**3GPP TSG-RAN WG3 Meeting #113-e R3-213566**

**E-meeting, 16-26 Aug 2021**

**Title:** (TP to 38.423/36.423 CPAC BL CR) Support of Early data forwarding

**Source:** Huawei

**Agenda item:** 14.3

**Document Type:** Other

# 1. Introduction

In the last meeting, RAN3 discussed the early data forwarding in CPAC and has the following agreements:

Support both PDCP SDU data forwarding and PDCP PDU data forwarding in early data forwarding.

WA: Use the Early Status Transfer message to inform the discarding of forwarded PDCP PDU for both PDCP PDU data forwarding and PDCP SDU data forwarding.

In this contribution, we first discuss the PDCP SDU forwarding and discarding, the PDCP PDU forwarding and discarding, and then provide the corresponding TP to XnAP and X2AP BL CRs.

# 2. Discussion

## 2.1 DL PDCP SDU forwarding and discarding

In R16 CHO, the early data forwarding is supported in order to reduce the latency of data forwarding. The source node initiates data forwarding before the UE executes the handover to a candidate node. The source node forwards the PDCP SDU with SNs assigned by the source node to the candidate node. When the UE access the candidate cell, the candidate cell can immediately send the early forwarded data to the UE. No downlink PDCP SDU without a SN and no uplink PDCP SDU is forwarded. The source node sends the EARLY STATUS TRANSFER message to maintain HFN continuity by indicating PDCP SN and HFN of the first PDCP SDU that the source node forwards to the candidate node.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CHOICE *Procedure Stage* | M |  |  |  |
| *>First DL COUNT* |  |  |  |  |
| **>>DRBs Subject To Early Status Transfer List** | M | *1* |  |  |
| **>>>DRBs Subject To Early Status Transfer Item** |  | *1 .. <maxnoofDRBs>* |  |  |
| >>>>DRB ID | M |  | 9.2.3.33 |  |
| >>>>CHOICE *First DL COUNT* | M |  |  |  |
| >>>>>*12 bits* |  |  |  |  |
| >>>>>> FIRST DL COUNT Value | M |  | COUNT Value for PDCP SN Length 12 9.2.3.36 | PDCP-SN and Hyper frame number of the first DL SDU that the source NG-RAN node forwards to the target NG-RAN node in case of 12 bit long PDCP-SN |
| >>>>>*18 bits* |  |  |  |  |
| >>>>>> FIRST DL COUNT Value | M |  | COUNT Value for PDCP SN Length 18 9.2.3.37 | PDCP-SN and Hyper frame number of the first DL SDU that the source NG-RAN node forwards to the target NG-RAN node in case of 18 bit long PDCP-SN |

In our understanding, for the data forwarding of PDCP SDUs, we can reuse the IEs within the *First DL COUNT* branch in the EARLY STATUS TRANSFER message to maintain HFN continuity.

1. **For the early data forwarding of DL PDCP SDUs, reuse the IEs within the *First DL COUNT* branchin the EARLY STATUS TRANSFER message.**

In CHO, before the UE accesses to the candidate cell, the source node may additionally send the EARLY STATUS TRANSFER message(s) to inform discarding of already forwarded PDCP SDUs. The target node does not transmit forwarded downlink PDCP SDUs to the UE whose COUNT is less than the provided and discards them if transmission has not been attempted.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CHOICE *Procedure Stage* | M |  |  |  |
| *>First DL COUNT* |  |  |  |  |
| **………** |  |  |  |  |
| *>DL Discarding* |  |  |  |  |
| **>>DRBs Subject To DL Discarding List** | M | *1* |  |  |
| **>>>DRBs Subject To DL Discarding Item** |  | *1 .. <maxnoofDRBs>* |  |  |
| >>>>DRB ID | M |  | 9.2.3.33 |  |
| >>>>CHOICE *DL Discarding* | M |  |  |  |
| >>>>>*12 bits* |  |  |  |  |
| >>>>>> DISCARD DL COUNT Value | M |  | COUNT Value for PDCP SN Length 12 9.2.3.36 | PDCP-SN and Hyper frame number for which the target NG-RAN node should discard forwarded DL SDUs associated with lower values in case of 12 bit long PDCP-SN |
| >>>>>*18 bits* |  |  |  |  |
| >>>>>> DISCARD DL COUNT Value | M |  | COUNT Value for PDCP SN Length 18 9.2.3.37 | PDCP-SN and Hyper frame number for which the target NG-RAN node should discard forwarded DL SDUs associated with lower values in case of 18 bit long PDCP-SN |

