**3GPP TSG-RAN2 #113bis-e R2-210xxxx**

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

**Agenda item:**8.6.2 (NR\_SmallData\_INACTIVE-Core)

**Source:** LG Electronics (Rapporteur)

**Title:** Report of [AT113bis-e][501][SDT] UP SDT open issues

**Document for:** Discussion and Decision

# 1. Introduction

This document summarizes issues identified in documents submitted to A.I. 8.6.2 User plane common aspects, except for the issues related to Post113-e[501][502][503][504].

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

* [AT113bis-e][501][SDT] UP SDT open issues (LG)

Scope:

* + - Discuss open UP SDT open issues AI 8.6.2

Intended outcome:

* + - Agreeable Proposals in R2-2104395

Deadline for providing comments:

* + - Companies inputs April 15th
    - Rapporteur Proposals – April 16th
    - Comments on Proposals and final proposals – April 19th

# 2 Contact Information

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| Samsung | anilag@samsung.com |
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# 3. Discussion

## 3.1 PDCP re-establishment

According to current specification, the UE performs PDCP re-establishment if the *reestablishPDCP* is configured. Whether this explicit configuration is needed for SDT RB requires further discussion [2], [4], [12].

**Q1: Which option do you prefer?**

**- Option 1: The UE performs PDCP re-establishment implicitly when the UE initiates SDT procedure.**

**- Option 2: Whether to perform PDCP re-establishment is explicitly indicated by the network.**

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| Company | Preferred option | Detailed Comments |
| Samsung | Option 1 | Upon initiating RESUME procedure for SDT initiation (i.e. for first SDT transmission), the UE shall always re-establish the SDT PDCP entities and resume the SDT RBs. So, explicit indication is not needed |
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## 3.2 PDCP status report

According to current specification, the PDCP status report will be generated when the PDCP entity re-establishment is requested by the upper layer and the *statusReportRequired* is configured. And the PDCP re-establishment will be performed when SDT procedure is initiated. Then, even if there is no status to be reported, the UE has to send PDCP status report, which will increase unnecessary overhead.

Thus, whether and how the PDCP status report is suppressed for SDT requires further discussion [1], [2], [3], [4], [5], [6], [9], [11], [12].

**Q2: Which option do you prefer?**

**- Option 1: The UE implicitly disables PDCP status report when the UE initiates SDT procedure.**

**- Option 2: Whether to trigger PDCP status report is explicitly indicated by the network.**

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| Company | Preferred option | Detailed Comments |
| Samsung | Option 1 | There is no case where PDCP status report is useful. So UE can simply not trigger PDCP status report when PDCP entity re-establishment of an AM DRB is triggered for small data transmission. |
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## 3.3 ROHC continuity

According to current specification, if *drb-ContinueROHC* has been provided and the RRC connection is resumed on the same cell where the connection was suspended, the UE will continue the ROHC context for the DRBs configured with the ROHC.

It has to be discussed first whether to support ROHC continuity for SDT [3], [4], [5], [6], [12].

**Q3: Which option do you prefer?**

**- Option 1: ROHC continuityis not supported for SDT.**

**- Option 2: Whether to support ROHC continuityis explicitly indicated by the network.**

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| Samsung | Option 2 |  |
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## 3.4 PDCP duplication

The PDCP duplication is used for increasing reliability of data transmission. However, it is not decided yet whether the PDCP duplication should be supported for SDT. Thus, whether to support PDCP duplication for SDT requires further discussion [3], [7].

**Q4: Which option do you prefer?**

**- Option 1: Both CA duplication and DC duplication are supported for SDT.**

**- Option 2: Only CA duplication is supported for SDT.**

**- Option 3: PDCP duplication is not supported for SDT.**

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| Company | Preferred option | Detailed Comments |
| Samsung | Option 1 |  |
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## 3.5 RLC failure

According to current specification, in case “RETX\_COUNT = maxRetxThreshold”, RRC will be informed that the max retransmission has been reached. Then, the RLF will be triggered and RRC re-establishment will be initiated.

For SDT, since RLC AM will be supported and UE specific RLC configuration will be used, one issue is whether the RLC failure will be detected and informed to upper layer in case “RETX\_COUNT = maxRetxThreshold”, and whether RRC re-establishment will be initiated [5].

**Q5: Which option do you prefer?**

**- Option 1: RLC failure handling is supported for SDT.**

**- Option 2: RLC failure handling is not supported for SDT.**

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| Company | Preferred option | Detailed Comments |
| Samsung | Option 2 | We can simply rely on SDT timer expiry or existing cell reselection triggers |
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## 3.6 Data volume criteria

According to current specification, the BS field in the BSR indicates the total amount of data volume calculated in PDCP and RLC. Note that RLC and MAC headers are not considered in BS calculation. The issue is whether the data volume used for SDT selection criteria is equal to the BS in BSR or other defined value [1], [2], [3], [8], [10], [12], [13], [15], [17].

