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3GPP TSG RAN meeting #93e
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Views on NR Sidelink enhancements for Rel-18

Background

Moderator's Summary for the email discussion [RAN93e-R18Prep-06] – for SL enhancements

- It is recommended to consider the following as the first candidate topics (non-controversial):
  - "Sidelink carrier aggregation"
    - − Include at least aggregating licensed/ITS carriers in FR1 (intra-band and inter-band). ○
      - Continue discussion on whether/how to handle other carriers (unlicensed and FR2)
    - − Rel-15 LTE sidelink carrier aggregation (including packet duplication) is the baseline. Continue discussion on the detailed work scope, e.g., whether to introduce new features not specified in Rel-15, etc.
    - − Leading WG: RAN1, Secondary WGs: RAN2, RAN4
    - − SA/CT impacts: TBD
  - "Sidelink in FR1 unlicensed band and/or FR2 licensed band"
    - − Decide later (during or after RAN#93e) which option(s) to support as the enabler of wide sidelink bandwidth ○
      - Option 1: Support of sidelink communication in unlicensed band for FR1 ▪ Continue discussion if the operation scenario can be limited in Rel-18, e.g., unlicensed stand-alone operation / LAA, Mode 1 / Mode 2, etc. ▪ Continue discussion on the detailed work scope, e.g., channel access, modification of SL resource allocation, new PHY structure, updates to PHY/MAC procedure like HARQ/CSI/power control, COT sharing, etc. ○
      - Option 2: Enhancements of sidelink communication in licensed band for FR2 ▪ Continue discussion if the operation scenario can be limited in Rel-18, e.g., NSA only or SA only, etc.
      - Continue discussion on the detailed work scope, e.g., sidelink beam management, FR1-assisted operation, CSI enhancement, multiple panels, sensing for beam monitoring, etc. ○
      - Leading WG: RAN1, Secondary WGs: RAN2, RAN4 ○
      - No SA/CT impacts are expected.

- It is recommended to continue discussion on whether to include the following in the candidate topics (controversial):
  - "Enhancements for sidelink power saving"
    - − Base the discussion on the assessment on the workload of the topics in the first set.
    - − Identify manageable potential solutions starting from those discussed in this thread such as UE-scheduling another UE (may also improve reliability and efficiency), enhancements to address new Rel-18 features (e.g., SL CA), WUS, flexible BW/BWP, PA-less/VLP devices, PSFCH power saving, groupcast power saving, reduction of TB transmission time, etc.
  - "Co-channel coexistence of LTE sidelink and NR sidelink"
    - − Discuss whether to include a feasibility study on the two alternatives discussed in this thread.
      - Alt 1: Resource pool separation between the two RATs ○
      - Alt 2: Dynamic resource sharing using overlapping resource pools between the two RATs.
      - This alternative should be considered under the Rel-16 in-device coexistence framework

Qualcomm's view on the essential areas for Rel-18

- For Co-channel/Co-existence of LTE Sidelink and NR Sidelink:
  - This has been pointed out by 5GAA as one of the most important topics for automotive industry [#2 out of 8 in 5GAA input ref RWS-210360] .
  - 3GPP Rel-18 package should aim at satisfying "tangible commercial interests", and therefore the MRP and operator inputs should be considered carefully.
  - Automotive industry is the early adopter of the Sidelink technology, and the only one with deployed commercial products. Thus, supporting the automotive industry's needs is essential for 3GPP.

  - We agree that the study could start with some analysis of the two alternatives (Alt 1 and Alt 2) listed and decide what is to be done in Rel-18. If workload is a concern, it can be decided later whether normative work is to be done in Rel-19.
    - We believe that a dynamic mechanism (i.e., Alt 2) is required, because static resource pool separation is not sufficient to resolve the issue, as the LTE V2X configuration will use all available ITS spectrum.
    - A dynamic mechanism is important for the V2X evolution, service migration and spectrum reuse, as indicated by multiple companies.
    - Even though the spectrum allocation status can be region specific, the issue identified for LTE V2X and NR V2X to operate co-channel is valid in several regions. Therefore, a standardized solution is required.
    - There is no change required to the LTE V2X specification. Some companies are assuming certain solutions, e.g. LTE decodes NR SCI and vice versa, which may not be required for the co-existence operation. It should be clarified that the goal is to avoid impacts to LTE V2X specification.
    - Scope can be limited to 5.9 GHz ITS bands for Rel-18.

Qualcomm’s view on the essential areas for Rel-18

- For “Sidelink in FR1 unlicensed band and/or FR2 licensed band”
  - It is not necessary to put the two options against each other before we understand the acceptable scope for each of them. Further, we should also consider the unlicensed bands in FR2-2 (e.g., 60GHz). Therefore, we believe that the topic name should be changed to “Sidelink in FR2 licensed band and in unlicensed bands (both FR1 and FR2)”

Qualcomm’s view on the essential areas for Rel-18

- For “Enhancements for sidelink power saving”
  - We suggest to consider power saving schemes only for unicast.
  - We believe that it is important to study at least the WUS/GTS, and flexible BW aspects.
    - Rel-17 DRX design still requires UE to wake up for the whole ON period even if there is no traffic.
    - This cannot meet the power saving needs of wearables or IoT devices.
    - Therefore, it has to be further enhanced to address these important markets.
- Along the same lines, we suggest to also consider RedCap UE support
  - This includes the 5MHz channelization
  - Support of different UE capabilities over Sidelink

Qualcomm’s view on the essential areas for Rel-18

- Additionally, we believe that the following also needs to be addressed in Rel-18:
  - Reliability enhancements for mode 1 and mode 2 beyond Rel-17
    - CSI enhancements (wideband CSI, report to gNB)
  - Periodic/low-latency/reliable traffic optimizations over SL (for IIoT applications)
  - MIMO enhancements – allowing more than 2 layers for efficiency enhancement (higher throughput)

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