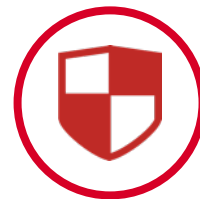
Compatible

- 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.



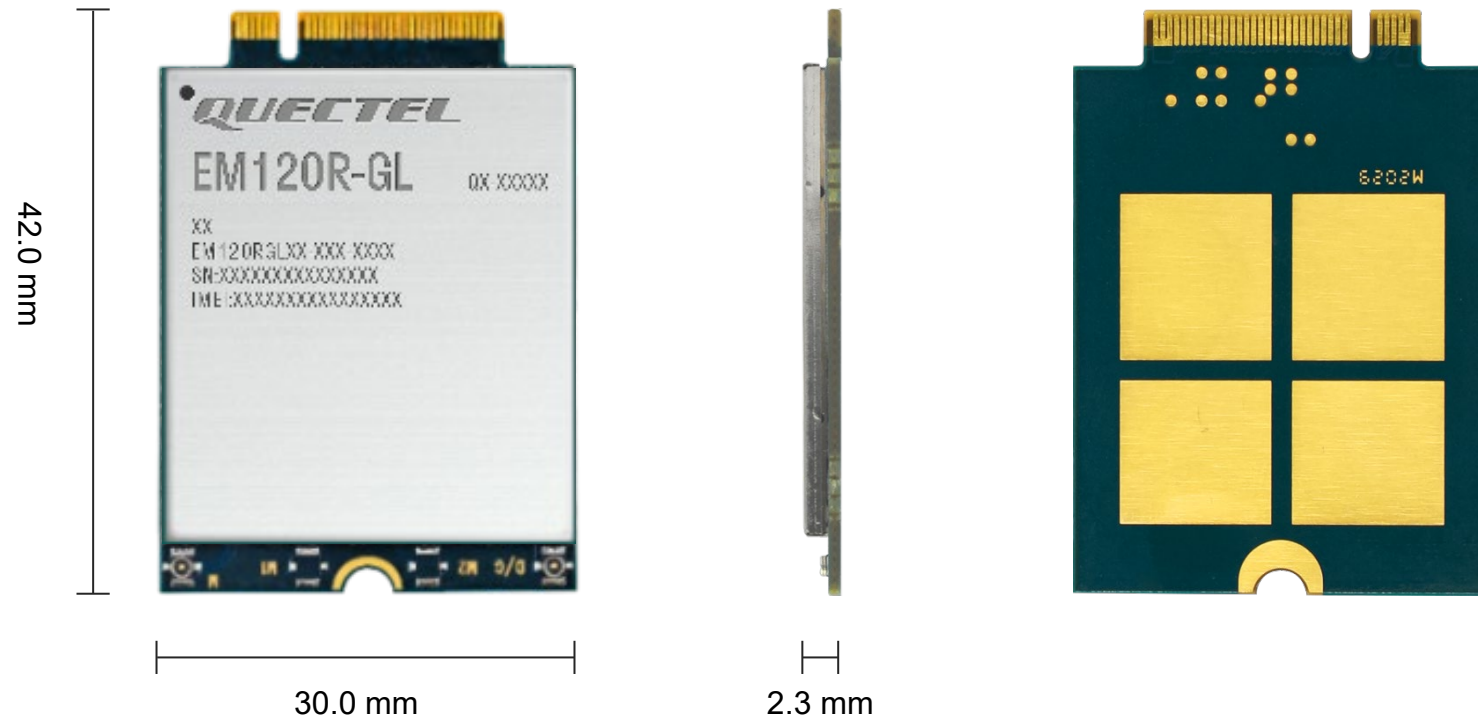
Reliable

- 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)



