Quectel BG95xA-GL Series

Ultra-Compact
LTE Cat M1/NB1/NB2* Modules

23.6 mm

19.9 mm

2.2 mm
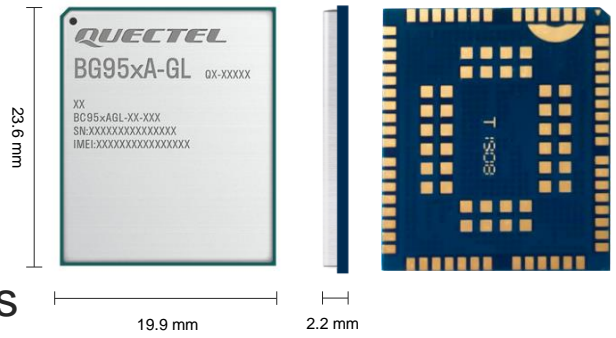
BG95xA-GL series modules are ultra-compact LPWA modules with an integrated GNSS engine, which supports LTE Cat M1 and LTE Cat NB1/NB2* bands. The modules are fully compliant with 3GPP E-UTRA Release 13/14* specification and provide global carrier band combinations. The modules feature the MIPS 5150 processor and the ultra-low power consumption by leveraging the integrated RAM and flash to achieve extremely low current consumption in various standby/hibernation modes, including 3GPP PSM and eDRX. In addition, the BG95xA-GL series modules contain a GNSS and cellular-based location engine that supports GPS, GLONASS, Galileo, Beidou and QZSS. BG95xA-GL series modules come in two variants: BG950A-GL and BG951A-GL.

The BG95xA-GL series modules boast a comprehensive hardware-based security feature - Integrated Security Elements (ISE). With an ultra-compact SMT form factor of 19.9 mm × 23.6 mm × 2.2 mm and a high integration level, the modules enable integrators and developers to design applications easily leveraging the modules' low-power consumption and compact structure. The BG95xA-GL's advanced LGA package allows for fully automated manufacturing required for large-scale applications.

A rich set of Internet protocols, industry-standard interfaces and abundant functionalities extend the applicability of the modules to a wide range of M2M applications, such as wireless POS, smart metering, tracking, wearable devices, and many more.

Key Features

- ✔ Extremely compact LTE Cat M1/NB1/NB2* module with ultra-low power consumption
- ✔ Integrated RAM and flash
- ✔ Super slim profile in the LGA package
- ✔ Embedded with abundant Internet service protocols
- ✔ Support for VoLTE* (Cat M1 only), QuecLocator®, and DFOTA
- ✔ A rich set of external, multi-band interfaces that ensure convenient applications
- ✔ Fast time-to-market: reference designs, evaluation tools and timely technical support minimize time and efforts in design and development
- ✔ Robust mounting and interfaces

LTE Cat M1 & Cat NB1/NB2*	LGA Package	Super Compact Size
Abundant Protocols Embedded	DFOTA	USB 2.0 Interface*
Ultra-Low Power Consumption	Quectel Enhanced AT Commands	Integrated RAM/ Flash in Module

Version: 1.0. | Status: Released

Quectel BG95xA-GL

LTE Cat M1/NB1/NB2*	BG950A-GL	BG951A-GL
Region/Operator	Global	Global
Dimensions (mm)	19.9 × 23.6 × 2.2	19.9 × 23.6 × 2.2
Package	LGA	LGA
Weight (g)	Approx. 2.15	Approx. 2.15
Temperature Range		
Operating Temperature	-35 °C to +75 °C	-35 °C to +75 °C
Extended Temperature	-40 °C to +85 °C	-40 °C to +85 °C
Frequency Bands		
LTE-FDD	Cat M1: B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B26/B27/B28/B66	
	Cat NB1/NB2*: B1/B2/B3/B4/B5/B8/B12/B13/B17/B18/B19/B20/B25/B28/B66	
Data Rate (Max.)		
Cat M1	588 kbps (DL)/ 1119 kbps (UL)	588 kbps (DL)/ 1119 kbps (UL)
Cat NB1	27.2 kbps (DL)/62.5 kbps (UL)	27.2 kbps (DL)/62.5 kbps (UL)
Cat NB2*	127 kbps (DL)/ 158 kbps (UL)	127 kbps (DL)/ 158 kbps (UL)
Certifications		
Carrier*	**Europe:** Vodafone/Deutsche Telekom/Telefónica **America:** Verizon/AT&T/T-Mobile	**Europe:** Vodafone/Deutsche Telekom/Telefónica **America:** Verizon/AT&T/T-Mobile
Regulatory*	**Global:** GCF **Europe:** CE **North America:** PTCRB **America:** FCC **Canada:** IC **South Korea:** KC **Japan:** JATE/TELEC **Australia/New Zealand:** RCM	**Global:** GCF **Europe:** CE **North America:** PTCRB **America:** FCC **Canada:** IC **South Korea:** KC **Japan:** JATE/TELEC **Australia/New Zealand:** RCM
Others*	RoHS	RoHS
Interfaces		
USB*	× 1 (Full speed only)	× 1 (Full speed only)
UART	× 3	× 3
PCM*	× 1 (For VoLTE only)	× 1 (For VoLTE only)
I2C*	× 1 (For VoLTE only)	× 1 (For VoLTE only)
ADC	× 2	× 2
(U)SIM	× 1 (Supports 1.8 V only)	× 1 (Supports 1.8 V only)
GPIO	× 9	× 9
GRFC*	× 2	× 2
NET_STATUS	× 1 (For network status indication)	× 1 (For network status indication)
STATUS	× 1 (For power on/off indication)	× 1 (For power on/off indication)
Antenna	× 2 (For the main antenna and GNSS antenna, respectively)	× 2 (For the main antenna and GNSS antenna, respectively)
Voice		
VoLTE*	Voice over LTE (For Cat M1 only)	
SMS		
Short Message Service	Point-to-point MO and MT SMS Cell Broadcast Text and PDU Mode	Point-to-point MO and MT SMS Cell Broadcast Text and PDU Mode
Enhanced Features		
GNSS	GPS/GLONASS	GPS/GLONASS/Galileo/Beidou/QZSS LTE & GNSS concurrency
DFOTA	Delta Firmware Upgrade Over The Air	Delta Firmware Upgrade Over The Air
QuecLocator®	Cell ID Positioning	Cell ID Positioning

