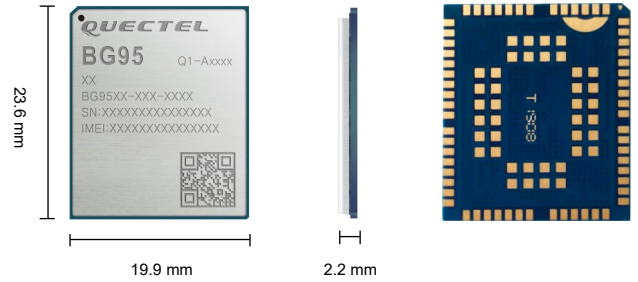# Quectel BG95 Series

LTE Cat M1/ Cat NB2/ EGPRS Module

BG95 is a series of multi-mode LPWA modules supporting LTE Cat M1/Cat NB2/EGPRS and integrated GNSS. It is 3GPP Rel-14 compliant and offers maximum data rates of 588 kbps downlink and 1119 kbps uplink under LTE Cat M1. It features ultra-low power consumption by leveraging the integrated RAM/flash as well as the ARM Cortex A7 processor supporting ThreadX, achieving up to 70% reduction in PSM leakage and 85% reduction in eDRX current consumption compared to its predecessor.

BG95 boasts a comprehensive set of hardware-based security features and enables trusted applications to run directly on the Cortex A7 TrustZone engine. Additionally, BG95 provides pin-to-pin compatibility with Quectel LTE Cat 4 modules EG91/EG95, LTE Cat M1/Cat NB1/EGPRS module BG96, NB-IoT module BC95, UMTS/HSPA modules UG95/UG96 and GSM/GPRS module M95.

With a cost-effective SMT form factor of 23.6 mm × 19.9 mm × 2.2 mm and high integration level, BG95 enables integrators and developers to easily design their applications and take advantage from the module's low power consumption and mechanical intensity. Its advanced LGA package allows fully automated manufacturing for high-volume applications. A rich set of Internet protocols, industry-standard interfaces and abundant functions extend the applicability of the module to a wide range of M2M applications such as wireless POS, smart metering, tracking, wearable devices, etc.

Key Benefits

✓ LTE Cat M1/Cat NB2/EGPRS module with ultra-low power consumption

✓ Easy migration from Quectel GSM/GPRS, UMTS/HSPA and LTE modules

✓ Integrated RAM and flash in the baseband chipset

✓ Comprehensive set of hardware-based security features

✓ Support VoLTE* (Cat M1 only), CS voice* for GSM, QuecOpen®, eSIM, etc.

✓ Fast time-to-market: reference designs, evaluation tools and timely technical support minimize design-in time and development efforts

✓ Compact SMT form factor ideal for size-constrained applications with tight space

