**3GPP TSG-RAN WG3 #120 R3-233330**

**22th – 26th May 2023**

**Incheon, Korea**

Agenda Item: 20.2

Source: ZTE (moderator)

Title: Summary of Offline Discussion on CB: SDT\_MTSDT

Document for: Approval

# Introduction

**CB: # 15\_SDT**

**- Discuss the open issues above and take all the contributions into account**

**- Capture agreements and open issues**

(moderator - ZTE)

Summary of offline disc [R3-233330](file:///D%3A%5C3GPPmeeting%5C202304%20RAN3%20%23119bis%5Cpre-meeting%5CInbox%5CR3-233330.zip)

# For the Chairman’s Notes

<TBD>

# Discussion- Second round

<TBD>

# Discussion-First round

## Background

The following is abstracted from Chair note

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| 1、Left to gNB implementation to handle DL non-SDT data when it arrives at the last serving gNB following the MT-SDT paging procedure before receiving the UE Context Retrieval Request.Lenovo：The gNB behavior is different with R17, change in stage2 is neededNok: Add note in TS38.300QC: Would like to discuss the solutionZTE: Stage2 text is enough**Work on stage2 text on how to handling DL non-SDT data when it arrives at the last serving gNB following the MT-SDT paging procedure before receiving the UE Context Retrieval Request?****CU makes the MT-SDT decision or both?****Discuss the IE presence over interfaces** |

## E1AP/XnAP/F1AP impact

E1AP:

**In E1AP: MT-SDT indicator IE within MT-SDT information IE is not needed.** (Since Data Size is mandatory)

XnAP:

**In XnAP: anchor node makes the MT-SDT decision, the receiving node takes it into account to make its own MT-SDT decision.**

**In XnAP: Both MT-SDT indicator IE and MT-SDT Data Size IE are “Mandatory”.**

**MT-SDT indicator IE is Mandatory, to indicate that anchor node decides to trigger MT-SDT** (Because the SDT is only for small data, so the anchor node can help receiving node to decide MT-SDT

**MT-SDT Data Size IE is Mandatory, to help the receiving node make its own MT-SDT decision** (Because the receiving node needs to make its own MT-SDT decision

F1AP:

**In F1AP: MT-SDT indicator IE is “Mandatory” and MT-SDT Data Size IE is “Optional”**

**[Option 1] In F1AP: gNB-CU makes the MT-SDT decision, gNB-DU shall follow the decision.**

**[Option 2] In F1AP: gNB-CU makes the MT-SDT decision, gNB-DU takes it into account to make its own MT-SDT decision.**

**[Option 3] Do not specify it.**

## Other issues

**[R3-232865]**

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| After triggering of MT-SDT from the network side, the gNB-CU-UP should keep detecting whether or not there is any subsequent SDT data arrival during the ongoing MT-SDT session, respectively. The following special cases requiring fast termination of SDT will lead to some interactions with the corresponding gNB-CU-CP:* Case 1: All DL SDT data has been sent and there is no newer DL SDT data arrival
	+ for each SDT DRB, set the *DRB Activity* IE as ‘Not active’ in the BEARER CONTEXT INACTIVITY NOTIFICATION message.
* Case 2: Non-SDT data arrival during ongoing SDT session
	+ existing DL DATA NOTIFICATION message could be sent without the new *MT-SDT Information* IE.
* Case 3: Subsequent DL SDT data becomes large enough
	+ new indication in the *MT-SDT Information* IE in the DL DATA NOTIFICATION message?

