3GPP TSG RAN Meeting #102 RP-233479
Edinburgh, Scotland, December 11-15, 2023

Views on Scope for MIMO Evolution in Rel-19

Agenda Item: 9.1.1.2

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Document for: Discussion

Background

- In RAN #101, the potential scope of Rel-19 MIMO was discussed, and 6 candidate objectives were identified
- For RAN #102, RAN chair has provided guidance on the Rel-19 MIMO WI, as in [1]
- For Rel-19 MIMO, the estimated TU budget is very limited, e.g., around 2~2.5 TUs
- In our view, further down scoping from the WID in RAN char's guidance is necessary to fit into the allocated number of TUs. In this contribution, we share our priorities for the potential objectives

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Rel-19 MIMO: Beam Management

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- Topic 1 in [1]
  - For Beam management enhancements to reduce overhead/latency through UE-initiated/event-driven beam management
    - Objective 1: Signalling/mechanism to facilitate UE-initiated beam management procedure including UE-initiated beam reporting/[switch]
- Views
  - UE-initiated beam switching requires more specs efforts. Due to the limited TU, it is not preferred to be pursued in Rel-19
  - To achieve UE-initiated beam reporting, the follows should be studied and targeted FR2
    - The event definition for triggering beam reporting
    - UL signalling contents
    - UL signalling container
- Proposal-1
  - Topic 1 for beam management should be included in the scope of MIMO WI
    - UE-initiated beam switching is suggested to be deprioritized
    - UE-initiated beam reporting is suggested to be specified, including the event definition, UL signaling contents and UL signaling container

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Rel-19 MIMO: CSI Enhancements

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- Topic 2 in [1]
  - For enhancements to CSI framework to support > 32 CSI-RS ports
    - Objective 1: Type I codebook enhancements to support > 32 CSI-RS ports
    - Objective 2: Type II codebook enhancements to support > 32 CSI-RS ports
    - Objective 3: Hybrid beamforming enhancements (CRI based reporting enhancements)
- Views
  - All the three objectives can be specified considering the potential restrictions to the scope and targeted FR1, e.g.,
    - Regarding the total number of CSI-RS ports across all resources, a limited set of values should be considered
    - The same number of CSI-RS ports should be assumed for each resource
    - The M-CRIs reporting based Type I codebook should be prioritized for hybrid beamforming
- Proposal-2
  - Topic 2 for CSI enhancements should be included in the scope of MIMO WI
    - All the three objectives including Type I/II codebook and hybrid beamforming are suggested to be specified in Rel-19 with potential scope restrictions

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Rel-19 MIMO: CJT/DL Multi-TRP

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- Topic 3 in [1]
  - For CJT/DL multi-TRP enhancements in Rel-19
    - Objective 1: UE-assisted calibration reporting of delay and frequency/phase offsets for CJT with non-ideal synchronization and backhaul
    - Note: Assume legacy CSI-RS design and standalone aperiodic reporting on PUSCH
- Views
  - CJT enhancements should be supported for FR1 in Rel-19
    - Delay offset measurement and reporting are more important due to ISI across TRPs
    - For stand-alone CSI reporting, Rel-18 TDCP reporting can be considered as the starting point
    - Considering the UE-assisted calibration is for gNB pre-compensation, Rel-17 HST-SFN could be used as the starting point for potential QCL enhancements
- Proposal-3
  - Topic 3 for CJT enhancements should be included in the scope of MIMO WI

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Rel-19 MIMO: UL Enhancements

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- Topic 4 in [1]
  - For UL enhancements in Rel-19,
    - Objective 1: STxMP enhancements
    - Objective 2: 3Tx for UL codebook and non-codebook based transmission
- Views
  - Considering limited TU, STxMP enhancements should be deprioritized
  - 3Tx UL could be supported in Rel-19 since there is commercial need
  - For 3Tx UL enhancements, the scope can be further limited to codebook based transmission. The enhancement on full power and SRS resource is not recommended to reduce the workload
- Proposal-4
  - Topic 4 for UL enhancements should be included in the scope of MIMO WI
    - STxMP enhancements are suggested to be deprioritized
    - 3Tx UL is suggested to be supported for codebook based transmission without the enhancement on full power or SRS resource

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Conclusions

- Proposal-1
  - Topic 1 for beam management should be included in the scope of MIMO WI
    - UE-initiated beam switching is suggested to be deprioritized
    - UE-initiated beam reporting is suggested to be specified, including the event definition, UL signaling contents and UL signaling container
- Proposal-2
  - Topic 2 for CSI enhancements should be included in the scope of MIMO WI
    - All the three objectives including Type I/II codebook and hybrid beamforming are suggested to be specified in Rel-19 with potential scope restrictions
- Proposal-3
  - Topic 3 for CJT enhancements should be included in the scope of MIMO WI
- Proposal-4
  - Topic 4 for UL enhancements should be included in the scope of MIMO WI
    - STxMP enhancements are suggested to be deprioritized
    - 3Tx UL is suggested to be supported for codebook based transmission without the enhancement on full power or SRS resource

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Reference

- [1] RP-232745, Summary for RAN Rel-19 Package: RAN1/2/3-led, RAN Chair, 3GPP TSG RAN Meeting #102, Edinburgh, December 11-15, 2023

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Thank you

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