

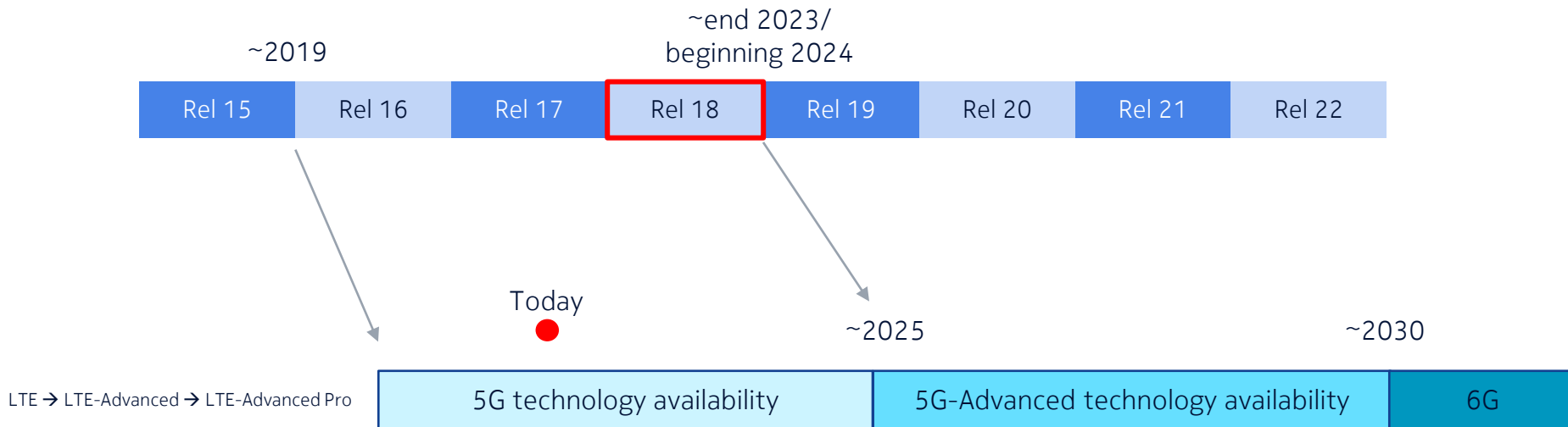
Nokia views for Rel-18 priorities and timeline

Rel-18 SA Workshop
9-10 September 2021

SP-210614, Nokia

5G Rel-18 – 5G-Advanced

Extending the longevity of the 5G system



Release 18 expected to be important 5G release impacting the 2nd half of 2020 decade

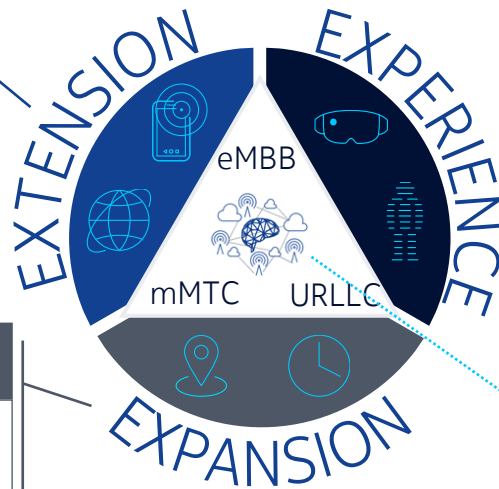
3GPP Rel-18 main directions – Nokia views

Extend the reach of 5G connectivity

- Satellite architecture enhancements
- Drones support enhancements
- Prose enhancements
- Personal IoT network

Expansion beyond connectivity

- Positioning enhancements
- Timing Resiliency- and Sync- aaS



Enhanced user experience

- Enhancements for XR, cloud gaming, multimedia services
- Edge computing
- Dual Registration