Considering that Case 1 and Case 2 can be supported by reuse existing mechanisms, we only need to consider whether to introduce new indication in the *MT-SDT Information* IE in the DL DATA NOTIFICATION message to indicate to the gNB-CU-CP about the arrival of large size DL SDT Data, i.e. case 3. This could be achieved by either define a very big maximum value of the *Data Size* IE, or introduce another optional IE to indicate big data in the *MT-SDT Information* IE in the DL DATA NOTIFICATION message, or send DL DATA NOTIFICATION without *MT-SDT Information* IE.**Proposal 4: To inform the gNB-CU-CP about the arrival of large size DL SDT Data, further discuss whether to introduce an optional sub IE in the *MT-SDT Information* IE in the E1AP: DL DATA NOTIFICATION message, or define a very big maximum value of the *Data Size* IE, or send DL DATA NOTIFICATION without *MT-SDT Information* IE.** |

**Moderator’s suggestion:**

Case 1: CU-UP will not send DL DATA NOTIFICATION message.

Case 2: CU-UP shall send DL DATA NOTIFICATION message excluding MT-SDT Data Size IE to indicate non-SDT data coming.

Case 3: CU-UP shall send DL DATA NOTIFICATION message including MT-SDT Data Size IE (any newer SDT data coming)

**[R3-233059] E1AP: Whether the interaction between DL Data Notification procedure and Bearer context setup/modification procedure is needed.**

It is also proposed to add an interaction section in E1 DL Data Notification procedure:

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| **Interactions with Bearer Context Setup procedure:**The DL Data Notification procedure may be initiated upon reception of a BEARER CONTEXT SETUP REQUEST message that includes the*MT-SDT Information Request* IE. **Interaction with Bearer Context Modification (gNB-CU-CP initiated) procedure:**The DL Data Notification procedure may be initiated upon reception of a BEARER CONTEXT MODIFICATION REQUEST message that includes the*MT-SDT Information Request* IE.  |

**[R3-233294]**

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| 1. **DL Data Volume Calculation**

The MT-SDT data size as a useful information need to be delivered in E1, F1 and Xn interface. In Rel-17 MO-SDT, how to UL data volume calculation in UE side was discussed in RAN2. The following agreements on the details of UL data volume calculation were made:1. RAN2#115-e meeting:
* 1.Data volume used for SDT selection criteria is calculated as the total sum of Buffer Size across SDT RBs (i.e. same approach as BSR)
* 4.For SDT procedure selection, Same data volume threshold is used for CG-SDT and RA-SDT
1. RAN2#116e meeting:
* PDCP header is not considered for the SDT data volume calculation. (23/23). No spec change is needed.
* Buffered packets in PDCP/RLC entities should be counted in SDT data volume calculation. (21/23). Whether and how to avoid any buffered packets in PDCP/RLC entities at the time of SDT data volume calculation is FFS.
1. RAN2#116Bis-e
* 2.For both DRBs and SRBs configured with SDT, RAN2 confirm that at the time of SDT data volume calculation, there should be no buffered packets in PDCP/RLC entities that will not be transmitted during SDT procedure.
* 3.For DRBs configured with SDT, PDCP suspend is performed upon reception of RRCRelease message including suspendConfig so that PDCP PDUs are discarded, and PDCP SDUs already stored are considered in SDT data volume calculation. No specification change is needed.
* 13.The size of CCCH message is not considered in SDT data volume calculation

As mentioned above, the UL data volume calculation is similar to the buffer size calculation filed in BSR, which does not take the RLC and MAC headers into account. In addition, for UL SDT, the PDCP header and the size of CCCH message are also not considered for SDT data volume calculation. For DL data volume calculation, we think the CCCH message is also not considered in DL SDT data volume calculation. **Proposal 2: CCCH message is also not considered in DL SDT data volume calculation.** For DL user plane data packets, the similar data volume calculation mechanism can be adopted for DL SDT, i.e. the PDCP header, RLC header, MAC header and the size of CCCH message are not considered in DL SDT data volume calculation. As for SDAP header, it need to be considered in DL data volume calculation.**Proposal 3: Similar to UL SDT, PDCH header, RLC header, MAC header and the size of CCCH message are not considered for the DL data volume calculation. The DL data volume calculation for SDT DL data packets shall take SDAP header into account.** |

