3GPP TSG RAN meeting #94e
Electronic meeting, December 6-17, 2021
A.I. 8A.1

RP-213050

Views on Rel-18 MIMO

Qualcomm

Introduction

- In this contribution, we give our views regarding the proposed WI objectives proposed in RP-212661
- In general, we think the proposed scope is too large and reduction is needed for a more realistic workplan
  - Especially concerned about another round of CSI enhancements, with or without Coherent JT
- Should be selective regarding including general left-overs
- Our detailed comments are included in the following slides

CSI and Coherent JT enhancements

- We believe that time domain CSI compression/prediction has certain merits; however, given that there will be a potentially large overlap with AI/ML studies in this direction, there would be a risk of redundant solutions; In addition, it's hard to guarantee the gain is achievable via predicted precoding and rate estimation especially in dynamic interference scenarios since the prediction (without AI/ML) only addresses the channel part, not the interference
  - → CSI enhancements for medium or high Doppler should not be high priority

- Coherent JT across transmission points requires tight phase-coherence that is only achievable if the actual upconverted RF signal is distributed across TRPs, as opposed to a baseband version, therefore; it is only practical across co-sited antennas/panels. It is unclear why existing codebooks (e.g., Type I - MultiPanel) could not be reused for such scenarios.
  - → CSI enhancements for Coherent JT should not be high priority

Larger number of DM-RS ports

- Although we do not think increasing the number of DM-RS ports is an essential Rel-18 enhancement, if there is strong support, could be included, as long as the scope is clearly defined and limited, e.g. as follows
  - → Support MU-MIMO multiplexing with legacy UEs to the maximum extent possible
  - → Reuse existing tone mapping and sequence generation to the extent possible
  - → At least CP-OFDM solution should be common between DL and UL

Simultaneous multi-panel UL transmission

- We believe this is an important feature, which will enable higher power and better diversity at the same time. The reception point can be both single or multiple TRP
  - → Support including this feature
  - → Simultaneous transmission needs to be supported to exploit higher power, higher rank, and diversity benefits
  - → This can include both single-DCI and multi-DCI frameworks

UL transmission with >4Tx with CPEs

- Although we think enhancements for CPEs are important, increasing the number of Tx antennas is not the most compelling case. However, if there is strong support for this feature it can be included with a limited scope
  - → Decouple the supported number of Tx ports from the supported rank
  - → Focus on 6 and 8 Tx with Rank<=4
  - → No new CW-to-layer mapping
  - → Clearly define whether CB or NCB, or both, are in scope

Panel-specific timing/power control

- We are ok with including this enhancement given that it allows for more practical mTRP deployment scenarios, especially for FR2
- We prefer to also study the impact to DL when received signals are not within the CP to make this objective meaningful. We expect some RAN4/RAN1 impact also for the case of DL
- We prefer to focus on multi-DCI scenario given the UE implementation challenges in single-DCI framework
- In addition, the motivation for the UL power control part is not clear as we already have separate power control in previous releases

- → Support including this feature with the following objective: “Study, and if justified, specify panel-specific UL timing and asynchronous DL reception for multi-DCI based multi-TRP/panel scenario”

Others

- Frequency-selective UL precoding for >4Tx
  - We don’t believe this is an essential feature for Rel-18 MIMO
  - → The study of this feature should include enhanced wide-band precoding with comparable complexity and overhead assumptions, which would take significant amount of time to study
  - → Not supportive of including it, especially given the control overhead concerns

- New CW-to-layer mapping
  - We don’t believe this is an essential feature for Rel-18 MIMO
  - → The change has been proposed and debated in multiple releases before
  - → Layer dependent modulation order would offer superior performance with lower overhead and HARQ complexity
  - → Not supportive of including it

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