3GPP TSG-RAN WG2 Meeting #116-e R2-2111274

Electronic Meeting, November 1st – 12nd 2021

Agenda: 8.7.2.3

Source: MediaTek Inc.

Title: Summary of 8.7.2.3 Adaptation layer

Document for: Discussion, Decision

# 1 Introduction

This document is to summarize the proposals made by the contributions submitted under the AI 8.7.2.3.

# 2 Summary of 8.7.2.3

## 2.1 General

### 2.1.1 TS naming and terminologies

Several companies [1][2][5][11] proposed different naming for new adaptation layer:

* Sidelink Adaptation Layer Protocol (SALP)
* Relay Adaptation Protocol (RAP)
* Sidelink Relay Adaptation Protocol (SRAP)

**Proposal 1: RAN2 to decide naming of adaptation layer TS from following three options.**

* **Sidelink Adaptation Layer Protocol (SALP)**
* **Relay Adaptation Protocol (RAP)**
* **Sidelink Relay Adaptation Protocol (SRAP)**

[5] has one proposal to rephrase the terminologies based on which interface we are mentioned and the entity is at which UE (i.e., remote UE or relay UE), but the proposal also include naming of TS, we need to postpone this proposal after we decide the naming of new adaptation layer TS.

**Proposal 2: The terminologies, including “PC5 SRAP entity at remote UE”, “PC5 SRAP entity at relay UE” and “Uu SRAP entity at relay UE”, can be used in the specification if SRAP can be agreed.**

**Proposal 3: To avoid confusion of RB ID in the adaptation layer, as in Uu, a Uu DRB and a Uu SRB are mapped to different RLC channels (i.e., PC5 RLC channel and Uu RLC channel).**

### 2.1.2 Modelling and functionalities

**PC5 adaptation layer modelling**

[2] [5] have the same proposal that relay UE has single PC5 adaptation layer entity.

**Proposal 4: Relay UE has a single PC5 adaptation layer entity shared for multiple remote UEs.**

**Adaptation layer functionalities**

[5] also propose a high level function view of adaptation layer, the FFS point is the exact naming of adaptation layer.

**Proposal 5a: The functionalities of PC5 [SRAP] entity at remote UE includes:**

* **For UL or TX side, add the PC5 [SRAP] header and perform the bearer mapping, upon receiving data from upper layer;**
* **For DL or RX side, deliver the SDU to the corresponding Uu PDCP entity by removing the PC5 [SRAP] header, upon receiving data from lower layer.**

**Proposal 5b: The functionalities of PC5 [SRAP] entity at relay UE includes:**

* **For UL or RX side, deliver the packet to the collocated Uu [SRAP] entity and provide the remote UE ID related information, upon receiving data from lower layer;**
* **For DL or TX side, add the PC5 [SRAP] header, determine the egress PC5 connection and perform the bearer mapping, upon receiving packet from the collocated Uu [SRAP] entity.**

**Proposal 5c: The functionalities of Uu [SRAP] entity at relay UE includes:**

* **For UL or TX side, add the Uu [SRAP] header and perform the bearer mapping, upon receiving packet from the collocated PC5 [SRAP] entity;**
* **For DL or RX side, deliver the packet to the collocated PC5 [SRAP] entity and provide the remote UE ID related information, upon receiving data from lower layer.**

## 2.2 User plane

### 2.2.1 Relay/Non-Relay traffic differentiation

[1][2][5][6][7][11][14][17] share the same view on relay/non-relay traffic differentiation over Uu hop, but [11] has the different view over PC5 hop, however, which is conflict with SA2 conclusion.

**Proposal 6: For Uu hop, rely on LCID to differentiate relay and non-relay traffic, i.e., no impact to adaptation layer design.**

**Proposal 7: For PC5 hop, rely on L2-ID and LCID to differentiate relay and non-relay traffic, i.e., no impact to adaptation layer design.**

### 2.2.2 PDU format

[3, 8, 11] proposes that Uu adaptation layer header should always be present, but [13] has different views on this.

**Proposal 8: RAN2 to discuss the presence of adaptation layer header could be configurable or not.**

Companies [1-6, 8-13, 17] have different proposals about detail PDU format, but at lease companies all raise some “R” bits for byte alignments (if needed).

**Proposal 9: header should be bytes alignments with additional R bits.**

For different parts, suggest RAN2 to discuss them, maybe use Q and A to survey companies’ view?

**Proposal 10: RAN2 to discuss whether control PDU is needed and thus D/C field is needed or not? If D/C field is needed, further discuss PDU type field is needed or not.**

**Proposal 11: RAN2 to discuss detail PDU format, questions are listed below:**

* **Whether the remote UE ID field in PC5 adaptation layer header can be configured to be absent.**
* **Whether apply same PDU format for PC5 and Uu adaptation layer or not?**
* **Size of remote UE ID? [24, 10, 8, 5]**
* **Size of Radio Bearer ID? [5, 6]**
* **1 bit Indication whether it is DRB or SRB?**
* **Whether include remote UE bearer ID in the Uu adaption layer header also for SRB0 (e.g. value “0”)?**

## 2.3 Control plane

### 2.3.1 Bearer mapping

[2-8, 10-12, 15] have proposals related to bearer mapping, RAN2 to discuss below proposals:

**Proposal 12: For DL bearer mapping, RAN2 to down-select below two alternatives on how relay UE determines egress PC5 RLC bearer/LCID, whether remote UE ID is needed in the mapping is FFS.**

* **Alt-1: relay UE is configured by gNB with a mapping from Uu E2E bearer ID in Uu adaptation layer header to egress PC5 RLC bearer ID/LCID.**
* **Alt-2: relay UE is configured by gNB with a mapping from ingress Uu-RLC channel to egress PC5-RLC bearer ID/LCID.**

