3GPP TSG RAN Rel-18 workshop
Electric Meeting, June 28 – July 2, 2021

RWS-210290

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Views on Rel-18 Sidelink

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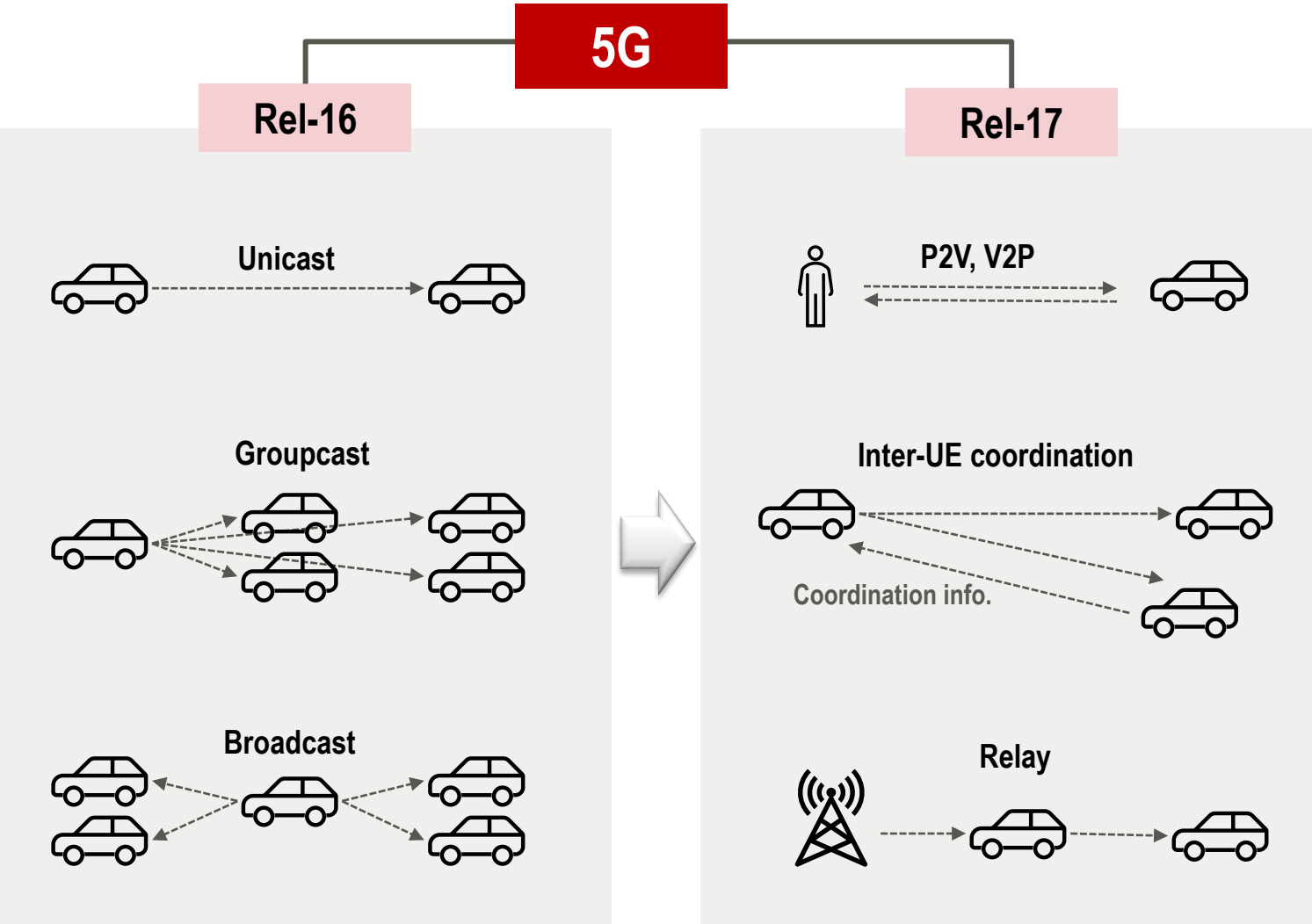
Sidelink in Rel-16 and Rel-17



- The following new features for sidelink have been supported in Rel-16 and Rel-17.
  - Unicast, groupcast
  - Mode 1
    - With HARQ feedback to gNB
  - Mode 2
    - With re-evaluation, pre-emption
  - HARQ feedback
    - For unicast, groupcast
  - CSI feedback
    - For unicast
  - Power control
    - Based on SL pathloss and for unicast
  - Partial sensing
  - DRX
  - Inter-UE coordination
  - Relay
    - UE-to-Network relay

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General Views on Rel-18 Sidelink

