**3GPP TSG-RAN2 #113bis-e R2-2104534**

**Electronic meeting, April 12 – April 20, 2021**

**Agenda item:**5.3.2

**Source:** LG Electronics (Rapporteur)

**Title:** Report of [AT113bis-e][004][NR15] PDCP SDAP

**Document for:** Discussion and Decision

# 1. Introduction

This document is to report the result of the following email discussion in RAN2#113bis-e Meeting.

* [AT113bis-e][004][NR15] PDCP SDAP (LGE)

 Scope: Treat R2-2103301, R2-2103302, R2-2103303, R2-2104201, R2-2104202, R2-2104293

 Phase 1, determine agreeable parts, Phase 2, for agreeable parts Work on CRs.

 Intended outcome: Report and Agreed-in-principle CRs.

 Deadline: Schedule A

# 2 Contact Information

|  |  |
| --- | --- |
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# 3. Phase I Discussion

## 3.1 PDCP re-establishment after RRC re-establishment

[R2-2103301](file:///D%3A%5C3GPP%5CRAN2%5CTSGR2_113bis-e%5Cdocs%5CR2-2103301.zip) Discussion on the issue of PDCP re-establishment after RRC re-establishment NEC discussion Rel-15 NR\_newRAT-Core

[R2-2103302](file:///D%3A%5C3GPP%5CRAN2%5CTSGR2_113bis-e%5Cdocs%5CR2-2103302.zip) Correction on PDCP re-establishment after RRC re-establishment NEC CR Rel-15 38.323 15.7.0 0066 - F NR\_newRAT-Core

[R2-2103303](file:///D%3A%5C3GPP%5CRAN2%5CTSGR2_113bis-e%5Cdocs%5CR2-2103303.zip) Correction on PDCP re-establishment after RRC re-establishment NEC CR Rel-16 38.323 16.3.0 0067 - A NR\_newRAT-Core

**Reason for change**

According to the current spec, the DRBs are suspended when the NW configure the UE to re-establish PDCP after RRC re-establishment, thus the unconfirmed PDCP SDUs of AM DRBs before re-establishment will be treated as new packets from upper layer for transmission.

However, to support lossless transmission and in-order delivery at RAN side, the COUNT of the unconfirmed PDCP SDUs before PDCP re-establishment should be reused for retransmission or transmission in the new cell after successful RRC re-establishment (corresponding to the behavior of AM DRBs which are not suppsended).

**Q1: Do you agree to the CR?**

|  |  |  |
| --- | --- | --- |
| Company | Agree/Disagree/Agree with modification | Detailed Comments |
| LG | Disagree | DRB suspend and PDCP suspend are different events. The text “for suspended AM DRBs” in PDCP specification is referring to the case when “PDCP suspend” was performed before. Thus, the unconfirmed PDCP SDUs of AM DRBs are treated as new packets only when the PDCP suspend was performed before.Note that, in RRC specification, “PDCP suspend” is performed only when the UE receives RRCRelease message. |
| vivo | Disagree | Agree with LG’s understanding. UE additionally indicate PDCP suspend to lower layers of all DRBs when RRCRelease message with *suspendConfig.* When upper layers request a PDCP entity suspend, the receiving PDCP entity shall set TX\_NEXT to the initial value*.* This is why unconfirmed PDCP SDUs of AM DRBs are treated as new packets when RRC resume successfully.For RRC reestablishment case, no PDCP suspend is indicated to PDCP layer. For all DRBs, the corresponding transmitting PDCP entity will maintain the transmitting status when the RRC re-establishment procedure is initiated. Thus, PDCP can re-transmit unconfirmed PDCP SDUs of AM DRBs with PDCP SN which are allocated before. |
| OPPO | Disagree | Agree previous comments |
| Futurewei | Disagree | Agree with LG. |
| Google | Disagree | Agree with previous comments |
| Qcom | Disagree | Agree with above comments  |
| NEC | Agree | We should capture clearly in the spec that in case of PDCP re-establishment after RRC re-establishment, for AM DRBs, the UE shall perform transmission and retransmission of the unconfirmed SDU using the COUNT value used before PDCP reestablishment.With regarding to comments from LG, yes, suspended DRB and PDCP suspend are different events, but why use suspended DRB to refer to PDCP suspend (and there no such definition in the PDCP spec stating that suspended DRBs actually means DRBs that have performed PDCP suspend before)? We should avoid having different definitions in different specifications regarding to the same terminology, as it will cause ambiguity. The straight forward way is to specify it clearly in the PDCP spec as "for suspended AM DRBs, and the PDCP entity has performed suspend before". |
| HW | Disagree | Agree with LG. There should be no room for ambiguity in PDCP spec as only “PDCP suspend” along with DRB suspend can be notified by upper layer involving the PDCP re-establishment when resume. For other cases, PDCP is not aware of DRB suspend. |
| CATT | Disagree | Agree with LG. |
| ZTE | Disagree | Agree with LG on that the PDCP suspension is a different event from the DRB suspension.  |
| Xiaomi | Disagree | Agree with LG and Samsung. |
| MediaTek | Disagree |  |
| Ericsson | Disagree | Agree to disagree with the same understanding as other companies above. |
| Apple | Disagree | Agree with the views from LG above. |
| Samsung | Disagree, but | Tend to agree with previous comments but it may be misleading to someone again and this issue may be revisited with another contribution. To avoid this, it would be good to capture the clarification in the meeting note, e.g. The text “for suspended AM DRBs” in PDCP specification is referring to the case when “PDCP suspend” was performed before. |
| Sequans | Agree (possibly with better wording) | We agree with NEC analysis.The issue was introduced by R2-1902780, which was supposed to apply to the PDCP suspend case only.In the case of PDCP re-establishment after RRC re-establishment, UE would have performed “suspend all RBs, except SRB0”.So when performing PDCP reestablishment, UE will apply “for suspended AM DRBs” behaviour, which breaks lossless behaviour.The problem is that:- PDCP suspend and DRB suspend are different in RRC.- there is no reason to have the understanding that “DRB suspend” in PDCP specification would correspond only to the case where a “PDCP suspend” was sent just after “DRB suspend” in RRC. |
| Intel | Disagree | Agree with LG. |
| Nokia | Disagree | Upon RLF, all DRBs are suspended. RLF is then followed by re-establishment. So we believe the current text is correct. In other words, it's not only about resume from INACTIVE. |
| Sharp | Disagree | Agree with LG. |

