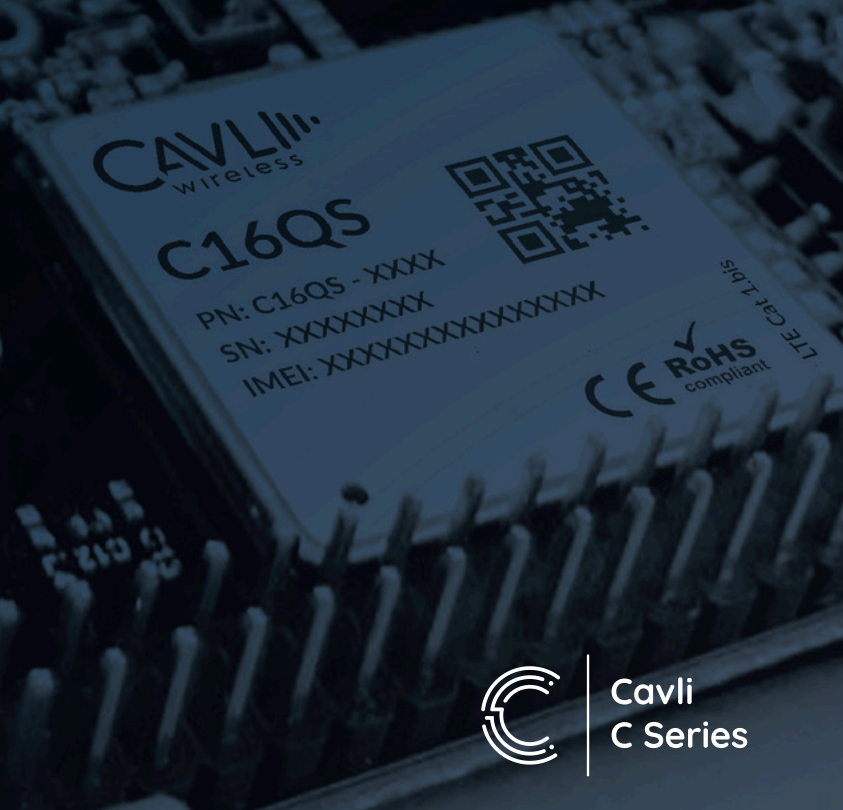# Technical Specification Document

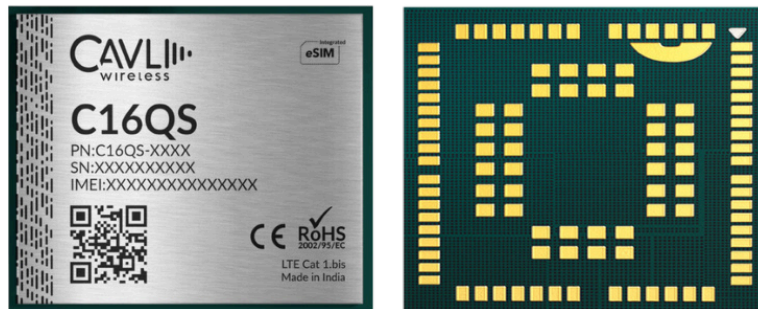# C16QS

Cat 1.bis LTE Module
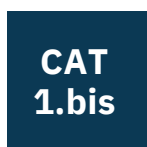
Cavli
C Series

# Cavli C-Series C16QS Module

## LTE Cat 1.bis Module



C16QS is a series of new LTE Cat1.bis modules with optional integrated GNSS and eSIM optimized for IoT applications with low cost and low power consumption. It is compliant to 3GPP Rel14 Cat.1bis standards and ideal for customers interested in switching from legacy 2G and 3G solutions to LTE.

C16QS comes with unique features that enables easy product development and faster go to market for product makers. Its enhanced tracking features that process GPS data on the edge, independent LTE and GNSS power supply and sleep features and low power modes making it ideal for applications such as asset tracking, POS and remote monitoring and energy metering.

