3GPP TSG-RAN WG2 #116bis-e R2-2201831

Electronical meeting, 17 – 25 January 2022

Agenda Item: 8.7.2.3

Source: Ericsson

Title: Summary of the email discussion [619][Relay] Remaining proposals on adaptation layer (Ericsson)

Document for: Discussion, Decision

# Introduction

This document is to summarize the following email discussion

* [AT116bis-e][619][Relay] Remaining proposals on adaptation layer (Ericsson)

Scope: Discuss the remaining proposals from R2-2200943: P6/P3/P9.

Intended outcome: Report to CB session

Deadline: Monday 2022-01-24 1800 UTC

For rapporteur to have enough time drafting summary report, we would like to have the following two phases:

* Phase 1: collect companies’ views by 2022-01-21 1400 UTC
* Phase 2: rapporteur will finalize summary report based on inputs of phase 1 by 2022-01-24 1600 UTC

# Summary of AI 8.7.2.3

In the online discussion, the following proposals from R2-2200943 [1] are decided to be treated by this email discussion.

***Proposal 6 (discussion) If remote UE local ID is present in PC5 adaption layer header, RAN2 to down select the following options based on which remote UE can obtain the local ID from the gNB:***

***a. Option 1: via Uu RRC messages, including RRCSetup/RRCReconfiguration/RRCResume/RRCReestablishment***

***b. Option 2: Via SRAP header of RRCResume / RRCReestablishment***

***c. Option 3: relay UE forwards the local ID to remote UE via PC5 RRC message***

***Proposal 3 (discussion) Control PDU is not supported for the adaptation layer in this release.***

***Proposal 9 (discussion) RAN2 to discuss whether LCID for PC5 RLC channel is to be allocated by UE as in R16 or specified for Uu SRB0.***

## P3

Companies are invited to express views for the following questions.

Control PDU may be introduced in Uu adaptation layer or PC5 adaptation layer. it is necessary to check companies’ views for the two cases separately.

***Q1-1: which option do companies agree regarding whether to adopt control PDU in PC5 adaptation layer in this release?***

***Option 1: adopt the control PDU***

***Option 2: not adopt the control PDU***

|  |  |  |
| --- | --- | --- |
| Company | Yes or No | Comments |
| Qualcomm | Option 2 (No) | Control PDU is intended to support flow control. We disagree:   1. It is conflicted with agreement that “PC5 SRAP only support bearer mapping in this release” 2. From technique perspective, because Rel-17 supports only single hop, we think flow control can be achieved by relay UE and gNB implementation. For example, the below solutions can be considered:  * gNB or relay UE can limit number of remote UE connections based on the load and channel quality of the Uu and PC5 links. * In single hop relay, the traffic load of remote UEs can be roughly estimated based on SL BSR |
| CATT | Option 2 | It is clearly stated that for the Uu adaptation layer, bearer mapping and identification can be supported, and for the PC5 adaptation layer, only bearer mapping function can be supported. That’s to say, there is no need to further introduce a control PDU for adaptation layer in Rel-17 SL Relay. |
| vivo | Option 2 | Control PDU, e.g. for flow control and others, belongs to the scope of optimization and future extension, and is thus not necessary to be specified in R17 due to limited time. |
| Ericsson | Option 2 | Agree with other companies that RAN2 has already concluded to only support bearer mapping for the PC5 SRAP. Therefore, further discussion on control PDU shall be avoided. |
| Lenovo | See comments | Whether to support control PDU should be discussed based on use case. If control PDU is not supported in this release, the field included in header e.g D/C is still needed for forward compatibility purpose. |
| Huawei, HiSilicon | Option 2 |  |
| Nokia | Option 2 |  |
| InterDigital | See comments | Agree with Lenovo that the header should be designed for forward compatibility. As to whether to have a control PDU or not, there are still discussions in QoS (e.g. flow control) which may affect this. |
| Spreadtrum | Option 2 |  |
| Sharp | Option 2 |  |
| ZTE | Option 2 |  |
| Apple | See comment | We think this depends on whether some per-packet QoS mechanism is still to be adopted. We can discuss this after QoS design is finalized. |
| Fujitsu | Option 2 | We share the view of Qualcomm. |
| Samsung | See comment | It is true that only bearer mapping is supported for SRAP on PC5, as noted above. But we agree with Lenovo, Apple and InterDigital that this decision (on the control PDU) should be use-case driven, and should be discussed in the QoS discussion. If the use case is in the service of bearer mapping, then this does not contradict the agreement on the functions of SRAP. |
| Xiaomi | Option 2 | The inclusion of remote UE local ID in the PC5 adaptation layer header is already one feature with no purpose in this release that is taking too much time, there is no need to introduce another. |
| Intel | Option 2 |  |
| LG | Option 2 |  |
| Philips | See comments | Agree with Lenovo, Apple, InterDigital and Samsung. |
| MediaTek | See comments | For mode 2 transmission between remote UE and relay UE, the flow control is needed. |