**Conclusion on Q1**

- Agree: 2

- Disagree: 17

Clear majority companies do not support the CRs in R2-2103302 and R2-2103303.

**Proposal 1: R2-2103302 and R2-2103303 are not pursued.**

## 3.2 Integrity check for interspersed ROHC feedback

[R2-2104201](file:///D%3A%5C3GPP%5CRAN2%5CTSGR2_113bis-e%5Cdocs%5CR2-2104201.zip) Integrity check for interspersed ROHC feedback LG Electronics Inc. (PDCP rapporteur) CR Rel-15 38.323 15.7.0 0068 - F NR\_newRAT-Core Late

[R2-2104202](file:///D%3A%5C3GPP%5CRAN2%5CTSGR2_113bis-e%5Cdocs%5CR2-2104202.zip) Integrity check for interspersed ROHC feedback LG Electronics Inc. (PDCP rapporteur) CR Rel-16 38.323 16.3.0 0069 - A NR\_newRAT-Core Late

**Reason for change**

The interspersed ROHC feedback is transmitted via PDCP Control PDU, and the PDCP Control PDU is neither ciphered nor integrity protected. However, in the current PDCP specification, it is specified that ciphering is not applied but not specified that integrity protection is not applied. It could be misled that integrity protection is applied to PDCP Control PDU including interspersed ROHC feedback.

**Q2: Do you agree to the CR?**

|  |  |  |
| --- | --- | --- |
| Company | Agree/Disagree/Agree with modification | Detailed Comments |
| LG | Agree | This is rapporteur CR. Note that similar change is proposed for EHC in Rel-16. |
| vivo | Disagree | In TS 38.323 clause 5.9, it is specified clearly that “The integrity protection is not applicable to PDCP Control PDUs.” Thus, we think the change is not necessary. |
| OPPO | Disagree | Agree with vivo the spec is already clear. |
| Futurewei | Disagree | Agree with Vivo that Clause 5.9 clearly specifies that “The integrity protection is not applicable to PDCP Control PDUs.”Regarding the sentence being questioned in clause 5.7.5, the intention of that sentence is not to specify the processing sequence, but to specify that decompression is performed on a non-ciphered compressed header, otherwise the decompression won’t be done correctly. If it were meant to specify the processing sequence, it would have, instead, said “after performing re-ordering and duplicate discarding”, which is the last step before header decompression.Therefore, these changes and those being proposed for EHC are unnecessary. |
| Google | Disagree |  |
| QCOM | Disagree | CR is adding clarification that ROHC feedback is not integrity protected. It is already there in spec, so strictly speaking there is no need for it |
| NEC | Disagree | Agree with vivo that integrity protection is not applicable to PDCP control PDU, so there is no need for the change. |
| HW | Disagree | Agree with vivo. |
| CATT | Disagree | Besides above comments, integrity protection is identified in the PDCP PDU format with MAC-I field. It seems there is no room for misunderstanding. |
| ZTE | Disagree | Agree with vivo on that the current spec have defined already. |
| Xiaomi | Disagree | Agree with vivo. |
| MediaTek | Disagree, but | We know that it is more of a clarification than an issue with the spec, we can follow majority’s views. |
| Ericsson | Disagree | First change is ok but not essential – can be handled by the other CR (reworded). Other changes not needed. |
| Apple | Disagree | As mentioned by vivo, the claus 5.9 of 38.323 specifies “integrity protection” is not applicable for PDCP Control PDUs. Further clarifications are not needed. |
| Samsung | Agree | The specification is already clear in Section 5.9. However, it may be confused in the procedural text given that UP IP can be applied in NR. One minor comment is that it would be better to put “integrity protection” before “ciphering” for the transmit operation, which is aligned with the general procedure.  |
| Sequans | Disagree | Agree with vivo. |
| Intel | Disagree | Agree with vivo. |
| Nokia | Agree |  |
| Sharp | Disagree | Agree with vivo |

