**3GPP TSG-RAN WG2 Meeting #124 R2-23xxxxx**

**Chicago, USA, November 13-17, 2023**

**Source: InterDigital**

**Title:****Summary of [Post123bis][415][Relay] Rel-18 relay PDCP identified open issues (InterDigital)**

**Agenda Item:** **7.9.1**

**Document for:** **Discussion and Decision**

# 1. Introduction

This is the list of open issues related to PDCP generated from the following email discussion:

* [Post123bis][415][Relay] Rel-18 relay PDCP CR (InterDigital)

 Scope: Update the running CR and generate an open issue list.

 Intended outcome: Draft CR and open issue list for next meeting

 Deadline: Medium (2 weeks)

Discussion of open issues and update of the running CR will use the following guidance from chairman:

Guidance for all post-meeting discussions on running CRs/open issues (also applicable to AI 7.9.1):

1. Update the running CR with agreements from the meeting

2. Rapporteur to propose resolutions for straightforward open issues which can already be included in the running CR

3. Get input on stage-3 issues that require further input from companies to make a decision:

 o Focus on stage-3 issues which are better handled via offline, e.g. signaling details, parameter values/ranges, NOT functionality discussion

 o For these issues, the discussion rapporteur submits a report with proposals to the next meeting, and input via company Tdocs should be avoided

4. Identify the remaining open issues that need to be solved for WI completion in the next meeting

 o Company Tdocs for the next meeting should focus on these issues

### 1.1 Contact Points

Respondents to this email discussion are kindly asked to fill in the following table for contact information.

|  |  |  |
| --- | --- | --- |
| Company | Name | Email Address |
| vivo | Boubacar Kimba D.A. | kimba@vivo.com |
| ZTE | Lin Chen | chen.lin23@zte.com.cn |
| CATT | Hao Xu | xuhao@catt.cn |
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# 2. Discussion

The discussion in this email discussion is focused on the “Editor’s notes” included in [1]. Note that some minor issues such as definition and terminology alignments are not discussed here, which can be addressed in running CR drafting process.

### 2.1 Data Volume Calculation for the non-3GPP entity

This is related to the following editor’s note:

Editor’s Notes: Whether and how to consider the data volume pending for transmission in the non-3GPP entity in the specification text is FFS.

In DC, the data volume calculation used for comparison with the split buffer threshold accounts for the total amount of PDCP data volume, and total RLC data volume pending for transmission in the primary and secondary RLC entities.

For MP, it is not clear how to capture the total data volume considering that:

* For a SL indirect path, PDCP is associated with an SRAP entity in the current specification and not an RLC entity. The SRAP entity is assumed to not buffer any data.
* For N3C indirect path, PDCP is associated with the non-3GPP interface. Whether the N3C interface is able to buffer data is outside of the 3GPP scope, and so it is not clear whether the N3C interface should indicate buffered data.

Q1: Do you agree to address this open issue as follows:

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| --- | --- | --- |
| Issue Number | Description  | Rapporteur’s Proposed Resolution |
| 1 | *Whether and how to consider the data volume pending for transmission in the non-3GPP entity in the specification text as well as the RLC entity of the indirect path.* | Issue is non-functional and can be resolved before the next meeting.* For SL indirect path, refer to the data volume in the “SL RLC entity associated with the SRAP entity”
* For N3C indirect path, consider data in the N3C interface “if available”

The corresponding specification text would captured as:*- if the total amount of PDCP data volume, RLC data volume pending for initial transmission (as specified in TS 38.322 [5]) in the RLC entity, and data volume pending for transmission in the N3C interface (if available) or SL RLC entity associated with the SRAP entity is equal to or larger than ul-DataSplitThreshold:* |

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| --- | --- | --- |
| Company | Y/N | Comment |
| InterDigital | Y |  |
| OPPO | Y |  |
| vivo |  | Not sure whether N3C interface (e.g. buffered data assumption) should be mentioned here since N3C is totally out of 3GPP scope. It may be left to UE implementation for N3C handling. |
| ZTE | See comment | There is only one SRAP entity at the PC5 interface for the remote UE. So all the PC5 RLC channels can be regarded as associated with this SRAP entity. However, we only want to check the data volume of the specific PC5 RLC channel mapped with the remote UE’s split RB. Based on this understanding, the following change is suggested:*- if the total amount of PDCP data volume, RLC data volume pending for initial transmission (as specified in TS 38.322 [5]) in the RLC entity, and data volume pending for transmission in the N3C interface (if available) or mapped SL RLC entity associated with the SRAP entity is equal to or larger than ul-DataSplitThreshold:*  |
| CATT | Y |  |

Rapporteur Summary:

Regarding the comment from vivo, to some extent, “if available” leaves the behavior upto the UE. Also, the comment from ZTE can be incorporated.

