China Academy of Telecommunication Technology

3GPP TSG RAN Meeting #94-e
Electronic Meeting, December 6th - 17th , 2021

RP-213310

On scope of Rel-18 further enhancements for NR Sidelink

China Academy of Telecommunications Technology (CATT)

Rel-18 SL Enhancement

Motivations

Higher data rate and better reliability

- Higher throughput and reliability requirement for advanced V2X applications
- Solution for limited or fragmented dedicated spectrum

FR2 enhancement

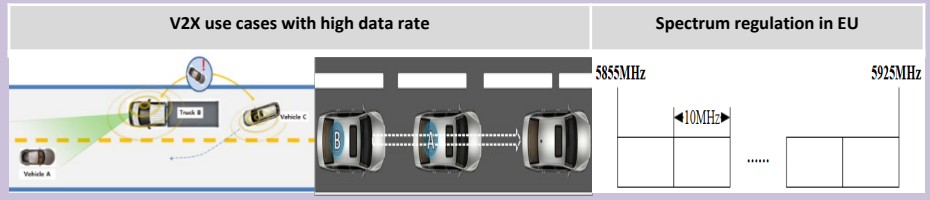
- Higher throughput and reliability requirement for advanced V2X applications
- Lack of beam management enhancement

Co-existence between LTE-V2X and NR-V2X

- Spectrum regulation in certain region: 20MHz(Basic safety V2X service)+10MHz

Main topics

Multi-carrier operation



- Multi-carrier operation in FR1, e.g., carrier aggregation/carrier selection, and PDCP duplication
- Multi-carrier operation in FR1+FR2 after completion of FR2 related enhancement

FR2 enhancement

- Potential operation scenario
- Sidelink beam management enhancement and multi-panel selection support

Co-existence between LTE-V2X and NR-V2X

- Alt 1: semi-static sharing between LTE-V2X and NR-V2X, e.g. by separate resource pool.
- Alt 2: dynamic sharing between LTE-V2X and NR-V2X
  - Feasibility should be justified, considering the impacts on LTE-V2X performance degradation.

Analysis of workload for the proposed WID

- Comparison of Rel-17 WID and Rel-18 (proposed) WID
  - Main components of Rel-17 sidelink :
    - Resource allocation enhancement (workload 1 unit)
      - Specify resource allocation to reduce power consumption of the UEs [RAN1, RAN2]
    - Study the feasibility and benefit of the enhancement(s) in mode 2 for enhanced reliability and reduced latency in consideration of both PRR and PIR defined in TR37.885 (by RAN#89), and specify the identified solution if deemed feasible and beneficial [RAN1, RAN2] (workload 1unit)
    - Total estimated workload : 2unit
  - Main components of proposed Rel-18 sidelink :
    - Specify mechanism to support NR sidelink CA operation based on LTE sidelink CA operation [RAN2, RAN1, RAN4] (workload 1unit)
    - Study the support of sidelink on unlicensed spectrum for both mode 1 and mode 2 where Uu operation for mode 1 is limited to licensed spectrum only [RAN1, RAN2, RAN4] (workload 2unit)
      - Evaluation methodology for sidelink operation on unlicensed spectrum
      - Sidelink channel access mechanism for unlicensed spectrum based on regional regulation requirement and use the existing channel success schemes from NR-U as a starting point
    - Study enhanced sidelink operation on FR2 licensed spectrum [RAN1, RAN2, RAN4] (workload 1unit)
    - Study mechanism(s) to enable co-channel coexistence for LTE sidelink and NR sidelink including performance, necessity, feasibility, and potential specification impact if any [RAN1, RAN2, RAN4] (workload 1unit)
    - Total estimated workload : 5unit

Analysis of workload for the proposed WID

- Observations from the comparison:
  - The proposed Rel-18 WID requires 2.5X total workload as compare to Rel-17 WID
  - The proposed TU requested for Rel-18 Sidelink is only 1.5X as compare to the TU allocated for Rel-17 WID
  - Rel-17 Sidelink WID requires at least two extra meeting on top of the requested time allocation
- Proposals:
  - Further scope reduction is necessary.
  - Based on the feedback from the pre-RAN94e email discussion, the following item in the proposed WID should be postponed:
    - Study the support of sidelink on unlicensed spectrum for both mode 1 and mode 2

Proposed changes to objectives of study for SL-U

- Study the support of sidelink on unlicensed spectrum for both mode 1 and mode 2 where Uu operation for mode 1 is limited to licensed spectrum only [RAN1, RAN2, RAN4]
  - Evaluation methodology for sidelink operation on unlicensed spectrum
    - Reusing relevant parts from TR 36.843, TR 37.885, TR 38.840 and TR 38.889
  - Sidelink channel access mechanism for unlicensed spectrum based on regional regulation requirement ~~and use the existing channel success schemes from NR-U as a starting point~~
    - Study necessary changes for existing channel access scheme from NR-U
    - Reuse Rel-16 resource allocation mechanism as much as possible
  - Study required changes to NR sidelink physical channel structures and procedures to operate on unlicensed spectrum
    - No specific optimizations for existing NR SL feature
  - Frequency bands for the unlicensed spectrum in FR1 are 5GHz and 6GHz
  - No specific optimizations for FR2 unlicensed spectrum

THANK YOU