tsdsi Telecommunications Standards Development Society, India

TSDSI –NSGM Workshop
on
Leveraging 5G and Cloud for Smart Grids – India Context

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Overview of 5G technology landscape

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5G: Diverse Use case

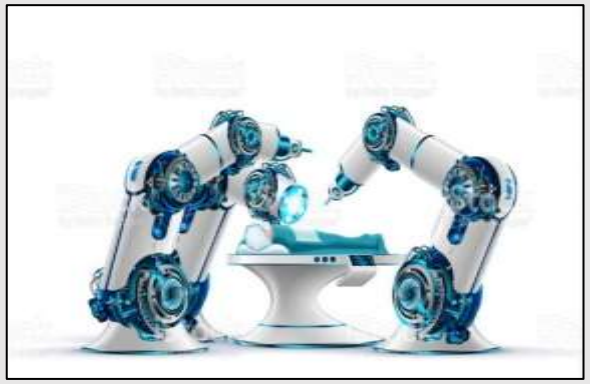
enhanced
Mobile Broadband

eMBB

massive
Machine Type
Communications

mMTC

ultra-reliable
Low Latency
Communications

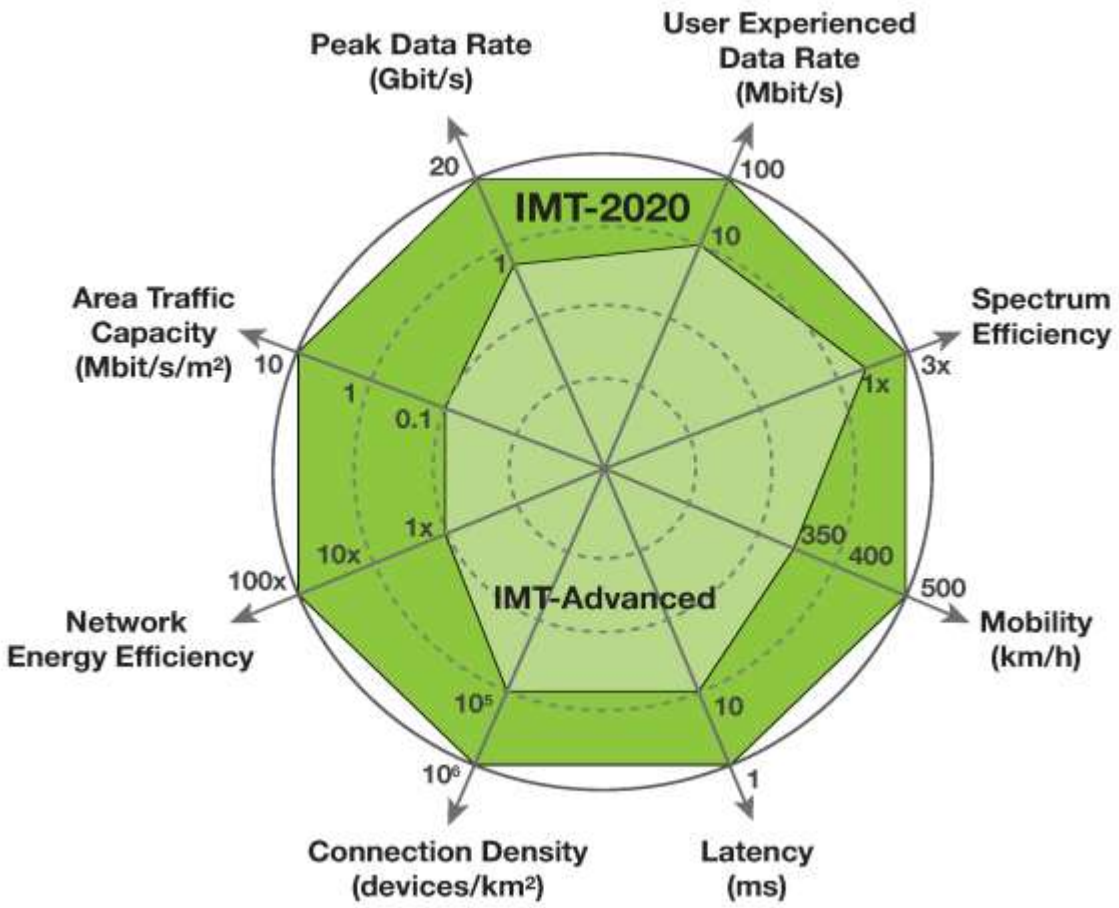


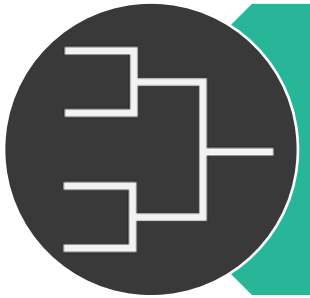
urLLC

5G requires delivery of high-speed mobile broadband and low-latency applications from a common infrastructure driving up deployment costs

