

3GPP TSG RAN Rel-19 workshop

Taipei, June 15 - 16, 2023

Agenda: 5

RWS-230238



# Views on Sidelink Relay Enhancement in Rel-19

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China Telecom

May-23

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# Potential Evolution on R19 SL Relay Scenarios

- Service and operational requirements for a 5G system involving relay as listed in TS 22.261-j10 (Stage-1 spec for R19)

## 6.9.2.1 General

The 5G system shall support the relaying of traffic between a remote UE and a gNB using one or more relay UEs.

The 5G system shall support same traffic flow of a remote UE to be relayed via different indirect network connection paths.

The 5G system shall support different traffic flows of a remote UE to be relayed via different indirect network connection paths.

The connection between a remote UE and a relay UE shall be able to use 3GPP RAT or non-3GPP RAT and use licensed or unlicensed band.

The connection between a remote UE and a relay UE shall be able to use fixed broadband technology.

The 5G system shall support indirect network connection mode in a VPLMN when a remote UE and a relay UE subscribe to different PLMNs and both PLMNs have a roaming agreement with the VPLMN.

The 5G system shall be able to support a UE using simultaneous indirect and direct network connection mode.

The network operator shall be able to define the maximum number of hops supported in their networks when using relay UEs.

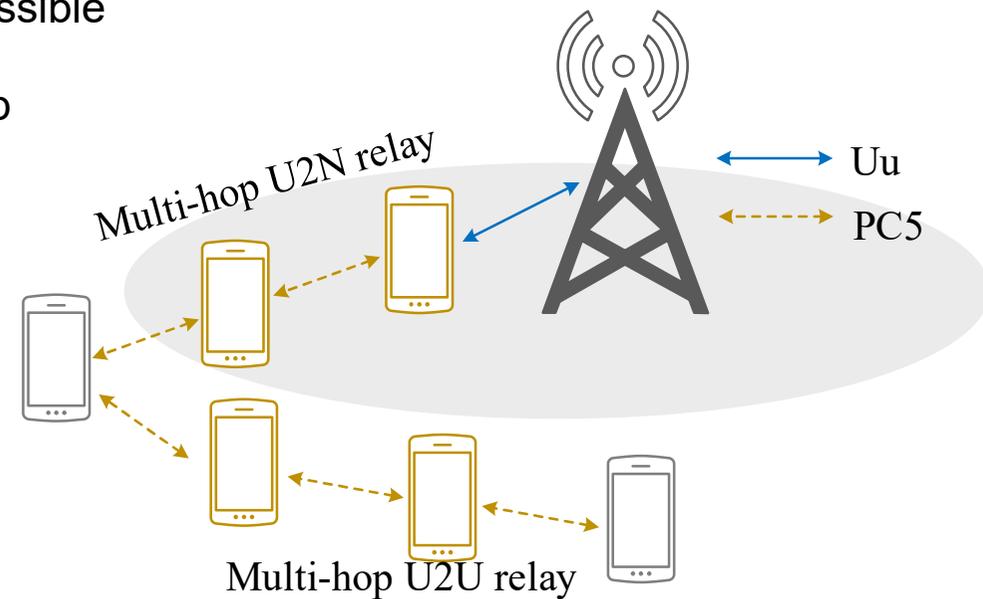
The 5G system shall be able to manage communication between a remote UE and the 5G network across multi-path indirect network connections.



