3GPP TSG-RAN WG3 #116e R3-223698

**E-meeting, 9th – 19th May, 2022**

Source: CATT (moderator)

Title: Summary of offline discussion for CB: # SDT3\_RACHbased

Agenda Item: 9.1.9.1

Document for: Approval

# Introduction

This is the Summary of the discussion for the following CB:

**CB: # SDT3\_RACHbased**

**- How to transfer SDT DRB/SRB information in the RETRIEVE UE CONTEXT RESPONSE message when needed?**

**- Add the QoS flow mapping information in the Partial UE Context Information for SDT IE? Add the SDT SRB Only Indicator IE in the Partial UE Context Information for SDT IE?**

**- Add SRB ID IE in the SDT SRB between New NG-RAN node and Old NG-RAN node in the RRC TRANSFER message IE?**

**- For SDT without UE context relocation, the receiving gNB releases the established SDT RLC entity and the partial UE context when the SDT transmission is completed?**

**- Check details of other corrections**

**- Capture agreements and provide CRs if agreeable**

(CATT - moderator)

Summary of offline disc [R3-223698](file:///C:\Users\sunjiancheng\AppData\Roaming\Microsoft\Word\Inbox\R3-223698.zip)

The deadline for the first phase is 8:00 UTC on Friday (May 13th).

According to the 1st round discussion, 2nd round discussion may be started to finalize the CR work.

# For the Chairman’s Notes

TBD.

# Discussion (first phase)

# Stage 3 changes

Contributions [1][2][4][6][10][12] provide the stage 3 changes for RA-based SDT.

**Issues to be resolved:**

1. **Presence of *SDT DRBs To Be Setup List* IE.**

Contributions [1][4][6] pointed out the *SDT DRBs To Be Setup List* IE should not be mandatory. Two solutions are provided to fix the issue:

**Solution 1-1:** as proposed in [1], add an additional IE *SDT SRB Only Indicator*, to ignore the *SDT DRBs To Be Setup List* IE.

**Solution 1-2:** as proposed in [4][6], change the presence of *SDT DRBs To Be Setup List* IE from “1” to “0..1”.

**Questions 1**: Do you acknowledge the issue and agree with the changes as proposed in [1] ?

| Company | Yes/No | Comment |
| --- | --- | --- |
| CATT | Yes, but | We acknowledged the issue.  But the simplest way is to change the presence of the *SDT DRBs To Be Setup List* IE from “1” to “0..1”. |
| ZTE | Yes, but | We also acknowledged this issue.  But we agree with change as proposed in [4][6]. |
| Google | Yes, but | The issue is acknowledged and the way proposed by [4][6] seems easier. |
| Huawei | Yes, but | Issue acknowledged, and solution 1-2 proposed by [4] and [6] is better. |
| Nokia | Yes and No | We also acknowledge this issue.  But we disagree with [1] and agree with change as proposed in [4][6]. |
| China Telecom | Yes, but | Agree with ZTE |
| E/// | Yes with Sol 1-2 |  |
| Lenovo | Yes with Sol 1-2 |  |
| Samsung | Yes with Sol 1-2 |  |
| Qualcomm | Yes | Sol 1-2 seems better; also no strong need to be backward compatible at this stage. |

1. **Add SDT Radio Bearer Configuration in Retrieval UE Context Response**

In the contributions [2] and [10], it’s proposed that anchor Gnb shall provide the SDT SRB (list), SDT DRB list to the receiving Gnb in case of SDT with anchor relocation.

The moderator observed that the reason of changes for both CRs are same, and the changes are quite similar, the major delta is [2] uses SDT SRB list, while the [10] use a SRB2 indicator.

**Questions 2**: In SDT with anchor relocation case, do you agree to add the radio bearer configuration for SDT in Context Retrieval Response? And which approach is preferred?

