



3GPP TSG-RAN WG4 Meeting # 110
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On R19 Demod Evolution WI

■ Candidate topics for demod evolution in R19 after RAN#102

- UE performance requirements with inter cel and with intra-cell inter-use interference for 8Rx CPE/FWA/vehicle/industrial devices
 - Further check if such objectives can be done in R18 performance
- Further check if 1024QAM + 4layers for indoor scenario for 4Rx UE and 8Rx CPE/FWA/vehicle/industrial devices shall be included in the scope
- UE CRI reporting requirements with multiple CSI-RS configured with priority on FR1
 - Further check if any other RRM requirements beyond Demod for FR2 CRI reporting
- Enhanced UE CSI reporting requirements with R-ML receiver for SU-MIMO with study on whether the UE with R-ML report incorrect CSI
- MMSE-IRC receiver for uplink taking LTE interference profile as starting point. FFS on other interference profile.
- Channel model with spatial component for performance requirements with following alternatives for study the test feasibility
 - Alternative 1: Extending TDL channel model
 - Alternative 2: CDL channel model



Rel-19 Demod Evolution | CSI Reporting Requirements

■ Background

- Multiple NZP CSI resources are configured in deployments
 - No requirements to verify CRI reporting from UE in NR
 - CRI reporting was introduced in LTE for FD-MIMO
- Different configurations are possible with multiple NZP CSI-RS with large antenna arrays
- In Rel-19 MIMO WI, enhancements to support up to 128 CSI-RS port will be introduced
- In Rel-15 CQI, PMI, RI reporting requirements were introduced for CSI reporting for NR
 - All requirements are with 1 NZP CSI-RS resource configured
 - No requirements for CRI reporting

■ Motivation

- Defining CRI reporting requirements in RAN4 will promote adoption of same test methodology for CRI reporting verification
- Defining requirements in RAN4 will reduce carrier specific tests

■ Objectives

- Study the framework and methodology for CRI reporting requirements
 - Re-use the LTE CRI reporting framework as a starting point
- Define CRI reporting requirements with multiple CSI-RS configured



Rel-19 Demod Evolution | Views on other candidate topics

■ ICI and MU-MIMO requirements with 8RX

- UE performance requirements with inter cel and with intra-cell inter-use interference for 8Rx CPE/FWA/vehicle/industrial devices
 - Further check if such objectives can be done in R18 performance
- [Apple] Possible to extend scope of current 8RX WI to include ICI and MU-MIMO requirements
 - Keep the same test scope and assumptions as Rel-17 requirements. For example - MIMO layer combination for MU-MIMO, MCS rank for ICI

■ 1024QAM Requirements

- Further check if 1024QAM + 4layers for indoor scenario for 4Rx UE and 8Rx CPE/FWA/vehicle/industrial devices shall be included in the scope
- [Apple] 1024QAM + 4layers would need very high SNR, which is not practical in actual deployment and also has testability limitations

■ CQI report for R-ML SU-MIMO receiver

- Enhanced UE CSI reporting requirements with R-ML receiver for SU-MIMO with study on whether the UE with R-ML report incorrect CSI
- [Apple] Need to further study and evaluate how to distinguish requirement/ performance for CQI reporting with R-ML compared to baseline receiver

■ Advanced receiver for BS - MMSE-IRC

- MMSE-IRC receiver for uplink taking LTE interference profile as starting point. FFS on other interference profile.
- [Apple] UL performance and coverage enhancement has been investigated mostly at UE side including HPUE, increasing number of Tx, etc.
 - Advanced receiver for mitigating interference is beneficial for UL performance enhancement

■ MIMO channel model enhancements

- Channel model with spatial component for performance requirements with following alternatives for study the test feasibility
 - Alternative 1: Extending TDL channel model
 - Alternative 2: CDL channel model
- [Apple] TDL channel model extension with MIMO correction matrix, beam steering have been adopted to model spatial aspects for defining RAN4 requirements since LTE
- In Rel-18 for Multi-RX requirements in FR2, we introduce a spatial correlation matrix to model cross talk between other TRP to UE panel
- Extension to TDL channel model can be introduced as needed for defining requirements
- The CDL channel model needs to be calibrated in RAN4. Each channel realization could give different performance leading to diverse performance and large simulation runs for convergence
- Introducing CDL channel model doesn't verify any additional baseband processing