# Further Evolution on Multi-hop Relay

## ■ Multi-hop U2U relay could be considered in Rel-19

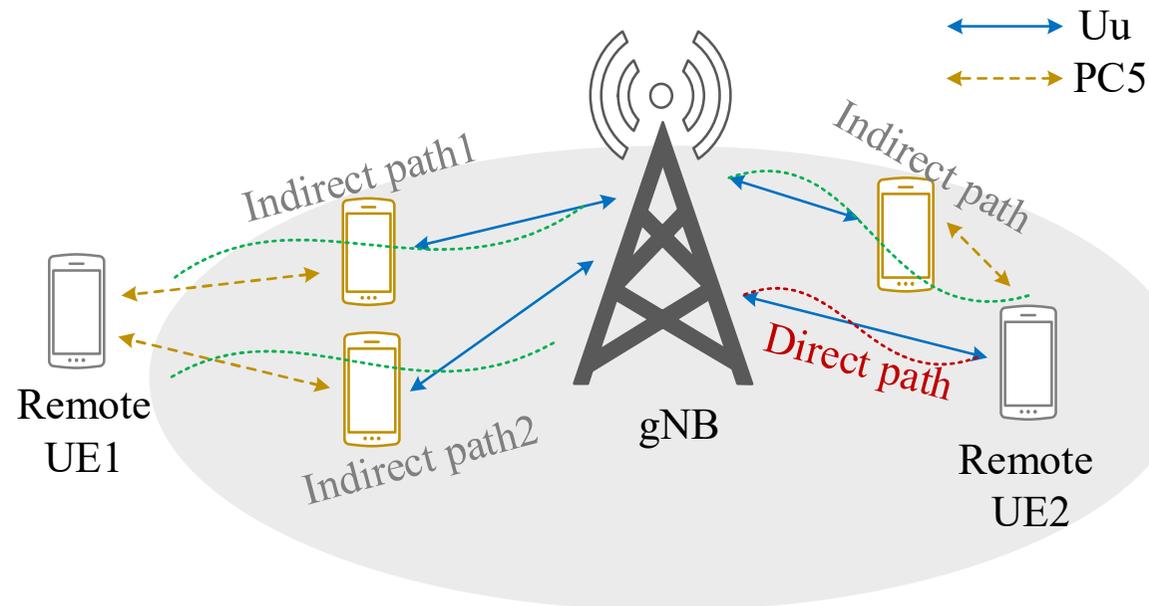
- » Reuse the Rel-17& Rel-18 solutions as much as possible
- » Relay discovery and relay (re)selection for each hop
- » Adaptation layer design
- » QoS configuration for multi-hop relay scenario
- » Control plane procedure to support multi-hop relays
- » Service continuity
- » ...



## ■ Further evolution on multi-hop U2N relay (U2U+U2N)

# Further Evolution on Multi-path relay

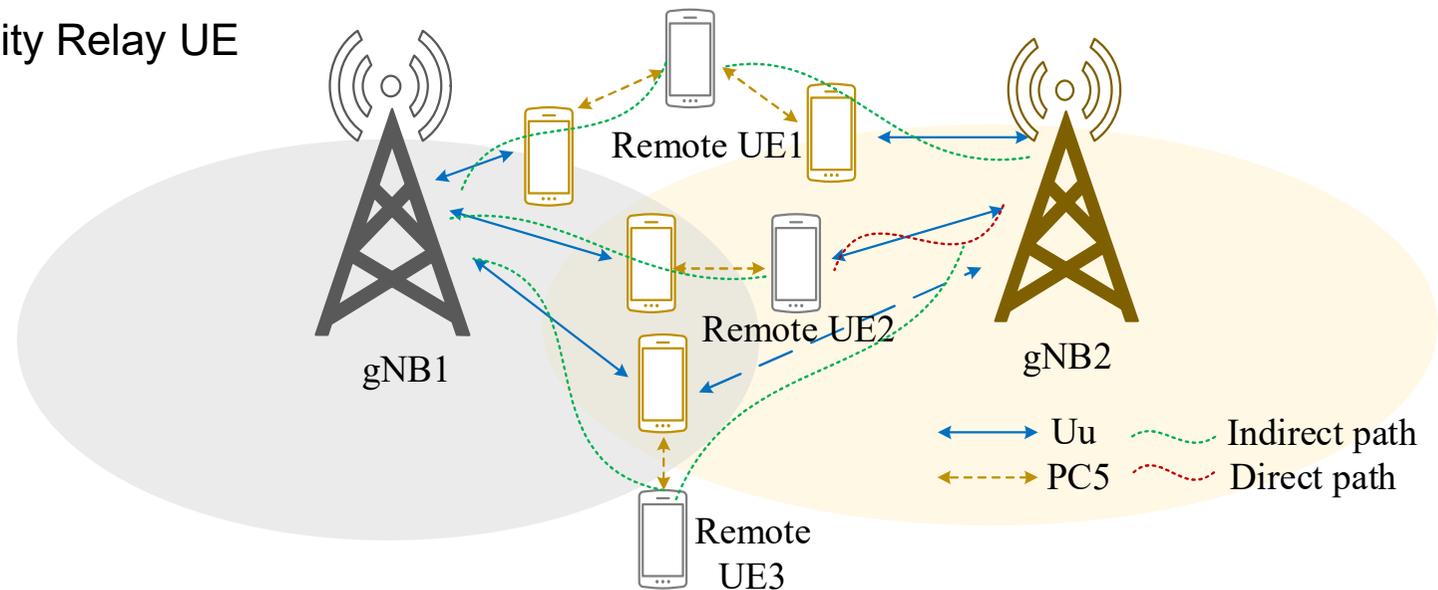
- Multi-path for intra-gNB scenario (not supported in Rel-18)
  - » Multi-path configuration during RRC Setup/Reestablishment/Resume procedure
  - » Configure two indirect paths
    - PCell on indirect path