✓ Robust mounting and interfaces

LTE Cat M1 & Cat NB2
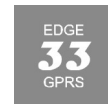
EGPRS

LGA Package

Embedded Abundant Protocols

DFOTA

USB 2.0 Interface

Ultra-low Power Consumption

Quectel Enhanced AT Commands

Integrated RAM/ Flash in Chipset

Rev.: V1.4 | Status: Released

Quectel BG95 Series

LPWA Module	BG95-M1	BG95-M2	BG95-M3	BG95-N1	BG95-M4	BG95-M5	BG95-MF*
Region/Operator	For the Global	For the Global	For the Global	For the Global	For the Global	For the Global	For the Global
Dimensions (mm)	23.6 × 19.9 × 2.2	23.6 × 19.9 × 2.2	23.6 × 19.9 × 2.2	23.6 × 19.9 × 2.2	23.6 × 19.9 × 2.2	23.6 × 19.9 × 2.2	23.6 × 19.9 × 2.2
Temperature Range							
Operating Temperature	-35 °C to +75 °C	-35 °C to +75 °C	-35 °C to +75 °C	-35 °C to +75 °C	-35 °C to +75 °C	-35 °C to +75 °C	-35 °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	-40 °C to +85 °C	-40 °C to +85 °C
Frequency Bands							
LTE-FDD	Cat M1 Only: B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B26/B27/B28/B66/B85	Cat M1: B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B26/B27/B28/B66/B85 Cat NB2: B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B28/B66/B71/B85	Cat M1: B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B26/B27/B28/B66/B85 Cat NB2: B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B28/B66/B71/B85	Cat NB2 Only: B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B28/B66/B71/B85	Cat M1: B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B26/B27/B28/B31[①]/B66/B72[①]/B73[①]/B85 Cat NB2: B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B28/B31[①]/B66/B72[①]/B73[①]/B85	Cat M1: B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B26/B27/B28/B66/B85 Cat NB2: B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B28/B66/B71/B85	Cat M1: B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B26/B27/B28/B66/B85 Cat NB2: B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B28/B66/B71/B85
GSM/EDGE	/	/	850/900/1800/1900 MHz	/	/	850/900/1800/1900 MHz	/
GNSS	GPS/GLONASS/BeiDou/Galileo/QZSS	GPS/GLONASS/BeiDou/Galileo/QZSS	GPS/GLONASS/BeiDou/Galileo/QZSS	GPS/GLONASS/BeiDou/Galileo/QZSS	GPS/GLONASS/BeiDou/Galileo/QZSS	GPS/GLONASS/BeiDou/Galileo/QZSS	GPS/GLONASS/BeiDou/Galileo/QZSS
Wi-Fi (For Positioning)	/	/	/	/	/	/	2.4 GHz
Data Transmission							
LTE-FDD Data Rate (kbps)	Cat M1: Max. 588 (DL) Max. 1119 (UL)	Cat M1: Max. 588 (DL) Max. 1119 (UL) Cat NB2: Max. 127 (DL) Max. 158.5 (UL)	Cat M1: Max. 588 (DL) Max. 1119 (UL) Cat NB2: Max. 127 (DL) Max. 158.5 (UL)	Cat NB2: Max. 127 (DL) Max. 158.5 (UL)	Cat M1: Max. 588 (DL) Max. 1119 (UL) Cat NB2: Max. 127 (DL) Max. 158.5 (UL)	Cat M1: Max. 588 (DL) Max. 1119 (UL) Cat NB2: Max. 127 (DL) Max. 158.5 (UL)	Cat M1: Max. 588 (DL) Max. 1119 (UL) Cat NB2: Max. 127 (DL) Max. 158.5 (UL)
EDGE Data Rate (kbps)	/	/	Max. 296 (DL) Max. 236.8 (UL)	/	/	Max. 296 (DL) Max. 236.8 (UL)	/
GPRS Data Rate (kbps)	/	/	Max. 107 (DL) Max. 85.6 (UL)	/	/	Max. 107 (DL) Max. 85.6 (UL)	/
Interfaces							
(U)SIM	× 1 (1.8 V only)	× 1 (1.8 V only)	× 1 (1.8 V only)	× 1 (1.8 V only)	× 1 (1.8 V only)	× 1 (1.8 V only)	× 1 (1.8 V only)
UART	× 3	× 3	× 3	× 3	× 3	× 3	× 3
USB 2.0	× 1	× 1	× 1	× 1	× 1	× 1	× 1
PCM*	× 1 (for VoLTE Only)	× 1 (for VoLTE Only)	× 1 (for VoLTE Only)	× 1 (for VoLTE Only)	× 1 (for VoLTE Only)	× 1 (for VoLTE Only)	× 1 (for VoLTE Only)
I2C*	× 1 (for VoLTE Only)	× 1 (for VoLTE Only)	× 1 (for VoLTE Only)	× 1 (for VoLTE Only)	× 1 (for VoLTE Only)	× 1 (for VoLTE Only)	× 1 (for VoLTE Only)
Antenna	× 2	× 2	× 2	× 2	× 2	× 2	× 3
GPIO	× 9	× 9	× 9	× 9	× 9	× 9	× 7*
GRFC	× 2	× 2	× 2	× 2*	/	× 2*	× 2*
Voice							
Voice	VoLTE* for LTE Cat M1	VoLTE* for LTE Cat M1	VoLTE* for LTE Cat M1 CS Voice* for GSM	/	VoLTE* for LTE Cat M1	VoLTE* for LTE Cat M1 CS Voice* for GSM	VoLTE* for LTE Cat M1
SMS							
SMS	Point-to-point MO/MT SMS Cell Broadcast Text and PDU Mode	Point-to-point MO/MT SMS Cell Broadcast Text and PDU Mode	Point-to-point MO/MT SMS Cell Broadcast Text and PDU Mode	Point-to-point MO/MT SMS Cell Broadcast Text and PDU Mode	Point-to-point MO/MT SMS Cell Broadcast Text and PDU Mode	Point-to-point MO/MT SMS Cell Broadcast Text and PDU Mode	Point-to-point MO/MT SMS Cell Broadcast Text and PDU Mode
Enhanced Features							
DFOTA	●	●	●	*	*	*	*
QuecOpen®	●	●	●	*	*	*	*
QuecLocator®	Cell ID Positioning*	Cell ID Positioning*	Cell ID Positioning	Cell ID Positioning*	Cell ID Positioning*	Cell ID Positioning*	Cell ID Positioning* Wi-Fi Positioning*
SoftSIM	*	*	●	*	*	*	*
IoT Platform Access	/	/	AWS/ Azure	/	/	/	/

Notes:
1. * means under development/on-going/planning.
2. ● means supported.
3. ① means LTE-FDD B31/B72/B73 for BG95-M4 supports Power Class 2.

