**3GPP TSG-CT WG1 Meeting #133-eC1-216976**

**E-meeting, 11-19 November 2021**

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| *9CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **24.193** | **CR** | **0064** | **rev** | **3** | **Current version:** | **17.2.0** |  |
|  | | | | | | | | |
| *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:*** | Termination of UE assistance mode | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei, HiSilicon | | | | | | | | | |
| ***Source to TSG:*** | C1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | ATSSS\_Ph2 | | | | |  | ***Date:*** | | | 2021-11-15 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | |  |
|  | *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:*** | | 3GPP TS 23.501 has been updated with regards to the UE Assistance Data so that it is described how to terminate the UE-assistance operation.  Clause 5.32.5.5. of TS 23.501 states, quote:  - If the UE decides to terminate the UE assistance operation, the UE may send a PMF-UAT (UE Assistance Termination) message to the UPF indicating that the UE assistance operation is terminated and the UE performs the UL traffic distribution according to the ATSSS rule received from the network. If the UPF receives the PMF-UAT message, the UPF removes DL steering rule created for UE assitance operation.  In addition to that, SA2 has agreed the CR in S2-2107830 which should also be considered as it updates TS 23.501 for the UE-assistance operation.  Hence, TS 24.193 needs to be updated to allow the UE sending a PMF-UAT (UE Assistance Termination) message to the UPF.  A PMFP UAD response message seems missing for the PMFP UAD provisioning message. Firstly, the UE should know if the UAD provisioning message is received by the UPF or not. This correct the protocol part of the UE assistance data provisioning procedure, so if the PMFP UAD reponse message is not received, the UE may treat PMFP UAD provisioning message as lost and then it should have the chance to resend it again. However, the network should protect from continuous resending as done by other protocols, so a timer should be able to be sent from the UPF to avoid the UE to continuously send the same UAS provisioning message (request).  Secondly, the PMFP UAD response message could include an indication on whether the UPF aligns the DL traffic distribution or not. In other words, if the UPF rejects to align the DL distribution based on the UE request, the UE will not send PMFP UAD provisioning message again, and also there is no need to send the PMPF UAT (UE assistance data termination) message either. | | | | | | | | |
| ***6.2.2.8*** | |  | | | | | | | | |
| ***Summary of change:*** | | A new procedure and related message is introduce to allow the UE informing the UPF of the termination of the UE-assistance operation. A PMPF UAD response message is added to complete the protocol part of the UE assistance data provisioning procedure. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Not alignment with stage 2 requirements in TS 23.501. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 2, 3.2, 5.4.8.1, (new) 5.4.a, (new) 5.4.a.1, (new) 5.4.a.2, 6.2.1.1, (new) 6.2.1.b, (new) 6.2.1.b.1, (new) 6.2.1.c, (new) 6.2.1.c.1, 6.2.2.1, (new) 6.2.2.d, (new) 6.2.2.f, (new) 6.2.2.g | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 \* \* \* \*

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 23.501: "System Architecture for the 5G System; Stage 2".

[3] 3GPP TS 23.502: "Procedures for the 5G System; Stage 2".

[4] 3GPP TS 23.316: "Wireless and wireline convergence access support for the 5G System (5GS)".

[5] 3GPP TS 24.526: "UE policies for 5G System (5GS); Stage 3".

[6] 3GPP TS 24.501: "Non-Access-Stratum (NAS) protocol for 5G System (5GS); Stage 3".

[7] 3GPP TS 24.502: "Access to the 3GPP 5G System (5GS) via non-3GPP access networks; Stage 3".

[8] IETF RFC 8684: "TCP Extensions for Multipath Operation with Multiple Addresses".

[9] IETF RFC 8803: "0-RTT TCP Convert Protocol".

[10] 3GPP TS 24.301: "Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3".

[11] IEEE Std 802-2014: "IEEE Standard for Local and Metropolitan Area Networks: Overview and Architecture".

[12] IEEE 802.3-2018: "IEEE Standard for Ethernet".

[13] 3GPP TS 24.007: "Mobile radio interface signalling layer 3; General aspects".

[14] 3GPP TS 33.501: "Security architecture and procedures for 5G system".

[15] 3GPP TS 37.324: "E-UTRA and NR; Service Data Adaptation Protocol (SDAP) specification".

[16] 3GPP TS 29.244: "Interface between the Control Plane and the User Plane Nodes; Stage 3".

[r24008] 3GPP TS 24.008: "Mobile Radio Interface Layer 3 specification; Core Network Protocols; Stage 3".

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

## 3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

5G-RG 5G Residential Gateway

ATSSS Access Traffic Steering, Switching, Splitting

ATSSS-LL ATSSS Low-Layer

LADN Local Area Data Network

MA PDU Multi-Access PDU

MAI Measurement Assistance Information

MPTCP Multi-Path TCP Protocol

PDU Protocol Data Unit

PLR Packet Loss Rate

PMF Performance Measurement Function

QFI QoS Flow Identifier

RTT Round Trip Time

SA PDU Single-Access PDU

SDF Service Data Flow

UAD UE Assistance Data

UAT UE Assistance data Termination

UPF User Plane Function

URSP UE Route Selection Policy

\* \* \* Next 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 the UL traffic distribution applied by the UE for a particular SDF.

If the UE receives 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: It is based on UE implementation that how the UE decides to apply a different UL traffic distribution for an SDF.

The UE in the PMFP UAD provisioning message includes:

a) correlation information; and

b) UL distribution information.