# Further Evolution on Multi-path relay

## ■ Multi-path for inter-gNB scenario (Low priority)

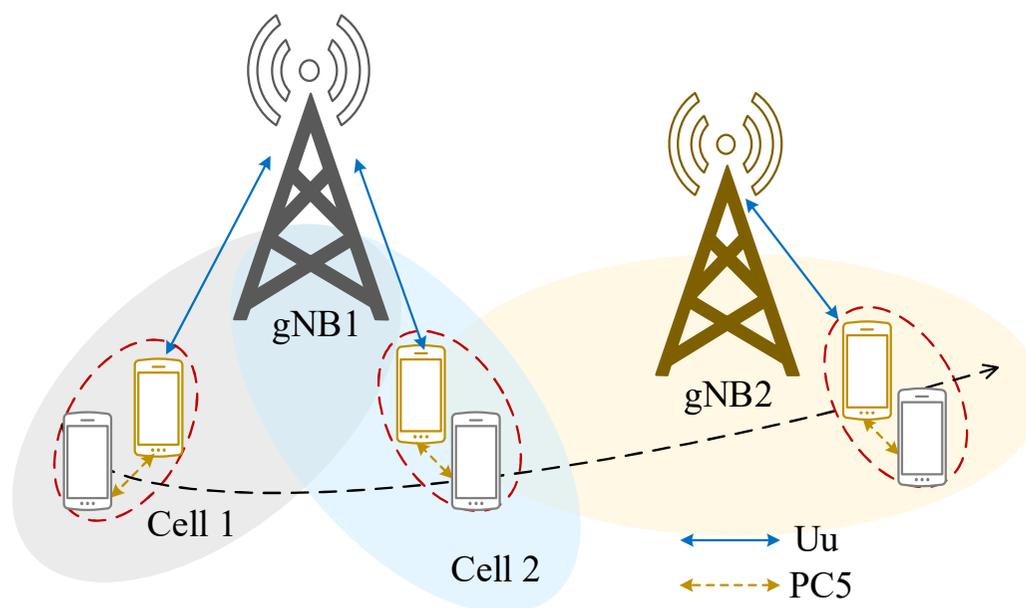
- » Direct path and indirect path are towards different gNBs.
- » Multiple indirect paths are towards different gNBs
  - via different Relay UEs
  - via a dual-connectivity Relay UE



# Further enhanced service continuity for L2 U2N relay

## ■ Further optimization for L2 U2N relay

- » Group mobility to avoid unnecessary PC5 link release/setup when the remote UE moving together with the relay UE



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**Further Evolution based on R18 SL Relay**

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**Power Saving in Sidelink Relay**

