**3GPP TSG-CT WG1 Meeting #132-eC1-21xxxx**

**E-meeting, 11-15 October 2021**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
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|  | **24.301** | **CR** | **3607** | **rev** | **2** | **Current version:** | **17.4.1** |  |
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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:***  | Service Request procedure for removing paging restriction at network side in EPS |
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| ***Source to WG:*** | Nokia, Nokia Shanghai Bell |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | MUSIM |  | ***Date:*** | 2021-09-28 |
|  |  |  |  |  |
| ***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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
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| ***Reason for change:*** | It is required to clarify that, the network shall remove any paging restriction it has for the UE once it receives SERVCE REQUEST message. This is according to stage-2 requirements in TS 23.401 clause 4.3.33.2 which states the following:*When the UE initiates for the USIM a Service Request procedure or Tracking Area Update procedure without providing a Release Request indication, the network removes any stored Paging Restriction Information.*It is worth to note that, this clarification already exists for the case of receiving EXTENDED SERVICE REQUEST in clause 5.6.1.4.1 as following:*If the UE supporting MUSIM does not include the Paging restriction IE in the EXTENDED SERVICE REQUEST message, the MME shall delete any stored paging restriction preferences for the UE and stop restricting paging.*Hence the change is needed only for SERVICE REQUEST case. |
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| ***Summary of change:*** | Clarifying that the network shall remove any paging restriction it has for that UE once it receives SERVCE REQUEST message.Also, few editorial corrections are made in clause 5.6.1.1. |
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| ***Consequences if not approved:*** | The network wrongly keeps the paging restriction even after receiving SERVIE REQUEST message from the UE. |
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| ***Clauses affected:*** | 5.6.1.1, 5.6.1.4.1 |
|  |  |
|  | **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:*** | Rev 1:Adding that, the Network shall remove paging restriction upon receiving SERVICE REQUEST message in EPS.Rev 2:Keeping only the requirement that the Network shall remove paging restriction upon receiving SERVICE REQUEST message in EPS and removing other requirements  |

\*\*\*\*\* First change \*\*\*\*\*

#### 5.6.1.1 General

The purpose of the service request procedure is to transfer the EMM mode from EMM-IDLE to EMM-CONNECTED mode. If the UE is not using EPS services with control plane CIoT EPS optimization, this procedure is used to establish the radio and S1 bearers when user data or signalling is to be sent. If the UE is using EPS services with control plane CIoT EPS optimization, this procedure can be used for UE initiated transfer of user data via the control plane. Another purpose of this procedure is to invoke MO/MT CS fallback or 1xCS fallback procedures.

This procedure is used when:

- the network has downlink signalling pending;

- the UE has uplink signalling pending;

- the UE or the network has user data pending and the UE is in EMM-IDLE mode;

- the UE is in EMM-CONNECTED mode and has a NAS signalling connection only; the UE is using EPS services with control plane CIoT EPS optimization, and it has user data pending which is to be transferred via user plane radio bearers;

- the UE in EMM-IDLE or EMM-CONNECTED mode has requested to perform mobile originating/terminating CS fallback or 1xCS fallback;

- the network has downlink cdma2000® signalling pending;

- the UE has uplink cdma2000® signalling pending;

- the UE has to request resources for ProSe direct discovery or Prose direct communication;

- the UE has to request resources for V2X communication over PC5;

- the UE that is MUSIM capable and in EMM-IDLE mode requests the network to remove the paging restriction; or

- to indicate to the network that the UE supporting MUSIM requests the release of the NAS signalling connection or reject paging.

The service request procedure is initiated by the UE, however, for the downlink transfer of signalling, cdma2000® signalling or user data in EMM-IDLE mode, the trigger is given by the network by means of the paging procedure (see clause 5.6.2).

The UE shall invoke the service request procedure when:

a) the UE in EMM-IDLE mode receives a paging request using S-TMSI with CN domain indicator set to "PS" from the network;

b) the UE, in EMM-IDLE mode, has pending user data to be sent;

c) the UE, in EMM-IDLE mode, has uplink signalling pending;

d) the UE in EMM-IDLE or EMM-CONNECTED mode is configured to use CS fallback and has a mobile originating CS fallback request from the upper layer;

e) the UE in EMM-IDLE mode is configured to use CS fallback and receives a paging request with CN domain indicator set to "CS", or the UE in EMM-CONNECTED mode is configured to use CS fallback and receives a CS SERVICE NOTIFICATION message;

f) the UE in EMM-IDLE or EMM-CONNECTED mode is configured to use 1xCS fallback and has a mobile originating 1xCS fallback request from the upper layer;

