**3GPP T****SG-RAN WG3 Meeting #121 R3-23xxxx**

**Toulouse, France, 21 – 25 Aug, 2023**

**Title:** (TP to TS 38.401 BL CR) Large SDT data arrival

**Source:** Huawei, Qualcomm Incorporated，China Telecom

**Agenda item:** 20.2

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# Introduction

At RAN3#120 meeting, the following agreements and FFSs were made:

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| **When new DL data is coming through non-SDT bearer, the gNB-CU-UP shall send DL DATA NOTIFICATION message. 2**  **FFS on either excluding MT-SDT Information, or introducing a new indicator (e.g., Non MT-SDT Data) or other method.**  **When large size of new DL data is coming through SDT bearer, the gNB-CU-UP shall send DL DATA NOTIFICATION message.**  **FFS on either excluding MT-SDT Information, or introducing a new indicator (e.g., MT-SDT Oversize), or other method. To be** |

In this document we provide TP to TS 38.401 to solve the FFSs above.

# TP to TS38.401 BL CR

***------------Start of the Next Change-----------------***

## 8.18 Overall procedure for Small Data Transmission during RRC Inactive

### 8.18.1 RACH based SDT

The procedure for RACH based small data transmission in RRC Inactive is shown in Figure 8.18.1-1.



Figure 8.18.1-1: RACH based Small Data Transmission in RRC Inactive state.

1. The UE in RRC Inactive sends the *RRCResumeRequest* message together with UL SDT data and/or UL SDT signalling.

2. The gNB-DU buffers the UL SDT data and/or UL SDT signalling.

3. The step 3 is as defined in step 4 in clause 8.6.2, including an indication of SDT access. The gNB-DU may also provide SDT assistance information.

4-5. If UE context is successfully retrieved as specified in TS 38.300 [2], the steps 4-5 are as defined in steps 6-7 in clause 8.9.6.2. The UL SDT data, if any, is forwarded to the gNB-CU-UP, and the UL signalling, if any, is forwarded to the gNB-CU-CP via the UL RRC MESSAGE TRANSFER message, in which any UL NAS PDU is delivered to AMF.

NOTE 1: In case that full UE context is retrieved from another gNB-CU-CP as specified in TS 38.300 [2], the gNB-CU-CP first establishes the UE context in the gNB-CU-UP via the Bearer Context Setup procedure and F1-U UL TEIDs are retrieved before step 4. The BEARER CONTEXT SETUP REQUSET message may include an indication to suspend non-SDT bearers, and in this case, the BEARER CONTEXT MODIFICATION REQUEST message in step 6 does not include resume indication for SDT DRBs.

NOTE 2: In case that only partial UE context for SDT including F1-U UL TEIDs is retrieved from another gNB-CU-CP as specified in TS 38.300 [2], the gNB-CU-CP uses those F1-U UL TEIDs for steps 4-5, and the subsequent steps 6-7 are not executed. The F1-U DL TEIDs received from the gNB-DU in step 5 should be forwarded to the other gNB-CU-CP, to be used for transferring of the DL SDT data. In addition, the UL SDT data, if any, is forwarded from the gNB-DU to the gNB-CU-UP of the other gNB-CU-CP for which the partial context is retrieved, and the UL signalling, if any, is forwarded from the gNB-CU-CP to the other gNB-CU-CP (the last serving gNB-CU-CP) via the XnAP RRC TRANSFER message.

NOTE 3: The other gNB-CU-UP may need to buffer the UL SDT data if received before the SDT bearer(s) are resumed.

6. The gNB-CU-CP sends the BEARER CONTEXT MODIFICATION REQUEST message including an resume indication for SDT DRBs. The gNB-CU-CP also includes the F1-U DL TEIDs received from the gNB-DU in step 5.

