5G standards in 3GPP

3GPP Release 16 and 17

Brighttalk Webinar – 9th April, 2020

Outline

- 3GPP going strong amid global crisis
- Release 16 and 17 timeline
- Main features of 3GPP Release 16 and 17
- Q&A

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Chairman of 3GPP RAN
NOKIA

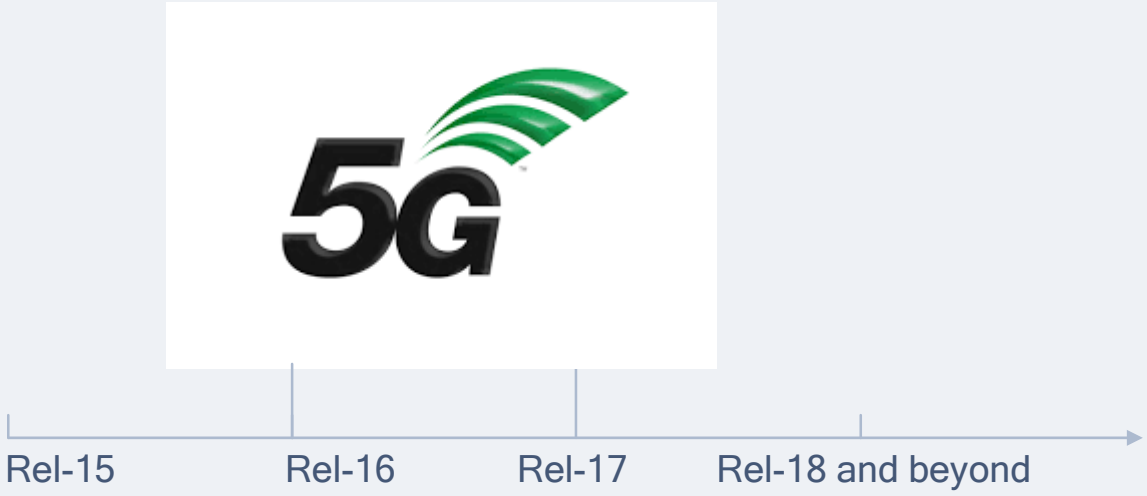
Thank you to Lorenzo Casaccia/Qcomm for allowing me to use his graphics and figures in this presentation!