***Q1-2: which option do companies agree regarding whether to adopt control PDU in Uu adaptation layer in this release?***

***Option 1: adopt the control PDU***

***Option 2: not adopt the control PDU***

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| Company | Yes or No | Comments |
| Qualcomm | Option 2 (No) | Similar comments in Q1-1. Please note that for Uu SRAP, we also have agreement that it only supports bearer mapping and remote UE identification. |
| CATT | Option 2 | It is clearly stated that for the Uu adaptation layer, bearer mapping and identification can be supported, and for the PC5 adaptation layer, only bearer mapping function can be supported. That’s to say, there is no need to further introduce a control PDU for adaptation layer in Rel-17 SL Relay. |
| vivo | Option 2 | Similar comments with Q1-1. |
| Ericsson | Option 2 |  |
| Lenovo | See comments | Whether to support control PDU should be discussed based on use case. If control PDU is not supported in this release, the field included in header e.g D/C is still needed for forward compatibility purpose. |
| Huawei, HiSilicon | Option 2 |  |
| Nokia | Option 2 |  |
| InterDigital | See comments | Same comments as Q1.1 apply here. |
| Spreadtrum | Option 2 |  |
| Sharp | Option 2 |  |
| ZTE | Option 2 |  |
| Apple | See comments | Same as answer in Q1.1. |
| Fujitsu | Option 2 | Similar to Q1-1. |
| Samsung | See comment | Similar to our answer to the previous question, we agree that this should be use-case driven, and we think there is indeed a use-case for this (flow control) on the Uu, and that this should be discussed in the QoS discussion. |
| Xiaomi | Option 2 |  |
| Intel | Option 2 |  |
| LG | Option 2 |  |
| Philips | See comments | Same as answer in Q1.1 |
| MediaTek | Option 2 |  |

**Rapporteur summary**:

In total, 19 companies have provided comments, wherein there are only 6 companies who are positive to introducing control PDU for the SRAP in PC5 SRAP and 5 companies support introducing control PDU for Uu SRAP. These companies think whether or not control PDU is needed should be use-case driven, and also needs to be discussed in QoS discussion. However, in the summary of QoS related contributions submitted by companies, it has proposed to handle control PDU in this agenda item.

Therefore, rapporteur would like to follow the majority view and formulate the following proposal:

1. Control PDU is not supported in neither PC5 SRAP layer (13/19) nor Uu SRAP layer (14/19) in this release.

## P6

Companies are invited to express views for the following questions.

***Q2: which option do companies agree based on which remote UE can obtain the local ID from the gNB if the local ID is present in PC5 adaptation layer header?***

* ***Option 1: via Uu RRC messages, including RRCSetup/RRCReconfiguration/RRCResume/RRCReestablishment***
* ***Option 2: Via SRAP header of RRCResume / RRCReestablishment***
* ***Option 3: relay UE forwards the local ID to remote UE via PC5 RRC message***
* ***Option 4: Specified as “all-zero” value in this release***