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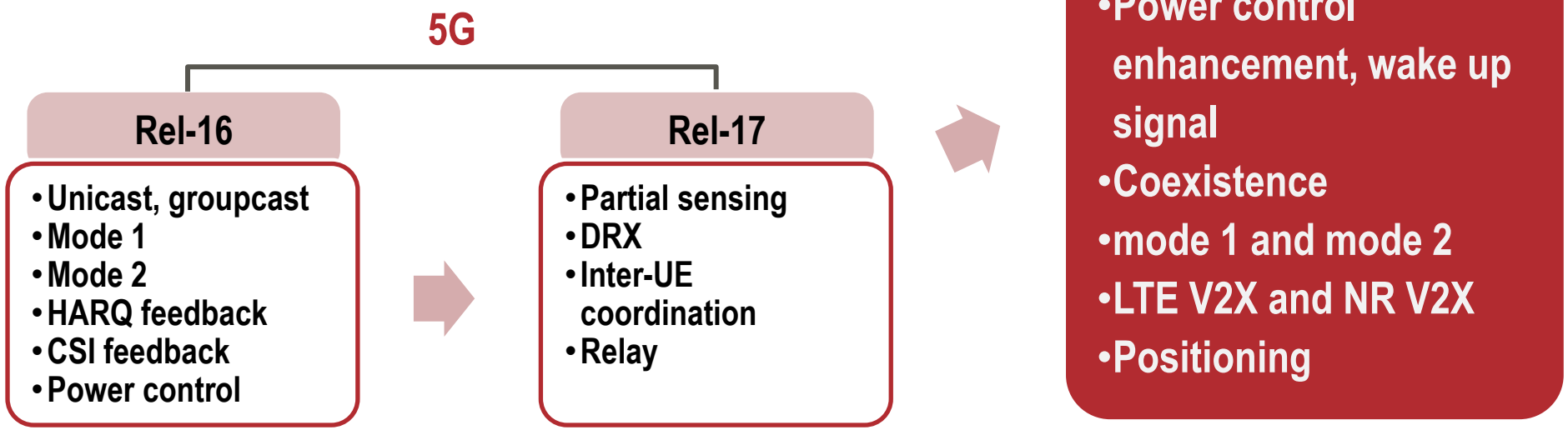
- **Rel-18 sidelink is expected to**
  - **Fulfill higher requirements.**
    - Some requirements in V2X cannot be met by existing Rel-16 and Rel-17 sidelink.
    - Some new requirements emerge with new services, e.g., XR.
  - **Include evolution of Rel-16 and Rel-17 sidelink.**
    - Remaining and critical issues will be handled.
- **The following topics are prioritized.**
  - SL unlicensed band (SL-U)
  - SL relay enhancement



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RAN1-Led Topic: SL-U (1/3)

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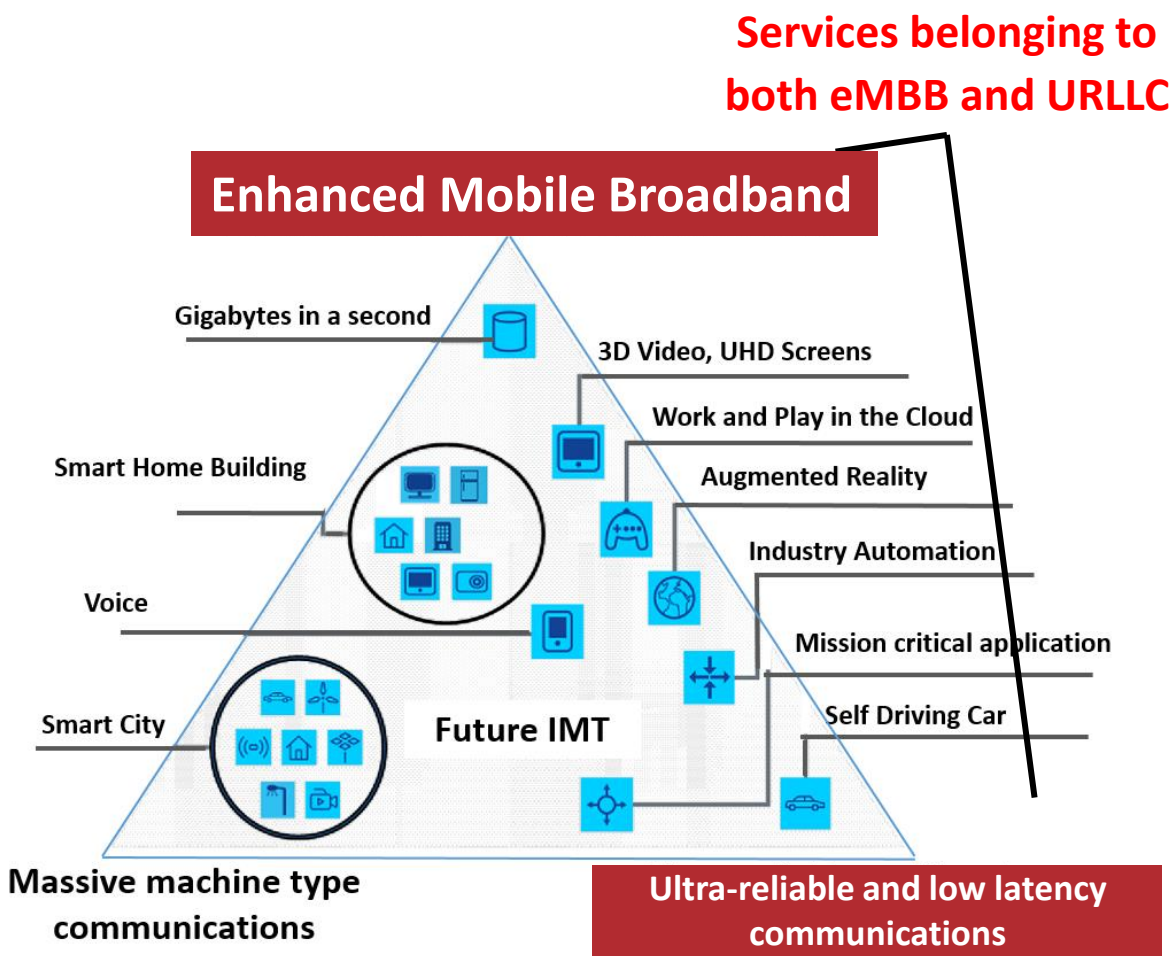
Motivation