Nokia internal use

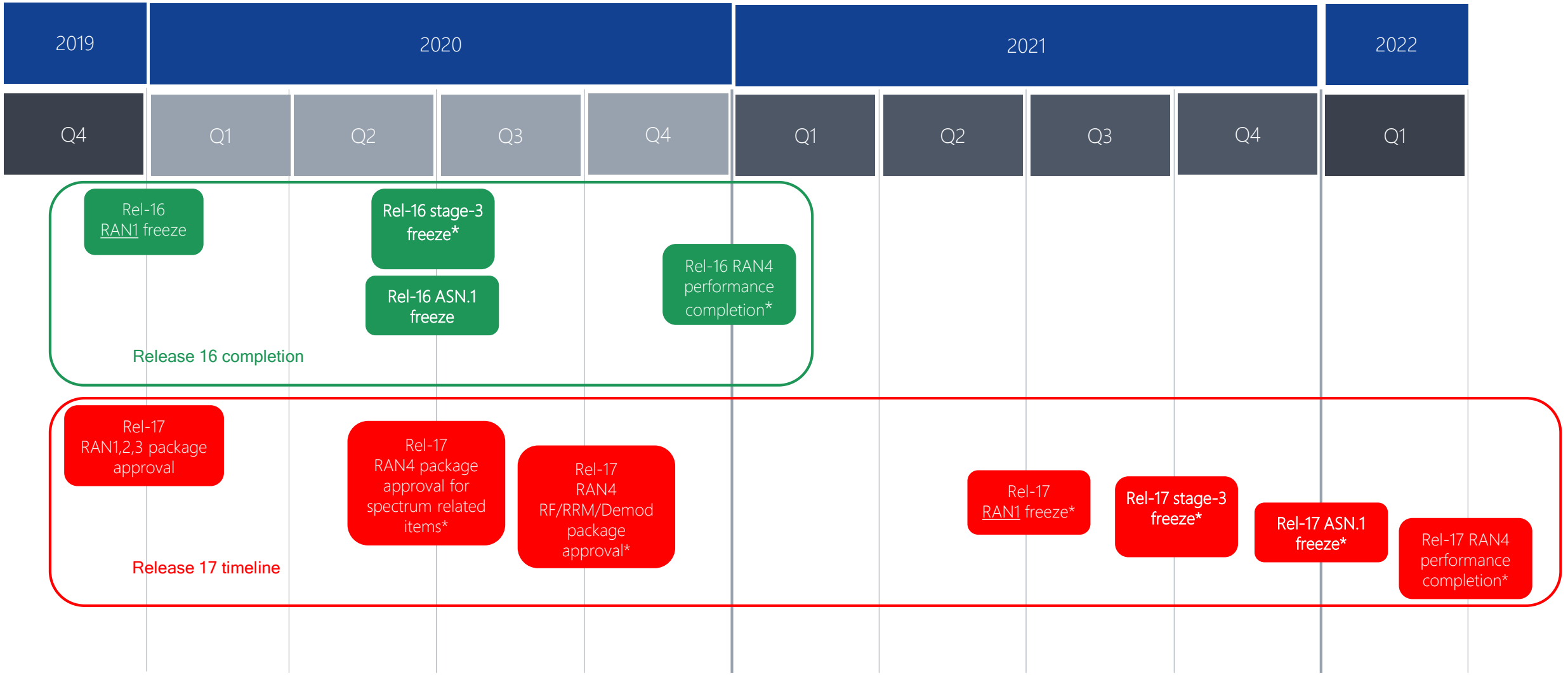
3GPP going strong

- 3GPP standardization work continuing strong amid global crisis
- Face-to-face meetings have been converted to virtual meetings
  - Electronic Working Group and Plenary meetings replacing face-to-face meetings
- Commitment of companies to contribute and innovate is as strong as ever!
- Strong 5G cellular technology evolution is more evident than ever!

Rel-16 and Rel-17 timeline



Overall 3GPP RAN timeline

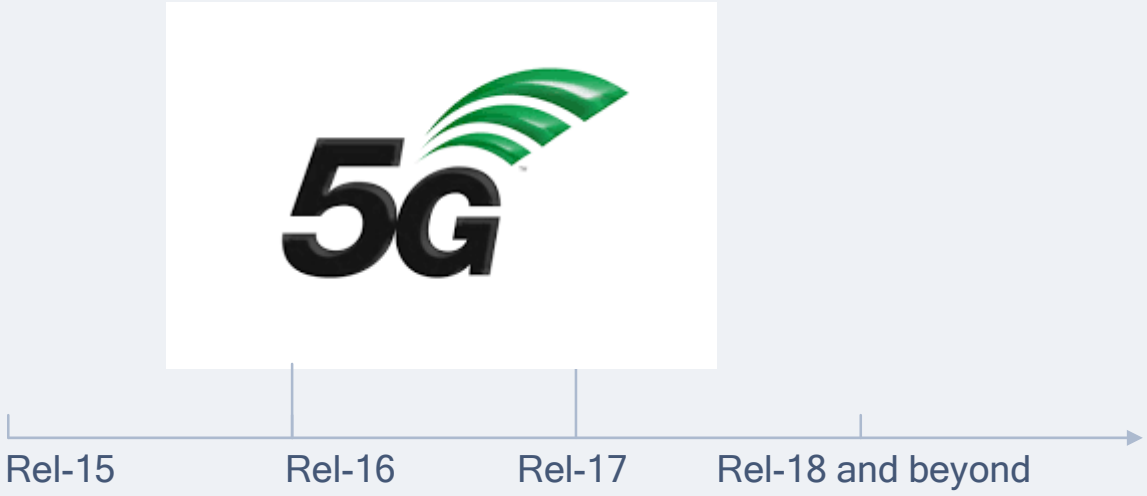


* These milestones show a 3-month shift compared to previously approved timelines