| Company | Yes/No | Comment |
| --- | --- | --- |
| CATT | Yes,  Prefer to merge them together and fix the issue. | As the two CRs are quite similar, the moderator would encourage to merge them together.  Currently, only SRB2 is supported in SDT. But we have agreed to use a SDT SRB list in Partial UE Context Transfer message for future proof.  Thus, the tabular in [2] is slightly preferred.  To be mentioned, the presence of SDT DRB info in both of the tabulars are not correctly, which has been pointed out in [1] [6].  The CR should be revised anyway, the moderator would propose to merge them together and fix issue for the presence of DRB list. |
| ZTE | Yes, but | Agree with CATT.  It is simpler to add SDT DRB/SRB id via explicit XnAP signalling than via updated RRC container within TS38.331. More, if RAN3 agrees to add SDT DRB/SRB id via explicit XnAP signalling, we shall notify RAN2 of our decision, then RAN2 does not need to update RRC container within TS38.331 to include SDT DRB/SRB id. |
| Google | No | To address the raised issue as well as supporting delta configuration for CG-SDT, it is preferred having an updated RRC container (i.e., HandoverPreparationInformation) to include the related information. |
| Huawei | No | Same view with Gg, and there will discussion in RAN2, we can wait for RAN2 progress. |
| Nokia | Wait | If RAN2 decides container, nothing to do; otherwise CR is ok with preference for [2] like the moderator. |
| China telecom | yes | Agree with ZTE and CATT. We also agree to merge the two CRs. And we could send a LS to RAN2 to notify our decision. |
| E/// | Yes | We know there is paper in RAN2 to discuss the same topic, but this issue can be solved by RAN3 signaling considering partial UE context transfer info already includes those IEs. So first we can agree that RAN3 is the one to fix this, and in 2nd round check how to merge the CRs. |
| Lenovo | No | It would be better to include it in RRC container. |
| Samsung | Yes | ACK the issue, and agree to merge two CRs.  Companies mentioned that the container can be used. However, in the existing container, SDT bearer ID is not contained since those configuration is given to the UE via RRCRelease message. |
| Qualcomm | Yes | Slightly prefer solution provided in [2]. CR merge can be discussed in the second round. |

1. **Should we change *SDT SRBs to Be Setup List* IE from optional to Mandatory?**

In [12], it’s proposed to change the presence of the *SDT SRBs to Be Setup List* IE from optional to Mandatory.

According to RAN2’s agreements, the SRB1 should be resumed during SDT procedure, e.g. for sending the *RRCRelease* message. From Xn interface point of view, the RLC context of SRB1 should be always provided from the last serving Gnb to the receiving Gnb in case of SDT without anchor relocation. However, the presence of SDT SRBs to Be Setup List IE is optional in the PARTIAL UE CONTEXT TRANSFER message. Thus, change the presence of *SDT SRB list* to mandatory.

**Questions 3**: Do you agree to change the presence of the *SDT SRBs to Be Setup List* IE to mandatory in the PARTIAL UE CONTEXT TRANSFER message?

| Company | Yes/No | Comment |
| --- | --- | --- |
| CATT | Yes | Seems reasonable. |
| ZTE | Yes | Agree |
| Google | Yes |  |
| Huawei | Yes |  |
| Nokia | Yes |  |
| China telecom | Yes |  |
| E/**//** | Yes |  |
| Lenovo | Yes |  |
| Samsung | Yes |  |
| Qualcomm | Yes |  |

1. **Add SRB ID in the RRC TRANSFER message to associate the PDCP-PDU with the SRB ID?**

In [12], it’s proposed to add SRB type/ID in the RRC TRANSFER message associated to the RRC container, to let the receiving node make proper handling for the signalling, e.g. for mapping the PDCP-C PDU to corresponding logical channel, and for PDCP security related handling.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **SDT SRB between New NG-RAN node and Old NG-RAN node** |  | *0..1* |  |  | YES | ignore |
| >RRC Container | M |  | OCTET STRING | Contains a PDCP-C PDU encapsulating an RRC message as defined in subclause 6.2.1 of TS 38.331 [10]. | – |  |
| >SRB ID | M |  | 9.2.3.165 | In this version of the specification, values "0", "3", and "4" shall not be set by the sender and ignored by the receiver. | - | - |

**Questions 4**: Do you agree to add *SRB ID* IE in the RRC TRANSFER message to make correct association between the RRC Container and the SRB ID?

| Company | Yes/No | Comment |
| --- | --- | --- |
| CATT | Yes | It seems reasonable to include a SRB ID to associate with each RRC container in the Xn RRC TRANSFER message. |
| ZTE | Yes | Share the same view with CATT |
| Google | Yes |  |
| Huawei | Yes |  |
| Nokia | Yes |  |
| China Telecom | Yes |  |
| E/**//** | Yes |  |
| Lenovo | Yes |  |
| Samsung | Yes |  |
| Qualcomm | Yes | Note that we are supposed to avoid “shall” statements in semantics. Just stating that certain values are not used, and ignored by the receiver is probably enough. |

1. **Add the QoS flow mapping information in the *Partial UE Context Information for SDT* IE?**

In [6], it’s proposed to add the QoS flow mapping information in the *Partial UE Context Information for SDT* IE. As the QoS flow mapping information is mandatory in the F1 Context setup request, it shall therefore be provided in the *Partial UE Context Information for SDT* IE.

