**3GPP TSG-CT WG1 Meeting #130-eC1-21xxxx**

**Electronic meeting, 20-28 May 2021**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
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|  | **24.301** | **CR** | **3535** | **rev** | **1** | **Current version:** | **17.2.0** |  |
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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 |  |

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| ***Title:***  | S-NSSAI associated with the PDN connection after handover |
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| ***Source to WG:*** | MediaTek Inc. |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | 5GProtoc17 |  | ***Date:*** | 2021-05-26 |
|  |  |  |  |  |
| ***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:*** | Based on the discussion paper C1-213330, when the PDN connection is transferred between S1 mode and ePDG, the stored S-NSSAI should be kept associating with the new PDN connection to ensure the session continuity. |
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| ***Summary of change:*** | When handover from ePDG to S1 mode, the new PDN connection should associate with the S-NSSAI and the related PLMN ID which was associated with the existing PDN connection over non-3GPP access, no matter whether the associated S-NSSAI and the PLMN ID is provided by the ePDG or not. |
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| ***Consequences if not approved:*** | Session continuity may not be maintained without associated S-NSSAI/PLMN ID when handover to N1 mode. |
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| ***Clauses affected:*** | 6.5.1.2, 6.5.1.3 |
|  |  |
|  | **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:*** |  |

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

#### 6.5.1.2 UE requested PDN connectivity procedure initiation

In order to request connectivity to a PDN, the UE shall send a PDN CONNECTIVITY REQUEST message to the MME, start timer T3482 and enter the state PROCEDURE TRANSACTION PENDING (see example in figure 6.5.1.2.1).

When the PDN CONNECTIVITY REQUEST message is sent together with an ATTACH REQUEST message, the UE shall not start timer T3482 and shall not include the APN.

NOTE 1: If the UE needs to provide protocol configuration options which require ciphering or provide an APN, or both, during the attach procedure, the ESM information transfer flag is included in the PDN CONNECTIVITY REQUEST. The MME then at a later stage in the PDN connectivity procedure initiates the ESM information request procedure in which the UE can provide the MME with protocol configuration options or APN or both.

In order to request a PDN connection for emergency bearer services or for access to RLOS, the UE shall not include an APN in the PDN CONNECTIVITY REQUEST message or, when applicable, in the ESM INFORMATION RESPONSE message.

In order to request connectivity to a PDN using the default APN, the UE includes the access point name IE in the PDN CONNECTIVITY REQUEST message or, when applicable, in the ESM INFORMATION RESPONSE message, according to the following conditions:

- if use of a PDN using the default APN requires PAP/CHAP, then the UE should include the Access point name IE; and

- in all other conditions, the UE need not include the Access point name IE.

In order to request connectivity to an additional PDN using a specific APN, the UE shall include the requested APN in the PDN CONNECTIVITY REQUEST message.

In the PDN type IE the UE shall either indicate the IP version capability of the IP stack associated with the UE or non IP or Ethernet as specified in subclause 6.2.2.

If the PDN type value of the PDN type IE is set to IPv4 or IPv6 or IPv4v6 and the UE indicates "Control plane CIoT EPS optimization supported" in the UE network capability IE of the ATTACH REQUEST message, the UE may include the Header compression configuration IE in the PDN CONNECTIVITY REQUEST message.

When the connectivity to a PDN is to be transferred from a non-3GPP access network to the 3GPP access network, the UE shall set the PDN type value of the PDN type IE to:

- IPv4, if the previously allocated home address information consists of an IPv4 address only;

- IPv6, if the previously allocated home address information consists of an IPv6 prefix only; or

- IPv4v6, if the previously allocated home address information consists of both an IPv4 address and an IPv6 prefix.

The UE shall set the request type to "initial request" when the UE is establishing a new PDN connectivity to a PDN in an attach procedure or in a stand-alone PDN connectivity procedure or when the UE is a 5G-RG and requests establishment of a PDN connection as a user-plane resource of an MA PDU session to be established. The UE shall set the request type to "emergency" when the UE is requesting a new PDN connectivity for emergency bearer services. The UE shall set the request type to "handover" when the connectivity to a PDN is to be transferred from a non-3GPP access network to the 3GPP access network, when the UE initiates the procedure to add 3GPP access to the PDN connection which is already established over WLAN, when the UE supporting N1 mode requests transfer of an existing non-emergency PDU session in 5GS or when the UE is a 5G-RG and requests establishment of a PDN connection as a user-plane resource of an already established MA PDU session. The UE shall set the request type to "handover of emergency bearer services" when a PDN connection for emergency bearer services is to be transferred from a WLAN to the 3GPP access network or when the UE supporting N1 mode requests transfer of an existing emergency PDU session in 5GS. The UE shall set the request type to "RLOS" when the UE is requesting a new PDN connection for RLOS.

If the UE supports DSMIPv6, the UE may include a request for obtaining the IPv6 address and optionally the IPv4 address of the home agent in the Protocol configuration options IE in the PDN CONNECTIVITY REQUEST message. The UE may also include a request for obtaining the IPv6 Home Network Prefix. The UE shall request the IPv6 Home Network Prefix only if the UE has requested the home agent IPv6 address. The requested home agent address(es) and the Home Network Prefix are related to the APN the UE requested connectivity for.

