



3GPP TSG RAN Rel-19 workshop
Taipei, June 15 - 16, 2023

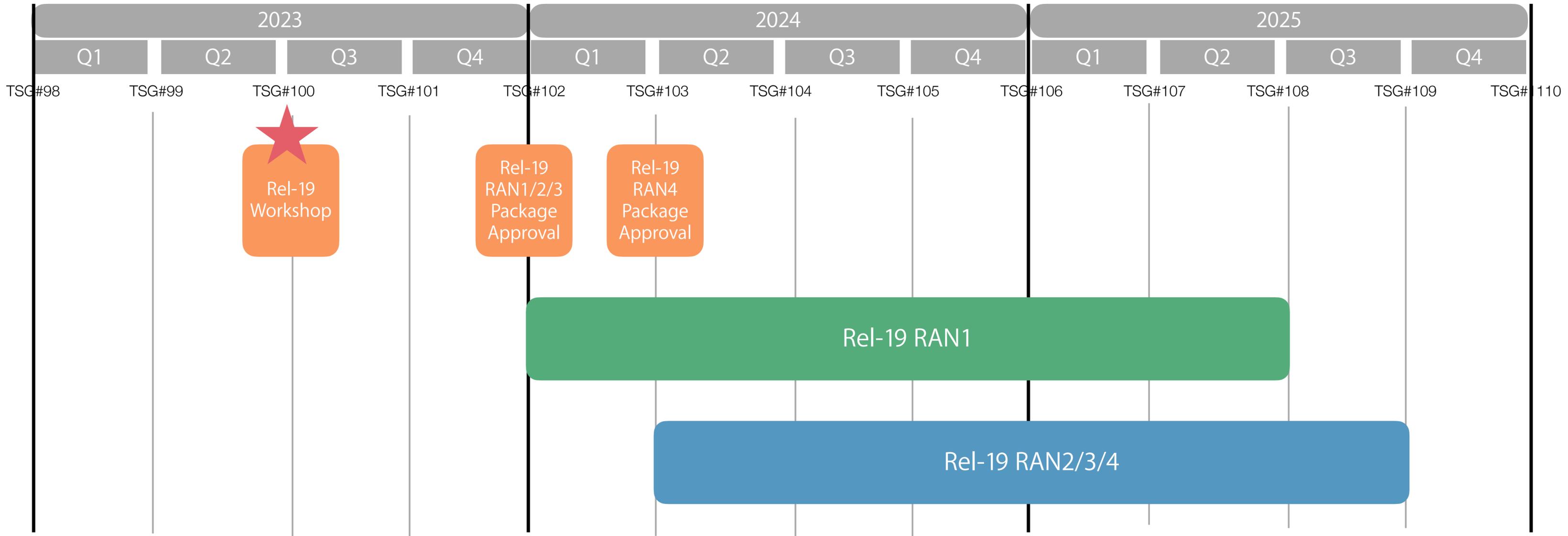
RWS-230226

Source: Apple
Agenda Item: 4

Overview on RAN Rel-19

Apple

RAN Rel-19 | Background

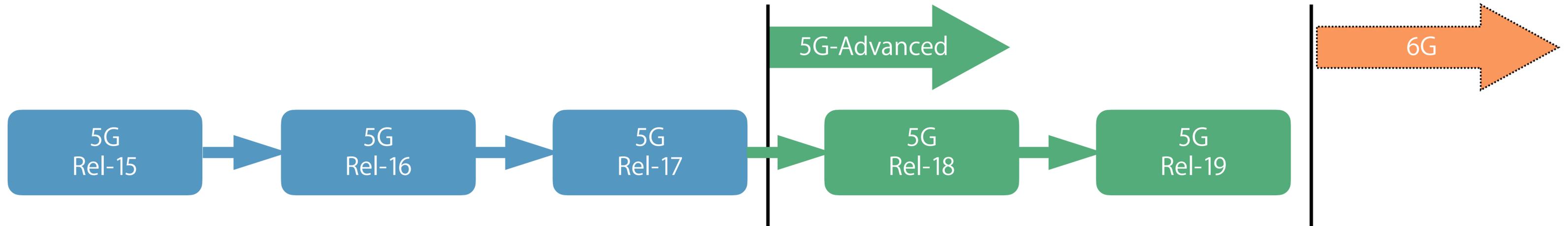


- Endorsed Rel-19 RAN timeline (Ref. RP-230050)
 - RAN1: Package approval (Q4/2023), Q1/2024 to Q2/2025
 - RAN2/3: Package approval (Q4/2023), Q2/2024 to Q3/2025
 - RAN4: Package approval (Q1/2024), Q2/2024 to Q3/2025



RAN Rel-19 | High Level Overview

- Rel-19 plays an important role in 5G evolution and transition from 5G to 6G
 - Rel-19 is the **5th release of 5G**
 - Rel-19 is the **2nd release of 5G-Advanced**
 - Rel-19 is very likely to be the **transition from 5G to 6G**



- Scope of Rel-19 package should be carefully determined and tracked
 - To **ensure timely completion of Rel-19**
 - To avoid the need of Rel-19 extension including dedicated maintenance as in previous release(s)

RAN Rel-19 | High Level Overview

- Rel-19 should focus on the following three areas
 - Enhancement/evolution for **near-term commercial deployment interest**
 - **Continued technology evolution** of 5G
 - Forward looking technology especially for **smooth transition from 5G to 6G**



RAN NR Rel-19 | RAN1 Topics

NR Rel-19 SI/WI	Apple tdoc	Scope
NTN Enhancement	RWS-230279	<ul style="list-style-type: none"> • Coverage enhancement for both DL and UL • Support UE without GNSS capability • Regenerative payload
