**3GPP TSG-RAN3 Meeting #117 R3-225003**

**Electronic Meeting, 15th – 26th August, 2022**

**Agenda item: 9.2.8**

**Source: ZTE (Moderator)**

**Title: Summary of offline discussion on CB#16\_R17SLRelay**

**Document for: Discussion and Decision**

# Introduction

This contribution provides the summary of the following email discussion,

**CB: # 16\_R17SLRelay**

**- Focus on the left issues in R17**

**- Uu/PC5 RLC channel setup in UE Context Setup procedure of Relay UE?**

**- How to configure the SRB0/1 mapping of remote UE at the gNB-DU?**

**- SRB1 configuration for Remote UE RRC Reestablishment?**

**- Other corrections?**

**- Capture agreements and provide CRs if agreeable, split the work if needed**

(ZTE - moderator)

Summary of offline disc [R3-225003](Inbox\\R3-225003.zip)

The discussion will be devided into two phases:

**- Phase 1 -** Please provide your views **by 23:59 UTC Wednesday August 17th**

**- Phase 2 -** TBD pending on the outcome of Phase 1

# For the Chairman’s Notes

Propose to capture the following: [TBD]

# Discussion

## Uu/PC5 RLC channel setup in UE context setup procedure of Relay UE

At RAN3#115e meeting, the issue about configuration of Uu RLC channel for remote UE’s SRB0/SRB1 before remote UE’s initial access was discussed [1]. Most companies think CU can know whether a UE is a relay UE based on authorization information from AMF, and it is very likely there will be remote UE connected with the relay UE, so it would be useful to include Uu RLC Channel to be setup list for remote UE’s SRB0/SRB1 in UE CONTEXT SETUP REQUEST message of relay UE for preparation. Thus RAN3 had an agreement that

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| **The UE CONTEXT SETUP REQUEST message of relay UE can be used to request the setup of Uu RLC channel(s) for SRB0/SRB1, respectively.** |

However, at RAN3#116 meeting, there were some concerns raised about Uu/PC5 RLC channel setup in UE Context Setup procedure of Relay UE. Since there may need more time to check these concerns, at RAN3#116e meeting, there is no consensus on the issue.

In contribution [1], it states that it is feasible to establish Uu RLC channel for remote UE’s SRB0/1 in UE context setup procedure of Relay UE and it is beneficial for signalling saving and latency reduction for remote UE’s initial access. Similarly, the PC5 RLC channel for remote UE’s SRB1 can be established in UE context setup procedure of relay UE. Contribution [5] thinks UE Context Setup procedure for Relay UE can be used to establish Uu/PC5 Relay RLC channel, and the description of the establishment of PC5 Relay RLC channel is lacked in related steps in remote UE’s initial access procedures. However, in [8], it thinks the Uu/PC5 RLC channel setup in UE Context Setup procedure is not necessary, because gNB can only configure the Uu/PC5 RLC channel without bearer mapping information at this stage, which cannot be used to transmit/receive SRBs of the remote UE.

In moderator’s view, since there is no technique issue identified for Uu RLC channel setup for remote UE’s SRB0/1 in UE context setup procedure of relay UE, it is better to keep the previous RAN3 agreement. Thus it has no spec changes to current specs.

### **Question 1: Do companies agree to keep previous RAN3 agreement that “The UE CONTEXT SETUP REQUEST message of relay UE can be used to request the setup of Uu RLC channel(s) for SRB0/SRB1, respectively.”?**

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| Company | Yes/No | Comment |
| ZTE | Yes |  |
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Similarly, PC5 RLC channel can be established in UE context setup procedure of relay UE. As we know, specified PC5 RLC channel is used to transmit remote UE’s SRB0 message, so only PC5 RLC channel for remote UE’s SRB1 is configured here.

### **Question 2: Do companies agree that the UE Context Setup procedure of relay UE can be used to setup PC5 RLC channel for remote UE’s SRB1?**

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| Company | Yes/No | Comment |
| ZTE | Yes |  |
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In TS 38.473, PC5 RLC channel established in UE context setup procedure of relay UE is supported, but the description of establishment of PC5 RLC channel for remote UE’s SRB1 is missing in remote UE initial access procedure in TS 38.401.

### **Question 3: If yes to question 2, do companies agree to add the description of establishment of PC5 RLC channel for remote UE’s SRB1 in related steps (e.g. step 3/5/8) in remote UE initial access procedure?**

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| Company | Yes/No | Comment |
| ZTE | Yes |  |
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## Remote UE SRB0/1 bearer mapping at gNB-DU

During RAN3#116e meeting, one question was raised, i.e. gNB-DU should know the mapping between remote UE SRB0/SRB1 and Uu RLC Channel, however, in current spec, there is no signalling achieving this. Thus it shall be discussed during remote UE initial access procedure, how to configure the SRB0/1 mapping of remote UE at the gNB-DU side (e.g., in section 8.19.1, step 11 and step 14 needs such configuration between relay UE and gNB-DU).

