**3GPP TSG-RAN WG2 Meeting #109bis Draft R2-2003846**

**Elbonia, Online, 20 -30 April 2020**

**Agenda item: 7.3.2.2**

**Source: Intel Corporation**

**Title: Report of [AT109bis-e][206][MOB] Flagging and discussion of DAPS CP open issues for RRC (Intel)**

**Document for: Discussion and Decision**

# Introduction

This is the email discussion report on below email discussion:

* [AT109bis-e][206][MOB] Flagging and discussion of DAPS CP open issues for RRC (Intel)

Scope:

* + - Companies flagging critical DAPS CP issues requiring Web conference discussion
    - Discuss the remaining CP/RRC open issues identified in email discussion report of Post109#11 in [R2-2003371](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003371.zip).

      Intended outcome:

* + - Discussion summary document in [R2-2003846](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003846.zip), including resolutions to open issues and identification of non-critical issues that should no longer be pursued in Rel-16

            Deadlines for flagging issues for Web conference discussion:

* + - Flagging of issues for the Web conference: Tuesday 2020-04-21 10:00 UTC
    - Rapporteur summary:  Tuesday 2020-04-21 11:30 UTC

Deadlines for providing comments and for rapporteur inputs:

* + - Initial deadline (for companies' feedback):  Thursday 2020-04-23 12:00 UTC
    - Initial deadline (for rapporteur's summary in [R2-2003846](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003846.zip)):  Friday 2020-04-24 08:00 UTC
    - Proposed agreements in [R2-200384](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003842.zip)6 indicated for email agreement and not challenged until Tuesday 2020-04-28 12:00 UTC will be declared as agreed by the session chair.

Based on Chairman’s guidance, the email discussion is splited into 3 phases:

**Phase 1** : please indicate whether any issues need to be discuss in the Web conference; Tuesday 2020-04-21 10:00 UTC

**Phase 2**: please provide your comments on open issues; Thursday 2020-04-23 12:00 UTC

**Phase 3:** double check the proposed agreements; Tuesday 2020-04-28 12:00 UTC

# Phase 1- flag issues

**Below are proposals from [1]:**

**To be agreed:**

Proposal S2.4: T312 in source is stopped upon executing a reconfiguration with sync even if DAPS is configured; No specificiation impact.

Proposal S2.4: T312 in source is stopped upon executing a reconfiguration with sync even if DAPS is configured; No specificiation impact.

Proposal S2.6-5-6: Do not introduce bye message from UE to the source upon UL switching.

Proposal S3.1: LTE DAPS+ LTE RACH-less is not allowed.

**RRC impacts:**

RRC S2.2-1: Condition for *statusReportRequired* should be changed to Rlc-AM-UM “For RLC AM or RLC UM ( if dapsConfig is configured for this bearer), the field is optionally present, need R. Otherwise, the field is absent.”.

RRC S2.3-1: Do not capture in specification “stop RLM in source after RACH successful to target PCell”, and remove the EN “TBC on how/whether to capture stop RLM in source after RACH successful to target PCell”.

RRC S2.3-2: moreThanoneRLC is not applied for DAPS HO, remove the EN “FFS on moreThanonRLC in pdcp-Config” and clarify in the field description “This field is not present if dapsConfig is configured for this bearer.”

RRC S2.3-3: Agree below principle on the terminoligy and to be confirmed in ASN.1 review, e.g. whether to change source/target to source/target MCG;

**Case 1** L1 configuration: “source or target" should be used since it is cell specific configuration;

**Case** 2 MAC/RLC/PDCP (Key, security/ROHC)/SDAP configuration: “source or target" could be used since they are common for all cells of source or target;

**Case** 3 C-RNTI, timers (e.g. T301, T310, T311) and constants (e.g. N310, N311): “source/target SpCell” should be used since it is PCell configuration;

**Case** 4 BCCH/MIB (5.3.5.5.2): “source/target SpCell” should be used since it is PCell configuration;

**Case** 5 RLF, and “revert back to the configuration used in source PCell”: “source/target SpCell” should be used since we only RLF in PCell instead of SCells;

**Case** 6 “revert back to the configuration used in source PCell”: “source PCell” could be used as legacy;

**Case** 7 SRB/DRB, RRM: “source or target" could be used since they are common for all cells of source or target;

RRC S2.3-5-3: For DAPS HO, reestablishPDCP is not needed for SRB, no matter whether key is changed or not.

RRC S2.3-8-1: When resume SRB upon DAPS HO failure, the old stored RRC message if any, (i.e.. the PDCP PDUs for SRB) shall be discarded;

RRC S2.5-1: To capture RAN1 parameters p-DAPS-FR1, p-DAPS-FR2 and UplinkPowerSharingDAPS-HO-mode and name them as “p-DAPS-Source, p-DAPS-Target and UplinkPowerSharingDAPS-HO-mode”

RRC S2.5-2: powerControlMode in HO preparation message ischanged to ENUMERATED {semi-static-mode1, semi-static-mode2, dynamic }

RRC S3.3: Agree below RRC changes:

3> consider radio link failure to be detected for the source MCG i.e. source RLF;

~~4~~3> suspend all DRBs in the source;

~~4~~3> release the source connection.