5G: Key Technologies

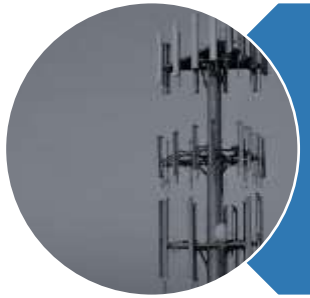
5G/IMR-2020 as per ITU-R M.[IMT.VISION]





Mixed numerology

- Different sub-carrier spacing
- Scaling RAN BW up to 1 GHz with carrier aggregation/dual connectivity



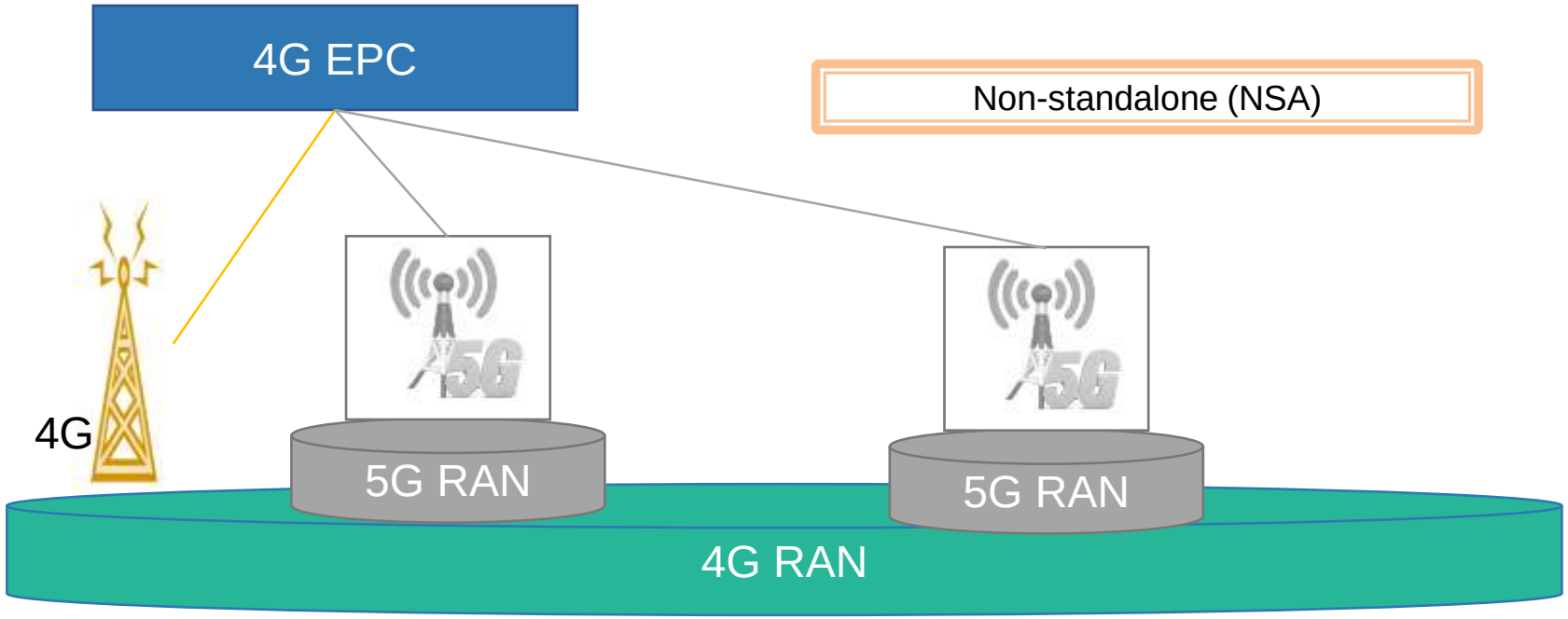
Massive MIMO

- 256x256 MIMO (in mmWave band)
- Beamforming and user tracking

C-RAN (Centralized RAN) 5G Phase 2

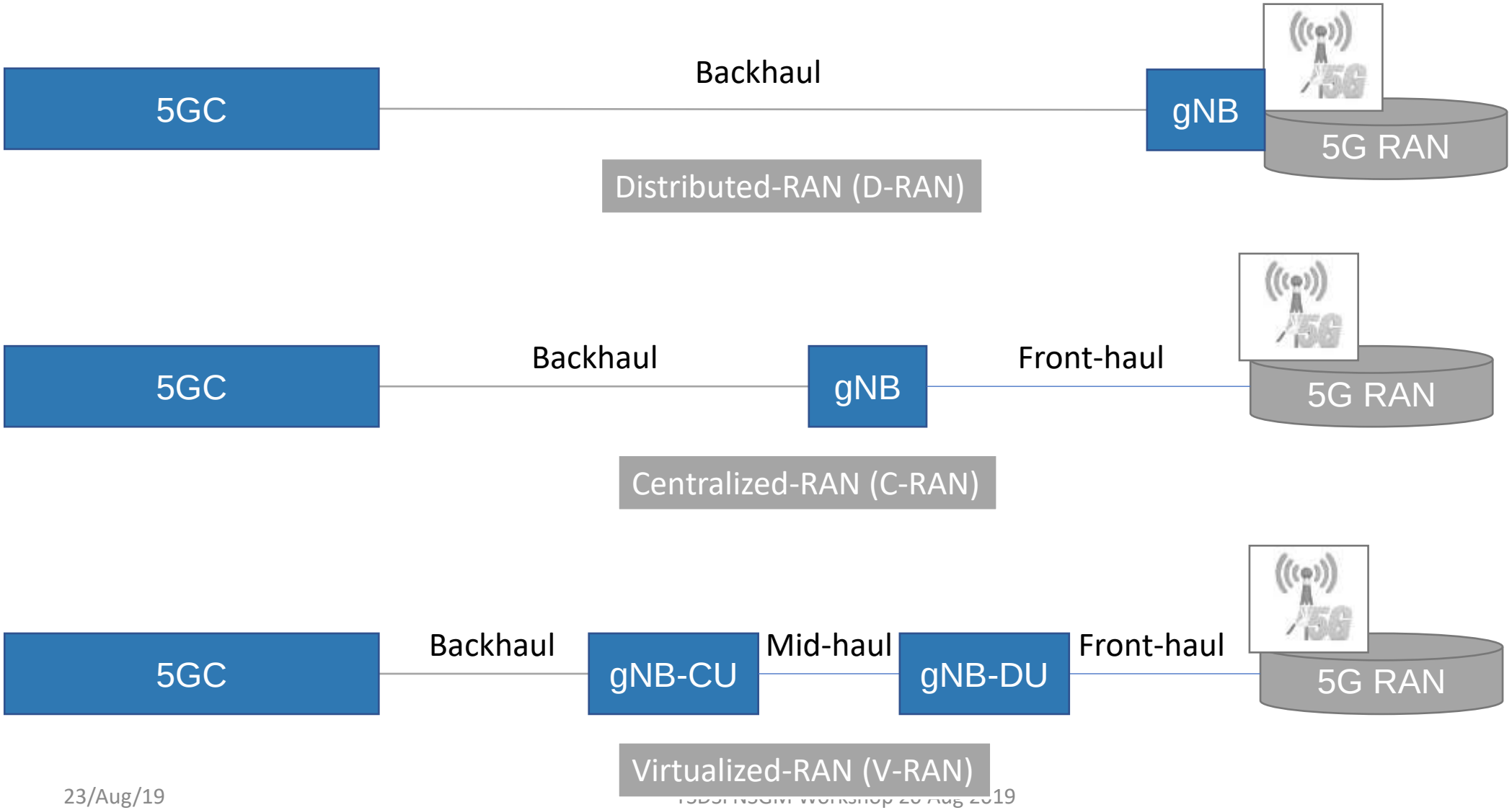
- Distributed mmWave hotspot and/or split CU, DU and distributed RU