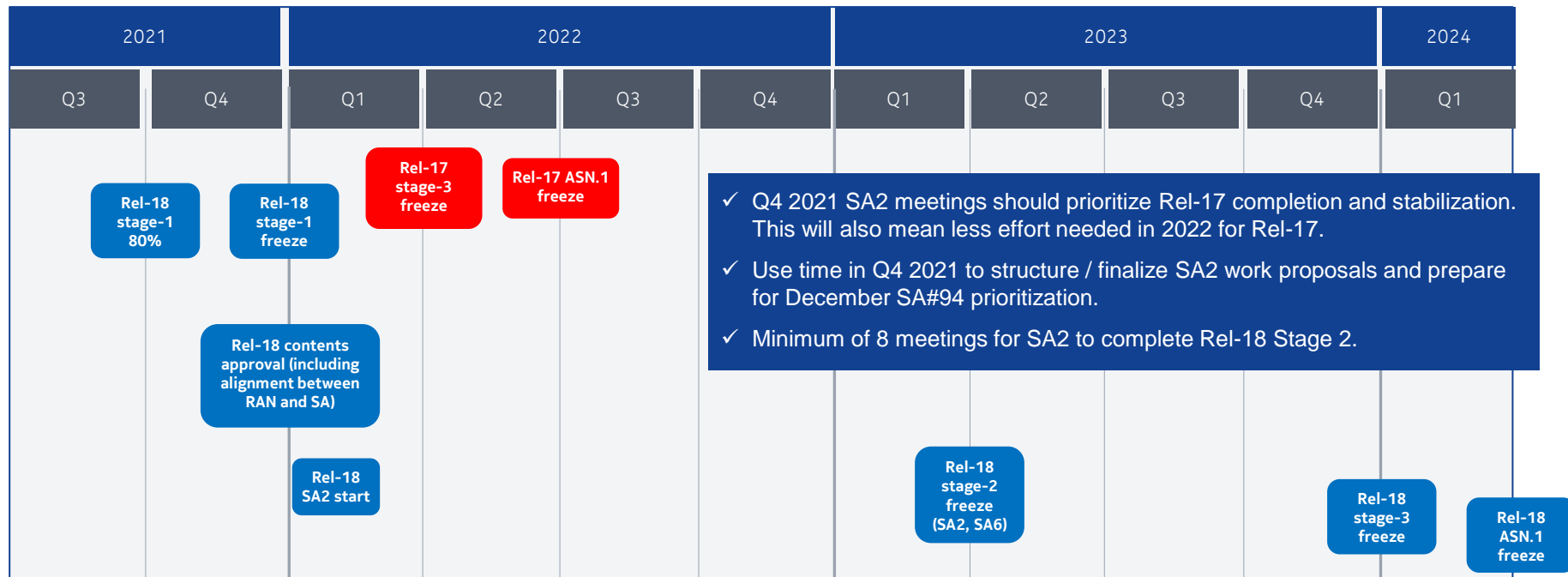
Architectural and operational enhancements

- Data exposure and analytics for AI/ML
- Wireline Wireless Convergence
- Network slicing
- ATSSS
- 5GC group management
- NPN

Energy efficiency and sustainability to be integral part of all Rel-18 features

Mission Critical communication for e.g. public safety and railways

Proposed Rel-18 timeline for SA/CT



General considerations for Rel-18

1. Larger amount of input proposals for Rel-18 compared to Rel-17. Prioritization is needed!
2. 3GPP meetings are still run as e-meetings and may start as F2F meetings at some point during Rel-18. Rel-18 needs proper planning to avoid overloading WGs during e-meeting era and make sure situation is manageable when F2F meetings are again possible.
3. Rel-18 package definition from SA perspective will need some discussion time ahead of December prioritization. 3GPP should use Q4 2021 for these discussions. SA2 to continue with technical discussion and scoping of the SIDs/WIDs until December 2021, SA#94 to run prioritization.
4. SA2 shall provide the final list of SIDs/WIDs to SA#94 with realistic Time Units' information per objective to allow SA#94 to do proper prioritization amongst SIDs/WIDs and potential down-scoping per objective within SIDs/WIDs.
5. We expect process for the prioritization to be finalized and endorsed by SA#93.

