3GPP TSG RAN Rel-19 Workshop
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Agenda Item	: 5
Source	: InterDigital, Inc.
Title	: Views on MIMO enhancements for Rel-19
Document for	: Discussion

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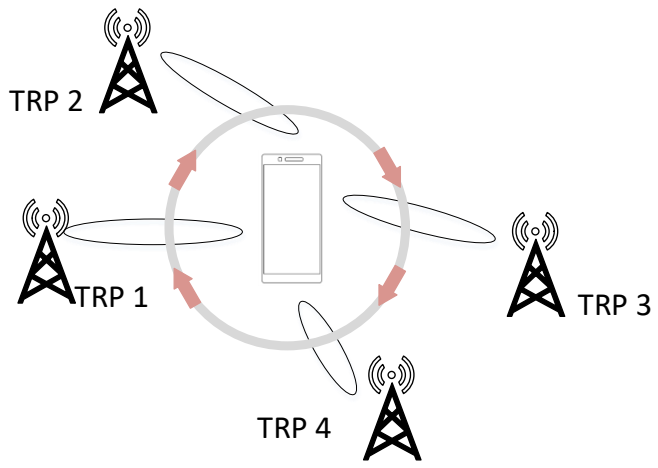
MIMO Enhancements for Rel-19

Motivation

- **UTCI and CSI Enhancements for CJT:** In Rel-18, assuming legacy TCI framework, CJT transmission with up to 4 TRPs is introduced for FR1 deployments. While coverage and average throughput are improved, further enhancements are necessary to reduce signaling overhead associated to beam and CSI operations.
    - *In Rel-18, UTCI framework is extended to multi-TRP, however it is restricted to a max of 2 TRPs. Therefore, and extension of UTCI framework is needed to enhance the efficiency of beam operation in CJT.*
    - *In Rel-18, an enhanced CSI framework based on Type-II codebook is introduced, requiring a relatively large CSI overhead. As such, some enhancements in CSI feedback will be beneficial to increase spectrum efficiency of the system.*



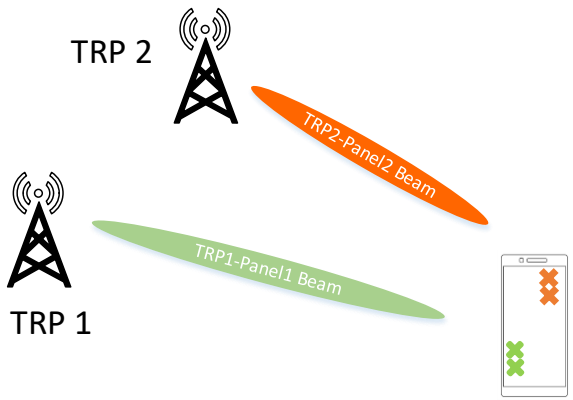
- **Robust and low latency beam operation:** BFR latency is considered a critical factor in operation of NR which is considered a beam-based system.
    - *In some use-cases, such as operation in FR2, high-mobility UEs, etc., where transmission/reception beams are more exposed to changes in the channel and transmission environment, a UE-driven beam procedure is beneficial to prevent frequent beam failures.*

MIMO Enhancements for Rel-19

Motivation

- **STxMP Enhancements:** In Rel-18, STxMP operation is introduced, however its operation is limited to single CW with SFN- or SDM-based transmissions with up to 2 panels.
  - *In Rel-18, 8TX UEs capable of transmission with up to 2 CW is introduced. Therefore, STxMP-based transmission can be further enhanced for high capability UE (e.g., 8Tx with 4 panels or antenna groups)*

- **High resolution UL Precoding:** In Rel-18, introduction of 8TX UE is an important step in enhancing UL coverage, throughput and reliability.
  - The Rel-18 8TX codebook is an enhanced-resolution codebook, however its operation is restricted to wideband precoding. Given the ever-increasing larger UL scheduling allocations, e.g., for eMBB, the UL performance can be further improved by employing frequency selective precoding.



MIMO Enhancements for Rel-19

Proposed R19 WI scope

- **[DL] Enhancements for CJT**
  - Extension of UTCI framework to 4 TRPs
  - Low overhead CSI for CJT

- **[UL] STxMP Enhancements**
  - Support 2 CW (8 layer) transmission
  - Extension to 4 panels (antenna groups)

- **[DL/UL] Robust and low latency beam operation**
  - UE-driven Beam Procedure

- **[UL] High resolution UL Precoding**
  - Support frequency selective precoding

- **Open for other market urgent issues**
  - [DL] Increasing CSI-RS ports, e.g., 64 or more ports
  - [DL/UL] UE-assisted DL MIMO calibration (m-TRP)
  - [DL/UL] SRS power imbalance compensation