5G: Initial deployment for densifying 4G

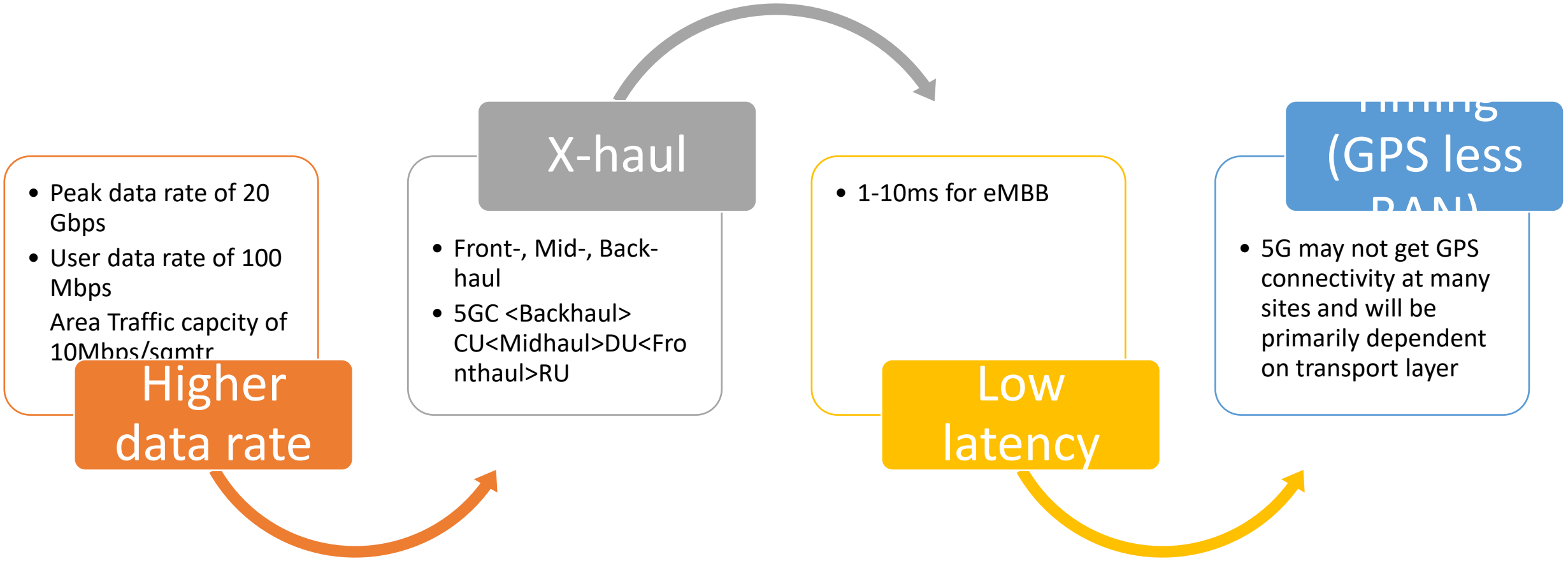


5G densification of 4G Macro

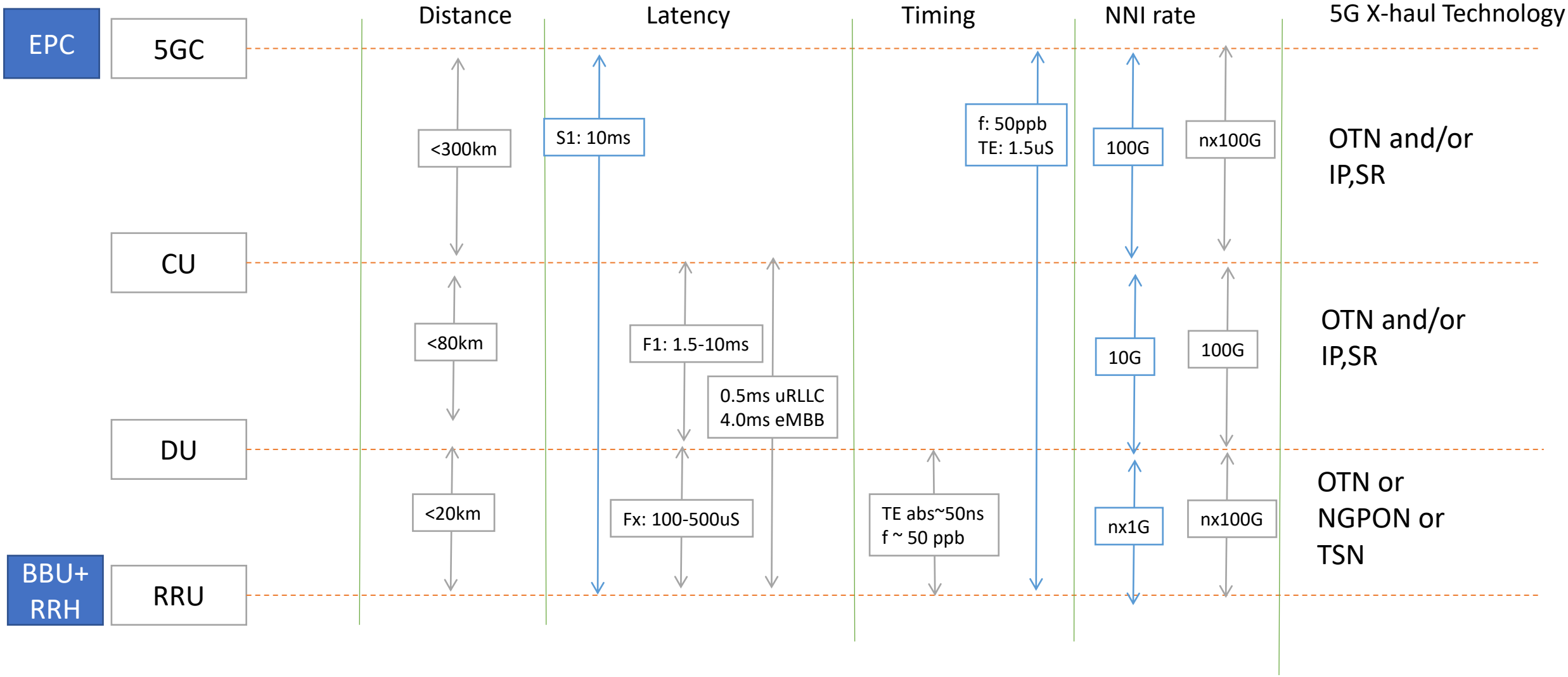
5G: Deployment models



5G: Key challenges



5G Transport Requirement overview (4G in Blue)



5G: Front-haul options