Architectural and operational enhancements (1/2)

Data exposure / analytics AI/ML optimized network operations

- ✓ New or enhanced AI/ML enabler (e.g. federated learning in 5GC)
- ✓ Data collection and data storage enhancements, including cross domain
- ✓ New use cases and new analytics, based on e.g. Rel-16 or Rel-17 features
- ✓ Management data analytics follow-up
- ✓ Alignment, coordination, interactions between various analytics entities (e.g. NWDAF, MDAS/MDAF)

RAN impacts: No

WGs impacted: SA2, SA3, SA5

Enhanced and more flexible 5GC Groups handling APIs

- ✓ Support for 5G ACIA requirements
- ✓ Dynamic management of ad-hoc groups
- ✓ Not limited to 5G LAN communications

RAN impacts: No

WGs impacted: SA2, SA3, SA5

ATSSS Improving deployment flexibility and user experience

- ✓ MPQUIC/QUIC based steering functions
- ✓ Improved GBR support for ATSSS
- ✓ MA PDU Sessions with variety of 3GPP and non 3GPP paths

RAN impacts: No

WGs impacted: SA2, SA3, SA5

Architectural and operational enhancements (2/2)

Network slicing

Operational enhancements to address scale and complex scenarios

- ✓ Improved control of UE slice registration behaviour (usage vs config, timing of deregistration after last application stops using a slice)
- ✓ Standard based topology awareness to improve formation of RA including allowing “Intelligent” registration with rejected slices in RA
- ✓ Addressing any control plane optimizations for limited Service Area (not mapping to already deployed TAs) and limited time-span NS
- ✓ EASNS requirements from SA1 (e.g., on roaming)
- ✓ Fully secured isolated Network Slices (e.g., Govt agencies, critical infrastructure etc.)

RAN impacts: Yes

WGs impacted: SA2, SA3, SA5

Wireline Wireless convergence

Complete work on BBF requirements

- ✓ Differentiated IP services to different devices behind the RG
- ✓ Improved support of devices connecting behind 5G-RG to enable community WiFi and network control based on association between the devices and the 5G-RG
- ✓ (in co-ordination with BBF) Deal with the SA1 requirements from ‘Resident’ work that target Wireline access

RAN impacts: RAN3 (possible NGAP impacts)

WGs impacted: SA2, SA3, SA5

NPN enhancements

Improving operational flexibility and introduce new features to NPNs

- ✓ Enabling Localized Services via local hosting NPN or PLMN (related to SA1 PALS work item requirements)
- ✓ Enhanced mobility between Equivalent SNPNs
- ✓ NPN support for features like ProSe, Edge Computing, Location Services

RAN impacts: Yes

WGs impacted: SA2, SA3, SA5

Extend the reach of 5G connectivity

Satellite architecture enhancements

- ✓ Mobility and service continuity between 5G terrestrial and 5G satellite access and between two 5G satellite access for VoNR
- ✓ Regulatory requirements on international areas outside of any country
- ✓ Multi-connectivity between terrestrial and satellite access
- ✓ Architectural impact to support network-based UE location determination over satellite access
- ✓ Support of discontinuous NTN coverage

RAN impacts: Yes

WGs impacted: SA2, SA3, SA5

Personal IoT networks

Need to split up between

- ✓ Support PIN use cases
- ✓ PRAS (HgNB)
- ✓ RG features to be done in 5WWC (or in BBF)

RAN impacts: Possible

WGs impacted: SA2, SA3, SA5

Drones

- ✓ Support transporting Broadcast Remote Identification (BRID), Detect And Avoid (DAA) protocols via PC5
- ✓ Service differentiation and prioritization for different UAV/UAM categories and mission types (e.g. public safety aerial vehicles, commercial payload vehicle, critical surveillance, etc.)
- ✓ Exposure of enhanced tracking features and information to the UTM for flight planning and monitoring