9.2.3.164 Partial UE Context Information for SDT

This IE contains the UE context information within the PARTIAL UE CONTEXT TRANSFER message for NR SDT.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| **SDT DRBs To Be Setup List** |  | *0..1* |  |  | YES | ignore |
| **>SDT DRBs to Be Setup Item** |  | *1 .. <maxnoofDRBs>* |  |  | – |  |
| >>DRB ID | M |  | 9.2.3.33 |  | – |  |
| >>UL TNL Information | M |  | UP Transport Parameters 9.2.3. 76 |  | – |  |
| >>DRB RLC Bearer Configuration | M |  | OCTET STRING | RLC-BearerConfig IE defined in subclause 6.3.2 of TS 38.331 [10] | – |  |
| >>DRB QoS | M |  | QoS Flow Level QoS Parameters  9.2.3.5 |  | – |  |
| >>S-NSSAI | M |  | 9.2.3.21 |  | – |  |
| >>RLC Mode | M |  | 9.2.3.28 |  | – |  |
| >>PDCP SN Length | M |  | 9.2.3.63 |  | – |  |
| >>Flows Mapped to DRB List |  | *1* |  |  | – |  |
| >>>Flows Mapped to DRB Item |  | *1 .. <maxnoofQoSFlows>* |  |  | – |  |
| >>>QoS Flow Identifier | M |  | 9.2.3.10 |  | – |  |
| >>>QoS Flow Level QoS Parameters | M |  | 9.2.3.5 |  | – |  |
| >>>QoS Flow Mapping Indication | O |  | 9.2.3.79 |  | – |  |

**Questions 5**: Do you agree to add the QoS flow mapping information in the *Partial UE Context Information for SDT* IE?

| Company | Yes/No | Comment |
| --- | --- | --- |
| CATT | Yes, See comment | Indeed there’s the issue on setting the mandatory QoS flow related information in F1 Context setup request in case of only parital UEcontext is provided from the last serving gNB to the receiving gNB.  I understand two possible way to handle this issue:   1. As proposed in this contribution, add the QoS flow mapping info in the partial UE context Transfer. 2. Make changes to F1, e.g. indicate the corresponding QoS flow mapping info is ignored for SDT.   The 1st solution is slightly preferred, to avoid extra impact to the legacy F1 procedure. |
| ZTE | Yes | First solution (as proposed in [6]) is better. |
| Google | Yes |  |
| Huawei | Yes |  |
| Nokia | Yes |  |
| China telecom | Yes |  |
| E/**//** | Yes |  |
| Lenovo | Yes |  |
| Samsung | Yes |  |
| Qualcomm | Yes |  |

1. **Other changes to Xn**

In [4], it’s proposed:

**Issue 1 :** The procedure description added in 8.2.12.1 is applicable only for the RACH based SDT without relocation scenario which needs to be clarified.

**- Issue 1 description:**

The procedure description in the second paragraph of 8.2.12.1 is applicable only for the RACH based SDT without relocation scenario. This needs to be clarified.

**- proposal 1: Clarification in the procedure text is needed as follows.**

In case of RACH based SDT when the UE context is kept in the old NG-RAN node, the Retrieve UE Context Confirm procedure is also used to request the termination of SDT session from the new NG-RAN node to the old NG-RAN node.

**Issue 2 :** The message name in 8.2.13.2 in the sentence below the figure is incorrect.

**- Issue 2 description:**

The message name in 8.2.13.2 in the sentence below the figure is incorrect and need to be corrected.

. **– proposal 2: Correct the message name in the procedure text as follows.**

The old NG-RAN node initiates the procedure by sending the PARTIAL UE CONTEXT TRANSFER ~~RETRIEVE REQUEST~~ message to the new NG-RAN node.

**Issue 3 :** The procedure description added in 8.3.9.1 is applicable only for the RACH based SDT without relocation scenario which needs to be clarified.

**- Issue 3 description:**

The procedure description in the second paragraph of 8.3.9.1 is applicable only for the RACH based SDT without relocation scenario. This needs to be clarified.