Sidelink Enhancement	RWS-230278	<ul style="list-style-type: none"> • Sidelink coverage enhancement including sidelink operations on below 1GHz unlicensed spectrum • Sidelink operations on FR2 licensed spectrum <ul style="list-style-type: none"> • Specify beam management for sidelink unicast • Study and specify extended sidelink beam management for sidelink groupcast and FR2 unlicensed spectrum • Sidelink carrier aggregation
XR Enhancement	RWS-230466	<ul style="list-style-type: none"> • 2 Rx relaxation • Other enhancement including <ul style="list-style-type: none"> • Uplink transmission enhancements to address the need to support uplink traffic besides pose/control. • Multiple DRX configurations to support multiple data flows in DL, UL and/or both DL/UL. • PDCCH monitoring enhancements including interaction between PDCCH skipping and NACK • HARQ-ACK/CSI enhancements for more resource-efficient transmission of XR traffic
AI/ML	RWS-230275	<ul style="list-style-type: none"> • Rel-19 AI/ML WI focuses on one-sided model with potential high gain <ul style="list-style-type: none"> • CSI prediction • Tx beam prediction at NW side • AI assisted positioning • Additional sub-use case for study <ul style="list-style-type: none"> • RS overhead optimization • Mobility optimization
Low Power WUS	RWS-230276	<ul style="list-style-type: none"> • WUS signal design • L1 procedures, higher layer procedures • RRM measurement enhancements