**Proposal 13: For UL bearer mapping, RAN2 to down-select below two alternatives on how relay UE determines egress Uu RLC bearer ID/LCID, whether remote UE ID is needed in the mapping is FFS.**

* **Alt-1: relay UE is configured by gNB with a mapping from Uu E2E bearer ID in PC5 adaptation layer header to egress Uu RLC bearer ID/LCID.**
* **Alt-2: relay UE is configured by gNB with a mapping from ingress PC5-RLC channel to egress Uu RLC bearer ID/LCID.**

**Proposal 14: For UL bearer mapping, remote UE is configured by gNB with a mapping from Uu E2E bearer ID to egress PC5 RLC bearer/LCID.**

2.3.2 Configuration for Relay UE

[1][2][3][4][5][10][11][12] share the similar views on the configuration for Relay UE.

**Proposal 15: 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 via SUI message to gNB and before forwarding the first SRB0 UL message of the remote UE.**

[2][3][8] also have similar proposals related to UE ID update, proposals are captured below:

**Proposal 16: It is left to gNB implementation to avoid collision on the usage of local/temp remote UE ID.**

**Proposal 17: gNB can update the local remote UE ID based on its implementation, and sends the updated ID via RRCReconfiguration message.**

**Proposal 18: Serving gNB can perform local remote UE ID update independent of the PC5 unicast link L2 ID update procedure**

### 2.3.3 Configuration for Remote UE

**Several companies proposed that remote UE is not necessary to be aware of it, because two remote UEs’ traffic can’t be multiplexed in same PC5 RLC bearer in this release (i.e. single hop scenario).**

**Proposal 19: RAN2 to discuss whether remote UE needs to know its local ID configured by gNB to be used in PC5 adaptation layer header in this release**

[1][8][12] share the similar view on configuration for remote UE.

**Proposal 20: If Proposal 19 concludes remote UE needs to know its local ID, RAN2 to discuss whether Remote UE can obtain UE ID to be used in PC5 adaptation layer from 1) RRCSetup message during setup procedure, 2) RRCReconfiguration message during handover procedure, 3) adaptation layer header of RRCResume for resume procedure, and 4) adaptation layer header of RRCReestablishment for reestablishment procedure.**

# 3 Conclusion

According to the summary in section 2, the following proposals are formulated, proposals marked with green is most companies share the similar view and can be agreed easier, proposals marked with blue require discussion due to different views from companies, proposals marked with grey is low priority or should be discussed later.

**Proposal 1: RAN2 to decide naming of adaptation layer TS from following three options.**

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**Proposal 2: The terminologies, including “PC5 SRAP entity at remote UE”, “PC5 SRAP entity at relay UE” and “Uu SRAP entity at relay UE”, can be used in the specification if SRAP can be agreed.**

**Proposal 3: To avoid confusion of RB ID in the adaptation layer, as in Uu, a Uu DRB and a Uu SRB are mapped to different RLC channels (i.e., PC5 RLC channel and Uu RLC channel).**

**Proposal 4: Relay UE has a single PC5 adaptation layer entity shared for multiple remote UEs.**

**Proposal 5a: The functionalities of PC5 [SRAP] entity at remote UE includes:**

* **For UL or TX side, add the PC5 [SRAP] header and perform the bearer mapping, upon receiving data from upper layer;**
* **For DL or RX side, deliver the SDU to the corresponding Uu PDCP entity by removing the PC5 [SRAP] header, upon receiving data from lower layer.**

**Proposal 5b: The functionalities of PC5 [SRAP] entity at relay UE includes:**

* **For UL or RX side, deliver the packet to the collocated Uu [SRAP] entity and provide the remote UE ID related information, upon receiving data from lower layer;**
* **For DL or TX side, add the PC5 [SRAP] header, determine the egress PC5 connection and perform the bearer mapping, upon receiving packet from the collocated Uu [SRAP] entity.**

**Proposal 5c: The functionalities of Uu [SRAP] entity at relay UE includes:**

* **For UL or TX side, add the Uu [SRAP] header and perform the bearer mapping, upon receiving packet from the collocated PC5 [SRAP] entity;**
* **For DL or RX side, deliver the packet to the collocated PC5 [SRAP] entity and provide the remote UE ID related information, upon receiving data from lower layer.**

**Proposal 6: For Uu hop, rely on LCID to differentiate relay and non-relay traffic, i.e., no impact to adaptation layer design.**

**Proposal 7: For PC5 hop, rely on L2-ID and LCID to differentiate relay and non-relay traffic, i.e., no impact to adaptation layer design.**

**Proposal 8: RAN2 to discuss the presence of adaptation layer header could be configurable or not.**

**Proposal 9: header should be bytes alignments with additional R bits.**

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**Proposal 12: For DL bearer mapping, RAN2 to down-select below two alternatives on how relay UE determines egress PC5 RLC bearer/LCID, whether remote UE ID is needed in the mapping is FFS.**

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**Proposal 18: Serving gNB can perform local remote UE ID update independent of the PC5 unicast link L2 ID update procedure**

**Proposal 19: RAN2 to discuss whether remote UE needs to know its local ID configured by gNB to be used in PC5 adaptation layer header in this release**

**Proposal 20: If Proposal 19 concludes remote UE needs to know its local ID, RAN2 to discuss whether Remote UE can obtain UE ID to be used in PC5 adaptation layer from 1) RRCSetup message during setup procedure, 2) RRCReconfiguration message during handover procedure, 3) adaptation layer header of RRCResume for resume procedure, and 4) adaptation layer header of RRCReestablishment for reestablishment procedure.**

# 4 References

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