RWS-210427

Agenda Item : 4.2

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Title : Sidelink Relay Enhancements for R18

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NR-Advanced Sidelink Relay

Justification

- SL Relay support in Rel-17 focused on UE-to-Network relaying
- UE to UE relay should be supported to address coverage extension for sidelink services
  - Public safety/emergency use cases, V2X use cases
  - Further extension of network coverage can be achieved by multi-hop UE to NW relays (multiple hops of the SL link)
- Services requiring higher bandwidth and data rates (e.g. XR) should be supported via a UE-to-NW relay
  - Current SL relay can support only a single connection for the remote UE (either direct or indirect)
  - Support of multiple connections by the remote UE can enable such services
- UE to NW relays for wearables, handheld relay, etc. requires more power efficient design for UE-to-NW relays in Idle/Inactive and Connected mode
  - Remote and/or Relay UEs in inactive/idle mode are required to monitor SL all the time

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Evolution of Sidelink Relaying for NR-Advanced

Evolution of UE-to-NW and UE-to-UE Relaying

- Coverage extension
- Service continuity for critical services (e.g. public safety)
- NW and relay Load balancing
- Multi-hop/mesh networking

L2 UE to UE relay (Rel-18)

- Discovery
- Relay Selection
- Adaptation Layer enhancements
- SL Unicast Link configuration/management

Multi-hop UE to NW relay

- Relay/Path Selection
- Adaptation Layer enhancements
- QoS Enforcement
- Uu Link Establishment/Management
- Mobility procedures

Mesh Networking

- Selection/Scheduling between Uu or SL relay
- Routing/route maintenance
- Enhancements to mode 1 and mode 2

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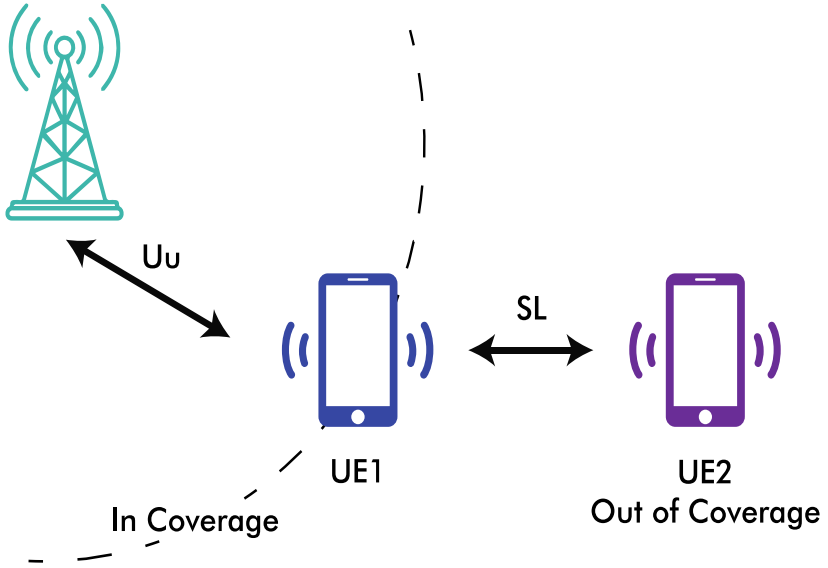
Evolution of Sidelink Relaying for NR-Advanced

Evolution of other SL Relaying Features

- Data rate enhancements for in/out of coverage UEs
  - Multi-connectivity via Uu and SL (relayed), or via separate relay UEs
  - Link management and scheduling procedures, control vs. data splitting, etc.
- Mobility enhancements
  - Extension of CHO and DAPS to a relayed UE-to-NW connection
  - Group mobility and support for inter-gNB mobility
- Power Savings enhancements for the UE-to-NW relay including:
  - Discontinuous SL monitoring for remote/relay UEs in IDLE/INACTIVE states
    - SL DRX can be the baseline
    - Power efficient paging/system info reception on SL
    - Consideration of Uu DRX and SL DRX alignment in the context of relays
  - Power savings for in-coverage UE:
    - Efficient path selection for UP/CP
    - Paging enhancements
  - Inactive state data transmission by the remote UE via a relay or combined with direct Uu transmission



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Objectives for Sidelink Relay in R18

- UE-to-UE relay support, including:
  - Support of Discovery and Relay Selection for UE-to-UE relay
  - Efficient resource selection for discovery
- Multi-connectivity via UE-to-NW Relays, including:
  - Enhanced link establishment/management procedures
- Mobility Enhancements, including:
  - CHO and DAPS enhancements for UE-to-NW Relay
  - Support for inter-gNB mobility
- Power Savings enhancements, including:
  - Power efficient paging/system info reception on SL

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