**3GPP** **TSG-SA WG2 Meeting #160 *S2-2313593***

**Chicago, USA, 13- 17 Nov, 2023 (revision of S2-2312716)**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
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|  | **23.502** | **CR** | **4623** | **rev** | **3** | **Current version:** | **18.3.0** |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

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| ***Title:***  | Adding DL data size in DL Notification message |
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| ***Source to WG:*** | ZTE |
| ***Source to TSG:*** | SA2 |
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| ***Work item code:*** | TEI18, NR\_RedCap\_Ph2, NR\_redcap\_enh-Core |  | ***Date:*** | 2023-10-28 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-18 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)Rel-12 (Release 12)Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
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| ***Reason for change:*** | In RAN3 LS S2-2308320/R3-233347 (Reply LS on INACTIVE eDRX above 10.24sec and SDT), RAN3 asks:* Furthermore, RAN3 has discussed the need to signal the DL data size in the DL DATA NOTIFICATION message to help NG-RAN making decision if MT-SDT paging can be performed based on the QFI associated with the configured SDT radio bearer. RAN3 would like to ask SA2 and CT4 whether it is feasible that DL data size can be signalled to the NG-RAN (e.g. for QoS flows that have buffered data in the CN) along with the paging differentiation parameters to assist NG-RAN for MT-SDT paging decision.

In CT4 LS S2-2310110/ C4-233691(Reply LS on INACTIVE eDRX above 10.24sec and SDT), CT4 agreed it is feasible to request the UPF to report the DL data size to the SMF over N4 interface. Given the RAN3 request and CT4 feedback, that RAN needs to receive DL data size per QoS Flow to be able to determine MT SDT or not, this CR proposes a solution to provide DL data size per QoS Flow to NG-RAN. . |
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| ***Summary of change:*** | When the SMF receives DL data size information in the Data Notification the SMF sends a new Namf\_MT\_EnableUEReachability message to AMF. The AMF include DL data size per QoS Flow in N2 DL Data Notification message to assist the RAN to determine the MT-SDT. |
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| ***Consequences if not approved:*** | Unclear specification causing confusion in stage-3 groups |
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| ***Clauses affected:*** | 4.8.2.2b |
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|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
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| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

>>>>BEGINNING OF CHANGES<<<<

#### 4.8.2.2b Network Triggered Connection Resume in RRC\_INACTIVE with CN based MT communication handling

When the UE is in CM-CONNECTED with RRC\_INACTIVE state with CN based mobile terminating (MT) communication handling, high latency communication as described in clause 5.31.8 of TS 23.501 [2] is applied.

This procedure may be triggered by MT data, or a N1 procedure from SMF and UPF as shown in Figure 4.8.2.2b-1. When the procedure is triggered by other NFs (e.g. SMSF, LMF, GMLC), the UPF (or SMF) in the following figure should be replaced by the respective NF (the corresponding service operations used by other NFs when they communicate with AMF may also be different from the service operations used by SMF/UPF).

During the procedure, the NG-RAN (i.e. gNB) performs RAN paging towards the UE based on the N2 message from the AMF in order to trigger the UE triggered Connection Resume procedure in clause 4.8.2.2.



Figure 4.8.2.2b-1: Network Triggered Connection Resume for UE in RRC\_INACTIVE with CN based MT communication handling

1a. When downlink data is received and the SMF/UPF is requested to perform buffering as specified in clause 4.8.1.1a, the UPF/SMF checks with AMF for the possibility of data delivery, similar to step 2 of clause 4.24.2 with the following differences:

- The UPF provides the DL data size information of the QoS Flow when sending Data Notification to SMF if the UPF has received instruction from SMF.

- In the Namf\_MT\_EnableUEReachability the SMF may also send the following parameters the PPI, the ARP and the 5QI, DL data size, and/or QFI for the QoS Flow of the PDU Session which triggered the request for paging policy differentiation as defined in clause 5.4.3.2 of TS 23.501 [2].

- If the SMF, while waiting for UE triggered Connection Resume indication or a reject response (with Estimated Maximum Wait time) from the AMF, receives any additional Data Notification message due to additional data packets for another QoS Flow associated with a higher priority (i.e. ARP priority level) than the priority indicated to the AMF in the previous Namf\_MT\_EnableUEReachability, or the SMF derive a different Paging Policy Indicator according to the additional Data Notification, the SMF invokes a new Namf\_MT\_EnableUEReachability indicating the higher priority or different Paging Policy Indicator to the AMF. The information contained in the new Namf\_MT\_EnableUEReachability request overrides the information from the previous Namf\_MT\_EnableUEReachability request that is stored in the AMF. If the SMF receives any additional Data Notification messages due to additional data packets for another QoS Flow associated with same or lower priority than the priority indicated to the AMF in the previous Namf\_MT\_EnableUEReachability or if the SMF has sent the second Namf\_MT\_EnableUEReachability message indicating the higher priority and receives additional downlink data packets for this UE, the SMF buffers these Data Notification messages and does not send a new Namf\_MT\_EnableUEReachability message. When the SMF receives DL data size information in the Data Notification message due to additional data packets for another QoS Flow, the SMF sends a Namf\_MT\_EnableUEReachability message to AMF.

- The AMF determines if the UE is reachable based on the stored eDRX values for RRC\_INACTIVE state provided by NG-RAN in clause 4.8.1.1a. If the UE is unreachable, the AMF stores the information received in the Namf\_MT\_EnableUEReachability request and provides the Estimated Maximum Wait time in the response message based on the eDRX values for RRC\_INACTIVE in AMF (steps 2-5 are postponed until the UE becomes reachable). If the UE is considered reachable, step 2 is executed immediately.

NOTE 1: This handling is similar to CM-IDLE with eDRX. When the AMF provides the Estimated Maximum Wait time, it can consider the time needed for RRC level procedures (e.g. RRC RNA update procedure) when UE wakes up from the eDRX cycle.

NOTE 2: The other NFs can use the Namf\_Communication\_N1N2MessageTransfer service operation to deliver the MT signalling.

2. When the AMF determines that the UE is reachable, the AMF sends an N2 DL Data Notification message to NG-RAN with the request for the UE's RRC connection to be resumed. The AMF may include the following per QoS Flow parameter(s) the PPI, the ARP and the 5QI, DL data size, DL Signalling indication and/or QFI for the QoS Flow(s) of the PDU Session in the N2 DL Data Notification message to trigger and enable RAN paging.

If the AMF receives MT signalling (i.e. via Namf\_Communication\_N1N2MessageTransfer) in step 1a, AMF includes also DL Signalling indication in the N2 RAN Paging Request message.

3. NG-RAN performs RAN paging towards the UE considering the parameters provided by the AMF. Based on the DL data size for QoS Flow(s), if it’s provided, the NG-RAN determines the Small Data Transmission as defined in TS 38.300 [9]).

4. When the UE receives RAN paging, it initiates the UE triggered Connection Resume procedure and NG-RAN notifies CN as specified in clause 4.8.2.2 including the N2 Notification in step 3b.

5. The UPF triggers downlink data delivery if there is any. The AMF sends downlink NAS messages if there is any.

>>>>END OF CHANGES<<<<