3GPP TSG-RAN WG2 Meeting #116 electronic R2-21xxxxx

Online, 1st – 12th November 2021

Source: vivo

Title: Summary of [AT116-e][628][Relay] Signalling from relay UE for cell (re)selection and failure cases (vivo)

Agenda Item: 8.7.3.2

Document for: Discussion and Decision

# Introduction

The following offline discussion is summarized in this discussion:

* [AT116-e][628][Relay] Signalling from relay UE for cell (re)selection and failure cases (vivo)

 Scope: Discuss P1 -P6 of R2-2111223 and attempt to converge. Discussion of P5 excludes the RLF case which is discussed in [AT116-e][622].

 Intended outcome: Report to CB session

 Deadline: Wednesday 2021-11-10 1600 UTC

# Contact information

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# Discussion

For the below questions from section 3.2 to 3.5, rapporteur would like to first clarify that all of them should focus on in which case should the relay UE send indication to remote UE and what is the information content/type. For the remote UE’s behavior, it simply says ‘may trigger relay reselection’. Whether remote UE of different RRC state should behavior differently can be clarified in the comment by companies, if needed.

In rapporteur’s understanding, for all the below questions which say ‘may trigger relay reselection’, it is applicable to at least IDLE/INACTIVE remote UE. Whether CONNECTED remote UE is also included is up to the discussion on Proposal 11 in R2-2111276 (as follows) and the discussion in CP agenda in case remote UE would trigger RRC re-establishment procedure followed by relay reselection.

*Proposal 11 (In R2-2111276): Relay (re)selection procedure is not performed by a L2 Remote UE in RRC\_CONNECTED, except for the case of RLF.*

And for the question organization,

* Cell (re)selection has impacts on IDLE/INACTIVE relay UE, so it is separately discussed in 3.1;
* 3.2 is when the relay UE’s Uu link becomes better;
* 3.3 is when the relay UE’s Uu link deteriorates;

The success/failure cases in 3.2/3.3 are separately discussed as the remote UE has opposite behaviours (i.e. may trigger relay reselection or stop relay reselection), and it may have impact on cause value design (e.g. if a single message to indicate both success/failure case then of course we need different cause value).

## 3.1 Cell (re)selection

**Proposal 1: RAN2 to discuss when relay UE performs cell (re)selection, whether relay UE may send an indication/message to its connected remote UE(s) which may trigger relay reselection.**

* **Option-1: Yes**
* **Option-2: Yes, only when (re)select to a new gNB**
* **Option-3: No**

### **Q1: Which option do companies prefer in the above Proposal 1?**

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| Company | Option # | Comments |
| MediaTek | Option-1 | We see the need to notify the connected remote UE(s) when the Relay UE performs cell (re)selection. This is especially needed for Remote UE in connected state, since this cell (re)selection may interrupt Remote UE’s connection with the network. Meanwhile, there may be different reasons for Relay UE to perform cell (re)selection (e.g. including RLF)  |
| OPPO | Option-1 | An indication to connected remote UE may be beneficial for remote UE to recover the service quickly. |
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## 3.2 RLF recovery case

**Proposal 2: RAN2 to discuss When Uu RLF is recovered by relay UE, whether relay UE may send an indication/message to its connected remote UE(s).**

### **Q2: Do companies support that, when Uu RLF is recovered by relay UE, relay UE may send an indication/message to its connected remote UE(s)?**

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| Company | Yes/No | Comments |
| MediaTek | Yes | During RLF, the Remote UE connection with the network may be suspended a bit and then the data transmission is held-on. The data transmission between Remote UE and the network can recover if a recovery indication can be received  |
| OPPO | No | We have already agreed that when Uu RLF is happened, relay UE may send an indication/message to its connected remote UE. But when/whether to send the message can be up to relay UE implementation. Therefore, we do not need to specify additional message for Uu RLF recovery. |
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## 3.3 Other failure case

**Proposal 3: RAN2 to discuss which of the following case should also be agreed for the relay UE to send an indication/message to its connected remote UE(s) which may trigger relay reselection:**

**Case-1: Uu Recovery failure**

**Case-2: HO failure**

**Case-3: Uu RRC reconfiguration failure**

### **Q3: Which case(s) do companies prefer to support?**

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| Company | Case # | Comments |
| MediaTek | Case-2 | We see the need for Relay UE to notify the Handover failure to its connected remote UE(s), since this is a typical case to trigger RRC reestablishment for Relay UE. For case-1/3, it is not clear to us.  |
| OPPO | Case-3 | For case-1: We have already agreed that when Uu RLF is happened, relay UE may send an indication/message to its connected remote UE. But when/whether to send the message can be up to relay UE implementation. Therefore, we do not need to specify additional message for Uu RLF recovery failure afterwards.For case-2: We have already agreed that when HO of relay UE is happened, relay UE may send an indication/message to its connected remote UE. But when/whether to send the message can be up to relay UE implementation. Therefore, we do not need to specify additional message for HO recovery failure afterwards.For case-3: It is similar to case-1,2 where Uu RRC reconfiguration failure will trigger relay UE to perform RRC re-establishment procedure. Therefore, the similar indication shall be applied to case 3 as well. |
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## 3.4 Cause value

