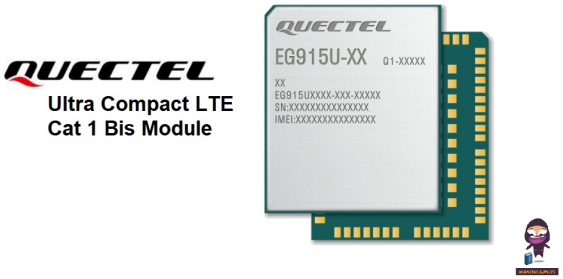


QUECTEL Ultra Compact LTE Cat 1 Bis Module Instructions

Contents

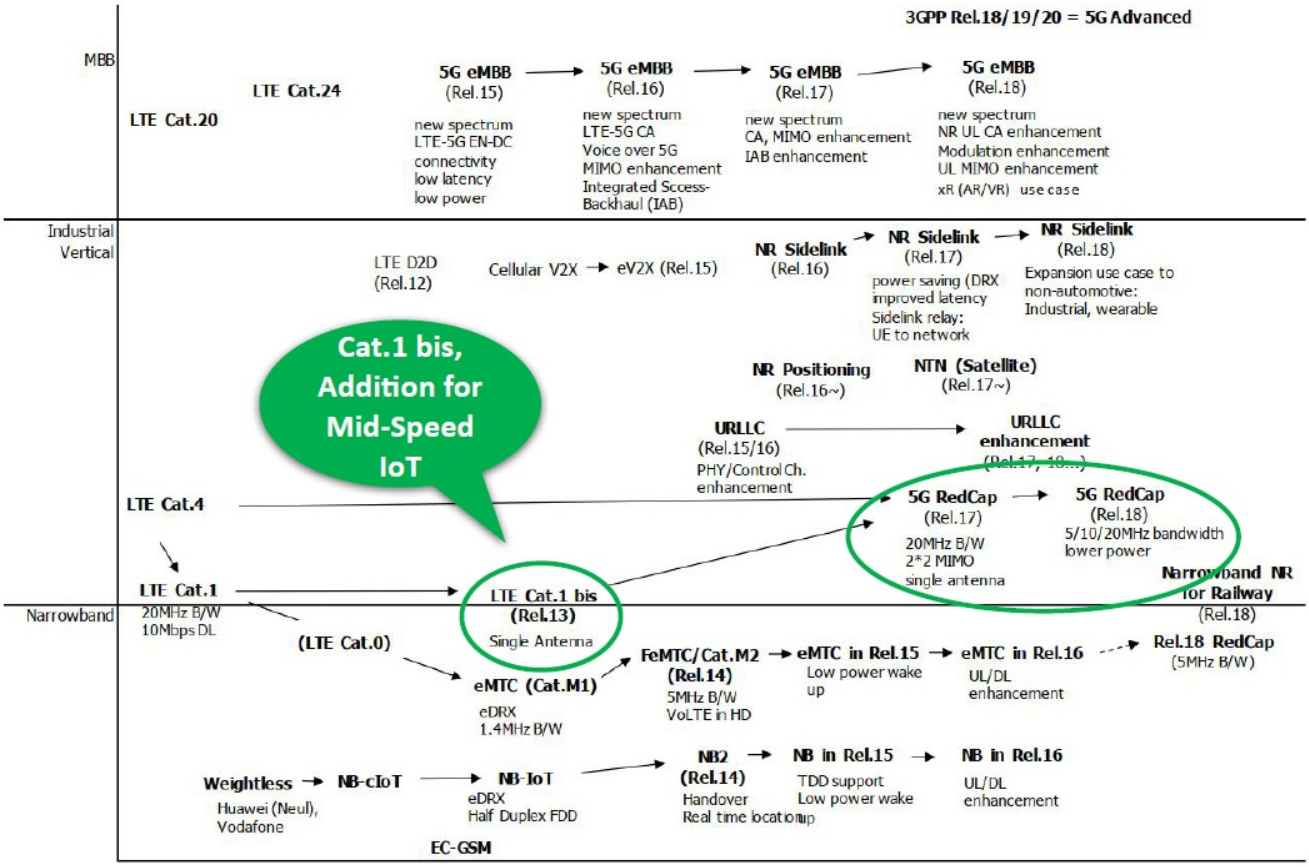
QUECTEL Ultra Compact LTE Cat 1 Bis Module

Specifications

- **Product Name:** Cat 1 bis for Medium Speed IoT
- **Technology:** LTE Cat 1 bis
- **Service Availability:** Global for LTE Cat 1 / Cat 1 bis, various regions for Cat M and NB IoT
- **Data Throughput:** LTE Cat 1: 10Mbps DL / 5Mbps UL, Cat M: 588Kb DL / 1Mb UL, NB IoT: 127 kbps DL / 158.5 kbps UL
- **Power Consumption:** Varies for different modes
- **Network Coverage:** LTE is the most ubiquitous network globally