Key points

- Release-16 stage-3 freeze moved to June/2020
- Release-16 ASN.1 freeze remains in June/2020
- Release-16 radio performance work completion moved to Dec/2020
- Start of Release-17 work scheduled for May/2020 (physical layer)
- Release-17 RAN1 (physical layer) freeze moved to June/2021
- Release-17 stage-3 freeze moved to September/2021
- Release-17 ASN.1 freeze moved to December/2021
- Release-17 radio performance work ompletion moved to March/2022

Rel-16 and Rel-17 content



Accelerating the expansion of 5G

New services, deployments, and spectrum bands

Continued eMBB enhancements, e.g., mobility, coverage, more

New spectrum above 52.6 GHz

More capable, flexible IAB

Enhancements to 5G NR IIoT

Expanded sidelink, e.g., V2X reliability, P2V

Unlicensed spectrum across all use cases

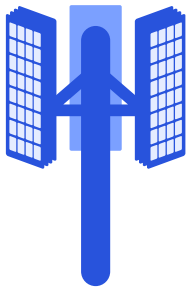
NR-Light for wearables, industrial sensors, and enhanced massive IoT

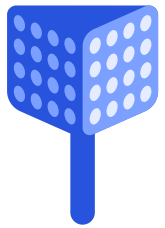
Positioning with cm-level accuracy

Extended reality

Rel-15 deployment learning, others

Continue to enhance the eMBB foundation





Enhanced eMBB in 3GPP Rel-17

Further improved MIMO for e.g., better mobility

Enhanced IAB with full-duplex and spatial multiplexing

DSS enhancements

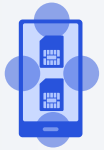
Enhanced coverage for sub-7 GHz & mmWave

Supporting even higher bands of up to 71 GHz[1]

Multicast for content delivery

Further power saving for idle, connected and small data

Further enhanced mobility for mixed topologies



Others such as, >4 Rx and multi-SIM

Foundational areas

Coverage, capacity, latency, power saving, mobility

Expanded deployments

New spectrum, topologies, integrated backhaul, ….

New services

Latency, reliability, positioning, use cases like XR

Dedicated and reliable networks optimized for local services

Scalable wireless connectivity on a future proof platform

Capabilities for new use cases e.g. wireless Industrial Ethernet

5G

3GPP Rel-16 Foundation

Private 5G network

Licensed, shared and unlicensed spectrum

Ultra-reliable low-latency communication (URLLC)

Time Sensitive Networking (TSN)

Positioning

Continued enhancements in 3GPP Release 17 to better support industrial IoT requirements

Expanding the 5G device ecosystem with NR-Light

Efficiently support more device types: wearables, IoT, …

5G NR – a unified, scalable air interface

Allowing coexistence of a wide range of 5G device classes

5G IoT – eMTC/NB-IoT

Lowest complexity devices – e.g., low complexity, low power, delay tolerant

Smart city (e.g., meters)

Low-end industrial IoT (e.g., sensors)

Low-end wearables

Low-end asset trackers

5G NR-Light

Lower complexity devices – e.g., with half-duplex, improved control channel design for lower bandwidth[3]

High-end wearables

Smart grid

High-end logistic trackers

Healthcare monitoring

Industrial cameras

eMBB and URLLC

Higher performance devices – e.g., high throughput, low latency

High-end smartphones

High-end industrial IoT (e.g., robotics)

Connected laptops

Extended Reality (XR)