In contribution [1], it thinks DU can identify the bearer mapping between the remote UE’s SRB0 and the Uu RLC channel over which the SRB0 message is received in step 11, thus DU can map the remote UE’s SRB0 to Uu RLC channel based on the UL mapping in step 14 by implementation. In contribution [5], it thinks DL RRC MESSAGE TRANSFER in step 13 can be used to convey bear mapping configuration for remote UE’s SRB0. Contribution [8] thinks the SRB0 bearer mapping configuration is needed for gNB-DU to receive/send the RRC message in step 11 and step 14, and the SRB1 bearer mapping is needed to receive the RRC message in step 16, therefore, the bearer mapping for Remote UE’s SRB0/1 should be configured before Remote UE’s initial access, which can only be completed during the Relay UE’s UE context modification procedure.

In moderator’s view, remote UE’s SRB0/1 bearer mapping is not need for gNB-DU to receive RRC messages. The issue is only related to DL RRC message transmission and bearer mapping, i.e. DU to map remote UE’s SRB0/1 message to Uu RLC channel to transmit to relay UE.

### **Question 4: Do companies agree that remote UE’s SRB0/1 bearer mapping is not needed for gNB-DU to receive the RRC messages?**

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| Company | Yes/No | Comment |
| ZTE | Yes |  |
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According to Remote UE initial access procedure in section 8.19.1 in TS 38.401, DU can obtain the mapping between the remote UE’s SRB1 and the Uu RLC channel in the UE Context Setup Request of Remote UE in step 20, and then use the mapping to map the first DL SRB1 message (SecurityModeCommand) to corresponding Uu RLC channel and transmit to relay UE in step 21.

So the issue is how the DU map the remote UE’s SRB0 message to Uu RLC channel in step 14. That is, DU may need to know the bearer mapping between remote UE’s SRB0 and Uu RLC Channel before step 14.

### **Question 5: Do company agree that DU needs to know the bearer mapping between remote UE’s SRB0 and Uu RLC Channel before step 14?**

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| Company | Yes/No | Comment |
| ZTE | Yes |  |
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According to companies’ contributions, there are three options proposed for gNB-DU to know the bearer mapping between remote UE’s SRB0 and Uu RLC channel before step 14:

**Option 1**: By DU implementation, i.e. DU can identify the bearer mapping between the remote UE’s SRB0 and the Uu RLC channel over which the SRB0 message is received in step 11, then DU can map the remote UE’s SRB0 (i.e. RRCSetup) to Uu RLC channel based on the UL mapping in step 14 by implementation. [1]

**Option 2**: DL RRC MESSAGE TRANSFER in step 13 can be used to convey bear mapping configuration for remote UE’s SRB0. [5]

**Option 3**: gNb-CU can include the bearer mapping for Remote UE’s SRB0/1 in Relay UE’s UE context Modification Request message, and send it to gNB-DU before remote UE initial access. [8]

### **Question 6: Which option do you prefer for the gNB-DU to know the bearer mapping for remote UE’s SRB0?**

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| Company | Option | Comment |
| ZTE | Option 1 | In step 11/12, when receiving remote UE’s message from relay UE via Uu RLC channel, DU can identify it is the first SRB0 message of a remote UE based on the remote UE local ID and bearer ID carried in SRAP header. Also DU can identify the bearer mapping between the remote UE’s SRB0 and the Uu RLC channel over which the SRB0 message is received.  Then in step 14, DU can map the remote UE’s SRB0 (i.e. RRCSetup) to Uu RLC channel based on the UL mapping identified in step 11 by implementation. |
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## The scope of PC5 RLC channel ID

In contribution [1], an issue related to the scope of PC5 RLC channel ID is proposed. According to TS 38.473, PC5 RLC channel ID can be allocated in the scope of remote UE or relay UE. In order to support the PC5 RLC channel ID allocation in scope of remote UE, the PC5 RLC channel ID and remote UE local ID is jointly used to identify the PC5 RLC channel to be setup/modified/released request and response message.

However, the SL RLC channel ID (equal to the PC5 RLC channel ID) designed in TS 38.331 assumes that the SL RLC channel ID can uniquely identify a PC5 RLC channel within a relay UE. When relay UE receive the SL RLC channel config to add/modify/release list from gNB, it only use the SL RLC channel ID to identify the PC5 RLC channel.

Suppose the PC5 RLC channel ID allocated by CU is only unique within the scope of remote UE, it may happen that the relay UE receive two PC5 RLC channels configuration with the same PC5 RLC channel ID but corresponding to two different remote UEs. In this case, when relay UE performs the DL bearer mapping, it may deliver the SRAP PDU to the wrong PC5 RLC channel.

To eliminate the gap between the RAN2 and RAN3, the following two options can be considered to fix this problem:

* **Option 1**: allow the PC5 RLC channel ID allocation within the scope of remote UE.
* **Option 2:** disable the PC5 RLC channel ID allocation within the scope of remote UE.