RRC S3.4-1: Do not add 2> If dapsConfig is configured for any DRB when capturing UL switching indication in RRC;

RRC S3.4-2: To discuss whether to UL switching indication in RRC as

3> for each DRB configured with *dapsConfig*, request uplink data switching to the PDCP entity, as specified in TS 38.323 [5];

RRC S3.5: Do not try to align the handling of SRB and non-DAPS DRB upon receiving DAPS HO command and upon fallback;

RRC S3.6: Change the handling on SRB for DAPS based on the below order:

1. *Regardless of security key change,*

* *Establish a PDCP entity for the target with state variables continuation as specified in TS 38.323 [5], with the same configuration, the state variables and security configuration as the PDCP entity for the source;*

1. *If reestablishPDCP for SRB is configured(i.e. security key change)*

* *The state variables will be reset by PDCP re-establishement.*

1. *Otherwise, the state variables are left as those of the source due to no PDCP re-establishment and it implies the case without security key change*

RRC S3.7-1: For non-DAPS DRB handling, do not agree that PDCP only reestablishment when RACH is successfully completed in target:

**Further discussion:**

Disc S2.3-6: To be discussed whether source can provide both original and downgrade source configuration to target;

Disc S3.8: To discuss whether the coordination on maxSCH-TB-BitsDL, maxSCH-TB-BitsUL is needed for NR since for NR the supported max DL/UL data rate for each CC can be derived from the L1 parameters included in the FeatureSet (according to the calculation defined in 38.306 4.1)

RRC S3.10: To discuss whether a new bit in RRC is needed to control second PDCP status report.

RRC S3.11: To discuss whether Network can trigger the subsequent HO after a DAPS HO before source cell has been released. If yes, whether source is released in the new HO command.

**Question 2.1-1: Any issue need to be discussed in the meeting?**

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| --- | --- | --- |
| **Company** | **Issues** | **Reason** |
| Huawei, HiSilicon | RRC S3.11 | It would be good to align companies’ understanding on subsequent RRC procedure. |
| QC | S2.3-6 | Providing only source down garded configuration to target cell means, source has to downgrade its configuration before DAPS HO (adds unnecessary signalling overhead and adds to DAPS HO delay as well) and which does not make sense if target prefers to fallback to legacy HO. If target fallsback to legacy HO, providing full source cell configuration to target cell would allow target to use delta configuration based on full source configuration and we can also avoid target using full configuration (with full config, PDCP SN continuity can not be maintained). There is no reason to limit legacy HO functionality when fallback occurs. |
| OPPO | Disc S2.3-6  RRC S3.11 | Network behavior in these two cases needs to be clarified since they may impact ASN.1. |
| Ericsson | Proposal S3.1  RRC S3.10 | The LTE RRC specification v16.0.0 already covers the case with DAPS combined with RACH-less. Not supporting this combination therefore actually involves more work since we have to explicitly forbid this combination. We see no strong need to support LTE DAPS + RACH-less but it seems unnecessary to remove this possibility given that the spec already allows it.  Regarding the control of the second PDCP status report, we think a separate flag is needed so that the second PDCP status report can be enabled only in the cases where it is useful. |
| Nokia | Proposal S3.1  Disc S2.3-6  RRC S3.11 | We are not against combining LTE RACH-less with DAPS in general. We just think there is no time in Rel-16 to design the details of such interaction (e.g. the UL switching point). Thus, we prefer to confirm Proposal S3.1  We agree RRC S3.11 and Disc S2.3-6 require further discussion, possibly during the web conference. |
| ZTE | Disc S2.3-6 | Considering it’s a critical issue for capability coordination signaling and there is no clear majority (supporting camp vs. non-supporting camp = 8 vs. 9) in the email discussion 109b#11, we think it’s better to solve this issue in the meeting. |
| LG | Disc S2.3-6  RRC S3.11 | Since there is no consensus on these issues, these two cases are needed to be aligned through online discussion having some clarification and understanding each other. |
| Intel | RRC S3.11  Disc S2.3-6  Proposal S3.1 | Agree it would be good to confirm in the meeting on RRC S3.11, Disc S2.3-6  Ok to confirm Proposal S3.1 online. |