Product Usage Instructions

Cat.1 bis for Medium Speed IoT



- LTE Cat.1 bis category was introduced in 3GPP release 13, for which the use of a single antenna. And it operates in existing LTE networks.
- No dedicated Cat.1 bis is signaling.
- LTE Cat.1 bis has the same data rate as LTE Cat.1. 10Mbps DL/ 5Mbps UL

Cat 1 bis acceptance
AT&T, Verizon, SBK, KDDI, and DCM

- Distinguish Cat 1 and Cat 1 bis specifically.
- Telstra: DO NOT accept Cat 1 bis today.
- Most ofthe EU carriers trust Cat 1 bis as Cat 1.

Characteristics of IoT standards

	LTE Cat 1	LTE Cat 1bis	LTE Cat 4	LTE Cat NB2 (NB-IoT)	LTE Cat-M1 (eMTC)	RedCap	eRedCap
3GPP release	Rel-8	Rel-13	Rel-8	Rel-14	Rel-13	Rel-17	Rel-18
Bandwidth	Up to 20 MHz	Up to 20 MHz	Up to 20 MHz	180 KHz	1.4 MHz	FR1:20 MHz	FR1: 5-20 MHz[1]
Duplex mode	FD, TDD	FD, TDD	FD, TDD	HD, FDD	FD[2], HD, TDD	FD, HD, TDD	FD, HD, TDD
Download (DL) peak data rate	10 Mbps	10 Mbps	150 Mbps	127 Kbps	300 kbps	FR1: 220 Mbps	10 Mbps
Upload (UL) peak data rate	5 Mbps	5 Mbps	50 Mbps	159 Kbps	375 kbps	FR1: 120 Mbps	10 Mbps
Max Tx/ Rx chain	1T/2R	1T/1R	1T/2R	1T/1R	1T/1R	1T/2R (1T/1R)	1T/1R
Tx power	23 dBm	23 dBm	23 dBm	14/20/23 dBm	20/23 dBm	20/23/26/ 29 dBm	23 dBm
Range (MCL)	144 dB	141 dB	144 dBm	164 dB	156 dB	140 dB	137 dB
Power save	eDRX, PSM	eDRX, PSM	eDRX, PSM	eDRX, PSM	eDRX, PSM	eDRX, MICO	eDRX, MICO
Voice	Supported	Supported	Supported	Supported	Supported	Supported	TBD

Comment

- Cat 1bis has an ideal global roaming footprint.
- Cat 1bis support PSM/eDRX. And its low power consumption should allow manufacturers to build devices that are easy to deploy and have a long battery life.
- LTE-M may not apply in nonstationary use cases like globally deployed asset trackers, which stand to gain a lot with the proliferation of Cat 1bis.

Refer to: whitepaper_understanding_the_benefits_of_lte_cat_1bis_technology from QC.

1. There are operators not supporting voice over Cat M
2. Some network operators are still evaluating when to introduce PSM and eDRX in their networks

Distinguishing Cat 1 and Cat 1 bis
Cat 1 bis is an addition for Mid-Speed IoT and is trusted by most EU carriers as equivalent to Cat 1. Telstra does not accept Cat 1 bis currently.

IoT Standards Characteristics
For detailed information on IoT standards, refer to the whitepaper “Understanding the Benefits of LTE Cat 1bis Technology” from QC.

LTE Cat 1 VS Cat M vs NB IoT
Each technology has its own service availability, data throughput, power consumption, and network coverage. Choose based on your specific requirements.

LTE Cat 1 - Cat M - NB IoT			
Items	LTE Cat 1 / Cat 1 bis	Cat M	NB IoT
Service availability	★★★★★ **Global**	★★ NA, LATAM, Western & Northern Europe, ANZ, JP&KR etc.	★★★ NA, LATAM, Europe, ANZ, JP&KR, China, India
Future network developments	Existing LTE networks	Network operators may decide not to invest in the technology	Network operators may decide not to invest in the technology
Voice Capability	★★★★ **Yes**	★★ **Yes (*)**	★ **No**
Data throughput	★★★★ 10Mbps DL/5Mbps UL	★★ 588Kb DL / 1Mb UL	★ 127 kbps DL / 158,5 kbps UL
Mobility	★★★★★	★★★★	★★
Roaming	★★★★★	★★	★★
Link budget	★★★	★★★★★	★★★★★
Power Consumption	★★★★ **Idle Mode**: 13mA **Sleep mode**: 1.2mA(DRX=1.28s) **PSM**: 5.7uA (**)	★★★★★ **Idle Mode**: 16.5 mA **Sleep mode:** 1.1 mA(DRX 1.28 s) **PSM**: 1.5 uA	★★★★★ **Idle Mode:** 16.8 mA **Sleep Mode:** 2.2(DRX 1.28s) **PSM:** 1.4 µA
Cost	★★★	★★★	★★★

Seamless Mobility

LTE is widely available globally with roaming contracts in place for high mobility. Consider network coverage when choosing between NB-IoT and Cat M.

