3GPP TSG-RAN WG2 Meeting #118-e R2- 220xxxx

Online, May, 2022

Agenda: 6.7.3

Source: ZTE

Title: Summary of [AT118-e][618][Relay] 37985 relay TP (ZTE)

Document for: Discussion, Decision

# 1 Introduction

This document captures the following email discussion:

 **[AT118-e][618][Relay] 37985 relay TP (ZTE)**

      Scope: Evaluate the TP in R2-2204800 and produce an endorsable version.

      Intended outcome: Endorsed TP and approved LS to RAN1 (without CBs)

      Deadline:  Wednesday 2022-05-18 0400 UTC

# Discussion

According to the justification part of R17 and R18 NR sidelink relay WID, the sidelink relay can be applied to wider range of applications and services, including V2X, public safety and commercial applications and services, which is copied as follows:

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| **New WID on NR Sidelink Relay (RP-210904)**  For Release 16, a first version of NR sidelink has been developed and it solely focused on supporting V2X related road safety services. The design aims to provide support for broadcast, groupcast and unicast communications in both out-of-coverage and in-network coverage scenarios. On top of that, sidelink-based relaying functionality was additionally studied in order for sidelink/network coverage extension and power efficiency improvement, considering wider range of applications and services.  **New WID on NR sidelink relay enhancements**(RP-213585)  3GPP RAN approved a study item “Study on NR Sidelink Relay” in Rel-17 in order to cover the enhancements and solutions necessary to support the UE-to-network Relay and UE-to-UE Relay coverage extension, considering wider range of including V2X, Public Safety and commercial applications and services. The study outcome was documented in 3GPP TR 38.836, and it contains potential technical solutions for the sidelink relay with a conclusion that both Layer-2 based Relay architecture and Layer-3 based Relay architecture are feasible and a recommendation for their normative work. However, the follow-up Rel-17 work item “NR Sidelink Relay” included only limited features due to the lack of time. In particular, it supports only UE-to-Network relay and its service continuity solution is limited to intra-gNB direct-to-indirect and indirect-to-direct path switching in Layer-2 relay.  A study item for ProSe phase 2 is approved in SA in order to investigate further 5G system enhancements to support Proximity Services in Rel-18. RAN-side enhancements for sidelink relay is necessary in accordance with the SA work.  For better support of the use cases requiring sidelink relay, further enhancements are necessary in order to introduce the potential solutions identified during the Rel-17 study item. To be specific, support of UE-to-UE relay is essential for the sidelink coverage extension without relying on the use of uplink and downlink. Service continuity enhancements in UE-to-Network relay are also necessary in order to cover the mobility scenarios not supported in the Rel-17 WI. |

On the other hand, the TR37.985 captures the overall description of RAN aspects for Vehicle-to-everything (V2X) based on LTE and NR. The scope of the TR 37.985 is copied as follows:

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| The present document provides an overall description of the features introduced by 3GPP to LTE and NR in support of V2X services, starting from Rel-14. The purpose of this TR is to give an overview across the RAN specifications of how the features have been designed, and how they operate together. This document addresses LTE V2X and NR V2X via both sidelink, i.e. the PC5 interfaces, and via the cellular uplink/downlink, i.e. the Uu interfaces. It covers V2V, V2I/N, and V2P, as well as the eNB/gNB, UE, and RSU nodes. The intention is to provide descriptions at approximately the Stage 2 level of detail, and thus references are provided to RAN specifications for the reader to obtain precise details. |

The document is a 'living' document, i.e. it is permanently updated and presented to TSG-RAN meetings. Actually, the overall description of R17 SL enhancement has been captured in the latest TR 37.985 v17.1.1. With regard to the sidelink relay, since it also address the V2X services, it may be necessary to capture the overall description of R17 sidelink relay into TR 37.985.

According to the session chair, the final determination of the work item for the CR, assuming there is one, is RAN1’s question. We may endorse the TP for TR 37.985 and send the LS under the SL relay work item. RAN1 will determine what they send to RP. This assumes that we want to endorse a TP on relaying for a TR that is specific to V2X, not general to all sidelink topics. Companies may consider this aspect in the email discussion.

