



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

Intel Corporation

# 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 similar or better performance comparing to LTE:

- LTE specifies support of interference aware receivers with and without network signalling assistance to suppress or cancel inter-cell and intra-cell interference. To achieve similar or better performance comparing to LTE, support of similar interference aware receiver structures and corresponding signalling assistance should be also considered for NR.
- LTE and NR specifies support CSI feedback based on beam combining framework. To achieve better multi-user performance of NR comparing to LTE, more advanced transmission options and enhanced CSI feedback comparing to Rel-15 should be considered.
- Support of multi-point transmission schemes specified in Rel-15 should be extended by considering unlicensed bands and URLLC types of traffic.

# Objective (1)

## Support of interference-aware receivers in NR

### Support of interference-aware receivers operation in NR

- Specify support network assisted interference cancellation and suppression (NAICS) receivers for data channels
  - For data channel identify the parameters of the interfering signals that can be blindly detected at the UE [RAN4].
  - Based on RAN4 feedback, for data channel specify the parameter of the interfering signals that can be indicated to the UE using physical layer and higher-layer signalling to assist interference aware receivers [RAN1]
- Evaluate and specify (if sufficient gain is shown) interference-aware analog beam selection at the UE for reception of data channel [RAN1]

Note 1: The specification should consider the previous studies on interference aware receivers for LTE (e.g. MMSE-IRC, NAICS, etc.).

Note 2: The specification should consider both TDD and FDD as well as dynamic TDD scenarios with cross-link interference.

Note 3: The specification should consider inter-TP and intra-TRP (MU-MIMO) interference scenarios

## Objective (2)

# Support of advanced multi-user MIMO in NR

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

- Evaluate and specify (if sufficient gain is shown), new multi-user transmission scheme starting from the schemes identified in TR 38.802
- Evaluate and specify (if sufficient gain is shown), new CSI reporting to support multi-user transmission starting from the CSI feedback schemes identified in TR 38.802
- Evaluate and, if needed, specify, procedure to support multi-user downlink and uplink transmission approaches in mmWave system for TPR and UE supporting analog beamforming

## Objective (3)

# Support of advanced multi-point operation in NR

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

- Identify and specify (if sufficient gain is shown) multi-point transmission schemes for unlicensed spectrum
- Identify and specify (if sufficient gain is shown) multi-point transmission schemes for URLLC type of communication. Consider both data and control channels

# Proposed timelines for WI