g) the UE in EMM-CONNECTED mode is configured to use 1xCS fallback and accepts cdma2000® signalling messages containing a 1xCS paging request received over E-UTRAN;

h) the UE, in EMM-IDLE mode, has uplink cdma2000® signalling pending to be transmitted over E-UTRAN;

i) the UE, in EMM-IDLE or EMM-CONNECTED mode, is configured to use 1xCS fallback, accepts cdma2000® signalling messages containing a 1xCS paging request received over cdma2000® 1xRTT, and the network supports dual Rx CSFB or provide CS fallback registration parameters (see 3GPP TS 36.331 [22]);

j) the UE, in EMM-IDLE or EMM-CONNECTED mode, has uplink cdma2000® signalling pending to be transmitted over cdma2000® 1xRTT, and the network supports dual Rx CSFB or provide CS fallback registration parameters (see 3GPP TS 36.331 [22]);

k) the UE performs an inter-system change from S101 mode to S1 mode and has user data pending;

l) the UE in EMM-IDLE mode has to request resources for ProSe direct discovery or Prose direct communication (see 3GPP TS 36.331 [22]);

m) the UE, in EMM-CONNECTED mode and has a NAS signalling connection only, is using EPS services with control plane CIoT EPS optimization and has pending user data to be sent via user plane radio bearers;

n) the UE in EMM-IDLE mode has to request resources for V2X communication over PC5 (see 3GPP TS 23.285 [47]);

o) the UE that is MUSIM capable and in EMM-IDLE mode is requesting the network to remove the paging restriction;

p) the UE supports MUSIM, in EMM-CONNECTED mode requests the network to release the NAS signalling connection and optionally includes paging restrictions; or

q) the UE supports MUSIM, in EMM-IDLE mode when responding to paging rejects the paging request from the network, requests the network to release the NAS signalling connection and optionally includes paging restrictions.

If one of the above criteria to invoke the service request procedure is fulfilled, then the service request procedure may only be initiated by the UE when the following conditions are fulfilled:

- its EPS update status is EU1 UPDATED, and the TAI of the current serving cell is included in the TAI list; and

- no EMM specific procedure is ongoing.

The UE that is MUSIM capable shall not initiate service request procedure for requesting the network to release the NAS signalling connection if the UE is attached for emergency bearer services or if the UE has a PDN connection for emergency bearer services established.



NOTE 1: AS indications (indications from lower layers) are results of procedures triggered by MME in service request procedure. Triggered procedures could be e.g. RRC connection reconfiguration procedure (see 3GPP TS 36.331 [22]) and inter system PS handover to GERAN or UTRAN procedure as a result of CSFB procedure (see 3GPP TS 23.272 [9]).

NOTE 2: For 1xCS fallback, the UE sends the EXTENDED SERVICE REQUEST message and starts timer T3417. The procedure is considered completed upon receiving indication of system change from AS.

Figure 5.6.1.1.1: Service request procedure (part 1)



NOTE 1: Security protected NAS message: this could be e.g. a SECURITY MODE COMMAND, SERVICE ACCEPT, or ESM DATA TRANSPORT message.

NOTE 2: AS indications (indications from lower layers) are results of procedures triggered by MME in service request procedure. Triggered procedures could be e.g. an RRC connection release procedure or RRC connection reconfiguration procedure (see 3GPP TS 36.331 [22]).

Figure 5.6.1.1.2: Service request procedure (part 2)

A service request attempt counter is used to limit the number of service request attempts and no response from the network. The service request attempt counter shall be incremented as specified in clause 5.6.1.6.

The service request attempt counter shall be reset when:

- a normal or periodic tracking area updating or a combined tracking area updating procedure is successfully completed;

- a service request procedure in order to obtain packet services is successfully completed;

- a service request procedure is rejected as specified in clause 5.6.1.5 or clause 5.3.7b; or

- the UE moves to EMM-DEREGISTERED state.

\*\*\*\*\* Next change \*\*\*\*\*

##### 5.6.1.4.1 UE is not using EPS services with control plane CIoT EPS optimization

If EMM-REGISTERED without PDN connection is supported by the UE and the MME and the MME has no active EPS bearer contexts for the UE, for cases a, b, c and o in clause 5.6.1.1, upon receipt of the SERVICE REQUEST message or the EXTENDED SERVICE REQUEST message for packet services, after completion of the EMM common procedures according to clause 5.6.1.3, if any, the MME shall send a SERVICE ACCEPT message.

