3GPP TSG RAN WG4 Meeting #110
Athens, Greece, February 26th – March 1st, 2024

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# Views on Rel-19 RAN4 scope

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|---|---|
| Agenda Item: | 14 |
| Source: | Intel Corporation |
| Document for: | Information |

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# Background

Rel-19 RAN4 WI/SI Package for non-spectrum topics is planned to be approved in RAN#103 (March 2024)

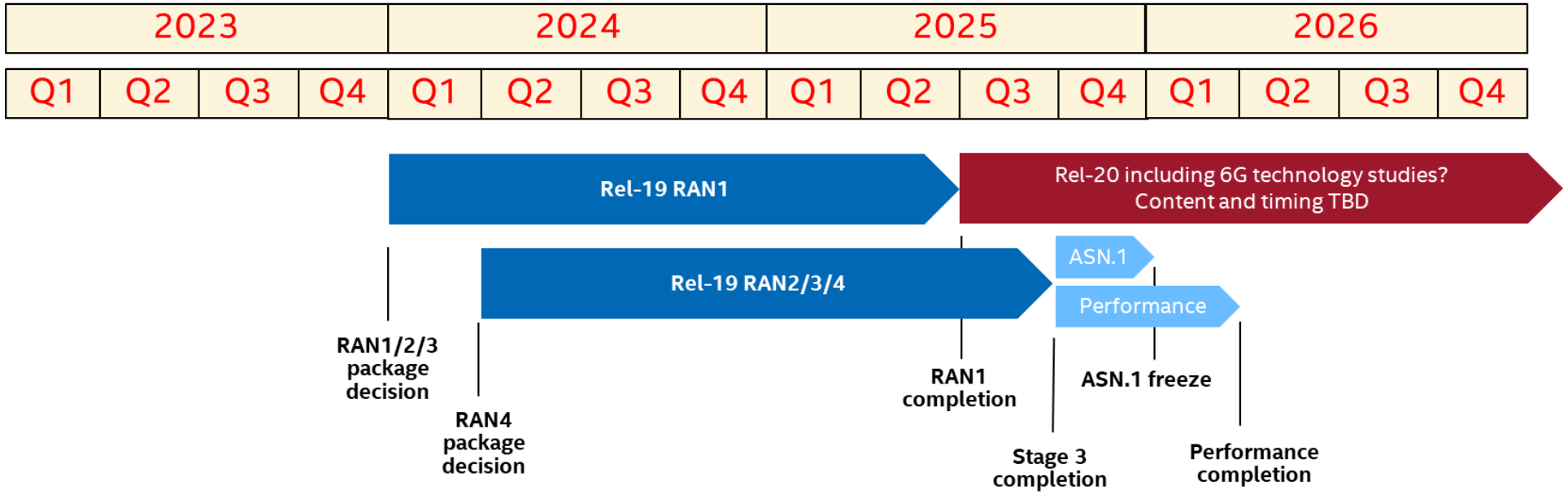
Multiple RAN4-led proposals were submitted for Rel-19 Workshop, RAN #101 and #102 meetings covering a wide set of topic areas. In RAN#102 several offline sessions on Rel-19 RAN4 topics took place and are summarized in the following documents

- RP-233918 Moderator's summary for RAN4 Candidate RF/OTA Topics
- RP-233951 Moderator's summary for RAN4 Candidate Demodulation/RRM Topics
- RP-233920 Moderator's summary for RAN4 Candidate Topics Impacting both RF/OTA and Demod/RRM
- RP-233921 Moderator's summary for other RAN4 Rel-19 topics

Multiple candidate topics were identified and further prioritization and down-scoping till RAN#103 is expected

# RAN4 Rel-19 Workload and TU budget

RAN4 Rel-19 package scope needs to be properly dimensioned to fit the timelines, and TU allocation shall be balanced to match RAN1/2/3-led items progress