Evolving 5G NR positioning to fully meet 5G requirements

Rel-17 will expand on the LTE and 5G NR Rel-16 foundation

Release 16

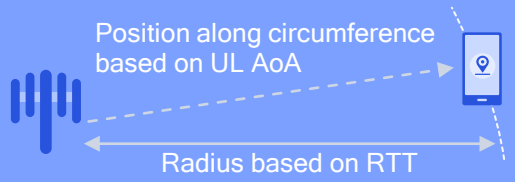
Meeting initial accuracy requirements of 3m (indoor) to 10m (outdoors) for 80% of time

Roundtrip time (RTT)

Angel of arrival / departure (AoA/AoD)

Time difference of arrival (TDOA)

Single-cell positioning



Release 17

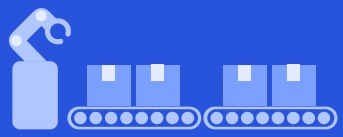
Enhancing capability and performance for a wide range of use cases

Centimeter level accuracy

Meeting absolute accuracy requirements[1] of down to 0.3m

Lower latency

Reducing positioning latency to as low as 10 ms[3]

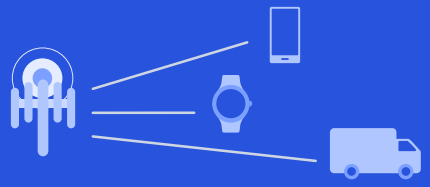


New evaluation scenarios

Supporting new channel models for industrial IoT environment

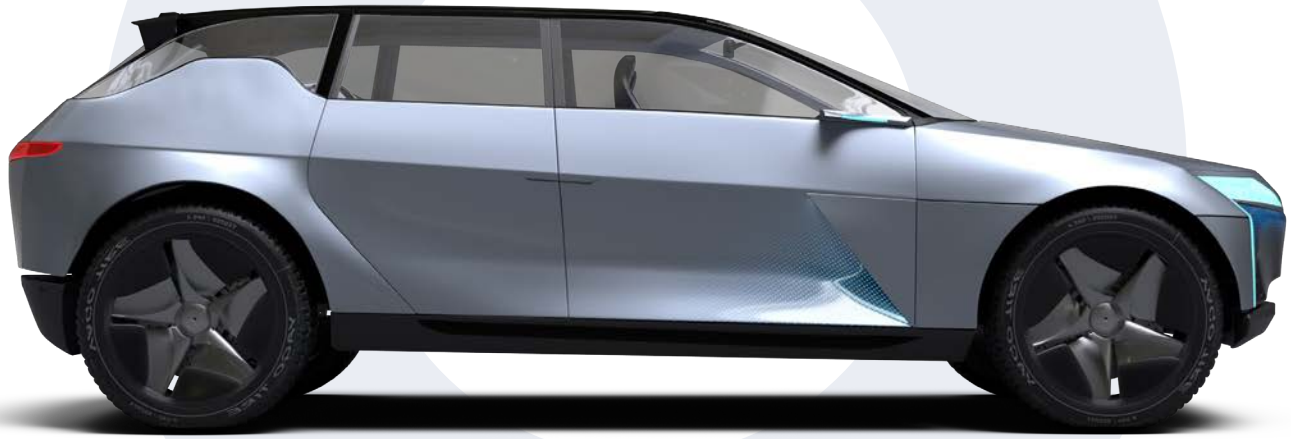
Higher capacity

Scaling to millions of simultaneous devices for e.g., IoT, automotive



5G NR C-V2X

Continued evolution to bring new benefits



Advanced safety

Real-time situation awareness and sharing of new kinds of sensor data take safety to the next level

Faster travel / energy efficiency

More coordinated driving for faster travel and lower energy usage

Accelerated network effect

Sensor sharing and infrastructure deployment bring benefits, even during initial deployment rollouts

Rel-17 to enhance C-V2X performance and expand to more road users (e.g., bicycles, scooters) with new power saving features

Thank you !

