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RP-231758

Qualcomm

# General views on Rel-19 package

AI: 8A.1
Document for: Discussion

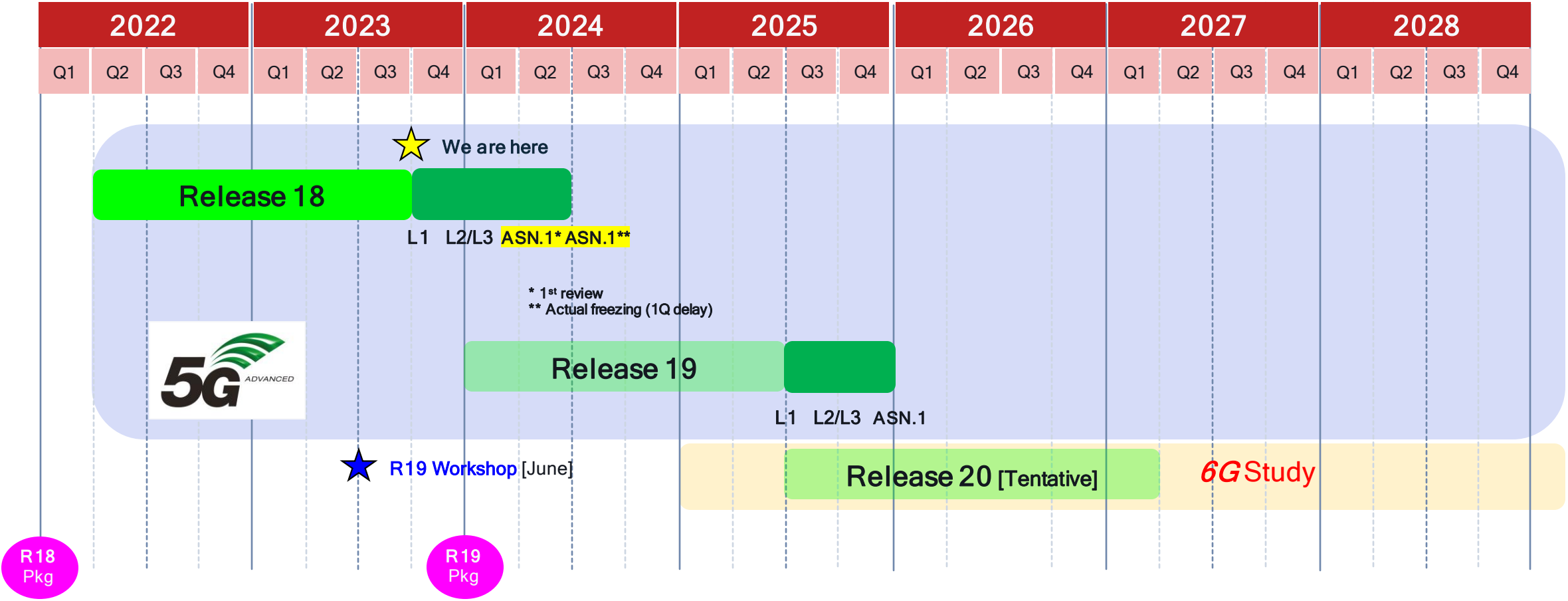
Qualcomm Incorporated

# High Level Principles

- Rel-19 is the **5th Release** of 5G and the **2nd Release** of 5G-Advanced
  - It is expected to be the **last 3GPP Release** before the 6G SI starts (3GPP schedule proposal in next slide)
- Some projects in Rel-19 would be in their Phase 4 from their inception…
  - Need to take into consideration commercial uptake of previous releases before loading up another Release of features without much commercial prospects
- Some of the most 5G-Advanced defining projects in Rel-18 were Release-long studies which are expected to be converted to WI (most of them are LARGE projects)
- Accurate TU allocation of projects
  - Avoid underestimating workload of projects
    - Explicitly account for TU allocation on non-primary-WGs when project impact is expected to be non-trivial
      - Particularly true for projects such as AI/ML for air-interface and Ambient-IOT
  - Towards RAN4 package discussions:
    - Need to accurately estimate RAN4 impact of all RAN1/RAN2/RAN3-led projects to better gauge the remaining RAN4 capacity for RAN4-led projects

# 3GPP Schedule

**Rel-19**: last Release exclusive of 5G/5G-Advanced
**Rel-20**: expected to launch 6G study
**Rel-21**: expected to create first 6G specifications



# Rel-19 RAN Package

## High level views

| RAN1-led | RAN2-led | RAN3-led |
|---|---|---|
| AI/ML for NR Air Interface, WI | NR Mobility enhancements, WI | NR Topology enhancements, WI |
| NR MIMO evolution, WI | NTN enhancements, WI | AI/ML for NG-RAN, SI |
| NR Duplex evolution, WI | XR evolution, WI | SON/MDT enhancements, WI |
| Ambient-IOT, SI | NR UAV/UAM enhancements, WI | |
| NR Network Energy Savings, WI | NR Multi-SIM enhancements, WI | |
| Channel modeling & ISAC studies, SI | User Plane protocol enh, SI | |
| NR LP-WUS/WUR in Rel-19, WI | 5G Broadcast enh, WI* | |
| NR Multi-carrier enhancements, WI* | | |
| NR Coverage enhancements, WI* | | |
| NR Sidelink evolution, WI* | | |
| NR Network-Controlled Repeaters, WI* | | |

* Limited scope project (small)

