3GPP TSG-RAN WG3 Meeting #122 R3-237249

Chicago, USA, 13 - 17 November 2023

**Agenda item: 26.2**

**Source: Nokia, Nokia Shanghai Bell, Huawei, CATT, ZTE, Ericsson**

**Title: (TP for TS 38.413 BL CR) Interworking with TSN network**

**Document for: Discussion and Decision**

# 1 Introduction

The RAN3-lead work item NR Timing Resiliency and URLLC enhancements includes the following objective [1]:

|  |
| --- |
| 2. Interworking with TSN network deployed in the transport network [RAN3]:  a. RAN impacts due to 5G System integration with TSN Transport network  Note 2: This objective has dependency on the progress of SA2 and CT4. |

In this paper, we resolve open issues for objective #2 to enable WI completion by the December RAN#102 plenary.

# 2 Discussion

## 2.1 Interworking with TSN network

In a Time Sensitive Networking (TSN) enabled Transport Network (TN), the NG-RAN nodes and the UPFs act as End Stations and may optionally support the TSN Talker and Listener (TL) functionality (i.e. AN-TL in the NG-RAN node and CN-TL in the UPF). The AN-TL and CN-TL may extend each End Station with a set of IEEE 802.1 functionalities, which allows to perform the stream transformation according to IEEE Std 802.1Q-2022 clause 46.1.4, the scheduling of the stream according to IEEE Std 802.1Q-2022 clause 8.6.8.4 and clause 46.2.3.5, and the exchange of topology information according to IEEE Std 802.1AB-2016. The SMF/CUC can communicate with the AN-TL and CN-TL to:

- retrieve the End Station capabilities (list of interfaces and interface capabilities) of the AN-TL and CN-TL; and

- configure TSN features in the AN-TL/CN-TL (e.g. for stream identification, stream association with TSN resources, stream transformation, hold and buffer functionality).

From RAN3 perspective the extended IEEE 802.1 functionalities of the AN-TL can be seen as out-of-scope. Only the presence of AN-TL in the NG-RAN node and the transparent information exchange between SMF/CUC and AN-TL needs to be considered.

The communication between AN-TL and SMF/CUC is based on TL-Containers sent within NGAP signaling to be specified by RAN3 in TS 38.413, while the communication between CN-TL and SMF/CUC is based on TL-Containers sent within PFCP Session related signaling specified by CT4 in TS 29.244. The related stage 2 call flows are specified in 3GPP TS 23.502. The RAN3 impacts related to NG-RAN support for AN-TL are described below.

|  |
| --- |
| *From TS 23.502 Figure F.4-1 step 3:*  3. During the PDU Session Establishment procedure, the SMF/CUC requests the NG-RAN to assign the N3 tunnel information by invoking the Namf\_Communication\_N1N2MessageTransfer request. The SMF/CUC includes a TL-Container to the N2 SM information in the request, the TL-Container contains a get-request as described in clause 5.28a.2 of TS 23.501 [2].  The NG-RAN responds with a N2 SM information. If the NG-RAN supports AN-TL, the NG-RAN includes a TL-Container to the N2 SM information. The TL-Container includes a get-response as described in clause 5.28a.2 of TS 23.501 [2]. The SMF/CUC stores the information provided in the get-response. |

Based on the above, the impacts to the PDU Session Resource Setup procedure are as follows:

1) The SMF sends a PDU session level TL-container (get-request) within the *PDU Session Resource Setup Request Transfer* IE; and

2) If the NG-RAN node supports AN-TL, it sends a PDU session level TL-container (get-response) within the *PDU Session Resource Setup Response Transfer* IE.

**Proposal 1: At PDU session level, add a new *Downlink TL Container* IE and *Uplink TL Container* IE in the *PDU Session Resource Setup Request Transfer* IE and *PDU Session Resource Setup Response Transfer* IE respectively.**

|  |
| --- |
| *From TS 23.502 Figure F.4-1 step 13:*  13. [Conditional] During the PDU Session Modification procedure, if the NG-RAN supports AN-TL, the SMF/CUC invokes the Namf\_Communication\_N1N2MessageTransfer request. The SMF/CUC includes a TL-Container to the N2 SM information in the request, the TL-Container contains a set-request as described in clause 5.28a.2 of TS 23.501 [2]. The SMF/CUC may also update the TSCAI in the NG-RAN for the BAT in DL direction as described in Annex M, clause M.1 of TS 23.501 [2], if the SMF/CUC received a TimeAwareOffset or AccumulatedLatency from TN CNC for a downlink stream (i.e. for a Talker in the UPF/CN-TL) in step 7.  The NG-RAN responds with a N2 SM information. If the NG-RAN supports AN-TL, the NG-RAN includes a TL-Container to the N2 SM information. The TL-Container includes a set-response as described in clause 5.28a.2 of TS 23.501 [2].  NOTE: TL-Containers and related Gate Control information as described clause M.1 of TS 23.501 [2] shall be removed during PDU Session Release or QoS Flow(s) Release. |

RAN3 has received an LS from SA2 in [3], stating the following in response to Q7: “*TSN Stream in the set request can be identified by a QFI parameter within a PDU Session*”. This means that a set-request is QoS flow specific.

