



Technical Specification Document

C16QS

Cat 1.bis LTE Module

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Cavli C-Series C16QSModule

Cat 1.bis LTE 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 6 variants - Europe and Asia, North America, Latin America, South-East Asia, Europe alone and Global variant respectively, covering different countries and regions. Being pin compatible with Cavli C42QM and C42GM modules which enables easy migration.

Key features



LTE Cat 1.bis



Integrated GNSS



Small Form
Factor Design



USB 2.0 Interface



eSIM



Cavli Hubble
Platform



Low Power
Consumption



Power
Saving Mode

C16QS-EA

EMEA and APAC

C16QS-NA

North America

C16QS-LA

Latin America

C16QS-ANAustralia, New Zealand,
Taiwan, Japan and S.Korea**C16QS-EU**

Europe

C16QS-WW

Global

Basic Information

Region	EMEA, APAC	North America	Latin America	Asia, New Zealand	Europe	Global
CPU	ARM Cortex M3 processor @204MHz clock	ARM Cortex M3 processor @204MHz clock	ARM Cortex M3 processor @204MHz clock	ARM Cortex M3 processor @204MHz clock	ARM Cortex M3 processor @204MHz clock	ARM Cortex M3 processor @204MHz clock
Memory	4MB NOR Flash + 1.25MB RAM	4MB NOR Flash + 1.25MB RAM	4MB NOR Flash + 1.25MB RAM	4MB NOR Flash + 1.25MB RAM	4MB NOR Flash + 1.25MB RAM	4MB NOR Flash + 1.25MB RAM
OS	FreeRTOS	FreeRTOS	FreeRTOS	FreeRTOS	FreeRTOS	FreeRTOS
Package	LGA & mPCIe ³	LGA & mPCIe ³	LGA & mPCIe ³	LGA & mPCIe ³	LGA & mPCIe ³	LGA & mPCIe ³
Dimension	26.5 x 22.5 x 2.3 mm	26.5 x 22.5 x 2.3 mm	26.5 x 22.5 x 2.3 mm	26.5 x 22.5 x 2.3 mm	26.5 x 22.5 x 2.3 mm	26.5 x 22.5 x 2.3 mm
Weight	3.9 g	3.9 g	3.9 g	3.9 g	3.9 g	3.9 g
Operating Temperature	-30 °C to +85 °C	-30 °C to +85 °C	-30 °C to +85 °C	-30 °C to +85 °C	-30 °C to +85 °C	-30 °C to +85 °C
Storage Temperature	-45 °C to +90 °C	-45 °C to +90 °C	-45 °C to +90 °C	-45 °C to +90 °C	-45 °C to +90 °C	-45 °C to +90 °C

Radio Frequency Bands

RAT	Cat1.bis	Cat1.bis	Cat1.bis	Cat1.bis	Cat1.bis	Cat1.bis
Transmission Rates (Peak)	DL 10Mbps & UL 5 Mbps	DL 10Mbps & UL 5 Mbps	DL 10Mbps & UL 5 Mbps	DL 10Mbps & UL 5 Mbps	DL 10Mbps & UL 5 Mbps	DL 10Mbps & UL 5 Mbps
LTE Band List	B1/ B3/ B5/ B8/ B20	B2/ B4/ B5/ B12/ B13/ B66	B2/ B3/ B4/ B7/ B8/ B28	B1/ B3/ B5/ B8/ B18/ B19/ B26/ B28	B1/ B3/ B5/ B7/ B8/ B20/ B28	B1/ B2/ B3/ B4/ B5/ B7/ B8/ B12/ B18/ B19/ B20/ B25/ B26/ B28/ B40/ B41/ B66

