**3GPP TSG-CT WG1 Meeting #131-eC1-21XXXX**

**E-meeting, 19-27 August 2021**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **24.193** | **CR** | **0048** | **rev** | **2** | **Current version:** | **17.1.0** |  |
|  | | | | | | | | |
| *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:*** | Measurement performance per QoS flow | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Lenovo, Motorola Mobility, Nokia, Nokia Shanghai Bell | | | | | | | | | |
| ***Source to TSG:*** | C1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | ATSSS\_Ph2 | | | | |  | ***Date:*** | | | 2021-08-19 |
|  |  | | | |  | |  | | |  |
| ***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:*** | | Stage 2 has defined access performance measurements based on target QoS flow used by the service data flow (SDF) traffic, if the UE is capable of it. This is an addition to what which has been used i.e. default QoS flow. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Added QFI to the abbreviation.  Added requirements to describe the behavior of the UE and the UPF about when to perform the access performance measurements based on target QoS flow or default QoS flow.  Added a new indicator for the measurement assistance information that the UE performs the measurements based on target QoS flow.  Added SMF providing the UE by the MAI, a QoS flow list for the access performance measurements per target QoS flow. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Stage 3 has not been implemented for the new feature based on target QoS flow. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 3.2, 4.4, 6.1.5.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 -----------------------------------

## 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

UPF User Plane Function

URSP UE Route Selection Policy

---------------------------------- NEXT CHANGE -----------------------------------

## 4.4 Support of access performance measurements

The ATSSS capable UE can perform access performance measurements to decide how to distribute traffic over 3GPP access and non-3GPP access. The access performance measurements can be performed by using the QoS flow(s) of default QoS rule. Based on the UE capability that the UE has indicated to the network, the access performance measurements can also be performed by using the QoS flows of non-default QoS rules.

An ATSSS capable UE receives MAI from the SMF during the PDU session establishment procedure for an MA PDU session as described in clause 5.32.5 of 3GPP TS 23.501 [2]. The MAI can contain the addressing information of the PMF in the UPF, as well as an indicator on whether access availability/unavailability reports need to be sent to the network. If the UE indicates to the network the capability to perform the access performance measurements by using the QoS flows of non-default QoS rules, the MAI can also indicate to the UE that the performance measurement is for the QoS flows of non-default QoS rules and therefore include a QoS flow list for which, the measurements are to be performed. The encoding of the MAI is specified in clause 6.1.5.

An ATSSS capable UE that supports the MPTCP steering functionality can use the measurements available at the MPTCP layer.

The following PMF protocol messages can be exchanged between the PMF in the UE and the PMF in the UPF:

a) messages for RTT measurements, only applicable for the ATSSS-LL steering functionality;

b) messages for reporting access availability/unavailability by the UE to the UPF;

c) messages for PLR measurements, only applicable for the ATSSS-LL steering functionality; or

d) messages for UAD provisioning from the UE to the UPF.

An ATSSS capable UE does not apply the ATSSS rules to the PMF protocol messages.

The performance measurement function protocol procedures are specified with following procedures:

a) UE-initiated RTT measurement (see clause 5.4.3);

b) Network-initiated RTT measurement (see clause 5.4.4);

c) UE-initiated PLR measurement (see clause 5.4.6);

d) Network-initiated PLR measurement (see clause 5.4.7); and

e) UE assistance data provisioning procedure (see clause 5.4.8).

The access availability/unavailability procedures are specified in clause 5.4.5.

---------------------------------- NEXT CHANGE -----------------------------------

#### 6.1.5.2 Encoding of measurement assistance information

The measurement assistance information contains addressing information for the PMF in the UPF and is encoded as shown in figure 6.1.5.2-1 and figure 6.1.5.2-2 and table 6.1.5.2-1 and table 6.1.5.2-2.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| PMF IP address type | | | | | | | | octet a+1 |
| PMF IP address | | | | | | | | octet a+2  octet b-5 |
| PMF 3GPP port | | | | | | | | octet b-4  octet b-3 |
| PMF non-3GPP port | | | | | | | | octet b-2  octet b-1 |
| 0  Spare | 0  Spare | 0  Spare | 0  Spare | 0  Spare | 0  Spare | APMQF | AARI | octet b |
| QoS flow list | | | | | | | | octet b+1\*  octet c\* |

