**3GPP TSG-CT WG1 Meeting #141eC1-232256**

**Online 17– 21 April 2023**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
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|  |  | **CR** | **0019** | **rev** | **1** | **Current version:** | **18.0.0** |  |
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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 | **x** | Radio Access Network |  | Core Network | **x** |

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| ***Title:***  | New procedures for PRU UE |
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| ***Source to WG:*** | Qualcomm Incorporated, CATT |
| ***Source to TSG:*** |  |
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| ***Work item code:*** | 5G\_eLCS\_Ph3 |  | ***Date:*** | 2023-04-05 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***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-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
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| ***Reason for change:*** | TS 23.273 introduces PRU UE and its related procedures with the LMF as following:* PRU association procedure
* UE initiated PRU disassociation procedure
* NW initiated PRU disassociation procedure.

It is proposed to implement the procedure into stage-3 specification. |
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| ***Summary of change:*** | New procedure for PRU association, UE-initiated PRU disassociation, and NW-initiated PRU disassociation. |
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| ***Consequences if not approved:*** | PRU association cannot be established or terminated. |
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| ***Clauses affected:*** | 5.2.1.x (new), 5.2.2.x (new), 5.2.2.y (new) |
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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:*** | Rev1: fix WIC |

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*1st changes\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

5.2.1.x Network initiated PRU disassociation procedure

5.2.1.x.1 General

The supplementary services PRU disassociation operation enables the LMF to disassociate the associated PRU UE from the serving LMF by using NAS signalling as decribed in clause 6.17.2 of 3GPP TS 23.273 [2]. The NAS signaling are transported using the DL NAS Transport message and the Uplink NAS Transport message defined in 3GPP TS 24.501 [3]. The LMF may invoke this procedure prior to the event of becoming unavailable LMF (e.g., for maintenance, removal or replacement of the LMF).

Figure 5.2.1.x.1-1 illustrates an example of the NAS signaling transport for a PRU disassociation procedure.

**Figure 5.2.1.x.1-1: NAS signalling transport for network initiated PRU disassociation procedure**

5.2.1.x.2 Normal operation

The LMF invokes a PRU disassociation procedure by invoking PRU disassociation operation to the associated PRU UE as defined in 3GPP TS 24.080 [5].

The PRU UE shall terminate the PRU association with the serving PLMN if this can be identified from the information in the PRU-disassociation invoke component. The UE shall then return a RELEASE COMPLETE message containing a PRU-disassociation return result component (see figure 5.2.1.x.2.1). If the PRU UE receives a new routing ID for a new serving LMF in the PRU-disassociation invoke component from the LMF, the PRU UE may perform a PRU association procedure with the new serving LMF as described in clause 5.2.2.x.

UE Network

REGISTER

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Facility (Invoke = PRU-disassociation)

RELEASE COMPLETE

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Facility (Return result = PRU-disassociation)

**Figure 5.2.1.x.2.1: Network initiated PRU disassociation procedure**

Editor’s Note: It is FFS whether return error message is needed for PRU disassociation procedure.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*2nd changes\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

5.2.2.x PRU association procedure

5.2.2.x.1 General

The supplementary services PRU association operation enables the PRU UE to associate with a serving LMF by using NAS signalling as decribed in clause 6.17.1 of 3GPP TS 23.273 [2]. The NAS signaling are transported using the DL NAS Transport message and the Uplink NAS Transport message defined in 3GPP TS 24.501 [3].

The supplementary services PRU association operation also enables to perform a PRU Association update to inform the serving LMF of the continued availability of the PRU or to inform the serving LMF of change to the location of the PRU (e.g. a change of tracking area or change of serving AMF) or a change of the PRU positioning capabilities.

Figure 5.2.2.x.1-1 illustrates an example of the NAS signaling transport for a PRU association procedure.

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**Figure 5.2.2.x.1-1: NAS signalling transport for PRU association procedure**

5.2.2.x.2 Normal operation

The PRU UE invokes a PRU association procedure by sending a REGISTER message containing a PRU-association invoke component to the serving LMF as defined in 3GPP TS 24.080 [5]. The PRU-association invoke component shall include a type for the PRU association request whether it is initial PRU association request or PRU association update, and the positioning capabilities of the PRU UE, and optionally the location information if available. The PRU UE may include the pre-configured routing ID for an initial association, or the routing ID received from the previous PRU association procedure in the UL NAS TRANSPORT message.

Editor’s Note: It is FFS the details of PRU UE’s positioning capabilities.

The LMF shall return a RELEASE COMPLETE message containing a PRU-association return result component if the LMF accepts the PRU association. The PRU-association return result component shall indicate the conditions for performing PRU association updates with the serving LMF. The conditions for performing PRU association update may include a periodic PRU association update timer and PRU association update based on a change of PRU location, change of PRU TAI, change of serving AMF.

If the LMF is unable to process the PRU-association invoke component received from the PRU UE as specified in clause 6.17.1 of 3GPP TS 23.273 [2], the LMF shall return a RELEASE COMPLETE message containing reject component. The reject component may include routing ID of the serving LMF if new LMF is selected to serve the PRU UE.

UE Network

REGISTER

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Facility (invoke = PRU association (PRUassociationType, positioningCapabilities, locationOfPRU)

RELEASE COMPLETE

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Facility (return result = PRU association (PRUassociationUpdateTimer, locationValidityPRUassociationUpdate)

RELEASE COMPLETE

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Facility (Return error (Error))

RELEASE COMPLETE

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Facility (Reject (newLMFroutingID))

**Figure 5.2.2.x.2.1: PRU association procedure**

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*3rd changes\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

5.2.2.y UE initiated PRU disassociation procedure

5.2.2.y.1 General

The supplementary services PRU disassociation operation enables the PRU UE to disassociate from a serving LMF by using NAS signalling as decribed in clause 6.17.3 of 3GPP TS 23.273 [2]. The NAS signaling are transported using the DL NAS Transport message and the Uplink NAS Transport message defined in 3GPP TS 24.501 [3]. The PRU UE may invoke this procedure prior to the event of becoming unavailable PRU (e.g., for a software upgrade or power down).

Figure 5.2.2.y.1-1 illustrates an example of the NAS signaling transport for a PRU disassociation procedure.

**Figure 5.2.2.y.1-1: NAS signalling transport for UE initiated PRU disassociation procedure**

5.2.2.y.2 Normal operation

The PRU UE invokes a PRU disassociation procedure by invoking PRU-disassociation operation to the serving LMF as defined in 3GPP TS 24.080 [5]. The PRU-disassociation invoke component shall include an indication whether an acknowledgement from the LMF is expected or not. The PRU UE shall include the routing ID received from the previous PRU association procedure in the UL NAS TRANSPORT message.

The LMF shall terminate the PRU association with the associated PRU UE if this can be identified from the information in the PRU-disassociation invoke component. The LMF shall then return a RELEASE COMPLETE message containing a PRU-disassociation return result component (see figure 5.2.2.y.2-1). If the PRU UE has not indicated that an acknowledgement is expected, the LMF may disassociate the PRU UE locally without return the RELEASE COMPLETE message.

UE Network

REGISTER

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Facility (invoke = PRU-disassociation (AckIndication))

RELEASE COMPLETE

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Facility (Return error (Error))

RELEASE COMPLETE

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Facility (return result = PRU-disassocation)

**Figure 5.2.2.y.2-1: UE initiated PRU disassociation procedure**

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