In Option 1, RAN2 shall add the remote UE local ID in the SL RLC channel configuration. The remote UE local ID and SL RLC channel ID are jointly used for the SL RLC channel add/modify/release. If this option is selected, RAN3 may further send LS to inform RAN2. In Option 2, RAN3 shall remove the remote UE local ID IE in the PC5 RLC channel setup/modify/release request/response message. In addition, the definition of the PC5 RLC channel ID should be updated.

Both options are workable, but they have different specification changes. Companies are invited to share your views which option is preferred.

### **Question 7: Which option do you prefer to fix the issue about the scope of PC5 RLC channel ID allocation?**

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| Company | Option | Comment |
| ZTE | Option 1/2 | Both options are fine to us. |
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## Other corrections

In contribution [8], an issue related to SRB1 configuration for remote UE RRC reestablishment was proposed. In RAN2#118 meeting, it has been agreed that the dedicated configuration of PC5 RLC cannot be included in the RRCReestablishment message for security purpose. Thus, in the RRC Reestablishment procedure in Figure 2, the configurations of PC5 Relay RLC channel(s) for relaying of U2N Remote UE’s SRB1 message should be configured in step 18 and step 19 if needed.

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| 14~23. The details of those steps can be referred to Steps 5~14 in clause 8.7. For L2 U2N relay, the RRC message(s) between the U2N Remote UE and the gNB-DU are relayed via the U2N Relay UE; Steps 18~19 may additionally perform the configurations of PC5 Relay RLC channel(s) for relaying of U2N Remote UE’s SRB1,SRB2, and DRBs. |

### **Question 8: Do company agree the above change for remote UE RRC reestablishment?**

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| Company | Yes/No | Comment |
| ZTE | Yes |  |
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In current TS 38.473, in the Uu/PC5 RLC channel to be modified list, the Presence of Uu/PC5 RLC channel QoS information is mandatory. But they may not mandatory to be modified and carried in the modified list. In contribution [4], it propose in the Uu/PC5 RLC channel to be modified list, the Presence of Uu/PC5 RLC channel QoS information shall be Optional. The ASN.1 shall be changed accordingly.

### **Question 9: Do company agree to change the Presence of Uu/PC5 RLC channel QoS information in the Uu/PC5 RLC channel to be modified list to “Optional”?**

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| Company | Yes/No | Comment |
| ZTE | Yes | In the Uu/PC5 RLC channel to be modified list, Uu/PC5 RLC channel QoS information are not mandatory to be modified and carried in the modified list. The Presence of Uu/PC5 RLC channel QoS information shall be changed to Optional. |
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In 8.3.1.2/8.3.4.2, if SRB/DRB Mapping Info is configured, it is specified that “The gNB-DU shall use the mapping information stored for the mapping of SRB data to Uu Relay RLC channel, as specified in TS 38.351 [45].”, however, in TS 38.351, it does not specify how gNB-DU uses the mapping info to map SRB/DRB data to Uu Relay RLC channel. In contribution [4], it is suggested to delete “as specified in TS 38.351 [45]”.

### **Question 10: Do company agree to delete “as specified in TS 38.351 [45]” in 8.3.1.2/8.3.4.2 in TS 38.473?**

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| Company | Yes/No | Comment |
| ZTE | Yes |  |
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In RAN2 specs and other RAN3 specs related to SL relay, the terminologies of “Uu Relay RLC channel” and “PC5 Relay RLC channel” are used. But in TS 38.401, Uu/PC5 RLC channel is used. Contribution [2] propose the changes to keep terminology alignment.

### **Question 11: Do company agree the changes in R3-224719?**

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| Company | Yes/No | Comment |
| ZTE | Yes |  |
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# Conclusion, Recommendations [if needed]

[TBD]

# References

1. R3-224717 Discussion on remaining issues for SL relay, ZTE, ChinaTelecom
2. R3-224718 Corrections on NR SL Relay for TS 38.470, ZTE, ChinaTelecom, CMCC
3. R3-224719 Corrections on NR SL Relay for TS 38.401, ZTE, ChinaTelecom, CMCC
4. R3-224720 Corrections on NR SL Relay for TS 38.473, ZTE, ChinaTelecom
5. R3-224736 Left issues about SL relay in Rel-17, CATT, Samsung,CMCC
6. R3-224737 Correction to 38.473 for SL relay (R17,) CATT, Samsung,CMCC
7. R3-224738 Correction to 38.401 for SL relay (R17), CATT, Samsung
8. R3-224544 SL relay corrections, Huawei, Nokia, Nokia Shanghai Bell, China Unicom
9. R3-224545 SL relay corrections, Huawei, Nokia, Nokia Shanghai Bell, China Unicom
10. R3-224546 SL relay corrections, Huawei, Nokia, Nokia Shanghai Bell, China Unicom