Figure 6.1.5.2-1: ATSSS parameter contents including one PMF IP address information

Table 6.1.5.2-1: PMF IP address type

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PMF IP address type (octet a+1) is set as follows:  Bits | | | | | | | | | | | |
| 8 | | 7 | | 6 | 5 | 4 | 3 | 2 | 1 |  |  |
| 0 | | 0 | | 0 | 0 | 0 | 0 | 0 | 1 |  | IPv4 |
| 0 | | 0 | | 0 | 0 | 0 | 0 | 1 | 0 |  | IPv6 |
| 0 | | 0 | | 0 | 0 | 0 | 0 | 1 | 1 |  | IPv4IPv6 |
| All other values are spare. | | | | | | | | | | | |
|  | | | | | | | | | | | |
| If the PMF IP address type indicates IPv4, then the PMF IP address field contains an IPv4 address in 4 octets. | | | | | | | | | | | |
|  | | | | | | | | | | | |
| If the PMF IP address type indicates IPv6, then the PMF IP address field contains an IPv6 address in 16 octets. | | | | | | | | | | | |
|  | | | | | | | | | | | |
| If the PMF IP address type indicates IPv4IPv6, then the PMF IP address field contains two IP addresses. The first PMF IP address is an IPv4 address in 4 octets and the second PMF IP address is an IPv6 address in 16 octets. | | | | | | | | | | | |
|  | | | | | | | | | | | |
| PMF 3GPP port (octets b-4 – b-3) is allocated port number associated with the 3GPP access network and is dedicated for the QoS flow of the default QoS flow. | | | | | | | | | | | |
|  | | | | | | | | | | | |
| PMF non-3GPP port (octets b-2 – b-1) is allocated port number associated with the non-3GPP access network and is dedicated for the QoS flow of the default QoS flow. | | | | | | | | | | | |
|  | | | | | | | | | | | |
| AARI (access availability reporting indicator) (octet b, bit 1) is set as follows:  Bit | | | | | | | | | | | |
| **1** | | |  | | | | | | | | |
| 0 | | | Do not report the access availability (NOTE 1) | | | | | | | | |
| 1 | | | Report the access availability | | | | | | | | |
|  | | | | | | | | | | | |
| APMQF (access performance measurements per QoS flow indicator) (octet b, bit 2) is set as follows (NOTE 2):  Bit | | | | | | | | | | | |
| **1** | | |  | | | | | | | | |
| 0 | | | Perform access performance measurements using default QoS rule. | | | | | | | | |
| 1 | | | Perform access performance measurements using non-default QoS rule. | | | | | | | | |
|  | | | | | | | | | | | |
| QoS flow list is according to figure 6.1.5.2-3, figure 6.1.5.2-4 and table 6.1.5.2-3. | | | | | | | | | | | |
|  | | | | | | | | | | | |
| NOTE 1: Even if AARI is set to "Do not report the access availability" during the MA PDU session establishment procedure, the UE still needs to perform access availability or unavailability report procedure over an access immediately after the MA PDU session is established to enable the UPF to determine the UDP port of the PMF in the UE or the UDP port and the IPv6 address of the PMF in the UE, as specified in clause 5.4.2.1.1.  NOTE 2: If APMQF is set to "Perform access performance measurements using default QoS rule.", the UE shall use octets b-4 and b-3 for PMF 3GPP port and octets b-2 and b-1 for PMF non-3GPP port and the UE shall ignore the QoS flow list, if provided. If APMQF is set to "Perform access performance measurements using non-default QoS rule." the UE shall use the information provided by the QoS flow list to perform the access performance measurements using the QoS flow of the non-default QoS rule. | | | | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| PMF 3GPP MAC address | | | | | | | | octet a+1  octet a+6 |
| PMF non-3GPP MAC address | | | | | | | | octet a+7  octet a+12 |
| 0  Spare | 0  Spare | 0  Spare | 0  Spare | 0  Spare | 0  Spare | APMQF | AARI | octet a+13 |
| QoS flow list | | | | | | | | octet a+14\*  octet b\* |

