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3GPP TSG RAN Rel-19 Workshop

Taipei, June 15<sup>th</sup>-16<sup>th</sup>, 2023

Agenda Item: 4

RWS-230090

# Views on 3GPP RAN Rel-19

# Comments on Rel-19

- Considering the return to F2F meetings, the endorsed **18-months** is a reasonable duration for release planning.

- Rel-19 RAN1 core freeze: 2Q25
- Rel-19 RAN2/3/4 core freeze: 3Q25
- Rel-19 ASN.1 freeze: 4Q25

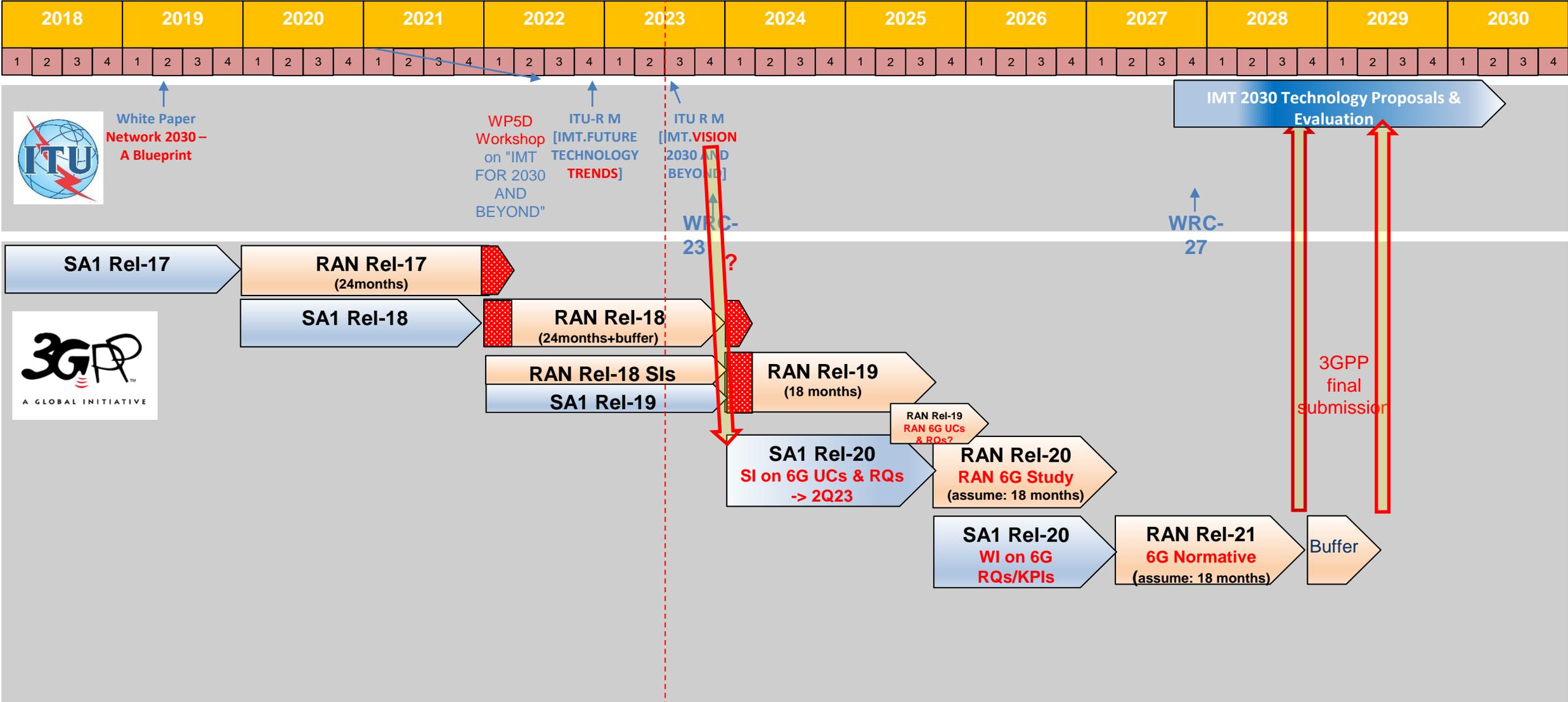
- The approach to the release content definition could be similar to the one used in the previous 5G-A release (i.e. “balanced evolution”), and can result in a **Rel-19 package** that includes:

- new topic(s), influenced by 6G
- Rel-19 topics based on Rel-18 studies
- enhancements on existing 5G features

- It would be important in December 2023/RAN#102 to consider (and account for) the **RAN4 time budget required** as a result of the approved RAN1/2/3 Rel-19 Items.
- Cross TSG-coordination will be essential.

# Potential Timeline Ahead (assuming 18-months long releases, but also adding an optional 6 months buffer)

 = buffer allocated for maintenance of the 3GPP release just completed



# Summary of Potential Rel-19 Topics

## New Topics

- Sensing and Communication
  - Release-long RAN WGs-led study
- Ambient IoT
  - RAN WGs-led SI; depending on its scope, duration and outcome, RAN can decide whether to cover the corresponding Rel-19 normative work

## • Rel-19 Topics Based on Rel-18 Studies

- AI/ML
  - Pending on the ongoing SI progress, consider having normative work, focusing on the 3 use cases (CSI, Beamforming, Positioning) covered in the SI, under a common framework/architecture
- Low Power WUS
  - Normative work based on relevant areas from the SI
- Evolution of Duplex Operation
  - In case of moving forward with normative work, pick the (SI) low-hanging fruits for duplex evolution

## Enhancements to Existing Features

- Positioning Enh.
- Non-Terrestrial Networks (NTN) Enh.
- Sidelink (SL) Relay Enh.
- Sidelink (SL) Enh.
- Extended Reality (XR) Enh.
- Network Energy Saving (NES) Enh.
- MIMO Enh.
- Network-Controlled Repeaters (NCR) Enh.
- In-Device Coexistence (IDC) Enh.

