**3GPP TSG-RAN WG3 Meeting #112-e *R3-212740***

**E-meeting, 17-28 May 2021**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.413** | **CR** | **0522** | **rev** | **3** | **Current version:** | 16.5.0 |  |
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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 |  | Radio Access Network | **X** | Core Network | **X** |

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| ***Title:*** | Introducing Maximum Integrity Protected Data Rate after EPC to 5GC handover | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei, CMCC, Orange, Deutsche Telekom | | | | | | | | | |
| ***Source to TSG:*** | RAN3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_newRAT-Core | | | | |  | ***Date:*** | | | 2021-05-01 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-16 |
|  | *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:*** | | Currently the *Maximum Integrity Protected Data Rate* IE included in the *Security Indication* IE, is only transferred in the PDU session resource setup procedure, path switch request and Handover Resource Allocation procedure.  In section 5.17.2.2.2 of TS 23.501, it is described that:   |  | | --- | | *For both idle mode and connected mode mobility from EPC to 5GC:*  *……*  *- If this is the first mobility event for a PDU Session that was established while being connected to EPC, the UE shall trigger the PDU Session Modification procedure and:*  *……*  *- should provide the UE Integrity Protection Maximum Data Rate to the network -i.e. SMF). The network shall consider that the maximum data rate per UE for user-plane integrity protection supported by the UE is valid for the lifetime of the PDU session.* |   It can be observed after the EPC to 5GC handover, the UE shall initiate the PDU session modification procedure to provide the maximum IP data rate to the SMF, in case these PDU sessions are established at the EPC side.  This procedure is also described in the section 4.3.3 of TS 23.502 for PDU session modification procedure.   |  | | --- | | *1. The procedure may be triggered by following events:*  *1a. (UE initiated modification) The UE initiates the PDU Session Modification procedure by the transmission of an NAS message (N1 SM container (PDU Session Modification Request (PDU session ID, Packet Filters, Operation, Requested QoS, Segregation, 5GSM Core Network Capability, Number Of Packet Filters, [Always-on PDU Session Requested])), PDU Session ID, UE Integrity Protection Maximum Data Rate…..*  *6. The (R)AN may acknowledge N2 PDU Session Request by sending a N2 PDU Session Ack*  *……*  *The NG-RAN may reject QFI(s) if it cannot fulfil the User Plane Security Enforcement information for a corresponding QoS Profile, e.g. due to the UE Integrity Protection Maximum Data Rate being exceeded* |   Hence, when the SMF acquires the UP IP maximum data rate from the UE, it should provide the updated UP IP maximum data rate included in the *Security Indication* IE in the PDU session resource modify procedure. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Include the ability to change the maximum IP data rate within the Security Indication IE in PDU SESSION RESOURCE MODIFY REQUEST message.    Impact Analysis:  Impact assessment towards the previous version of the specification (same release):  This CR has isolated impact with the previous version of the specification (same release).  The impact can be considered isolated because the change only affects the UP integrity protection after EPC to 5GC handover. | | | | | | | | |
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| ***Consequences if not approved:*** | | The UE IP maximum data rate included in the security indication may not be sent to the NG-RAN node when the SMF acquires the UE UP IP maximum data rate after the handover from EPC to 5GC. | | | | | | | | |
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| ***Clauses affected:*** | | 8.2.3, 9.3.4.3, 9.4.5 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | | Rev0: R3-206639  Rev1: R3-210587  Update the proposal to include the Security Indication in the PDU session resource modify request message, and the Security Result in the PDU session resource modify response message.  Update based on the latest specification.  Rev2: R3-212086  Rebase on the latest specification.  Rev3: R3-212740  Update based on the online discussion, including  - changing to Rel-16 CR;  - just updating Maximum Integrity Protected Data Rate in the PDU SESSION RESOURCE MODIFY REQUEST message. | | | | | | | | |

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| **Change Begins** |

### 8.2.3 PDU Session Resource Modify

#### 8.2.3.1 General

The purpose of the PDU Session Resource Modify procedure is to enable configuration modifications of already established PDU session(s) for a given UE. It is also to enable the setup, modification and release of the QoS flow for already established PDU session(s). The procedure uses UE-associated signalling.

