**3GPP TSG-RAN WG3 #114e R3-215912R3-215701**

E-meeting, 1st-11th, November, 2021

Agenda Item: 23.2

Source: CMCC (moderator)

Title: Summary of offline discussion on Authorization for SL relay

Document for: Discussion

# Introduction

This contribution provides the summary of the following email discussion,

**CB: # SLRelay1\_Authorization**

**- Introduce new IEs for 5G ProSe authorization, ProSe NR UE-PC5-AMBR, PC5 QoS parameters?**

**- Impact on the NG/Xn/F1 interface messages?**

**- Capture agreements and open issues**

(CMCC - moderator)

Summary of offline disc [R3-215912](file:///C:\Users\cmcc\Documents\WeChat%20Files\liangzai936046\FileStorage\File\2021-11\Inbox\R3-215912.zip)

Since this is the first meeting to discuss sidelink relay WI in RAN3, the moderator proposes to focus on the high-level agreement first, whether to discuss the stage 3 IE details and CRs at this meeting can be considered later, pending on the progress.

Please provide your views by **11:00 UTC Wednesday November 3rd**, so that they may be taken into account during the online session.

# For the Chairman’s Notes

Propose to capture the following: [TBD]

# Discussion

Authorization for relay UE and remote UE for L2 and L3 UE to network relay has been addressed in R17 SL relay WI objectives [1]. Both L2 and L3 SL relay should be discussed with LTE solution as baseline.

Work item objectives on aspects common to both L2 and L3:

1. Specify mechanisms for **Relay and Remote UE authorization** for L3 and L2 relaying [RAN3]
   1. Re-use LTE as baseline

## Issue 1- 5G ProSe Authorized

As mentioned in contributions [2] [3] [4] [5] [6] [7] [8], SA2 has already specified the procedures for service authorization to NG-RAN in TS 23.304 clause 6.6 to make support of SL relay. We list relative text as follow:

6.6 Procedures for Service Authorization to NG-RAN

6.6.2 Registration procedure

The Registration procedure for UE is performed as defined in TS 23.502 [5] clause 4.2.2.2 with the following additions:

……

- If the UE is authorised to use 5G ProSe services, then the AMF shall include in a NGAP message sent to NG-RAN:

- "5G ProSe authorised" information, including one or more of the following:

- whether the UE is authorized to use 5G ProSe Direct Discovery;

- whether the UE is authorized to use 5G ProSe Direct Communication;

- whether the UE is authorized to act as a 5G ProSe Layer-2 UE-to-Network Relay;

- whether the UE is authorized to act as a 5G ProSe Layer-3 UE-to-Network Relay;

- whether the UE is authorized to act as a 5G ProSe Layer-2 Remote UE.

- ProSe NR UE-PC5-AMBR, used by NG-RAN for the resource management of UE's PC5 transmission for 5G ProSe services in network scheduled mode.

- the PC5 QoS parameters for 5G ProSe used by the NG-RAN for the resource management of UE's PC5 transmission for ProSe services in network scheduled mode.

- If the UE is authorised to use 5G ProSe services, then the AMF should not initiate the release of the signalling connection after the completion of the Registration procedure. The release of the signalling connection relies on the decision of NG-RAN, as specified in TS 23.502 [5].

6.6.3 Service Request procedure

The Service Request procedures for UE in CM-IDLE state are performed as defined in TS 23.502 [5] clause 4.2.3.2 and clause 4.2.3.3 with the following additions:

- If the UE is authorised to use ProSe services, then the AMF shall include "ProSe authorised" information in the NGAP message, indicating which of the ProSe services the UE is authorised to use as described in clause 6.6.2.

- The AMF includes the ProSe NR UE-PC5-AMBR in the NGAP message to the NG-RAN as part of the UE context and NG-RAN may use in resource management of UE's PC5 transmission for ProSe services in network scheduled mode.

- The AMF sends the PC5 QoS parameters for ProSe to NG-RAN via N2 signalling. The PC5 QoS parameters for ProSe may be stored in the UE context after the registration procedure. If the UE is authorised to use ProSe services but AMF does not have PC5 QoS parameters for ProSe available, the AMF fetches the PC5 QoS parameters for ProSe from the PCF.

6.6.4 N2 Handover procedure

The N2 based handover procedures for UE are performed as defined in TS 23.502 [5] clause 4.9.1.3 with the following additions:

- If the UE is authorised to use ProSe services, then the target AMF shall send the "ProSe authorised" information, ProSe NR UE-PC5-AMBR, and PC5 QoS parameters for ProSe to the target NG-RAN in the NGAP Handover Request message.

