3GPP TSG-RAN WG3 #114-e R3-215832

1-11 Nov 2021

Online

Agenda Item: 9.3.6.1

Source: CMCC

Title: Summary of offline discussion on PDU session modification corrections

Document for: Discussion

# Introduction

This contribution provides the summary of the following email discussion,

**CB: # 29\_PDUSessModCorrections**

**- Clarify the PDU session NAS PDU Delivery handling when only the PDU Session AMBR IE is modified.**

**- Provide CR if agreeable**

(CMCC - moderator)

Summary of offline disc [R3-215832](file:///D%3A%5C3gpp%E4%BC%9A%E8%AE%AE%5CRAN3%5CRAN3%23114%5CCB%5CCB%20%23%2029_PDUSessModCorrections%5CInbox%5CR3-215832.zip)

# For the Chairman’s Notes

Propose to capture the following:

(To be added)

# Discussion

During this meeting, several CRs on PDU session modify have been submitted which believes the current spec is not clear enough and some clarifications are needed. And all potential options are subject to the modifications on current description in TS 38.413 below,

**<Start of quotation>**

- If the *NAS-PDU* IE is received for the PDU session, the NG-RAN node shall pass it to the UE when modifying the Data Radio Bearer configuration. The NG-RAN node does not send the NAS PDU received for the PDU session when all the QoS flows to be added or modified are failed and no QoS flow was requested to be released, even if e.g. the NG-U UP TNL modification is successful.

**<End of quotation>**

* **Case 1: PDU session modification without QoS flow to be added or modified or released.**

According to the submitted contributions, all contributions mention the case when the NG-RAN receives the PDU Session Resource Modify Request message, including:

* The NAS-PDU including the **Session AMBR**
* The ***PDU Session Aggregate Maximum Bit Rate*** IE

Under such case, [1] and [4] think that the current spec text indicates that the NAS-PDU will not be sent to the UE since there’s no Data Radio Bearer configuration modified. And [3] thinks current spec text is unclear about whether to send NAS-PDU to UE.

**Question 1: Do companies think NG-RAN shall send NAS-PDU to UE under Case 1?**

|  |  |
| --- | --- |
| Company | Comment |
| CMCC | Yes. Although NG-RAN is agnostic to the content of NAS-PDU, if NG-RAN receives a PDU Session Resource Modify Request message in which PDU Session AMBR IE is modified, it should assume that the Session AMBR parameter is also provided in NAS-PDU. In order to avoid mismatch between NG-RAN and UE, the NG-RAN shall send NAS-PDU to UE.And as witnessed in our current network, the CN may send a Modify Request message which only includes NAS-PDU and PDU Session AMBR IE for the purpose of UL rate limitation at the UE side. If the NAS-PDU is not transmitted to UE under such case, the UE is not able to perform UL rate limitation accordingly. |
| CATT | YesWhen CN send PDU Session Aggregate Maximum Bit Rate to NG-RAN node, the corresponding NAS-PDU should also be sent to UE to enable UE to update this information  |
| Ericsson | DL PDU session AMBR is enforced by the network. In this case, it does not seem necessary to update UE. |
| Nokia | Yes.  |
| Huawei | Yes.Agree with CMCC/CATT. About the Ericsson’ comment, it is specified in TS 23.501 that: - *UPF and UE perform Session-AMBR enforcement as specified in clause 5.7.1.8 and the UPF performs counting of packets for charging.*Also as mentioned in [R3-215265](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_114-e%5CDocs%5CR3-215265.zip), the session-AMBR is included the PDU session level NAS-PDU signaled to the UE. |

However, under Case 1, some company believes that the update of PDU Session AMBR IE in NG-RAN will result in the RRC reconfiguration on logical channel configuration (such as the update of the PrioritizedBitRate) for some associated DRBs over Uu, which could also be regards as ‘modifying the Data Radio Bearer configuration’.

