3GPP TSG RAN Rel-18 workshop
Electronic Meeting, June 28 - July 2, 2021
Agenda Item: 4.2

RWS-210005

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On V2X Evolution

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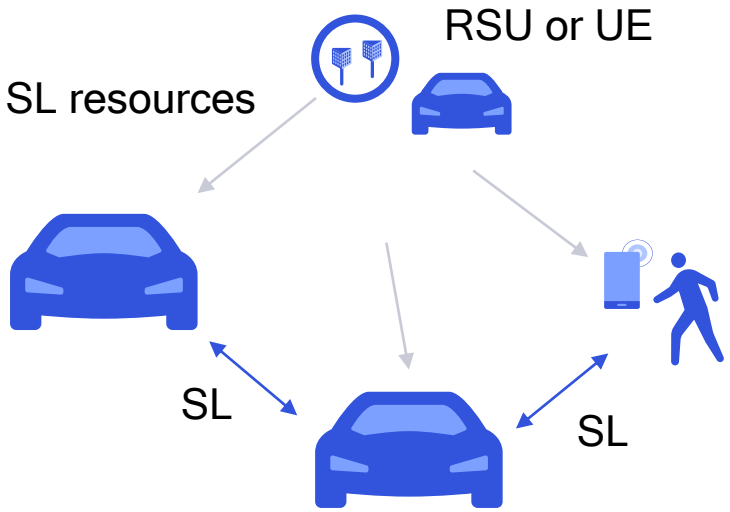
V2X Evolution

Areas for Rel-18 work to enable applications requiring higher throughput and reliability.

- NR-LTE V2X Co-Channel Coexistence [1]
  - Maximizes deployment flexibility and enables new technology migration paths
- SL Positioning [2]
  - Enables precise location even in Out of Coverage Scenarios
- UE Scheduling another UE over Sidelink
  - Improves PRR in congested areas for out of coverage UEs and UEs without Uu.
  - Includes leader selection and reselection, group management, and scheduling mechanism
- Carrier Aggregation (multi-carrier)
  - Enables improved performance where V2X spectrum is fragmented, e.g., the European Union.
  - Support contiguous and non-contiguous carriers across multiple bands with capability exchange for unicast connections
- UE to UE Relay
  - Enhance Rel-17 UE-to-UE relay to support relaying for connection-less traffic
  - Network coding retransmission support by relay UE