C16QS comes in 7 variants - Eurasia and Japan, North America, Latin America, South-East Asia, Europe alone, Indian alone and Global variant respectively, covering different countries and regions. Being pin compatible with Cavli C42GM modules enables easy migration.
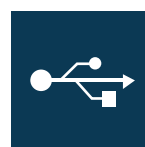
# Key features

| | | | | |
|---|---|---|---|---|
| **CAT 1.bis** | Integrated GNSS | **LGA** Small Form Factor Design | USB 2.0 Interface | **eSIM** |
| LTE Cat 1.bis | | | | |

| | | |
|---|---|---|
| Cavli Hubble Platform | Low Power Consumption | Power Saving Mode |

## C16QS

### Basic Information

| | |
|---|---|
| Region | EAJ / EU/ NA/ AN/ LA / IN / WW |
| CPU | ARM Cortex M3 processor @204MHz clock |
| Memory | 4MB NOR Flash + 1.25MB RAM |
| OS | FreeRTOS |
| Package | LGA & mPCIe |
| Pin Count | 102 |
| Dimensions | 26.5 x 22.5 x 2.3 mm |
| Weight | 3.9g |
| Operating Temperature | -45 °C to +90 °C |

### Radio Frequency Bands

| | |
|---|---|
| RAT | Cat 1.bis |
| Transmission Rates | DL 10Mbps & UL 5 Mbps |
| LTE Band List | EAJ - 1/ 3/ 5/ 7/ 8/ 18/19/20/26/28/38/40/41<br>EU - 1/ 3/ 5/ 7/ 8/ 20/ 28<br>NA - 2/ 4/ 5/ 12/ 13/ 25/ 66<br>AN - 2/ 4/ 5/ 12/ 13/ 25/ 66<br>LA - 1/2/ 3/ 4/ 5/ 7/ 8/ 28<br>IN - 1/3/5/8/40/41<br>WW - 1/ 2/ 3/ 4/ 5/ 7/ 8/ 12/ 13/ 18/ 19/ 20/ 25/ 26/ 28/ 38/ 40/ 41/66 |
| 3GPP Release | 14 |

### GNSS Capability

| | |
|---|---|
| GNSS (GNA Variant) | GPS/ BeiDou |

### Network Protocols

| | |
|---|---|
| Internet Protocols | TCP(S), HTTP(S), FTP(S), MQTT(S), UDP, PPP |

### Interfaces

| | |
|---|---|
| UART | x3 |
| USB 2.0 | x1 |
| USIM (DSSS) (1.8V / 3.0V) | x1 |
| SWD | x1 |
| Network Status Indicator | x1 |
| Power ON Status Indicator | x1 |
| Power ON Status Indicator | x1 |
| ADC | x2 |
| I2S [2] | x1 |

| | |
|---|---|
| I2C [2] | x1 |
| SPI [2] | x1 |
| GPIO [2] | x4 |
| Main ANT | x1 |
| GNSS ANT | x1 |

## Electrical Characteristics

| | |
|---|---|
| Operating Voltage | Range: 3.4 V to 4.2 V<br>Typical: 3.7 V |
| TxD Peak (@23dBm) | 970 mA |
| TxD Idle (USB Connected) | EAJ : 34.2 mA<br>EU : 34.2 mA<br>NA : 34.1 mA<br>AN : 34.2 mA<br>LA : 34.2 mA<br>IN : 34.1 mA<br>WW : 34.3 mA |
| TxD Idle (USB disconnected) | 5.1 mA |
| Sleep Mode (Hibernate) | 11 µA |
| GNSS (Fix) | 60 mA |

## Enhanced Features

| | |
|---|---|
| SMS - SG | Yes |
| DFOTA | Yes |

## Driver Support

| | |
|---|---|
| USB Driver | RNDIS / CDC-ECM / CDC-ACM |

## Certifications

| | |
|---|---|
| Regulatory | Global : GCF [3]<br>Europe : CE<br>UK : UKCA[3]<br>Taiwan : NCC [3]<br>South Africa: ICASA<br>N.A : PTCRB [3]<br>Brazil : ANATEL[3]<br>Australia : RCM [3]<br>America : FCC<br>Canada : IC<br>Japan : TELEC [3] |
| Carrier | TBD |
| Others | RoHS / REACH |