**Question 2: Is it a common understanding that ‘modifying the Data Radio Bearer configuration’ also includes RRC reconfiguration over Uu? Companies are invited to provide comments.**

|  |  |
| --- | --- |
| Company | Comment |
| CMCC | It seems that 38413 has not provided a clear definition on ‘modifying the DRB config’, so it is at least unclear to us what is included in DRB configuration modification.Even though it also includes RRC Reconfiguration over Uu, the PriorotizedBitRate is configured in CellGroupConfig rather than RadioBearerConfig in which the DRB related information is provided. So it is quite vague to us on what is included by indicating ‘modifying DRB config’.However, we are also fine if it is the common understanding that modifying DRB config also includes RRC reconfiguration on Prioritized bit rate for a logical channel associated to the DRB; otherwise, we would like to make it clearer in the text. |
| CATT | We think it depends on the implementation. It could not be guaranteed that update of PDU Session AMBR IE in NG-RAN will always result in the RRC reconfiguration on logical channel configuration. |
| Ericsson | “modify the Data Radio Bearer configuration” includes “RRC reconfiguration over Uu” is our understanding. |
| Nokia | Agree with CATT. What happens in the gNB may depend on implementation for the scenario discussed.  |
| Huawei | We understand the current texts are that “modifying the Data Radio Bearer configuration” means the RRC reconfiguration including the DRB level parameters. And question whether “update of PDU Session AMBR IE in NG-RAN will result in the RRC reconfiguration?” our understanding is not always possible (agree with CATT) Basically, it depends on the NG-RAN’s decision of new calculated the UE-AMBR value upon receiving the update of Session-AMBR. The NG-RAN can decide whether to update DRB level parameters or not. - (note that according to TS 23.501, it is specified that “*Each (R)AN shall set its UE-AMBR to the sum of the Session-AMBR of all PDU Sessions with active user plane to this (R)AN up to the value of the UE-AMBR received from AMF*”)In addition, there are cases that the update of Session-AMBR will not result at any modifying the DRB config or RRC reconfiguration. But current procedure texts don't allow the NAS-PDU to be sent to UE in this case. We suggest to remove the **‘modifying the Data Radio Bearer configuration’ to avoid any ambiguity.**  |

In addition, [1] provides additional cases, for which current spec text does not cover,

* **Case 2: Only partial QoS flows to be added or modified are failed**

Considering the following case at NG-RAN:

* + Request: QoS flow 1 and QoS flow 2 are to be added.
	+ NG-RAN Result: QoS flow 1 is added, while QoS flow 2 is failed.

And [1] believes the NAS-PDU should be sent from NG-RAN to UE under such case; however, current spec text does not mention such case, so it may lead to misunderstanding.

* **Case 3: QoS flow to be added is failed, and QoS flow to be released is successful.**

Considering the following case at NG-RAN:

* + Request: QoS flow 1 to be added, QoS flow2 to be released
	+ NG-RAN Result: QoS flow 1 is failed to be added, while QoS flow 2 release is always successful.

And [1] believes the NAS-PDU should be sent from NG-RAN to UE under such case; however, current spec text does not mention such case, so it may lead to misunderstanding.

Moreover, some company also provides the following case, for which current spec text does not cover,

* **Case 4: All QoS flows to be added or modified are failed, and PDU Session AMBR IE to be modified is successful.**

Considering the following case at NG-RAN:

* + Request: QoS flow 1 & 2 to be added, and PDU Session AMBR IE to be modified
	+ NG-RAN Result: All QoS flows to be added are failed, while update of PDU Session AMBR IE is always successful.

Under such case, it is still controversial on whether to send NAS-PDU from NG-RAN to UE.

**Question 3: Do you think it is necessary to update the current spec text regarding Case 1-4?**

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| --- | --- |
| Company | Comment |
| CMCC | At least for Case 1 since the very issue occurs in our current network, and other cases can also be considered. |
| CATT | We think all cases i.e. case 1-4 should be considered |
| Nokia | Agree that clarification is useful. |
| Huawei | Yes. It is better to have common understanding with the finally (agreed) CR. And we can analyse the above cases respectively based on the CR in the next round.  |

Based on the above mentioned cases, [2] [3] and [4] believe it is necessary to update the current spec text in order to make it more clear. And the proposed CRs are listed as follows,

**Option 1**- Huawei, China Unicom and Orange [2] proposes the following text which considers Case 1-3:

- If the *NAS-PDU* IE is received for the PDU session, the NG-RAN node shall pass it to the UE unless the NG-RAN reports the *PDU Session Resource Failed to Modify List* IE contained in the PDU SESSION RESOURCE MODIFY RESPONSE message for the concerned PDU session.

**Option 2** – CMCC and CATT [3] proposes the following text which considers Case 1:

- If the *NAS-PDU* IE is received for the PDU session, the NG-RAN node shall pass it to the UE when modifying the Data Radio Bearer configuration, or when the *PDU Session Aggregate Maximum Bit Rate* IE included in *PDU Session Resource Modify Request Transfer* IE is successfully modified. In case no PDU Session Aggregate Maximum Bit Rate IE is included, the NG-RAN node does not send the NAS PDU received for the PDU session when all the QoS flows to be added or modified are failed and no QoS flow was requested to be released, even if e.g. the NG-U UP TNL modification is successful.