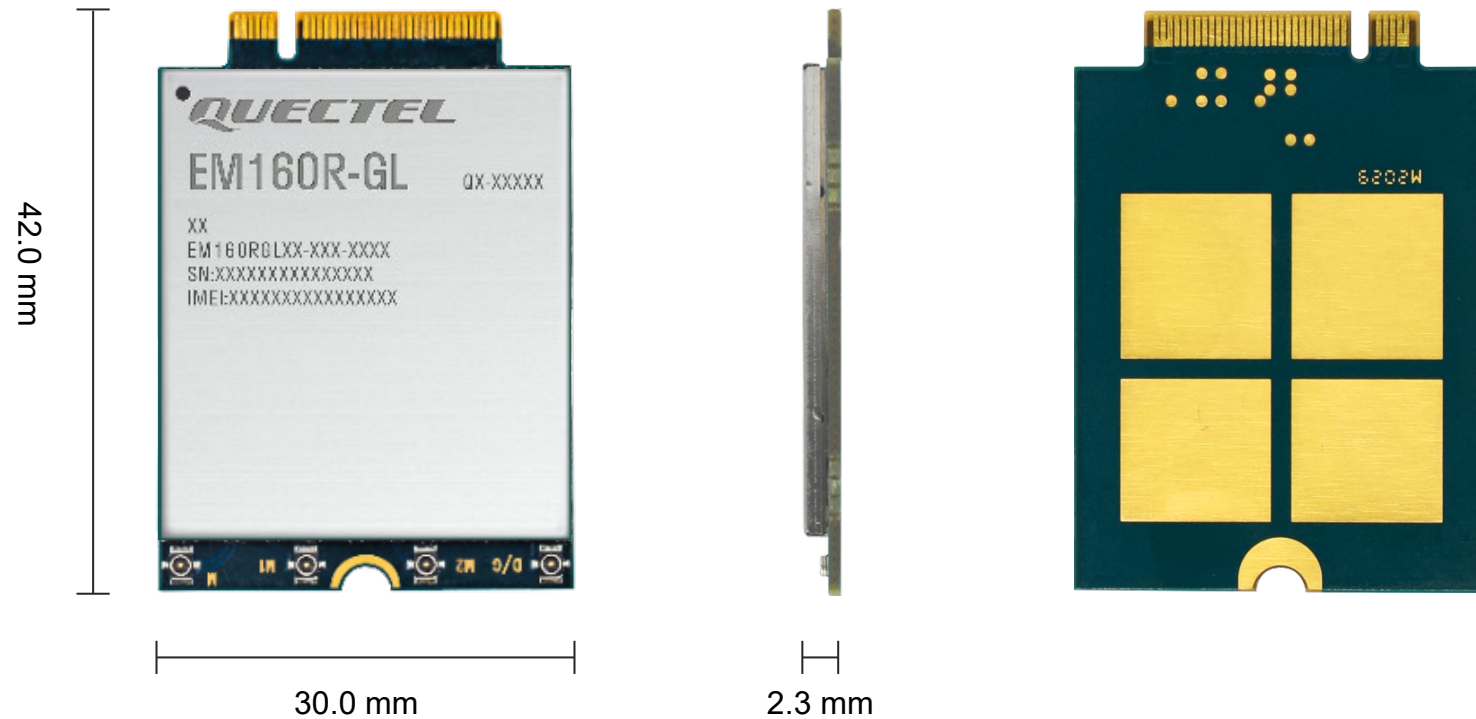
Length: 42.0 mm (± 0.15 mm)
Width: 30.0 mm (± 0.15 mm)
Height: 2.3 mm (± 0.08 mm)
M.2 Package, Key-B

1. Images above are for illustration purpose only and may differ from the actual module. For authentic appearance and label, please refer to the module received from Quectel.
2. EM120R-GL above 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

Images above are for illustration purpose only and may differ from the actual module. For authentic appearance and label, please refer to the module received from Quectel.