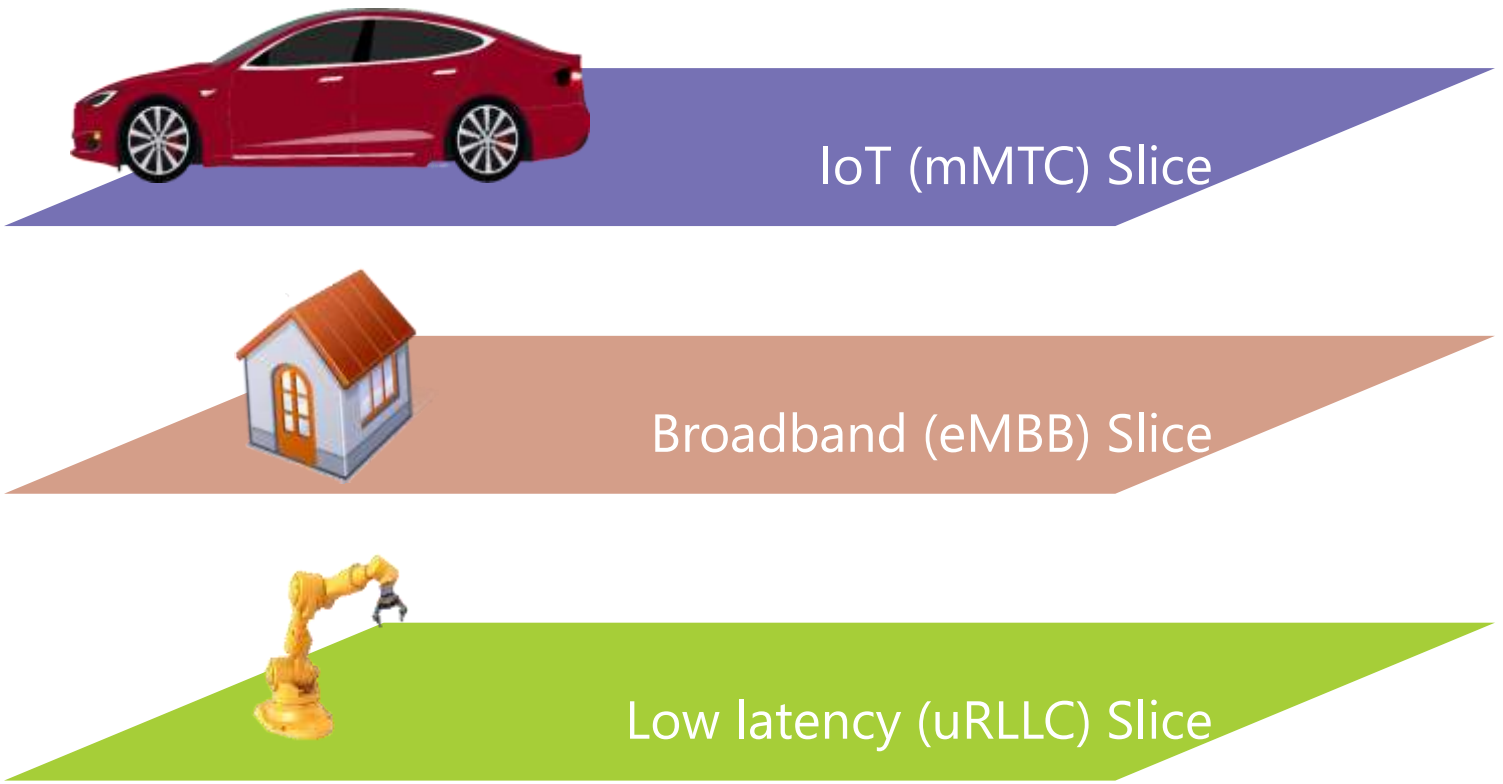
Number of Antenna Ports	Radio Channel Bandwidth			
	10 MHz	20 MHz	200 MHz	1GHz
2	1 Gbps	2 Gbps	20 Gbps	100 Gbps
8	4 Gbps	8 Gbps	80 Gbps	400 Gbps
64	32 Gbps	64 Gbps	640 Gbps	3,200 Gbps
256	128 Gbps	256 Gbps	2,560 Gbps	12,800 Gbps