In the last meeting, RAN3 has agreed to support the early data forwarding for both PDCP SDU and PDCP PDU. And a working assumption was made as “Use the Early Status Transfer message to inform the discarding of forwarded PDCP PDU for both PDCP PDU data forwarding and PDCP SDU data forwarding.” In our understanding, before the UE accesses the candidate PSCell, there are also some forwarded data which has been transmitted to the UE successfully by the MN or source SN. Therefore the target SN does not need to send these data to the UE again, this discard mechanism should be supported.

1. **Support to inform the discarding of forwarded DL PDCP SDU and PDCP PDU.**

In CHO, the source NG-RAN will send the early status transfer message for discarding of already forwarded downlink SDUs for respective DRB. The early status transfer message include the *DL Discarding* branch to inform the PDCP-SN and Hyper frame number for which the target node should discard forwarded DL SDUs associated with lower values. For the DL PDCP SDU early data forwarding in CPAC, the existing IEs in the *DL Discarding* branch can be reused*.*

1. **For the discarding of forwarded DL PDCP SDUs, reuse the existing IEs in the *DL Discarding* branch in the EARLY STATUS TRANSFER message.**

Table 1 The data forwarding in CPAC

|  |  |
| --- | --- |
|  | **Data forwarding** |
| **Bearer type change in CPAC** | **S-SN to MN** | **MN to T-SN** | **T-SN to MN** |
| MN terminated MCG/SCG/Split bearer=> MN terminated MCG bearer | / | / | / |
| MN terminated MCG/SCG/Split bearer=> MN terminated SCG/Split bearer | / | PDCP PDU | / |
| MN terminated MCG/SCG/Split bearer=> SN terminated SCG bearer | / | PDCP SDU | / |
| MN terminated MCG/SCG/Split bearer=> SN terminated MCG/Split bearer | / | PDCP SDU | PDCP PDU |
| SN terminated MCG/SCG/Split bearer=> MN terminated MCG bearer | PDCP SDU | / | / |
| SN terminated MCG/SCG/Split bearer=> MN terminated SCG/Split bearer | PDCP SDU | PDCP PDU | / |
| SN terminated MCG/SCG/Split bearer=> SN terminated MCG/Split bearer | PDCP SDU | PDCP SDU | PDCP PDU |
| SN terminated MCG/SCG/Split bearer=> SN terminated SCG bearer | PDCP SDU | PDCP SDU | / |

Table 1 shows the required data forwarding in CPAC, there could be data forwarding of PDCP SDUs from the source SN to the MN, and from the MN to the candidate SNs. In the current description of the EARLY STATUS TRANSFER message, it cannot cover all these scenarios, there is a need to extend the scenario listed.

1. **To support DL PDCP SDUs early data forwarding and discarding, extend the EARLY STATUS TRANSFER message to the following cases: from the source SN to the MN, and from the MN to the candidate SNs.**

## 2.2 DL PDCP PDU forwarding and discarding

For the data forwarding of PDCP PDUs, we think the node hosting PDCP entity does not need send the first DL count to the corresponding node same to the legacy behaviours. The node hosting PDCP entity can directly send the DL PDCP PDUs to the corresponding node.

1. **For the early data forwarding of PDCP PDUs, the node hosting PDCP entity does not need to send the first DL count to the corresponding node.**

Based on table 1, in MR-DC, there are several bearer types and the bearer types will be changed during CPAC procedures. The node receiving the forwarded PDCP SDUs may still need to forward the PDCP PDUs to the other node. For example, if one bearer is a SN terminated split bearer before and after CPC, upon receiving the forwarded PDCP SDUs, the candidate SN should forward the PDCP PDUs to the MN. This kind of data forwarding is supported in late data forwarding by default, and it is better to enable it in early data forwarding to reduce the transmission delay of the data split to the MN.