6.6.5 Xn Handover procedure

The Xn based handover procedures for UE are performed as defined in TS 23.502 [5] clause 4.9.1.2 with the following additions:

- If the "ProSe authorised" information is included in the UE context, then the source NG-RAN shall include a "ProSe authorised" information, ProSe NR UE-PC5-AMBR and PC5 QoS parameters for ProSe in the XnAP Handover Request message to the target NG-RAN.

- If the "ProSe authorised" information is included in the UE context, then the AMF shall send the "ProSe authorised" information, the ProSe NR UE-PC5-AMBR, and PC5 QoS parameters for ProSe to the target NG-RAN in the Path Switch Request Acknowledge message.

**Question 1: Do companies support to define a new IE to indicate whether UE is authorized to use 5G ProSe services? The type of authorization information includes one or more items as below?**

**- 5G ProSe Direct Discovery**

**- 5G ProSe Direct Communication**

**- 5G ProSe Layer-2 UE-to-Network Relay**

**- 5G ProSe Layer-3 UE-to-Network Relay**

**- 5G ProSe Layer-2 Remote UE**

|  |  |
| --- | --- |
| Company | Comment |
| Qualcomm | Yes.  Whether the items mentioned above are included as individual IEs under a parent IE or as a bitmap as proposed in [12] and [13] should be discussed further. Either way is fine with us (although LTE defined dedicated IEs and not bitmap). |
| CATT | Yes.  A |
| Nokia | Yes. Prefer to align with LTE IE. |
| CMCC | Yes. |
| E/// | Yes. With regard to the design of IE, a bitmap helps save the bits and could be easily extended once required. LTE way is due to only two codepoints are present. We need to take future compatibility into account. |
| Huawei | Yes.  Note: we also wait for SA2 decision on whether 5G ProSe Layer-3 Remote UE should be included. RAN2 also had some discussion/progress here. |
| Samsung | Yes |
| China Telecom | Yes. |
| ZTE | Yes. All the items listed in SA2 could be included in the new defined ProSe authorization IE. |
| Lenovo, Motorola Mobility | Yes |

In Rel-16 NGAP/XnAP/F1AP, the NR UE Sidelink Aggregate Maximum Bit Rate and PC5 QoS Parameters were introduced to support V2X services. As described in contribution [3], SA2 already has identified the procedures and have listed requirements to include ProSe NR UE-PC5-AMBR and PC5 QoS parameters for ProSe in Registration, Service Request, N2 Handover and Xn Handover procedures. Contribution [3] proposed to include ProSe NR UE-PC5-AMBR and PC5 QoS parameters for ProSe in the relevant Xn/NG/F1 messages over network interfaces during registration, service request, N2 HO, Xn HO etc. In contribution [6], it suggested both of them can be reused for Rel-17 ProSe and clarify the NR UE Sidelink Aggregate Maximum Bit Rate and PC5 QoS Parameters are also applicable to 5G ProSe.

Here we discuss about NR UE Sidelink Aggregate Maximum Bit Rate and PC5 QoS Parameters are needed for ProSe. Companies are encouraged to show their views on it.

