**3GPP TSG-SA WG2 Meeting #161ES2-2400726r05**

**21 – 29 Jan., 2024, Elbonia (was S2-2310800, 13119)**

|  |
| --- |
| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **23.502** | **CR** | **4514** | **rev** | **2** | **Current version:** | **18.4.0** |  |
|  |
| *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)*.* |
|  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network | **X** | Core Network | **X** |

|  |
| --- |
|  |
| ***Title:***  | Clarification on PDU Set based handling during UE states transition |
|  |  |
| ***Source to WG:*** | Google |
| ***Source to TSG:*** | SA2 |
|  |  |
| ***Work item code:*** | XRM |  | ***Date:*** | 2024-01-21 |
|  |  |  |  |  |
| ***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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | For non-homogeneous NG-RAN support of PDU Set based Handling, the SMF may need to activate/deactivate PDU Set based handling at PSA UPF when Connection is Resumed for UE in RRC\_INACTIVE state, because there may be a change of NG-RAN for PDU Set based handling supportThe NG-RAN needs to indicate SMF whether downlink PDU Set based handling is supported when the UE in RRC\_INACTIVE state is changed. |
|  |  |
| ***Summary of change:*** | It is proposed to clarify the following procedures * UE Triggered Connection Resume in RRC\_INACTIVE procedure
 |
|  |  |
| ***Consequences if not approved:*** | Incomplete features for supporting PDU Set based handling at RAN and PSA UPF. |
|  |  |
| ***Clauses affected:*** | 4.8.2.2 |
|  |  |
|  | **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 ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

**\*\*\*\*\*\*\*Start of changes\*\*\*\*\*\*\***

#### 4.8.2.2 UE Triggered Connection Resume in RRC\_INACTIVE procedure

The Connection Resume procedure is used by the UE in RRC\_INACTIVE state, e.g. to transition to RRC\_CONNECTED state or for Small Data Transmission while in RRC\_INACTIVE as specified in TS 38.300 [9]. Triggers for the UE to initiate this procedure are defined in clause 5.3.3.2.5 of TS 23.501 [2].



Figure 4.8.2.2-1: Connection Resume in RRC\_INACTIVE

1. UE to NG-RAN: RRC message (Resume ID).

 The UE initiates connection resume from RRC\_INACTIVE state, see TS 38.300 [9]. The UE provides its Resume ID needed by the NG-RAN to access the UE's stored Context.

2. [Conditional] NG-RAN performs UE Context Retrieval.

 UE Context Retrieval is performed when the UE Context associated with the UE attempting to resume its connection is not locally available at the accessed NG-RAN. The UE Context Retrieval procedure via NG-RAN is specified in TS 38.300 [9].

3. NG-RAN to UE: RRC messages.

 NG-RAN determines whether the UE shall be transitioned to RRC\_CONNECTED state or kept in RRC\_INACTIVE (e.g. the latter in the case of Small Data Transmission as defined in TS 38.300 [9]).

4a. [Conditional] N2 Path switch procedure.

 If the accessed NG-RAN is able to retrieve the UE Context, the accessed NG-RAN node initiates N2 Path Switch procedure, i.e. steps 1 to 8 of clause 4.9.1.2.2 and including Xn data forwarding.

 If the Connection Resume procedure is a response to RAN paging which is triggered by 5GC due to an N2 interface procedure, NG-RAN and 5GC handle the N2 interface procedure as a collision described in clause 4.9.1.2.

 If Connection Inactive procedure with CN based MT communication handling (see clause 4.8.1.1a) has been performed previously then when the path switch procedure is performed downlink data or signalling delivery is triggered, if there is any.

If UE context contains PDU Set based QoS parameters for QoS flows of the PDU Session and NG-RAN supports PDU Set QoS handling, then NG-RAN includes PDU Set Based Handling Support Indication in N2 Path Switch request message as described in clause 4.9.1.2.2. With the indication, the SMF may determine to activate PDU Set based Handling as described in clause 5.37.5.3 of TS 23.501 [2].

4b. [Conditional] N2 Notification,

4b.1 If the accessed NG-RAN is the same as the NG-RAN that configured RRC\_INACTIVE and still has the UE context, NG-RAN sends:

- an N2 Notification to the AMF indicating the UE is in RRC\_CONNECTED, if an AMF requested N2 Notification (see clause 4.8.3); or

- an MT Communication Handling request to the AMF indicating the UE is now reachable for downlink data and/or signalling if Connection Inactive procedure with CN based MT communication handling (see clause 4.8.1.1a) has been performed previously.

4b.2 The AMF invokes Nsmf\_PDUSession\_UpdateSMContext Request towards SMF indicating the Downlink data delivery for each PDU session with active user plane, if the AMF has requested data buffering as described in clause 4.8.1.1a.

4b.3 N4 session modification procedure is triggered by the SMF. If data buffering is handled in the UPF, the SMF updates the UPF with appropriate rules to trigger data delivery.

4b.4 The SMF sends the Nsmf\_PDUSession\_UpdateSMContext response.

4b.5 The AMF sends the N2 MT Communication Handling response message to NG-RAN.

If NG-RAN determines that the connection resume is for Small Data Transmission as defined in TS 38.300 [9] and step 4a or steps 4b.1 to 4b.5 have been performed, then NG-RAN keeps the UE in RRC\_INACTIVE state and the UL/DL Small Data are transferred via the NG-RAN. Based on the procedures defined in TS 38.300 [9], if the UE is re-configured with RRC Inactive with eDRX>10.24s, the NG-RAN may send an N2 message to 5GC as described in step 2 in clause 4.8.1.1a so the CN can then handle mobile terminated (MT) communication.

**\*\*\*\*\*\*\*End of changes\*\*\*\*\*\*\***