#### 8.2.3.2 Successful Operation



Figure 8.2.3.2-1: PDU session resource modify: successful operation

**<Unchanged Text Omitted>**

For each PDU session included in the *PDU Session Resource Modify Request List* IE:

- For each QoS flow included in the *QoS Flow Add or Modify Request List* IE, based on the *QoS Flow Level QoS Parameters* IE, the NG-RAN node may establish, modify or release the DRB configuration and may change allocation of resources on NG or Uu accordingly. The NG-RAN node shall associate each QoS flow accepted to setup or modify with a DRB of the PDU session. The associated DRB for the QoS flow accepted to modify may not change.

- For each QoS flow, if the *Redundant QoS Flow Indicator* IE is included, the NG-RAN node shall, if supported, store it and consider it for the redundant transmission as specified in TS 23.501 [9].

- For each QoS flow included in the *QoS Flow Add or Modify Request List* IE, if the *QoS Flow Add or Modify Request Item* IE is included for an existing *QoS Flow Identifier* IE, the NG-RAN node shall overwrite the content of the full *QoS Flow Add or Modify Request Item* IE.

- For each QoS flow included in the *QoS Flow to Release List* IE, the NG-RAN node shall de-associate the QoS flow with the previously associated DRB.

- If the *NAS-PDU* IE is received for the PDU session, the NG-RAN node shall pass it to the UE when modifying the Data Radio Bearer configuration. The NG-RAN node does not send the NAS PDU received for the PDU session when all the QoS flows to be added or modified are failed and no QoS flow was requested to be released, even if e.g. the NG-U UP TNL modification is successful.

- The NG-RAN node may change allocation of resources on NG according to the requested target configuration.

- If the *PDU Session Aggregate Maximum Bit Rate* IE is included in the *PDU Session Resource Modify Request Transfer* IE, the NG-RAN node shall store and use the received PDU Session Aggregate Maximum Bit Rate value when enforcing traffic policing for Non-GBR QoS flows for the concerned UE as specified in TS 23.501 [9].

- If the *UL NG-U UP TNL Information* IE in the *UL NG-U UP TNL Modify List* IE is included in the *PDU Session Resource Modify Request Transfer* IE, the NG-RAN node shall update the transport layer information for the uplink data accordingly for the concerned transport bearers identified by the *DL NG-U UP TNL Information* IE included in the *PDU Session Resource Modify Request Transfer* IE for the concerned PDU session.

- If the *Additional UL NG-U UP TNL Information* IE is included in the *PDU Session Resource Modify Request Transfer* IE, the NG-RAN node may allocate resources for an additional NG-U transport bearer for some or all of the QoS flows present in the *QoS Flow Add or Modify Request List* IE and it shall indicate these QoS flows in the *Additional DL QoS Flow per TNL Information* IE in the *PDU Session Resource Modify Response Transfer* IE. In case the *Additional DL QoS Flow per TNL Information* IE is not included the SMF shall consider the proposed additional UL NG-U UP TNL information as available again.

- In case more than one NG-U transport bearers have been set up for the PDU session, if all the QoS flows associated to one existing NG-U transport bearer are included in the *QoS Flow to Release List* IE in the *PDU Session Resource Modify Request Transfer* IE, the NG-RAN node and 5GC shall consider that the concerned NG-U transport bearer is removed for the PDU session, and both NG-RAN node and 5GC shall therefore consider the related NG-U UP TNL information as available again.

