

3GPP TSG RAN Rel-19 workshop

Taipei, June 15 - 16, 2023

Agenda item: 5. Specific RAN1/2/3-led Rel-19 topics

RWS-230136

Further NR MIMO evolution

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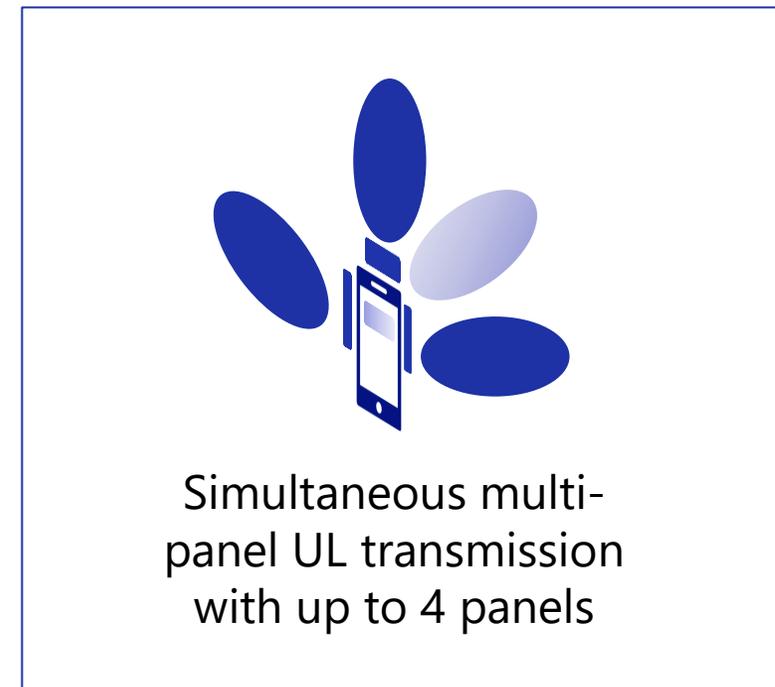
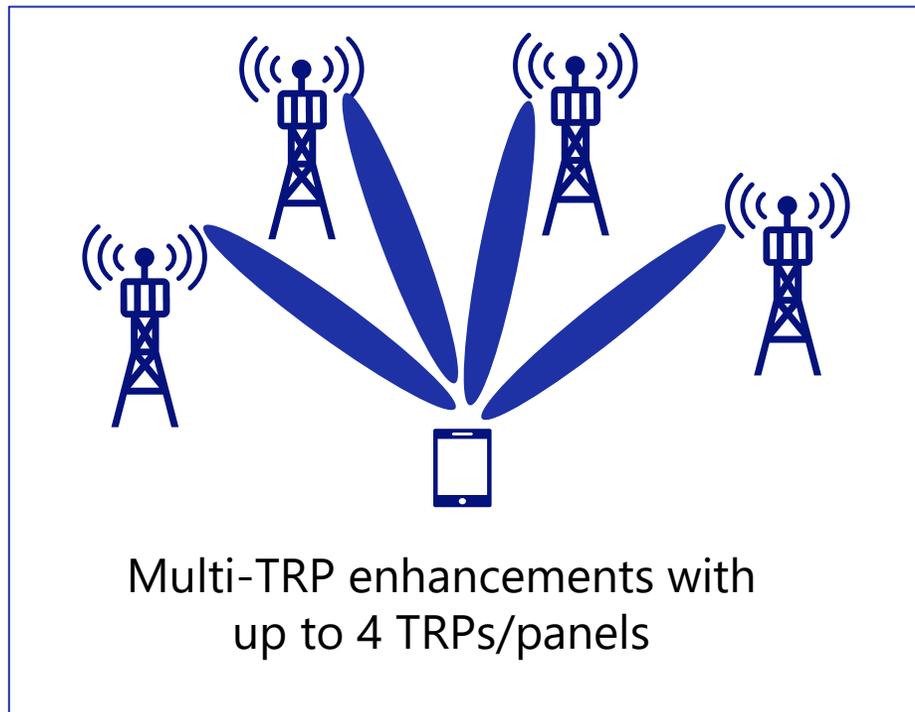
Motivation for further NR MIMO evolution

- ◆ MIMO is one of the key technologies in NR systems and is successful in commercial deployment

- ◆ There is still a need for the following enhancements
 - Beam management
 - Further latency/overhead reduction with UE assistance is beneficial for dynamic and flexible beam management.
 - Multi-TRP transmission
 - In Rel-18, up to 4 TRPs for CJT has been specified. In Rel-19, other multi-TRP transmission schemes (including NCJT, SDM, FDM, TDM and SFN) can be extended with up to 4 TRPs for reliability and throughput improvement.
 - CSI enhancement
 - Codebook enhancement for more than 32 ports to fulfil the increased number of antennas for massive MIMO.
 - CSI enhancements for the enhanced multi-TRP transmission.
 - UL enhancements
 - UL enhancements with 8Tx and simultaneous multi-panel transmission were specified in Rel-18. Considering the demand for UL services, further UL enhancements are needed.

Overview of further NR MIMO evolution

- ◆ In Rel-19, MIMO WI is expected to
 - Further enhancements of multi-TRP/multi-beam deployment targeting up to 4 TRPs/panels for other multi-TRP transmission schemes (e.g. NCJT, SDM, FDM, TDM and SFN)
 - Further UL enhancements (e.g. simultaneous multi-panel transmission, UL codebook generation)



Objectives for further NR MIMO evolution

- ◆ Specify enhancements on multi-TRP deployment for DL and UL targeting up to 4 TRPs/panels, potentially with non-ideal synchronization, including:
 - Latency/overhead reduction for beam management with UE assistance
 - Extension of Rel-18 Unified TCI framework with up to 4 TRPs/panels considering non-ideal synchronization, including support of Rel-16/17 reliability and robustness schemes
 - Extension of Rel-18 two TAs with up to 4 TRPs/panels, also including support of single-DCI based multi-TA
 - Enhancements for asynchronous multi-TRP based on at least two different DL reference timings
- ◆ Specify CSI enhancements, including:
 - Enhancements on CSI acquisition for more CSI-RS ports (potentially with 64/96/128 ports), based on legacy CSI-RS resource configuration framework
 - Enhancements on CSI acquisition with refinement based on Rel-16/17 Type-II codebook for multi-TRP schemes with up to 4 TRPs, including non coherent-JT, SDM, FDM, TDM and SFN
- ◆ Specify UL enhancements, including:
 - Enhancements on UL codebook (potentially with frequency selective precoding as Type II DL codebook)
 - Enhancements on simultaneous multi-panel UL transmission extension (including 8Tx, up to 4 panels and supporting of > 4 layers)

Summary

- ◆ In Rel-19, further NR MIMO evolution is very attractive.
- ◆ It is proposed to introduce enhancements for :
 - Latency/overhead reduction on beam management,
 - Multi-TRP/multi-beam deployment targeting up to 4 TRPs/panels,
 - CSI acquisition,
 - 8Tx UL operation,
 - Simultaneous multi-panel UL transmission.

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