**[Cross WG]Proposal 4: RAN2 to discuss whether different cause value is needed in PC5-S message for HO, RLF and other cases(if agreed in Proposal 1, Proposal 2 and Proposal 3).**

* **Option-1: Yes**
* **Option-2: No**
* **Option-3: Up to CT1**

### **Q4: Which option do companies prefer?**

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| Company | Option # | Comments |
| MediaTek | No | It would be a bit strange for RAN2 to discuss the signalling content of a signalling managed by other WG. We suggest to not put the AS layer failure information into PC5-S, which cause unnecessary inter-layer interaction  |
| OPPO | Option-3 | The cause value is defined in TS24.334, which is CT1 spec. |
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## 3.5 New PC5-RRC message

As indicated in the email scope, P5 is modified to exclude the RLF case which is discussed in [AT116-e][622] Q6.13.

Considering companies may think we need PC5-RRC message only for some of the cases, the question is asked in a way to split cases for convenience.

**Proposal 5: RAN2 to discuss whether new message/ indication is needed (e.g. PC5-RRC) for HO and other cases(if agreed in Proposal 1, Proposal 2 and Proposal 3).**

### **Q5: Which of the following case do you think a new PC5 RRC message should be used for sending indication to the remote UE by relay UE (if agreed in Proposal 1, Proposal 2 and Proposal 3)?**

**Case-1: HO**

**Case-2 (if agreed): Cell (re)selection**

**Case-3 (if agreed): Uu RLF recovered**

**Case-4 (if agreed): Uu Recovery failure**

**Case-5 (if agreed): HO failure**

**Case-6 (if agreed): Uu RRC reconfiguration failure**

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| Company | Case # | Comments |
| MediaTek | Case-3 and Case-5 | We prefer a new PC5 RRC message to make such indication from Relay UE to Remote UE. Or rather, we can use the same PC5-RRC message as discussed for RLF indication but with a different cause value.  |
| OPPO | None | PC5-S signalling is sufficient.We see the attempt behind the PC5-RRC signalling is to pursue further complicated UE behaviour during various failure cases, yet that seem optimization given no support on group-mobility in this release anyway. |
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## 3.6 PC5-S message type

For the Disconnect Request Message, it is proposed by Qualcomm(R2-2109432) and is included in the summary document. It is specified in TS 23.287.

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| **23.287**6.3.3.3            Layer-2 link release over PC5 reference pointFigure 6.3.3.3-1 shows the layer-2 link release procedure over PC5 reference point.cid:image001.png@01D7D253.21960F80Figure 6.3.3.3-1: Layer-2 link release procedure0.  UE-1 and UE-2 have a unicast link established as described in clause 6.3.3.1.1.  UE-1 sends a Disconnect Request message to UE-2 in order to release the layer-2 link and deletes all context data associated with the layer-2 link.2.  Upon reception of the Disconnect Request message UE-2 may respond with a Disconnect Response message and deletes all context data associated with the layer-2 link.     The V2X layer of each UE informs the AS layer that the unicast link has been released. The V2X layer uses PC5 Link Identifier to indicate the released unicast link. This enables the AS layer to delete the context related to the released unicast link. |

**[Cross WG]Proposal 6: RAN2 to discuss whether the agreed “PC5-S message (similar to LTE) to notify remote UE Uu RLF and HO” is the Disconnect Request message, or is up to SA2.**

### **Q6: What do you think the agreed “PC5-S message (similar to LTE) to notify remote UE Uu RLF and HO” should be?**

**Option-1: Up to SA2**

**Option-2: Disconnect Request message**

**Option-3: Other PC5-S message (Please specify)**

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| Company | Option # | Comments |
| MediaTek | No  | We prefer a new PC5 RRC message (instead of PC5-S) to make such indication from Relay UE to Remote UE. |
| OPPO | Option-1/2 |  |
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# Conclusion

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Reference

1. R2-2111223, Summary of AI 8.7.3.2 Relay (re)selection, vivo, 3GPP TSG-RAN WG2 Meeting #116 electronic, Online, 1st – 12th November 2021