**Question 2.1-2: Any other issues not covered in [1], and need to be discussed in the meeting?**

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| **Company** | **Issues** | **Reason** |
| LG | Align the terminology of “DAPS” between PDCP and RRC | In the current specficiation for PDCP and RRC, the terminology for “DAPS” and is not aligned between them. With this reason, we provide the contribution (r6) to clean up the terminology. We think that it should be discussed. |
| MediaTek | Actions related to dapsConfig | dapsConfig is OPTIONAL Need N, so the related action should be one-shot and the field is not stored, i.e, upon receiving dapsConfig (Need N) for a DRB, UE transforms the (normal) PDCP into DAPS PDCP, and the dapsConfig is not stored.  But in 5.3.10.3, we have:  The UE shall:  1> if *dapsConfig* is configured for any DRB:  2>  upon T310 expiry in source; or  2>  upon random access problem indication from source MCG MAC; or  2>  upon indication from source MCG RLC that the maximum number of retransmissions has been reached:  3>  consider radio link failure to be detected for the source MCG i.e. source RLF;  4> suspend all DRBs in the source;  4> release the source connection.  Considering the fact that *dapsConfig* is Need N, it seems imprecise to say “ if *dapsConfig* is configured for any DRB”  We may:  1. revise the text as “if the current UE configuration contains at least one DRB with DAPS PDCP entity”, or  2. revise the text as “if DAPS bearer is configured”, if LG’s proposal above is agreed. |
| Sharp | Handling of timers and state variables of SRB when fallback to the source (related to RRC S2.3-8-1) | It seems to be agreed When resume SRB upon DAPS HO failure, the old stored RRC message if any, (i.e.. the PDCP PDUs for SRB) shall be discarded (RRC S2.3-8-1).  Then the following handling would be required:  - For RLC enitity: all state variables should be initialized and all timers should be stoped and reset if running in order to initialize ARQ and reassembly operation  - For PDCP entity: state variables related to re-orderig should be updated so that there will be no waited PDCP SDU in the re-ordering buffer, and re-ordering timer should be stopped and reset if running |

**Summary of Phase 1 discussion:**

11 companies provided inputs, and following issues are flagged:

**Sovled in the online session:**

**Disc S2.3-6:** To be discussed whether source can provide both original and downgrade source configuration to target;

6 companies: QC, OPPO, Nokia, ZTE, LG, Intel

* We stick to legacy that source only provides one configuration to target in Rel-16.

**Proposal S3.1:** LTE DAPS+ LTE RACH-less is not allowed.

1 companies: Ericsson, Not supporting this combination therefore actually involves more work since we have to explicitly forbid this combination.

LTE DAPS+ LTE RACH-less is not allowed

**Not discussed online (continue during email in this meeting):**

**RRC S3.11:** To discuss whether Network can trigger the subsequent HO after a DAPS HO before source cell has been released. If yes, whether source is released in the new HO command.

6 companies: Huawei, HiSilicon, OPPO, Nokia, LG, Intel

**RRC S3.10**: To discuss whether a new bit in RRC is needed to control second PDCP status report.

1 company: Ericsson

Furthermore, in the email discussion, one company raised the comments that there is confliction between

RRC S3.6: Change the handling on SRB for DAPS based on the below order:

1. *Regardless of security key change,*

* *Establish a PDCP entity for the target with state variables continuation as specified in TS 38.323 [5], with the same configuration, the state variables and security configuration as the PDCP entity for the source;*

1. *If reestablishPDCP for SRB is configured(i.e. security key change)*

* *The state variables will be reset by PDCP re-establishement.*

1. *Otherwise, the state variables are left as those of the source due to no PDCP re-establishment and it implies the case without security key change*

RRC S2.3-5-3: For DAPS HO, reestablishPDCP is not needed for SRB, no matter whether key is changed or not.

In addition, one company raised issue on Align the terminology of “DAPS” between PDCP and RRC

*In the current specficiation for PDCP and RRC, the terminology for “DAPS” and is not aligned between them. With this reason, we provide the contribution (R2-2002860) to clean up the terminology. We think that it should be discussed.*

MTK commented:

dapsConfig is OPTIONAL Need N, so the related action should be one-shot and the field is not stored, i.e, upon receiving dapsConfig (Need N) for a DRB, UE transforms the (normal) PDCP into DAPS PDCP, and the dapsConfig is not stored.

But in 5.3.10.3, we have:

The UE shall:

1> if *dapsConfig* is configured for any DRB:

Considering the fact that *dapsConfig* is Need N, it seems imprecise to say “ if *dapsConfig* is configured for any DRB”

1. revise the text as “if the current UE configuration contains at least one DRB with DAPS PDCP entity”, or

2. revise the text as “if DAPS bearer is configured”, if LG’s proposal above is agreed.

RRC S2.3-8-1: When resume SRB upon DAPS HO failure, the old stored RRC message if any, (i.e.. the PDCP PDUs for SRB) shall be discarded;

Sharp commented if polling related counters and timer in RLC transmission side needs to be cleaned or not.

