**3GPP TSG-CT WG1 Meeting #125-eC1-205239**

**Electronic meeting, 20-28 August 2020**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **24.301** | **CR** | **3416** | **rev** | **1** | **Current version:** | **16.5.1** |  |
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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 | **X** | Radio Access Network |  | Core Network |  |

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| ***Title:*** | Requested PDN type after handover to non-3GPP access | | | | | | | | | |
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| ***Source to WG:*** | vivo, ZTE | | | | | | | | | |
| ***Source to TSG:*** | C1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | SAES17 | | | | |  | ***Date:*** | | | 2020-08-08 |
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| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-16 |
|  | *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 can be 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-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17)* | |
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| ***Reason for change:*** | | Call drop case was observed in real field when the user switches between VoLTE and VoWIFI.  The scenario is as following:   1. The UE sent the PDN CONNECTIVITY REQUEST message with the PDN type IE set to IPv4v6. The connectivity with the requested PDN is accepted, but with a restriction of IP version, for example, IPv6. ESM cause#51 "PDN type IPv6 only allowed" was be included in the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message sent by the network 2. The UE performed IMS registrion using the above established PDN connection and got voice service over 3GPP access, i.e., VoLTE. 3. Due to the coverage condition, the above PDN connection for IMS service was handovered to non-3GPP access, i.e., VoWiFi, during which *the network initiated the EPS bearer context deactivation procedure* to deactivated the EPS bearer with QCI=5. 4. Due to the coverage condition changes, the above PDN connection for IMS had to be handovered back to 3GPP access, i.e., VoLTE, and the UE sent the PDN CONNECTIVITY REQUEST message with request type set to “handover”. 5. call drop happens when the UE set the PDN type IE set to “IPv4v6”.   In the above step 4, per the requirement in subclause 6.2.2 of TS24.301, the UE set the PDN type IE set to “IPv4v6” in the PDN CONNECTIVITY REQUEST message.  “*The UE shall not subsequently initiate another UE requested PDN connectivity procedure to the same APN to obtain a PDN type different from the one allowed by the network until:*  *a) all EPS bearer contexts to the given APN are deactivated at the UE and the network as a result of:*  *i) EPS bearer context synchronization during tracking area updating or service request procedure;*  ii) *an EPS bearer context deactivation procedure initiated by the network*;  …….”  However, the PDN connection transferred beween non-3GPP access and 3GPP access is served by the same PGW,and the UE’s subscription will not be changed during the handover, the restriction of IP version is still valid after handover.  Besides, the EPS bearer context deactivation procedure initiated by the network is actually trigger by the handover-PDN connection request from the UE.  Therefore, it is proposed that the UE shall follow the IP restriction received before the handover of PDN connection between 3GPP access and non-3GPP access. | | | | | | | | |
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| ***Summary of change:*** | | The UE shall follow the IP restriction received before the handover of PDN connection between 3GPP access and non-3GPP access. | | | | | | | | |
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| ***Consequences if not approved:*** | | Call drop will happen when the UE switch between VoLTE and VoWIFI. | | | | | | | | |
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| ***Clauses affected:*** | | 6.5.1.2 | | | | | | | | |
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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:*** | |  | | | | | | | | |

\* \* \* First 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.

NOTE 2: The UE can also have an S-NSSAI associated with the PDN connection, if the S-NSSAI was provided by the network during the PDN connection establishment via non-3GPP access to EPC (see 3GPP TS 24.302 [48]). The UE stores this S-NSSAI 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.



Figure 6.5.1.2.1: UE requested PDN connectivity procedure

\* \* \* End of Change \* \* \* \*