**Option 3** - ZTE [4] proposes the following text which considers Case 1:

- If the *NAS-PDU* IE is received for the PDU session, the NG-RAN node shall pass it to the UE. The NG-RAN node does not send the NAS PDU received for the PDU session when all the QoS flows to be added or modified are failed and no QoS flow was requested to be released, even if e.g. the NG-U UP TNL modification is successful.

**Question 4: If the answer to Q3 is yes, which option do you prefer?**

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| --- | --- | --- |
| Company | Which option? | Comment |
| CMCC | Option 2 or 1 | Since the current text is unclear to us, we would like to make it more clear at least under Case 1. So Option 2.If companies identify that other cases could cause the similar unclearness as in Case 1, then Option 1 is also acceptable to us. |
| CATT | Option 2 | There is scenario that all request on QoS flow to be added or modified failed while the update of UL TNL Address is successful. In this case, the NG-RAN node would not report *PDU Session Resource Failed to Modify List*. However, it is not needed to send NAS-PDU to UE.The description in option 1 is not aligned with above scenario [Huawei reply]: For option 1 in this case, it is true that the NG-RAN will send the NAS-PDU to the UE since the NAS-PDU may carry the Session-AMBR. Then the SMF shall send another round NAS-PDU. As analysed below, option 1 is simple one for both NG-RAN and CN.  |
| Ericsson |  | We would like to propose the text as in below (it is Option 2 + Option 1 + Rewording):- If the *NAS-PDU* IE is received for the PDU session, the NG-RAN node shall pass it to the UE when modifying the Data Radio Bearer configuration or when the PDU session parameters successfully modified need to inform UE, e.g. the PDU Session AMBR modification is successful. Reasoning: 1. The current specification on “when not to sent NAS-PDU” is inaccurate, because if all the QoS add/mod fails, if the PDU session AMBR is included, the NAS-PDU may need to be sent to the UE;
2. The specification should be made general, not only to state “PDU session AMBR”. If companies see the need to mention it, we could give it as an example, as the proposal above.
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| Nokia | Option 4 | After more thinking we come to the following wording:If the *NAS-PDU* IE is received for the PDU session, the NG-RAN node shall pass it to the UE regardless of the outcome of the PDU Session Resource modification. |
| Huawei | Option 1 preferred | As mentioned in 5265, option 1 has the following benefits. * Currently there exists no indication of PDU-session level NAS non-delivery to the SMF, e.g. via the NAS non-delivery. For rest options, the SMF may have to rely on the *QoS Flow Failed to Add or Modify List* IE to derive the non-delivery of NAS-PDU in the modify response. While for option 1, it can directly be aware of the non-delivery of the NAS-PDU based on the *PDU Session Resource Failed to Modify List* IE.
* The NG-RAN is designed transparent to the content of the NAS-PDU. For rest options, the NG-RAN has to ascertain the results of the QoS flow level admission control to determine the delivery of the NAS-PDU, while option 1 here can largely simplify the NG-RAN node design.

**For option 2/suggested change from Ericsson**: It may work for the Session-AMBR update case, but we need to consider those NAS-PDU Session parameters not included in the NGAP IEs e.g., RQ timer value, or QoS rules etc. as mentioned in 5265. Anyway, we may suggest to remove the **‘modifying the Data Radio Bearer configuration’** from the procedure texts to avoid any ambiguity, the same as option 3 suggested. So the removal of this wording could be seen as the first step to move forward.  |

# Conclusion, Recommendations [if needed]

If needed

# References

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| [1] | [R3-215265](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_114-e%5CDocs%5CR3-215265.zip) | Correction of PDU session resource modify (Huawei, China Unicom, Orange) |
| [2] | [R3-215266](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_114-e%5CDocs%5CR3-215266.zip) | Correction of PDU session resource modify (Huawei, China Unicom, Orange) |
| [3] | [R3-215687](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_114-e%5CDocs%5CR3-215687.zip) | Correction of NAS PDU in PDU Session Modify (CMCC) |
| [4] | [R3-215752](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_114-e%5CDocs%5CR3-215752.zip) | PDU session NAS PDU Delivery (ZTE) |