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Sidelink Enhancements for Rel-18

RAN Rel-18 Workshop

28th June – 2nd July 2021

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Sidelink relay enhancements

Motivation:

- SL relay can provide low-cost network coverage enhancements and when combined with multi-hop relay can enable massive IoT use cases in more power efficient way.
- In Rel. 17 SL relay WI, the scope was to specify a workable L2 and L3 sidelink relay solution, and therefore the priority was put on specifying basic features of UE-to-NW relays.
- However, relay functionality such as UE-to-UE, an essential feature for public safety and key functional element for multi-hop, has been deprioritized from the Rel. 17 SL relay WI.
- For Rel.18, UE-to-UE and multi-hop SL relaying should be in scope of sidelink relay enhancements in addition to enhancement of UE-to-NW relay.

Objectives:

- Enhancement of relay Link management
  - Relay discovery and selection
  - Access control for multi-hops
  - Link establishment and configuration based on QoS
  - Resource allocation for relay discovery and communication
- Enhancement on mobility and service continuity during
  - Path-switch between PC5 and Uu
  - Re-selection of relays
  - Joint handover of relay and remote UE

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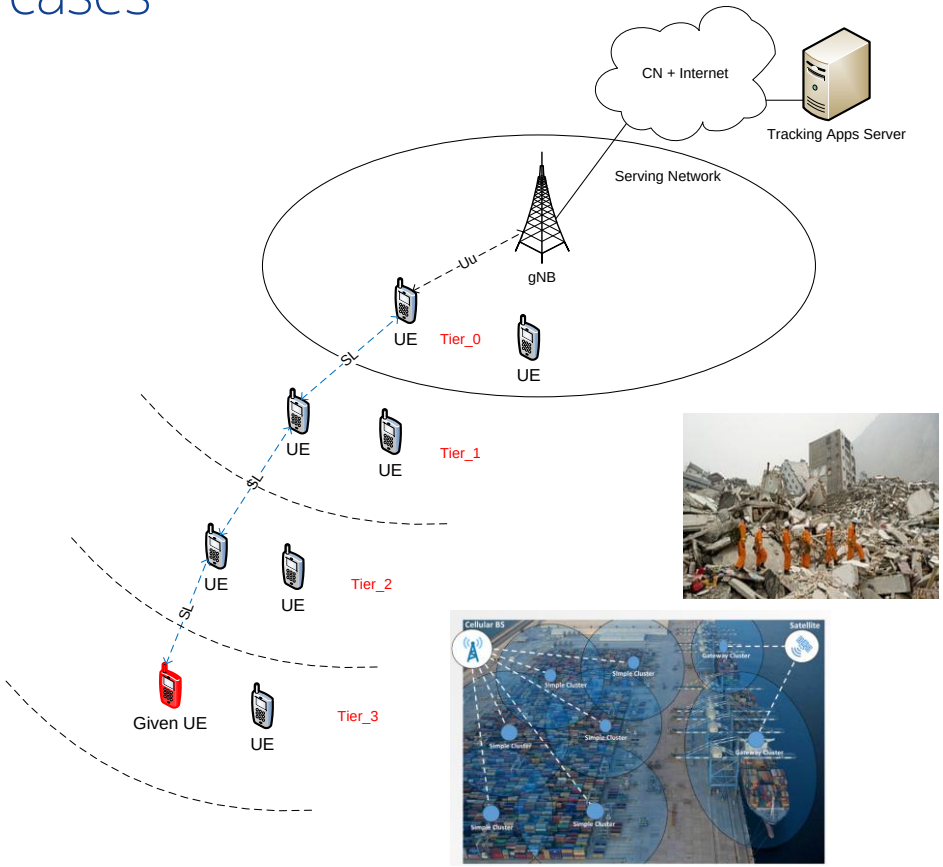
Sidelink relay enhancements: Use cases

Support of tracking applications in industrial logistic management or public safety to enable fast, scalable, energy and cost-efficient solution.

Thus, simple and effective solution which produces, minimized protocol overhead and therefore power consumption to UEs in the first place is the key enabler



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Sidelink unlicensed enhancements

Motivation:

- There is an increasing number of use cases that benefit from direct information exchange between terminals in proximity of each other
  - E.g. in-vehicle communications, wearables, AR/VR, smart home, IIoT, public safety, distributed AI, edge intelligence.
- The amount of bandwidth required can range from a few kbit/s (e.g. IoT use cases) all the way to a few Gbit/s (e.g. AR/VR use cases).
- The use of licensed spectrum for sidelink communications will impact Uu capacity, therefore it is desirable that sidelink communications can take place over unlicensed spectrum.
- This will allow sidelink communication to take advantage of the bandwidth available in unlicensed bands to enable higher throughput and more reliable SL communication through time and frequency diversity.