Figure 6.1.5.2-2: ATSSS parameter contents including one PMF MAC address information

Table 6.1.5.2-2: PMF MAC address type

|  |  |  |
| --- | --- | --- |
| PMF 3GPP MAC address contains a 6 octet MAC address associated with the 3GPP access network and is dedicated for the QoS flow of the default QoS flow. | | |
|  | | |
| PMF non-3GPP MAC address contains a 6 octet MAC address associated with the non-3GPP access network and is dedicated for the QoS flow of the default QoS flow. | | |
|  | | |
| AARI (access availability reporting indicator) (octet a+13, bit 1) is set as follows:  Bit | | |
| **1** | |  |
| 0 | | Do not report the access availability (NOTE 1) |
| 1 | | Report the access availability |
|  | | |
| APMQF (access performance measurements per QoS flow indicator) (octet a+13, bit 2) is and set as follows (NOTE 2):  Bit | | |
| **1** | |  |
| 0 | | Perform access performance measurements using default QoS rule. |
| 1 | | Perform access performance measurements using non-default QoS rule. |
|  | | |
| QoS flow list is according to figure 6.1.5.2-3, figure 6.1.5.2-5 and table 6.1.5.2-3. | | |
|  | | |
| NOTE 1: Even if AARI is set to "Do not report the access availability" during the MA PDU session establishment procedure, the UE still needs to perform access availability or unavailability report procedure over an access immediately after the MA PDU session is established to enable the UPF to determine the MAC address of the PMF in the UE as specified in clause 5.4.2.1.2.  NOTE 2: If APMQF is set to "Perform access performance measurements using default QoS rule.", the UE shall use octets a+1 through a+6 for PMF 3GPP MAC address and octets a+7 and a+12 for PMF non-3GPP MAC address and the UE shall ignore the QoS flow list, if provided. If APMQF is set to "Perform access performance measurements using non-default QoS rule." the UE shall use the information provided by the QoS flow list to perform the access performance measurements using the QoS flow of the non-default QoS rule. | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of QoS flow contents | | | | | | | | octet 1 |
| QoS flow 1 | | | | | | | | octet 2  octet k |
| … | | | | | | | | octet k+1\*  octet m-1\* |
| QoS flow n | | | | | | | | octet m\*  octet n\* |

Figure 6.1.5.2-3: QoS flow list information element

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | | 6 | 5 | 4 | 3 | 2 | 1 |  |
| 0 Spare | | 0 Spare | QFI | | | | | | octet p |
| PMF 3GPP port | | | | | | | | | octet p+1  octet p+2 |
| PMF non-3GPP port | | | | | | | | | octet p+3  octet p+4 |

Figure 6.1.5.2-4: QoS flow – IP address

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | | 6 | 5 | 4 | 3 | 2 | 1 |  |
| 0 SpareI | | 0 Spare | QFI | | | | | | octet p |
| PMF 3GPP MAC address | | | | | | | | | octet p+1  octet p+6 |
| PMF non-3GPP MAC address | | | | | | | | | octet p+7  octet p+12 |

Figure 6.1.5.2-5: QoS flow – MAC address

Table 6.1.5.2-3: QoS flow

|  |
| --- |
| QFI is defined in Table 9.11.4.12.1 of 3GPP TS 24.501 [6]. |
|  |
| PMF 3GPP port contains a 2 octet port number, associated with the 3GPP access network for the target QoS flow. |
|  |
| PMF non-3GPP port contains a 2 octet port number, associated with the non-3GPP access network for the target QoS flow. |
|  |
| PMF 3GPP MAC address contains a 6 octet MAC address, ssociated with the 3GPP access network for the target QoS flow. |
|  |
| PMF non-3GPP MAC address contains a 6 octet MAC address, ssociated with the non-3GPP access network for the target QoS flow. |
|  |

---------------------------------- End of CHANGE -----------------------------------