EM12xR-GL Specifications



42.0 mm × 30.0 mm × 2.3 mm
LTE Cat 12, 600 Mbps DL/150 Mbps UL

■ Multi-Mode LTE-A Pro Module

| Variant | | EM120R-GL | EM121R-GL (Preliminary) |
|-------------------|-----------|--|---|
| Category | | DL/UL: 12 /13 | DL/UL: 12 /13 |
| LTE | LTE-FDD | B1/B2/B3/B4/B5/B7/B8/B12/B13/B14/B17/B18/B19/B20/B25/B26/B28/B29/ B30/B32/B66 | B1/B2/B3/B4/B5/B7/B8/B12/B13/B14/B17/B18/B19/B20/B25/B26/B28/B29/ B30/B32/B66 |
| | LTE-TDD | B38/B39/B40/B41/B42/B43/B46(LAA)/B48(CBRS) | B38/B39/B40/B41/B42/B43/B46(LAA)/B48(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/B2/B3/B4/B5/B6/B8/B19 | B1/B2/B3/B4/B5/B6/B8/B19 |
| Embedded GNSS | | Supported/ L1 (Passive Antenna) | Supported/ L1 + L5 (Active Antenna) |
| PCIe Interface | | Supported | Supported |
| USB 3.0 Interface | | Supported | Supported |
| eSIM | | Supported / Built-in eSIM (optional) | Supported / Built-in eSIM (optional) |
| Region | | Global | Global |
| Certification | | Carrier: Vodafone/ British Telecom/ Verizon/ AT&T/ T-Mobile/ Sprint/ China Mobile/ China Unicom/ NTT DOCOMO/ SoftBank ^① / KDDI/ Telstra ^{TBD} / Swisscom Regulatory: GCF/ CE/ FCC/ PTCRB/ IC/ Anatel/ IFETEL/ SRR/ NAL/ CCC/ KC/ NCC/ JATE/ TELEC/ RCM/ ICASA | Carrier: AT&T*/ Verizon Regulatory: GCF/ CE/ FCC/ PTCRB/ IC/ RCM |

Notes: 1. “*”: Under development/ In progress.

2. TBD: To Be Determined

3. ①: Currently, SoftBank certification is only supported for PC applications.

EM160R-GL Specifications



■ Multi-Mode LTE-A Pro Module

42.0 mm × 30.0 mm × 2.3 mm
LTE Cat 16, 1.0 Gbps DL/150 Mbps UL

| | | |
|--------------------------|---|--|
| Variant | EM160R-GL | |
| Category | DL/UL: 16 /13 | |
| LTE | LTE-FDD | B1/B2/B3/B4/B5/B7/B8/B12/B13/B14/B17/B18/B19/B20/B25/B26/B28/B29/B30/B32/B66 |
| | LTE-TDD | B38/B39/B40/B41/B42/B43/B46(LAA)/B48(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/B2/B3/B4/B7/B25/B30/B32/B66/B38/B39/B40/B41 |
| | DL 256QAM | Supported |
| | UL 2CA | Intra-band |
| | UL 64QAM | Supported |
| UMTS | WCDMA | B1/B2/B3/B4/B5/B6/B8/B19 |
| Embedded GNSS | Supported | |
| PCIe Interface | Supported | |
| USB 3.0 Interface | Supported | |
| eSIM | Supported / Built-in eSIM (optional) | |
| Region | Global | |
| Certification | Carrier: Vodafone/ British Telecom/ Verizon/ AT&T/ T-Mobile/ Sprint/ China Mobile/ China Unicom/ NTT DOCOMO/ SoftBank ^① / KDDI/ Telstra ^{TBD} / Swisscom Regulatory: GCF/ CE/ FCC/ PTCRB/ IC/ Anatel/ IFETEL/ SRRC/ NAL/ CCC/ KC/ NCC/ JATE/ TELEC/ RCM/ ICASA | |

Notes: 1. “*”: Under development/ In progress.

2. TBD: To Be Determined

3. ①: Currently, SoftBank certification is only supported for PC applications.

EM120R-GL Certification



Project Schedule

EM120R-GL

MP

MP: Hardware and software ready for mass production.

Carrier Certification

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

Completed



Telstra TBD

Regulatory Certification

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

Completed



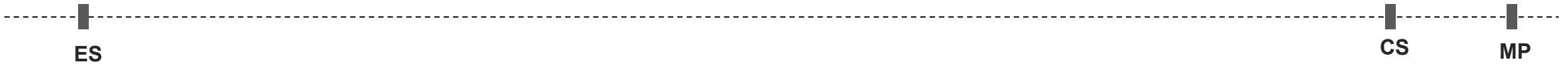
Notes: 1. TBD: To Be Determined
2. ①: Currently, SoftBank certification is only supported for PC applications.

EM121R-GL Timeline (Preliminary)



| 2020 | | | | | | | | 2021 | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|-----|------|------|------|------|------|------|------|
| May | Jun. | Jul. | Aug. | Sep. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | Jun. | Jul. | Aug. | Sep. | Oct. | Nov. | Dec. |

Project Schedule



ES: Engineering samples ready. Basic functions are available for customers' simple demo purpose.

CS: Commercial samples ready. Stable hardware design and quite stable software design. New software features can be added upon request.

MP: Hardware and software ready for mass production.