**[**[**R3-232687**](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_120%5CDocs%5CR3-232687.zip)**]**

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| TS 37.480===================**Start Change**=============================5.1.2 E1 bearer context management functionThe establishment of the E1 bearer context is initiated by the gNB-CU-CP and accepted or rejected by the gNB-CU-UP based on admission control criteria (e.g., resource not available).The modification of the E1 bearer context can be initiated by either gNB-CU-CP or gNB-CU-UP. The receiving node can accept or indicate failure to carry out the modification request. The E1 bearer context management function also supports the release of the bearer context previously established in the gNB-CU-UP. The release of the bearer context is triggered by the gNB-CU-CP either directly or following a request received from the gNB-CU-UP. This function is used to setup and modify the QoS-flow to DRB mapping configuration. The gNB-CU-CP decides flow-to-DRB mapping and provides the generated SDAP and PDCP configuration to the gNB-CU-UP. The gNB-CU-CP also decides the Reflective QoS flow to DRB mapping. The function is also used to send to the gNB-CU-UP the alternative QoS Parameters Sets when available for a QoS flow. For each PDU Session Resource to be setup or modified, the S-NSSAI, shall be provided in the E1 bearer context setup procedure and may be provided in the E1 bearer context modification procedure by gNB-CU-CP to the gNB-CU-UP.This function is also used to setup and modify the EPS bearer/E-RAB to DRB mapping configuration for the case of eNB-CP and eNB-UP separation. The eNB-CP decides EPS bearer/E-RAB-to-DRB mapping and provides the E-UTRAN/NR PDCP configuration to the eNB-UP.This function is also used for the gNB-CU-UP to report the MT-SDT data size to the gNB-CU-CP. With this function, the gNB-CU-UP requests gNB-CU-CP to trigger paging procedure over F1 or Xn to trigger the mobile terminated-small data transmission as described in TS 38.300 [6]. |

# Conclusion, Recommendations

# References

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| 20. NR MT-SDT WIWID [NR\_MT\_SDT-Core]: [RP-213583](https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_94e/Docs/RP-213583.zip) (target: RAN #101) [TU: 0.5 (**0.5**, 0.5)]**QUOTA: 2** |
| 20.1. General*Time plan, skeletons, BLs*  |
| [R3-232533](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_120%5CDocs%5CR3-232533.zip) | (BLCR to 38.401) Introduction on MT-SDT (Huawei, ZTE, Nokia, Nokia Shanghai Bell, Ericsson, Intel Corporation, China Telecom, Lenovo, LG Electronics) | CR0284r2, TS 38.401 v17.4.0, Rel-18, Cat. B **Endorsed as BL CR** |
| [R3-232534](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_120%5CDocs%5CR3-232534.zip) | (BLCR to 38.423) Introduciton on MT-SDT (Ericsson, ZTE, Intel Corporation, Nokia, Nokia Shanghai Bell, China Telecom, Huawei, Lenovo) | CR1010r2, TS 38.423 v17.4.0, Rel-18, Cat. B **Endorsed as BL CR** |
| [R3-232535](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_120%5CDocs%5CR3-232535.zip) | (BLCR to 38.473) Introduction on MT-SDT (Intel Corporation, ZTE, Nokia, Nokia Shanghai Bell, Ericsson, Huawei) | CR1140r2, TS 38.473 v17.4.1, Rel-18, Cat. B* Only capture single author name for BL CR

Rev in [R3-233328](file:///D%3A%5C3GPPmeeting%5C202304%20RAN3%20%23119bis%5Cpre-meeting%5CInbox%5CR3-233328.zip)  **Endorsed as BL CR unseen** |
| [R3-232536](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_120%5CDocs%5CR3-232536.zip) | (BLCR to 37.483) introduction of MT-SDT (Nokia, Nokia Shanghai Bell, ZTE, Ericsson, Intel Corporation, China Telecom, Huawei, Lenovo, LG Electronics) | CR0054r2, TS 37.483 v17.4.0, Rel-18, Cat. B* Only capture single author name for BL CR

