

Views on NR Sidelink Enhancements for Rel-18



Background (1)

Moderator's Summary for the email discussion [RAN94e-R18Prep-04] – for SL enhancements

- **Proposal 3:** Specify mechanism to support NR sidelink CA operation based on LTE sidelink CA operation [RAN2, RAN1, RAN4]
 - Prioritize supporting LTE sidelink CA features for NR (i.e. SL carrier (re-)selection, synchronization of aggregated carriers, handling the limited capability, power control for simultaneous sidelink TX, packet duplication)
 - At least for FR1 licensed spectrum and ITS band
 - Whether or not to support sidelink CA for FR2 and/or unlicensed band is to be decided in RAN#98 after the relevant studies are done
 - This feature is backwards compatible in the following regards
 - Rel-16 UEs can receive Rel-18 sidelink broadcast/groupcast transmissions with CA for the carriers on which they receive and transmit the corresponding sidelink HARQ feedback.
 - Assuming this sidelink functionality would co-exist in the same resource pools as Rel-16/Rel-17 functionalities (e.g., no changes to reservations in SCI, etc.)
- **Proposal 4:** 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
 - 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
 - Reuse Rel-16 resource allocation mechanism as much as possible
 - 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
 - RAN to determine in RAN#98 whether or not there is to be specification support in Rel-18 and if there is specification support, the scope of the work.

Background (2)

Moderator's Summary for the email discussion [RAN94e-R18Prep-04] – for SL enhancements

- **Proposal 5:** Study enhanced sidelink operation on FR2 licensed spectrum [RAN1, RAN2, RAN4]
 - Work is limited to the support of sidelink beam management (including initial beam-pairing, beam maintenance, and beam failure recovery) by enhancing existing sidelink CSI framework and reusing Uu beam management concepts wherever possible.
 - RAN to determine in RAN#98 whether or not there is to be specification support in Rel-18 and if there is specification support, the scope of the work.
- **Proposal 6:** 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]
 - Reuse the in-device coexistence framework defined in Rel-16 as much as possible
 - RAN to determine in RAN#98 whether or not there is to be specification support in Rel-18 and if there is specification support, the scope of the work.

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

- For Proposal 6 on 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.
- Dynamic coexistence addresses co-existence in ways that semi-static coexistence mechanism cannot:
 - Pre-configuration is already defined for existing LTE V2X (e.g. SAE J3161) and cannot be changed to adopt semi-static coexistence and support NR SL in the same channel. Dynamic coexistence does not require changes to LTE SL pre-configuration.
 - Dynamic coexistence provides the ability to gradually transition spectrum use from LTE SL to NR SL as more device become NR SL capable to benefit from NR SL enhanced reliability and efficiency. This is not possible using semi-static coexistence since pre-configuration cannot be changed once set.
- Existing in-device coexistence works by dropping transmission or reception of overlapping packets, dynamic coexistence can try to avoid the overlap in the first place.
 - Dynamic coexistence can be implemented, at the most basic level, by reporting information from the LTE SL module to the NR SL module, like Rel-16 in-device coexistence.

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

- For Proposal 5 on enhanced sidelink operation on FR2 licensed spectrum
 - For efficient FR2 sidelink operation, sidelink beam management should include initial beam-pairing, beam maintenance, and beam failure recovery.
 - The above includes, but is not limited to, enhancing the existing sidelink CSI framework.

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

- For Proposal 4 on sidelink on unlicensed spectrum
 - Support of sidelink over FR2 unlicensed spectrum is very important to achieve the requirements set by some very high data rate sidelink applications.
 - Many aspects of these could be common for both FR2-1 and FR2-2 operation and should be leveraged to the extent possible existing Uu mechanisms for the same.

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

- For Proposal 3 on sidelink carrier aggregation
 - While SL CA is an important Rel-18 objective, we view LTE/NR SL coexistence, SL over FR2, and SL over unlicensed FR1 and FR2 as higher priority objectives based on commercial interest and industry input.
 - To manage WG workload, SL CA should only comprise a work phase, without a study phase, that starts with the other objectives' work phases.



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