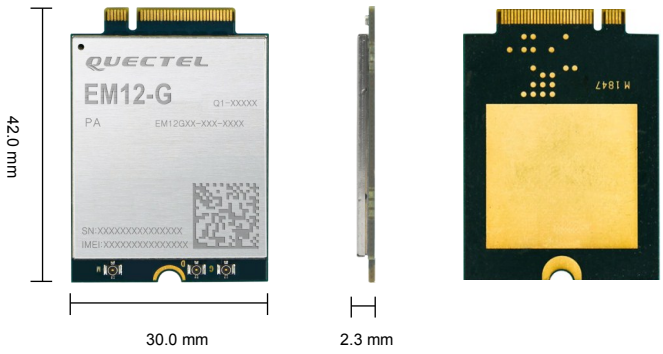
Quectel EM12-G

IoT/M2M-optimized
LTE-A Cat 12 M.2 Module



Quectel EM12-G is an LTE Advanced category 12 module optimized specially for M2M and IoT applications. Adopting the 3GPP Rel-12 LTE technology, it delivers M2M-optimized speeds of 600 Mbps downlink and 150 Mbps uplink peak data rates. Designed in the M.2 form factor, EM12-G is compatible with Quectel Cat 6 module EM06 , which will facilitate customers to migrate between different categories.

EM12-G is designed for global and nearly covers all the main stream carriers worldwide.

EM12-G, optionally, supports Qualcomm® IZat™ location technology Gen9HT Lite (GPS, GLONASS, BeiDou, 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 (USB drivers for Windows 7, Windows 8/8.1, Windows 10, Linux, Android/eCall, etc.) extend the applicability of the module to a wide range of M2M and IoT applications such as industrial router, home gateway, STB, industrial laptop, consumer laptop, industrial PDA, rugged tablet PC, video surveillance and digital signage, etc.

Key Features

- LTE-A Cat 12 module with M.2 form factor, optimized for eMBB and IoT applications
- Support DL 3 × Carrier Aggregation and 256QAM
- Worldwide LTE-A and UMTS/HSPA+ coverage
- Multi-constellation GNSS receiver available for applications requiring fast and accurate fixes in any environment
- Feature refinements: supports DFOTA and VoLTE
- MIMO technology meets demands for data rate and link reliability in modem wireless communication systems

LTE Cat 12
Max. 600 Mbps (DL)
Max. 150 Mbps (UL)

Max. 42 Mbps (DL)
Max. 5.76 Mbps (UL)

M.2 Form Factor

Embedded Abundant Protocols

Voice over LTE (Optional)

Multi-constellation GNSS (Optional)

USB 2.0/3.0 High Speed Interface

USB Drivers

Quectel Enhanced AT Commands

Version: 1.0 | Status: Released

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LTE-A Cat 12 M.2 Module

Global Model

EM12-G:

LTE FDD: B1/B2/B3/B4/B5/B7/B8/B9/B12/B13/ B14/B17/B18/B19/B20/B21/B25/B26/B28/B29①/ B30/B32①/B66

LTE TDD: B38/B39/B40/B41

DL 2 × CA: Inter-band CA/Intra-band CA

DL 3 × CA: Inter-band CA/Intra-band CA

WCDMA: B1/B2/B3/B4/B5/B8/B9/B19

GNSS: GPS/GLONASS/BeiDou/Galileo/QZSS

Data

LTE:

LTE FDD:

Max. 600 Mbps (DL) / Max. 150 Mbps (UL)

LTE TDD:

Max. 430 Mbps (DL) / Max. 90 Mbps (UL)

UMTS:

DC-HSDPA: Max. 42 Mbps (DL)

HSUPA: Max. 5.76 Mbps (UL)

WCDMA: Max. 384 kbps (DL/UL)

SMS

Text and PDU Modes

Point-to-point MO and MT

SMS Cell Broadcast

Storage: ME by default

Audio

Digital Audio Interface:

PCM interface

Speech Codec Modes:

AMR/AMR-WB

Echo Arithmetic:

Echo Cancellation/Noise Reduction

VoLTE (Optional):

CSFB (Circuit Switched FallBack)

VoLTE (Voice over LTE)

Interfaces

(U)SIM: × 2

I2C: × 1

PCM (Digital Audio): × 1

ANTCTL (Antenna Tuner Control)*: × 4

USB 2.0/USB 3.0: × 1

W_DISABLE1#: × 1

RESET#: × 1

WAKE_ON_WAN#: × 1

WWAN_LED#: × 1 (high speed UARTs)

Antenna: × 3 (Main, Diversity&GNSS, GNSS)

Electrical Characteristics

Supply Voltage: 3.135–4.4 V, typ. 3.7 V

Current Consumption (typ.):

56 µA @ Power down

4.0 mA @ Sleep

19.4 mA @ Idle

Output Power:

Class 3 (23 dBm ±2 dB) for LTE FDD Bands

Class 3 (23 dBm ±2 dB) for LTE TDD Bands

Class 3 (24 dBm +1/-3 dB) for WCDMA Bands

Enhanced Features

MIMO (2 × 2, 4 × 2, DL)

Digital Audio & VoLTE (Voice over LTE) (Optional)

(U)SIM Card Detection

DTMF (Dual Tone Multi Frequency)

Dual SIM Single Standby

DFOTA

GNSS

Software Features

3GPP E-UTRA Release 12

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

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: 8/8.1/10

Linux: 3.18–5.4

Gobinet Driver:

Linux: 2.6–5.4

QMI_WWAN Driver:

Linux: 3.4–5.4

GNSS Driver:

Android: 4.x/5.x/6.x/7.x/8.x/9.x

Protocols:

QMI/ NTP/ TCP/ UDP/ FTP/ HTTP/ PING/ HTTPS

General Features

Temperature Range:

Operating Temperature:

-30 °C to +70 °C;

-10 °C to +65 °C (Only for UL CA test)

Extended Temperature: -40 °C to +85 °C

Dimensions: 42.0 mm × 30.0 mm × 2.3 mm

Package: M.2

Weight: approx. 6.0 g

Approvals

Carrier:

Vodafone* (Europe)

Deutsche Telekom* (Germany)

British Telecom* (British)

Telefónica* (Spain)

Verizon/AT&T/Sprint* (America)

Telus (Canada)

Telstra (Australia)

NTT DOCOMO*/SoftBank* (Japan)

Regulatory:

GCF (Global)

CE (Europe)

PTCRB (North America)

FCC (America)

IC(ISED) (Canada)

KC (South Korea)

NCC (Taiwan, China)

JATE/TELEC (Japan)

RCM (Australia/New Zealand)

ICASA (South Africa)

Others:

RoHS/WHQL

Notes:

1. * Under Development
2. ① LTE-FDD B29 and B32 support receiving only, and are only for secondary component carrier in 2 × CA.

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