CPRI

eCPRI

Also ORAN (For us Ethernet + TSN)

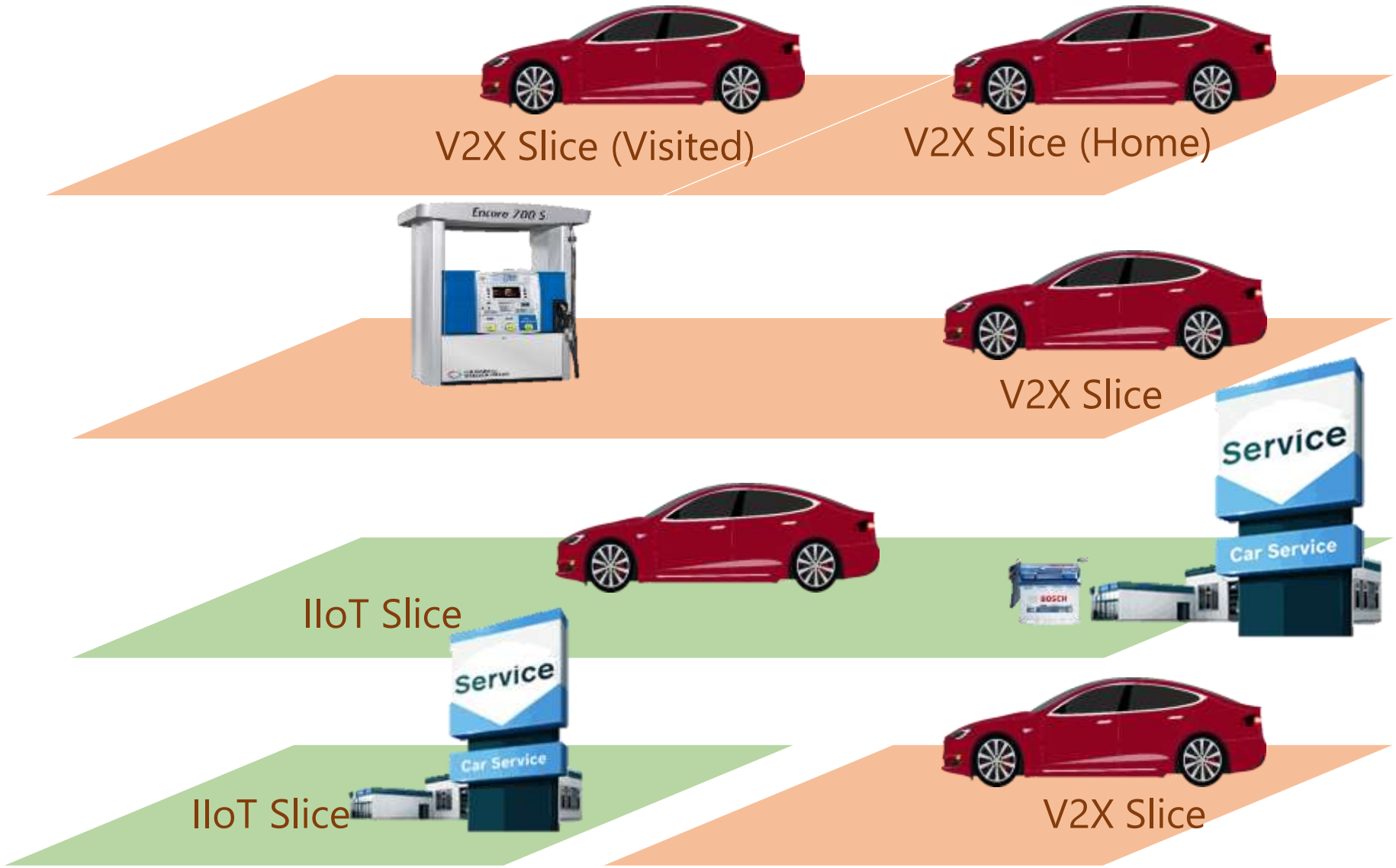
Network Slice



A network slice :

- could span across multiple parts of the network infrastructure (e.g. terminal, access network, core network and transport network)
- could also be deployed across multiple operators.
- comprises dedicated and/or shared resources, e.g. in terms of processing power, storage, and bandwidth and has isolation from the other network slices.