RAN NR Rel-19 | RAN1 Topics

NR Rel-19 SI/WI	Apple tdoc	Scope
MIMO Evolution	RWS-230226	<ul style="list-style-type: none"> • Beam management enhancement: <ul style="list-style-type: none"> • UE assisted beam management • Mechanisms for low latency and hierarchical beam tracking • CSI enhancement <ul style="list-style-type: none"> • CSI report with multiple hypothesis • Mechanism to handle dynamic UE CSI processing load/condition • Enhancement for UE with advanced processing ability <ul style="list-style-type: none"> • Enhancement to MU-MIMO for MUD for DL • Distributed user Antennas enhancement for UL
NCR Enhancement	RWS-230229	<ul style="list-style-type: none"> • NCR in unlicensed spectrum <ul style="list-style-type: none"> • Consider both the FR1 and FR2 unlicensed spectrum • Study and specify the necessary enhancements needed to support channel access in unlicensed bands • Semi-static/dynamic power control • Cross carrier operation, i.e., out-of-band operation at NCR-MT • UE-aware NCR deployment
RIS	RWS-230230	<ul style="list-style-type: none"> • Study RIS modeling and evaluation methodology for different deployment scenarios • Study different modes of RIS operation including reflection, refraction, absorption, etc. • Study the requirements and potential specification impacts for control interface between RIS and controlling node, such as gNB for RIS configuration coverage enhancement
Duplexing Evolution (SBFD)	RWS-230277	<ul style="list-style-type: none"> • Specify signaling and procedure to configure SBFD resource for a SBFD aware UE • Specify signaling and procedure to identify victim and aggressor UEs and manage UE-to-UE CLI
Ambient IoT	RWS-230231	<ul style="list-style-type: none"> • Study evaluation methodology for different device types and applicable deployment scenarios • Study the requirements and identify PHY enhancements (if any) to enable RF-based energy harvesting and communication with different ambient IoT devices types for different topologies • Study and identify higher layer impacts to support ambient IoT device types



RAN NR Rel-19 | RAN1 Topics

NR Rel-19 SI/WI	Apple tdoc	Scope
<p>Sidelink Positioning (Unlicensed)</p>	<p>RWS-230228</p>	<ul style="list-style-type: none"> • Target Positioning Requirements • Physical channel design framework: <ul style="list-style-type: none"> • SL-PRS structure satisfying OCB requirement • Channel access mechanisms <ul style="list-style-type: none"> • Channel access for SL-PRS
<p>Joint Communications and Sensing</p>	<p>RWS-230227</p>	<ul style="list-style-type: none"> • Use cases and scenario identification, Positioning/Localization and Sensing requirements • Representative evaluation scenarios definition and evaluation methodologies • JCAS modes selection and evaluation • Channel modeling for both sensing and communications based on TR 38.901 • Sensing architecture for sensing services, functional interfaces, protocols, and procedures • Potential solutions of sensing technologies <ul style="list-style-type: none"> • NR-based sensing, non-NR based sensing and Hybrid Schemes • Existing or new (if needed) signals, measurements, measurement data and reporting to support JCAS. • Interaction between communications capacity and sensing accuracy



RAN NR Rel-19 | RAN2 Topics

NR Rel-19 SI/WI	Apple tdoc	Scope
User Plane Enhancement	RWS-230465	<ul style="list-style-type: none"> To avoid throughput degradation at high data rates, study enhancements to simply the L2 processing and reduce the number of L2 headers Overhead reduction and prioritization techniques to enhance QoS in high-throughput and low-latency scenarios Enhancements to SDAP for Handover, RQoS, redundant processing of RQI, Reliability, AQM
Further Mobility Enhancement	RWS-230464	<ul style="list-style-type: none"> Simple UE implementation to reduce the mobility interruption time Fast failure/RLF recovery enhancements Inter-RAT mobility enhancement L2 mobility enhancement Study and specify the group handover mechanism
XR Enhancements	RWS-230466	<ul style="list-style-type: none"> Power saving enhancement <ul style="list-style-type: none"> Retransmission-Less CG Grant-dependent C-DRX configurations Expand L2/L1 mobility for inter-CU cases Inter-PDU Set discarding mechanisms Coordinated transmissions for time-alignment between different flows for the same XR application Round trip delay minimization based on RAN enhancement Potential optimization for XR operations in unlicensed band RAN-Awareness of application layer forward-error corrections
Security Enhancement	RWS-230463	<ul style="list-style-type: none"> Protect the integrity and authenticity of L1 and/or L2 control messages Provide integrity protection of the system information message (if not covered in R18)
Sidelink Relay Enhancements	RWS-230462	<ul style="list-style-type: none"> Multi-hop UE-to-NW relay Multi-hop UE-to-UE relay Multi-path UE-to-NW relay enhancements Multi-path UE-to-UE relay Group mobility for service continuity (not included in R17/R18 work)