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https://www.3gpp.org/news-events/2098-5g-in-release-17-–-strong-radio-evolution

https://vimeo.com/380274974

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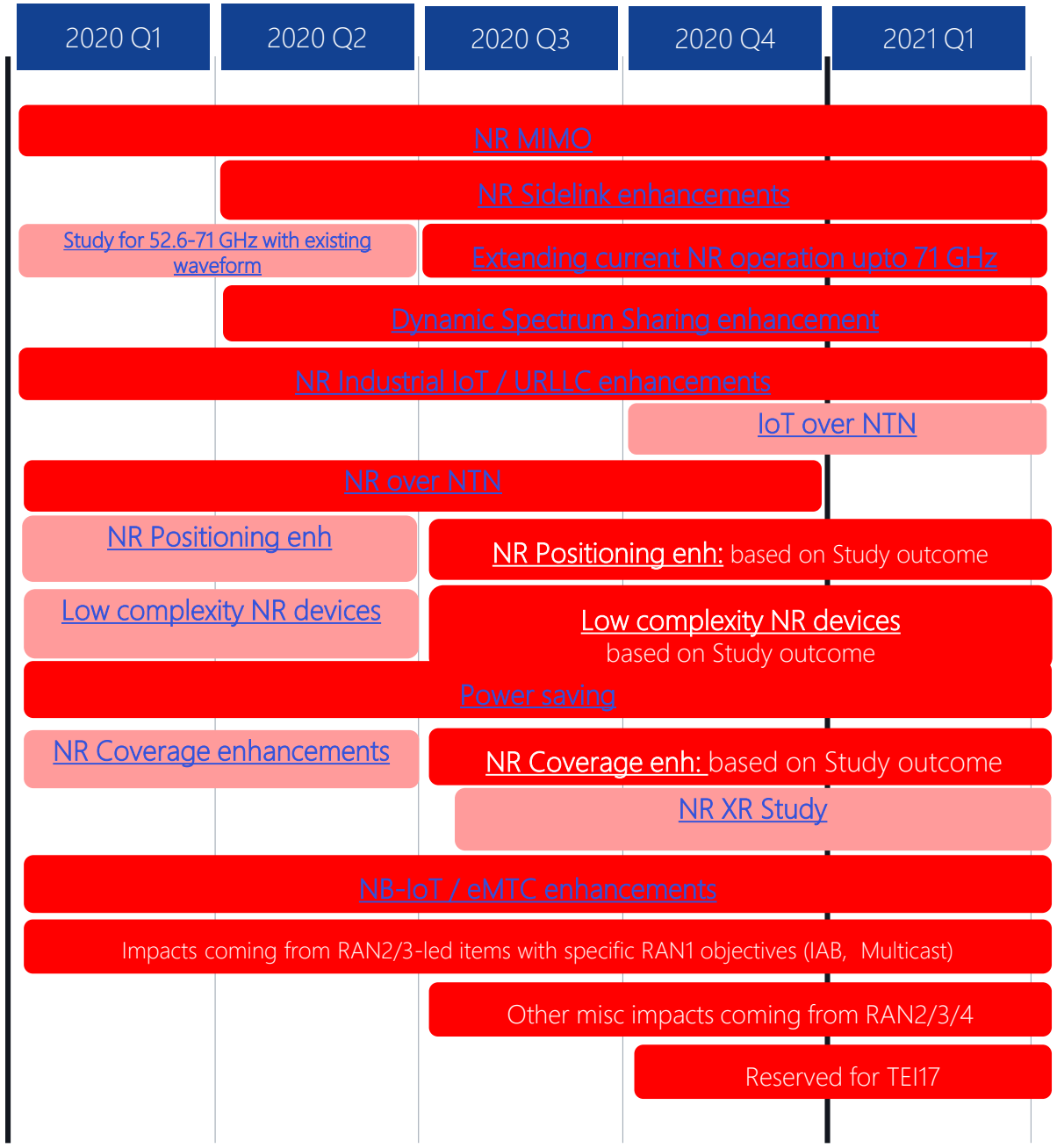
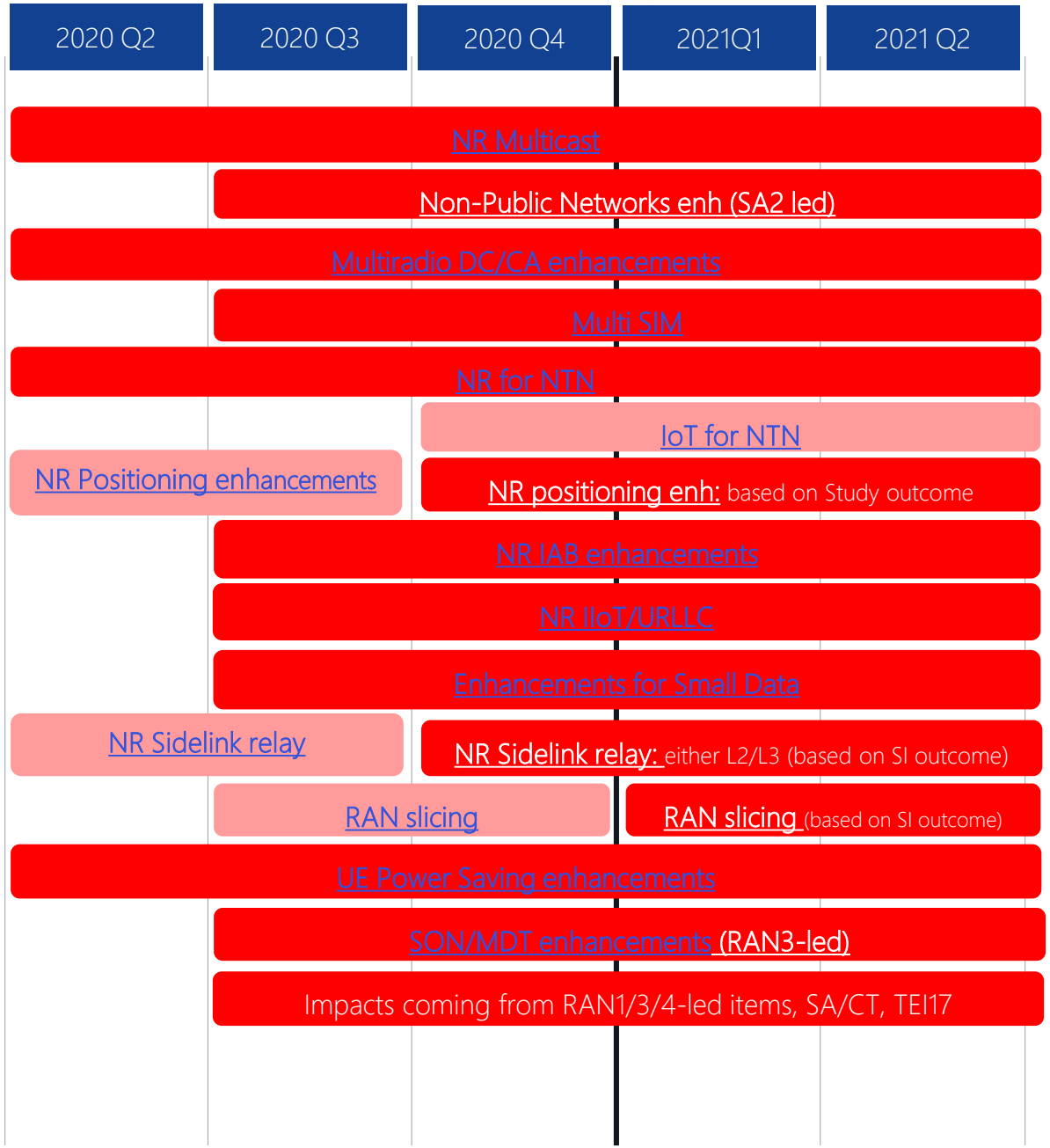
