**3GPP TSG-CT WG1 Meeting #131-eC1-214799**

**E-meeting, 19-27 August 2021**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **24.501** | **CR** | **3420** | **rev** | **1** | **Current version:** | **17.3.1** |  |
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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 | **x** | Radio Access Network |  | Core Network |  |

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| ***Title:*** | Resuming a connection due to ProSe discovery/communication over PC5 | | | | | | | | | |
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| ***Source to WG:*** | Samsung, Nokia, Nokia Shanghai Bell | | | | | | | | | |
| ***Source to TSG:*** | C1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5G\_ProSe | | | | |  | ***Date:*** | | | 12-08-2021 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-17 |
|  | *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 can be 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:*** | | A UE in 5GMM-CONNECTED mode with RRC inactive indication may require to perform ProSe discovery and/or communication over PC5 for which the UE would need to transition to 5GMM-CONNECTED mode. This is currently missing in TS 24.501. | | | | | | | | |
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| ***Summary of change:*** | | The UE requests the lower layers to transition to RRC\_CONNECTED state for ProSe direct discovery over PC5 or ProSe direct communication over PC5. | | | | | | | | |
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| ***Consequences if not approved:*** | | The UE in 5GMM-CONNECTED mode with RRC inactive indication will not be able to perform ProSe discovery and/or communication over PC5. | | | | | | | | |
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| ***Clauses affected:*** | | 5.3.1.4 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 CHANGE \*\*\*\*\*\*

#### 5.3.1.4 5GMM-CONNECTED mode with RRC inactive indication

This subclause is only applicable for UE's 5GMM mode over 3GPP access. The 5GMM-CONNECTED mode with RRC inactive indication is not supported when the UE is in NB-N1 mode.

The UE is in 5GMM-CONNECTED mode with RRC inactive indication when the UE is in:

a) 5GMM-CONNECTED mode over 3GPP access at the NAS layer; and

b) RRC\_INACTIVE state at the AS layer (see 3GPP TS 38.300 [27]).

Unless stated otherwise, the UE behaviour in 5GMM-CONNECTED mode with RRC inactive indication follows the UE behaviour in 5GMM-CONNECTED over 3GPP access, except that:

a) the UE shall apply the mobility restrictions; and

b) the UE shall perform the PLMN selection procedures

as in 5GMM-IDLE mode over 3GPP access.

The UE shall transition from 5GMM-CONNECTED mode over 3GPP access to 5GMM-CONNECTED mode with RRC inactive indication upon receiving an indication from the lower layers that the RRC connection has been suspended.

NOTE 0: Any pending procedure or uplink data packet when receiving an indication from the lower layers that the RRC connection has been suspended, triggers a request to the lower layers to transition to RRC\_CONNECTED state. This is also the case when the pending procedure or uplink data packet triggered a previous request to the lower layers to transition to RRC\_CONNECTED state.

Upon:

a) a trigger of a procedure which requires sending of a NAS message different from a REGISTRATION REQUEST message with the NG-RAN-RCU bit of the 5GS update type IE set to "UE radio capability update needed";

b) an uplink user data packet to be sent for a PDU session with suspended user-plane resources; or

x) a trigger to request resources for 5G ProSe direct discovery over PC5 or 5G ProSe direct communication over PC5;

the UE in 5GMM-CONNECTED mode with RRC inactive indication over 3GPP access shall request the lower layers to transition to RRC\_CONNECTED state (see 3GPP TS 38.300 [27]).

Upon a trigger to send a REGISTRATION REQUEST message with the NG-RAN-RCU bit of the 5GS update type IE set to "UE radio capability update needed", the UE in 5GMM-CONNECTED mode with RRC inactive indication shall move to 5GMM-IDLE mode over 3GPP access and proceed with the registration procedure for mobility and periodic registration as specified in subclause 5.5.1.3.2.

The UE shall transition from 5GMM-CONNECTED mode with RRC inactive indication to 5GMM-CONNECTED mode over 3GPP access upon receiving an indication from the lower layers that the UE has transitioned to RRC\_CONNECTED state (see 3GPP TS 38.300 [27]).

NOTE 1: The AMF can be aware of the transition between 5GMM-CONNECTED mode and 5GMM-CONNECTED mode with RRC inactive indication for a UE (see 3GPP TS 23.502 [9]).

The UE shall trigger a transition from 5GMM-CONNECTED mode with RRC inactive indication to 5GMM-IDLE mode upon selection of a PLMN that is not an equivalent PLMN to the registered PLMN. The UE shall not trigger a transition from 5GMM-CONNECTED mode with RRC inactive indication to 5GMM-IDLE mode upon entering a new PLMN which is in the list of equivalent PLMNs.

The UE shall trigger a transition from 5GMM-CONNECTED mode with RRC inactive indication to 5GMM-IDLE mode upon receiving REFRESH command from the UICC as specified in subclause 5.4.5.3.3.

If the UE in 5GMM-CONNECTED mode with RRC inactive indication receives an indication from the lower layers that the RRC connection has been suspended, the UE shall stay in 5GMM-CONNECTED mode with RRC inactive indication. The UE shall re-initiate any pending procedure that had triggered the request to the lower layers to transition to RRC\_CONNECTED state, if still needed.

