3GPP TSG RAN Meeting #78
Lisbon, Portugal, Dec. 18-21, 2017

RP-172395

# Motivation on New SID/WID: Enhancements to MIMO operation for NR

Intel Corporation, Huawei, InterDigital

# Justification

Rel-15 NR would support various MIMO features targeting multi-antenna support at the TRP and UE for various deployment scenarios and carrier frequencies (below and above 6GHz).

Further enhancement are required for NR MIMO to provide better performance comparing to Rel-15:

- NR Rel-15 specifies Type II codebook supporting CSI feedback based on linear beam combing codebook (Type II) for up to two MIMO layers transmission. Support of Type II codebook should be extended to up to four MIMO layers.
- CSI feedback should be extended to support efficient mechanism to assist precoding selection for beamformed CSI-RS transmission, e.g. by using covariance matrix feedback from the UE.
- Non-linear precoding for MU-MIMO should be considered to improve MU-MIMO performance comparing to conventional linear precoding.
- Support of multi-user MIMO transmission for mmWave bands with intra-TRP interference suppression should be also considered as an enhancement to Rel-15 NR MIMO.
- Support of multi-point transmission schemes specified in Rel-15 should be extended by e.g. by considering transmit diversity schemes for non coherent transmission

# Objectives (1)
# Enhancements to multi-user MIMO in NR

## Enhancement to multi-user operation in NR [RAN1]

- Enhancement to multi-user operation in NR [RAN1]
- Evaluate and specify (if sufficient benefits are shown), new multi-user transmission scheme(s) based on non-linear precoding identified in TR 38.802 (e.g., DPC based schemes, THP based schemes)
- Evaluate and specify (if sufficient benefits are shown), new CSI reporting schemes identified in TR 38.802 to support multi-user transmission
  - Type-II CSI feedback for up to rank-4 with further reporting overhead reduction/compression and L ≤ 6 in W1
  - Explicit feedback of channel covariance and/or channel matrix and corresponding compression schemes
  - Analog CSI feedback
- Evaluate and specify (if sufficient benefits are shown), enhancements to support multi-user transmission approaches in mmWave system for TPR and UE supporting analog beamforming
- Evaluate and specify (if sufficient gain is shown) interference-aware analog beam selection for reception of data channel
- Document the study result of benefit in a TR

# Objective (2)
# Enhancements to multi-point operation in NR

## Enhancement to multi-point and multi-user operation in NR [RAN1]

- Identify and specify (if sufficient gain is shown) enhancements to multi-point transmission schemes. e.g., support of diversity scheme for non-coherent joint transmission, etc.
- Document the study result of benefit in a TR