**Conclusion on Q2**

- Agree: 3

- Disagree: 16

Clear majority companies do not support the CRs in R2-2104201 and R2-2104202.

**Proposal 2: R2-2104201 and R2-2104202 are not pursued.**

## 3.3 Change of PDU session ID

[R2-2104293](file:///D%3A%5C3GPP%5CRAN2%5CTSGR2_113bis-e%5Cdocs%5CR2-2104293.zip) Clarification on the change of PDU session ID Samsung CR Rel-15 38.313 15.13.0 2568 - F NR\_newRAT-Core Late

**Reason for change**

From the current specification, it is unclear whether PDU session ID (i.e. pdu-Session under SDAP-Config in DRB-ToAddMod) can be changed using DRB modification procedure.

Even though the latest specification does not restrict such configuration, such scenario was never discussed in RAN2, and thus it should not be allowed to avoid any malfunction.

Note that TS 37.324 (only) defines QoS flow remapping scenario based on the RRC reconfiguration, but from our understanding, the scenario assumes that it can occur within the same PDU session.

**Q3: Do you agree to the CR?**

|  |  |  |
| --- | --- | --- |
| Company | Agree/Disagree/Agree with modification | Detailed Comments |
| LG | Agree | We have the same understanding that PDU session ID can be changed only by release/addition of the DRB. |
| OPPO | Disagree | We don’t see any issue, however we are open to clarify it, maybe in stage 2 specification. |
| Google | Disagree | It is unclear what the problem is. If the network chooses to invoke DRB modification to change the PDU session of a DRB, then it should ensure there is no problem in the configuration. |
| Qcom | Agree | We carry the same understanding  |
| NEC | Agree with modification | We are OK the intention of the change, but we want to align with the wording in ***sdap-HeaderUL*** and ***sdap-HeaderDL,*** i.e. by using“The field cannot be changed after a DRB is established.” |
| HW | Disagree | Not clear about the intention and the issue here.If the intention is to restrict that the PDU session ID cannot be modified for a concerned PDU session. We think it has been reflected in TS 23.501, and obviously this is not a RAN concept so this CR is not needed. Table 5.6.1-1: Attributes of a PDU Session

|  |  |  |
| --- | --- | --- |
| PDU Session attribute | May be modified later during the lifetime of the PDU Session | Notes |
| S-NSSAI of the HPLMN | No | (Note 1) (Note 2) |
| S-NSSAI of the Serving PLMN | Yes | (Note 1) (Note 2) (Note 4) |
| DNN (Data Network Name) | No | (Note 1) (Note 2) |
| PDU Session Type | No | (Note 1) |
| SSC mode | No | (Note 2)The semantics of Service and Session Continuity mode is defined in clause 5.6.9.2 |
| PDU Session Id | No |  |
| User Plane Security Enforcement information | No | (Note 3) |
| Multi-access PDU Connectivity Service | No | Indicates if the PDU Session provides multi-access PDU Connectivity Service or not. |