1. **The node receiving the forwarded DL PDCP SDUs can forward the DL PDCP PDUs to other nodes in early data forwarding.**

In R15, RAN3 introduced the discarded PDCP PDU SNs in the user plane for the flow control. Therefore there are two options to inform the discarding of PDCP PDU SNs.

* Option 1: user plane solution, i.e. reuse the DL USER DATA frame
* Option 2: control plane solution, i.e. the early status transfer message

In option 1, the current DL USER DATA frame can indicate the all NR PDCP PDUs up to and including a defined DL discard NR PDCP PDU SN or discard one or a number of blocks of downlink NR PDCP PDUs. Therefore it is only needed to add some descriptions in TS 37.340.

In option 2, the early data forwarding of several DRBs will be performed in CPAC. For some DRBs, the PDCP PDUs are forwarded. For some other DRBs, the PDCP SDUs are forwarded. Therefore option 2 can use the unified message to inform the discarding of all these forwarded DL data. But in MR-DC, the early status transfer message will first be sent to the CU-CP of the corresponding node, then the CU-CP of the corresponding node need forward the message to the DU. Currently there is no early status transfer message in F1. In this solution it is needed to introduce the Early Status Transfer procedure over F1 interface.

1. **RAN3 down select the solution to inform the discarding of DL PDCP PDU SNs:**

**- Option 1: user plane solution, i.e. reuse the DL USER DATA frame**

**- Option 2: control plane solution, i.e. the early status transfer message**

# 3. Conclusions and Proposals

In this contribution, we discussed how to support early data forwarding, get the following proposals:

1. **For the early data forwarding of DL PDCP SDUs, reuse the IEs within the *First DL COUNT* in the EARLY STATUS TRANSFER message.**
2. **Support to inform the discarding of forwarded DL PDCP SDU and PDCP PDU.**
3. **For the discarding of forwarded DL PDCP SDUs, reuse the existing IEs in the *DL Discarding* branch in the EARLY STATUS TRANSFER message.**
4. **To support DL PDCP SDUs early data forwarding and discarding, extend the EARLY STATUS TRANSFER message to the following cases: from the source SN to the MN, and from the MN to the candidate SNs.**
5. **For the early data forwarding of PDCP PDUs, the node hosting PDCP entity does not need to send the first DL count to the corresponding node.**
6. **The node receiving the forwarded DL PDCP SDUs can forward the DL PDCP PDUs to other nodes in early data forwarding.**
7. **RAN3 down select the solution to inform the discarding of DL PDCP PDU SNs:**

**- Option 1: user plane solution, i.e. reuse the DL USER DATA frame**

**- Option 2: control plane solution, i.e. the early status transfer message**

The corresponding TP to TS 38.423 BL CR is provided in section 4, the corresponding TP to TS 36.423 BL CR is provided in section 5.

# 4. TP to CPAC BL CR of TS 38.423

**------------Start of the First Change---------------**

### 8.2.10 Early Status Transfer

#### 8.2.10.1 General

The purpose of the Early Status Transfer procedure is to transfer the COUNT of the first downlink SDU that the source NG-RAN node forwards to the target NG-RAN node or the COUNT for discarding of already forwarded downlink SDUs for respective DRB during DAPS Handover or Conditional Handover.

For MR-DC with 5GC, the Early Status Transfer procedure is also used from the source S-NG-RAN node to the source M-NG-RAN node during a Conditional Handover as specified in TS 37.340 [8].

For MR-DC with NR SCG, the Early Status Transfer procedure is also used from the source S-NG-RAN node to the M-NG-RAN node, and from the M-NG-RAN node to the target S-NG-RAN node, to transfer the COUNT of the first forwarded DL SDU or the COUNT for discarding of already forwarded downlink SDUs for respective DRB during Conditional PSCell Addition and Change as specified in TS 37.340 [8].