Rev [R3-233329](file:///D%3A%5C3GPPmeeting%5C202304%20RAN3%20%23119bis%5Cpre-meeting%5CInbox%5CR3-233329.zip)  **Endorsed as BL CR unseen** |
| [R3-232561](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_120%5CDocs%5CR3-232561.zip) | (BLCR to 38 300) Introduction on MT-SDT (ZTE, CATT, Ericsson, China Mobile, China Telecom, Nokia, Nokia Shanghai Bell, Lenovo, Huawei, Google, LG Electronics) | draftCR **Endorsed as BL CR** |
| [R3-233074](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_120%5CDocs%5CR3-233074.zip) | (BLCR to 38.420) Introduction on MT-SDT (Lenovo, CATT, ZTE) | CR0034r1, TS 38.420 v17.2.0, Rel-18, Cat. B **Endorsed as BL CR** |
| [R3-232562](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_120%5CDocs%5CR3-232562.zip) | (BLCR to 38.420) Introduction on MT-SDT (Lenovo) | CR0034r, TS 38.420 v17.2.0, Rel-18, Cat. Bwithdrawn |
| 20.2. Support for Paging-Triggered SDTSpecify the support for paging-triggered SDT (MT-SDT) [RAN2, RAN3]* MT-SDT triggering mechanism for UEs in RRC\_INACTIVE, supporting RA-SDT and CG-SDT as the UL response;
* MT-SDT procedure for initial DL data reception and subsequent UL/DL data transmissions in RRC\_INACTIVE.