Application of Slice for Automotive (EV) vertical



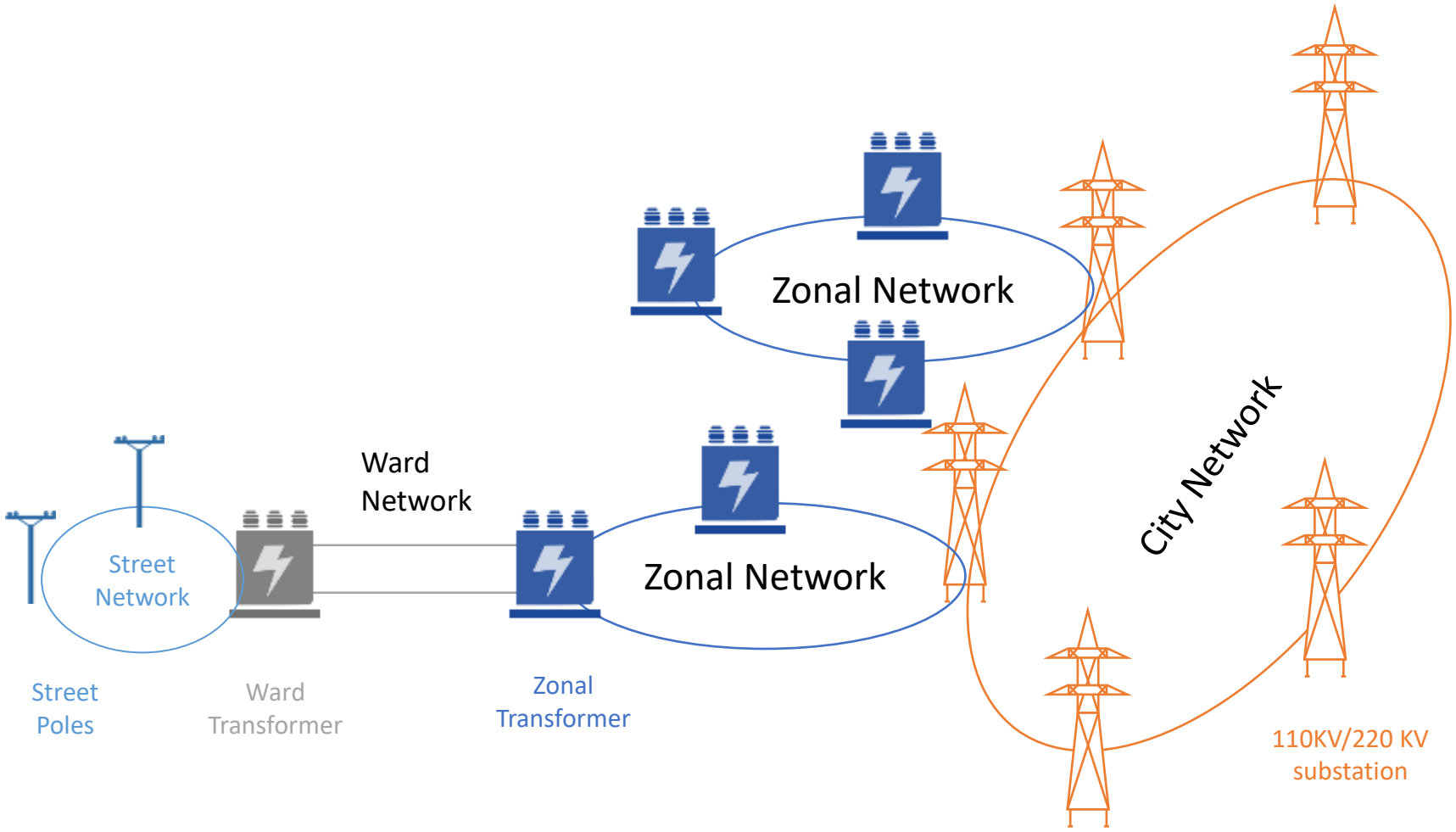
Slice Roaming

Slice Analytics

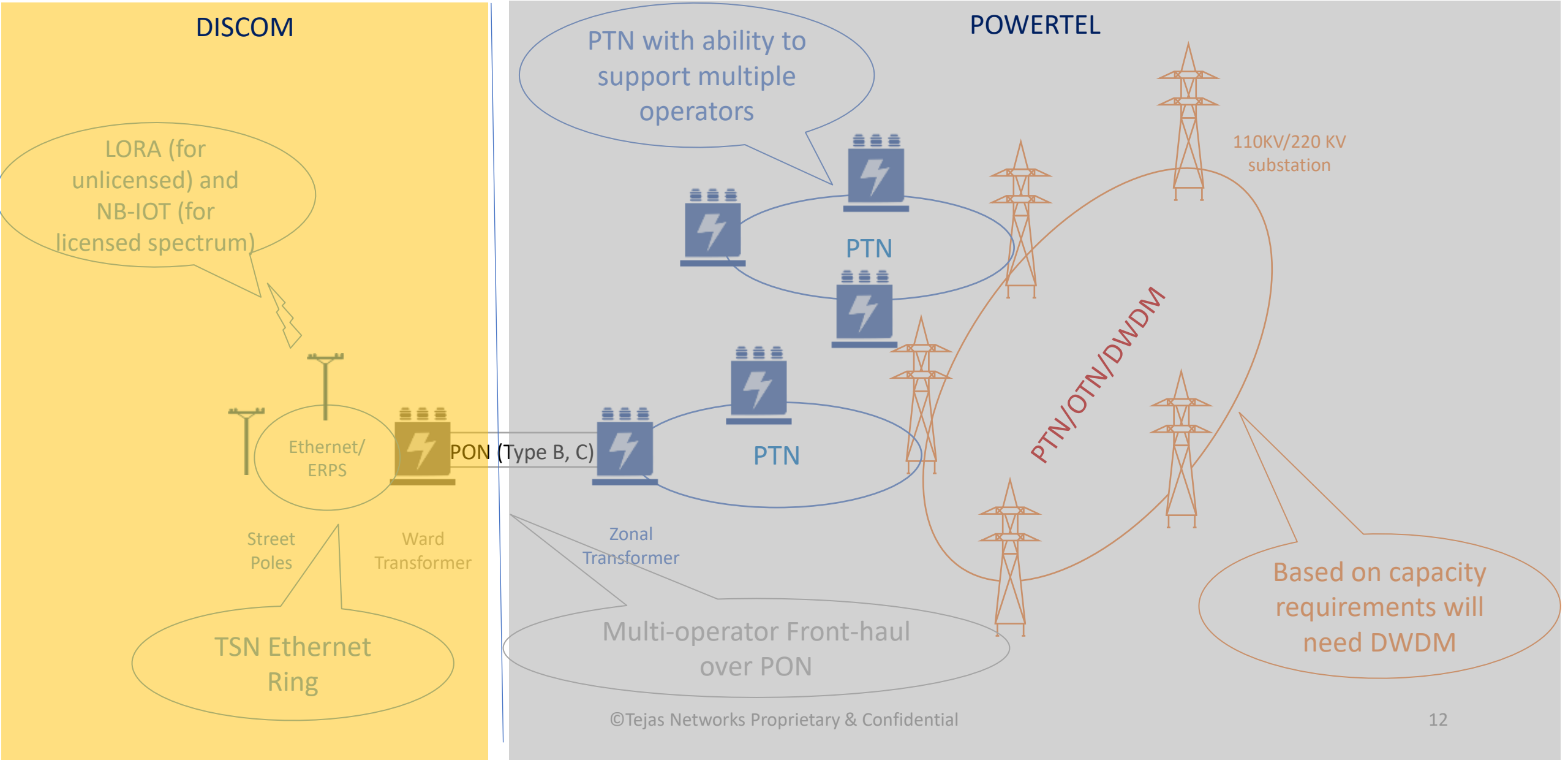
Slice Provisioning

Slice integration

5G: X-haul role for power companies



5G: X-haul role for power companies



5G: DISCOM/POWERTEL Open Issues

Deployment challenges

- Max tower access without grid disruption
- How can the operator be allowed access to the radio unit for maintenance?
- The need for faraday cage and armoured power cables to handle surge protection
- How to handle lightning?

Business model

- Auction of site access
- Infrastructure as a Service (IaaS)
- Network Slice (mMTC or eMBB) as a Service (NSaaS)

Conclusion

Discom can have a key role in 5G

- Tower, power, space and location advantage can enable Discoms to generate addition revenue from telecom operators

Discom as a converged infra player

- Discom should become a converged communication and electricity provider

Thank you