- LTE is the most ubiquitous network.
- According to GSA(General Services Administration), by June 2021, GSA had identified 811 operators running public LTE networks in 240 countries/territories worldwide.
- Due to the high mobility of mobile phone users, LTE network operators have concluded roaming contracts.
- Improvement of the NB-IoT and Cat M coverage may not be happy, as it represents additional investment from the network operators.

Countries/territories with no identified commercial LTE network
Source: GSA report.

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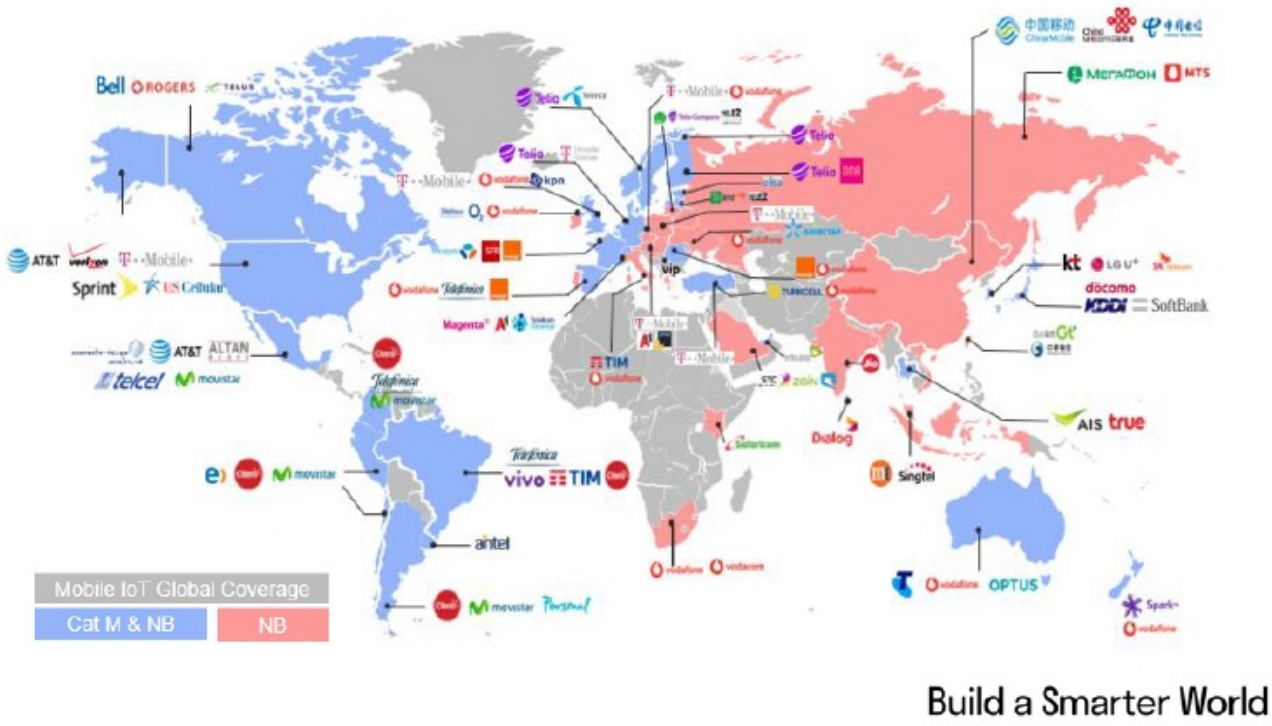

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FAQs

Q: What is the difference between LTE Cat 1 and LTE Cat M?
A: LTE Cat 1 offers higher data throughput compared to LTE Cat M, suitable for applications requiring faster speeds.

Q: How can I determine the best technology for my IoT project?
A: Consider factors such as service availability, data requirements, power consumption, and network coverage to choose between LTE Cat 1, Cat M, or NB IoT.

Documents / Resources

	QUECTEL Ultra Compact LTE Cat 1 Bis Module [pdf] Instructions Cat 1 bis, Ultra Compact LTE Cat 1 Bis Module, Compact LTE Cat 1 Bis Module, LTE Cat 1 Bis Module, Cat 1 Bis Module, Bis Module

References

- User Manual