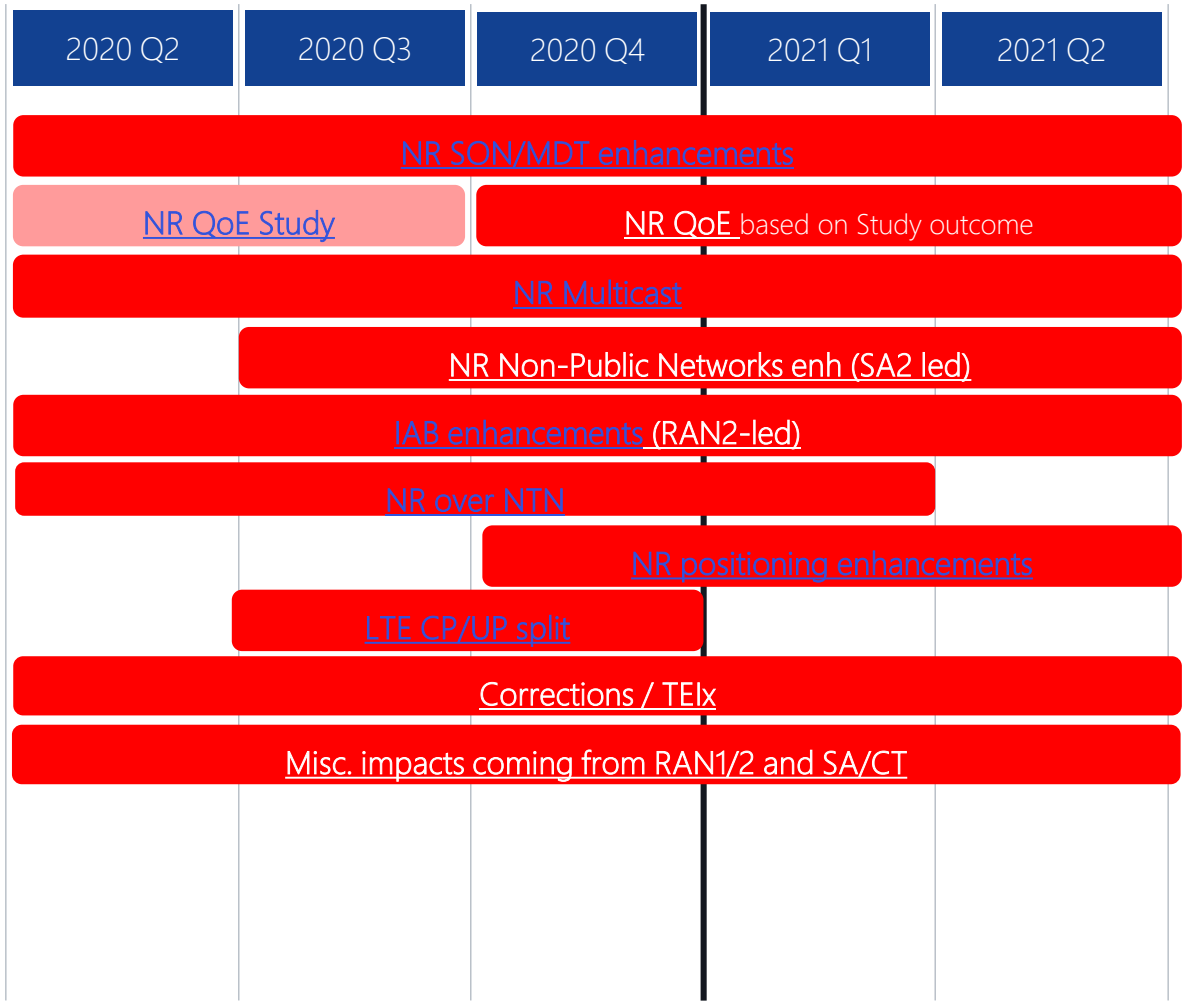
Annex – Rel-17 content in detail

RAN1 - physical layer



RAN2 - radio protocols



RAN3 – radio architecture