But if the intention is to restrict that “DRB to PDU session ID remapping” is not allowed. We think it was never discussed before and can be left to proper NW implementation for now unless any critical issue is identified. |
| CATT | Agree | We think the understanding in the CR is reasonable. |
| ZTE | Disagree | Considering UE behavior is clear by following the specification, if NW would like to reconfigure the PDU session ID for a DRB, NW shall guarantee no problem will be caused. From specification point of view, there is no need for us introduce this restriction to NW and no more enhancements would be considered. |
| Xiaomi | No strong view | We should firstly understand in which case the configuration could be used, and what the potential issues are. |
| MediaTek | Agree |  |
| Ericsson | Agree with understanding | We are unsure a CR is needed though as the scenario for which only the PDU-session id would be changed is unclear. |
| Apple | Agree | We think that this issue clarification seems reasonable.  |
| Samsung | Agree | In the field test, the concerned configuration happens. However, the corresponding UE behaviour is not defined in the specifications. So, if UE receives such configuration, the only choice what UE can do is RRC connection reconfiguration failure–as UE cannot comply it–which results RRC reestablishment procedure. For example, there is no UE behaviour between different SDAP entities in 37.324. Note that we establish SDAP entity per PDU session. We do not mind where to capture the expected configuration (e.g. stage2/stage3/meeting minutes), but at least want to have common understanding whether such configuration is allowed. |
| Sequans | Agree | We have the same understanding. |
| Intel | Agree with modification | Agree with the change proposed by NEC for consistency.  |
| Nokia | Disagree | Agree with Google, Huawei and ZTE. Tricky reconfigurations can usually be handled using different LCID.  |
| Sharp | Disagree | We disagree to the proposed change. Since “PDU session with PDU session ID=a” and “PDU session with PDU session ID=b” are different PDU sessions, these PDU sessions are treated separately. There is no concept of “PDU session ID change”. |

**Conclusion on Q3**

- Agree: 7

- Agree with modification: 2

- No strong view: 1

- Agree with understanding but CR is not needed: 1

- Disagree: 6

There are no clear majorities on this issue. Majority companies think that PDU session ID is not changed during the lifetime of the DRB, but there is hesitance to specify it in the specification. Moreover, some companies think that no problem is foreseen even if the network changes the PDU session ID.

Considering that this is Rel-15 CR, and there are no overwhelming majorities to support the CR, the rapporteur suggests not to pursue this CR.

**Proposal 3: R2-2104293 is not pursued.**

# 4. Phase I Conclusions

**Proposal 1: R2-2103302 and R2-2103303 are not pursued.**

**Proposal 2: R2-2104201 and R2-2104202 are not pursued.**

**Proposal 3: R2-2104293 is not pursued.**

# 5. Phase II Discussion

Please indicate in the table below if you object to any of the proposals in Phase 1 discussion.

|  |  |  |
| --- | --- | --- |
| Company | Unacceptable proposal  | Reason and alternative proposal |
| NEC | Proposal 1 | We are OK if the majority companies think “suspended DRB” is referring to “PDCP suspended was performed before” in PDCP. However, “suspended DRB” is one undefined terminology in the PDCP specification. Similar to AM DRB, UM DRB, DAPS bearer and (non-)split bearer in section 3.1, at least one definition should be added in 3.1 to clarify the meaning of suspended DRB. We don’t think we can leave the spec as it is, as there is very significant difference from our common understood “suspended DRB” in RRC.Our alternative proposals are: Proposal 1: RAN2 confirm that “suspended DRB” in PDCP spec is a DRB whose PDCP entity has just performed PDCP suspend.Proposal 2: The term “suspended DRB” is added in section 3.1 of TS 38.323, and the definition is “a data radio bearer whose PDCP entity that has just performed PDCP suspend”. |
| Samsung | Proposal 3 | As indicated in Phase 1, we do not mind whether to agree the CR for the issue, but at least, we would like to give a general understanding to our implementation. In that sense, would it be possible to capture it to the meeting minutes e.g. as follows?"The field *pdu-Session* of *SDAP-Config* of a DRB cannot be changed after that DRB is established." |
| Nokia | Proposal 3 | We are fine with capturing it as suggested above i.e. “The field *pdu-Session* of *SDAP-Config* of a DRB cannot be changed after that DRB is established” |

# 6. Phase II Conclusions

Regarding Proposal 1, NEC still have concern that “suspended DRB” is not clear, and propose to add the definition of “suspended DRB” in the PDCP specification. However, during Phase 1 discussion, most companies think that DRB suspend and PDCP suspend are different events, and the text “for suspended AM DRBs” in PDCP specification is referring to the case when “PDCP suspend” was performed before.

Unless NEC’s concerns are shared by majority companies, the rapporteur think it is difficult to agree on any changes. Thus, it is proposed to stick to the proposal 1 in Phase 1 discussion.

**Proposal 1: R2-2103302 and R2-2103303 are not pursued.**

Regarding Proposal 2, there is no comment received. Thus, the Proposal 2 could be agreed.

**Proposal 2: R2-2104201 and R2-2104202 are not pursued.**

Regarding Proposal 3, Samsung and Nokia proposed to capture the general understanding in the Chairman’s note. During Phase 1 discussion, slight majorities were positive on the CR. Thus, rapporteur think that capturing the general understanding in the Chairman’s note is a middle-ground solution, and propose to go with it.

**Proposal 3: R2-2104293 is not pursued.**

**Proposal 4: Capture in the chairman’s note that “The field pdu-Session of SDAP-Config of a DRB cannot be changed after that DRB is established”.**