# Phase 2 discusion

Following issues need further discussion:

## 3.1 RRC S3.11: To discuss whether Network can trigger the subsequent HO after a DAPS HO before source cell has been released. If yes, whether source is released in the new HO command.

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| **The issue was discussed in the email discussion 109-11,** Summary: 12 companies provided inputs  **Network can trigger the subsequent HO after a DAPS HO before source cell has been released:**  **Yes: 5**  **NO:4**  **If support, explicit release by new target: 5**  RRC S3.11: To discuss whether Network can trigger the subsequent HO after a DAPS HO before source cell has been released. If yes, whether source is released in the new HO command. |

During the discussion, some companies think we do not need to restrict the network implmementation, but we have to discuss whether source cell is released by network explicitly or by UE autonomously if it is allowed.

Some companies do not see the need to do this.

Rapporteur would like to check companies’ opinion again:

**Question 3.1: which option do companies prefer?**

**Option 1: Network can trigger the subsequent HO after a DAPS HO before source cell has been released. Source cell is released by new target explicitly in the new handover command;**

**Option 2: Network can trigger the subsequent HO after a DAPS HO before source cell has been released. Source cell is released by UE autonomously;**

**Option 3: network shall release the source first before triggering the new handover procedure;**

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| **Company** | **Option 1, 2, 3** | **Remark** |
| MediaTek | 3 | We do not see the need of having such an urgent HO. However, current RRC procedure does not prohibit target node from sending HO command before source node release; if this happens, source node should be explicitly released by HO command from target node. |
| Ericsson | Option 1 or 2 | We slightly prefer option 2, since for option 1 there is a need for the source to inform the target of the need to release source cell connection.  @Mediatek: The comment from Mediatek does not seem to be aligned with the option they indicated. From the comment it seems they are suggesting option 1 but they have answered option 3. |
| QC | Option 1 or Option 2 | I assume this is scenario is about 1st DAPS HO is from cell1 to cell2. 2nd DAPS HO is from cell2 to cell3.  This source release mechanism may not be needed in case of DAPS HO from cell 1 to cell2 and again back from cell2 to cell1. |
| LG | Option 3 | It is possible that the network can trigger the subsequent HO after a DAPS HO because this isn’t a new scenario compared to the legacy HO scenarios. Option 1 is also fine for us but we prefer to take Option 3 more because we want to avoid RAN3 impact. To provide release indication of the old source configuration, there should be somemore internode signalling between new target and old target.  Then, we think the old target cell should send Reconfiguration message to release the source configuration before sending the new HO command. Since we already agreed that two RRC Reconfiguration message can be sent in a same TTI, RAN2 can consider sending two RRC signalling in a same TTI for this issue. |
| Intel | Optioin 3 | Tend to agree with LG. |
| Huawei, HiSilicon | Option 3 | We tend to not enlarge the complexity of DAPS. Even if we don’t allow subsequent RRC procedure before source release, e.g. a second handover, it won’t impact much. |
| ZTE | Option 3 | Agree with LG. |
| Nokia | Option 1 | As HO command is an RRC Reconfiguration, sent from the NW to the UE, similarly to the daps-SourceRelease, it can be sent in one message, if such scenario is indeed critical to be addressed in Rel-16. |
| OPPO | Option 3 | We also don't’ see such urgent HO is normal case. It should be handled by the target cell of DAPS HO and there is no spec impact. |
| Samsung | Optoin 3 | No special handling would be needed. Option 1 and Option would be a small optimization of reducing one round RRCReconfiguration message. |
| vivo | Option 3 | The gNB by implementation can send the two RRC messages (one for releasing the source cell, and one for HO) in the same MAC PDU without the specification change. |
| NEC | Option 3 | The target node is aware of that the source is not released before sending handover command, the source node should be released first by the target before sending handover command. |
| Apple | Option 3 | We think the subsequent HO being triggered during DAPS HO is rare case, which is not worth the further optimization. |
| Sharp | Option 1 or 2 | Option 3 has security problem in case of inter-eNB or inter-gNB handover.  As specified in SA3 spec. (7.2.8.4.2 in 33.401, 6.9.2.3.2 in 33.501) the target eNB/gNB needs to initiate handover within the eNB/gNB to renew the security key received from the source eNB/gNB immediately after the inter-eNB/gNB handover.  If the target eNB/gNB sends RRC message to release the source configuration before the security key is renewed by the handover within the target eNB/gNB, it would cause security problem. |

## 3.2 RRC S3.10: To discuss whether a new bit in RRC is needed to control second PDCP status report.

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| Summary: 12 companies provided inputs  **Jointly control/ individually controlled (separate bits) on second PDCP status report:**  **Jointly: 5**  **Individually:** 5  There is no clear consensus on whether we need a new bit to control second PDCP status report.  RRC S3.10: To discuss whether a new bit in RRC is needed to control second PDCP status report. |

During the discussion, companies who support separate bit think individually control can have flexibility; Companies who do not support it think it is small feature and do not need separate control.