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| --- | --- | --- |
| Company | Yes or No | Comments |
| Qualcomm | Option 1 | Because only single hop is supported in Rel-17, we think Option 1 is sufficient and can handle all scenarios. And Option 1 is also aligned the agreed way how relay UE gets remote UE’s local ID.  For Option 2, we agree that it can also work, although we are not totally sure whether any security concern because SRAP header is not security protected. However, it is redundant if Option 1 is adopted. It can be regarded as enhancement on top of Option 1. Because we agreed local ID is only 8bit, the benefit to save its payload size in Uu RRC message seems to be marginal.  For Option 3, we understand the intention is to have a unified procedure for local ID acquisition of remote UE (but if only option 1 is agreed, we don’t have this issue). However, you anyway need to use RRCReconfiguration during path switch, so the spec change on Uu is un-avoided. Meanwhile, Option 3 also means a latency of 1 Uu RRC message delivery because relay UE can’t multiplex PC5 RRC message and forwarded Uu SRB0/1 RRC message (e.g. ***RRCSetup /RRCResume/RRCReestablishment)*** in same MAC PDU. |
| OPPO | Option-1 | We are open to all options, and see the first priority is to converge on a solution ASAP.  Considering a) 2 is not a widely applicable solution since for RRC setup and HO case, the embed UP solution does not work, and b) 3 is not a widely applicable solution to HO, 1 is the one that can work for all cases.  So to save spec effort, 1 seems a better choice. |
| vivo | Option 4 | Option 4 is simple and can avoid going against previous agreement of not supporting any PC5-SRAP-header related impacts other than bearer mapping. |
| Ericsson | Option 1 | Agree with Qualcomm and OPPO, option 1 is the best option. |
| Lenovo | Option 1 | The remote UE can get the local ID before the packet including adaptation layer header is transmitted. |
| Huawei, HiSilicon | Prefer Option 3, Fine with option 4. | Relay UE will anyway be configured with the remote UE ID. Please see the agreement “*Relay UE is configured by gNB with the local/temp remote UE ID to be used in adaptation layer by RRCReconfiguration message, after reporting the remote UE’s L2ID via SUI message to gNB and before forwarding the first SRB0 UL message of the remote UE.*”  In the RRC setup phase, the procedure will be: relay UE request the local ID for remote=>gNB allocate the local ID to relay UE. This is can be even done before RRC setup procedure. So, once relay UE get the local ID, it can directly forward the local ID to remote UE.  Using option 1 will just cause unnecessary delay for the remote UE ID configuration. |
| Nokia | Option 1 |  |
| InterDigital | Option 1 | Same view as Qualcomm. |
| Spreadtrum | Option 1 |  |
| Sharp | Option 1 | Considering it is agreed that “gNB can update the local remote UE ID based on its implementation, and sends the updated ID via RRCReconfiguration message”, option 1 is preferred to deliver the newly assigned ID and the updated ID. |
| ZTE | Slightly prefer option 3, option 1 is also acceptable | Both option works, With Option 1, four Uu RRC signalling (RRCSetup/RRCReconfiguration/RRCResume/RRCReestablishment) need to be enhanced. With Option 3, one PC5 signalling and one Uu RRC signalling(RRCReconfiguration) need to be enhanced. |
| Apple | Option 1 if remote UE ID is per gNB.  Option 3 if remote UE is per relay UE | It is reasonable to let gNB to share it in Uu RRC if the local ID is allocated per gNB. But if it is per-relayUE, then it is natural to shre it via PC5-RRC. |
| Fujitsu | Option 1 |  |
| ASUSTeK | Prefer Option 4, Option 3 is acceptable | We consider Option 4 because the remote UE does not need to set the local ID field in PC5 hop SRAP header for the relay UE to support U2N relay operation in this release, given the previous agreement that the relay UE is aware of the local ID of the remote UE.  Comparing between Option 1 and 3, we think both options require spec changes but Option 3 is simpler.  With above consideration, we prefer Option 4 and can also accept Option 3. |
| Samsung | Option 4 | Agree with vivo. Option 4 is in the spirit of the underlying assumption that the remote UE does not need to know the local ID. |
| Xiaomi | Option 4 | As the field has no real use in this release it is consistent to not introduce additional signaling to support it. |
| Intel | Option 1 | Option 1 is to be supported for direct to indirect path switching anyways. |
| LG | Option 4 | This field is unnecessary in this release. So, if we have to fill it with some value, all-zero may be non-controversial. |
| Philips | Option 1 |  |
| MediaTek | Option 4 |  |