**Q1) Do you agree to capture the overall description of R17 sidelink relay into TR37.985?**

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| Company | Option | Comments |
| Huawei, HiSilicon | No | In our understanding, SL U2N relay is not specific to V2X, it is rather a common design. Therefore there is no need to include the relay description in the TR.  ZTE comment: According to the R17 sidelink enhancement WID, SL enhancement is also not specific to V2X, it can be used to address a wide range of services. Since the overall description of SL enhancement has been captured in TR37.985, the same principle should also apply to R17 SL relay. It looks strange that we have different criteria for the two WI.  The justification part of R17 SL enhancement WID is copied as follows:  “For V2X and public safety, the service requirements and operation scenarios are not fully supported in Rel-16 due to the time limitation, and SA works are ongoing on some enhancement in Rel-17 such as architecture enhancements for 3GPP support of advanced V2X services – Phase 2 (FS\_eV2XARC\_Ph2) and System enhancement for Proximity based Services in 5GS (FS\_5G\_ProSe). In addition, other commercial use cases related to NR sidelink are being considered in SA WGs via several work/study items such as Network Controlled Interactive Service (NCIS), Gap Analysis for Railways (MONASTERYEND), Enhanced Relays for Energy eFficiency and Extensive Coverage (REFEC), Audio-Visual Service Production (AVPROD). In order to provide a wider coverage of NR sidelink for these use cases and be able to provide the radio solutions in accordance with the progress in SA WGs, it is necessary to specify enhancements to NR sidelink in TSG RAN.” |
| CATT | No | Agree with Huawei. |
| LG | No | We have same view with HW. |
| Apple | No strong view (slightly Yes) | As far as we know, 5GAA think SL relay may be helpful for some use cases. So, we are fine to capture it. But we can follow majority. |
| InterDigital | No | Same view as Huawei |
| ZTE | Yes | SL relay is trying to address V2X, Public Safety and commercial applications and services. In this sense, it has not difference with SL enhancement since SL enhancement is also not specific to V2X. Consdiering that the overall description of SL enhancement has been captured in TR 37.985, it is no harm to capture the overall description of sidelink relay in TR37.985. Anyway, sl relay it can be used in some use cases of V2X. |
| Ericsson | No | We share the same view as Huawei. In addition, there is no use case regarding V2X in the relay WID. Therefore, the TP is not supported.  [ZTE] The relay WID does not mention any specific use cases, it only mention that it will consider wider range of applications and services, such as V2X, public safety and other commercial applications. On the other hand, in TR 22.886, use case “tethering via vehicle Vehicle” is captured in clause 5.18 of 5G V2X service. This use cases is essentially the usage of UE-to-Network relay for V2X service. The requirement as copied asd follows:  “[PR.5.18-002] The 3GPP system shall enable a UE supporting a V2X application to discover another UE supporting V2X application that can offer access to the network.  [PR.5.18-003] The 3GPP system shall enable a UE supporting a V2X application to switch the network access from direct 3GPP connection to an indirect 3GPP connection via another UE supporting V2X application that is connected via 3GPP access to the 3GPP core network, and vice versa.  [PR.5.18-004] The 3GPP system should provide integrity and confidentiality protection (end to end) for the network access traffic of a V2X UE via another such UE.” |
| Lenovo | No strong view(slightly prefer No) | Tend to agree with Huawei. |

# 4 Conclusions

In this contribution, we have the following proposals based on the email discussion.

# 5 References

1. TR 37.985 3GPP TSG RAN Overall description of RAN aspects for V2X based on LTE and NR.
2. RP-210904, New WID on NR Sidelink Relay, March 2021.
3. RP-213585, New WID on NR Sidelink Relay Enhancement, December 2021.
4. R2-2204800 TP to introduce Rel-17 sidelink relay and discovery in TR 37.985 ZTE, Sanechips.