

Clarifications for RAN1 NR WI Scope

NTT DOCOMO, INC.

- At the RAN1#94 meeting, whether or not support cross-carrier scheduling among carriers with different numerologies was discussed although there is no conclusion.

- There are still lots of works on cross-carrier scheduling among carriers with different numerologies in RAN1.
 - For cross-carrier scheduling among carriers with different numerologies, we estimate the completion level after RAN1#94 is 10~20%.

- If there are no strong demands for this feature, it would be helpful to clarify that cross-carrier scheduling among carriers with different numerologies is not supported in Rel-15.

■ List of open issues is provided below

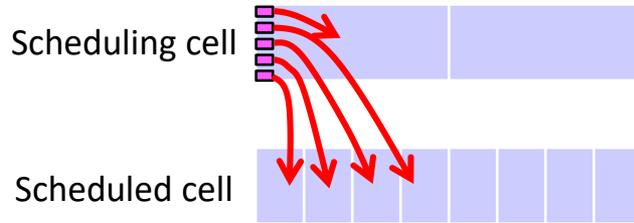
- The numbers of PDCCH blind decodes and non-overlapped CCEs for CA with up to 4 DL-CCs, or with up to T DL-CCs where the UE reports BD capability value y and $T \leq y$;
 - » Scheduling cell and scheduled cell(s) use different SCSs
 - » Scheduling cell and scheduled cell(s) use the same SCS but scheduling cells use different SCSs
- For CA with more than 4 DL-CCs and with up to T DL-CCs where the UE reports BD capability value y and $T > y$;
 - » Scheduling cell and scheduled cell(s) use different SCSs
 - » Scheduling cell and scheduled cell(s) use the same SCS but scheduling cells use different SCSs
- Necessary constraint for k_0

■ To complete the features, additional TUs would be necessary to resolve open issues.

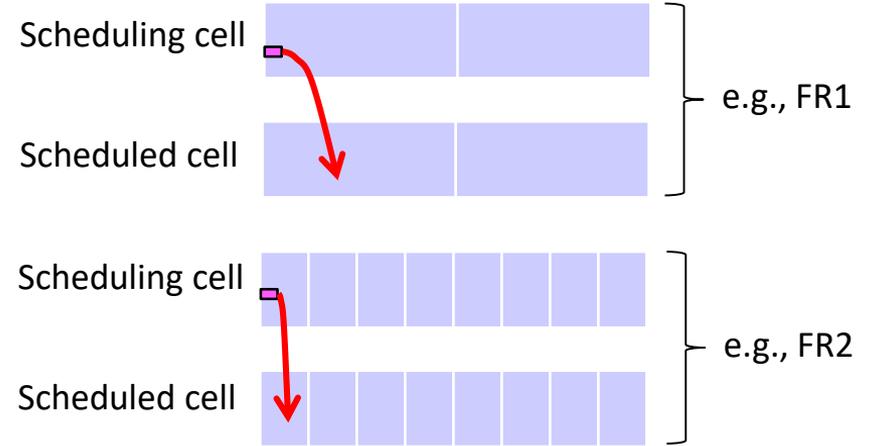
■ Proposals

- Decide on whether cross-carrier scheduling among carriers with different numerologies is supported or not in Rel-15, i.e.,
 - » Clarify whether/which case(s) is supported
 - Case 1: Different numerologies between scheduling cell and scheduled cell
 - Case 2: Same numerology between scheduling cell and scheduled cell but different numerologies between scheduling cells
- If the feature is not supported, delete the corresponding UE feature 6-10a and update the specifications accordingly
- Otherwise, reserve additional TUs to complete the feature

