**3GPP TSG-CT WG1 Meeting #129-eC1-212xxx**

**Electronic meeting, 19-23 April 2021**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **24.301** | **CR** | **3507** | **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 | **X** |

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| ***Title:*** | EPS bearer context modification for C2 communication | | | | | | | | | |
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| ***Source to WG:*** | Huawei, HiSilicon | | | | | | | | | |
| ***Source to TSG:*** | C1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | ID\_UAS | | | | |  | ***Date:*** | | | 2021-04-08 |
|  |  | | | |  | |  | | |  |
| ***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:*** | | About PDN connection used for C2 communication, following stage 2 requirements were specified in TS 23.256:  "*An UAV uses PDU Sessions or PDN Connections for communication with the USS and for C2 communication with a networked UAV-C.*"  "*An UAV may use either:*  *- a common PDU Session/PDN Connection for communication with the USS and C2 communication with the UAV-C, or*  *- separate PDU Sessions/PDN Connections for communication with the USS and C2 communication with the UAV-C respectively.*  *If a common PDU Session/PDN Connection is used, the UAV may establish the PDU Session/PDN Connection and enable the C2 communication during the same procedure, or the UAV may establish the PDU Session/PDN Connection for communication with the USS first* ***and then later enable the C2 communication using the PDU Session/bearer modification procedure.*** "  "*C2 authorization is performed during the PDU Session or PDN Connection establishment or modification procedure for UAV communication. If a single PDU Session or PDN Connection is used for both the communication with the USS and the C2 communication, the UAV - UAV-C pairing authorization by the USS may be performed together with the UUAA procedure during the PDU Session or PDN Connection establishment procedure, as described in clause 5.2.3; or, the UAV may initiate the UAV - UAV-C pairing authorization by requesting the EPS bearer context modification or EPS bearer modification after the PDU Session or PDN connection for UAV communication is established.*"  "*The UAV requests UAV - UAV-C pairing authorization by initiating EPS bearer context modification procedure and include a "C2 communication indication" in the request.*"  Based on above stage 2 requirements, following observations can be made in principle:   1. In case of a common PDN connection is used for communication with the USS and C2 communication but originally the PDN connection was established only for communication with the USS, the UE can request to modifiy the EPS bearer context of this PDN connection for C2 communication as well. 2. The UAV needs to indicate the purpose of the EPS bearer context modification for C2 communication to the netwrok during the EPS bearer context modification procedure.   To implement these observations in stage 3, it is better to define a new general ESM IE (named as "*ESM traffic type*") to indicate the purpose of the EPS bearer context modification for C2 communication.  The C2 pairing authorization needs also to be performed during such EPS bearer context modification procedure for C2 communication but due to currently it was not specified in TS 23.256, so this was captured as an EN for tracking in CT1. | | | | | | | | |
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| ***Summary of change:*** | | It proposes to implement above stage 2 requirements on EPS bearer context modification for C2 communication. | | | | | | | | |
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| ***Consequences if not approved:*** | | The stage 2 requirements on EPS bearer context modification for C2 communication are not implemented in stage 3. | | | | | | | | |
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| ***Clauses affected:*** | | 6.5.4.1, 6.5.4.2, 8.3.10.1, 8.3.10.xx (new) | | | | | | | | |
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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:*** | | The new ESM traffic type IE was defined in CR#3506. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

\* \* \* First Change \* \* \* \*

#### 6.5.4.1 General

The purpose of the UE requested bearer resource modification procedure is for a UE:

a) to request a modification, or release of bearer resources for a traffic flow aggregate;

b) to request a modification of a traffic flow aggregate by replacing packet filters or adding packet filters;

c) to re-negotiate header compression configuration associated to an EPS bearer context;

d) to indicate a change of 3GPP PS data off UE status for a PDN connection; or

e) to request a modification of bearer resources of a PDN connection for the UAV C2 communication as requested by the upper layers.

When requesting a modification of bearer resources for a traffic flow aggregate or a modification of a traffic flow aggregate, the UE can modify the existing GBR. If accepted by the network, this procedure invokes a dedicated EPS bearer context activation procedure (see subclause 6.4.2), an EPS bearer context modification procedure (see subclause 6.4.3), or an EPS bearer context deactivation procedure (see subclause 6.4.4).