- If the *Redundant UL NG-U UP TNL Information* IE within the *UL NG-U UP TNL Modify List* IE is included in the *PDU Session Resource Modify Request Transfer* IE, the NG-RAN node shall, if supported, update the transport layer information for the uplink data accordingly for the concerned transport bearer identified by the *Redundant DL NG-U UP TNL Information* IE included in the *PDU Session Resource Modify Request Transfer* IE for the concerned PDU session.

- If the *Additional Redundant UL NG-U UP TNL Information* IE is included in the *PDU Session Resource Modify Request Transfer* IE, the NG-RAN node may allocate resources for an additional redundant NG-U transport bearer for some or all of the QoS flows present in the *QoS Flow Add or Modify Request List* IE and it shall, if supported, indicate these QoS flows in the *Additional Redundant DL QoS Flow per TNL Information* IE in the *PDU Session Resource Modify Response Transfer* IE. In case the *Additional Redundant DL QoS Flow per TNL Information* IE is not included the SMF shall consider the proposed additional Redundant UL NG-U UP TNL information as available again.

- If the *Redundant UL NG-U UP TNL Information* IE is included in the *PDU Session Resource Modify Request Transfer* IE, the NG-RAN node may allocate resources for a redundant NG-U transport bearer for some or all of the QoS flows present in the *QoS Flow Add or Modify Request List* IE and it shall, if supported, indicate the corresponding NG-RAN endpoint of this NG-U transport bearer in the *Redundant DL NG-U UP TNL Information* IE in the *PDU Session Resource Modify Response Transfer* IE.

- If the *Security Indication* IE is included in the *PDU Session Resource Modify Request Transfer* IE, the NG-RAN node shall, if supported, only update the maximum integrity protected data rate uplink and/or the maximum integrity protected data rate downlink, and take them into account as defined in the PDU Session Resource Setup procedure.

**<Unchanged Text Omitted>**

#### 9.3.4.3 PDU Session Resource Modify Request Transfer

This IE is transparent to the AMF.

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| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| PDU Session Aggregate Maximum Bit Rate | O |  | 9.3.1.102 |  | YES | reject |
| **UL NG-U UP TNL Modify List** |  | *0..1* |  |  | YES | reject |
| **>UL NG-U UP TNL Modify Item** |  | *1..<maxnoofMultiConnectivity>* |  | This IE(s) are included only for modification of an existing tunnel. | - |  |
| >>UL NG-U UP TNL Information | M |  | UP Transport Layer Information  9.3.2.2 | UPF endpoint of the NG-U transport bearer, for delivery of UL PDUs. | - |  |
| >>DL NG-U UP TNL Information | M |  | UP Transport Layer Information  9.3.2.2 | Identifies the NG-U transport bearer at the NG-RAN node. | - |  |
| >>Redundant UL NG-U UP TNL Information | O |  | UP Transport Layer Information  9.3.2.2 | UPF endpoint of the NG-U transport bearer, for delivery of UL PDUs for the redundant transmission. | YES | ignore |
| >>Redundant DL NG-U UP TNL Information | O |  | UP Transport Layer Information  9.3.2.2 | Identifies the NG-U transport bearer at the NG-RAN node for the redundant transmission. | YES | ignore |
| Network Instance | O |  | 9.3.1.113 | This IE is ignored if the *Common Network Instance* IE is included. | YES | reject |
| **QoS Flow Add or Modify Request List** |  | *0..1* |  |  | YES | reject |
| **>QoS Flow Add or Modify Request Item** |  | *1..<maxnoofQoSFlows>* |  |  | - |  |
| >>QoS Flow Identifier | M |  | 9.3.1.51 |  | - |  |
| >>QoS Flow Level QoS Parameters | O |  | 9.3.1.12 |  | - |  |
| >>E-RAB ID | O |  | 9.3.2.3 |  | - |  |
| >>TSC Traffic Characteristics | O |  | 9.3.1.130 | This IE may be present in case of GBR QoS flows and is ignored otherwise. | YES | ignore |
| >>Redundant QoS Flow Indicator | O |  | 9.3.1.134 | This IE indicates whether this QoS flow is requested for the redundant transmission. | YES | ignore |
| QoS Flow to Release List | O |  | QoS Flow List with Cause  9.3.1.13 |  | YES | reject |
| Additional UL NG-U UP TNL Information | O |  | UP Transport Layer Information List  9.3.2.12 | UPF endpoint of the additional NG-U transport bearer(s) proposed for delivery of UL PDUs for split PDU session. | YES | reject |
| Common Network Instance | O |  | 9.3.1.120 |  | YES | ignore |
| Additional Redundant UL NG-U UP TNL Information | O |  | UP Transport Layer Information List  9.3.2.12 | UPF endpoint of the additional NG-U transport bearer(s) proposed for delivery of redundant UL PDUs for split PDU session. | YES | ignore |
| Redundant Common Network Instance | O |  | Common Network Instance  9.3.1.120 |  | YES | ignore |
| Redundant UL NG-U UP TNL Information | O |  | UP Transport Layer Information  9.3.2.2 | UPF endpoint of the NG-U transport bearer, for delivery of UL PDUs for the redundant transmission of the Redundant QoS Flow(s). | YES | Ignore |
| Security Indication | O |  | 9.3.1.27 |  | YES | ignore |

