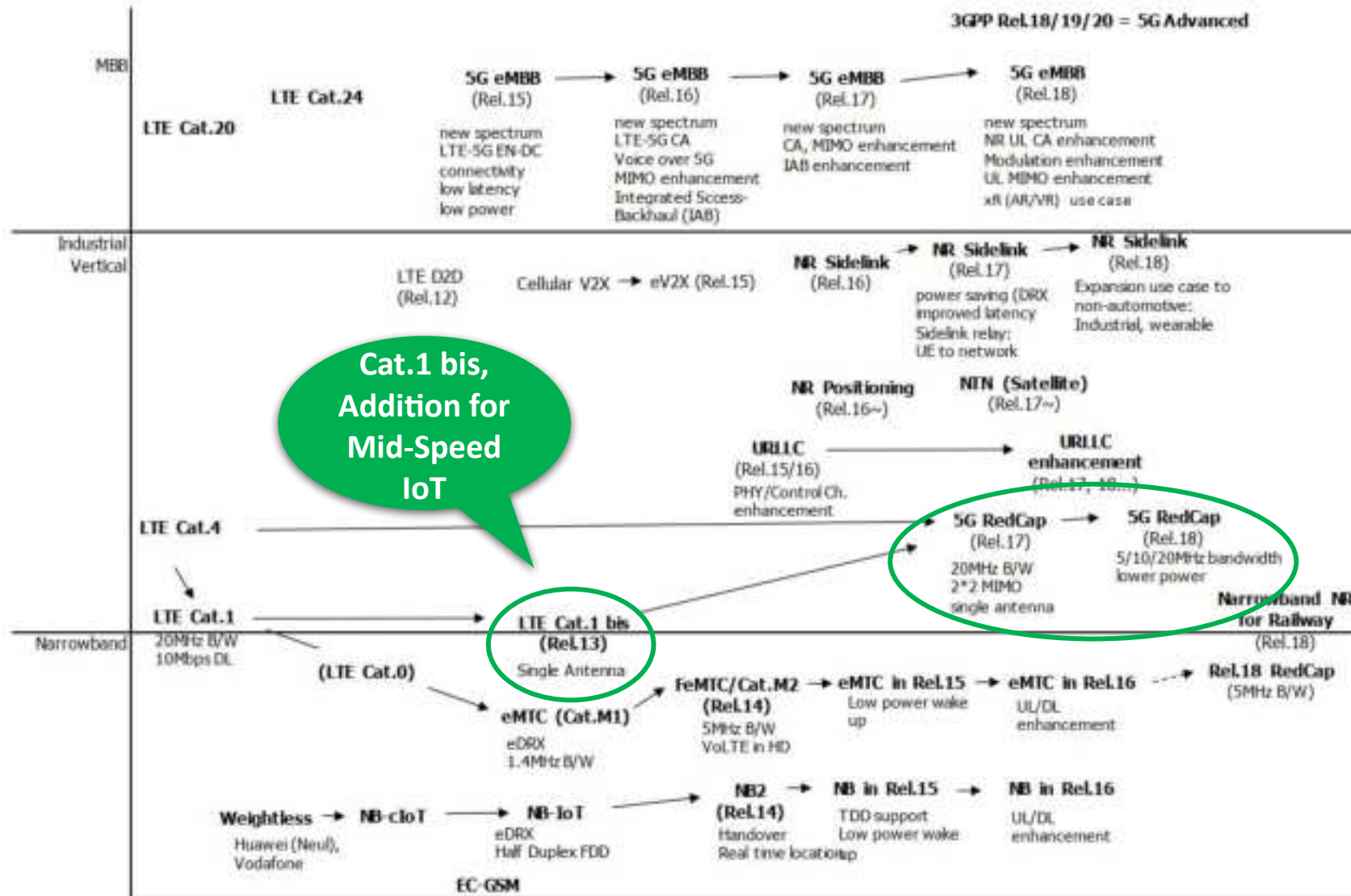




Cat 1 bis vs Cat 1

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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.
- There's [no dedicated](#) Cat.1 bis 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 of EU carriers trust Cat 1 bis as Cat 1.

Characteristics of IoT standards



Comment

- Cat 1bis is wider 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 non-stationary use cases like globally deployed asset trackers, which stand to gain a lot with the proliferation of Cat 1bis.

	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

Refer to: [whitepaper_understanding_the_benefits_of_lte_cat_1bis_technology_from_QC](#)

LTE Cat 1 VS Cat M vs NB IoT



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	★★★	★★★	★★★

(*) there are operators not supporting voice over Cat M

(**) some network operators are still evaluating when to introduce PSM and eDRX in their networks

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Seamless mobility



- LTE is the most ubiquitous network
- According to GSA(General Service Association), **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 happen as it represents additional investment from the network operators



Countries/territories with no identified commercial LTE network

Source: GSA report.





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Thank You

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