

Multi-antenna requirements for NR

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AI: 8.1.2 MIMO

Background

- In TR 38.802, beam management is listed first in the multi-antenna section without a discussion on when beam management is needed which gives the impression that we *must always* use beamformed/beam sweeping signals and related management in NR.
 - For some signals/channels, beam sweeping may not be used, even at higher carrier frequencies
- NR should cover a wide range of frequencies (<1 to 100 GHz) and deployment with widely different antenna configurations (1 to 1024 antennas) and hardware implementations
- NR should support both FDD and TDD spectrum

Background

- Ensure that NR is not designed with one particular use case
 - Such as high carrier frequency, analog beamforming, very large antenna arrays and TDD
- NR specs should be flexible to support all use cases without penalty in e.g. latency or overhead due to support of other use cases
- For multi-antenna, ensure the above by agreeing on multi-antenna requirements for NR on the following pages

Proposals

- NR specifications should be efficient for both a few (e.g. 1-4) antenna elements as well as for a massive number of antenna elements (>50) per TRP
 - Note: An antenna element as defined here has controllable phase/amplitude and may physically consist of an antenna subarray with non-controllable subarray antenna elements
- Performance when using digital implementation of antenna arrays at TRP and/or UE should not be sacrificed due to additional support for analog or hybrid implementations in specifications

Proposals

- Performance for “single beam” approaches (w/o need for beam sweeping as defined RAN1#85) at TRP should not be sacrificed due to support of multi-beam approaches in specifications
 - Overhead and latency when not using beam sweeping of initial access or mobility signals should not be sacrificed due to additional support in NR for beam sweeping of such signals or channels
- Performance when using a few antenna elements per TRP (i.e. without the use of beamforming) at TRP and/or UE should not be unnecessarily sacrificed due to extended support for a massive number of antenna elements per TRP/UE in specifications