**Conclusion: Issue #1 can be resolved in the running CR as suggested by rapporteur, taking the suggested change from ZTE.**

### 2.2 Split bearer threshold

This is related to the following editor’s note:

Editor’s Notes: How to configure, and whether to re-use the same *ul-DataSplitThreshold* as DC for multipath is FFS.

Q2: Do you agree to address this open issue as follows:

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| --- | --- | --- |
| Issue Number | Description  | Rapporteur’s Proposed Resolution |
| 2 | *How to configure, and whether to re-use the same ul-DataSplitThreshold as DC for multipath. (e.g., use different threshold(s) for multipath compared with DC).* | Functionality discussion – to be discussed based on contributions at next meeting. |

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| Company | Y/N | Comment |
| InterDigital | Y | Aspects related to the relay UE should be considered when configuring ul-DataSplitThreshold. We prefer to discuss this further. |
| OPPO | Y | We can further discuss this, and we understand the old parameter (ul-DataSplitThreshold) can be reused. |
| Vivo | Ok for discussion | We also think reusing the current parameter (ul-DataSplitThreshold) is enough. |
| ZTE | Y | We think the old ul-DataSplitThreshold can be reused for MP. Anyway we are fine to further discuss this. |
| CATT | Y | We can further discuss this issue. |

Rapporteur Summary:

**Conclusion: Issue #2 is added to the open issues list.**

### 2.3 SDU Discard Operation for N3C

This is related to the following editor’s note:

Editor’s Notes: Whether to indicate discard to the non-3GPP interface is FFS.

Q3: Do you agree to address this open issue as follows:

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| Issue Number | Description  | Rapporteur’s Proposed Resolution |
| 3 | *Whether to indicate SDU discard to the non-3GPP interface is FFS.* | Functionality discussion – to be discussed based on contributions. |

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| --- | --- | --- |
| Company | Y/N | Comment |
| InterDigital | Y | We should discuss whether SDU discard indication may be useful at the relay UE. |
| OPPO | Y | We are open to discuss the discard at remote UE’s PDCP (same as legacy and Scenario-1), but any further optimization beyond that should be avoided. |
| Vivo | Open for discussion | Interaction between two Ues for N3C interface is not needed. |
| ZTE | Y | Fine to further discuss it. |
| CATT | Y |  |

Rapporteur Summary:

**Conclusion: Issue #3 is added to the open issues list.**

### 2.4 Data Volume Calculation for BSR

This is related to the following editor’s note:

Editor’s Notes: Whether to indicate data volume calculation for MP with non-3GPP interface is FFS.

Q4: Do you agree to address this open issue as follows:

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| --- | --- | --- |
| Issue Number | Description  | Rapporteur’s Proposed Resolution |
| 4 | *Whether to indicate data volume calculation for MP with N3C* | Functionality discussion – to be discussed based on contributions. |

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| Company | Y/N | Comment |
| InterDigital | Y | We should discuss whether the relay UE can use data volume calculation from the PDCP entity at the remote UE.  |
| OPPO | Y | Open to discuss, but restrict to UE internal data volume calculation just as legacy. |
| Vivo | Open for discussion | Up to UE implementation and no optimization is needed. |
| ZTE | Y | Fine to further discuss, but no or less spec impact is preferred. |
| CATT | Y |  |

Rapporteur Summary:

**Conclusion: Issue #4 is added to the open issues list. Data volume calculation in PDCP specification will be updated when the issue is resolved.**

### 2.5 MAC Entity Modelling for MP

This is related to the following editor’s note:

Editor’s Notes: Whether to model/capture MP behaviour as a single MAC entity, multiple MAC entities, or agnostic of the modelling.

