**3GPP TSG-CT WG1 Meeting #137-eC1-22xxx**

**E-Meeting, 18th – 26th August 2022 rev of C1-224985**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
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|  | **24.501** | **CR** | **4618** | **rev** | **1** | **Current version:** | **17.7.1** |  |
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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 |  | Radio Access Network |  | Core Network | **x** |

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| ***Title:***  | MUSIM and notification message over non-3GPP access |
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| ***Source to WG:*** | Ericsson, Samsung |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | MUSIM |  | ***Date:*** | 2022-08-11 |
|  |  |  |  |  |
| ***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 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:*** | For the case the MUSIM UE is registered over both 3GPP access and N3GPP access in a PLMN but busy in a different PLMN over 3GPP access, i.e. the UE is idle over the 3GPP access with paging restrictions established and connected over the N3GPP access in the first PLMN.If there is downlink signaling or data pending for the 3GPP access in the first PLMN, then the AMF could send a notification message over N3GPP indicating 3GPP access if the paging restrictions allows, and thedownlink signaling or data pending is not voice service related:*The network shall not use the NOTIFICATION message over non-3GPP access, if:**a) the MUSIM UE supports the paging indication for voice services;**b) the network has indicated "paging indication for voice services supported" to the UE; and**c) the AMF detects that the downlink data is related to voice service (see 3GPP TS 23.501 [8]).*However, this is not covered by the current notification procedure that the netwrok will not consider paging restrictions in this case. |
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| ***Summary of change:*** | MUSIM paging restrictions apply for notification message over N3GPP indicating 3GPP access. |
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| ***Consequences if not approved:*** | Unnecssary signaling over the air interface |
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| ***Clauses affected:*** | 5.6.3.2 |
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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 ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** | Rev1: Updated considering both pending downlink signaling and pending downlink user data. Some improvements. Additional source company. Notification message can be sent for voice services if the feature is not supported in UE or network. |

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\* \* \* First Change \* \* \* \*

#### 5.6.3.2 Notification procedure initiation

The network shall initiate the notification procedure by sending the NOTIFICATION message to the UE and start timer T3565 (see example in figure 5.6.3.2.1).

For case a) in subclause 5.6.3.1, the NOTIFICATION message is sent from the network to the UE via 3GPP access with access type indicating non-3GPP access.

For case b) in subclause 5.6.3.1, the NOTIFICATION message is sent from the network to the UE via non-3GPP access with access type indicating 3GPP access when the UE is not in MICO mode.



Figure 5.6.3.2.1: Notification procedure

For case b) in subclause 5.6.3.1, if the network has downlink user data pending for a UE and the AMF has stored paging restriction of the UE and the Paging restriction type in the stored paging restriction is set to:

a) "All paging is restricted", the network should not send the NOTIFICATION message to the UE;

b) "All paging is restricted except for voice service", the network should send the NOTIFICATION message to the UE only when the pending downlink user data for the UE is considered as voice service related by the network and the MUSIM UE does not support the paging indication for voice services or the network has not indicated "paging indication for voice services supported" to the UE

c) "All paging is restricted except for specified PDU session(s)", the network should send the NOTIFICATION message to the UE only for PDU session(s) that paging is not restricted based on the stored paging restriction, the network has downlink user data pending;

d) "All paging is restricted except for voice service and specified PDU session(s)" the network should send the NOTIFICATION message to the UE only:

1) when the MUSIM UE support the paging indication for voice services and the network has indicated "paging indication for voice services supported" to the UE, for PDU session(s) that paging is not restricted based on the stored paging restriction and that are not associated with voice service, the network has downlink user data pending; or

2) when the MUSIM UE does not support the paging indication for voice services, or the network has not indicated "paging indication for voice services supported" to the UE and:

i) the pending downlink user data for the UE is considered as voice service related by the network; or

ii) for PDU session(s) that paging is not restricted based on the stored paging restriction, the network has downlink user data pending.

For case b) in subclause 5.6.3.1, if the network has downlink signalling pending for a UE and the AMF has stored paging restriction of the UE and the Paging restriction type in the stored paging restriction is set to:

a) "All paging is restricted", the network should not send the NOTIFICATION message to the UE;

b) "All paging is restricted except for voice service", then the network should send the NOTIFICATION message to the UE only:

1) when the pending downlink signalling for the UE is 5GMM signalling; or

2) when the pending downlink signalling for the UE is 5GSM signalling of the PDU session of voice service and the MUSIM UE does not support the paging indication for voice services, or the network has not indicated "paging indication for voice services supported" to the UE

c) "All paging is restricted except for specified PDU session(s)", the network should send the NOTIFICATION message to the UE only:

1) when the pending downlink signalling for the UE is 5GMM signalling; or

2) for PDU session(s) that paging is not restricted based on the stored paging restriction, the network has downlink 5GSM signalling pending; or

d) "All paging is restricted except for voice service and specified PDU session(s)" then the network should send the NOTIFICATION message to the UE only:

1) when the pending downlink signalling for the UE is 5GMM signalling;

2) when the MUSIM UE support the paging indication for voice services and the network has indicated "paging indication for voice services supported" to the UE, for PDU session(s) that paging is not restricted based on the stored paging restriction and that are not associated with voice service, the network has downlink 5GSM signalling pending; or

3) when the MUSIM UE does not support the paging indication for voice services, or the network has not indicated "paging indication for voice services supported" to the UE and:

i) the pending downlink signalling for the UE is 5GSM signalling of the PDU session of voice service; or

ii) for PDU session(s) that paging is not restricted based on the stored paging restriction, the network has downlink 5GSM signalling pending.

