**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** | **3533** | **rev** | **5** | **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 | **X** | Radio Access Network |  | Core Network | **X** |

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| ***Title:*** | C2 pairing authorization at PDN connectivity | | | | | | | | | |
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| ***Source to WG:*** | Lenovo, Motorola Mobility, Huawei, HiSilicon | | | | | | | | | |
| ***Source to TSG:*** | C1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | ID\_UAS | | | | |  | ***Date:*** | | | 2021-10-11 |
|  |  | | | |  | |  | | |  |
| ***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 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-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | According to TS 23.256:  *Depending on 3GPP network operator and/or regulatory requirements, the UUAA is performed:*  *-   In 5GS: either as a separate procedure during the 5GS registration procedure (optional and based on specific PLMN policies, USS requirements, and geographic regulatory requirements), or when the UAV requests user plane resources for UAV operation (i.e. PDU session establishment). The UAV shall support UUAA during Registration and PDU session establishment procedure. The network shall support UUAA during PDU session establishment.*  *-   In EPS: during the attach procedure and the corresponding PDN connection establishment. The network shall support UUAA during PDN connection establishment. The UAV shall support UUAA during PDN connection establishment procedure.*  Therefore in EPS, the UUAA-SM occurs at the time of attch and one option for the UAV to perform C2 pairing authorization is at that time. Another option is for the UE is to perform C2 pairing authorization at the time of establishing a PDN connection. | | | | | | | | |
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| ***Summary of change:*** | | Changes are proposed for PDN connection for UUAA-SM in together with or with C2 pairing authorization. | | | | | | | | |
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| ***Consequences if not approved:*** | | Stage 3 of a feature is not implemented. | | | | | | | | |
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| ***Clauses affected:*** | | 6.4.1.3, 6.5.1.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 <<<<<<<<<<

#### 6.4.1.3 Default EPS bearer context activation accepted by the UE

Upon receipt of the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message, if the UE provided an APN for the establishment of the PDN connection, the UE shall stop timer T3396 if it is running for the APN provided by the UE. If the UE did not provide an APN for the establishment of the PDN connection and the request type was different from "emergency" and from "handover of emergency bearer services", the UE shall stop the timer T3396 associated with no APN if it is running. If the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message was received in response to a request for an emergency PDN connection, the UE shall not stop the timer T3396 associated with no APN if it is running. For any case, the UE shall then send an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message and enter the state BEARER CONTEXT ACTIVE. When the default bearer is activated as part of the attach procedure, the UE shall send the ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message together with ATTACH COMPLETE message. When the default bearer is activated as the response to the stand-alone PDN CONNECTIVITY REQUEST message, the UE shall send the ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message alone.

If a WLAN offload indication information element is included in the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message, the UE shall store the WLAN offload acceptability values for this PDN connection and use the E-UTRAN offload acceptability value to determine whether this PDN connection is offloadable to WLAN or not.

The UE checks the PTI in the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message to identify the UE requested PDN connectivity procedure to which the default bearer context activation is related (see clause 6.5.1).

If the UE receives a serving PLMN rate control IE in the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message, the UE shall store the serving PLMN rate control IE value and use the stored serving PLMN rate control value as the maximum allowed limit of uplink User data container IEs included in ESM DATA TRANSPORT messages for the corresponding PDN connection in accordance with 3GPP TS 23.401 [10].

If the UE receives an APN rate control parameters container in the protocol configuration options IE or extended protocol configuration options IE in the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message, the UE shall store the APN rate control parameters value and use the stored APN rate control parameters value as the maximum allowed limit of uplink user data related to the APN indicated in the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message in accordance with 3GPP TS 23.401 [10]. If the UE has a previously stored APN rate control parameters value for this APN, the UE shall replace the stored APN rate control parameters value for this APN with the received APN rate control parameters value.

If the UE receives an additional APN rate control parameters for exception data container in the protocol configuration options IE or extended protocol configuration options IE in the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message, the UE shall store the additional APN rate control parameters for exception data value and use the stored additional APN rate control parameters for exception data value as the maximum allowed limit of uplink exception data related to the APN indicated in the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message in accordance with 3GPP TS 23.401 [10]. If the UE has a previously stored additional APN rate control parameters for exception data value for this APN, the UE shall replace the stored additional APN rate control parameters for exception data value for this APN with the received additional APN rate control parameters for exception data value.

If the UE receives a small data rate control parameters container in the protocol configuration options IE or the extended protocol configuration options IE in the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message, the UE shall store the small data rate control parameters value and use the stored small data rate control parameters value as the maximum allowed limit of uplink user data for the corresponding PDU session that becomes transferred after inter-system change from S1 mode to N1 mode in accordance with 3GPP TS 23.501 [58].

If the UE receives an additional small data rate control parameters for exception data container in the protocol configuration options IE or the extended protocol configuration options IE in the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message, the UE shall store the additional small data rate control parameters for exception data value and use the stored additional small data rate control parameters for exception data value as the maximum allowed limit of uplink exception data for the corresponding PDU session that becomes transferred after inter-system change from S1 mode to N1 mode in accordance with 3GPP TS 23.501 [58].