# Power Saving in Sidelink Relay

## ■ Motivation

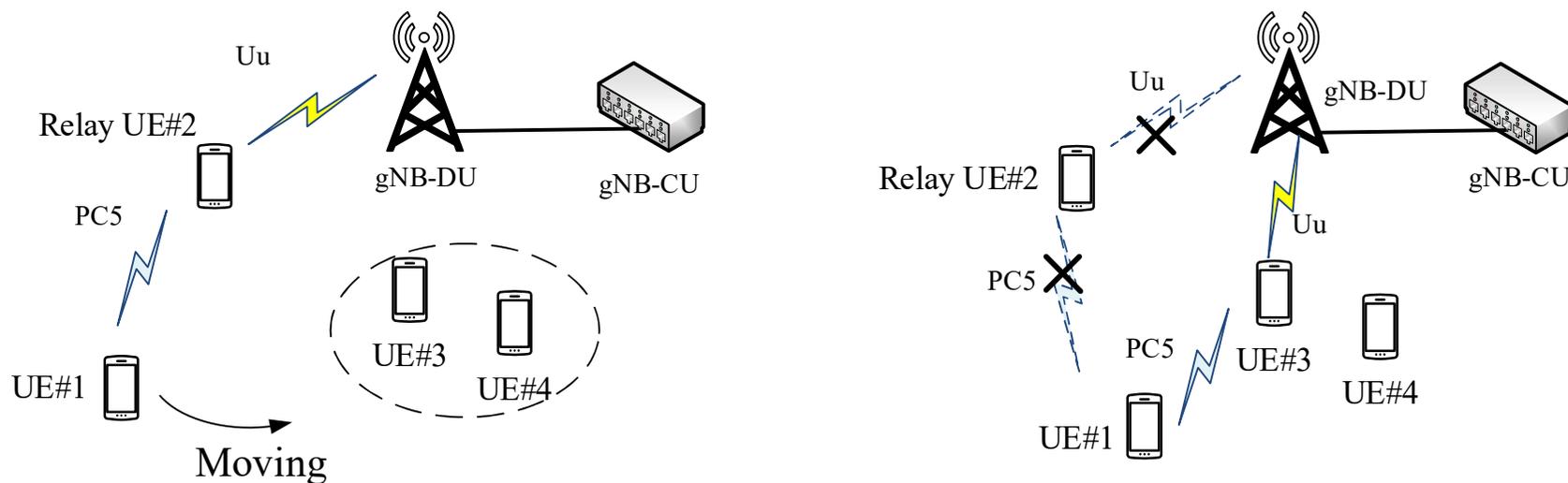
- » Although sidelink relay could be a promising approach to improve network performance and reduce CAPEX in 5G-A, UE battery might be the bottleneck for the commercialization of sidelink relay in cellular network.
- » From relay UE's perspective, sidelink relay will obviously increase the power consumption of relay UE, which may reduce the willingness of UE as a relay node. If there are not sufficient relay UEs in the network, the gain of sidelink relay might be influenced.
- » In order to promote the commercial and industrial development of sidelink relay technology, it is necessary to study and enhance UE power saving techniques in sidelink relay scenarios, including specific power saving techniques for remote UE and/or relay UE.