*Observation-1: A set-request is QoS flow specific.*

Then, the question is whether a TL-container can include only a single set-request or can aggregate multiple set-requests. Although aggregating multiple set-requests in a single TL-container has some benefit in terms of overhead reduction, the benefit is quite small and brings additional complexity (e.g., to CT4 specifications), and therefore does not seem to be a useful optimization. RAN3 can assume that a TL-container includes only a single set-request, unless informed otherwise by CT4.

*Observation-2: RAN3 can assume that a TL-Container includes a single set-request, unless informed otherwise by CT4.*

Based on the above, the impacts to the PDU Session Resource Modify procedure are as follows:

1) The SMF sends a QoS flow level TL-container (set-request) within the *PDU Session Resource Modify Request Transfer* IE.

2) If the NG-RAN node supports AN-TL, it sends a QoS flow level TL-container (set-response) within the *PDU Session Resource Modify Response Transfer* IE.

**Proposal 2: At QoS flow level, add a new *Downlink TL Container* IE and *Uplink TL Container* IE in the *PDU Session Resource Modify Request Transfer* IE and *PDU Session Resource Modify Response Transfer* IE respectively.**

The LS from SA2 in [3] also indicates, in response to Q2, that the PDU session release procedure was updated to allow the exchange of a Set-Request/Response TL-Container for each QoS flow of the PDU session (see S2-2311523 [4]).

|  |
| --- |
| *From SA2 LS [3]:*  If a PDU Session is released, SA2 decided that the PDU session release procedure needs to be updated to address this scenario. The update in the PDU session release procedure allow the exchange of a Set-Request/Response TL-Container containing all relevant information to perform following modifications at the AN-TL/CN-TL:  • Removal of the TN Stream information at the addressed interfaces for each QoS Flow of the PDU Session, and  • Update of Gate Control input information to allow at each addressed interface the recalculation of the Gate Control Information for remaining streams.  Hence, SA2 agrees to clarify TS 23.502 as specified in the attachment.  *From attachment to SA2 LS, S2-2311523 [4] Figure 4.3.4.2-1 step 6:*  6. [Conditional] If the (R)AN had received a N2 SM request to release the AN resources, the (R)AN acknowledges the N2 SM Resource Release Request by sending an N2 SM Resource Release Ack (User Location Information, Secondary RAT usage data) Message to the AMF.  […]  If interworking with TSN deployed in the transport network is supported and the NG-RAN supports AN-TL and received a TL-Container with a set-request from the SMF/CUC in step 4, the NG-RAN/AN-TL includes a TL-Container with a set-response. |

Based on the above, the impacts to the PDU Session Resource Release procedure are as follows:

1) The SMF sends a QoS flow level TL-container (set-request) within the *PDU Session Resource Release Command Transfer* IE; and

2) If the NG-RAN node supports AN-TL, it sends a QoS flow level TL-container (set-response) within the *PDU Session Resource Release Response Transfer* IE.

**Proposal 3: At QoS flow level, add a new *Downlink TL Container* IE and *Uplink TL Container* IE in the *PDU Session Resource Release Command Transfer* IE and *PDU Session Resource Release Response Transfer* IE respectively.**

The content of the TL Container IEs is defined by CT4. According to the LS from CT4 in [2], “CT4 is specifying in a new stage 3 specification (TS 29.585) the protocol used between the SMF/CUC and the (R)AN/AN-TL […]. This corresponds to the Get Request/Response and Set Request/Response specified in TS 23.501/23.502 that are transferred in TL-Containers in NGAP over N2 […].”. Therefore, the TL Container IEs should be encoded as OCTET STRING containing a Get/Set message specified in TS 29.585.

