5GAA input to 3GPP Rel. 18 Workshop
Introduction

• 5GAA, the 5G automotive association, appreciates the opportunity to provide guidance to 3GPP on the important features for Rel-18 evolution.

• Scope of 5GAA is focused on bringing connectivity solutions to market addressing technical, business, and regulatory challenges including technology, standards, spectrum, policy & regulations, testing, business models & go-to-market.

• It is important to note that C-V2X is in development in different countries, with several milestones in the US and active deployment in China.
• 5GAA member companies submitted proposals for new features and requirements as input to 3GPP Rel.18 workshop

• Via a survey, 5GAA companies:
  • Rated the listed proposals in terms of priority
    (Score: 1 = Very low priority – 3 = neutral – 5 = Very high priority)
  • Rated sub-topics of each proposal in terms of relevance
    (Score: 1 = not at all relevant – 3 = neutral – 5 = Extremely relevant)

• The survey results were consolidated and provided in their entirety, in a decreasing order according to the final ranking

• The input is aligned amongst all sectors of 5GAA membership: Automotive OEM, Automotive suppliers, MNO, MNO suppliers
## 5GAA list of proposals according to priority ranking

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1. Positioning enhancements

• Motivation
  • Advanced use cases require high level positioning accuracy and precision
  • Advanced use cases include basic and advanced VRU protection, automated driving, teleoperated driving, dynamic intersection management, group start, etc.

• Sub-topics
  • Introduce mechanisms to enhance the positioning accuracy, regardless of the network coverage scenarios, i.e. in-coverage, partial coverage and out-of-coverage.
  • For in-coverage scenarios, support a combined Uu and sidelink positioning mode.
  • Include positioning enhancements for vehicular Distributed Antenna Systems (DAS) UE.
  • To support positioning in unlicensed spectrum, thus avoiding any impact to existing V2X deployments.
2. LTE/NR-V2X sidelink co-channel coexistence

• Motivation
  • Dedicated V2X spectrum is scarce in some regions and LTE/NR-V2X need to co-exist even in the same channel
  • Important across all basic and advanced use cases
  • Improves overall system performance, increases deployment flexibility, enables technology migration path from IEEE technology

• Sub-topics
  • Introduce mechanisms for LTE/NR-V2X co-channel coexistence.
  • Introduce mechanisms for LTE/NR-V2X co-channel coexistence taking into account existing NR-V2X Rel-16/17 solutions.
3. Sidelink carrier aggregation (CA)

• Motivation
  • Some advanced use cases require high data-rate and/or increased reliability
  • In some regions V2X spectrum is fragmented
  • Examples: High-definition sensor sharing, see through for passing,

• Sub-topics
  • Introduce mechanism to support NR-V2X intra-band non-contiguous CA.
  • Introduce mechanism to support NR-V2X intra-band contiguous CA.
  • Introduce mechanism to support NR-V2X inter-band CA FR1 + FR1. (e.g. combinations of ITS Band / Unlicensed / Licensed)
4. Enhancements to sidelink power saving

• Motivation
  • Some specific advanced use cases require modes of operation and/or UEs with diverse capabilities
  • This includes, for example,
    • reliable and sustainable operation of Automated Valet Parking (AVP), to allow maneuver and authentication of requested/activated vehicles,
    • support the various types of VRU equipment and scenarios, e.g. use of on-board modem for e-Bike and micro-mobility also in battery charge mode

• Sub-topics
  • Further enhancements to sidelink power saving (e.g. Wake-up, go-to-sleep, adaptive DRX, etc.)
  • Introduce UE reduced capabilities with sidelink.
  • Introduce configurable UE sidelink power saving capabilities, e.g. different VRU types.
5. Predictive QoS

• Motivation
  • Advanced use cases will benefit from improved predictive QoS, including their safety enhancement goals
  • Current and future QoS information such as latency, for example, is essential for safe and high quality teleoperated driving

• Sub-topics
  • Introduce more accurate sidelink and Uu Reporting.
  • Improve E2E reporting e.g. signalling based latency, fine granular reporting.
  • Introduce sidelink report equivalent information as MBB-UE (Mobile Broadband UE) in terms of MDT (Minimization of Drive Test) and NR QoE (Quality-of-Experience).
6. UE-to-UE relay

• Motivation
  • In some environments, e.g. urban, NLOS create challenges to meet the reliability requirements of some V2X use cases.
  • For example, RSUs in intersection may serve as a relay to vehicles in challenging NLOS situations.

• Sub-topic
  • Introduce the definition of UE-to-UE Relay for V2X operation.
7. NR-V2X sidelink adjacent-channel coexistence with non-3GPP technologies

• Motivation
  • V2X spectrum is scarce in some regions and non-3GPP technology is already deployed in some of the available channels

• Sub-topic
  • Introduce mechanism for adjacent-channel coexistence of NR-V2X with other ITS technologies.
  • Introduce mechanism for adjacent-channel coexistence of NR-V2X with non-3GPP ITS technologies also to existing NR-V2X Rel-16/17 by implementing corresponding CRs or by allowing early implementations.
8. Enhancements for vehicular Distributed Antenna System (DAS) UE transmission

• Motivation
  • Advanced use cases operating in sidelink unicast mode and also via Uu will benefit of enhanced vehicular DAS UE transmission due to the improved signal quality
  • This includes HD sensor sharing for AVs, group start, coordinated, cooperative driving manoeuvre, etc.

• Sub-topic
  • Include enhancements for vehicular DAS UE. E.g. sending the SL/UL signal/channel only from the antenna panel achieving the best performance for the target receiver