Rapporteur would like to check companies’ opinion again:

**Question 3.2: which option do companies prefer?**

**Option 1: new bit in RRC to control second PDCP status report;**

**Option 2: same bit for second PDCP status report and legacy PDCP status report;**

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| --- | --- | --- |
| **Company** | **Option 1, 2** | **Remark** |
| MediaTek | 2 | If this works, we don’t need to introduce a new bit. |
| Ericsson | Option 1 | The need for a second PDCP Status Report is questioned, mainly due to the time between sending the first PDCP Status Report (sent at UL transmission switch) and the second PDCP Status Report, is expected to be very short.  During this time period, the number of DL packets sent from the source node to the UE will most likely be few (if any), and for such a DL packet the RLC ACK would in addition need to be lost in order for the PDCP Status Report to fill a purpose.  Considering this, it seems reasonable to at least separate the configuration of the first and the second PDCP Status Report, to allow the UE to send a second PDCP Status Report only in the scenarios it would be useful. |
| QC | Option 1 | It provides flexibility for configuration. |
| LG | Option 2 | The second PDCP status report is minor thing. Thus, we do not want to introduce a new bit. |
| Intel | Option2 | RAN2 agreed “Secondary PDCP status report for AM is mandatory to support for DAPS capable UE.” Because it is small feature. Therefore we do not see the need to have a new bit. |
| Huawei, HiSilicon | Option 2 | It is unnecessary to have a separate configuration. If it is needed, maybe the second PDCP status report is not deemed useful. |
| ZTE | Option 1 | Slightly prefer option 1 to provide the flexibility for requesting PDCP status report considering the second PDCP status report is less important. |
| Nokia | Option 2 | We agree that second PDCP SR is not that essential. However, we think it is acceptable to configure it jointly with the first PDCP status reporting (i.e. not sufficient justification to keep extra flexibility). |
| OPPO | Option 2 | Single bit control is sufficient. |
| Samsung | Option 2 | Our understanding is that the second PDCP status report was introduced to help DAPS handover, which is a DAPS-handover specific function. We don’t see the benefit from the control of sending the first PDCP status report and not sending the second one. |
| Vivo | Option 2 | The benefit of two bits control is not clear. |
| NEC | Option 2 | There is no need to introduce a new bit. |
| Apple | Option 2 | 1 bit control is sufficient. |
| Sharp | Option 2 |  |

## 3.3 RRC S3.6: Change the handling on SRB for DAPS based on the below order (conflict with RRC S2.3-5-3)

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| Summary: 11 companies provided inputs  **Regarding the changes:**   1. *Regardless of security key change,*  * *Establish a PDCP entity for the target with state variables continuation as specified in TS 38.323 [5], with the same configuration, the state variables and security configuration as the PDCP entity for the source;*  1. *If reestablishPDCP for SRB is configured(i.e. security key change)*  * *The state variables will be reset by PDCP re-establishement.*  1. *Otherwise, the state variables are left as those of the source due to no PDCP re-establishment and it implies the case without security key change*   **Yes: 6**  **No strong view: 3**  Rapporteur would suggest to go for majority.  RRC S3.6: Change the handling on SRB for DAPS based on the below order:   1. *Regardless of security key change,*  * *Establish a PDCP entity for the target with state variables continuation as specified in TS 38.323 [5], with the same configuration, the state variables and security configuration as the PDCP entity for the source;*  1. *If reestablishPDCP for SRB is configured(i.e. security key change)*  * *The state variables will be reset by PDCP re-establishement.*  1. *Otherwise, the state variables are left as those of the source due to no PDCP re-establishment and it implies the case without security key change* |

The RRC S3.6 conflicts with below RAN2 agreement

*RRC S2.3-5-3: For DAPS HO, reestablishPDCP is not needed for SRB, no matter whether key is changed or not.*

In [R2-2003372](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003372.zip), RRC S3.6 is captured as:

1> If *dapsConfig* is configured for any DRB:

2> for each SRB:

3> establish a PDCP entity for the target as specified in TS 38.323 [5], with the same configuration as the PDCP entity for the source;

3> if the *masterKeyUpdate* is received:

4> configure the PDCP entity with the security algorithms according to securityConfig and apply the keys (KRRCenc and KRRCint) associated with the master key ( KgNB) or secondary key (S-KgNB) as indicated in keyToUse, if applicable;

3> else:

4> configure the PDCP entity for the target with state variables continuation as specified in TS 38.323 [5], the state variables and security configuration as the PDCP entity for the source;

Rapporteur would like to check companies’ opinion:

**Question 3.3: do companies see the need to have above change?**

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| --- | --- | --- |
| **Company** | **Yes/No?** | **Remark** |
| MediaTek | Yes | The change is needed if we keep the RAN2 agreement. |
| Ericsson | ? | Not sure which change that is being referred to. Do you mean the change in the original RRC S.3.6 or do you mean the variant of RRC S.3.6 captured in R2-2003372? The intention of the original RRC S.3.6 seems to be to re-establish the SRB PDCP entity in case of key change but this is not how it has been captured in R2-2003372.  [Yi] the proposal is referring to the change captured in R2-2003372.  What was the motivation for agreeing to RRC S2.3-5-3 (not re-establishing the PDCP entity for the target)?  [Yi] since source SRB is maintained, and new PDCP is established for Target. Then reestablishPDCP is not needed for target PDCP. |
| QC | Yes (assuming S2.3-5-3) | We already agreed for SRB, target PDCP entity will be established and we should not change that. |
| LG | Yes | We also think the change is needed. |
| Intel | Yes | Agree the changes captured in R2-2003372 |
| Huawei, HiSilicon | No | We have agreed to S2.3-5-2, so to have the following two handlings:  Handling 1 (key change): Establish a PDCP entity for the target as specified in TS 38.323 [5], with the same configuration as the PDCP entity for the source;  Handling 2 (without key change): Establish a PDCP entity for the target with state variables continuation as specified in TS 38.323 [5], with the same configuration,  If we have the changes above, it is ambiguous to explain why we devide handling 2 into two steps:   * + - 1. establish a PDCP entity for the target       2. configure the PDCP entity for the target with state variables continuation |
| ZTE | Yes | We are fine for the change in R2-200372. |
| OPPO | Yes |  |
| Samsung | Yes | The PDCP re-establishment of SRB would be triggered based on the explicit indication from the network as in legacy, which can be based on the security key change/no change. |
| vivo | Yes |  |
| NEC | Yes |  |
| Apple | Yes |  |
| Sharp | Yes |  |

## 3.4 Align the terminology of “DAPS” between PDCP and RRC in R2-2002860;

The summary in R2-2002860 is

- Remove “DAPS PDCP entity” and “normal PDCP entity” from the specification.

- From the PDCP point of view, “DAPS PDCP entity” or “normal PDCP entity” are all a PDCP entity, the difference being whether the PDCP entity is configured with “DAPS”. Calling them with different names makes more confusion.

- Change “Reconfigure the PDCP entity to DAPS PDCP entity” to “Reconfigure the PDCP entity to configure DAPS”, and change “Reconfigure the PDCP entity to normal PDCP entity” to “Reconfigure the PDCP entity to release DAPS”.

- Use “DAPS bearer” in the specification.

- “DAPS bearer” is already defined in PDCP specification as “a bearer whose radio protocols are located in both the source gNB and the target gNB during DAPS handover to use both source gNB and target gNB resources”. RRC specification can also add “DAPS bearer” in the definition section and use this terminology.

- Change “for each DRB with a DAPS PDCP entity” to “for each DAPS bearer”.

- Remove the text regarding association between PDCP entity and the RLC entity.

- Such association between them was never specified before (see split bearer or duplicate bearer where the PDCP entity is associated with at least two RLC entities). We don’t see the need to specify the association only for DAPS bearer.

The proposals looks reasonable, Rapporteur would like to check companies’ opinion .

**Question 3.4-1: do companies agree the proposals in R2-2002860?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No?** | **Remark** |
| MediaTek | Yes |  |
| Ericsson | Yes | We agree that the terminology should be aligned. We are in principle OK with the proposed changes in R2-2002860. |
| QC | Yes |  |
| LG | Yes | Note that if the text proposal is agreed in R2-2002860, the same principle should be applied to the LTE specification i.e., 36.323 and 36.331. |
| Intel | Yes |  |
| Huawei, HiSilicon | Yes |  |
| ZTE | Yes |  |
| Nokia | Yes | For both LTE and NR. |
| OPPO | Yes |  |
| Samsung | Yes |  |
| vivo | Yes |  |
| NEC | Yes |  |
| Apple | Yes |  |
| Sharp | Yes, but | In the current specification, association between PDCP and RLC (LHC) is specified under RLC bearer addition/modification section. We prefer specify association between PDCP and RLC (LHC) after RLC and LHC establishment (i.e., in reconfiguration with sync) section. |

**Similar issue was raised in the reflector:**

*dapsConfig is OPTIONAL Need N, so the related action should be one-shot and the field is not stored, i.e, upon receiving dapsConfig (Need N) for a DRB, UE transforms the (normal) PDCP into DAPS PDCP, and the dapsConfig is not stored.*

*But in 5.3.10.3, we have:*

The UE shall:

* + - 1. if *dapsConfig* is configured for any DRB:

Considering the fact that *dapsConfig* is Need N, it seems imprecise to say “ if *dapsConfig* is configured for any DRB”

1. revise the text as “if the current UE configuration contains at least one DRB with DAPS PDCP entity”, or

2. revise the text as “if DAPS bearer is configured”, if LG’s proposal above is agreed.