Case 1

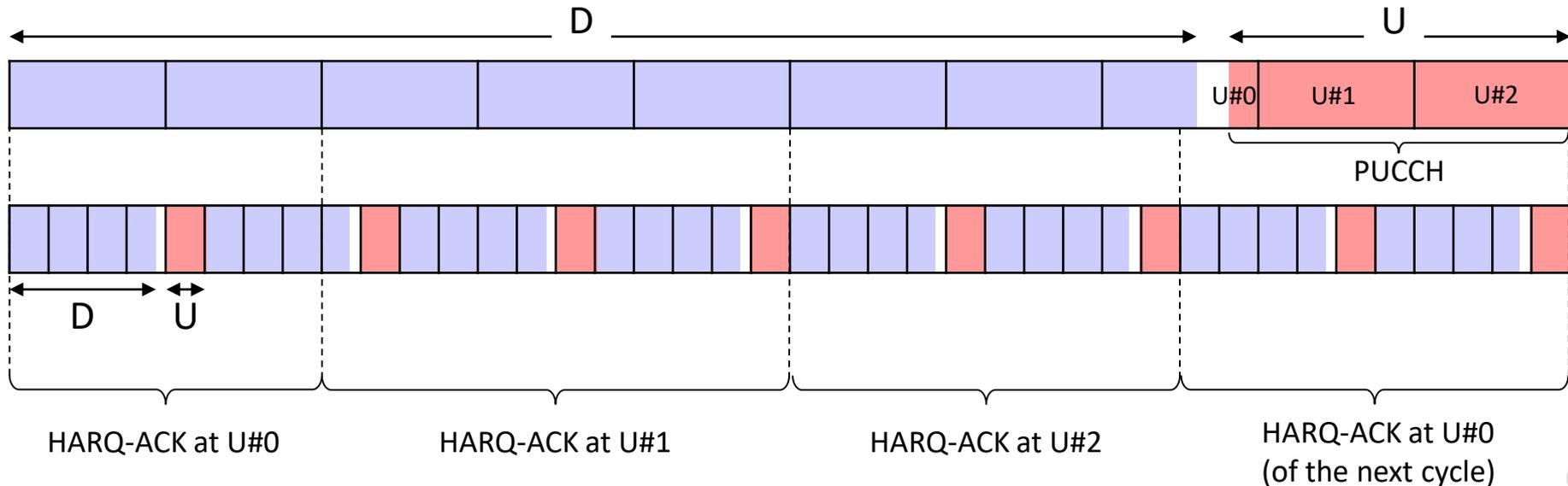


Case 2



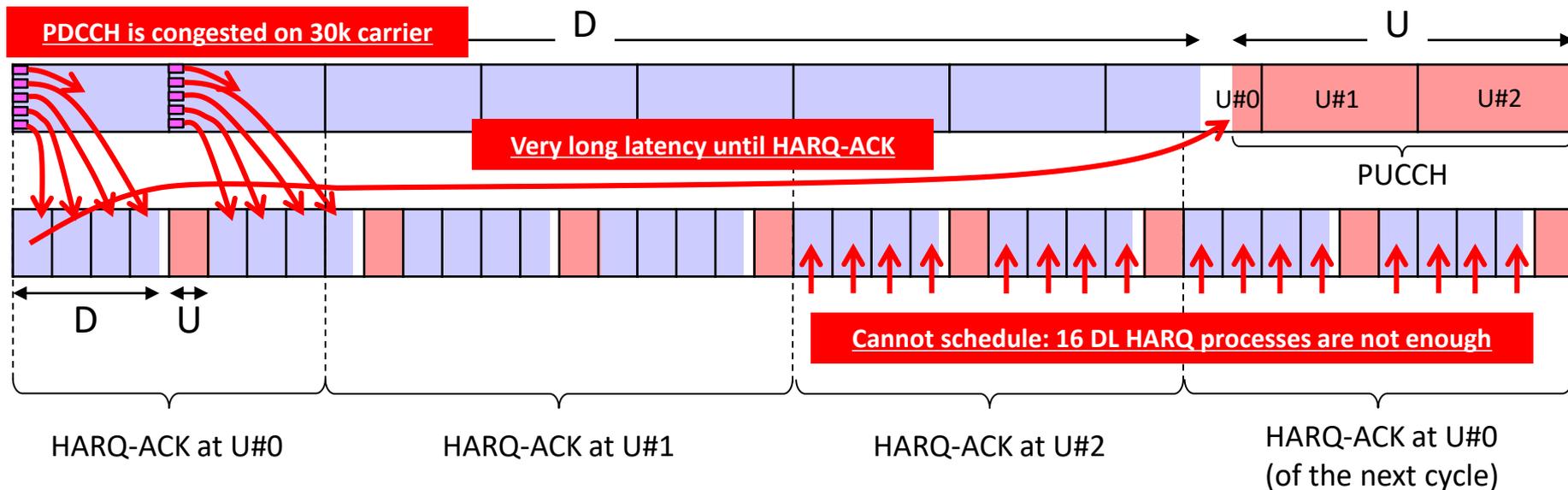
- For CA with different numerologies, self-scheduling offers higher achievable DL throughput compared to cross-carrier scheduling in many cases
 - Reason 1: UE PDSCH processing time is determined by the lowest SCS among PDCCH, PDSCH, and HARQ-ACK
 - Reason 2: Number of DL HARQ processes per serving cell is up to 16
 - As a result, for cross-carrier scheduling, some DL resources are not available.

E.g., Cross-carrier scheduling from SCS 30k carrier to SCS 120k carrier (PUCCH is configured on SCS 30k carrier)



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