**3GPP TSG-CT WG1 Meeting #136-eC1-223346**

**E-Meeting, 12th – 20th May 2022**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **24.193** | **CR** | **0096** | **rev** | **-** | **Current version:** | **17.4.1** |  |
|  | | | | | | | | |
| *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:*** | Addition of UE assistance data provisioning procedure supervision | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson | | | | | | | | | |
| ***Source to TSG:*** | C1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | ATSSS\_Ph2 | | | | |  | ***Date:*** | | | 2022-04-20 |
|  |  | | | |  | |  | | |  |
| ***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 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:*** | | Under UE assistance functionality for ATSSS the netwok can allow the UE (under conditions determined by the UE) to change the UL traffic distribution for the indicated SDF(s). Such change of UL distribution is of importance for the UE and can impact the service experience. In the UE assistance data provisioning procedure the UE informs the UPF of the change in UL traffic distribution and privides an indication of suggested DL distribution that the UPF can take in consideration for the distribution of corresponding DL traffic. UAD messages are delivered by the PMF protocol layer over user plane without any guaranteed delivery.  As the change of traffic distribution is of importance for the UE, it is also of importance that the UPF is informed in a reliable way,for possible DL traffic distribution alignment. It is therefore proposed to add supervision of the UE assistance data provisioning procedure so that the UE can retry informing the UPF of traffic distribution under UE assistance, if messages are lost.  Further Message type table in 6.2.2.1 has been corrected to list messages in code point order.  It should be noted that only upon receiving the acknowledgement from the UPF, the UE can know that change in traffic distribution has been received. At missing acknowledgement, the UE cannot conclude whether the PMFP UAD provisioning message reached the UPF or not (UL or DL message lost). Therefore, after initiating the first attempt, it is proposed that a retransmission scheme following legacy principles of e.g. NAS is followed and a maximum of five retransmissions is specified. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Addition of a PMFP UAD PROVISIONING COMPLETE message to inform the UE of a successfully received PMFP UAD PROVISIONING message.  UE retransmission timer of receiving a PMFP UAD PROVISIONING COMPLETE message.  UE retransmission behavior at retransmission timer timeout. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The UE is not aware of whether a change in draffic distribution was considered at the UPF or not and traffic distribution may be misaligned UL and DL. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.4.8.1, 5.4.8.2, 5.4.8.3 (new), 5.4.8.x (new), 6.2.1.1, 6.2.1.6.1, 6.2.1.x (new), 6.2.1.x.1 (new), 6.2.2.1, 7.2, 8.3.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

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

### 5.4.8 UE assistance data provisioning procedure

#### 5.4.8.1 General

The purpose of the UE assistance data provisioning procedure is to enable the UE to provide to the UPF a DL traffic distribution that can be applied by the UPF for all DL traffic that applies to the UE assistance operation.

If the UE has received the UE assistance indicator in an ATSSS rule and decides to apply for an SDF a UL traffic distribution different from the default UL traffic distribution indicated in the load balancing steering mode of the ATSSS rule, the UE sends a PMFP UAD provisioning message to the UPF.

NOTE 1: It is based on UE implementation that how the UE decides to apply a different UL traffic distribution for an SDF and how the corresponding DL traffic distribution is decided.

NOTE 2: Once the UE assistance data provisioning procedure is successfully completed, if the UE receives updated ATSSS rules in which the value of the load balancing percentages adjustment operation filed is changed from "UE assistance operation is allowed" to other values, the UE needs to turn to apply immediately the UL traffic distribution for the SDF indicated in the updated ATSSS rules.

#### 5.4.8.2 UE assistance data provisioning procedure initiation

In order to initiate a UE assistance data provisioning procedure over an access of an MA PDU session, the UE shall:

a) allocate an EPTI value as specified in clause 5.4.2.2;

b) create a PMF UAD PROVISIONING message;

c) set the EPTI IE of the PMFP UAD PROVISIONING message to the allocated EPTI value; and

d) include the DL distribution information IE with a DL traffic distribution that can be applied by the UPF for all DL traffic that applies to the UE-assistance operation.

Upon sending the PMFP UAD PROVISIONING message the UE shall start a timer T10x.

The UE in the PMFP UAD provisioning message includes DL distribution information.



Figure 5.4.8.2-1: UE assistance data provisioning procedure

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

#### 5.4.8.3 UE assistance data received by the network

On receipt of a PMFP UAD PROVISIONING message, the UPF may use the information in the received PMF UAD PROVISIONING message to align the DL traffic distribution for all DL traffic that applies to the UE-assistance operation. Furthermore, the UPF shall create a PMFP UAD PROVISIONING COMPLETE message. In the PMFP UAD PROVISIONING COMPLETE message, the UPF shall set the EPTI IE to the EPTI value in the PMFP UAD PROVISIONING message. The UPF shall send the PMFP UAD PROVISIONING COMPLETE message over the access of the MA PDU session via which the PMFP UAD PROVISIONING message was received.