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Quectel BG95 Series

LPWA Module	BG95-M1	BG95-M2	BG95-M3	BG95-N1	BG95-M4	BG95-M5	BG95-MF*
Software Features							
Protocols	PPP/TCP/UDP/SSL/TLS/FTP(S)/HTTP(S)/NITZ/PING/MQTT/LwM2M/CoAP/IPv6*	PPP/TCP/UDP/SSL/TLS/FTP(S)/HTTP(S)/NITZ/PING/MQTT/LwM2M/CoAP/IPv6*	PPP/TCP/UDP/SSL/TLS/FTP(S)/HTTP(S)/NITZ/PING/MQTT/LwM2M/CoAP/IPv6	PPP/TCP/UDP/SSL/TLS/FTP(S)/HTTP(S)/NITZ/PING/MQTT/LwM2M/CoAP*/IPv6*	PPP/TCP/UDP/SSL/TLS/FTP(S)/HTTP(S)/NITZ/PING/MQTT/LwM2M/CoAP*/IPv6*	PPP/TCP/UDP/SSL/TLS/FTP(S)/HTTP(S)/NITZ/PING/MQTT/LwM2M/CoAP*/IPv6*	PPP/TCP/UDP/SSL/TLS/FTP(S)/HTTP(S)/NITZ/PING/MQTT/LwM2M/CoAP*/IPv6*
USB Serial Driver*	Windows 7/8/8.1/10, Linux 2.6–5.4, Android 4.x–9.x	Windows 7/8/8.1/10, Linux 2.6–5.4, Android 4.x–9.x	Windows 7/8/8.1/10, Linux 2.6–5.4, Android 4.x–9.x	Windows 7/8/8.1/10, Linux 2.6–5.4, Android 4.x–9.x	Windows 7/8/8.1/10, Linux 2.6–5.4, Android 4.x–9.x	Windows 7/8/8.1/10, Linux 2.6–5.4, Android 4.x–9.x	Windows 7/8/8.1/10, Linux 2.6–5.4, Android 4.x–9.x
GNSS/RIL Driver*	Android 4.x–9.x	Android 4.x–9.x	Android 4.x–9.x	Android 4.x–9.x	Android 4.x–9.x	Android 4.x–9.x	Android 4.x–9.x
Certifications							
Carrier	**North America:** Sprint/Verizon*/AT&T*	**North America:** Sprint/Verizon*/AT&T*/T-Mobile* **Europe:** Deutsche Telekom* **South Korea:** SKT* **Japan:** NTT DOCOMO*/SoftBank*/KDDI* **Australia:** Telstra*	**Global:** Vodafone* **Europe:** Deutsche Telekom*/Telefónica* **North America:** Verizon/ AT&T/ Sprint/ T-Mobile* **China:** China Telecom*/China Mobile*/China Unicom* **South Korea:** SKT* **Japan:** NTT DOCOMO*/SoftBank*/KDDI* **Australia:** Telstra*	**North America:** Verizon*/AT&T*/T-Mobile*	**Global:** Vodafone*	**Global:** Vodafone* **Europe:** Deutsche Telekom* **North America:** Verizon*/AT&T*/T-Mobile*/Sprint* **China:** China Telecom*/China Mobile*/China Unicom* **South Korea:** SKT*/LGU+ **Japan:** NTT DOCOMO*/SoftBank*/KDDI* **Australia:** Telstra*	/
Regulatory	**Global:** GCF* **Europe:** CE **North America:** FCC*/PTCRB* **Canada:** IC* **Australia/New Zealand:** RCM*	**Global:** GCF* **Europe:** CE **North America:** FCC*/PTCRB* **Canada:** IC* **Brazil:** Anatel **Mexico:** IFETEL* **South Korea:** KC* **Taiwan China:** NCC* **Japan:** JATE*/TELEC* **Australia/New Zealand:** RCM* **Thailand:** NBTC*	**Global:** GCF **Europe:** CE **North America:** FCC/PTCRB **Canada:** IC **Brazil:** Anatel **Mexico:** IFETEL* **China:** SRRC*/NAL*/CCC* **South Korea:** KC* **Taiwan China:** NCC* **Japan:** JATE*/TELEC* **Australia/New Zealand:** RCM **Thailand:** NBTC* **Singapore:** IMDA*	**Global:** GCF* **Europe:** CE* **North America:** FCC*/PTCRB* **Canada:** IC* **Australia/New Zealand:** RCM*	