When the UE in 5GMM-CONNECTED mode with RRC inactive indication receives a fallback indication from lower layers, and the UE has no pending NAS procedure and no pending uplink user data for PDU session(s) with user-plane resources already established, the UE shall:

a) enter 5GMM-IDLE mode; and

b) initiate the registration procedure for mobility and periodic registration update and include the Uplink data status IE in the REGISTRATION REQUEST message indicating the PDU session(s) for which user-plane resources were active prior to receiving the fallback indication, if any (see subclause 5.5.1.3 for further details).

If the UE requests the lower layers to transition to RRC\_CONNECTED state at initiation of a registration procedure, a service request procedure or a de-registration procedure, upon fallback indication from lower layers, the UE shall:

- enter 5GMM-IDLE mode;

- proceed with the pending procedure; and

- if the pending procedure is a service request or registration request procedure, the UE shall include the Uplink data status IE in the SERVICE REQUEST message, the CONTROL PLANE SERVICE REQUEST message or in the REGISTRATION REQUEST message, indicating the PDU session(s) without active user-plane resources for which the UE has pending user data to be sent, if any, and the PDU session(s) for which user-plane resources were active prior to receiving the fallback indication, if any (see subclauses 5.5.1.3 and 5.6.1 for further details).

If the UE requests the lower layers to transition to RRC\_CONNECTED state for other reason than initiation of a registration procedure, or for other reason than a service request procedure, or for other reason than a de-registration procedure, upon fallback indication from lower layers, the UE shall:

1) enter 5GMM-IDLE mode;

2) initiate the service request procedure and include the Uplink data status IE in the SERVICE REQUEST message or the CONTROL PLANE SERVICE REQUEST message indicating the PDU session(s) for which user-plane resources were active prior to receiving the fallback indication, if any (see subclause 5.6.1 for further details). If the procedure that triggered the request to the lower layers to transition to RRC\_CONNECTED state is the UE-initiated NAS transport procedure and the UE had SMS, location services message, or CIoT user data to send, the UE shall also include the SMS, location services message, or CIoT user data in the CONTROL PLANE SERVICE REQUEST message as described in subclause 5.6.1.2.2; and

3) upon successful service request procedure completion, proceed with any pending procedure.

If the UE in 5GMM-CONNECTED mode with RRC inactive indication receives a fallback indication from lower layers, and the UE has pending uplink user data for PDU session(s) with user-plane resources already established but no pending NAS procedure, the UE shall:

1) enter 5GMM-IDLE mode; and

2) initiate the service request procedure and include the Uplink data status IE in the SERVICE REQUEST message or the CONTROL PLANE SERVICE REQUEST message indicating the PDU session(s) for which user-plane resources were active prior to receiving the fallback indication (see subclause 5.6.1 for further details).

In the above cases when the UE receives a fallback indication from lower layers, if the UE is in non-allowed area or not in allowed area, the UE shall behave as specified in subclause 5.3.5.

If the UE in 5GMM-CONNECTED mode with RRC inactive indication receives an indication from the lower layers that the resumption of the RRC connection has failed, and:

a) if the lower layers indicate that access barring is applicable for all access categories except categories 0 and 2, or access barring is applicable for all access categories except category 0, the UE shall:

1) stay in 5GMM-CONNECTED mode with RRC inactive indication;

b) else, the UE shall:

1) enter 5GMM-IDLE mode; and

2) initiate the registration procedure for mobility and periodic registration update used for mobility (i.e. the 5GS registration type IE set to "mobility registration updating" in the REGISTRATION REQUEST message) for N1 NAS signalling connection recovery as specified in subclause 5.5.1.3.2.

NOTE 2: An indication from the lower layer that the RRC connection has been released with cause "RRC resume failure" can be considered as an indication that the resumption of the RRC connection has failed.

The UE shall transition from 5GMM-CONNECTED mode with RRC inactive indication to 5GMM-IDLE mode over 3GPP access upon receiving from the lower layers:

a) indication of transition from RRC\_INACTIVE state to RRC\_IDLE state; or

b) indication of cell selection to E-UTRAN or another RAT that the UE supports.

If the UE in 5GMM-CONNECTED mode with RRC inactive indication receives an indication from the lower layers about the cell (re-)selection to different RAT that the UE supports, the UE shall initiate the registration procedure for mobility or periodic registration update used for mobility (i.e. the 5GS registration type IE set to "mobility registration updating" in the REGISTRATION REQUEST message) as specified in subclause 5.5.1.3.2.

If the UE in 5GMM-CONNECTED mode with RRC inactive indication receives an indication from the lower layers of a transition from RRC\_INACTIVE state to RRC\_IDLE state and 5GMM-REGISTERED.LIMITED-SERVICE is entered, the UE shall subsequently upon entering state 5GMM-REGISTERED.NORMAL-SERVICE and if there is no uplink user data or signalling pending, initiate the registration procedure for mobility and periodic registration update used for mobility (i.e. the 5GS registration type IE set to "mobility registration updating" in the REGISTRATION REQUEST message) for N1 NAS signalling connection recovery as specified in subclause 5.5.1.3.2.

Upon receiving AMF paging indication from the lower layers, the UE shall transition from 5GMM-CONNECTED mode with RRC inactive indication to 5GMM-IDLE mode over 3GPP access and handle the AMF paging same as the paging request received in the 5GMM-IDLE mode over 3GPP access as specified in subclause 5.6.1.

\*\*\*\*\*\* END CHANGES \*\*\*\*\*\*