- In legacy releases, a service belongs to one of eMBB, URLLC and mMTC.
- For sidelink, some advanced services such as high-demand V2X and XR require both high data rate and low latency. These services cover both eMBB and URLLC, and thus their requirements cannot be met by Rel-16 or Rel-17 sidelink.
- Wider bandwidth in unlicensed band can be utilized in sidelink to achieve high data rate and low latency simultaneously.



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RAN1-Led Topic: SL-U (2/3)

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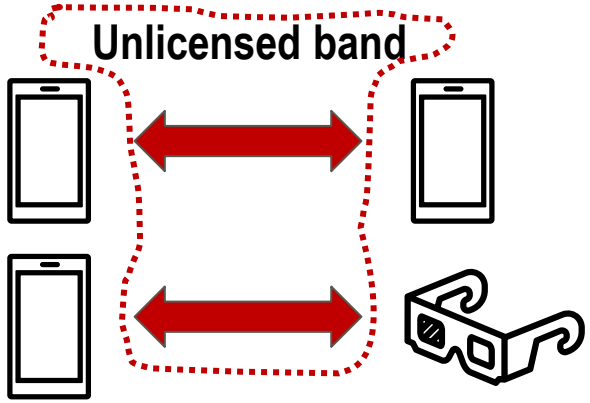
Use cases

- Unlicensed band for sidelink can be leveraged to enable sidelink use cases which require high data rate and low latency simultaneously.
  - V2X (sidelink for vehicle devices)
    - For V2X, some scenarios requiring high data rate and low latency cannot be well supported by Rel-16 V2X or Rel-17 sidelink, e.g., sensor information or video information sharing between V2X UEs.
  - Commercial use cases (sidelink for non-vehicle devices)
    - For commercial use cases, some scenarios require high data rate and low latency, e.g., XR gaming or real-time XR information sharing.

Vehicle to vehicle



Device to device

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RAN1-Led Topic: SL-U (3/3)

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- **Potential studies**
  - **SL-U (FR1 is prioritized)**
    - Channel access, e.g., LBT, COT.
    - Resource allocation, e.g., impact on existing mode 1 and mode 2.
    - Physical layer structure, e.g., non-slot with flexible starting position, potentially interlaced channels/signals.
    - Physical layer procedure, e.g., SL HARQ-ACK to cope with LBT failure.
    - Synchronization, e.g., S-SSB to cope with LBT failure.
    - Carrier aggregation, e.g., aggregating both licensed and unlicensed carriers.

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RAN2-Led Topic: SL Relay Enhancements (1/3)

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Motivation

- SL relay has been studied in Rel-17 sidelink. Due to time limit, the scope is only limited to UE-to-Network relay.
- In Rel-18, SL relay enhancements are expected to meet requirements for diverse use cases, e.g.
  - Further coverage extension and power saving for public safety.
  - High data rate for XR.
  - High reliability for IIoT.
  - Mobility enhancement for V2X and wearables.