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| Range bound | Explanation |
| maxnoofQoSFlows | Maximum no. of QoS flows allowed within one PDU session. Value is 64. |
| maxnoofMultiConnectivity | Maximum no. of connectivity allowed for a UE. Value is 4. The current version of the specification supports up to 2 connectivity. |

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| **Next Change** |

### 9.4.5 Information Element Definitions

-- ASN1START

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-- Information Element Definitions

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NGAP-IEs {

itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)

ngran-Access (22) modules (3) ngap (1) version1 (1) ngap-IEs (2) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS

**<Unchanged Text Omitted>**

PDUSessionResourceModifyRequestTransfer ::= SEQUENCE {

protocolIEs ProtocolIE-Container { {PDUSessionResourceModifyRequestTransferIEs} },

...

}

PDUSessionResourceModifyRequestTransferIEs NGAP-PROTOCOL-IES ::= {

{ ID id-PDUSessionAggregateMaximumBitRate CRITICALITY reject TYPE PDUSessionAggregateMaximumBitRate PRESENCE optional }|

{ ID id-UL-NGU-UP-TNLModifyList CRITICALITY reject TYPE UL-NGU-UP-TNLModifyList PRESENCE optional }|

{ ID id-NetworkInstance CRITICALITY reject TYPE NetworkInstance PRESENCE optional }|

{ ID id-QosFlowAddOrModifyRequestList CRITICALITY reject TYPE QosFlowAddOrModifyRequestList PRESENCE optional }|

{ ID id-QosFlowToReleaseList CRITICALITY reject TYPE QosFlowListWithCause PRESENCE optional }|

{ ID id-AdditionalUL-NGU-UP-TNLInformation CRITICALITY reject TYPE UPTransportLayerInformationList PRESENCE optional }|

{ ID id-CommonNetworkInstance CRITICALITY ignore TYPE CommonNetworkInstance PRESENCE optional }|

{ ID id-AdditionalRedundantUL-NGU-UP-TNLInformation CRITICALITY ignore TYPE UPTransportLayerInformationList PRESENCE optional }|

{ ID id-RedundantCommonNetworkInstance CRITICALITY ignore TYPE CommonNetworkInstance PRESENCE optional }|

{ ID id-RedundantUL-NGU-UP-TNLInformation CRITICALITY ignore TYPE UPTransportLayerInformation PRESENCE optional }|

{ ID id-SecurityIndication CRITICALITY ignore TYPE SecurityIndication PRESENCE optional },

...

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**<Unchanged Text Omitted>**

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| **Change Ends** |