Carrier Certification

Verizon **Completed**



Regulatory Certification

GCF/ CE/ PTCRB/ FCC/ IC/ RCM **Completed**

EM160R-GL Certification



Project Schedule

EM160R-GL



MP: Hardware and software ready for mass production.

Carrier Certification

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

Completed



Telstra TBD

Regulatory Certification

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

Completed



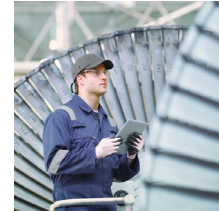
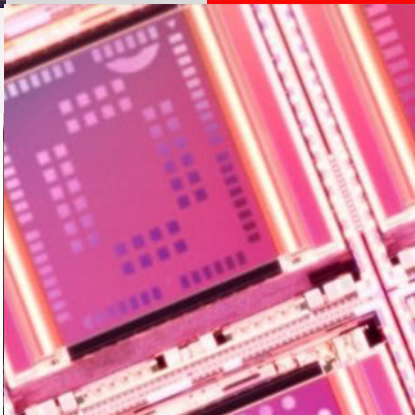
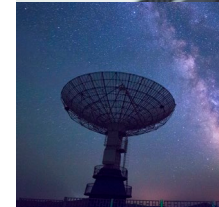
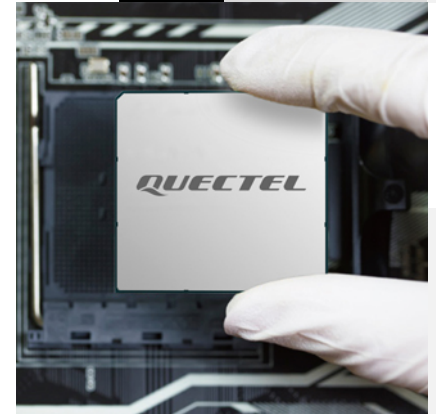
Notes: 1. TBD: To Be Determined
2. ①: Currently, SoftBank certification is only supported for PC applications.



LTE-Advanced Pro Roadmap Highlights & Specifications

Technical Details

Applications



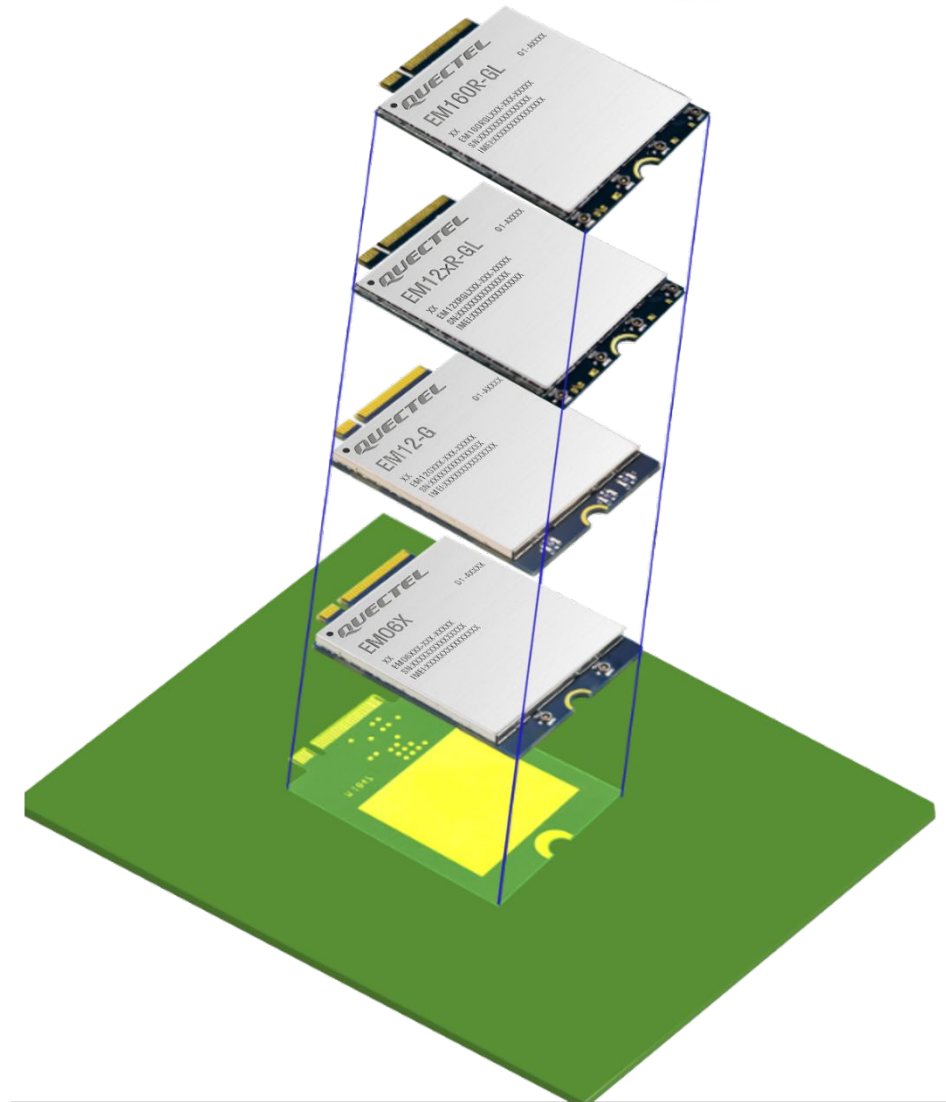
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M.2 Series Footprint Compatibility



