**3GPP TSG-CT WG1 Meeting #133e-bisC1-22XXXX**

**E-meeting, 17-21 January 2022**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
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|  | **24.501** | **CR** | **3666** | **rev** | **2** | **Current version:** | **17.5.0** |  |
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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:***  | 5GS MUSIM Paging restriction |
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| ***Source to WG:*** | Mediatek Inc., Nokia, Nokia Shanghai Bell, Samsung, Intel |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | MUSIM |  | ***Date:*** | 2022-01-19 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
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| ***Reason for change:*** | In 23.501 5.38.5 Paging Restriction The Paging Restriction Information may indicate any of the following:a) all paging is restricted; orb) all paging is restricted, except paging for voice service (IMS voice); orc) all paging is restricted, except for certain PDU Session(s); ord) all paging is restricted, except paging for voice service (IMS voice) and certain PDU session(s).NOTE 1: The UE expects not to be paged for any purpose in case a). The UE expects to be paged only for voice service in case b). The UE expects to be paged only for certain PDU Session(s) in case c). The UE expects to be paged for voice service and certain PDU session(s) in case d). The AMF can page the UE for **mobile terminated signalling** based on local policy considering the stored Paging Restriction Information, **except for case a)**. In this case, to comply with the UE provided Paging Restriction Information, the AMF can **trigger AN release procedure** as soon as possible after the mobile terminated signalling procedure is executed. |
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| ***Summary of change:*** | Clearly specify what kinds of event can trigger to page UE when the Paging restriction type is used |
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| ***Consequences if not approved:*** | Unclear specification and undefined behaviour when paging restriction is used. |
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| ***Clauses affected:*** | 5.6.2.2.1 |
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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:*** |  |

\*\*\* change \*\*\*

##### 5.6.2.2.1 General

The network shall initiate the paging procedure for 5GS services when NAS signalling messages or user data is pending to be sent to the UE in 5GMM-IDLE mode over 3GPP access (see example in figure 5.6.2.2.1.1) and there is no paging restriction applied in the network for that paging.



Figure 5.6.2.2.1.1: Paging procedure

To initiate the procedure the 5GMM entity in the AMF requests the lower layer to start paging and shall start timer T3513.

If downlink signalling or user data is pending to be sent over non-3GPP access, the 5GMM entity in the AMF shall indicate to the lower layer that the paging is associated to non-3GPP access.

The network shall not page the UE to re-establish user-plane resources of PDU session(s) associated with non-3GPP access over 3GPP access if all the PDU sessions of the UE that are established over the 3GPP access are associated with control plane only indication.

If the network has downlink user data pending for a UE, 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 page the UE;

b) "All paging is restricted except for voice service", the network should page the UE only when:

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

c) "All paging is restricted except for specified PDU session(s)", the network should page the UE only when:

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

d) "All paging is restricted except for voice service and specified PDU session(s)", the network should page the UE only when:

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

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

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 page the UE;

b) "All paging is restricted except for voice service", the network should page the UE only when:

1) the pending downlink signalling for the UE is 5GMM signalling or 5GSM signalling of the IMS PDU session;

c) "All paging is restricted except for specified PDU session(s)", the network should page the UE only when:

1) 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)", the network should page the UE only when:

1) the pending downlink signalling for the UE is 5GMM signalling or 5GSM signalling of the IMS PDU session; or

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

NOTE X: If the network pages the UE due to downlink signalling pending, the network initiates the release of the N1 NAS signalling connection after network-requested procedure is completed.

The 5GMM entity in the AMF may provide the lower layer with the "allowed CAG list" and an "indication that the UE is only allowed to access 5GS via CAG cells" for the current PLMN, if available, and with the "allowed CAG list" and an "indication that the UE is only allowed to access 5GS via CAG cells" per equivalent PLMN, if available. If there is an active emergency PDU session, the 5GMM entity in the AMF shall not provide the lower layer with the "allowed CAG list" and an "indication that the UE is only allowed to access 5GS via CAG cells" for the current PLMN, even if available, or with the "allowed CAG list" and an "indication that the UE is only allowed to access 5GS via CAG cells" per equivalent PLMN, even if available.

Upon reception of a paging indication, the UE shall stop the timer T3346, if running, and:

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 to respond to the paging as specified in subclauses 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 and the UE is in the 5GMM-IDLE mode without suspend indication;

2) initiate a service request procedure over non-3GPP access to respond to the paging as specified in subclauses 5.6.1;

3) initiate a registration procedure for mobility and periodic registration update over 3GPP access to respond to the paging as specified in subclauses 5.5.1.3.2; or

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

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

1) initiate a service request procedure as specified in subclause 5.6.1.2.2 if 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 subclauses 5.5.1.3.2; or

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

NOTE 1: If the UE is in the 5GMM-IDLE mode without suspend indication and has an uplink user data to be sent to the network using control plane CIoT 5GS optimization when receiving the paging indication, the UE can piggyback the uplink user data during the service request procedure initiated to respond to the paging, as specified in subclause 5.6.1.2.2.

Upon reception of a paging indication, if the network supports the rejection of paging request and if a MUSIM capable UE decides not to accept the paging, the UE may initiate a service request procedure to reject the paging as specified in clause 5.6.1.1.

NOTE 2: As an implementation option, MUSIM-capable UE is allowed to not respond to paging based on the information available in the paging message, e.g. voice service indication.

If TMGI is used as paging identity and the TMGI matches with MBS multicast session which the has UE joined, the UE shall respond to the paging. Otherwise, the UE shall not respond to the paging.

The network shall stop timer T3513 for the paging procedure when an integrity-protected response is received from the UE and successfully integrity checked by the network or when the 5GMM entity in the AMF receives an indication from the lower layer that it has received the NGAP UE context resume request message as specified in 3GPP TS 38.413 [31]. If the response received is not integrity protected, or the integrity check is unsuccessful, timer T3513 for the paging procedure shall be kept running unless:

a) the UE is registered for emergency services;

b) the UE has an emergency PDU session; or

c) the response received is a REGISTRATION REQUEST message for mobility and periodic registration update and the security mode control procedure or authentication procedure performed during mobility and periodic registration update has completed successfully.

Upon expiry of timer T3513, the network may reinitiate paging.

If the network, while waiting for a response to the paging sent without paging priority, receives downlink signalling or downlink data associated with priority user-plane resources for PDU sessions, the network shall stop timer T3513, and then initiate the paging procedure with paging priority.

\*\*\* end of change \*\*\*