**Proposal 4: The TL Container IEs are encoded as OCTET STRING with semantics description “Containing the <message name> message specified in TS 29.585 [x]”.**

# 3 Conclusions

In this paper we evaluated the RAN3 impacts of interworking with TSN network and proposed the following:

**Proposal 1: At PDU session level, add a new *Downlink TL Container* IE and *Uplink TL Container* IE in the *PDU Session Resource Setup Request Transfer* IE and *PDU Session Resource Setup Response Transfer* IE respectively.**

**Proposal 2: At QoS flow level, add a new *Downlink TL Container* IE and *Uplink TL Container* IE in the *PDU Session Resource Modify Request Transfer* IE and *PDU Session Resource Modify Response Transfer* IE respectively.**

**Proposal 3: At QoS flow level, add a new *Downlink TL Container* IE and *Uplink TL Container* IE in the *PDU Session Resource Release Command Transfer* IE and *PDU Session Resource Release Response Transfer* IE respectively.**

**Proposal 4: The TL Container IEs are encoded as OCTET STRING with semantics description “Containing the <message name> message specified in TS 29.585 [x]”.**

Stage 3 text proposal for NGAP is provided in Annex A.

# References

1. RP-231106 *Revised WID on NR Timing Resiliency and URLLC enhancements*, Nokia, Nokia Shanghai Bell
2. R3-234532 *Support of Time Sensitive Networking (TSN) enabled Transport Network (TN)*, CT4
3. R3-237154 *Reply LS Support of Time Sensitive Networking (TSN) enabled Transport Network (TN)*, SA2
4. S2-2311523 *Updates and clarifications related to PDU Session procedures in context to get and set messages for KI#5*, Nokia, Nokia Shanghai Bell

# Annex A: Text Proposal for TS 38.413

*first modification*

# 2 References

\*\* Unchanged text skipped \*\*

[52] 3GPP TS 26.118: "Virtual Reality (VR) profiles for streaming applications".

[53] IETF RFC 4122: "A Universally Unique IDentifier (UUID) URN Namespace".

[x] 3GPP TS 29.585: "5G System (5GS); Session Management Function (SMF) / Centralized User Configuration (CUC) to Access Network Talker Listener (AN-TL) and Core Network Talker Listener (CN-TL) protocol aspects; Stage 3".

*next modification*

#### 8.2.1.2 Successful Operation



Figure 8.2.1.2-1: PDU session resource setup: successful operation

\*\* Unchanged text skipped \*\*

If the *User Location Information* IE is included in the PDU SESSION RESOURCE SETUP RESPONSE message, the AMF shall handle this information as specified in TS 23.501 [9].

For each PDU session, if the *Downlink* *TL Container* IE is included in the *PDU Session Resource Setup Request Transfer* IE of the PDU SESSION RESOURCE SETUP REQUEST message, the NG-RAN node shall, if supported, handle it as specified in TS 23.501 [9] and shall include the *Uplink* *TL Container* IE in the *PDU Session Resource Setup Response Transfer* IE as specified in TS 23.501 [9]. **Interactions with Handover Preparation procedure:**

If a handover becomes necessary during the PDU Session Resource Setup procedure, the NG-RAN node may interrupt the ongoing PDU Session Resource Setup procedure and initiate the Handover Preparation procedure as follows:

1. The NG-RAN node shall send the PDU SESSION RESOURCE SETUP RESPONSE message in which the NG-RAN node shall indicate, if necessary, all the PDU session resources which failed to be setup with an appropriate cause value, e.g. "NG intra-system handover triggered", "NG inter-system handover triggered" or "Xn handover triggered".

2. The NG-RAN node shall trigger the handover procedure.

*next modification*

#### 8.2.2.2 Successful Operation



Figure 8.2.2.2-1: PDU session resource release: successful operation

The AMF initiates the procedure by sending a PDU SESSION RESOURCE RELEASE COMMAND message.

The PDU SESSION RESOURCE RELEASE COMMAND message shall contain the information required by the NG-RAN node to release at least one PDU session resource, and include each PDU session resource to release in the *PDU Session Resource to Release List* IE.

If a *NAS-PDU* IE is contained in the PDU SESSION RESOURCE RELEASE COMMAND message, the NG-RAN node shall pass it to the UE.

Upon reception of the PDU SESSION RESOURCE RELEASE COMMAND message the NG-RAN node shall execute the release of the requested PDU sessions. For each PDU session to be released the NG-RAN node shall release the corresponding resources over Uu and over NG, if any.

If the *RAN Paging Priority* IE is included in the PDU SESSION RESOURCE RELEASE COMMAND message, the NG-RAN node may use it to determine a priority for paging the UE in RRC\_INACTIVE state.

The NG-RAN node shall, if supported, report in the PDU SESSION RESOURCE RELEASE RESPONSE message location information of the UE in the *User Location Information* IE.