If EMM-REGISTERED without PDN connection is supported by the UE and the MME and the UE has no active EPS bearer contexts, for cases a, b, c and o in clause 5.6.1.1, the UE shall treat the receipt of a SERVICE ACCEPT message as successful completion of the procedure. Otherwise, for cases a, b, c, h, k, l and o in clause 5.6.1.1, the UE shall treat the indication from the lower layers that the user plane radio bearer is set up as successful completion of the procedure. The UE shall reset the service request attempt counter, stop the timer T3417 and enter the state EMM-REGISTERED.

If the service type information element in the EXTENDED SERVICE REQUEST message indicates "mobile terminating CS fallback or 1xCS fallback" and the CSFB response IE, if included, indicates "CS fallback accepted by the UE", or if the service type information element in the EXTENDED SERVICE REQUEST message indicates "mobile originating CS fallback or 1xCS fallback" or "mobile originating CS fallback emergency call or 1xCS fallback emergency call", the network initiates CS fallback or 1xCS fallback procedures.

If the EPS bearer context status IE is included in the EXTENDED SERVICE REQUEST message, the network shall deactivate all those EPS bearer contexts locally (without peer-to-peer signalling between the network and the UE) which are active on the network side but are indicated by the UE as being inactive. If a default EPS bearer context is marked as inactive in the EPS bearer context status IE included in the EXTENDED SERVICE REQUEST message, and this default bearer is not associated with the last remaining PDN connection of the UE in the MME, the MME shall locally deactivate all EPS bearer contexts associated to the PDN connection with the default EPS bearer context without peer-to-peer ESM signalling to the UE. If the default bearer is associated with the last remaining PDN connection of the UE in the MME, and EMM-REGISTERED without PDN connection is supported by the UE and the MME, the MME shall locally deactivate all EPS bearer contexts associated to the PDN connection with the default EPS bearer context without peer-to-peer ESM signalling to the UE.

If the SERVICE REQUEST message or the EXTENDED SERVICE REQUEST message for packet services, was sent in a CSG cell and the CSG subscription has expired or was removed for a UE, but the UE has a PDN connection for emergency bearer services established, the network shall accept the SERVICE REQUEST message or the EXTENDED SERVICE REQUEST message for packet services and deactivate all non-emergency EPS bearers locally. The emergency EPS bearers shall not be deactivated.

For cases d in clause 5.6.1.1, and for case e in clause 5.6.1.1 when the CSFB response was set to "CS fallback accepted by the UE", the UE shall treat the indication from the lower layers that the inter-system change from S1 mode to A/Gb or Iu mode is completed as successful completion of the procedure. The EMM sublayer in the UE shall indicate to the MM sublayer that the CS fallback procedure has succeeded. The UE shall stop the timer T3417ext or T3417ext-mt, respectively, and enter the state EMM-REGISTERED.NO-CELL-AVAILABLE.

If the service request procedure was initiated in EMM-IDLE mode and an EXTENDED SERVICE REQUEST message was sent in a CSG cell and the CSG subscription has expired or was removed for the UE, the network need not perform CSG access control if the service type information element indicates "mobile originating CS fallback emergency call or 1xCS fallback emergency call".

For cases f and g in clause 5.6.1.1:

- if the UE receives the indication from the lower layers that the signalling connection is released with the redirection indication to cdma2000® 1x access network or the indication from the lower layers that a change to cdma2000® 1x access network for 1xCS fallback has started (see 3GPP TS 36.331 [22]), the UE shall consider the service request procedure successfully completed, stop timer T3417 and enter the state EMM-REGISTERED.NO-CELL-AVAILABLE;

- if the UE receives the dual Rx/Tx redirection indication from the lower layers (see 3GPP TS 36.331 [22]), the UE shall select cdma2000® 1x access network for 1xCS fallback, consider the service request procedure successfully completed, stop timer T3417 and enter the state EMM-REGISTERED.NORMAL-SERVICE; and

- if the UE receives a cdma2000® signalling message indicating 1xCS fallback rejection by cdma2000® 1x access network, the UE shall abort the service request procedure, stop timer T3417 and enter the state EMM-REGISTERED.NORMAL-SERVICE.

For cases i and j in clause 5.6.1.1, if the UE receives the indication from the lower layers that the signalling connection is released, the UE shall consider the service request procedure successfully completed, stop timer T3417 and enter the state EMM-REGISTERED.NO-CELL-AVAILABLE.

For cases p and q in clause 5.6.1.1, when the UE supporting MUSIM in the EXTENDED SERVICE REQUEST message sets the Request type to "NAS signalling connection release" or to "Rejection of paging" in the UE request type IE, the UE shall treat the receipt of SERVICE ACCEPT message as the successful completion of the procedure and the UE shall reset the service request attempt counter, stop timer T3417 and enter the state EMM-REGISTERED.