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RAN2-Led Topic: SL Relay (2/3)

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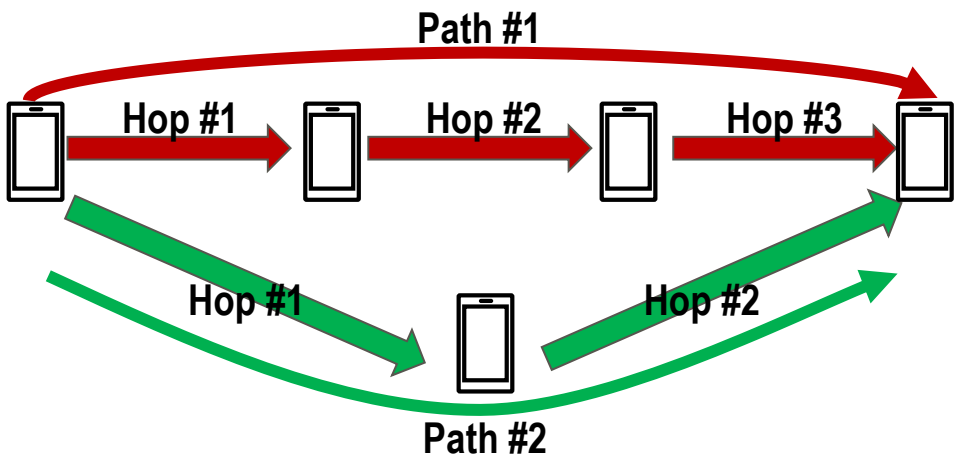
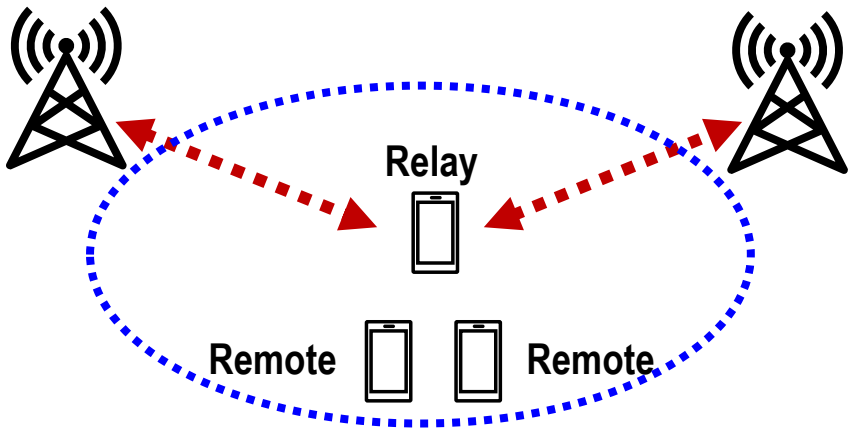
- **Use cases**
  - **Public safety**
    - Further coverage extension and power saving can be achieved by UE-to-UE relay, multi-hop relay.
  - **XR, IIoT**
    - High date rate for XR and high reliability for IIoT can be achieved by multi-path relay.
  - **V2X, wearables**
    - Mobility enhancement can be achieved based on group mobility which is beneficial for enhanced service-continuity.



UE-to-UE relay, multi-hop relay, multi-path relay



Group mobility in SL relay

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RAN2-Led Topic: SL Relay (3/3)

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- **Potential studies**
  - **SL relay enhancements**
    - **UE-to-UE relay**
      - **Adaptation layer design**
      - **QoS management**
      - **Relay discovery, selection and reselection**
      - **Control plane procedure, e.g., connection establishment/reconfiguration/release, SI, paging, mobility measurement configuration and reporting**
    - **Multi-hop support**
    - **Multi-path support**
      - **Relay UEs selection and reselection**
      - **Path setup, selection and aggregation**
    - **Group mobility**
      - **Signaling procedure for e.g intra-gNB and inter-gNB scenarios**
      - **Service continuity**

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Proposals (1/2)

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- For Rel-18 sidelink (RAN1-led), specify the following
  - SL-U (FR1 is prioritized)
    - Channel access, e.g., LBT, COT.
    - Resource allocation, e.g., impact on existing mode 1 and mode 2.
    - Physical layer structure, e.g., non-slot with flexible starting position, potentially interlaced channels/signals.
    - Physical layer procedure, e.g., SL HARQ-ACK to cope with LBT failure.
    - Synchronization, e.g., S-SSB to cope with LBT failure.
    - Carrier aggregation, e.g., aggregating both licensed and unlicensed carriers.

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Proposals (2/2)

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- For Rel-18 sidelink (RAN2-led), specify the following
  - SL relay enhancements
    - UE-to-UE relay
      - Adaptation layer design.
      - QoS management.
      - Relay discovery, selection and reselection.
      - Control plane procedure, e.g., connection establishment/reconfiguration/release, SI, paging, mobility measurement configuration and reporting.
    - Multi-hop support
    - Multi-path support
      - Relay UEs selection and reselection.
      - Path setup, selection and aggregation.
    - Group mobility
      - Signaling procedures, e.g., for intra-gNB and inter-gNB scenarios.
      - Service continuity.

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