[FFS]For MR-DC with NG SCG, the Early Status Transfer procedure is also used from the M-NG-RAN node to the target S-NG-RAN node, and from the target S-NG-RAN node to the M-NG-RAN node, to transfer the COUNT for discarding of already forwarded downlink PDUs for respective DRB during Conditional PSCell Addition and Change as specified in TS 37.340 [8].

Editor’s note: the applicable for PDCP PDU is FFS.

The procedure uses UE-associated signalling.

#### 8.2.10.2 Successful Operation



Figure 8.2.10.2-1: Early Status Transfer during DAPS Handover or Conditional Handover, successful operation



Figure 8.2.10.2-2: Early Status Transfer during Conditional Handover in MR-DC operation, successful operation

**From source NG-RAN node to target NG-RAN node**

The *DRBs Subject To Early Status Transfer List* IE included in the EARLY STATUS TRANSFER message contains the DRB ID(s) corresponding to the DRB(s) subject to be simultaneously served by the source and the target NG-RAN nodes during DAPS Handover or the DRB(s) transferred during Conditional Handover.

For each DRB in the *DRBs Subject To Early Status Transfer List* IE, the target NG-RAN node shall use the value of the *FIRST DL COUNT Value* IE as the COUNT of the first downlink SDU that the source NG-RAN node forwards to the target NG-RAN node.

For each DRB in the *DRBs Subject To Early Status Transfer List* IE for which the *DISCARD DL COUNT Value* IE is received in the EARLY STATUS TRANSFER message, the target NG-RAN node does not transmit forwarded downlink SDUs to the UE whose COUNT is less than the provided and discards them if transmission has not been attempted.

**From source S-NG-RAN node to source M-NG-RAN node, the source NG-RAN node for Conditional Handover**

**From source S-NG-RAN node to M-NG-RAN node, and from M-NG-RAN node to target S-NG-RAN node, for Conditional PSCell Addition and Change**

The *DRBs Subject To Early Status Transfer List* IE included in the EARLY STATUS TRANSFER message contains the DRB ID(s) corresponding to the DRB(s) transferred during Conditional Handover or during Conditional PSCell Addition and Change.

For each DRB in the *DRBs Subject To Early Status Transfer List* IE, the source M-NG-RAN node shall forward to the target during Conditional Handover, or the sending node shall forward to the receiving node during Conditional PSCell Addition and Change, the value of the received *FIRST DL COUNT Value* IE or *DISCARD DL COUNT Value* IE.

Editor’s note: the applicable for PDCP PDU is FFS. Note PDCP PDU forwarding exists between MN and T-SNs

#### 8.2.10.3 Unsuccessful Operation

Not applicable.

#### 8.2.10.4 Abnormal Conditions

If the target NG-RAN node receives this message for a UE for which no prepared DAPS Handover or Conditional Handover exists at the target NG-RAN node, the target NG-RAN node shall ignore the message.

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

#### 9.1.1.14 EARLY STATUS TRANSFER

This message is sent by the source NG-RAN node to the target NG-RAN node to transfer the COUNT value related to the forwarded downlink SDUs during DAPS Handover or Conditional Handover.

For MR-DC with 5GC, the message is also used, during a Conditional Handover, to transfer from the source S-NG-RAN node to the source M-NG-RAN node, the COUNT value related to the forwarded downlink SDUs.

For MR-DC with NR SCG, this message is also used, during a Conditional PSCell Addition and Change, to transfer from the source S-NG-RAN node to the M-NG-RAN node, and from the M-NG-RAN node to the target S-NG-RAN node, the COUNT value related to the forwarded downlink SDUs.

Direction: source NG-RAN node → target NG-RAN node (DAPS Handover or Conditional Handover).