After sending a PDU SESSION RESOURCE RELEASE RESPONSE message, the NG-RAN node shall be prepared to receive a PDU SESSION RESOURCE SETUP REQUEST message requesting establishment of a PDU session with a PDU Session ID corresponding to one of the PDU Session IDs that was present in the *PDU Session Resource to Release List* IE of the PDU SESSION RESOURCE RELEASE COMMAND message.

If the *User Location Information* IE is included in the PDU SESSION RESOURCE RELEASE RESPONSE message, the AMF shall handle this information as specified in TS 23.501 [9].

For each PDU session, if the *Downlink* *TL Container* IE is included in the *PDU Session Resource Release Command Transfer* IE of the PDU SESSION RESOURCE RELEASE COMMAND message, the NG-RAN node shall, if supported, handle it as specified in TS 23.501 [9] and shall include the *Uplink* *TL Container* IE in the *PDU Session Resource Release Response Transfer* IE as specified in TS 23.501 [9]. For each PDU session for which the *Secondary RAT Usage Information* IE is included in the *PDU Session Resource Release Response Transfer* IE, the SMF shall handle this information as specified in TS 23.502 [10].

*next modification*

#### 8.2.3.2 Successful Operation



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

\*\* Unchanged text skipped \*\*

For each PDU session, if the *TSC Traffic Characteristics* IE is included in the *PDU Session Resource Modify Request Transfer* IE contained in the PDU SESSION RESOURCE MODIFY REQUEST message, the NG-RAN node shall, if supported, store it and use it as specified in TS 23.501 [9].

For each PDU session, if the *Redundant QoS Flow Indicator* IE is included and set to “false” for all QoS flows, the NG-RAN node shall, if supported, stop the redundant transmission and release the redundant tunnel for the concerned PDU session as specified in TS 23.501 [9].

For each PDU session, if the *Downlink TL Container* IE is included in the *PDU Session Resource Modify Request Transfer* IE contained in the PDU SESSION RESOURCE MODIFY REQUEST message, the NG-RAN node shall, if supported, handle it as specified in TS 23.501 [9] and shall include the *Uplink TL Container* IE in the *PDU Session Resource Modify Response Transfer* IE as specified in TS 23.501 [9].

*next modification*

#### 9.3.4.1 PDU Session Resource Setup Request Transfer

This IE is transparent to the AMF.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 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 | This IE shall be present when at least one Non-GBR QoS flow is being setup and is ignored otherwise. | YES | reject |
| 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. | 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), for delivery of UL PDUs for split PDU session. | YES | reject |
| Data Forwarding Not Possible | O |  | 9.3.1.63 | This IE may be present in case of HANDOVER REQUEST message and is ignored otherwise. | YES | reject |
| PDU Session Type | M |  | 9.3.1.52 |  | YES | reject |
| Security Indication | O |  | 9.3.1.27 |  | YES | reject |
| Network Instance | O |  | 9.3.1.113 | This IE is ignored if the *Common Network Instance* IE is included. | YES | reject |
| **QoS Flow Setup Request List** |  | *1* |  |  | YES | reject |
| **>QoS Flow Setup Request Item** |  | *1..<maxnoofQoSFlows>* |  |  | - |  |
| >>QoS Flow Identifier | M |  | 9.3.1.51 |  | - |  |
| >>QoS Flow Level QoS Parameters | M |  | 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 |
| Common Network Instance | O |  | 9.3.1.120 |  | YES | ignore |
| Direct Forwarding Path Availability | O |  | 9.3.1.64 | This IE may be present in case of inter-system handover and intra-system handover. | 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. | 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), 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 PDU Session Information | O |  | 9.3.1.136 |  | YES | ignore |
| MBS Session Setup Request List | O |  | 9.3.1.211 |  | YES | ignore |
| Downlink TL Container | O |  | OCTET STRING | Containing the Get Request message specified in TS 29.585 [x]. | YES | ignore |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofQoSFlows | Maximum no. of QoS flows allowed within one PDU session. Value is 64. |