# RAN4 Rel-19 Workload and TU budget

The remaining TU capacity for RAN4-led Rel-19 projects based on the latest TU spreadsheet RP-232744 is provided below

| Meeting / TUs | #110bis Apr 24 | #111 May 24 | #112 Aug 24 | #112bis Oct 24 | #113 Nov 24 | #114 Feb 25 | #114bis Apr 25 | #115 May 25 | #116 Aug 25 |
|---|---|---|---|---|---|---|---|---|---|
| Reserved for approved projects (maintenance, Rel-18, Rel-19 RAN1/2/3 projects) | | | | | | | | | |
| RAN4 RF | 24.5 | 24.5 | 18.5 | 18.0 | 18.0 | 16.5 | 16.0 | 16.0 | 16.0 |
| RAN4 RD | 19.85 | 20.1 | 15.0 | 14.0 | 14.0 | 14.0 | 13.5 | 13.25 | 13.25 |
| Available budget for RAN4-projects (non-spectrum) | | | | | | | | | |
| RAN4 RF | 0.00 | 0.00 | 6.0 | 6.5 | 6.5 | 8.0 | 8.5 | 8.5 | 8.5 |
| RAN4 RD | 0.65 | 0.40 | 5.5 | 6.5 | 6.5 | 6.5 | 7.0 | 7.25 | 7.25 |

- There is no sufficient RAN4 capacity in Q2'2024 to start the work on new RAN4-led Rel-19 projects
- There is a limited capacity for new RAN4-led projects in Rel-19 with 6.0-8.5 RF TUs and 5.5-7.25 RD TUs per meeting starting from Q3'2024.

**Proposal #1:** RAN4-led Rel-19 non-spectrum projects shall be scheduled to start from RAN4 #112 (Aug 24). Initial work plan discussions can be arranged starting from RAN4 #111 (May 24)

# RAN4 Rel-19 package

Intel views on a candidate package of RAN4-led Rel-19 SI/WIs based on RAN #102 proposals is provided below and covers key areas including RF, RRM, Demodulation, OTA and several cross-area topics

- **RF**
  - WI: UE RF evolution
  - WI: HPUE evolution
  - WI: NTN evolution
  - WI: BS RF evolution
  - SI: UE RF BC spec simplification
- **RRM**
  - WI: RRM evolution
  - WI: Measurement Gaps evolution
- **Cross area**
  - WI: FR2 multi-panel UE evolution
  - WI: Intra-band non-contiguous CA/DC
  - WI: ATG enhancements
- **Demodulation**
  - WI: Demodulation enhancements
- **OTA**
  - SI: FR2 OTA test methods
  - WI: FR1 OTA (approval in June'24)

# RAN4 Rel-19 package TU budget

Below we provide proposals on the approximate RAN4 TU allocation per each SI/WI per meeting for the Core part with total allocation fulfilling the constraints in slide 5.

| SI/WI | RF TUs | RD TUs |
|---|---|---|
| WI: UE RF evolution | 2.0 | 0.0 |
| WI: HPUE evolution | 1.0 | 0.0 |
| WI: NTN evolution | 1.0 | 0.0 |
| WI: BS RF evolution | 0.5 | 0.0 |
| SI: UE RF BC specification simplifications | 0.0 | 0.0 |
| WI: RRM evolution | 0.0 | 2.0 |
| WI: Measurement Gaps evolution | 0.0 | 1.0 |
| WI: FR2 multi-panel UE evolution | 1.0 | 1.0 |
| WI: Intra-band Non-contiguous CA/DC | 0.5 | 0.5 |
| WI: ATG enhancements | 0.5 | 0.5 |
| WI: Demodulation enhancements | 0.0 | 2.0 |
| SI: FR2 OTA test methods | 0.5 | 0.0 |
| WI: FR1 OTA | 1.0 | 0.0 |
| Total TU budget | 8.0 | 7.0 |