**Question 2: Do companies think it necessary to include ProSe NR UE-PC5-AMBR and PC5 QoS parameters for ProSe?**

|  |  |
| --- | --- |
| Company | Comment |
| Qualcomm | Yes, necessary to include both ProSe NR UE-PC5-AMBR and PC5 QoS parameters for ProSe.  Regarding whether to reuse old IEs as proposed in [6] or define new Ies for ProSe as in [3] depends on ***whether a UE can use sidelink for both V2X and ProSe at the same time***. If such a scenario is possible, defining dedicated Ies for ProSe can help configure different AMBR/QoS values compared to V2X.  Even if the scenario described above might not be possible today, it might be beneficial to define dedicated Ies for ProSe allowing future compatibility. |
| CATT | Yes, SA2 has clearly specified that in the TS 23.304.  It’s assumed the old Ies defined for NR V2X could be reused, unless ProSe NR UE-PC5-AMBR and PC5 QoS parameters have different definition between V2X and ProSe. Maybe double check with SA2 is needed. |
| Nokia | Yes. Both are needed.  Prefer to reuse the existing Ies. Ok to further check with SA2. |
| CMCC | Yes. ProSe NR UE-PC5-AMBR and PC5 QoS parameters for ProSe are both needed. |
| E/// | Assume the question is asking whether we need to introduce new ProSe AMBR and PC5 QoS parameters over NG interface. So far the UE should either use V2X services or SL Relay only.  In SA2 spec TS 23.304, currently no special PC5 QoS is defined for ProSe. Thus current PC5 AMBR and QoS parameters should be reused without concern. RAN3 can keep as it is unless there is new coming requirement. |
| Huawei | Yes. We prefer separate new dedicated Ies for ProSe |
| Samsung | Yes. |
| China Telecom | Yes. We prefer to reuse the existing Ies. |
| ZTE | Yes. As SA2 specified, it is necessary to include both ProSe NR UE-PC5-AMBR and PC5 QoS parameters for ProSe.  In our view, the old IEs defined for NR V2X services could be reused with extension for 5G ProSe services. Both V2X services and/or 5G ProSe services are subject to the same AMBR/QoS IE. As to whether different requirements of AMBR/QoS for V2X services and 5G ProSe services are needed or not, we shall check with SA2. |
| Lenovo, Motorola Mobility | Yes. Making it separate from NR SL PC5-AMBR, and PC5 QoS parameters seems cleaner and future proof. Agree with QC that if a UE is allowed to operate both V2X and ProSe at the same time, different authorization info has to be distinguished. |

## Issue 2- Impact on NG/Xn/F1 interface massage

Similar to V2X authorization, the 5G ProSe Service Authorized information needs to be provided from 5GC to the NG-RAN during the Registration procedure, Service Request procedure and Handover procedure, etc. Discussion for the impact on NG/Xn/F1 interface massage is required.

Here we list the signaling procedures for NG/Xn/F1 interface separately.

**Question 3: Do companies agree to include above 5G ProSe authorized information in the listed NGAP messages?**

1. **INITIAL CONTEXT SETUP REQUEST**
2. **UE CONTEXT MODIFICATION REQUEST**
3. **HANDOVER REQUEST**
4. **PATH SWITCH REQUEST ACKNOWLEDGE**

|  |  |
| --- | --- |
| Company | Comment |
| Qualcomm | Yes |
| CATT | Yes |
| Nokia | Yes |
| CMCC | Yes |
| E/// | Yes |
| Huawei | Yes |
| Samsung | Yes |
| China Telecom | Yes. |
| ZTE | Yes |
| Lenovo, Motorola Mobility | Yes |

**Question 4: Do companies agree to include above 5G ProSe authorized information in the listed XnAP messages?**

1. **HANDOVER REQUEST**
2. **RETRIEVE UE CONTEXT RESPONSE**

|  |  |
| --- | --- |
| Company | Comment |
| Qualcomm | Yes |
| CATT | Yes |
| Nokia | Yes with comments. It should be the RETRIEVE UE CONTEXT RESPONSE message, rather the REQUEST message |
| CMCC | Yes. |
| E/// | Yes |
| Huawei | Yes – and for (2) we agree with NOK it shall be response |
| Samsung | Yes with modification from Nok |
| China Telecom | Yes. |
| ZTE | Yes |
| Lenovo, Motorola Mobility | Yes |

In contribution [3] [4] [5] [6], the above "5G ProSe authorized" information are also supported to be included in F1AP. The moderator would like to point out, CU/DU architecture has not been clearly identified in objectives of sidelink relay WI. So, we suggest discussing whether CU/DU architecture is considered in R17 SL relay firstly.

**Question 5: Do companies agree to consider CU/DU architecture in R17 SL relay?**

|  |  |
| --- | --- |
| Company | Comment |
| Qualcomm | Yes, CU/DU architecture and thereby F1/E1 impacts should be considered in all sidelink relay related topics. |
| CATT | We are open to discussion.  If CU/DU split is considered, more F1 work will be involved, work load should also be considered. |
| Nokia | Yes |
| CMCC | Yes |
| E/// | Yes |
| Huawei | Yes |
| Samsung | Yes |
| China Telecom | Yes. |
| ZTE | Yes, CU/DU split is an essential architecture in NR, we shall support SL relay in CU/DU split architecture. |
| Lenovo, Motorola Mobility | Yes |