The UE may set the ESM information transfer flag in the PDN CONNECTIVITY REQUEST message to indicate that it has ESM information, i.e. protocol configuration options, APN, or both, that needs to be sent after the NAS signalling security has been activated between the UE and the MME.

If the UE supports A/Gb mode or Iu mode or both, the UE shall indicate the support of the network requested bearer control procedures (see 3GPP TS 24.008 [13]) in A/Gb mode or Iu mode in the protocol configuration options IE.

If the UE supports N1 mode and the request type is:

a) "initial request" or "emergency", the UE shall generate a PDU session ID, associate the PDU session ID with the PDN connection that is being established, and include the PDU session ID in the protocol configuration options IE or the extended protocol configuration options IE;

b) "handover" or "handover of emergency bearer services", and the UE requests:

1) transfer of an existing PDU session in 5GS or establishment of a PDN connection as a user-plane resource of an already established MA PDU session, the UE shall associate the PDU session ID of the PDU session with the PDN connection that is being established for the existing PDU session and include the PDU session ID in the protocol configuration options IE or the extended protocol configuration options IE; or

2) transfer of an existing PDN connection in a non-3GPP access connected to the EPC and a PDU session ID is associated with the existing PDN connection, the UE shall include the PDU session ID in the protocol configuration options IE or the extended protocol configuration options IE and associate the PDU session ID with the PDN connection that is being established. If the existing PDN connection is a non-emergency PDN connection and an S-NSSAI and a related PLMN ID are associated with the existing PDN connection, the UE shall in addition associate the S-NSSAI and the related PLMN ID with the PDN connection that is being established.

NOTE 2: The UE can also have an S-NSSAI and the related PLMN ID associated with the PDN connection, if the S-NSSAI and the related PLMN ID was associated with the existing PDN connection in a non-3GPP access connected to the EPC as specified in 3GPP TS 24.302 [48]. The UE stores this S-NSSAI and the related PLMN ID for later use during inter-system change from S1 mode to N1 mode.

If the UE supporting N1 mode supports receiving QoS rules with the length of two octets or QoS flow descriptions with the length of two octets via the extended protocol configuration options IE, the UE shall include the QoS rules with the length of two octets support indicator or the QoS flow descriptions with the length of two octets support indicator, respectively, in the protocol configuration options IE or the extended protocol configuration options IE.

Protocol configuration options provided in the ESM INFORMATION RESPONSE message replace any protocol configuration options provided in the PDN CONNECTIVITY REQUEST message.

When the UE initiates the procedure to add 3GPP access to the PDN connection that is already established over WLAN, the UE shall provide the same APN as that of the PDN connection established over WLAN in the PDN connectivity procedure as specified in the subclause 6.2.2 of 3GPP TS 23.161 [34].

If the UE supports APN rate control, the UE shall include an APN rate control support indicator and an additional APN rate control for exception data support indicator in the protocol configuration options IE or extended protocol configuration options IE.

If the UE supports DNS over (D)TLS (see 3GPP TS 33.501 [24]), the UE shall include the extended protocol configuration options IE in the PDN CONNECTIVITY REQUEST message and include DNS server security information indicator.

NOTE 3: Support of DNS over (D)TLS is based on the informative requirements as specified in 3GPP TS 33.501 [24].



Figure 6.5.1.2.1: UE requested PDN connectivity procedure

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

#### 6.5.1.3 UE requested PDN connectivity procedure accepted by the network

Upon receipt of the PDN CONNECTIVITY REQUEST message, the MME checks whether the ESM information transfer flag is included. If the flag is included the MME waits for completion of the ESM information request procedure before proceeding with the PDN connectivity procedure. The MME then checks if connectivity with the requested PDN can be established. If no requested APN is included in the PDN CONNECTIVITY REQUEST message or the ESM INFORMATION RESPONSE message and the request type is different from "emergency" and from "handover of emergency bearer services" and from "RLOS", the MME shall use the default APN as the requested APN. If the request type is "emergency" or "handover of emergency bearer services", the MME shall use the APN configured for emergency bearer services or select the statically configured PDN GW for unauthenticated UEs, if applicable. If the request type is "RLOS", the MME shall use the APN configured for RLOS.

If the network receives a PDN CONNECTIVITY REQUEST message with the same combination of APN and PDN type as an already existing PDN connection, and multiple PDN connections for a given APN are allowed, the network retains the existing EPS bearer contexts for the PDN connection and proceeds with the requested PDN connectivity procedure.

If the lower layers provide a GW Transport Layer Address value identifying a L-GW together with the PDN CONNECTIVITY REQUEST message and a PDN connection is established as a LIPA PDN connection due to the PDN CONNECTIVITY REQUEST message, then the MME shall store the GW Transport Layer Address value as the P-GW address in the EPS bearer context of the LIPA PDN connection.