RAN impacts: Yes

WGs impacted: SA2, SA3

ProSe enhancements

- ✓ Service continuity when switching between two indirect network communication paths via different relay for L3 and L2 UE-to-NW Relay
- ✓ Enhancement of Layer-3 and Layer-2 UE-to-Network Relay for support multiple NR PC5 hops
- ✓ Support of Layer-3 and Layer-2 UE-to-UE Relay over one NR PC5 hop and multiple NR PC5 hops

RAN impacts: Yes

WGs impacted: SA2, SA3, SA5

Enhanced user experience

XR and multimedia services

- ✓ Study the traffic characteristics of media service enabling improved network resources usage and QoE.
- ✓ Support differentiated QoS handling considering different importance of application traffic
- ✓ Support uplink-downlink transmission coordination to meet RTT (Round-Trip Time) requirements.
- ✓ Potential policy enhancements to minimize the jitter

RAN impacts: Yes

WGs impacted: SA2, SA3, SA4, SA5

Edge Computing Serving better the Apps, differentiated offloading

- ✓ Data exposure leveraging UPF services
- ✓ Diverse offload policies for diverse collections of UE(s)
- ✓ Traffic offload in Roaming case
- ✓ Need to leverage and align with related industry work (e.g., ETSI MEC)

RAN impacts: Yes

WGs impacted: SA2, SA3, SA4, SA5, SA6

Dual Registration in PLMNs and/or SNPNs simultaneously

Motivation:

- ✓ Slicing use case – when a VPLMN doesn't support all slices, UE can register in multiple VPLMNs
- ✓ PALS use case – PLMN or SNPN broadcast 3rd party services; UE can register in its home and PALS network to obtain services simultaneously
- ✓ Data and voice – PLMN or SNPN leverages another PLMN or SNPN for offering voice services to its subscribers. UE camps in the two networks

RAN impacts: No

WGs impacted: SA2

Expansion beyond connectivity

5G Timing Resiliency + TSC & URLLC enh.

- ✓ Lawmakers mandate land-based backup/alternate systems for GNSS. 5G can provide wireless front end Global Terrestrial Timing Service (GTTTS).
- ✓ 5G wide area networks offer attractive wireless and indoor-capable time synchronization service to finance, transportation, power, utility sector, banking, etc rely on precise time
- ✓ Secured timing reference signal for trust verification by clients
- ✓ 5GS integration with IEEE TSN distributed configuration model for ETH applications
- ✓ TSC and URLLC enh for 5GS: Reliability enhancements for 5GS, improved support for low latency and low jitter.
- ✓ Enhancements needed for exposure framework that enables AF to request redundancy, reliability criteria

RAN impacts: Yes

WGs impacted: SA2, SA3, SA5

Location services enhancements

- ✓ D2D/Sidelink positioning
- ✓ AI/ML assisted positioning
- ✓ Positioning via User Plane
- ✓ Enhanced location service for edge computing scenarios

RAN impacts: Yes

WGs impacted: SA2, SA3, SA5

Mission Critical Communications

Interconnection and migration between Mission Critical Communication systems

- ✓ Functional Alias handling for group and private communications
- ✓ Quick migration and optimized connectivity between MC systems
- ✓ Location management, call forwarding/transfer and IP connectivity between different Mission Critical systems

RAN impacts: No

WGs impacted: SA6

Gateway UE function for Mission Critical Communication

- ✓ Strong demand from first responder users to connect (legacy) non-3GPP capable equipment to the Mission Critical Communication network
- ✓ Functional Architecture for a Mission Critical gateway UE
- ✓ Authorization for connection of non-3GPP devices

RAN impacts: No

WGs impacted: SA6

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