Rapporteur could see 3 options:

Option 1: revise the text as “if the current UE configuration contains at least one DRB with DAPS PDCP entity”, or

Option 2 revise the text as “if any DAPS bearer is configured”, if LG’s proposal above is agreed.

Option 3: do nothing, same as existing specification.

**Question 3.4-2: Which option do companies prefer?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Option 1, 2, 3** | **Remark** |
| MediaTek | 1 or 2 | This problem should be fixed, and we are fine with both ways. |
| Ericsson | Option 2 or option 1 | For option 2, the text should say “if **any** DAPS bearer is configured”. |
| QC | 1 or 2 |  |
| LG | Option 2 | In R2-2002860, it is proposed that the “DAPS PDCP” is not used in the specification. Thus, the proposal 1 should not be applied if the text proposal in R2-2002860 is agreed.  In addion, we are fine with Ericsson’s proposal on “if **any** DAPS bearer is configured”. |
| Intel | Option 2 | Agree with Ericsson’s proposal “any”, added in option 2. |
| Huawei, HiSilicon | Option 2 | Ok with Ericsson’s wording proposal |
| ZTE | Option 2 | Agree with Ericsson’s wording proposal |
| Nokia | Option 2 |  |
| OPPO | Option 2 | “if **any** DAPS bearer is configured” |
| Samsung | Option 2 | Option 2 with modification as “if any DAPS bearer is configured” as Ericsson mentioned. |
| vivo | Option 2 |  |
| NEC | Option 2 | Agree with Ericsson’s wording proposal |
| Apple | Option 2 |  |
| Sharp | Option 2 |  |

## 3.5 Further details on “discard RRC in source SRB”

RAN2 has agreed

*RRC S2.3-8-1: When resume SRB upon DAPS HO failure, the old stored RRC message if any, (i.e.. the PDCP PDUs for SRB) shall be discarded;*

One company raised question, for fallback to source, in source should polling related counters and timer in RLC transmission side needs to be cleaned or not?

Rapporteur would like to check companies’ opinion:

**Question 3.5: for fallback to source, in source should polling related counters and timer in RLC transmission side needs to be cleaned or not?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No?** | **Remark** |
| Ericsson | Yes | There could have been ongoing transmissions when the source SRB was suspened and these transmissions will be resumed when the SRB is resumed at fallback.  As mentioned before, we think the simplest solution is to reset the RLC and PDCP entity for the source SRB when the the fallback is triggered. We only need to make sure the COUNT value is not reset for the SRB during the re-PDCP establishment (currently when an SRB is re-established the COUNT is reset to 0). |
| QC | Yes |  |
| LG | No | Even if the remaining data is transmitted in RLC at SRB resume, we do not see any problem. |
| Intel | N | Agree with LG. Do not see any problem. |
| Huawei, HiSilicon | No | Agree with LG |
| ZTE | No | For how to discard the old stored RRC message, we think the UE can just discard PDCP SDUs and PDCP PDUs which has not been submitted by the RLC entity to the lower layer (i.e. as the legacy discard mechanism). Then we don’t need to do additional handling for the RLC state reset. Regarding the reordering gap in PDCP reception side due to the discard of PDCP packet can be left to the NW implementation, similar to the handling of reordering issue caused by updating state variables for SRB at fall-back to source in case of DAPS HO without security key change. |
| Nokia | Yes | Agree with Ericsson. |
| OPPO | No | No need for additional handling than discarding PDCP SDUs and PDCP PDUs which have not been submitted by the RLC entity to the lower layer. |
| Samsung | Yes | If the old RRC message is the measurement report and is transmitted to the source when UE fallbacks, then the source may trigger another handover based on wrong measurement results, which can cause delay due to possible handover failure.  Simply, the RLC can be re-established and the RRC can discard the stored old RRC messages. |
| Vivo |  | No strong view. However it companies all agreed not to send the RRC message. Both the PDCP and the RLC buffer should be flushed. |
| NEC | No | Agree with LG that even sending old RRC message, there is no harm. The source shall ignore the old RRC message before FailureInformation message with information of DAPS handover failure. |
| Apple | Yes |  |
| Sharp | Yes | Agree with Ericsson.  For RLC, no need to keep state variables, counters and timers. The simplest solution will be re-establish the RLC. For PDCP also re-establish PDCP will be simplest if state variables can be kept. |