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# New Studies

## Sensing and Communication

- SA1 is preparing to deliver Rel-19 sensing normative RQs/KPIs
- Channel modelling needs to be considered
- Aspects for a potential release-long RAN WGs study could include: physical layer, protocol impacts, architecture etc

## Ambient IoT

- SA1 is preparing to deliver Rel-19 Ambient IoT normative RQs/KPIs, while RAN plenary is about to conclude a corresponding RAN-level study
- In Rel-19 there could be an initial RAN WGs-led study phase where depending on the scope, duration and outcome, RAN can decide whether to also cover the corresponding Rel-19 normative work
- We see Ambient IoT as a feature that will span more than one release

# Rel-19 Topics Based on Rel-18 Studies 1/2

## AI/ML

- *Motivation: core enabler for system optimisations in enhancing performance and/or reducing complexity*
- Pending on the ongoing SI progress, consider having normative work, focusing on the 3 use cases (CSI, Beamforming, Positioning) covered in the SI, under a common framework/architecture
- Consider study new use cases: UE-centric mobility

## Low Power WUS

- *Motivation: Power consumption reduction on the UE side is important, Rel-19 normative work on Low Power WUS is a natural progression and enables new use cases*
- Potential areas to be covered by Rel-19 normative work:
  - » LP-WUS signal design, LP-SS design ensuring as much compatibility with the LP-WUS signal design as possible, Layer 1 procedures, including monitoring behaviour of LP-WUS
  - » IDLE mode mobility procedures when UE monitors LP-WUS (including RRM measurements)
    - ◆ LP-WUS is applicable to UEs in IDLE / INACTIVE mode
    - ◆ LP-WUS shall not present a coverage limitation for 5G

# Rel-19 Topics Based on Rel-18 Studies 2/2

## Evolution of Duplex Operation

- *Motivation: improves user throughput, latency, uplink coverage*
- In case of normative work, Rel-19 should pick the (SI) low-hanging fruits for duplex evolution. Other useful features can be deferred to a future release
- Potential areas to be covered by Rel-19 normative work:
  - » Sub-band Full Duplex (SBFD): To make things simple, one approach could be to consider semi-statically configured sub-bands in Connected Mode only. We can consider an activation/deactivation DCI to turn sub-band on/off
  - » Flexible/Dynamic TDD: The promising features seem to be gNB-gNB measurements, UE L1 CLI measurements and Time alignment, where UE's UL aligns with aggressor's DL

# Enhancements to Existing Features 1/3

## Positioning Enh.

- *Motivation: improve accuracy and/or reduce latency in various use-cases, including sidelink positioning*
- We expect NR positioning to continue evolving in Rel-19, including normative work on:
  - ◆ improving accuracy (e.g. set B for IIoT and V2X according to TR 38.859)
  - ◆ sidelink positioning enhancements (e.g. IUC-like operation for positioning, synchronization procedure)
  - ◆ sidelink positioning operation in unlicensed-band

## Non-Terrestrial Networks (NTN) Enh.

- *Motivation: Improve coverage, QoS, integration with existing TNs*
- We expect NTN to continue evolving in Rel-19, including normative work on:
  - ◆ DL enhancements (e.g. Polarisation Enh, study which channels need coverage enhancement)
  - ◆ Dual connectivity between NTN
  - ◆ mobility enhancements in NTN/TN

## Sidelink Relays Enh.

- *Motivation: improve coverage & mobility*
- multi-hop UE-to-Network and UE-to-UE relay
- Inter-gNB mobility for multi-path relay

# Enhancements to Existing Features 2/3

## Sidelink Enh.

- *Motivation: enable use cases in wider bandwidth*
- We expect sidelink to continue evolving in Rel-19, including normative work on:
  - ◆ sidelink on FR2: topic was studied in Rel-18 without going to normative Rel-18 work
  - ◆ sidelink CA: topic was pending in Rel-18 and eventually postponed for consideration in Rel-19

## Extended Reality (XR) Enh.

- *Motivation: capacity enhancements, UE power saving, multi-modality*
- We expect XR to continue evolving in Rel-19, including work on:
  - ◆ capacity enhancements to configured grant (e.g., FDRA, MCS, Retx-less)
  - ◆ power saving (dynamic DRX scheduling)
  - ◆ support for multi-modality, differentiated QoS between flows and PDU sets

## Network Energy Saving (NES) Enh.

- *Motivation: remaining techniques covered during the study (TR38.864) should be considered for the Rel-19 work:*
- cell without SIB/SSB
- on-demand SIB1
- UE wake up signal (WUS) for gNB

# Enhancements to Existing Features 3/3

## MIMO Enh.

- *Motivation: UL throughput and latency improvements*
- Further UL transmission enhancements:
  - ◆ SRS enhancement leftovers
  - ◆ UL-only TRP to improve throughput and coverage
  - ◆ UE-initiated/triggered beam management

## Network-Controlled Repeaters (NCR) Enh.

- *Motivation: This feature could be enhanced in Rel-19 covering items that were left out from Rel-18, like:*
- power control
- forwarding several beams simultaneously
- multi-band operation
- new measurements for interference management

## In-Device Coexistence (IDC) Enh.

- *Motivation: Signaling/Reporting enhancement to reflect the UE's real-life performance (static capability is agreed to be introduced for Rel-18)*
- work on dynamic indication of Maximum Sensitivity Degradation (MSD) for band combinations

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