If the UE receives non-IP Link MTU parameter, Ethernet Frame Payload MTU parameter, IPv4 Link MTU parameter, or Unstructured Link MTU parameter of the protocol configuration options IE or of the extended protocol configuration options IE in the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message, the UE shall pass the received Non-IP Link MTU size, Ethernet Frame Payload MTU size, or IPv4 Link MTU size, or Unstructured Link MTU size to the upper layer.

NOTE 1: The Non-IP Link MTU and the IPv4 Link MTU size correspond to the maximum length of user data that can be sent either in the user data container in the ESM DATA TRANSPORT message or via S1-U interface.

NOTE 2: The Ethernet frame payload MTU size corresponds to the maximum length of a payload of an Ethernet frame that can be sent either in the user data container in the ESM DATA TRANSPORT message or via S1-U interface.

NOTE 3: A PDN connection of non-IP PDN type can be transferred to a PDU session of "Unstructured" PDU session type, thus the UE can request the unstructured link MTU parameter in the default EPS bearer context activation procedure. The unstructured link MTU size correspond to the maximum length of user data packet that can be sent either via the control plane or via N3 interface for a PDU session of the "Unstructured" PDU session type as specified in 3GPP TS 24.501 [54].

Upon receiving the DNS server security information, the UE shall pass it to the upper layer. The UE shall use this information to send the DNS over (D)TLS (See 3GPP TS 33.501 [24]).

NOTE 4: Support of DNS over (D)TLS is based on the informative requirements as specified in 3GPP TS 33.501 [24].

Upon receipt of the ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message, the MME shall enter the state BEARER CONTEXT ACTIVE and stop the timer T3485, if the timer is running. If the PDN CONNECTIVITY REQUEST message included a low priority indicator set to "MS is configured for NAS signalling low priority", the MME shall store the NAS signalling low priority indication within the default EPS bearer context.

The ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message, included in the ESM message container of the ATTACH ACCEPT message, can include an extended protocol configuration options IE containing the service-level-AA container with the length of two octets and

a) if the PDN connection is for USS communication, the service-level-AA container IE with the length of two octets:

1) contains service-level-AA response set to the value of the result for USS communication; and

2) contains service-level-AA payload; or

b) if the PDN connection is for both USS communication and C2 communication, the service-level-AA container with the length of two octets:

1) contains service-level-AA response set to the value of the result for the USS communication;

2) contains service-level-AA payload;

3) contains C2 pairing authorization result;

4) can contain C2 session security information;

5) can contain service-level device ID with the value set to a new CAA-level UAV ID; and

6) can contain the flight authorization information.

The ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message, is standalone (i.e. not included in the ESM message container of an ATTACH ACCEPT message), can include an extended protocol configuration options IE containing the service-level-AA container with the length of two octets. The service-level-AA container IE with the length of two octets:

a) contains C2 pairing authorization result;

b) can contain C2 session security information;

c) can contain service-level-ID with the value set to a new CAA-level UAV ID; and

d) can contain the flight authorization information.

If the service-level-AA container with the length of two octets contains a CAA-level UAV ID, the UE supporting UAS services, shall replace its currently stored CAA-level UAV ID with the new CAA-level UAV ID.

>>>>>>>>>> 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 clause 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 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 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 clause 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 Protocol configuration options IE or the Extended protocol configuration options IE in the PDN CONNECTIVITY REQUEST or ESM INFORMATION RESPONSE message and include the 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].

If the UE supporting UAS services, is attaching for UAS services, it shall establish a PDN connection for the USS communication. The UE shall include the extended protocol configuration option IE in the PDN CONNECTIVITY REQUEST message containing the service-level-AA container with the length of two octets and:

a) if the PDN connection is for USS communication, the service-level-AA container with the length of two octets:

1) shall include service-level-ID with the value set to CAA-level UAV ID of the UE; and

2) may include service-level-AA server address with the value set to the USS address;or

b) if the PDN connection is for USS communication and C2 communication, the service-level-AA container with the length of two octets:

1) shall include the service-level device ID with the value set to CAA-level UAV ID of the UE;

2) if available, shall include the identification information of UAV-C to pair;

3) may include the flight authorization information; and

4) may include the service-level-AA server address with the value set to the USS address.

The UE shall send the PDN CONNECTIVITY REQUEST message included in the ESM message container of an ATTACH REQUEST message towards the MME.

If the UE supporting UAS services, is already attached to the network and the UE attempts to establish a PDN connection for the UAV operation of C2 communication, the UE shall include the extended protocol configuration option IE in the PDN CONNECTIVITY REQUEST message containing the service-level-AA container with the length of two octets which:

a) shall include the service-level device ID with the value set to the CAA-level UAV ID of the UE;

b) if available, shall include the identification information of UAV-C to pair; and

c) may include the flight authorization information.

The UE shall send the PDN CONNECTIVITY REQUEST message towards the MME.

NOTE 4: The CAA-Level UAV ID, pairing information and flight authorization information are coded as described in 3GPP TS 24.501 [54].

Editor's note: Whether the identification information of UAV-C to pair is mandatory or optional if it is available is FFS.



Figure 6.5.1.2.1: UE requested PDN connectivity procedure

>>>>>>>>>> End of changes <<<<<<<<<<