#### 9.3.4.2 PDU Session Resource Setup Response Transfer

This IE is transparent to the AMF.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| DL QoS Flow per TNL Information | M |  | QoS Flow per TNL Information  9.3.2.8 | NG-RAN node endpoint of the NG-U transport bearer for delivery of DL PDUs, together with associated QoS flows. | - |  |
| Additional DL QoS Flow per TNL Information | O |  | QoS Flow per TNL Information List  9.3.2.1 | NG-RAN node endpoint of the additional NG-U transport bearer(s) for delivery of DL PDUs for split PDU session, together with associated QoS flows and corresponding to the *Additional UL NG-U UP TNL Information* IE in the *PDU Session Resource Setup Request Transfer* IE. | - |  |
| Security Result | O |  | 9.3.1.59 |  | - |  |
| QoS Flow Failed to Setup List | O |  | QoS Flow List with Cause  9.3.1.13 |  | - |  |
| Redundant DL QoS Flow per TNL Information | O |  | QoS Flow per TNL Information  9.3.2.8 | NG-RAN node endpoint of the NG-U transport bearer(s) for delivery of DL PDUs of the indicated Redundant QoS Flow(s) and corresponding to the *Redundant UL NG-U UP TNL Information* IE in the *PDU Session Resource Setup Request Transfer* IE. | YES | ignore |
| Additional Redundant DL QoS Flow per TNL Information | O |  | QoS Flow per TNL Information List  9.3.2.1 | NG-RAN node endpoint of the additional NG-U transport bearer(s) for delivery of redundant DL PDUs for split PDU session, together with associated QoS flows and corresponding to the *Additional Redundant UL NG-U UP TNL Information* IE in the *PDU Session Resource Setup Request Transfer* IE. | YES | ignore |
| Used RSN Information | O |  | Redundant PDU Session Information  9.3.1.136 |  | YES | ignore |
| Global RAN Node ID of Secondary NG-RAN Node | O |  | Global RAN Node ID  9.3.1.5 |  | YES | ignore |
| MBS Support Indicator | O |  | 9.3.1.210 |  | YES | ignore |
| MBS Session Setup Response List | O |  | 9.3.1.213 |  | YES | ignore |
| MBS Session Failed to Setup List | O |  | 9.3.1.214 |  | YES | ignore |
| Uplink TL Container | O |  | OCTET STRING | Containing the Get Response message specified in TS 29.585 [x]. | YES | ignore |

#### 9.3.4.3 PDU Session Resource Modify Request Transfer

This IE is transparent to the AMF.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 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 |
| >>Downlink TL Container | O |  | OCTET STRING | Containing the Set Request message specified in TS 29.585 [x]. | 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 |
| MBS Session Setup or Modify Request List | O |  | 9.3.1.212 |  | YES | ignore |
| MBS Session To Release List | O |  | 9.3.1.215 |  | YES | ignore |

|  |  |
| --- | --- |
| 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. |

#### 9.3.4.4 PDU Session Resource Modify Response Transfer

This IE is transparent to the AMF.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| DL NG-U UP TNL Information | O |  | UP Transport Layer Information  9.3.2.2 | NG-RAN node endpoint of the NG-U transport bearer, for delivery of DL PDUs. | - |  |
| UL NG-U UP TNL Information | O |  | UP Transport Layer Information  9.3.2.2 | Identifies the NG-U transport bearer at the 5GC node. | - |  |
| **QoS Flow Add or Modify Response List** |  | *0..1* |  |  | - |  |
| **>QoS Flow Add or Modify Response Item** |  | *1..<maxnoofQoSFlows>* |  |  | - |  |
| >>QoS Flow Identifier | M |  | 9.3.1.51 |  | - |  |
| >>Current QoS Parameters Set Index | O |  | Alternative QoS Parameters Set Index  9.3.1.152 | Index to the currently fulfilled alternative QoS parameters set | YES | Ignore |
| >>Uplink TL Container | O |  | OCTET STRING | Containing the Set Response message specified in TS 29.585 [x]. | YES | ignore |
| Additional DL QoS Flow per TNL Information | O |  | QoS Flow per TNL Information List  9.3.2.1 | NG-RAN node endpoint of the additional NG-U transport bearer(s) for delivery of DL PDUs for split PDU session, together with associated QoS flows. | - |  |
| QoS Flow Failed to Add or Modify List | O |  | QoS Flow List with Cause  9.3.1.13 |  | - |  |
| Additional NG-U UP TNL Information | O |  | UP Transport Layer Information Pair List  9.3.2.11 | NG-RAN node endpoint of the NG-U transport bearer corresponding to the modified UPF endpoint received in the *PDU Session Resource Modify Request Transfer* IE in case of PDU session split. | YES | ignore |
| Redundant DL NG-U UP TNL Information | O |  | UP Transport Layer Information  9.3.2.2 | NG-RAN node endpoint of the NG-U transport bearer, for delivery of DL PDUs for the redundant transmission. | YES | ignore |
| Redundant UL NG-U UP TNL Information | O |  | UP Transport Layer Information  9.3.2.2 | Identifies the NG-U transport bearer at the 5GC node for the redundant transmission. | YES | ignore |
| Additional Redundant DL QoS Flow per TNL Information | O |  | QoS Flow per TNL Information List  9.3.2.1 | NG-RAN node endpoint of the additional NG-U transport bearer(s) for delivery of redundant DL PDUs for split PDU session, together with associated QoS flows. | YES | ignore |
| Additional Redundant NG-U UP TNL Information | O |  | UP Transport Layer Information Pair List  9.3.2.11 | NG-RAN node endpoint of the NG-U transport bearer for delivery of redundant DL PDUs corresponding to the modified UPF endpoint(s) received in the *UL NG-U UP TNL Modify List* IE of the *PDU Session Resource Modify Request Transfer* IE in case of PDU session split. | YES | ignore |
| Secondary RAT Usage Information | O |  | 9.3.1.114 |  | YES | ignore |
| MBS Support Indicator | O |  | 9.3.1.210 |  | YES | ignore |
| MBS Session Setup or Modify Response List | O |  | MBS Session Setup Response List  9.3.1.213 |  | YES | ignore |
| MBS Session Failed to Setup or Modify List | O |  | MBS Session Failed to Setup List  9.3.1.214 |  | YES | ignore |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofQoSFlows | Maximum no. of QoS flows allowed within one PDU session. Value is 64. |