Editor's note (WI ATSSS\_Ph2, CR#0096): Further content of PMFP UAD PROVISIONING COMPLETE message may be needed upon stage-2 updates.

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

#### 5.4.8.x Abnormal cases in the UE

The following abnormal cases can be identified:

a) Expiry of the timer T10x

The UE shall, on the first expiry of the timer T10x, retransmit the PMFP UAD PROVISIONING message and shall reset and start timer T10x. This retransmission is repeated up to four times, i.e. on the fifth expiry of timer T10x, the UE shall abort the procedure.

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

#### 6.2.1.1 General

The following PMFP messages are specified:

- PMFP echo request;

- PMFP echo response;

- PMFP access report;

- PMFP acknowledgement;

- PMFP UAD provisioning;

- PMFP UAD provisioning complete;

- PMFP UAT command;

- PMFP UAT complete;

- PMFP PLR count request;

- PMFP PLR count response;

- PMFP PLR report request; and

- PMFP PLR report response.

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

##### 6.2.1.6.1 Message definition

The PMFP UAD PROVISIONING message is sent by the UE to provide UE assistance data to the UPF.

See table 6.2.1.6.1-1.

Message type: PMFP UAD PROVISIONING

Significance: dual

Direction: UE to network

Table 6.2.1.6.1-1: PMFP UAD PROVISIONING message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | PMFP UAD provisioning message identity | Message type  6.2.2.1 | M | V | 1 |
|  | EPTI | Extended procedure transaction identity  6.2.2.2 | M | V | 2 |
|  | DL distribution information | DL distribution information  6.2.2.8 | M | V | 1 |

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

#### 6.2.1.x PMFP UAD provisioning complete

##### 6.2.1.x.1 Message definition

The PMFP UAD PROVISIONING COMPLETE message is sent by the UPF to the UE as response to PMFP UAD PROVISIONING message.

See table 6.2.1.x.1-1.

Message type: PMFP UAD PROVISIONING COMPLETE

Significance: dual

Direction: network to UE

Table 6.2.1.x.1-1: PMFP UAD PROVISIONING COMPLETE message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | PMFP UAD provisioning complete message identity | Message type  6.2.2.1 | M | V | 1 |
|  | EPTI | Extended procedure transaction identity  6.2.2.2 | M | V | 2 |

Editor's note (WI ATSSS\_Ph2, CR#0096): Further content of PMFP UAD PROVISIONING COMPLETE message may be needed upon stage-2 updates.

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

#### 6.2.2.1 Message type

Message type is a type 3 information element with length of 1 octet.

Table 6.2.2.1-1 defines the value part of the message type IE used in the PMFP.

Table 6.2.2.1-1: Message type

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| Bits | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | | | 7 | | | 6 | | | 5 | | | 4 | | | 3 | | | 2 | | | 1 | | | | | |  |  | | |
| 0 | | | 0 | | | 0 | | | 0 | | | 0 | | | 0 | | | 0 | | | 1 | | |  | | | | PMFP ECHO REQUEST message | | |
| 0 | | | 0 | | | 0 | | | 0 | | | 0 | | | 0 | | | 1 | | | 0 | | |  | | | | PMFP ECHO RESPONSE message | | |
| 0 | | | 0 | | | 0 | | | 0 | | | 0 | | | 0 | | | 1 | | | 1 | | |  | | | | PMFP ACCESS REPORT message | | |
| 0 | | | 0 | | | 0 | | | 0 | | | 0 | | | 1 | | | 0 | | | 0 | | |  | | | | PMFP ACKNOWLEDGEMENT message | | |
| 0 | | | 0 | | | 0 | | | 0 | | | 0 | | | 1 | | | 0 | | | 1 | | |  | | | | PMFP PLR COUNT REQUEST message | | |
| 0 | | | 0 | | | 0 | | | 0 | | | 0 | | | 1 | | | 1 | | | 0 | | |  | | | | PMFP PLR COUNT RESPONSE message | | |
| 0 | | | 0 | | | 0 | | | 0 | | | 1 | | | 0 | | | 0 | | | 1 | | |  | | | | PMFP UAD PROVISIONING message | | |
| 0 | | | 0 | | | 0 | | | 0 | | | 0 | | | 1 | | | 1 | | | 1 | | |  | | | | PMFP PLR REPORT REQUEST message | | |
| 0 | | | 0 | | | 0 | | | 0 | | | 1 | | | 0 | | | 0 | | | 0 | | |  | | | | PMFP PLR REPORT RESPONSE message | | |
| 0 | | | 0 | | | 0 | | | 0 | | | 1 | | | 0 | | | 1 | | | 0 | | |  | | | | PMFP UAT COMMAND message | | |
| 0 | | | 0 | | | 0 | | | 0 | | | 1 | | | 0 | | | 1 | | | 1 | | |  | | | | PMFP UAT COMPLETE message | | |
| 0 | | | 0 | | | 0 | | | 0 | | | 1 | | | 1 | | | 0 | | | 0 | | |  | | | | PMFP UAD PROVISIONING COMPLETE message | | |
|  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| All other values are reserved | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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