Direction: source S-NG-RAN node → source M-NG-RAN node (Conditional Handover)

Direction: source S-NG-RAN node → M-NG-RAN node, M-NG-RAN node → target S-NG-RAN node, [FFS] target S-NG-RAN node → M-NG-RAN node (Conditional PSCell Addition and Change)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.3.1 |  | YES | ignore |
| Source NG-RAN node UE XnAP ID | M |  | NG-RAN node UE XnAP ID9.2.3.16 | Allocated for handover at the source NG-RAN node. | YES | reject |
| Target NG-RAN node UE XnAP ID | M |  | NG-RAN node UE XnAP ID9.2.3.16 | Allocated for handover at the target NG-RAN node. | YES | reject |
| CHOICE *Procedure Stage* | M |  |  |  | YES | reject |
| *>First DL COUNT* |  |  |  |  |  |  |
| **>>DRBs Subject To Early Status Transfer List** | M | *1* |  |  | – |  |
| **>>>DRBs Subject To Early Status Transfer Item** |  | *1 .. <maxnoofDRBs>* |  |  | – |  |
| >>>>DRB ID | M |  | 9.2.3.33 |  | – |  |
| >>>>CHOICE *First DL COUNT* | M |  |  |  | – |  |
| >>>>>*12 bits* |  |  |  |  |  |  |
| >>>>>> FIRST DL COUNT Value | M |  | COUNT Value for PDCP SN Length 12 9.2.3.36 | PDCP-SN and Hyper frame number of the first DL SDU that the source NG-RAN node forwards to the target NG-RAN node in case of 12 bit long PDCP-SN | – |  |
| >>>>>*18 bits* |  |  |  |  |  |  |
| >>>>>> FIRST DL COUNT Value | M |  | COUNT Value for PDCP SN Length 18 9.2.3.37 | PDCP-SN and Hyper frame number of the first DL SDU that the source NG-RAN node forwards to the target NG-RAN node in case of 18 bit long PDCP-SN | – |  |
| *>DL Discarding* |  |  |  |  |  |  |
| **>>DRBs Subject To DL Discarding List** | M | *1* |  |  | – |  |
| **>>>DRBs Subject To DL Discarding Item** |  | *1 .. <maxnoofDRBs>* |  |  | – |  |
| >>>>DRB ID | M |  | 9.2.3.33 |  | – |  |
| >>>>CHOICE *DL Discarding* | M |  |  |  | – |  |
| >>>>>*12 bits* |  |  |  |  |  |  |
| >>>>>> DISCARD DL COUNT Value | M |  | COUNT Value for PDCP SN Length 12 9.2.3.36 | PDCP-SN and Hyper frame number for which the target NG-RAN node should discard forwarded DL SDUs or DL PDUs [FFS] associated with lower values in case of 12 bit long PDCP-SN | – |  |
| >>>>>*18 bits* |  |  |  |  |  |  |
| >>>>>> DISCARD DL COUNT Value | M |  | COUNT Value for PDCP SN Length 18 9.2.3.37 | PDCP-SN and Hyper frame number for which the target NG-RAN node should discard forwarded DL SDUs or DL PDUs [FFS] associated with lower values in case of 18 bit long PDCP-SN | – |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofDRBs | Maximum no. of DRBs allowed towards one UE. Value is 32.  |

**------------End of the Changes---------------**

# 5. TP to CPAC BL CR of TS 36.423

**------------Start of the First Change---------------**

### 8.2.7 Early Status Transfer

#### 8.2.7.1 General

The purpose of the Early Status Transfer procedure is to transfer the COUNT of the first downlink SDU that the source eNB forwards to the target eNB or the COUNT for discarding already forwarded downlink SDUs for respective E-RAB during DAPS Handover or Conditional Handover.

For Dual Connectivity or EN-DC, the Early Status Transfer procedure is also used, during a Conditional Handover, from the SeNB to the MeNB as specified in TS 36.300 [15], or from the en-gNB to the eNB as specified in TS 37.340 [32].

For EN-DC, the Early Status Transfer procedure is also used from the source en-gNB to the eNB, and from the eNB to the target en-gNB, to transfer the COUNT of the first forwarded DL SDU or the COUNT for discarding of already forwarded downlink SDUs for respective E-RAB during Conditional PSCell Addition and Change as specified in TS 37.340 [32].