Q5: Do you agree to address this open issue as follows:

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| --- | --- | --- |
| Issue Number | Description  | Rapporteur’s Proposed Resolution |
| 5 | *Whether to model/capture MP behaviour in the PDCP specification assuming single MAC entity, multiple MAC entities, or agnostic of the modelling.* | Functionality discussion – to be discussed based on contributions. |

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| --- | --- | --- |
| Company | Y/N | Comment |
| InterDigital | Y | We agreed to model mode 1 remote UE as a single MAC entity, but have not had similar discussion for mode 2 remote UE. Also, it is unclear whether the PDCP entity at the remote UE can interact directly with the MAC entity at the relay UE for N3C.  |
| OPPO | N | We understand this is not a PDCP open issue, and the EN can be removed directly. |
| vivo | N | MAC modelling is not related to PDCP layer. |
| ZTE | N | It has been agreed that “For Scenario-1/2, MP remote UE is configured with a single cell group, i.e., MCG, for the direct path, and SL configuration, for the indirect path”. It is not necessary to further discuss this in PDCP spec.  |
| CATT | N |  |

Rapporteur Summary:

No further discussion of the modelling at the next meeting is suggested. Regarding the text for data volume calculation that refers to the MAC entities, discussion on how to capture this can occur at that time.

**Conclusion: Issue #5 will be covered when issue 4 is resolved. The editor’s note is removed from the running CR.**

### 2.6 Requirement for Duplicate PDU discard

This is related to the following editor’s note:

Editor’s Notes: Whether the requirement for not indicating Uu RLC entity to discard in multipath can be stronger (i.e., “shall not”).

Q6: Do you agree to address this open issue as follows:

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| Issue Number | Description  | Rapporteur’s Proposed Resolution |
| 6 | *Whether the requirement for not indicating Uu RLC entity to discard in multipath can be stronger (i.e., “shall not”).* | Rapporteur thinks this can be resolved without discussion at next meeting.Current specification already captures the requirement correctly and the editor’s note can be removed without specification. |

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| Company | Y/N | Comment |
| InterDigital | Y |  |
| OPPO | Y |  |
| vivo | Y |  |
| ZTE | Y |  |
| CATT | Y |  |

Rapporteur Summary:

**Conclusion: Issue #6 can be resolved in the running CR as suggested by rapporteur.**

### 2.7 Support of Duplicate Discard in N3C

This is related to the following editor’s note:

Editor’s Notes: Whether/how to support duplicate PDU discard in multipath with N3C indirect path is FFS.

Q7: Do you agree to address this open issue as follows:

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| --- | --- | --- |
| Issue Number | Description  | Rapporteur’s Proposed Resolution |
| 7 | *Whether/how to support duplicate PDU discard in multipath with N3C.* | Functionality discussion – to be discussed based on contributions. |

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| --- | --- | --- |
| Company | Y/N | Comment |
| InterDigital | Y |  |
| vivo | Y | Consider some basic description, e.g. if the successful delivery of a PDCP Data PDU is confirmed by the Uu AM RLC entity, indicate to N3C interface to discard the duplicated PDCP Data PDU for multipath. |
| ZTE | Y |  |
| CATT | Y |  |

Rapporteur Summary:

**Conclusion: Issue #7 is added to the open issues list.**

### 2.8 Additional Open Issues

Companies are welcome to indicate additional open issues they see associated with PDCP specification.

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| Company | Description of Issue  | Further Comments |
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# 3 Conclusion

**Issue #1 can be resolved in the running CR as suggested by rapporteur, taking the suggested change from ZTE.**

**Issue #2 is added to the open issues list.**

**Issue #3 is added to the open issues list.**

**Issue #4 is added to the open issues list. Data volume calculation in PDCP specification will be updated when the issue is resolved.**

**Issue #5 will be covered when issue 4 is resolved. The editor’s note is removed from the running CR.**

**Issue #6 can be resolved in the running CR as suggested by rapporteur.**

**Issue #7 is added to the open issues list.**

# Reference

[1] R2-2311558 PDCP Running CR for R18 SL relay endorsed in RAN2#123bis meeting