*next modification*

#### 9.3.4.12 PDU Session Resource Release Command Transfer

This IE is transparent to the AMF.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Cause | M |  | 9.3.1.2 |  | - |  |
| QoS Flow Additional Information List |  | *0..1* |  |  | YES | Ignore |
| >QoS Flow Additional Information Item |  | *1..<maxnoofQoSFlows>* |  |  |  |  |
| >>QoS Flow Identifier | M |  | 9.3.1.51 |  | - |  |
| >>Downlink TL Container | O |  | OCTET STRING | Containing the Set Request message specified in TS 29.585 [x]. | - |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofQoSFlows | Maximum no. of QoS flows allowed within one PDU session. Value is 64. |

*next modification*

#### 9.3.4.21 PDU Session Resource Release Response Transfer

This IE is transparent to the AMF.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Secondary RAT Usage Information | O |  | 9.3.1.114 |  | YES | ignore |
| QoS Flow Additional Information List |  | *0..1* |  |  | YES | Ignore |
| >QoS Flow Additional Information Item |  | *1..<maxnoofQoSFlows>* |  |  |  |  |
| >>QoS Flow Identifier | M |  | 9.3.1.51 |  | - |  |
| >>Uplink TL Container | O |  | OCTET STRING | Containing the Set Response message specified in TS 29.585 [x]. | - |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofQoSFlows | Maximum no. of QoS flows allowed within one PDU session. Value is 64. |

*next modification*

### 9.4.5 Information Element Definitions

-- ASN1START

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Information Element Definitions

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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