The UPF in the PMFP UAD response message includes:

a) DL distribution alignment information. It indicates on whether the UPF aligns the DL traffic distribution or not based on the UE request. If the UPF rejects the alignment, a Back-off timer value IE is included.

If the UE receives the PMFP UAD response message including a rejection indication, the UE shall not resend the PMFP UAD provisioning message again before the Back-off timer has expired.

Editor's note: The details of the correlation information and UL distribution information are FFS waiting the conclusions from SA2.



Figure 5.4.8.1-1: UE assistance data provisioning procedure

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

### 5.4.a UE assistance data termination procedure

#### 5.4.a.1 General

The purpose of the UE assistance data termination procedure is to enable the UE to inform the UPF that the UE assistance data operation is terminated and the UE performs UL traffic distribution according to load balancing percentages of the ATSSS rule received from the network.

If the UE decides to terminate the UE assistance data operation and instead use the percentage of the SDF traffic transmitted over 3GPP access and non-3GPP access indicated in the load balancing steering mode of the ATSSS rule, the UE sends a PMFP UAT command message to the UPF.

NOTE: It is based on UE implementation how the UE decides to terminate applying UL traffic distribution different from the the percentage of the SDF traffic transmitted over 3GPP access and non-3GPP access indicated in the load balancing steering mode of the ATSSS rule.



Figure 5.4.a.1-1: UE assistance data termination procedure

#### 5.4.a.2 UE assistance data termination received by the network

On receipt of a PMFP UAT command message, the UPF shall remove the DL traffic steering rule, if one has been created for UE assitance data operation and shall perform DL traffic distribution according to the load balancing percentages of the MAR rules.

\* \* \* 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 response;

- PMFP UAT command;

- PMFP PLR count request;

- PMFP PLR count response;

- PMFP PLR report request; and

- PMFP PLR report response.

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

#### 6.2.1.b PMFP UAT command

##### 6.2.1.b1 Message definition

The PMFP UAT COMMAND message is sent by the UE to the UPF in order to terminate the UE assistance operation to the UPF.

See table 6.2.1.b.1-1.

Message type: PMFP UAT COMMAND

Significance: dual

Direction: UE to network

Table 6.2.1.b.1-1: PMFP UAT COMMAND message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | PMFP UAT command message identity | Message type  6.2.2.1 | M | V | 1 |

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

#### 6.2.1.c PMFP UAD response

##### 6.2.1.c.1 Message definition

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

See table 6.2.1.c.1-1.

Message type: PMFP UAD response

Significance: dual

Direction: network to UE

Table 6.2.1.c.1-1: PMFP UAD response message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | PMFP UAD response message identity | Message type  6.2.2.1 | M | V | 1 |
|  | DL distribution information | DL distribution information  6.2.2.d | M | TV | 1 |
|  | Back-off timer value | GPRS timer 3  6.2.2.g | O | TLV | 3 |

\* \* \* 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

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 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 | | 1 | | 0 | | 0 | | 1 | |  | | | PMFP UAD PROVISIONING 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 | | 0 | | 1 | | 1 | | 1 | |  | | | PMFP PLR REPORT REQUEST message | |
| 0  0 | | 0  0 | | 0  0 | | 0  0 | | 1  1 | | 0  0 | | 0  0 | | 0  1 | |  | | | PMFP PLR REPORT RESPONSE message  PMFP UAD RESPONSE message | |
| 0 | | 0 | | 0 | | 0 | | 1 | | 0 | | 1 | | 0 | |  | | | PMFP UAT COMMAND message | |
|  | | | | | | | | | | | | | | | | | | | | |
| All other values are reserved | | | | | | | | | | | | | | | | | | | | |

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

#### 6.2.1.d PMFP UAD response

##### 6.2.1.d.1 Message definition

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

See table 6.2.1.d.1-1.

Message type: PMFP UAD response

Significance: dual

Direction: network to UE

Table 6.2.1.d.1-1: PMFP UAD response message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | PMFP UAD response message identity | Message type  6.2.2.1 | M | V | 1 |
|  | DL distribution information | DL distribution information  6.2.2.f | M | TV | 1 |
|  | Back-off timer value | Back-off timer  6.2.2.g | O | TLV | 3 |

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

#### 6.2.2.f DL distribution result

The purpose of the DL distribution result information element is to indicate whether the UPF aligns the DL traffic distribution based on the UE request.

The DL distribution result is a type 1 information element.

The DL distribution result information element is coded as shown in figure 6.2.2.f-1 and table 6.2.2.f-1.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | | 4 | 3 | | 2 | | | 1 |  |
| DL distribution result IEI | | | | 0  spare | | | 0  spare | | 0  spare | DDR | | octet 1 |

Figure 6.2.2.f -1: DL distribution result information element

Table 6.2.2.f-1: DL distribution resut information element

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| DL Distribution Result (DDI) (octet 1, bit 1) | | | | |
| Bit | | | | |
| 1 |  |  |  |  |
| 0 |  |  |  | The UPF aligns the DL distribution traffic based on the UE request |
| 1 |  |  |  | The UPF rejects to align DL distribution traffic |
|  | | | | |

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

#### 6.2.2.g Back-off timer

The purpose of the Back-off timer information element is included in the PMFP UAD response message if the UPF rejects to align the DL distribution traffic based on the UE request.

The Back-off timeris a type 4 information element with 3 octets length.

The Back-off timer information element is coded as the GPRS timer 3 information element in 3GPP TS 24.008 [r24008] subclause 10.5.7.4a.

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