

3GPP TSG RAN Rel-19 workshop

Taipei, June 15 - 16, 2023

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

RWS-230137

# NR Duplex Enhancements

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# Duplex evolution in Rel-19

- ◆ As a possible enhancement of the conventional TDD operation, which has limitations on UL capacity, coverage and latency, Rel-18 considered “NR Duplex Evolution Enhancements” to allow simultaneous UL and DL within a TDD carrier. The study items includes studying the subband non-overlapping full duplex (SBFD) and potential enhancements on dynamic/flexible TDD.
- ◆ The objective of SBFD study is to identify and evaluate the potential enhancements to support duplex operation for NR TDD in unpaired spectrum. Following scope is defined
  - Subband non-overlapping Full Duplex Operation at gNB
  - Half duplex operation at UE
  - No restriction on frequency ranges
- ◆ The objective of dynamic/flexible TDD is to study enhanced solutions to manage the inter-gNB and inter-UE CLI

# Duplex evolution in Rel-19

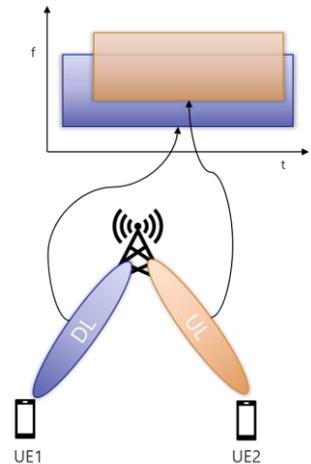
- ◆ In Rel-19, this duplex evolution should be converted into a WID, and the below aspects can be included in the objectives.
  - Support both semi-static and dynamic SBFDD operation
  - Enhancements of physical channels/signals for UL transmissions and DL receptions across SBFDD symbols and non-SBFDD symbols occurring in different slots
  - UE collision handling for UL and DL operation in the same SBFDD symbol
  - SBFDD operation for initial access, e.g., PRACH occasion configuration in SBFDD symbols
  - Inter-gNB and inter-UE CLI handling,
    - Support of CLI measurement/reporting by UE/gNB
    - Support of inter-gNB signaling of SBFDD time/frequency resources for CLI mitigation

# Items that can be further considered

- ◆ Rel-18 (and following Rel-19) NR Duplex Evolution scope will be limited due to following reasons
  - SBFDD may not provide higher network capacity due to zero overlap of DL and UL subbands
  - Even though the SBFDD study assumed no restriction of frequency range but impact on unlicensed band operation was not considered and hence deploying SBFDD in unlicensed channels is not possible

## Support of Sub-band Overlapping Full Duplex for mmWave

- ◆ **Justification:** Allowing overlap of DL and UL subband can provide higher capacity as compared to SBFDD. Self-interference can be effectively mitigated by intelligent beam-based scheduling for mmWave
- ◆ Following aspects should be considered:
  - Specify enhancements to support Subband Overlapping Full Duplex in FR2
  - Identify solutions to manage inter-gNB and inter-UE CLI handling



## Support of Unlicensed Band Operation for SBFDD

- ◆ **Justification:** Many use cases of SBFDD and unlicensed spectrum e.g., indoor hotspots, indoor office, factory are common, hence simultaneous operation of both is beneficial to study
- ◆ Following aspects should be considered:
  - Specify solutions for radio resource allocation for SBFDD to meet the unlicensed band requirements
  - Enhancements to channel access procedures for SBFDD operation

# Summary

- ◆ As the continuation from the Rel-18 SI, the work on NR Duplex operation should be done on top of the outcome of the SI, where the following scopes can be considered:
  - Support both semi-static and dynamic SBFDD operation
  - Enhancements of physical channels/signals for UL transmissions and DL receptions across SBFDD symbols and non-SBFDD symbols occurring in different slots
  - UE collision handling for UL and DL operation in the same SBFDD symbol
  - SBFDD operation for initial access, e.g. PRACH occasion configuration in SBFDD symbols
  - Inter-gNB and inter-UE CLI handling,
    - Support of CLI measurement/reporting by UE/gNB
    - Support of inter-gNB signaling of SBFDD time/frequency resources for CLI mitigation
  
- ◆ As observed in the previous slides, there are still many aspects to be considered, the WI on NR Duplex operation is essential in Rel-19.

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