

# Discussion on Rel-18 WI scope for eRedCap

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# WID on Rel-18 RedCap

- The following tasks are captured in the WID in RP-222675
  - Check in RAN#98-e regarding:
    - Whether UE peak data rate reduction for UE is limited only with UE BB bandwidth reduction or standalone
    - Whether or not/how a separate early indication can be supported
    - Other restrictions of the WI (e.g., connectivity restrictions, band, etc.)
- We provide our views on the remaining issues in the following pages. The following abbreviations are used in the descriptions
  - BW3: the agreed option for bandwidth reduction according to the WID in RP-222675
  - PR1: the option for peak data rate reduction.
    - The constraint  $v_{Layers} \cdot Q_m \cdot f \geq 4$  is relaxed to  $v_{Layers} \cdot Q_m \cdot f \geq Y$ . FFS: the value of Y

# Whether UE peak data rate reduction for UE is limited only with UE BB bandwidth reduction or standalone ?

- RAN1 agreed that PR1 is supported at least as an add-on to BW3 and whether standalone PR1 is supported will be decided in RAN plenary
- On the number of UE types
  - NR UE can report a capability on peak data rate by parameters  $v_{Layers}$ ,  $Q_m$  and  $f$ . However, such UE capability is not considered as different UE types
  - Concept of different UE type is introduced for Rel-17 RedCap UE for the reduced BW and antennas, which is mainly for the early identification of Rel-17 RedCap UE in initial access
  - Rel-18 eRedCap UE of standalone PR1 is same as Rel-17 RedCap UE except more relaxed UE processing capability. In this sense, Rel-18 eRedCap UE of standalone PR1 may be considered the same UE type as Rel-17 RedCap UE
  - If peak data rate is taken as the metric to define UE type, Rel-18 eRedCap UE of standalone PR1 is the same type as Rel-18 eRedCap UE of BW3 (+PR1) since they have common target peak data rate of 10Mbps
  - In conclusion, the support of standalone PR1 may not result in more than one new UE type for Rel-18 eRedCap
- Standalone PR1 provides small complexity reduction of about 4-5% compared to Rel-17 RedCap UE according to the TR 38.865
- Standalone PR1 has no performance impacts, e.g., coverage
- Standalone PR1 has marginal impact of network deployment/ coexistence
  - However, as 'BW3+PR1' is already supported for Rel-18 eRedCap, the introduction of standalone PR1 will increase the complexity of gNB scheduler
- Standalone PR1 has minimal specification impacts
- **Observation**
  - Standalone PR1 has no or minimal impacts in terms of performance, coexistence and complexity, however, it only provides limited benefits
- **Proposal 1**
  - Standalone PR1, if supported, should not result in more than one new UE type for Rel-18 eRedCap

# *Whether or not/how a separate early indication can be supported ?*

- RAN1 agreed that
  - If RAR PDSCH is scheduled within the maximum number of PRBs of 5Mhz, the legacy timeline between RAR and Msg3 is reused
  - If RAR PDSCH exceeds the maximum number of PRBs of 5Mhz, UE can transmit Msg3 subjected a relaxed timeline between RAR and Msg3
    - Otherwise, the UE behavior is up to the UE implementation
  
- Early identification between Rel-17 RedCap UE and Rel-18 eRedCap UE by Msg1 is not preferred
  - If supported, it causes further fragmentation of RO resources or PRACH preambles in a RO
  - Based on the RAN1 agreements, if RAR payload size is small, gNB can schedule RAR in 5MHz with legacy timeline; On the other hand, if RAR payload size is larger, gNB can schedule RAR following the relaxed timeline
  
- Early identification between Rel-17 RedCap UE and Rel-18 eRedCap UE by Msg3 can be supported
  - The early identification by Msg3 enables proper scheduling of Msg4/PUCCH for Rel-17 RedCap UE and Rel-18 eRedCap UE
  - The specification impact is expected to be a new LC ID for eRedCap UE
  
- **Proposal 2**
  - Early identification between Rel-17 RedCap UE and Rel-18 eRedCap UE can be supported by Msg3 but not Msg1

# Proposals to update WID on eRedCap

## ■ Proposal 1

- Standalone PR1, if supported, should not result in more than one new UE type for Rel-18 eRedCap

## ■ Proposal 2

- Early identification between Rel-17 RedCap UE and Rel-18 eRedCap UE can be supported by Msg3 but not Msg1

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