**Rapporteur summary**:

In total, 19 companies have provided comments which are summarized as the below

**Option 1**: 13

**Option 3**: 3

**Option 4**:76

Rapporteur would like to follow the majority view and thus would like to suggest:

1. (13/19) Remote UE obtains the local ID from the gNB via Uu RRC messages including RRCSetup/RRCReconfiguration/RRCResume/RRCReestablishment*.*

## P9

Companies are invited to express views for the following questions.

***Q3: Regarding how to allocate LCID for PC5 RLC channel of remote UE Uu SRB0, which option do companies agree?***

* [**Option 1:  allocated by UE same as in R16 SL**](#_Toc93052901)
* [**Option 2: specified**](#_Toc93052902) **in RRC**

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| --- | --- | --- |
| Company | Yes or No | Comments |
| Qualcomm | Option 2 | We have agreed to use specified PC5 RLC configuration for SRB0 delivery. Then, it means that a LCID is reserved for it (Otherwise, how relay UE can know it is the default PC5 RLC channel?) |
| vivo | Option 2 | We think specified PC5 RLC configuration for SRB0 includes the LCID value. |
| Ericsson | Option 2 |  |
| Lenovo | Option 2 |  |
| Huawei, HiSilicon | Option 2 | Why do we need to re-open the discussion, with the below agreement long time ago?  “For the delivery of remote UE’s SRB0 RRC message, specified (fixed) configuration is used for the configuration of PC5 RLC channel.” |
| Nokia | Option 2 |  |
| InterDigital | Option 2 | Since this is a specified RLC channel, its value should be specified. |
| Spreadtrum | Option 2 |  |
| Sharp | Option 2 |  |
| ZTE | Option 2 |  |
| Apple | Option 2 |  |
| Fujitsu | Option 2 |  |
| ASUSTeK | Option 2 |  |
| Samsung | Option 2 | Agree with Huawei and others. |
| Xiaomi | Option 2 |  |
| Intel | Option 2 |  |
| LG | Option 2 |  |
| Philips | Option 1 |  |
| MediaTek | Option 2 |  |

**Rapporteur summary**:

In total, 19 companies have provided comments and 18 companies that LCID for PC5 RLC channel is specified for Uu SRB0.

Rapporteur thus would like to suggest:

1. (18/19) LCID for PC5 RLC channel is specified for remote UE Uu SRB0

# Conclusion

We have the following proposal:

[Proposal 1 Control PDU is not supported in neither PC5 SRAP layer (13/19) nor Uu SRAP layer (14/19) in this release.](#_Toc93926851)

[*Proposal 2* (13/19) Remote UE obtains the local ID from the gNB via Uu RRC messages including RRCSetup/RRCReconfiguration/RRCResume/RRCReestablishment*.*](#_Toc93926852)

[Proposal 3 (18/19) LCID for PC5 RLC channel is specified for remote UE Uu SRB0](#_Toc93926853)

3.1 Proposals in priority order

**Easy Proposals**

[Proposal 3 (18/19) LCID for PC5 RLC channel is specified for remote UE Uu SRB0](#_Toc93926797)

**Proposals for Online discussion**

[Proposal 1 Control PDU is not supported in neither PC5 SRAP layer (13/19) nor Uu SRAP layer (14/19) in this release.](#_Toc93926795)

[*Proposal 2* (13/19) Remote UE obtains the local ID from the gNB via Uu RRC messages including RRCSetup/RRCReconfiguration/RRCResume/RRCReestablishment*.*](#_Toc93926796)

# Reference

[1] [R2-2200943](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202201%20-%20RAN2_116bis-e,%20Online\Extracts\R2-2200943%20-%20Summary%20of%20AI%208.7.2.3%20on%20the%20adaptation%20layer%20(Ericsson).docx) summary of AI 8.7.2.3 on the adaptation layer, Ericsson