[1] Optional      [2] Needs SDK      [3] In Progress

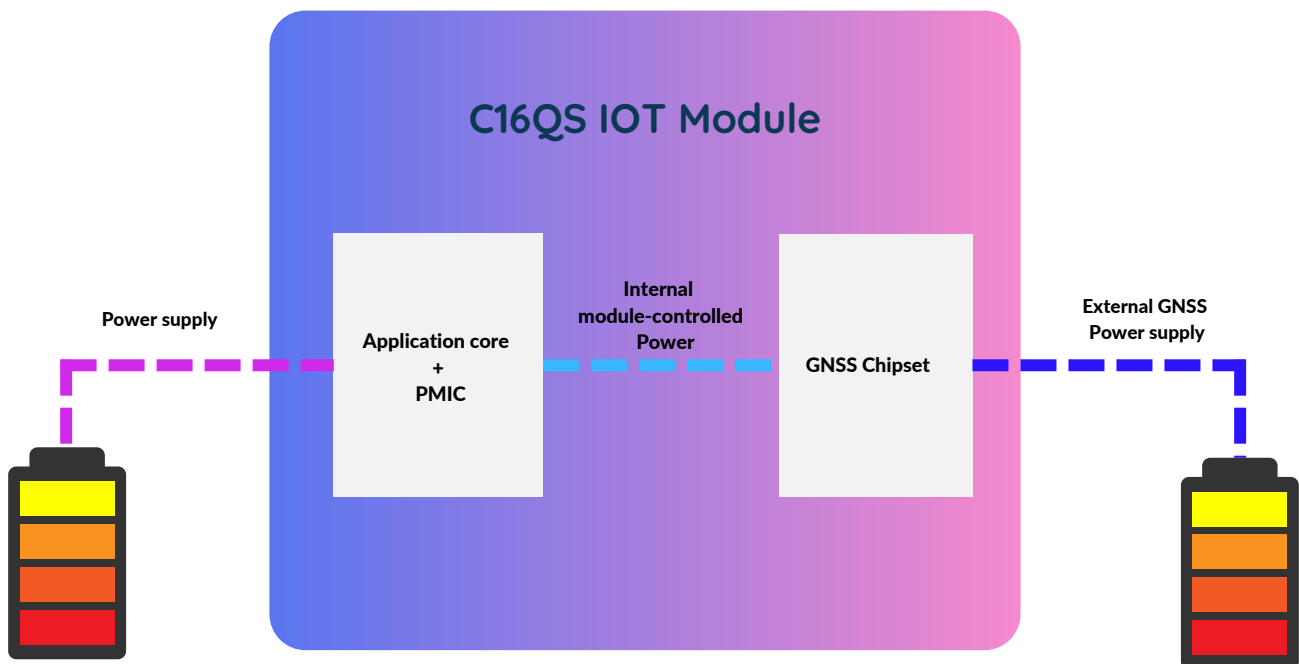| Other Features | |
|---|---|
| Integrated GNSS | Optional |
| Integrated eSIM + Cavli Hubble Global Connectivity and Device Management Platform | Optional |
| miniPCIe Form Factor | Optional |

# Independent Operation of GNSS and Cellular



C16QS has a feature that enables independent functionality of its baseband and GNSS cores. The provision for an external supply to the GNSS core directly enables the user to utilize the location services without powering the baseband core. The GNSS services can also be accessed via the modem's Cavli proprietary AT commands.

# Product Variants

| Features | Modem Only | Modem + eSIM | Modem + GNSS (L1) | Modem + eSIM + GNSS (L1) |
|---|---|---|---|---|
| **EAJ**<br>EMEA, APAC and Japan | C16QS-EAJ-S00N | C16QS-EAJ-S00H | C16QS-EAJ-GNAN | C16QS-EAJ-GNAH |
| **EU**<br>Europe | C16QS-EU-S00N | C16QS-EU-S00H | C16QS-EU-GNAN | C16QS-EU-GNAH |
| **NA**<br>North America | C16QS-NA-S00N | C16QS-NA-S00H | C16QS-NA-GNAN | C16QS-NA-GNAH |
| **LA**<br>Latin America | C16QS-LA-S00N | C16QS-LA-S00H | C16QS-LA-GNAN | C16QS-LA-GNAH |
| **AN**<br>Australia, New Zealand, Taiwan and South Korea | C16QS-AN-S00N | C16QS-AN-S00H | C16QS-AN-GNAN | C16QS-AN-GNAH |
| **IN**<br>India | C16QS-IN-S00N | C16QS-IN-S00H | C16QS-IN-GNAN | C16QS-IN-GNAH |
| **WW**<br>World Wide | C16QS-WW-S00N | C16QS-WW-S00H | C16QS-WW-GNAN | C16QS-WW-GNAH |

For more information

Contact : sales@cavliwireless.com     |Visit :   www.cavliwireless.com

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