7. The gNB-CU-UP responds with the BEARER CONTEXT MODIFICATION RESPONSE message.

NOTE 4: Upon receiving the UE INACTIVITY NOTIFICATION message from the gNB-DU and deciding to terminate the SDT, the gNB-CU, if serving the UE, shall transmit the UE CONTEXT RELEASE COMMAND message to the gNB-DU. If CG-SDT is (re-)configured, the gNB-CU may request the gNB-DU to keep CG-SDT configuration and resources in the UE CONTEXT RELEASE COMMAND message.

### If the amount of the received DL SDT data is above the threshold provided by gNB-CU-CP, the gNB-CU-UP shall send DL DATA NOTIFICATION message with the SDT volume threshold crossed indication. The gNB-CU-CP may terminate the ongoing SDT procedure.8.18.2 CG based SDT

The procedure for CG based small data transmission in RRC Inactive is shown in Figure 8.18.2-1.



Figure 8.18.2-1: CG based Small Data Transmission in RRC Inactive state.

1. The gNB-CU decides to move UE into RRC\_INACTIVE state.

2. The gNB-CU-CP decides to configure CG-SDT, it sends UE CONTEXT MODIFICATION REQUEST message including a query indication for CG-SDT related resource configuration associated with the information of SDT Radio Bearer(s).

3. The gNB-DU sends the UE CONTEXT MODIFICATION RESPONSE message including the CG-SDT related resource configurations for the requested SDT Radio Bearer(s) within the *DU to CU RRC Information* IE.

4. The gNB-CU-CP sends the BEARER CONTEXT MODIFICATION REQUEST towards the gNB-CU-UP, with the suspend indication.

5. The gNB-CU-UP sends the BEARER CONTEXT MODIFICATION RESPONSE towards the gNB-CU-CP.

6. The gNB-CU-CP sends the UE CONTEXT RELEASE COMMAND message to the gNB-DU including an *RRCRelease* message to the UE with the CG-SDT information within suspend configuration. The gNB-CU notifies the gNB-DU to keep the SDT RLC config, F1-U tunnels, F1AP UE association, and store the CG resource for SDT when the UE is entering RRC\_INACTIVE state with an explicit CG-SDT kept indicator.

7. The gNB-DU sends the *RRCRelease* message to UE.

8. The gNB-DU sends UE CONTEXT RELEASE COMPLETE message. The gNB-DU keeps the SDT RLC config, F1-U tunnels, F1AP UE association, and stores the CG resource for SDT when the UE entering RRC\_INACTIVE. The gNB-DU also stores the C-RNTI, CS-RNTI, and which bearers are CG-SDT bearers.

After a period of time of the UE being in RRC\_INACTIVE state.

9. The UE decides to perform CG based SDT procedure, it sends the *RRCResumeRequest* message together with UL SDT data/UL NAS PDU.

10. The gNB-DU sends the UL RRC MESSAGE TRANSFER message including the *RRCResumeRequest* message to indicate the access due to CG-SDT.

11/12. If UE context is successfully retrieved as specified in TS 38.300 [2], the gNB-CU-CP initiates the BEARER CONTEXT MODIFICATION procedure to resume SDT DRBs.

13 – 13a. The gNB-DU sends the UL SDT data, if any, to the gNB-CU-UP, and/or sends the UL signalling, if any, to the gNB-CU-CP via the UL RRC MESSAGE TRANSFER message, in which any UL NAS PDU is delivered to AMF.

NOTE 1: Upon receiving the UE INACTIVITY NOTIFICATION message from the gNB-DU and deciding to terminate the SDT, the gNB-CU shall transmit the UE CONTEXT RELEASE COMMAND message to the gNB-DU.

If CG-SDT is re-configured, the gNB-CU may request the gNB-DU to keep CG-SDT configuration and resources in the UE CONTEXT RELEASE COMMAND message.

If the amount of the received DL SDT data is above the threshold provided by gNB-CU-CP, the gNB-CU-UP shall send DL DATA NOTIFICATION message with the SDT volume threshold crossed indication. The gNB-CU-CP may terminate the ongoing SDT procedure***------------End of the Change-----------------***