**Question 6: Do companies agree to include above 5G ProSe authorized information in the listed F1AP messages?**

1. **UE CONTEXT SETUP REQUEST**
2. **UE CONTEXT MODIFICATION REQUEST**

|  |  |
| --- | --- |
| Company | Comment |
| Qualcomm | Yes |
| CATT | Yes |
| Nokia | Yes |
| CMCC | Yes |
| E/// | Yes |
| Huawei | Yes |
| Samsung | Yes |
| China Telecom | Yes. |
| ZTE | Yes |
| Lenovo, Motorola Mobility | Yes |

# Conclusion, Recommendations [if needed]

[TBD]

# References

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| --- | --- | --- | --- |
| [1] | RP-212601 | 3GPP RP-212601 " WID on NR sidelink relay" | RAN P |
| [2] | [R3-214837](https://www.3gpp.org/ftp/TSG_RAN/WG3_Iu/TSGR3_114-e/Docs/R3-214837.zip) | Discussion on Relay and Remote UE authorization | China Telecommunication |
| [3] | [R3-214913](https://www.3gpp.org/ftp/TSG_RAN/WG3_Iu/TSGR3_114-e/Docs/R3-214913.zip) | Relay and Remote UE Authorization | Qualcomm Incorporated |
| [4] | [R3-214973](https://www.3gpp.org/ftp/TSG_RAN/WG3_Iu/TSGR3_114-e/Docs/R3-214973.zip) | SL relay authorization | ZTE, Sanechips |
| [5] | [R3-215283](https://www.3gpp.org/ftp/TSG_RAN/WG3_Iu/TSGR3_114-e/Docs/R3-215283.zip) | Authorization for Relay and Remote UE | Ericsson |
| [6] | [R3-215352](https://www.3gpp.org/ftp/TSG_RAN/WG3_Iu/TSGR3_114-e/Docs/R3-215352.zip) | Discussion on Relay and Remote UE authorization | Nokia, Nokia Shanghai Bell |
| [7] | [R3-215595](https://www.3gpp.org/ftp/TSG_RAN/WG3_Iu/TSGR3_114-e/Docs/R3-215595.zip) | Discussion on UE authorization for NR SL Relay | CATT |
| [8] | [R3-215701](https://www.3gpp.org/ftp/TSG_RAN/WG3_Iu/TSGR3_114-e/Docs/R3-215701.zip) | Consideration on authorization for SL relay | CMCC |
| [9] | R3-214965 | Discussion on the support of ProSe service | Huawei |
| [10] | [R3-214962](https://www.3gpp.org/ftp/TSG_RAN/WG3_Iu/TSGR3_114-e/Docs/R3-214962.zip) | Support of NR ProSe authorization | Huawei |
| [11] | [R3-214963](https://www.3gpp.org/ftp/TSG_RAN/WG3_Iu/TSGR3_114-e/Docs/R3-214963.zip) | Support of NR ProSe authorization | Huawei |
| [12] | [R3-215284](https://www.3gpp.org/ftp/TSG_RAN/WG3_Iu/TSGR3_114-e/Docs/R3-215284.zip) | Introduction of service authorization for SL Relay over NG | Ericsson |
| [13] | [R3-215285](https://www.3gpp.org/ftp/TSG_RAN/WG3_Iu/TSGR3_114-e/Docs/R3-215285.zip) | Introduction of service authorization for SL Relay over Xn | Ericsson |
| [14] | [R3-215353](https://www.3gpp.org/ftp/TSG_RAN/WG3_Iu/TSGR3_114-e/Docs/R3-215353.zip) | (NGAP CR) support for NR Sidelink Relay | Nokia, Nokia Shanghai Bell |
| [15] | [R3-215354](https://www.3gpp.org/ftp/TSG_RAN/WG3_Iu/TSGR3_114-e/Docs/R3-215354.zip) | (XnAP CR) support for NR Sidelink Relay | Nokia, Nokia Shanghai Bell |
| [16] | [R3-215355](https://www.3gpp.org/ftp/TSG_RAN/WG3_Iu/TSGR3_114-e/Docs/R3-215355.zip) | (F1AP CR) support for NR Sidelink Relay | Nokia, Nokia Shanghai Bell |
| [17] | [R3-215596](https://www.3gpp.org/ftp/TSG_RAN/WG3_Iu/TSGR3_114-e/Docs/R3-215596.zip) | Support of 5G ProSe Authorization for NGAP | CATT |
| [18] | [R3-215597](https://www.3gpp.org/ftp/TSG_RAN/WG3_Iu/TSGR3_114-e/Docs/R3-215597.zip) | Support of 5G ProSe Authorization for XnAP | CATT |