# Proposed scope for RAN4 Rel-19 RF/OTA

| | Candidate objectives/scope | Comments |
|---|---|---|
| UE RF | • 6Rx for handheld/CPE/FWA<br>• SRS IL compensation and reporting<br>• Irregular channel bandwidth<br>• Power boosting and/or MPR reduction | An umbrella WI focusing on FR1 UE RF topics.<br>[2.0] RF TU per meeting. |
| HPUE | • Generic framework of support increasing UE power high limit for inter-band CA HPUE (only for TN)<br>• PC1.5 UE for CA for 1) intra-band CCA with or without UL MIMO with 2Tx; 2) two band inter-band CA with 2Tx and 3Tx for handheld and FWA | A separate WI focusing on FR1 HPUE topics for different use cases and scenarios to avoid fragmented discussions across multiple WIs.<br>[1.0] RF TU per meeting |
| NTN | • PC2 for NR/IoT NTN UE in NTN FR1 bands<br>• [PC1 or PC1.5] for NR NTN UE in NTN FR1 bands | A separate project focusing on NTN HPUE aspects with [1.0] RF TUs.<br>Can include other NTN-centric objectives (e.g., RRM/RF). |
| BS RF | • OTA test enhancement (to reduce the testing time)<br>• EIRP mask for upper 6GHz | Small project with [0.5] RF TUs per meeting |
| UE RF BC simplifications | • Study on simplification of UE RF specification for band combination | Continuation of RAN4 work to simplify UE RF specification for BCs. Spectrum TUs can be reused. |
| OTA | • FR2 OTA: Dynamic OTA test methods | FR1 OTA: The work scope of FR1 OTA work can be discussed at a later stage (June'24) after completion of Rel-18 WIs performance part.<br>FR2 OTA: Further studies on additional test methods are recommended.<br>0.5 – 1.0 TUs per meeting. |

# Proposed scope for RAN4 Rel-19 RRM/Demod

| | Prioritized objectives/scope | Comments |
|---|---|---|
| RRM evolution | • RRM requirements for RTD > CP<br>• SCell with UL-only TX<br>• FR2 RRM delay reduction enhancements | A single umbrella WI is recommended to continue the evolution of RRM enhancements with [2.0] RD TU per meeting.<br>The scope shall focus on improving the requirements and enabling new use cases rather than on addressing leftovers. |
| Measurement Gaps evolution | • Pre-configured NCSG<br>• Enhanced collision handling for concurrent MGs (parallel measurements) | An umbrella WI is recommended to continue the evolution of MG enhancements with [1.0] RD TU per meeting. |
| WI: Demodulation enhancements | • BS MMSE-IRC for uplink inter-cell interference<br>• Enhanced MIMO channel models with spatial components for UE and BS requirements<br>• [UE CRI reporting requirements with multiple CSI-RS configured for FR1] | An umbrella WI is recommended to continue the evolution of Demodulation enhancements with [2] RD TU per meeting.<br>The WI scope shall ensure a balance between BS and UE requirements. |

# Proposed scope for RAN4 Rel-19 Cross-area topics

| | Prioritized objectives/scope | Comments |
|---|---|---|
| Evolved FR2 multi-panel UE | • Multi-RX panel enhancements (1st priority)<br>  • Intra-band CA (RF/RRM requirements)<br>  • RRM requirements for 1) L3 delay reduction, 2) Unified TCI state switching delay<br>• STxMP requirements (2nd priority) | A standalone WI to continue the work on RF/RRM enhancements for multi-panel simultaneous RX/TX with [1.0/1.0] RF/RD TUs per meeting.<br>STxMP work can be handled with the 2nd priority (e.g., work can start in the 2nd part of R19 after meaningful progress is reached for multi-Rx part). |
| Intra-band non-co-located CA/EN-DC enhancements | • UEs with 6 or 8 total antenna/LNA-s (Type 4a/4b)<br>• UEs with 4 shared antenna/LNA-s (Type 3a/3b) | Continuation of Rel-18 work to enable non-collocated operation for additional UE types. [0.5/0.5] RF/RD TUs per meeting. |
| ATG enhancements | • FR2 RF/RRM requirements<br>• FR1 [intra-band] CA support | Continuation of Rel-18 work to enable ATG with focus on exploration study for FR2 use case. [0.5/0.5] RF/RD TUs per meeting. |

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