**- proposal 3: Clarification in the procedure text is needed as follows.**

In case of RACH based SDT when the UE context is kept in the old NG-RAN node, ~~T~~this procedure is also used to deliver a PDCP-C PDU encapsulating an NR RRC message between the new NG-RAN node and the old NG-RAN node.

**Issue 4 :** The use of RETRIEVE UE CONTEXT CONFIRM is applicable only for the RACH based SDT without relocation scenario and needs to be clarified.

**- Issue 4 description:**

The use of RETRIEVE UE CONTEXT CONFIRM is applicable only for the RACH based SDT without relocation scenario which needs to be clarified in 9.1.1.16

**- proposal 4: Clarification in the message description is needed as follows.**

In case of RACH based SDT when the UE context is kept in the old NG-RAN node, the Retrieve UE Context Confirm procedure is also used to request termination of SDT session from the new NG-RAN node to the old NG-RAN node

**Issue 5 :** The Partial UE Context Information for SDT IE within PARTIAL UE CONTEXT TRANSFER message should have presence M.

**- Issue 5 description:**

The Partial UE Context Information for SDT IE within PARTIAL UE CONTEXT TRANSFER message should have presence Mas it does not make sense to receive this message without the Partial UE Context Information for SDT IE

**- proposal 5: The presence of Partial UE Context Information for SDT IE within PARTIAL UE CONTEXT TRANSFER message should be changed from O to M.**

**Issue 6 :** Criticality Diagnostics IE is missing in PARTIAL UE CONTEXT TRANSFER ACKNOWLEDGE message.

**- Issue 6 description:**

Criticality Diagnostics IE is missing in PARTIAL UE CONTEXT TRANSFER ACKNOWLEDGE message.

**- proposal 6: Add Criticality Diagnostics IE in PARTIAL UE CONTEXT TRANSFER ACKNOWLEDGE message .**

**Issue 7 :** The use of RRC TRANSFER is applicable only for the RACH based SDT without relocation scenario and needs to be clarified.

**- Issue 7 description:**

The use of RRC TRANSFER is applicable only for the RACH based SDT without relocation scenario which needs to be clarified in 9.1.2.20

**- proposal 7: Clarification in the message description is needed as follows.**

This message is also sent by the new NG-RAN-NODE to the old NG-RAN-NODE or from the old NG-RAN-NODE to the new NG-RAN-NODE to transfer an RRC message containing the SDT SRB in case of RACH based SDT when the UE context is kept in the old NG-RAN node.

In [6], it’s also proposed:

1/ corrected message name in section 8.2.13.2, already covered in the issue 2 of [4].

2/ change “may include data forwarding information” into “shall, if supported”

**Proposal 8：change “may include data forwarding information” into “shall, if supported”.**

**Questions 6**: Companies are encouraged to provide your views on the above 8 proposals?

| Company | Comment |
| --- | --- |
| CATT | Thanks HW, Nokia for carefully check and refinements.  Generally, I’m fine with all of the proposals.  One thing to be further confirmed, should we use “RACH based SDT when the UE context is kept in the old NG-RAN node” or to keep alignment with our stage 2, using “SDT without UE context relocation”? |
| ZTE | Agree for all. Slight prefer to CATT’s suggestion to align with stage 2. |
| Google | Agree for all. |
| Huawei | Agree for all. |
| Nokia | Agree for all. Also prefer CATT rewording to keep alignment with stage 2. |
| China Telecom | Agree for all |
| E/// | In general ok. One concern on this additional “in case of RACH based SDT when the UE context is kept in the old NG-RAN node”, We don’t see a strong point to add this in all the places. Normally the condition is described from IE presence point of view. |
| Lenovo | Agree for all |
| Samsung | Agree for all |
| Qualcomm | Agree for all. Prefer CATT’s rewording. |

# Stage 2 changes

# Draft CR for TS 38.300

Contributions [3][5] [8][9][11] provide various of changes to the stage 2 procedures for RA-based SDT for TS 38.300.

To make life easier, the moderator tried to merge the changes from the above CRs, and provided the new draftCR in the folder for further check. Companies are encouraged to double check the draftCR or TS 38.300, and provide the comment or necessary updates.