If the lower layers provide a SIPTO L-GW Transport Layer Address value identifying a L-GW together with the PDN CONNECTIVITY REQUEST message and a PDN connection is established as a SIPTO at the local network PDN connection due to the PDN CONNECTIVITY REQUEST message, then the MME shall store the SIPTO L-GW Transport Layer Address value as the P-GW address in the EPS bearer context of the SIPTO at the local network PDN connection.

If the lower layers provide a LHN-ID value together with the PDN CONNECTIVITY REQUEST message and a PDN connection is established as a SIPTO at the local network PDN connection due to the PDN CONNECTIVITY REQUEST message, then the MME shall store the LHN-ID value in the EPS bearer context of the SIPTO at the local network PDN connection.

NOTE 1: The receipt of a LHN-ID value during the establishment of the PDN connection, during tracking area updating procedure or during inter-MME handover can be used as an indication by the MME that the SIPTO at the local network PDN connection is established to a stand-alone GW (see 3GPP TS 23.401 [10]).

If connectivity with the requested PDN is accepted by the network, the MME shall initiate the default EPS bearer context activation procedure (see subclause 6.4.1).

If connectivity with the requested PDN is accepted and the network considers this PDN connection a LIPA PDN connection, then subject to operator policy the MME shall include in the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message the Connectivity type IE indicating "the PDN connection is considered a LIPA PDN connection".

If connectivity with the requested PDN is accepted, but with a restriction of IP version (i.e. both an IPv4 address and an IPv6 prefix is requested, but only one particular IP version, or only single IP version bearers are supported/allowed by the network), ESM cause #50 "PDN type IPv4 only allowed", #51 "PDN type IPv6 only allowed", or #52 "single address bearers only allowed", respectively, shall be included in the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message.

If connectivity with the requested PDN is accepted and the UE provided the Header compression configuration IE in the PDN CONNECTIVITY REQUEST message, the MME may include the Header compression configuration IE in the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message. Furthermore, if the MME decides that the associated PDN connection is only for control plane CIoT EPS optimization (see subclause 5.3.15), the MME shall include the Control plane only indication in the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message.

Upon receipt of the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message, the UE shall stop timer T3482 and enter the state PROCEDURE TRANSACTION INACTIVE. The UE should ensure that the procedure transaction identity (PTI) assigned to this procedure is not released immediately. The way to achieve this is implementation dependent. While the PTI value is not released, the UE regards any received ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message with the same PTI value as a network retransmission (see subclause 7.3.1).

Upon receipt of the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message with the Connectivity type IE indicating "the PDN connection is considered a LIPA PDN connection", the UE provides an indication to the upper layers that the connectivity is provided by a LIPA PDN connection.

Upon receipt of the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message, if the 3GPP PS data off UE status is "activated", the UE behaves as described in subclause 6.3.10.

Upon receipt of the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message, if the SCEF or P-GW indicates acceptance of use of Reliable Data Service to transfer data for the PDN connection, the UE behaves as described in subclause 6.3.11.

Upon receipt of the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message, if an S-NSSAI and the PLMN ID that this S-NSSAI relates to are provided in the protocol configuration options IE or extended protocol configuration options IE, the UE shall delete the stored S-NSSAI and the PLMN ID that this S-NSSAI relates to, if any, and shall store the S-NSSAI and the PLMN ID this S-NSSAI relates to provided in the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message and the associated PLMN ID along with the corresponding PDU session ID that the UE provided in the PDN CONNECTIVITY REQUEST message. The usage of the PDU session ID and the corresponding S-NSSAI with the associated PLMN ID is specified in 3GPP TS 24.501 [54].

Upon receipt of the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message with a session-AMBR and QoS rule(s), which correspond to the default EPS bearer of the PDN connectivity being activated, in the protocol configuration options IE or the extended protocol configuration options IE, the UE stores the session-AMBR and QoS rule(s) for use during inter-system change from S1 mode to N1 mode.

If the UE requests the PDN type "IPv4v6", receives the selected PDN type set to "IPv4" and the ESM cause value #50 "PDN type IPv4 only allowed", the UE shall not automatically send another PDN CONNECTIVITY REQUEST message for "IPv6" to the same APN (or no APN, if no APN was indicated by the UE) and the PDN type "IPv6" until:

- the UE is registered to a new PLMN;

- the UE is switched off; or

- the USIM is removed.

If the UE requests the PDN type "IPv4v6", receives the selected PDN type set to "IPv6" and the ESM cause value #51 "PDN type IPv6 only allowed", the UE shall not automatically send another PDN CONNECTIVITY REQUEST message for "IPv4" to the same APN (or no APN, if no APN was indicated by the UE) and the PDN type "IPv4" until:

- the UE is registered to a new PLMN;

- the UE is switched off; or

- the USIM is removed.

NOTE 2: For the ESM cause values #50 "PDN type IPv4 only allowed" and #51 "PDN type IPv6 only allowed", re-attempt in A/Gb, Iu, or N1 mode for the same APN (or no APN, if no APN was indicated by the UE) is only allowed using the PDN type(s) indicated by the network.