**Global:** GCF* **Europe:** CE* **North America:** FCC* **Brazil:** Anatel* **Mexico:** IFETEL*	**Global:** GCF* **Europe:** CE* **North America:** FCC*/PTCRB* **Canada:** IC* **Brazil:** Anatel* **China:** SRRC*/NAL*/CCC* **South Korea:** KC* **Taiwan China:** NCC* **Japan:** JATE*/TELEC* **Australia/New Zealand:** RCM* **Thailand:** NBTC* **Singapore:** IMDA*	**Global:** GCF* **Europe:** CE* **North America:** FCC*/PTCRB* **Canada:** IC* **Australia/New Zealand:** RCM*
Others	RoHS	RoHS	RoHS/PEN/ATEX*	RoHS	RoHS*	RoHS*/ATEX*	RoHS
Electrical Features							
Supply Voltage Range ② (V)	2.6–4.8, typ. 3.3	2.6–4.8, typ. 3.3	3.3–4.3, typ. 3.8	2.6–4.8, typ. 3.3	3.2–4.2, typ. 3.8	3.3–4.3, typ. 3.8	Typ. 3.8
Max Output Power (dBm)	Power Class 5 21 @ LTE Bands	Power Class 5 21 @ LTE Bands	Power Class 5 21 @ LTE Bands	Power Class 5 21 @ LTE Bands	Power Class 2* 26 @ B31/B72/B73 Power Class 3 23 @ B31/B72/B73 Power Class 5 21 @ other LTE Bands	Power Class 3 23 @ LTE Bands	Power Class5 21 @ LTE Bands
Power Consumption (Typ.)	**PSM (µA):** 3.9 **LTE Cat M1:** **Sleep Mode (mA):** 1.68 @ DRX = 1.28 s 0.99 @ e-I-DRX = 81.92 s **Active Mode (mA):** 227 @ 21 dBm, GNSS off	**PSM (µA):** 3.9 **LTE Cat M1:** **Sleep Mode (mA):** 1.68 @ DRX = 1.28 s 0.99 @ e-I-DRX = 81.92 s **Active Mode (mA):** 227 @ 21 dBm, GNSS off **LTE Cat NB1:** **Sleep Mode (mA):** 1.53 @ DRX = 1.28 s 1.05 @ e-IDRX = 81.92 s **Active Mode (mA):** 178 @ 21 dBm, GNSS off	**PSM (µA):** 3.9 **LTE Cat M1:** **Sleep Mode (mA):** 1.65 @ DRX = 1.28 s 0.85 @ e-IDRX = 81.92 s **Active Mode (mA):** 199 @ 21 dBm, GNSS off **LTE Cat NB1:** **Sleep Mode (mA):** 1.56 @ DRX = 1.28 s 0.81 @ e-IDRX = 81.92 s **Active Mode (mA):** 172 @ 21 dBm, GNSS off	**PSM (µA):** 3.9 **LTE Cat NB1:** **Sleep Mode:** 1.6 @ DRX = 1.28 s 0.82 @ e-IDRX = 81.92 s **Active Mode (mA):** 180 @ 21 dBm, GNSS off	**PSM (µA):** 4 **LTE Cat M1:** **Sleep Mode (mA):** 1.7 @ DRX = 1.28 s TBD @ e-IDRX = 81.92 s **Active Mode (mA):** 198 @ 21 dBm, GNSS off 241 @ 26 dBm, GNSS off **LTE Cat NB1:** **Sleep Mode (mA):** 1.4 @ DRX = 1.28 s TBD @ e-IDRX = 81.92 s **Active Mode (mA):** 163 @ 21 dBm, GNSS off 213 @ 26 dBm, GNSS off	**PSM (µA):** 6 **LTE Cat M1:** **Sleep Mode (mA):** 1.7 @ DRX = 1.28 s 0.83 @ e-IDRX = 81.92 s **Active Mode (mA):** 221 @ 23 dBm, GNSS off **LTE Cat NB1:** **Sleep Mode (mA):** 1.67 @ DRX = 1.28 s 0.85 @ e-IDRX = 81.92 s **Active Mode (mA):** 202 @ 23 dBm, GNSS off	TBD

Notes:
1. * means under development/on-going/planning.
2. ● means supported.
3. ① means LTE-FDD B31/B72/B73 for BG95-M4 supports Power Class 2.
4. ② please refer to the hardware design manual for more specific requirements on the power supply voltage.

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