Note:
*: Under development / in progress.

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LTE Cat M1/NB1/NB2*	BG950A-GL	BG951A-GL
Software Features		
3GPP	3GPP E-UTRA Release 13/14*	3GPP E-UTRA Release 13/14*
AT Commands	3GPP TS 27.007 3GPP TS 27.005 Quectel Enhanced AT Commands	3GPP TS 27.007 3GPP TS 27.005 Quectel Enhanced AT Commands
Protocols	TCP/ PPP/ UDP/ SSL/ MQTT/ FTP(S) / HTTP(S) / LwM2M/ IPv4/ IPv6/ TLS/ DTLS/ PING/ CoAP/ NITZ	
Firmware Upgrade	UART DFOTA USB*	UART DFOTA USB*
Electrical Features		
Output Power	Max. 23 dBm	Max. 23 dBm
Supply Voltage Range	**VBAT_BB / VBAT_RF**: 2.2 - 4.35 V, typ. 3.3 V	**VBAT_BB / VBAT_RF**: 2.2 - 4.35 V, typ. 3.3 V

Power Consumption (Typical)	**Power Saving Mode:** 1.4 µA
	
	Sleep Mode (modem disabled): 45 µA
	
	Sleep Mode (ECL0):
	Cat M: 1.1 mA @ DRX = 1.28 s
	    0.06 mA @ eDRX Cycle=40.96 s; PTW=1.28 s; DRX=1.28 s
	    0.05 mA @ eDRX Cycle=81.92 s; PTW=1.28 s; DRX=1.28 s
	
	NB-IoT: 2.2 mA @ DRX = 1.28 s
	    0.16 mA @ eDRX Cycle=40.96 s; PTW=1.28 s; DRX=1.28 s
	    0.12 mA @ eDRX Cycle=81.92 s; PTW=1.28 s; DRX=1.28 s
	
	Active Mode (GNSS disabled):
	Cat M: 189 mA @ 23 dbm,
	B1/2/3/4/5/18/19/20/25/26/27/66
	    201 mA @ 23 dbm, B8/B13
	    225 mA @ 23 dbm, B12/B28
	
	NB-IoT (max power mode 3.75 kHz):
	    322 mA @ 23 dbm, B1/B2/B3/B4/B25/B66
	    359 mA @ 23 dbm, B5/B8/B13/B18/B19/B20
	    225 mA @ 23 dbm, B12/B17/B28
	
	NB-IoT (max power mode 15 kHz):
	    169 mA @ 23 dbm, B1/B2/B3/B4/B25/B66
	    191 mA @ 23 dbm, B5/B8/B13/B18/B19/B20
	    225 mA @ 23 dbm, B12/B17/B28
		Power Saving Mode: 1.4 µA
		
		Sleep Mode (modem & GNSS disabled):
		(GNSS mode = 1): 45 µA
		(GNSS mode = 2): 196 uA
		
		Sleep Mode (ECL0):
		TBD
		
		Active Mode (GNSS disabled):
		TBD
		
		GNSS Stand-Alone (modem disabled, processor sleep):
		Idle: 4 mA
		Positioning: 23 mA

Note:
*: Under development / in progress.

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