[FFS]For EN-DC, the Early Status Transfer procedure is also used from the eNB to the target en-gNB, and from the target en-gNB to the eNB, to transfer the COUNT for discarding of already forwarded downlink PDUs for respective E-RAB during Conditional PSCell Addition and Change as specified in TS 37.340 [32].

Editor’s note: the applicable for PDCP PDU is FFS.

The procedure uses UE-associated signalling.

#### 8.2.7.2 Successful Operation



Figure 8.2.7.2-1: Early Status Transfer during DAPS Handover or Conditional Handover, successful operation



Figure 8.2.7.2-2: Early Status Transfer during Conditional Handover in dual connectivity or EN-DC operation, successful operation

**From source eNB to target eNB**

The *E-RABs Subject To Early Status Transfe List* IE included in the EARLY STATUS TRANSFER message contains the E-RAB ID(s) corresponding to the E-RAB(s) subject to be simultaneously served by the source and the target eNBs during DAPS Handover or the E-RAB(s) transferred during Conditional Handover.

For each E-RAB for which the *FIRST DL COUNT Value* IE is received in the EARLY STATUS TRANSFER message, the target eNB shall use it as the COUNT of the first downlink SDU that the source eNB forwards to the target eNB. If the *FIRST DL COUNT Value Extended* IE or *FIRST DL COUNT Value for PDCP SN Length 18* IE is included in the *E-RABs Subject To Early Status Transfer Item* IE, the target eNB shall, if supported, use this value instead of the value contained in the *FIRST DL COUNT Value* IE.

For each E-RAB for which the *DISCARD DL COUNT Value* IE is received in the EARLY STATUS TRANSFER message, the target eNB does not transmit forwarded downlink SDUs to the UE whose COUNT is less than the provided and discards them if transmission has not been attempted. If the *DISCARD DL COUNT Value Extended* IE or *DISCARD DL COUNT Value for PDCP SN Length 18* IE is included in the *E-RABs Subject To Early Status Transfer Item* IE, the target eNB shall, if supported, use this value instead of the value contained in the *DISCARD DL COUNT Value* IE.

**From SeNB (respectively, en-gNB) to MeNB (respectively, eNB), the source eNB for Conditional Handover**

**From source en-gNB to eNB node, and from eNB to target en-gNB, for Conditional PSCell Addition and Change**

The *E-RABs Subject To Early Status Transfer List* IE included in the EARLY STATUS TRANSFER message contains the E-RAB ID(s) corresponding to the E-RAB(s) transferred during Conditional Handover or during Conditional PSCell Addition and Change.

For each E-RAB in the *E-RABs Subject To Early Status Transfer List* IE, the source eNB shall forward to the target during Conditional Handover, or the sending node shall forward to the receiving node during Conditional PSCell Addition and Change, the value of the received *FIRST DL COUNT Value* IE or *DISCARD DL COUNT Value* IE. If the *FIRST DL COUNT Value Extended* IE or *FIRST DL COUNT Value for PDCP SN Length 18* IE is included, if supported, this value is forwarded instead of the value contained in the *FIRST DL COUNT Value* IE. If the *DISCARD DL COUNT Value Extended* IE or *DISCARD DL COUNT Value for PDCP SN Length 18* IE is included, if supported, this value is forwarded instead of the value contained in the *DISCARD DL COUNT Value* IE.

Editor’s note: the applicable for PDCP PDU is FFS. Note PDCP PDU forwarding exists between MN and T-SNs

#### 8.2.7.3 Abnormal Conditions

If the target eNB receives this message for a UE for which no prepared DAPS Handover or Conditional Handover exists at the target eNB, the target eNB shall ignore the message.

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

#### 9.1.1.9 EARLY STATUS TRANSFER

This message is sent by the source eNB to the target eNB to transfer the COUNT value related to the forwarded downlink SDUs during DAPS Handover or Conditional Handover.