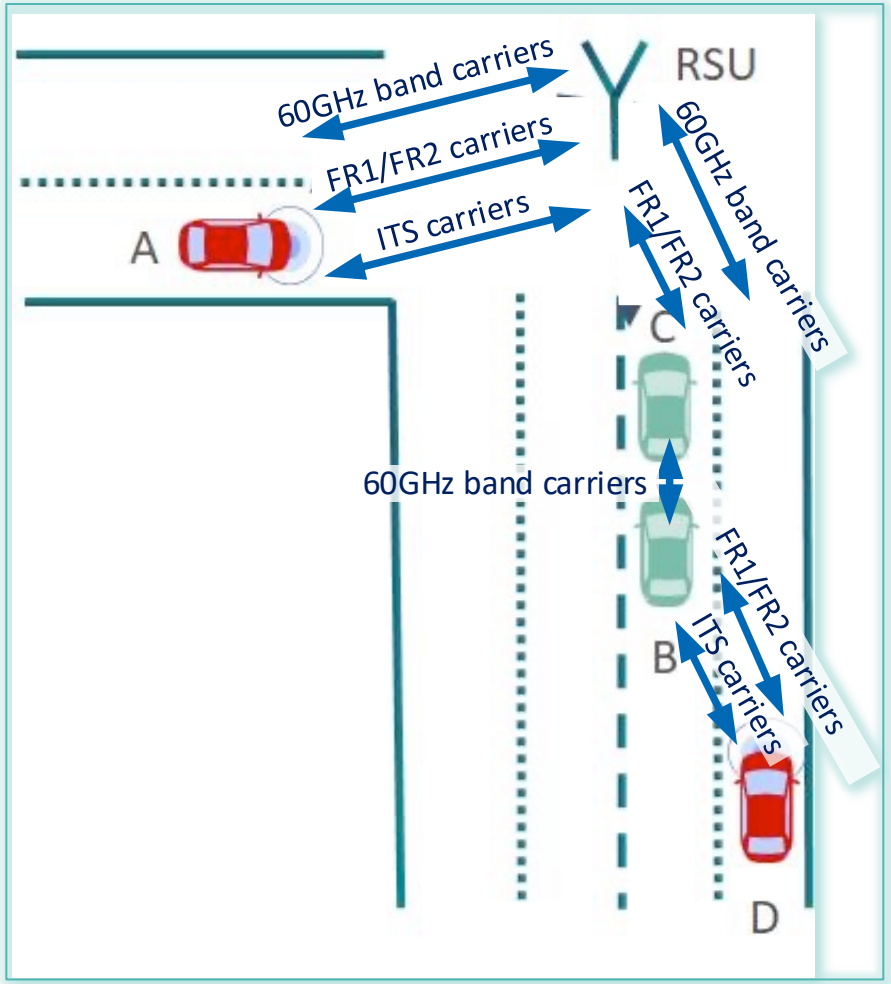
UE Scheduling Another UE over Sidelink

- Use Cases
  - RSU managing communications at an intersection.
  - Designated UE, for example a group leader.
  - The receiver UE scheduling transmissions.
- Scheduling over sidelink compared to Mode 1 enables benefits even in out of coverage scenarios and for UEs that do not have a Uu interface.
  - Improves system reliability by reducing collisions caused by half-duplex and hidden nodes.
  - Reduces power consumption of UEs that no longer perform sensing.
- Scope
  - Leader selection and reselection
  - Group management
  - Scheduling mechanism



Sidelink Carrier Aggregation (SL CA) for V2X

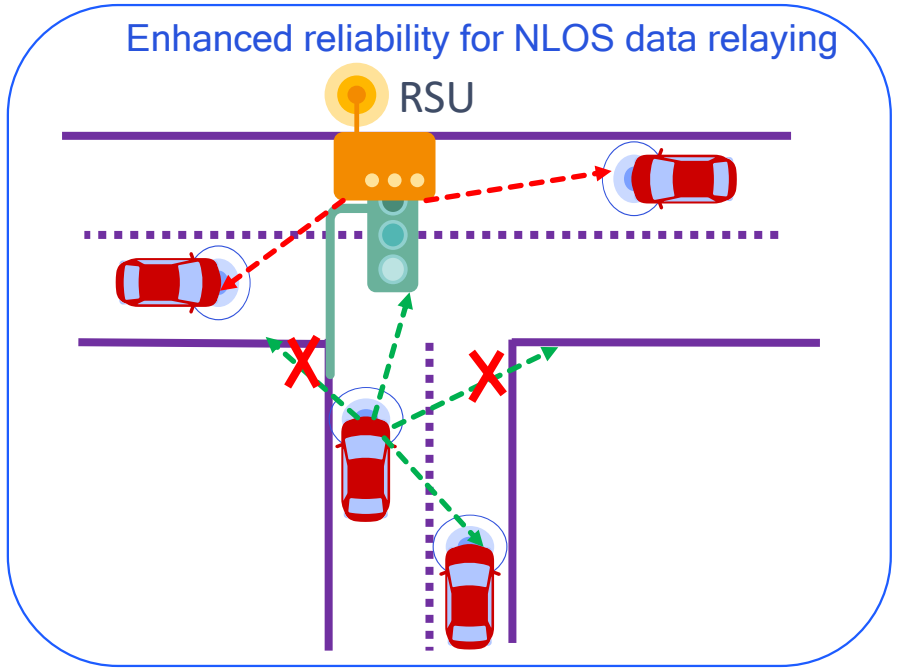
- **Motivation**
  - SL CA is supported for LTE V2X, but is currently missing in NR V2X.
  - This will allow improved performance in regions where V2X spectrum is fragmented, e.g., the European Union and where there may be different channels for NR V2X in ITS spectrum
    - In Europe, ITS spectrum may end up being with a 20MHz channelization. In order to have the capability to deploy NR V2X over 40MHz, multi-carrier capabilities may be required
  - For advanced V2X services, more carriers are needed for higher data rate services, such as raw sensor data sharing.
- **Scope**
  - Enable carrier aggregation for V2X services on contiguous and non-contiguous carriers that may span multiple bands
  - (Pre-)configured mapping from application to carrier
  - Capability exchange for unicast connections



Sidelink UE-to-UE relay evolution

Extending UE-to-UE relay for advanced V2X use cases

- **Motivation**
  - NLOS vehicles may experience blockage
  - RSU at an intersection can provide relaying to enhance reliability for cars NLOS to each other
  - RSU may use network coding to improve resource utilization in high reliability eV2X scenarios
- **Scope**
  - Enhance Rel-17 UE-to-UE relay to support relaying for connection-less traffic
    - Selective relaying based on Zone or direction or other metrics
  - Network coding retransmission support by relay UE



References

- [1] RWS-210008: On Sidelink positioning
- [2] RWS-210006: On NR-LTE V2X Co-Channel Coexistence Perspectives for Release 18

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