*Note: Data transmission in DL within paging message is not in scope of this WI.* *MT-SDT can be triggered by DL SDT user data and/or DL SDT signalling.**Upon reception of DL SDT user data, the gNB-CU-UP may include the assistance information (e.g., Data size) in E1AP DL Data Notification message to gNB-CU-CP.* *When receiving DL SDT data, the anchor gNB may send MT-SDT information IE to the neighbour gNBs within the RNA, via XnAP RAN paging message.* *The gNB that receives MT-SDT information within the RNA takes into account this information received in the XnAP RAN PAGING message from the anchor gNB to decide whether to trigger MT-SDT Uu paging.* *Upon reception of MT-SDT information via XnAP RAN paging message from the anchor gNB-CU, the gNB-CU may send F1 MT-SDT information to the gNB-DU via F1AP Paging message.* *RAN3#119bis-e:**Agree to reusing existing IE (i.e., SDT Support Request) within the XnAP Retrieve Context Request message when the UE resumes for MT-SDT, and there is no RAN3 standard impact.**Include an MT-SDT Information Request IE as optional IE in the E1AP: BEARER CONTEXT SETUP REQUEST/ MODIFICATION message to request the report of MT-SDT Information for bearers configured as SDT bearers.**For the issue on DL non-SDT data arrives during the ongoing MT-SDT procedure, RAN3 waits for RAN2 on whether any signaling enhancements are needed.**RAN3 acknowledges the case that DL non-SDT data arrives at the last serving gNB following the MT-SDT paging procedure before receiving UE Context Retrieval Request message. It is FFS whether it is left to gNB implementation, or reusing existing IE(s), or introducing a new IE.* *In XnAP: RAN Paging message includes the MT-SDT Data Size IE. FFS on the MT-SDT indicator IE and the presence of MT-SDT Data Size IE.* *The encoding and the name of MT-SDT information IE in E1AP DL DATA NOTIFICATION message include MT-SDT Data Size IE (Mandatory, INTEGER (1…96000, …). FFS on whether MT-SDT indicator IE is needed.* *The encoding and the name of MT-SDT information IE in F1AP: Paging message include MT-SDT indicator IE (Mandatory). FFS on MT-SDT Data Size IE.**Continue to work on the stage3 details*  |
| [R3-232682](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_120%5CDocs%5CR3-232682.zip) | Signaling enhancements to enable MT-SDT for RRC\_INACTIVE UEs. (Qualcomm Incorporated) | discussion |
| [R3-232686](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_120%5CDocs%5CR3-232686.zip) | (TP to 38.423, 38.473, 37.483) Introduction on MT-SDT (ZTE) | other |
| [R3-232687](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_120%5CDocs%5CR3-232687.zip) | (TP to 38.401,37.480) Introduction on MT-SDT (ZTE) | other |
| [R3-232711](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_120%5CDocs%5CR3-232711.zip) | (TP for TS 37.483 and TS 38.300) Completion of MT-SDT Open Points (Nokia, Nokia Shanghai Bell, Orange ) | other |
| [R3-232712](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_120%5CDocs%5CR3-232712.zip) | (TP for TS 38.423 and TS 38.473) Completion of MT-SDT Open Points (Nokia, Nokia Shanghai Bell, Orange ) | other |
| [R3-232800](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_120%5CDocs%5CR3-232800.zip) | (TP for BL CR to TS 38.423/38.473/37.483) Support of MT-SDT (CATT,CERPI) | other |
| [R3-232865](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_120%5CDocs%5CR3-232865.zip) | (TPs to TS 38.401, 38.473 BL CRs) Consideration on MT-SDT (Huawei) | other |
| [R3-232866](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_120%5CDocs%5CR3-232866.zip) | (TPs to TS 38.423, 37.463 BL CRs) Consideration on MT-SDT (Huawei) | other |
| [R3-233049](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_120%5CDocs%5CR3-233049.zip) | (TP to TS 38.300/401/420 BL CRs) Support for Paging-Triggered SDT (Lenovo) | other |
| [R3-233059](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_120%5CDocs%5CR3-233059.zip) | Discussion on MT-SDT Open issues for E1, F1 and Xn with TPs (Ericsson) | other |
| [R3-233060](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_120%5CDocs%5CR3-233060.zip) | TPs to TS 38.401 BL CR and E1AP BL CR (Ericsson) | other |
| [R3-233079](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_120%5CDocs%5CR3-233079.zip) | (TP to TS 38.423, 38.473 and 37.483) Support of MT-SDT (LG Electronics) | other |
| [R3-233080](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_120%5CDocs%5CR3-233080.zip) | (TP to TS 38.401) MT-SDT Support (LG Electronics) | other |
| [R3-233294](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_120%5CDocs%5CR3-233294.zip) | Discussion on Support of MT-SDT in Split Architecture (China Telecom) | discussion |
| [R3-233295](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_120%5CDocs%5CR3-233295.zip) | Discussion on Remaining Issues for RAN Paging (China Telecom) | discussion |
| [R3-232801](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_120%5CDocs%5CR3-232801.zip) | (TP for BLCR to TS 38.413) Support of Redcap and MT-SDT (CATT,CERPI) | other |
| 1、Left to gNB implementation to handle DL non-SDT data when it arrives at the last serving gNB following the MT-SDT paging procedure before receiving the UE Context Retrieval Request.Lenovo：The gNB behavior is different with R17, change in stage2 is neededNok: Add note in TS38.300QC: Would like to discuss the solutionZTE: Stage2 text is enough**Work on stage2 text on how to handling DL non-SDT data when it arrives at the last serving gNB following the MT-SDT paging procedure before receiving the UE Context Retrieval Request?****CU makes the MT-SDT decision or both?****Discuss the IE presence over interfaces****CB: # 15\_SDT****- Discuss the open issues above and take all the contributions into account****- Capture agreements and open issues**(moderator - ZTE)Summary of offline disc [R3-233330](file:///D%3A%5C3GPPmeeting%5C202304%20RAN3%20%23119bis%5Cpre-meeting%5CInbox%5CR3-233330.zip) |