id-AdditionalDLForwardingUPTNLInformation,

id-AdditionalULForwardingUPTNLInformation,

id-AdditionalDLQosFlowPerTNLInformation,

id-AdditionalDLUPTNLInformationForHOList,

id-AdditionalNGU-UP-TNLInformation,

id-AdditionalRedundantDL-NGU-UP-TNLInformation,

id-AdditionalRedundantDLQosFlowPerTNLInformation,

id-AdditionalRedundantNGU-UP-TNLInformation,

id-AdditionalRedundantUL-NGU-UP-TNLInformation,

id-AdditionalUL-NGU-UP-TNLInformation,

id-AlternativeQoSParaSetList,

id-BurstArrivalTimeDownlink,

id-Cause,

id-CNPacketDelayBudgetDL,

id-CNPacketDelayBudgetUL,

id-CNTypeRestrictionsForEquivalent,

id-CNTypeRestrictionsForServing,

id-CommonNetworkInstance,

id-ConfiguredTACIndication,

id-CurrentQoSParaSetIndex,

id-DAPSRequestInfo,

id-DAPSResponseInfoList,

id-DataForwardingNotPossible,

id-DataForwardingResponseERABList,

id-DirectForwardingPathAvailability,

id-DL-NGU-UP-TNLInformation,

id-DownlinkTLContainer,

id-EndpointIPAddressAndPort,

id-EnergySavingIndication,

id-ExtendedMobilityInformation,

id-ExtendedPacketDelayBudget,

id-ExtendedRATRestrictionInformation,

id-ExtendedReportIntervalMDT,

id-ExtendedSliceSupportList,

id-ExtendedTAISliceSupportList,

id-ExtendedUEIdentityIndexValue,

id-EUTRA-PagingeDRXInformation,

id-GlobalCable-ID,

id-GlobalRANNodeID,

id-GlobalTNGF-ID,

id-GlobalTWIF-ID,

id-GlobalW-AGF-ID,

id-GUAMIType,

id-HashedUEIdentityIndexValue,

id-IncludeBeamMeasurementsIndication,

id-IntersystemSONInformationRequest,

id-IntersystemSONInformationReply,

id-IntersystemResourceStatusUpdate,

id-LastEUTRAN-PLMNIdentity,

id-LastVisitedPSCellList,

id-LocationReportingAdditionalInfo,

id-M4ReportAmount,

id-M5ReportAmount,

id-M6ReportAmount,

id-ExcessPacketDelayThresholdConfiguration,

id-M7ReportAmount,

id-MaximumIntegrityProtectedDataRate-DL,

id-MBS-AreaSessionID,

id-MBS-QoSFlowsToBeSetupList,

id-MBS-QoSFlowsToBeSetupModList,

id-MBS-QoSFlowToReleaseList,

id-MBS-ServiceArea,

id-MBS-SessionFSAIDList,

id-MBS-SessionID,

id-MBS-ActiveSessionInformation-SourcetoTargetList,

id-MBS-ActiveSessionInformation-TargettoSourceList,

id-MBS-SessionTNLInfo5GC,

id-MBS-SupportIndicator,

id-MBSSessionFailedtoSetupList,

id-MBSSessionFailedtoSetuporModifyList,

id-MBSSessionSetupResponseList,

id-MBSSessionSetuporModifyResponseList,

id-MBSSessionToReleaseList,

id-MBSSessionSetupRequestList,

id-MBSSessionSetuporModifyRequestList,

id-MDTConfiguration,

id-MicoAllPLMN,

id-NetworkInstance,

id-NGAPIESupportInformationRequestList,

id-NGAPIESupportInformationResponseList,

id-NID,

id-NR-CGI,

id-NRNTNTAIInformation,

id-NPN-MobilityInformation,

id-NPN-PagingAssistanceInformation,

id-NPN-Support,

id-NR-PagingeDRXInformation,

id-OldAssociatedQosFlowList-ULendmarkerexpected,

id-OnboardingSupport,

id-PagingAssisDataforCEcapabUE,

id-PagingCauseIndicationForVoiceService,

id-PDUSessionAggregateMaximumBitRate,

id-PduSessionExpectedUEActivityBehaviour,

id-PDUSessionPairID,

id-PDUSessionResourceFailedToSetupListCxtFail,

id-PDUSessionResourceReleaseResponseTransfer,

id-PDUSessionType,

id-PEIPSassistanceInformation,

id-PSCellInformation,

id-QMCConfigInfo,

id-QoSFlowAdditionalInfoList,

id-QosFlowAddOrModifyRequestList,

id-QosFlowFailedToSetupList,

id-QosFlowFeedbackList,

id-QosFlowParametersList,

id-QosFlowSetupRequestList,

id-QosFlowToReleaseList,

id-QosMonitoringRequest,

id-QosMonitoringReportingFrequency,

id-SuccessfulHandoverReportList,

id-UEContextReferenceAtSource,

id-RAT-Information,

id-RedundantCommonNetworkInstance,

id-RedundantDL-NGU-TNLInformationReused,

id-RedundantDL-NGU-UP-TNLInformation,

id-RedundantDLQosFlowPerTNLInformation,

id-RedundantPDUSessionInformation,

id-RedundantQosFlowIndicator,

id-RedundantUL-NGU-UP-TNLInformation,

id-SCTP-TLAs,

id-SecondaryRATUsageInformation,

id-SecurityIndication,

id-SecurityResult,

id-SgNB-UE-X2AP-ID,

id-S-NSSAI,

id-SONInformationReport,

id-SourceNodeID,

id-SourceNodeTNLAddrInfo,

id-SourceTNLAddrInfo,

id-SurvivalTime,

id-TNLAssociationTransportLayerAddressNGRAN,

id-TAINSAGSupportList,

id-TargetHomeENB-ID,

id-TargetRNC-ID,