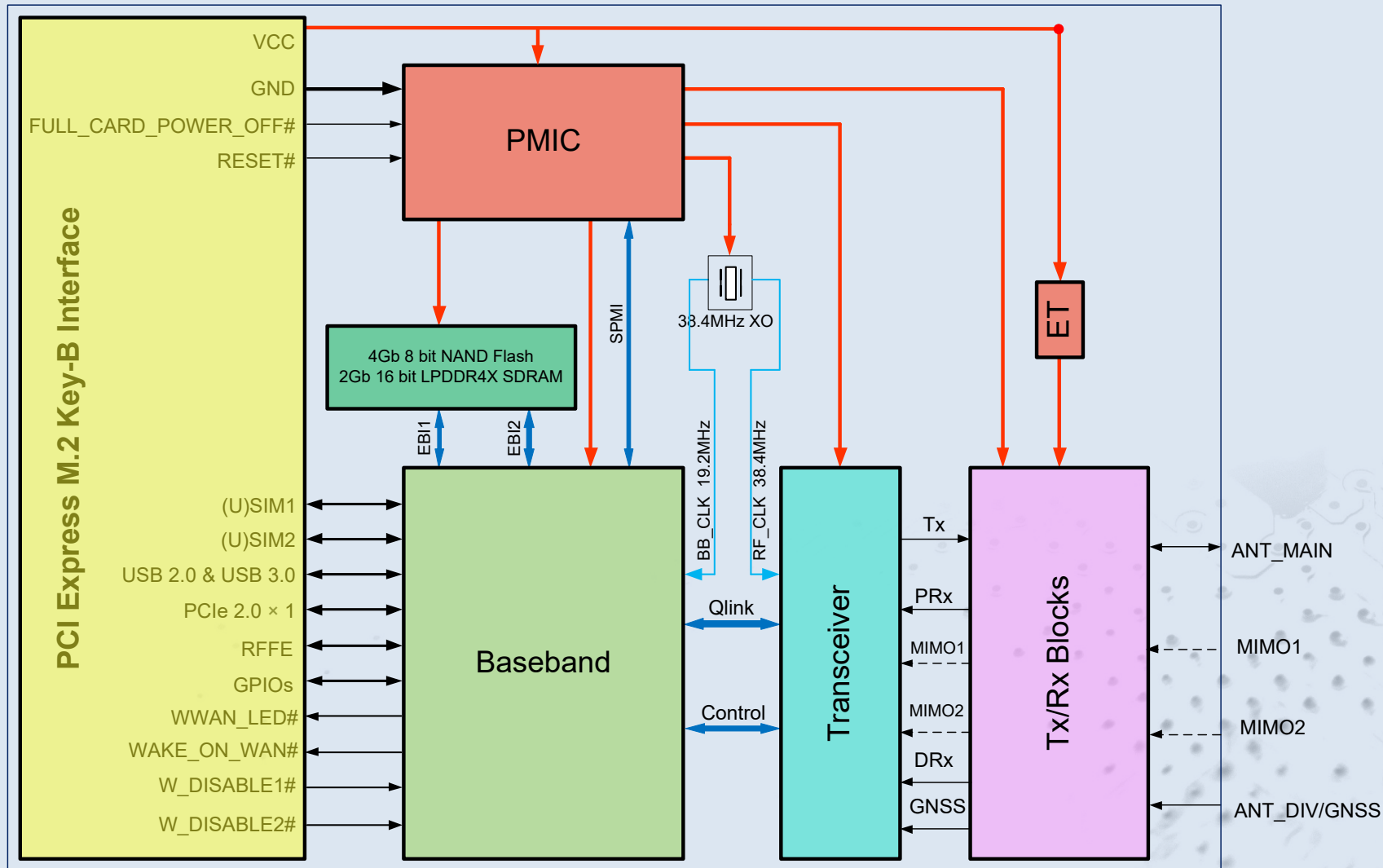
Quectel EM12xR-GL/EM160R-GL module is compatible with the following LTE-A modules:

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



1. EM06X above refers to EM06 and EM060K-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.

USB Serial Driver

- Windows 7/8/8.1/10
- Linux 2.6~5.4
- Android 4.x/5.x/6.x/7.x/8.x/9.x

GNSS & RIL & NDIS & MBIM & GobiNet & QMI_WWAN Drivers

- GNSS Driver:
Android 4.x/5.x/6.x/7.x/8.x/9.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
- MBIM Driver:
Windows 10, Linux 3.18~5.4
- GobiNet Driver:
Linux 2.6~5.4
- QMI_WWAN Driver:
Linux 3.4~5.4

Quality Guarantee

- Reliable network protocol
- Steady flash protection mechanism
- Superior audio algorithms
- High sensitivity

Abundant Protocols

QMI/ MBIM/ NITZ/ PING/ HTTP/ HTTPS

Flexible Applications

- eCall*
- (U)SIM card detection

Special Features

- Over Temperature & Voltage Protection
- ESD Protection

Notes: “*”: Under development/ In progress.



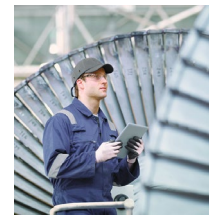
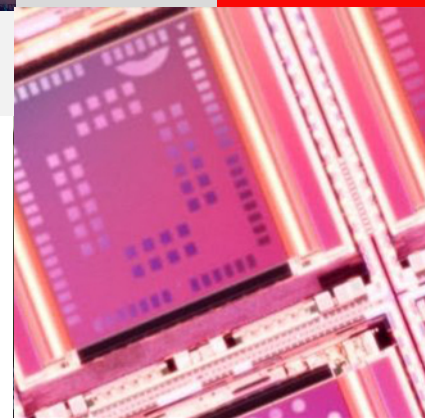
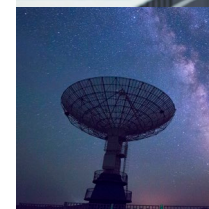
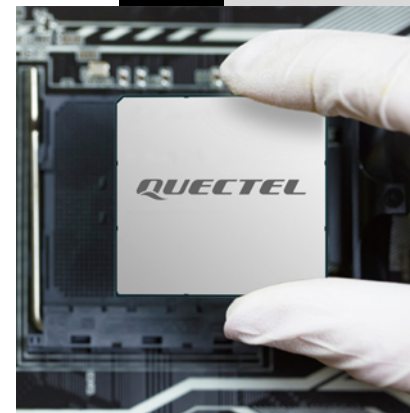
LTE-Advanced Pro Roadmap

Highlights & Specifications

Technical Details

Applications

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Target Applications



Fixed Wireless Wideband Services

- Home/Enterprise Gateways
- Consumer/Industrial Routers
- CPE
- DTU
- VoIP
- Servers
- Portable MiFi

Mobile Wideband Devices

- Consumer Laptops
- Industrial Laptops
- Notebooks/Tablets
- High-Definition Live Broadcast
- AR/VR
- Delivery Drones

Industrial Automation

- Robots
- AGV
- Industrial Energy
- Edge Computers
- Vehicle-Mounted Terminals





The number one cellular module vendor in the world and a leading GNSS module supplier

- Unbeatable choice from the broadest module portfolio in the world
- The highest quality products for the best possible prices
- Superb support with the largest R&D team in the industry
- Continuous innovation – first to market with 5G, LPWA, CV2X, snapdragon
- A passionate, dedicated team of “Quectelers” ensure our customers always come first

Thank You

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