## 3.6 Disc S3.8: To discuss whether the coordination on maxSCH-TB-BitsDL, maxSCH-TB-BitsUL is needed for NR since for NR the supported max DL/UL data rate for each CC can be derived from the L1 parameters included in the FeatureSet (according to the calculation defined in 38.306 4.1)

|  |
| --- |
| **Question 3.8: For NR, should maxSCH-TB-BitsDL/** **maxSCH-TB-BitsUL be defined as relative value as current CR or absolute value? If it is absolute value, what value range should be? If it is relative value, what reference should be? (RRC impact)**  Summary: 2 companies provided inputs  **2 companies mentioned we may not need the coordination on maxSCH-TB-BitsDL, maxSCH-TB-BitsUL since for NR the supported max DL/UL data rate for each CC can be derived from the L1 parameters included in the FeatureSet (according to the calculation defined in 38.306 4.1).** |

Rapporteur would like to check companies’ opinion:

For NR,

Option 1: **should maxSCH-TB-BitsDL/** **maxSCH-TB-BitsUL be defined as relative value as current CR?**

**Option 2: should maxSCH-TB-BitsDL/** **maxSCH-TB-BitsUL be defined as absolute value? What value/value range?**

**Option 3: maxSCH-TB-BitsDL/** **maxSCH-TB-BitsUL are not needed for NR since for NR the supported max DL/UL data rate for each CC can be derived from the L1 parameters included in the FeatureSet (according to the calculation defined in 38.306 4.1)**

**Option 4: Laeve it unspecified;**

**Question 3.6: Which option do companies prefer?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Option 1, 2, 3** | **Remark** |
| MediaTek | 3 |  |
| Ericsson | Option 1  or  Option 4 (leave it unspecified) | It doesn’t seem option 3 will work since the target node will not always be able to determine the feature set selected by the source node from the source cell configuration. For example, the maximum MCS is part of the feature set but there is is no parameter in the source cell configuration that indicates the maximum MCS that the source selected. This leaves us with option 1 or 2 and out of these option 1 is preferred since it is more future proof.  We realize though that with option 1 it will be quite complicated to come up with a suitable reference value since we don’t have UE categories in NR. Therefore, we would also be fine with not transmitting any maxSCH-TB-BitsDL/ maxSCH-TB-BitsUL value at all over Xn (i.e. similar to option 3) and leave it up to network implementation how to determine the maxSCH-TB-BitsDL/ maxSCH-TB-BitsUL.  [Yi] from specification perspective, I assume there should be no difference between Option 3 and 4. |
| QC | Option 1 | NR does not have UE category. But max data rate supported by UE can be derived based on featureset. Based on derived UE max data rate support, maxSCH-TB-BitsDL/ maxSCH-TB-BitsUL can be set a % values. Spec should allow range from 1 to 100% in increments of 1 or 2. |
| Intel | Option 3 or 4 | Do not transfer “**maxSCH-TB-BitsDL/** **maxSCH-TB-BitsUL**” between source and target; |
| Huawei, HiSilicon | Option 1 or option 3 | We are fine with current CR. And if this restriction is not applied, we also don’t see much impact. |
| ZTE | Option 3 | Regarding the issue proposed by Ericsson, we guess it may also exist in MR-DC. Considering we did not introduce maxSCH-TB-BitsDL/ maxSCH-TB-BitsUL in the inter-node coordination for MR-DC, we think it’s also fine to not coordinate maxSCH-TB-BitsDL/ maxSCH-TB-BitsUL in DAPS HO. Anyway it can be up to the NW implementation to determine the maxSCH-TB-BitsDL/ maxSCH-TB-BitsUL in the target cell. |
| Nokia | Option 3 or 4 | With no specification impact. |
| OPPO | Option 3 |  |
| Samsung | Option 3 |  |
| vivo | Option 3 |  |
| NEC | Option 3 | Since maxSCH-TB-BitsDL/ maxSCH-TB-BitsUL are not coordinated for NR-DC, it should be the same for DAPS. |
| Apple | Option 1 or option 3 |  |

## 3.7 Any other issues?

**Question 3.7: Any other issues need to be considered?**

|  |  |
| --- | --- |
| **Company** | **Remark** |
| MediaTek | In TS38.331 ‘5.3.5.6.5 DRB addition/modification’, we have the following text:  2> if the *sdap-Config* is included and the uplink data switching indication is received from lower layer:  Our concern is that there’s no definition of “uplink data switching indication” by lower layer in MAC specifications. We believe that the UL data switching happens when RA to target cell is done, and we do have the following text in MAC CR for DAPS:  1> If the Random Access Procedure towards target cell for DAPS handover is successfully completed;  2> indicate the successful completion of the Random Access Procedure to the upper layers.  Therefore, we propose to revise the above text about sdap-Config as:  2> if the *sdap-Config* is included and when indication of successful completion of random access towards target cell is received from lower layers as specified in [3]: |
|  |  |
|  |  |

# Conclusion

The followings are proposed:

To be agreed:

Further discussion:

# References

1. [R2-2003371](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003371.zip), Report of [Post109e#11][MOB] Resolving open issues for DAPS (Intel), Intel Corporation