**Questions 7**: Any comment on the draftCR for TS 38.300?

| Company | Comment |
| --- | --- |
| ZTE | Thanks for moderator’s good work. We would like to consign this draftCR.  Additional, in 18.3 SDT without UE context relocation, **“7. Upon receiving the RETRIEVE UE CONTEXT CONFIRM message,** **and the SDT transmission is completed, the last serving Gnb responds to the receiving Gnb with the RETRIEVE UE CONTEXT FAILURE message including an encapsulated RRCRelease message in order to send the UE to RRC\_INACTIVE state if the receiving Gnb indicated a “normal” end of SDT or to RRC\_IDLE state if the receiving Gnb indicated a radio link problem. ”**.  Because I think if DL SDT DRB/SRB packets is still coming although receiving the RETRIEVE UE CONTEXT CONFRIM message, the last serving Gnb will not end this SDT procedure, so I suggest to have above change. |
| Google | The proposed changes in [9] was missing and should be taken into account. We have provided an update to the moderator’s draft CR. |
| Nokia | Update is OK and integrates all 3151 changes, very good work. I just made 3 minor additional terminology changes (see in the CB folder). Please add Nokia, Nokia Shanghai Bell co-sign. |
|  |  |

# Draft CR for TS 38.401

The contribution [7] provides some update to TS 38.401. The changes are as below:

**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 *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, with including an indication of SDT access. The Gnb-DU may also provide SDT assistance information.

4-5. 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 etrieved 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, which will be provided to the Gnb-CU-UP by the Bearer Context Modification procedure, and 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 ignaling, if any, is forwarded from the Gnb-CU-CP to the other Gnb-CU-CP via the XnAP RRC TRANSFER message.

NOTE 3: The buffered UL SDT data/ignaling in Gnb-DU could be sent to Gnb-CU-UP/Gnb-CU-CP afer step 5. The 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-CP responds with the BEARER CONTEXT MODIFICATION RESPONSE message.

**Questions 8**: Do you agree with the changes to TS 38.401 as above?

| Company | Yes/No | Comment |
| --- | --- | --- |
| ZTE | Yes | In note 3, there is typo “afer” |
| Google | Yes/No | No strong view for the clarification. |
| Huawei | Yes/No | No strong view for these clarifications. |
| Nokia | Yes | Clarification helps. |
| China Telecom | yes |  |
| E/// | Neutral | No strong view. Let’s check CR in 2nd round. |
| Lenovo |  | Agree with the intent, but the wording needs to be carefully checked in the 2nd round |
| Samsung | Yes |  |
| Qualcomm | Neutral | Prefer not to mention Note3. It should be left to implementation. Can be checked further. |

# Conclusion, recommendations [if needed]

# Reference

1. R3-223610 Correction on RA-SDT without anchor relocation in Xn (LG Electronics) CR0836r, TS 38.423 v17.0.0, Rel-17, Cat. F
2. R3-223111 Correction on RACH based SDT (ZTE. China Telecom, CATT) CR0775r, TS 38.423 v17.0.0, Rel-17, Cat. F
3. R3-223144 Correction for Support of SDT procedure over RACH (Huawei, China Telecom, China Unicom) draftCR
4. R3-223145 Correction for RA-SDT in XnAP (Huawei, China Telecom, China Unicom, Lenovo, Motorola Mobility) CR0780r, TS 38.423 v17.0.0, Rel-17, Cat. F
5. R3-223151 Correction of RACH-based SDT Stage 2 (Nokia, Nokia Shanghai Bell) draftCR
6. R3-223152 Correction of RACH-based SDT Stage 3 (Nokia, Nokia Shanghai Bell) CR0782r, TS 38.423 v17.0.0, Rel-17, Cat. F
7. R3-223279 CR to TS 38.401 Clarifications on RA-SDT overall procedures (CATT, ZTE) CR0213r, TS 38.401 v17.0.0, Rel-17, Cat. F
8. R3-223280 Draft CR to TS 38.300 correction on RA-SDT overall procedures (CATT, ZTE) draftCR
9. R3-223248 Correction to receiving gNB behaviour upon SDT completion (Google Inc.) draftCR
10. R3-223500 Correction for Rel-17 RA-SDT with anchor relocation (Intel Corporation) CR0822r, TS 38.423 v17.0.0, Rel-17, Cat. F
11. R3-223168 SDT corrections in stage-2 (Ericsson) draftCR
12. R3-223307 Correction on SRB SDT on XnAP (Lenovo, ZTE, Ericsson, Huawei) CR0799r, TS 38.423 v17.0.0, Rel-17, Cat. F