If there is a PDN connection for emergency bearer services established, the UE shall not request a modification of bearer resources for this PDN connection.

When the UE requested bearer resource modification procedure is used to indicate a change of 3GPP PS data off UE status for a PDN connection (see subclause 6.3.10), the UE shall initiate the UE requested bearer resource modification procedure even if the timer T3396 or the back-off timer is running or is deactivated.

\* \* \* Next Change \* \* \* \*

#### 6.5.4.2 UE requested bearer resource modification procedure initiation

In order to request the modification of bearer resources for one traffic flow aggregate, the UE shall send a BEARER RESOURCE MODIFICATION REQUEST message to the MME, start timer T3481 and enter the state PROCEDURE TRANSACTION PENDING (see example in figure 6.5.4.2.1).

The UE shall include the EPS bearer identity of the EPS bearer associated with the traffic flow aggregate in the EPS bearer identity for packet filter IE.

To request a change of the GBR without changing the packet filter(s), the UE shall set the TFT operation code in the Traffic flow aggregate IE to "no TFT operation" and include the packet filter identifier(s) to which the change of the GBR applies in the Packet filter identifier parameter in the parameters list. The UE shall indicate the new GBR requested for the EPS bearer context in the Required traffic flow QoS IE.

To request a modification of a traffic flow aggregate, the UE shall set the TFT operation code in the Traffic flow aggregate IE to "Replace packet filters in existing TFT" or "Add packet filters to existing TFT". If the TFT operation code is set to "Add packet filters to existing TFT", the UE shall include in the parameter list one existing packet filter identifier to which the newly added packet filter(s) is linked. If the EPS bearer is a GBR bearer and the UE also wishes to request a change of GBR, the UE shall indicate the new GBR requested for the EPS bearer context in the Required traffic flow QoS IE.

To request a release of bearer resources, the UE shall set the TFT operation code in the Traffic flow aggregate IE to "Delete packet filters from existing TFT". If the EPS bearer is a GBR bearer and the UE does not request the release of all bearer resources, the UE shall indicate the new GBR requested for the EPS bearer context in the Required traffic flow QoS IE.

To request re-negotiation of header compression configuration associated to an EPS bearer context, the UE shall include the Header compression configuration IE in the BEARER RESOURCE MODIFICATION REQUEST message if the network indicated "Control plane CIoT EPS optimization supported" and "Header compression for control plane CIoT EPS optimization supported" in the EPS network feature support IE.

For a PDN connection established for the UAV communication with USS, as requested by the upper layers to request a modification of bearer resources of this PDN connection for the UAV C2 communication, the UE shall include the ESM traffic type IE in the BEARER RESOURCE MODIFICATION REQUEST message and shall set the IE to "UAV-USS communication and UAV C2 communication" (see 3GPP TS 23.256 [xx]).

Editor's note: It is FFS on whether the network can use other information to identify a PDN connection established for the UAV communication with USS is modified for the UAV-USS communication and UAV C2 communication.

Editor's note: It is FFS on how to perform the C2 pairing authorization during the UE requested bearer resource modification procedure.

After an inter-system change from N1 mode to S1 mode, if:

a) the UE is operating in single-registration mode and has received the interworking without N26 interface indicator set to "interworking without N26 interface not supported" from the network;

b) the PDN type value of the PDN type IE is set to "IPv4", "IPv6" or "IPv4v6";

c) the UE indicates "Control plane CIoT EPS optimization supported" and "Header compression for control plane CIoT EPS optimization supported" in the UE network capability IE of the TRACKING AREA UPDATE REQUEST message; and

d) the network indicates "Control plane CIoT EPS optimization supported" and "Header compression for control plane CIoT EPS optimization supported" in the EPS network feature support IE of the TRACKING AREA UPDATE ACCEPT message;

the UE shall send a BEARER RESOURCE MODIFICATION REQUEST message to the MME and include the Header compression configuration IE to negotiate the header compression configuration.