If the SERVICE REQUEST message or an EXTENDED SERVICE REQUEST message for packet services was used, the UE shall locally deactivate the EPS bearer contexts that do not have a user plane radio bearer established upon successful completion of the service request procedure, except for the case when the UE supporting MUSIM in the EXTENDED SERVICE REQUEST message sets the Request type to "NAS signalling connection release" or to "Rejection of paging" in the UE request type IE.

If the EXTENDED SERVICE REQUEST message is for CS fallback or 1xCS fallback and radio bearer establishment takes place during the procedure, the UE shall locally deactivate the EPS bearer contexts that do not have a user plane radio bearer established upon receiving a lower layer indication of radio bearer establishment. The UE does not perform local deactivation of EPS bearer contexts upon receiving an indication of inter-system change from lower layers.

If the EXTENDED SERVICE REQUEST message is for CS fallback or 1xCS fallback and radio bearer establishment does not take place during the procedure, the UE does not perform local deactivation of the EPS bearer context. The UE does not perform local deactivation of EPS bearer contexts upon receiving an indication of inter-system change from lower layers.

If a service request is received from a UE with a LIPA PDN connection, and if:

- a GW Transport Layer Address IE value identifying a L-GW is provided by the lower layer together with the service request, and the P-GW address included in the EPS bearer context of the LIPA PDN connection is different from the provided GW Transport Layer Address IE value (see 3GPP TS 36.413 [23]); or

- no GW Transport Layer Address is provided together with the service request by the lower layer;

then the MME shall locally deactivate all EPS bearer contexts associated with any LIPA PDN connection. Furthermore, if no active EPS bearer contexts remain for the UE, the MME shall not accept the service request as specified in clause 5.6.1.5.

If a service request is received from a UE with a SIPTO at the local network PDN connection, and if the PDN connection is a:

1) SIPTO at the local network PDN connection with stand-alone GW, and if:

- a LHN-ID value is provided by the lower layer together with the service request, and the LHN-ID value stored in the EPS bearer context of the SIPTO at the local network PDN connection is different from the provided LHN-ID value (see 3GPP TS 36.413 [23]); or

- no LHN-ID value is provided together with the service request by the lower layer; or

2) SIPTO at the local network PDN connection with collocated L-GW, and if:

- a SIPTO L-GW Transport Layer Address IE value identifying a L-GW is provided by the lower layer together with the service request, and the P-GW address included in the EPS bearer context of the SIPTO at the local network PDN connection is different from the provided SIPTO L-GW Transport Layer Address IE value (see 3GPP TS 36.413 [23]); or

- no SIPTO L-GW Transport Layer Address is provided together with the service request by the lower layer;

then, the MME takes one of the following actions:

- if all the remaining PDN connections are SIPTO at the local network PDN connections, the MME shall not accept the service request as specified in clause 5.6.1.5; and

- if a PDN connection remains that is not SIPTO at the local network PDN connection and the network decides to set up the S1 and radio bearers, the MME shall upon completion of the setup of the S1 bearers initiate an EPS bearer context deactivation procedure with ESM cause #39 "reactivation requested" for the default EPS bearer context of each SIPTO at the local network PDN connection (see clause 6.4.4.2).

NOTE: For some cases of CS fallback or 1x CS fallback the network can decide not to set up any S1 and radio bearers.

Upon receipt of the SERVICE REQUEST message, the MME shall delete any stored paging restriction preferences for the UE and stop restricting paging.

If the UE supporting MUSIM does not include the Paging restriction IE in the EXTENDED SERVICE REQUEST message, the MME shall delete any stored paging restriction preferences for the UE and stop restricting paging.

For cases p and q in clause 5.6.1.1 when the UE supporting MUSIM sets the Request type to "NAS signalling connection release" or to "Rejection of paging" in the UE request type IE in the EXTENDED SERVICE REQUEST message and if the UE requests restriction of paging by including the Paging restriction IE, the MME shall store the paging restriction preferences of the UE and enforce these restrictions in the paging procedure as described in clause 5.6.2.

When the E-UTRAN fails to establish radio bearers for one or more EPS bearer contexts, then the MME shall locally deactivate the EPS bearer contexts corresponding to the failed radio bearers based on the lower layer indication from the E‑UTRAN, without notifying the UE.

If the UE is not using EPS services with control plane CIoT EPS optimization, the network shall consider the service request procedure successfully completed in the following cases:

- when it receives an indication from the lower layer that the user plane is setup, if radio bearer establishment is required;

- otherwise when it receives an indication from the lower layer that the UE has been redirected to the other RAT (GERAN or UTRAN in CS fallback, or cdma2000® 1x access network for 1xCS fallback).

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