Objectives:

- Enhancement in the SL physical layer and resource allocation procedures design to support coexistence with other systems in unlicensed bands (e.g. via LBT and other coexistence mechanisms)
- Enhancement of the PHY and MAC layer procedures such as synchronization, HARQ and CSI feedback.
- Enhancement of the SL wireless communication architecture to enable the combined use of licensed and unlicensed carriers (e.g. control plane in licensed and user plane in unlicensed)

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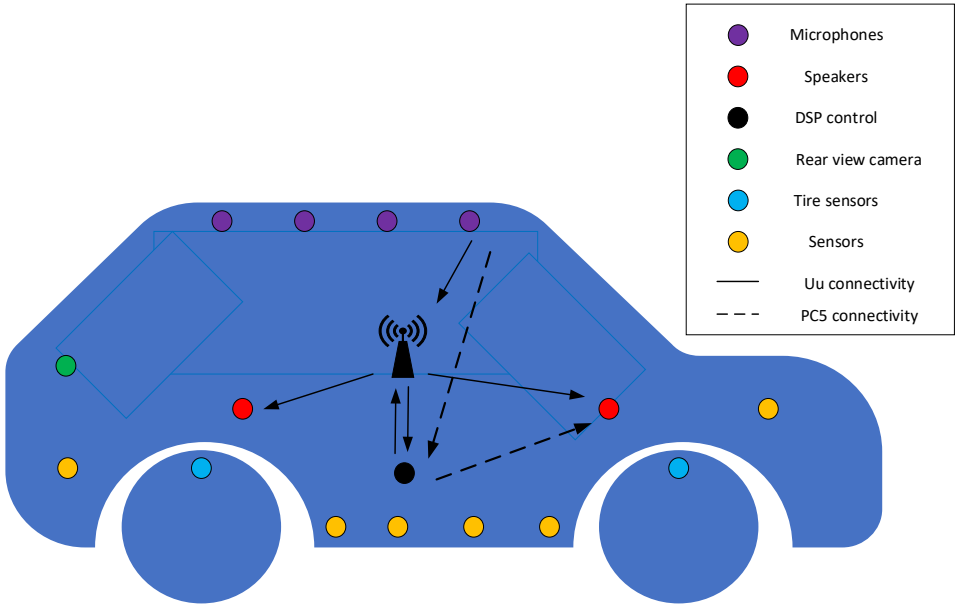
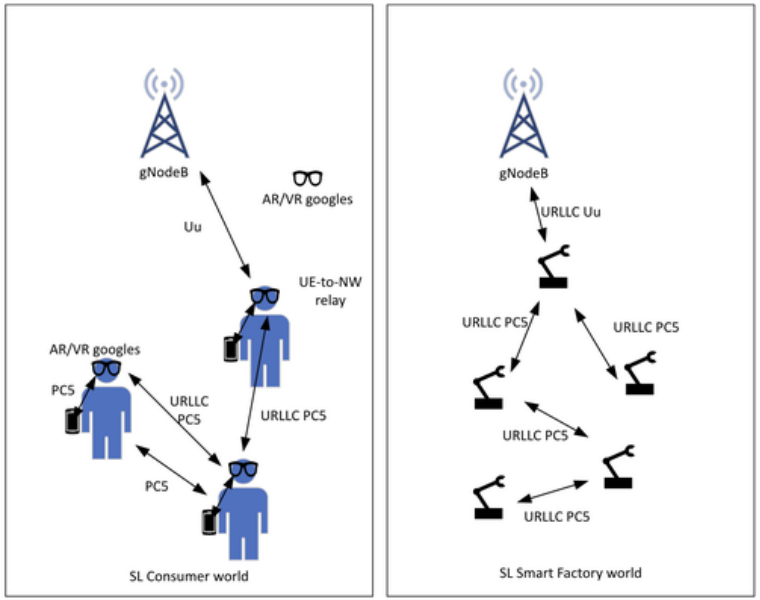
Sidelink unlicensed enhancements: Use cases



In-vehicle communications can benefit from sidelink communications in unlicensed spectrum



Examples of commercial and industrial use cases that can take advantage of unlicensed spectrum sidelink operation

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Sidelink additional enhancements

- Additional power saving sidelink features, e.g. such as wake up and go to sleep signals as the enhancement of the SL DRX mechanism
- Leftover of Rel.17 inter-UE coordination enhancements, e.g. to increase reliability of inter-UE coordination messages
- Enhancements for FR2 operation, e.g. beam management

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