¹Optional²Needs SDK. Not available currently³In Progress

	C16QS-EA	C16QS-NA	C16QS-LA	C16QS-AN	C16QS-EU	C16QS-WW
3GPP Release	14	14	14	14	14	14

GNSS Capability

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

Network Protocols

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

Interfaces

UART	x3	x3	x3	x3	x3	x3
USB 2.0	x1	x1	x1	x1	x1	x1
USIM (DSSS) (1.8V / 3.0V)	x1	x1	x1	x1	x1	x1
SWD	x1	x1	x1	x1	x1	x1
Network Status Indicator	x1	x1	x1	x1	x1	x1
Power ON Status Indicator	x1	x1	x1	x1	x1	x1
ADC ²	x2	x2	x2	x2	x2	x2
I2S ²	x1	x1	x1	x1	x1	x1
I2C ²	x1	x1	x1	x1	x1	x1

¹ Optional

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³ In Progress

	C16QS-EA	C16QS-NA	C16QS-LA	C16QS-AN	C16QS-EU	C16QS-WW
SPI ²	x1	x1	x1	x1	x1	x1
GPIO ²	x4	x4	x4	x4	x4	x4
Main ANT	x1	x1	x1	x1	x1	x1
GNSS ANT	x1	x1	x1	x1	x1	x1

Electrical Characteristics

Operating Voltage	Range: 3.4 V to 4.2 V Typical: 3.7 V	Range: 3.4 V to 4.2 V Typical: 3.7 V	Range: 3.4 V to 4.2 V Typical: 3.7 V	Range: 3.4 V to 4.2 V Typical: 3.7 V	Range: 3.4 V to 4.2 V Typical: 3.7 V	Range: 3.4 V to 4.2 V Typical: 3.7 V
TxD Peak (@23dBm)	620 mA	620 mA	TBD	TBD	TBD	472.4 mA
TxD Typical	70 mA	71 mA	TBD	TBD	TBD	63 mA
TxD Idle (@23dBm)	18 mA	18 mA	TBD	TBD	TBD	4.9 mA
Sleep Mode	TBD	TBD	TBD	TBD	TBD	5 mA
GNSS (Fix)	60 mA	60 mA	60 mA	60 mA	60 mA	60 mA

Enhanced Features

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

Driver Support

USB Driver	RNDIS / CDC-ECM / CDC-ACM	RNDIS / CDC-ECM / CDC-ACM	RNDIS / CDC-ECM / CDC-ACM	RNDIS / CDC-ECM / CDC-ACM	RNDIS / CDC-ECM / CDC-ACM	RNDIS / CDC-ECM / CDC-ACM
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¹ Optional

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	C16QS-EA	C16QS-NA	C16QS-LA	C16QS-AN	C16QS-EU	C16QS-WW
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Certifications

Regulatory & Conformance	Europe : CE UK : UKCA ³ Global : GCF ³ South Africa: ICASA	N.A : PTCRB ³ America: FCC Canada : IC	Europe: CE ³ Brazil : ANATEL ³	Europe : CE Taiwan : NCC Australia: RCM ³	TBD	Global : GCF ³ Europe : CE ³ America: FCC ³ Canada : IC ³ Japan : TELEC ³ N.A : PTCRB ³
Carrier	Telefonica ³ / DT ³ / Orange	Verizon ³ / AT&T ³ / T-Mobile ³	TBD	TBD	Telefonica ³ / DT ³ / Orange	Verizon ³ / AT&T ³ / T-Mobile ³
Others	RoHS/REACH	RoHS/REACH	RoHS/REACH	RoHS/REACH	RoHS/REACH	RoHS/REACH