## 7.2 Timers of performance measurement function (PMF) protocol (PMFP)

Timers of PMFP are shown in table 7.2-1 and table 7.2-2.

Table 7.2-1: Timers of PMFP – UE side

| TIMER NUM. | | TIMER VALUE | | CAUSE OF START | | NORMAL STOP | | ON  THE  1st, 2nd, 3rd, 4th EXPIRY (NOTE 1) | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| T101 | | 1s | | Transmission of the first PMFP ECHO REQUEST message | | A PMFP ECHO RESPONSE message received for each sent PMFP ECHO REQUEST message | | Abort of the procedure. | |
| T102 | | NOTE 2 | | Transmission of PMFP ACCESS REPORT message | | PMFP ACKNOWLEDGEMENT message with the same EPTI is received | | Retransmission of PMFP ACCESS REPORT message | |
| T103 | | 1s | | Transmission of PMFP PLR COUNT REQUEST message | | PMFP PLR COUNT RESPONSE message with the same EPTI is received | | Abort of the procedure. | |
| T104 | | 1s | | Transmission of PMFP PLR REPORT REQUEST message | | PMFP PLR REPORT RESPONSE message with the same EPTI is received | | Abort of the procedure. | |
| T105 | | 1s | | Transmission of PMFP UAT COMMAND message | | PMFP UAT COMPLETE message with the same EPTI is received | | Retransmission of PMFP UAT COMMAND message | |
| T10x | | 1s | | Transmission of PMFP UAD PROVISIONING message | | PMFP UAD PROVISIONING COMPLETE message with the same EPTI is received | | Retransmission of PMFP UAD PROVISIONING message | |
| NOTE 1: Typically, the procedures are aborted on the fifth expiry of the relevant timer. Exceptions are described in the corresponding procedure description.  NOTE 2: Initial timer value is 500 milliseconds. The timer value doubles after each timer expiry, until set to 4 seconds. | | | | | | | | | |

Table 7.2-2: Timers of PMFP – UPF side

| TIMER NUM. | | TIMER VALUE | | CAUSE OF START | | NORMAL STOP | | ON  THE  1st, 2nd, 3rd, 4th EXPIRY (NOTE 1) | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| T201 | | NOTE 2 | | Transmission of the first PMFP ECHO REQUEST message | | A PMFP ECHO RESPONSE message received for each sent PMFP ECHO REQUEST message | | Abort of the procedure. | |
| T203 | | 1s | | Transmission of PMFP PLR COUNT REQUEST message | | PMFP PLR COUNT RESPONSE message with the same EPTI is received | | Abort of the procedure. | |
| T204 | | 1s | | Transmission of PMFP PLR REPORT REQUEST message | | PMFP PLR REPORT RESPONSE message with the same EPTI is received | | Abort of the procedure. | |
| NOTE 1: Typically, the procedures are aborted on the fifth expiry of the relevant timer. Exceptions are described in the corresponding procedure description.  NOTE 2: The value of this timer is network dependent. | | | | | | | | | |

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

### 8.3.1 Extended procedure transaction identity (EPTI)

The following network procedures shall apply for handling an unknown, erroneous, or unforeseen EPTI received in a PMFP message:

a) In case the network receives a PMFP ECHO RESPONSE message in which the EPTI value does not match any EPTI in use, the network shall ignore the PMFP message.

The following UE procedures shall apply for handling an unknown, erroneous, or unforeseen EPTI received in a PMFP message:

a) In case the UE receives a PMFP ECHO RESPONSE message, a PMFP UAD PROVISIONING COMPLETE message, a PMFP UAT COMPLETE message or a PMFP ACKNOWLEDGEMENT message in which the EPTI value does not match any EPTI in use, the UE shall ignore the PMFP message.

\* \* \* End of Changes \* \* \* \*