During a Conditional Handover with EN-DC or Dual Connectivity, this message is also used to transfer the COUNT value related to the forwarded downlink SDUs. In case of EN-DC, the COUNT value is transferred from the en-gNB to the eNB, while in case of Dual Connectivity, the COUNT value is transferred from the SeNB to the MeNB.

During a Conditional PSCell Addition and Change with EN-DC, this message is also used to transfer from the en-gNB to the eNB, and from the eNB to the target en-gNB, the COUNT value related to the forwarded downlink SDUs.

Direction: source eNB → target eNB (DAPS Handover or Conditional Handover).

Direction: en-gNB → eNB (Conditional Handover with EN-DC), SeNB → MeNB (Conditional Handover with Dual Connectivity)

Direction: source en-gNB → eNB, eNB → target en-gNB, [FFS] target en-gNB → eNB (Conditional PSCell Addition and Change)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | ignore |
| Old eNB UE X2AP ID | M |  | eNB UE X2AP ID9.2.24 | Allocated for DAPS handover or Conditional handover at the source eNB | YES | reject |
| New eNB UE X2AP ID | M |  | eNB UE X2AP ID9.2.24 | Allocated for DAPS handover or Conditional handover at the target eNB | YES | reject |
| Old eNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID9.2.86 | Allocated for DAPS handover or Conditional handover at the source eNB | YES | reject |
| New eNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID9.2.86 | Allocated for DAPS handover or Conditional handover at the target eNB | YES | reject |
| CHOICE Procedure Stage | M |  |  |  | YES | reject |
| *>First DL COUNT* |  |  |  |  |  |  |
| >>**E-RABs Subject To Early Status Transfer List** |  | *1 .. <maxnoofBearers>* |  |  | – |  |
| >>>**E-RABs Subject To Early Status Transfer Item** |  |  |  |  | – |  |
| >>>>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>>>FIRST DL COUNT Value | M |  | COUNT Value9.2.15 | PDCP-SN and Hyper frame number of the first DL SDU that the source eNB/MeNB forwards to the target eNB/en-gNB in case of 12 bit long PDCP-SN | – |  |
| >>>>FIRST DL COUNT Value Extended | O |  | COUNT Value Extended 9.2.66 | PDCP-SN and Hyper frame number of the first DL SDU that the source eNB/MeNB forwards to the target eNB/en-gNB in case of 15 bit long PDCP-SN | – |  |
| >>>>FIRST DL COUNT Value for PDCP SN Length 18 | O |  | COUNT Value for PDCP SN Length 189.2.82 | PDCP-SN and Hyper frame number of the first DL SDU that the source eNB/MeNB forwards to the target eNB/en-gNB in case of 18 bit long PDCP-SN | – |  |
| *>DL Discarding* |  |  |  |  |  |  |
| >>**E-RABs Subject To DL Discarding List** | M | *1* |  |  | – |  |
| >>>**E-RABs Subject To DL Discarding Item** |  | *1 .. <maxnoofBearers>* |  |  | – |  |
| >>>>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>>>DISCARD DL COUNT Value | M |  | COUNT Value9.2.15 | PDCP-SN and Hyper frame number for which the target eNB/en-gNB should discard forwarded DL SDUs or DL PDUs [FFS] associated with lower values in case of 12 bit long PDCP-SN | – |  |
| >>>>DISCARD DL COUNT Value Extended | O |  | COUNT Value Extended 9.2.66 | PDCP-SN and Hyper frame number for which the target eNB/en-gNB should discard forwarded DL SDUs or DL PDUs [FFS]associated with lower values in case of 15 bit long PDCP-SN | – |  |
| >>>>DISCARD DL COUNT Value for PDCP SN Length 18 | O |  | COUNT Value for PDCP SN Length 189.2.82 | PDCP-SN and Hyper frame number for which the target eNB/en-gNB should discard forwarded DL SDUs or DL PDUs [FFS] associated with lower values in case of 18 bit long PDCP-SN | – |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofBearers | Maximum no. of E-RABs. Value is 256. |

**------------End of the Changes---------------**