# Power Saving in Sidelink Relay

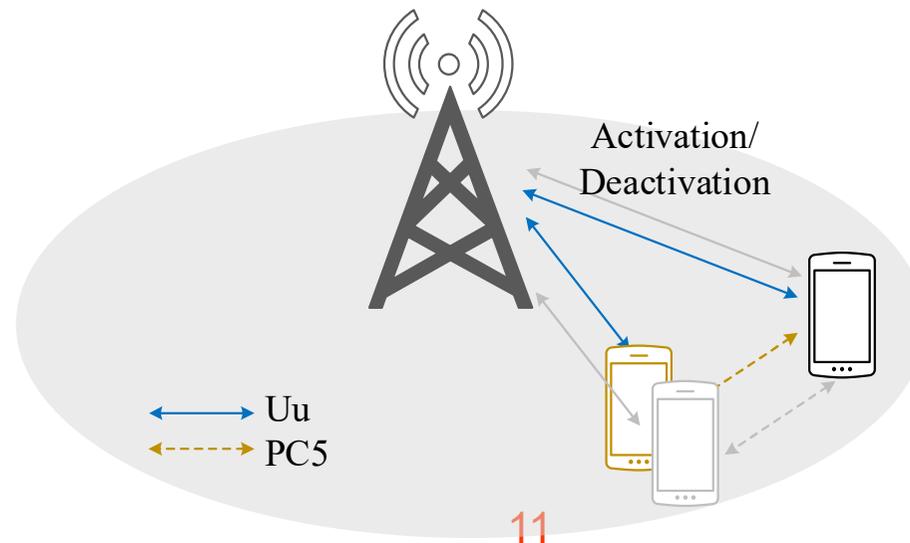
## ■ Potential issue 1

- » Due to the movement of remote/ relay UE, frequent relay reselection or connection re-establishment may occur, which may cause extra power consumption of the remote UE.
- » It is meaningful to identify potential solutions to reduce relay reselection or connection re-establishment for remote UE, such as CHO-like solution or pre-configuration of candidate relays.



## ■ Potential issue 2

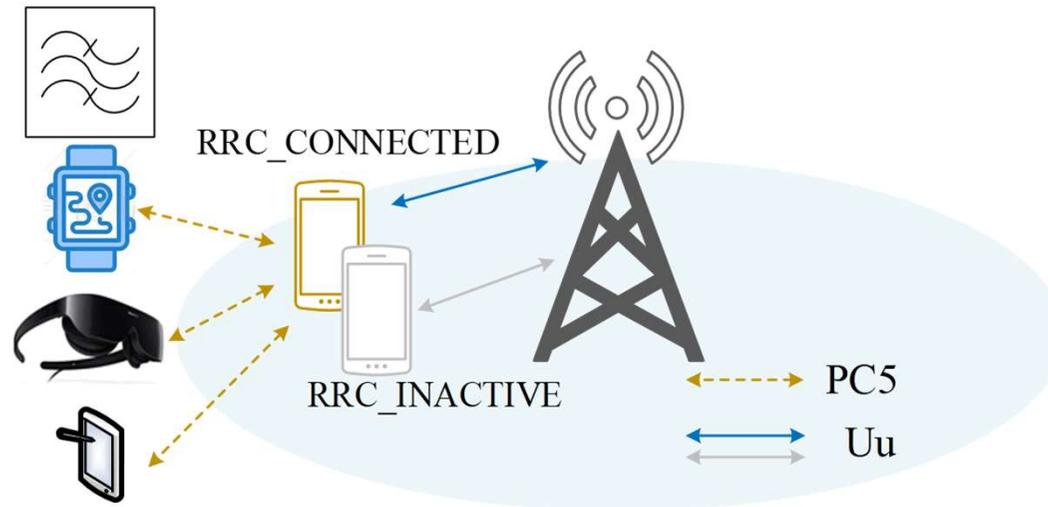
- » In multi-path relay, the direct/ indirect path might be add or release based on service requirements. When service requirements change rapidly, frequent path addition or release may cause extra power consumption of both remote UE and relay UE.
- » It is meaningful to support dynamic path activation/deactivation or path dormancy mechanism based on service requirements to reduce unnecessary UE power consumption in multi-path scenarios.



# Power Saving in Sidelink Relay

## ■ Potential issue 3

- » A UE in RRC\_CONNECTED state consumes much more power than in idle or inactive state. Besides, in some scenarios, the remote UE may have only small and infrequent signaling and/or data packets.
- » It is meaningful to identify potential solutions to allow relay UE in RRC\_INACTIVE to perform unicast data transmission at least for remote UE's small data transmission scenario.



## ■ Summary

- » Sidellink relay can be considered as a promising approach to improve network performance and reduce CAPEX in 5G-A or pre 6G.
- » For eMBB scenarios under network control, **further evolution on multi-hop/ multi-path relay** could be considered in Rel-19 for high priority scenarios.
- » In order to promote the commercial and industrial development of sidelink relay technology, it is necessary to identify potential power consumption issues in sidelink relay scenarios, and specify potential solutions to **enhance power saving techniques for remote UE and/or relay UE**.



Thanks!

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