**3****GPP TSG RAN WG1 #118 R1-** **xxxxxx**

**Maastricht, NL, August 19th - 23rd, 2024**

**Agenda item:** 9.1.3.2

**Source:** Moderator (Qualcomm)

**Title:** Additional study on AI/ML for NR air interface: CSI compression results template discussion

**Document for:** Discussion and Decision

# Introduction

This document is to discuss results template for Rel-19 CSI compression studies.

# General remarks

Please provide comments in the tables provided in this document. In addition, you may add comments directly in the template spreadsheet using the MS Excel commenting tool.

Color coding in the results templates:

* Changes/ additions the FL made w.r.t. the last meeting are marked in red.
* Companies to use the green color for the following:
  + to report new results by adding new columns not reported in RAN1 #117
  + for indicating changes to the results reported in RAN1 #117
* Please make sure to report the SGCS results from FTP and full buffer evaluations into the “IntermediateKPI” tab as well. The observations for SGCS will be derived from the “IntermediateKPI” tab.

As announced earlier, please follow the following guidelines:

* How to capture multiple results for the given payload range
  + First of all, please use your discretion on whether to report all the results you have or report a representative result.
  + In case multiple results are reported into a column, I will take the best result.
  + In case multiple results are reported into separate columns, I will take all of them to derive a range.

# CSI\_Table 8. CSI compression temporal Case-1-2-5 1-on-1 joint training

Compared to the last version at the end of RAN1 #117, the following changes were made.

Agreement

For the evaluation of temporal domain aspects of AI/ML-based CSI compression (Cases 1-5), in addition to FLOPs, also consider FLOPs per normalized time unit. Use 5msec as the normalized time unit.

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# CSI\_Table 9. CSI compression temporal Case-3-4 1-on-1 joint training

Compared to the last version at the end of RAN1 #117, the following changes were made.

Agreement

For temporal domain aspects Case 3/4, change the small / medium / large payload region definition as follows:

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| Note: X, Y, Z, A, B, and C are feedback overhead rates in bits per time unit of 5ms.  Note: For X, Y, and Z, α=[2] for rank=1/2 and α=[4] for rank=4  Note: For A, B, and C, β=[0.5] for rank=1 and β=[0.75] for rank=2/4 |

Agreement

For the evaluation of temporal domain aspects of AI/ML-based CSI compression (Cases 1-5), in addition to FLOPs, also consider FLOPs per normalized time unit. Use 5msec as the normalized time unit.

Agreement

In the results template for capturing the evaluation of temporal domain aspects Case 3/4 of AI/ML based CSI compression, regarding the “upper bound”, capture both of the following:

* upper bound based on ideal CSI prediction and without CSI compression
* upper bound based on benchmark CSI prediction and without CSI compression

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# CSI compression localized model

Compared to the last version at the end of RAN1 #117, the following changes were made.

Agreement

For collecting evaluation results for temporal domain aspects of AI/ML-based CSI compression using localized models, use the same results template used to collect evaluation results for AI/ML-based CSI compression using localized models

* Adding the same temporal setting that is used for results template used to collect evaluation results for temporal domain compression Case 1/2/5.

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| **Temporal setting** | **Temporal domain aspect Case 1-5** |
| **CSI-RS configuration: periodic or aperiodic For periodic: periodicity For aperiodic: # of resources K in the CSI-RS burst / time internal m in msec** |
| **CSI reporting periodicity** |
| **Usage of historical CSI at UE side: number / time distance** |
| **Usage of historical CSI at NW side: number / time distance** |
| **Prediction window: number / time distance between prediction instances / distance from the last observation instance to the 1st prediction instance (Only applicable to Case 3,4)** |

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# CSI compression temporal case with model generalization

TBD

Conclusion

For model generalization results table, adopt Rel-18 Table 2 and Generalization Case 1 / 2 / 3 as starting point with same additions above. For generalization aspects, adopt the following

* Various UE speed
* UE distribution
* Various CSI-RS periodicity

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# CSI compression temporal case with model scalability

TBD

Conclusion

For model scalability results table, adopt Rel-18 Table 3 and Generalization Case 1 / 2 / 3 as starting point with same additions above. For generalization aspects, adopt the following

* Various numbers of antenna ports
* Various frequency granularity
* Various payload size

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# CSI compression temporal case Multi-vendor joint training

TBD

Conclusion

For multi-vendor results table, adopt Rel-18 Table 4 for joint training and Rel-18 Table 5 for separate training as starting point, with the same additions of above 2 agreements.

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# CSI compression temporal case Separate training

TBD

Conclusion

For multi-vendor results table, adopt Rel-18 Table 4 for joint training and Rel-18 Table 5 for separate training as starting point, with the same additions of above 2 agreements.

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