3GPP TSG RAN #93e
Electronic Meeting, Sept. 13 - 17, 2021
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# Views on RAN4 Rel-18

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# Outline

- General views
- Demod focus evolution
- FR1 RF focus evolution
- FR2 RF focus evolution
- RRM focus evolution
- Test methodology and EMC
- Cross-area proposals

# General views on RAN4 non-spectrum work

## Approval timeline

» Without clear definition, it is difficult to differentiate “old” and “new” areas.

» One-phase approval approach is preferred, i.e., approve RAN4 non-spectrum package in one RAN meeting.

- Few items can be approved earlier based on consensus.

» RAN4-led topics are more relevant to product or deployment roadmaps

» Some RAN1/2/3 features defined in previous releases are still lack of RAN4 requirements by now.

*=> Keep enough room for RAN4-led work.*

Two alternatives are provided in per-RAN email discussion:

» Alt. A (Moderator’s proposal based on the email discussion): Approve RAN4 non-spectrum package in Mar 2022, and reserve RAN4 TUs for RAN4-led WI/SI.

- Few items can be approved in Dec 2021, based on consensus.
- The exact number of reserved TUs needs to be discussed further.

» Alt. B: Approve RAN4 non-spectrum package in Dec 2020.

Note 1: The actual time to start the RAN4 work would be the same for the two alternatives.

Note 2: Either alternative can achieve the goal of leaving room for RAN4-led work, and it depends on which one is more feasible to implement from RAN and RAN4 leadership perspective.

# General views on RAN4 non-spectrum work

- Categorization of proposals
  - » Category #1: Proposals within one of the five areas (FR1 RF, FR2 RF, BS RF, RRM and Demod)
    - The number of objectives in each area needs to be limited, to control the overall workload.
  - » Category #2: Cross-area proposals, which can be further split into two sub-categories:
    - Proposals involving more than 1 area with major work in 1 area, e.g., FR1 4Tx, FR1 8Rx, FR2 UL CA with CBM, FR2 UL 256QAM, which can be put into the area with major work.
    - Proposals involving more than 2 areas, e.g., FR1 ATG, FR1 non-co-located intra-band NR-CA/EN-DC, FR2 multi-Rx chain DL reception, which can be discussed separately.
  - » Category #3: Testability and EMC related proposals
    - As usual, they are discussed separately.
- General principle on the prioritization of different proposals
  - » To consider the performance benefits as well as the popularity/probability of the corresponding scenarios happened in real networks or implemented in commercial UE/BSs.

# General views on RAN4 spectrum work

- Approval timeline: follow the way in Rel-17, i.e.,
  - » Group #1: Spectrum basket items
    - Group 1A): Continuation of Rel-17 basket WIs, which can be approved at March 2022.
    - Group 1B): New basket WIs that cannot be foreseen at the beginning of Rel-18. To accommodate operators' requests in a timely way, not limit the approval of these items to certain meetings or time period, if the objectives are agreeable.
  - » Group #2: Spectrum non-basket items
    - To be treated in the same way as for group 1B), i.e., not limit the approval of these items to certain meetings or time period, if the objectives are agreeable.
- Boundary between spectrum and non-spectrum WI/SIs
  - » If new agreement on the boundary will be agreed, it applies to Rel-18 and not impact Rel-17.
  - » Discuss how to accommodate operators' needs efficiently if some proposals belonging to spectrum work in Rel-17 and before will be moved to non-spectrum items in Rel-18.

# Demodulation focus requirement evolution

- Interested proposals

| | Scenario | Candidate receiver | Note |
|---|---|---|---|
| UE | Inter-cell and intra-cell MU-MIMO scenario with CA | MMSE-IRC | Single carrier requirements defined in Rel-17 |
| | FR1 8Rx:<br>FFS on the transmission rank | FFS on MMSE, IRC or R-ML | Also has RF/RRM impact |
| | Intra-cell inter-user interference (MU-MIMO) | E-IRC, R-ML, SL-IC | IRC for MU-MIMO defined in Rel-17 |
| | Inter-stream interference (SU-MIMO) | Soft-IC | Total number of iterations is not increased, if limiting the number of iterations for each LDPC decoding. |
| | Inter-cell SSB/TRS interference | Interference mitigation | Configuring SSB in the same time/frequency location for neighboring cells is a typical scenario. |
| | Inter-cell interference with uneven interference | E-IRC, e.g., with data based interference estimation | For scenarios with non-slot based transmission and aligned SCS among cells |
| BS | Inter-cell interference | MMSE-IRC | BS IRC was defined for LTE. Difficult to discuss further BS receiver enhancement if IRC requirement is absent. |

» Prioritization will be discussed further.

# UE RF and RRM requirement focus evolution

- UE FR1 RF: interested proposals
  - » FR1 4Tx for CPE: also has BS demodulation impact
  - » 3Tx handled UE: for single band 3Tx, UL CA with UL-MIMO in one hand and/or 3 bands UL CA
    - Single band 3Tx 3-layer transmission requires RAN1 work
    - For UL CA, heating dissipation issue can be alleviated if only two Tx are transmitted concurrently by using Tx switching.
    - NOTE: With Rel-16/17 Tx switching, inter-band UL CA with UL-MIMO on one or two band have already been supported for UE capable for 2Tx, where the UL CA and MIMO are not scheduled at the same time.
  - » A-MPR optimization
- UE FR2 RF: interested proposals
  - » FR2 UL 256QAM: also has BS demodulation impact
- RRM: interested proposals
  - » NeedForGap
  - » HO with PSCell for new scenarios
  - » Inter-RAT NR measurement without gaps
  - » FR2-FR2 DAPS requirements (also discussed in Mobility Enhancements thread)
  - » FR2 beam measurement enhancement

# Test methodology, EMC and cross-area proposals

- Test methodology and EMC: interested proposals
  - » BS and UE EMC enhancement
  - » Dynamic OTA testing methodology for FR2
- Cross-area proposals (involves more than 2 areas): interested proposals
  - » FR1 ATG (air-to-ground network)
    - Involve RF, RRM and demod requirements.
  - » FR2 multi-Rx chain DL reception including 4-layer DL MIMO
    - Involve test methodology, RF, RRM and demod requirements.
  - » FR2 HST enhancement
    - Potentially involve RF, RRM and demod requirements.

# Thanks!