Other Features

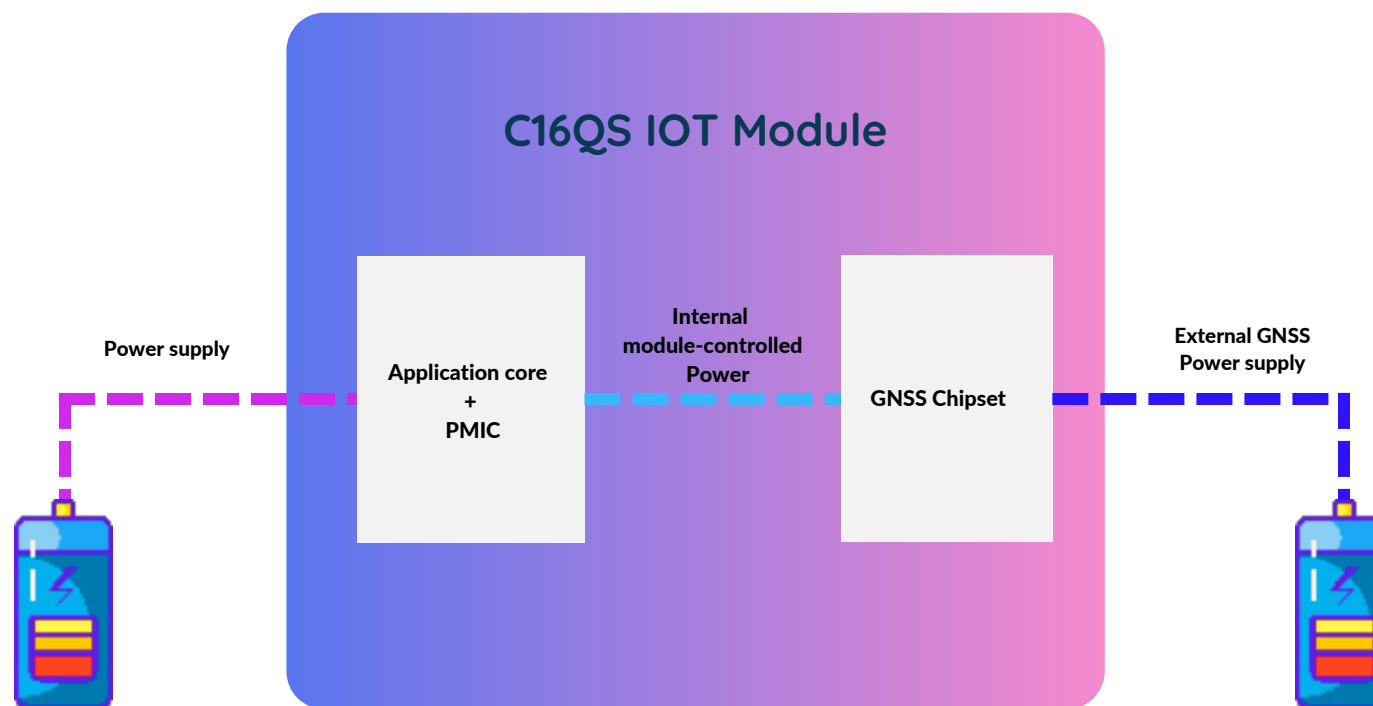
Integrated GNSS	Optional	Optional	Optional	Optional	Optional	Optional
Integrated eSIM + Hubble	Optional	Optional	Optional	Optional	Optional	Optional

¹Optional

²Needs SDK. Not available currently

³In Progress

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	EA EMEA and APAC	NA North America	LA Latin America	AN Australia, New Zealand, Taiwan and South Korea	EU Europe	WW World Wide
Modem Only	C16QS-EA-S00N	C16QS-NA-S00N	C16QS-LA-S00N	C16QS-AN-S00N	C16QS-EU-S00N	C16QS-WW-S00N
Modem + eSIM	C16QS-EA-S00H	C16QS-NA-S00H	C16QS-LA-S00H	C16QS-AN-S00H	C16QS-EU-S00H	C16QS-WW-S00H
Modem + GNSS (L1)	C16QS-EA-GNAN	C16QS-NA-GNAN	C16QS-LA-GNAN	C16QS-AN-GNAN	C16QS-EU-GNAN	C16QS-WW-GNAN
Modem + eSIM + GNSS (L1)	C16QS-EA-GNAH	C16QS-NA-GNAH	C16QS-LA-GNAH	C16QS-AN-GNAH	C16QS-EU-GNAH	C16QS-WW-GNAH

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