**Q6: Which option do you prefer?**

**- Option 1: Data volume used for SDT selection criteria is calculated same as BS, i.e. PDCP data volume + RLC data volume, without considering RLC and MAC headers.**

**- Option 2: Data volume used for SDT selection criteria is the size of MAC PDU, i.e. PDCP data volume + RLC data volume + MAC/RLC/PDCP/SDAP/RRC overhead.**

**- Option 3: Data volume used for SDT selection criteria is the PDCP data volume.**

**- Option 4: Data volume used for SDT selection criteria is left up to UE implementation.**

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| Company | Preferred option | Detailed Comments |
| Samsung | Option 1 | Same as buffer status.  The data available can be transmitted using multiple TBs during SDT procedure (initial UL transmission in CG/Msg3/MsgA and subsequent UL transmission based on dynamic grant), header overhead cannot be known in advance. |
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## 3.7 PHR

According to current specification, upon initiation of connection resume for SDT, UE applies default MAC Cell Group configuration. Then, for SDT, PHR is triggered and included ahead of DTCH SDU, which may be not optimal for SDT. Thus, whether to support PHR functionality for SDT requires further discussion [1], [5], [8], [12].

**Q7: Which option do you prefer?**

**- Option 1: PHR functionality is supported for SDT.**

**- Option 2: PHR functionality is not supported for SDT.**

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| Company | Preferred option | Detailed Comments |
| Samsung | Option 2 | If option 1 is supported, PHR MAC CE priority should be considered lower than DTCH to prioritise small data transmission. |
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## 3.8 LCH Restrictions

According to current specification, in RRC\_CONNECTED, LCH restrictions are applied when performing LCP. The issue is whether the LCH restrictions used in RRC\_CONNECTED is still applied for SDT [1], [8].

**Q8: Which option do you prefer?**

**- Option 1: LCH restrictions is not used for SDT.**

**- Option 2: LCH restrictions used for SDT is explicitly indicated by the network.**

**- Option 3: LCH restrictions used in RRC\_CONNECTED is kept used for SDT.**

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| Company | Preferred option | Detailed Comments |
| Samsung | Option 1 | Some LCH restrictions such as allowedServingCells are not valid during SDT procedure.  Given that we have agreed that network will indicate the DRBs for which SDT transmission is allowed, the simplest approach would be to not apply LCH restrictions in Logical channel configuration |
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## 3.9 SR

In RRC connected mode, SR is triggered when regular BSR is triggered but there is no UL grant available. If SR resource is not available, RA procedure will be triggered. However, it is not decided yet whether the SR resource is available for SDT. Thus, it has to be decided first whether SR is supported for SDT [5], [6], [12], [16].

**Q9: Which option do you prefer?**

**- Option 1: SR is supported for SDT.**

**- Option 2: SR is not supported for SDT.**

**- Option 3: SR is supported for SDT, but not triggered during subsequent SDT.**

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| Company | Preferred option | Detailed Comments |
| Samsung | Option 2 | SR support is not essential for SDT operation |
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## 3.10 DRX

The DRX is supported in RRC\_CONNECTED. Though RAN1 needs to be involved, it would be good to check whether the DRX needs to be supported for SDT from RAN2 point of view [13].

**Q10: Which option do you prefer?**

**- Option 1: DRX is supported for SDT.**

**- Option 2: DRX is not supported for SDT.**

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## 3.11 BFR

The Beam Failure Recovery is supported in RRC\_CONNECTED. Though RAN1 needs to be involved, it would be good to check whether the BFR needs to be supported for SDT from RAN2 point of view [8], [12], [14].

**Q11: Which option do you prefer?**

**- Option 1: BFR is supported for SDT.**

**- Option 2: BFR is not supported for SDT.**

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# 4. Conclusions

To be filled later..

# References

[1] R2-2102708 User Plane Common Aspects of RACH and CG based SDT Samsung

[2] R2-2102750 Discussion on user plane issues of SDT Oppo

[3] R2-2102755 Discussion on User Plane Aspect of Small Data Transmission vivo

[4] R2-2102840 User plane aspects for SDT Intel Corporation

[5] R2-2103018 User plane open issues for SDT ZTE Corporation, Sanechips

[6] R2-2103102 Analysis on UP common aspects of SDT CATT

[7] R2-2103197 Support of CA and PDCP CA duplication Fujitsu

[8] R2-2103319 The UP common issues for small data transmissions Lenovo, Motorola Mobility

[9] R2-2103430 Discussion on user plane common aspects of NR small data transmission Qualcomm Incorporated

[10] R2-2103521 Common aspects for SDT Ericsson

[11] R2-2103528 User Plane common aspects Nokia, Nokia Shanghai Bell

[12] R2-2103531 User plane common aspects for SDT Huawei, HiSilicon discussion

[13] R2-2103583 Some aspects of User Plane for SDT in NR Sony Europe B.V.

[14] R2-2103674 Discussion on beam operations for small data transmission Google Inc.

[15] R2-2104220 Discussion on data volume calculation Xiaomi Communications

[16] R2-2103454 Avoid triggering RA during subsequent SDT ASUSTeK

[17] R2-2103672 Discussion on small data transmission Google Inc.