NOTE 1: If the network sends NOTIFICATION message to the UE due to downlink signalling pending, the network initiates the release of the N1 NAS signalling connection over 3GPP access after network-requested procedure is completed.

Upon reception of a NOTIFICATION message, the UE shall stop the timer T3346, if running.

For case a) in subclause 5.6.3.1, upon reception of NOTIFICATION message, the UE shall initiate a service request procedure over 3GPP access as specified in subclauses 5.6.1.

NOTE 2: For a UE in NB-NI mode, if there is DL user data pending for a PDU session associated with non-3GPP access then the AMF notifies the SMF that reactivation of user plane resources cannot be performed if the number of PDU sessions that currently has user-plane resources established equals to the UE's maximum number of supported user-plane resources.

For case b) in subclause 5.6.3.1, upon reception of NOTIFICATION message:

a) if control plane CIoT 5GS optimization is not used by the UE, the UE shall:

1) initiate a service request procedure over 3GPP access as specified in subclause 5.6.1.2.1, if the UE is in 5GMM-REGISTERED.NORMAL-SERVICE or 5GMM-REGISTERED.NON-ALLOWED-SERVICE (as described in subclause 5.3.5.2) state over 3GPP access or 5GMM-REGISTERED.NON-ALLOWED-SERVICE state (see subclause 5.3.5.2), and the UE is in the 5GMM-IDLE mode without suspend indication;

2) initiate a registration procedure for mobility and periodic registration update over 3GPP access as specified in subclause 5.5.1.3.2, if the UE is in 5GMM-REGISTERED.ATTEMPTING-REGISTRATION-UPDATE state over 3GPP access; or

3) proceed as specified in subclause 5.3.1.5 if the UE is in the 5GMM-IDLE mode with suspend indication;

b) if control plane CIoT 5GS optimization is used by the UE, the UE shall:

1) initiate a service request procedure over 3GPP access as specified in subclause 5.6.1.2.2, if the UE is in 5GMM-REGISTERED.NORMAL-SERVICE or 5GMM-REGISTERED.NON-ALLOWED-SERVICE (as described in subclause 5.3.5.2) state and the UE is in the 5GMM-IDLE mode without suspend indication;

2) initiate a registration procedure for mobility and periodic registration update over 3GPP access as specified in subclause 5.5.1.3.2, if the UE is in 5GMM-REGISTERED.ATTEMPTING-REGISTRATION-UPDATE state; or

3) proceed as specified in subclause 5.3.1.5 if the UE is in the 5GMM-IDLE mode with suspend indication; or

c) if:

1) the UE is in 5GMM-REGISTERED.NO-CELL-AVAILABLE state, 5GMM-REGISTERED.PLMN-SEARCH state, 5GMM-REGISTERED.LIMITED-SERVICE state or 5GMM-REGISTERED.UPDATE-NEEDED state over 3GPP access; or

2) the MUSIM UE is not able to respond the NOTIFICATION message as specified in case a) and b) above, e.g., due to UE implementation constraints;

 the UE shall respond with NOTIFICATION RESPONSE message over non-3GPP access indicating inability of the UE to initiate a service request procedure or a registration procedure over 3GPP access and may include the PDU session status information element to indicate:

1) the single access PDU session(s) not in 5GSM state PDU SESSION INACTIVE in the UE associated with the 3GPP access type; and

2) the MA PDU session(s) not in 5GSM state PDU SESSION INACTIVE in the UE and having user plane resources established associated with the 3GPP access type.

Upon reception of NOTIFICATION message:

 For case b) in subclause 5.6.3.1, if the UE is in 5GMM-REGISTERED.NO-CELL-AVAILABLE state or 5GMM-REGISTERED.PLMN-SEARCH state and a local release was performed in the UE for the single access PDU sessions associated with the 3GPP access or for user plane resources on the 3GPP access of MA PDU sessions;

then the UE shall respond with NOTIFICATION RESPONSE message over non-3GPP access indicating with the PDU session status information element that:

- the local release of its single access PDU sessions associated with the 3GPP access was performed; and

- the local release of its 3GPP access user plane resources of MA PDU sessions was performed.

\* \* \* End of Changes \* \* \* \*