To indicate a change of 3GPP PS data off UE status associated to a PDN connection, the UE shall include the protocol configuration options IE in the BEARER RESOURCE MODIFICATION REQUEST message and set the 3GPP PS data off UE status only if:

- the network included the 3GPP PS data off support indication in the protocol configuration options IE in the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message when the PDN connection was established; or

- the PDU session was established when in N1 mode.

The UE behaves as described in subclause 6.3.10.

If the UE requests the modification of a traffic flow aggregate, which is assigned to a dedicated EPS bearer context, it shall ensure that at least one packet filter applicable for the uplink direction remains among the packet filters created on request from the UE in that TFT, or no own packet filters.

NOTE: If the UE requests the release of all bearer resources of a GBR bearer and includes a Required traffic flow QoS IE in the BEARER RESOURCE MODIFICATION REQUEST message, the network ignores the Required traffic flow QoS IE.

If the UE includes the Required traffic flow QoS IE, the UE shall set the QCI to the current QCI value of the EPS bearer context.

If the UE requests the release of bearer resources, the ESM cause value typically indicates one of the following:

#36: regular deactivation.



Figure 6.5.4.2.1: UE requested bearer resource modification procedure

For the NBIFOM procedures as defined in 3GPP TS 24.161 [36], the UE may send a BEARER RESOURCE MODIFICATION REQUEST message to the MME.

It is possible that the traffic flow aggregate IE is not needed in the following procedures:

- re-negotiation of header compression configuration associated to an EPS bearer context;

- indicating a change of 3GPP PS data off UE status associated to a PDN connection; or

- NBIFOM procedures.

If the traffic flow aggregate IE is not needed, the UE shall set:

- the length indicator of the Traffic flow aggregate IE to the value 1;

- the TFT operation code to "000";

- the E bit to zero; and

- the number of packet filters to zero.

\* \* \* Next Change \* \* \* \*

#### 8.3.10.1 Message definition

This message is sent by the UE to the network to request the modification of a dedicated bearer resource, or to request re-negotiation of header compression configuration associated to an EPS bearer context if the network has previously indicated support of Control plane CIoT EPS optimization and Header compression for control plane CIoT EPS optimization. See table 8.3.10.1.

Message type: BEARER RESOURCE MODIFICATION REQUEST

Significance: dual

Direction: UE to network

Table 8.3.10.1: BEARER RESOURCE MODIFICATION REQUEST message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | EPS bearer identity | EPS bearer identity  9.3.2 | M | V | 1/2 |
|  | Procedure transaction identity | Procedure transaction identity  9.4 | M | V | 1 |
|  | Bearer resource modification request message identity | Message type  9.8 | M | V | 1 |
|  | EPS bearer identity for packet filter | Linked EPS bearer identity  9.9.4.6 | M | V | 1/2 |
|  | Spare half octet | Spare half octet  9.9.2.9 | M | V | 1/2 |
|  | Traffic flow aggregate | Traffic flow aggregate description  9.9.4.15 | M | LV | 2-256 |
| 5B | Required traffic flow QoS | EPS quality of service  9.9.4.3 | O | TLV | 3-15 |
| 58 | ESM cause | ESM cause  9.9.4.4 | O | TV | 2 |
| 27 | Protocol configuration options | Protocol configuration options  9.9.4.11 | O | TLV | 3-253 |
| C- | Device properties | Device properties  9.9.2.0A | O | TV | 1 |
| 33 | NBIFOM container | NBIFOM container  9.9.4.19 | O | TLV | 3-257 |
| 66 | Header compression configuration | Header compression configuration  9.9.4.22 | O | TLV | 5-257 |
| 7B | Extended protocol configuration options | Extended protocol configuration options  9.9.4.26 | O | TLV-E | 4-65538 |
| 5C | Extended EPS QoS | Extended quality of service  9.9.4.30 | O | TLV | 12 |
| XX | ESM traffic type | ESM traffic type  9.9.4.xx | O | TV | 1 |

\* \* \* Next Change \* \* \* \*

#### 8.3.10.xx ESM traffic type

This IE shall be included in the message when the UE is requested by the upper layers to request a modification of bearer resources of a PDN connection for the UAV C2 communication.

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