# Rel-19 RAN Package

## RAN1 projects (1/2): QC priorities

| Tdoc# | Title | Priority Areas |
|---|---|---|
| RP-231759 | Views on scope for AI/ML for NR Air Interface in Rel-19 | Normative phase for 6 sub use cases. Important to keep SA2 involved in architecture discussions. RAN2-led SI on Mobility. |
| RP-231551 | Views on scope for NR MIMO evolution in Rel-19 | UE-initiated BM/CSI update, L1-SINR based beam group report, PTRS rate matching for mTRP, Link adaptation enh., 1k-QAM UL |
| RP-231552 | Views on scope for NR Duplex evolution in Rel-19 | SBFD operation is feasible in RAN1 specification, continue to WI The WI scope for dynamic/flexible TDD should only include common enhancement with SBFD |
| RP-231553 | Views on scope for Ambient-IOT in Rel-19 | Confirm the device type of interest to be device B or C to support target use cases [RAN1] |
| RP-231554 | Views on scope for NR Network Energy Savings in Rel-19 | On-demand SSB only in connected mode for Scell, Beam-specific broadcast configuration, Compact SSB pattern, Multiple DTX/DRX configurations, Inter-node paging restriction (RAN3), DU assisted (de)activation (RAN3) |
| RP-231760 | Views on Channel modeling and ISAC studies in Rel-19 | Channel model for 7-24GHz (RAN1).<br>Use cases and scenarios for ISAC (RAN-P 1st part of R19)<br>Initial study of ISAC aspects (RAN1-led 2nd part of R19) |

# Rel-19 RAN Package

## RAN1 projects (2/2): QC priorities

| Tdoc# | Title | Priority Areas |
|---|---|---|
| RP-231555 | Views on scope for NR LP-WUS/WUR in Rel-19 | OOK1/4 which is robust to frequency and timing error is the best design choice. Optional overlaying OFDM sequence on top of OOK symbol. The overlayed sequence should be used only for detection performance increase. |
| RP-231556 | Views on scope for NR Multi-carrier enhancements in Rel-19 | Unclear if another round of enhancements is necessary, Given many other items of higher priority in Rel-19, need for a coverage enhancement WI in Rel-19 must be critically examined. FDSS with spectrum extension should not be pursued. |
| RP-231557 | Views on scope for NR Coverage enhancements in Rel-19 | Unclear if another round of enhancements is necessary.<br>If a WI is started, unifying UL CA and SUL should be pursued |
| RP-231762 | Views on scope for NR Sidelink evolution in Rel-19 | Normative phase of multi-beam SL (studied in R18) |
| RP-231558 | Views on scope for NR Network-Controlled Repeaters in Rel-19 | Limit to power control |

# Rel-19 RAN Package

## RAN2 projects (1/2): QC priorities

| Tdoc# | Title | Priority Areas |
|---|---|---|
| RP-231855 | Views on scope for NR Mobility enhancements in Rel-19 | Focus on LTM enhancements - Conditional LTM, Inter-CU mobility, Measurement/reporting enhancements, Delay reduction. |
| RP-231720 | Views on scope for NTN enhancements in Rel-19 | **NR NTN:** DL CovEnh & paging alert; uplink capacity enhancements; HD redcap; Disc. Coverage; mobility enhancements.<br>**IOT NTN:** Uplink capacity enhancements; UE location support outside of LPP; Cell DTX; |
| RP-231856 | Views on scope for XR evolution in Rel-19 | **XR awareness**: Delivery deadline based scheduling, Awareness of APP level FEC in RAN, Enhanced bit rate adaptation; **PowS enh**: PDCCH skipping enh; **Cap enh**: Dynamic measurement gaps |
| RP-231974 | Views on scope for NR UAV/UAM in Rel-19 | NTZ, small mobility enh e.g. CHO, FR1 beamforming, height based PRACH config with reduced # of CS, PSCCH DMRS and PSFCH with reduced # of CS, height-based flight zones. |
| RP-231857 | Views on scope for NR Multi-SIM in Rel-19 | NW awareness of MUSIM UE in single operator scenario, Per-CC/FR MUSIM gaps, Enhanced UE assistance for paging collision avoidance. |

# Rel-19 RAN Package

## RAN2 projects (2/2): QC priorities

| Tdoc# | Title | Priority Areas |
|---|---|---|
| RP-231975 | Views on scope for Broadcast/Multicast in Rel-19 | Coexistence of 5G Broadcast with other systems (e.g. ATSC 3.0) in he same channel. |
| RP-231858 | Views on user plane protocol enhancements in Rel-19 | Improve UE and gNB window management, UP latency reduction for retransmissions, No "pre-6G" study. |

# Rel-19 RAN Package

## RAN3 projects: QC priorities

| Tdoc# | Title | Priority Areas |
|---|---|---|
| RP-231973 | Views on scope for NR Topology enhancements in Rel-19 | Define Enhancements for the support of WAB e.g., Authorization, QoS support for WAB BH, Study impact of gNB mobility within a stationary RAN and in proximity to other mobile gNBs, WAB node mobility etc.<br>Capture the enhancements for multi-hop mobile IAB in Stage 2.<br>Capture integration of IAB and WAB architectures in Stage 2. |
| RP-231825 | Views on scope for AI/ML for NG-RAN in Rel-19 | R19 further enhancements to R18 identified use cases : Mobility Optimization, Energy savings and support for dis-aggregated gNB Architecture.<br>R19 enhancements for new use cases : Traffic prediction and QoE Prediction, RAN Slicing Resource Management, support AI/ML Information exchange between RAN and 5GC, continuous collection of UE data/measurement across all RRC states |
| RP-231788 | Views on scope for SON/MDT in Rel-19 | Focus on enhancements related to features of commercial interest. Features of interest include MRO for R17 SCG (de)-activation, R18 Mobility Enhancements, SON/MDT enhancements for NTN, RedCap, MBS, UAV, SDT. |

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