id-TraceCollectionEntityURI,

id-TSCTrafficCharacteristics,

id-UEHistoryInformationFromTheUE,

id-UERadioCapabilityForPaging,

id-UERadioCapabilityForPagingOfNB-IoT,

id-UL-NGU-UP-TNLInformation,

id-UL-NGU-UP-TNLModifyList,

id-ULForwarding,

id-ULForwardingUP-TNLInformation,

id-UplinkTLContainer,

id-UsedRSNInformation,

id-UserLocationInformationTNGF,

id-UserLocationInformationTWIF,

id-UserLocationInformationW-AGF,

id-EarlyMeasurement,

id-BeamMeasurementsReportConfiguration,

id-TAI,

id-HFCNode-ID-new,

id-GlobalCable-ID-new,

id-ClockQualityReportingControlInfo,

id-RANfeedbacktype,

id-QoSFlowTSCFeedbackList,

id-TSCTrafficCharacteristicsFeedback,

maxnoofAllowedAreas,

maxnoofAllowedCAGsperPLMN,

\*\* unchanged text skipped \*\*

PDUSessionResourceReleaseCommandTransfer ::= SEQUENCE {

cause Cause,

iE-Extensions ProtocolExtensionContainer { {PDUSessionResourceReleaseCommandTransfer-ExtIEs} } OPTIONAL,

...

}

PDUSessionResourceReleaseCommandTransfer-ExtIEs NGAP-PROTOCOL-EXTENSION ::= {

{ ID id-QoSFlowAdditionalInfoList CRITICALITY ignore EXTENSION QoSFlowAdditionalInfoListRelCom PRESENCE optional }, ...

}

\*\* unchanged text skipped \*\*

PDUSessionResourceReleaseResponseTransfer ::= SEQUENCE {

iE-Extensions ProtocolExtensionContainer { {PDUSessionResourceReleaseResponseTransfer-ExtIEs} } OPTIONAL,

...

}

PDUSessionResourceReleaseResponseTransfer-ExtIEs NGAP-PROTOCOL-EXTENSION ::= {

{ ID id-SecondaryRATUsageInformation CRITICALITY ignore EXTENSION SecondaryRATUsageInformation PRESENCE optional }|

{ ID id-QoSFlowAdditionalInfoList CRITICALITY ignore EXTENSION QoSFlowAdditionalInfoListRelRes PRESENCE optional },

...

}

\*\* unchanged text skipped \*\*

PDUSessionResourceSetupRequestTransfer ::= SEQUENCE {

protocolIEs ProtocolIE-Container { {PDUSessionResourceSetupRequestTransferIEs} },

...

}

PDUSessionResourceSetupRequestTransferIEs NGAP-PROTOCOL-IES ::= {

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

{ ID id-UL-NGU-UP-TNLInformation CRITICALITY reject TYPE UPTransportLayerInformation PRESENCE mandatory }|

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

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

{ ID id-PDUSessionType CRITICALITY reject TYPE PDUSessionType PRESENCE mandatory }|

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

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

{ ID id-QosFlowSetupRequestList CRITICALITY reject TYPE QosFlowSetupRequestList PRESENCE mandatory }|

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

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

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

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

{ ID id-DownlinkTLContainer CRITICALITY ignore TYPE TLContainer PRESENCE optional },

...

}

PDUSessionResourceSetupResponseTransfer ::= SEQUENCE {

dLQosFlowPerTNLInformation QosFlowPerTNLInformation,

additionalDLQosFlowPerTNLInformation QosFlowPerTNLInformationList OPTIONAL,

securityResult SecurityResult OPTIONAL,

qosFlowFailedToSetupList QosFlowListWithCause OPTIONAL,

iE-Extensions ProtocolExtensionContainer { {PDUSessionResourceSetupResponseTransfer-ExtIEs} } OPTIONAL,

...

}

PDUSessionResourceSetupResponseTransfer-ExtIEs NGAP-PROTOCOL-EXTENSION ::= {

{ ID id-RedundantDLQosFlowPerTNLInformation CRITICALITY ignore EXTENSION QosFlowPerTNLInformation PRESENCE optional }|

{ ID id-AdditionalRedundantDLQosFlowPerTNLInformation CRITICALITY ignore EXTENSION QosFlowPerTNLInformationList PRESENCE optional }|

{ ID id-UsedRSNInformation CRITICALITY ignore EXTENSION RedundantPDUSessionInformation PRESENCE optional }|

{ ID id-GlobalRANNodeID CRITICALITY ignore EXTENSION GlobalRANNodeID PRESENCE optional }|

{ ID id-MBS-SupportIndicator CRITICALITY ignore EXTENSION MBS-SupportIndicator PRESENCE optional }|

{ ID id-MBSSessionSetupResponseList CRITICALITY ignore EXTENSION MBSSessionSetupResponseList PRESENCE optional }|

{ ID id-MBSSessionFailedtoSetupList CRITICALITY ignore EXTENSION MBSSessionFailedtoSetupList PRESENCE optional }|

{ ID id-QoSFlowTSCFeedbackList CRITICALITY ignore EXTENSION QoSFlowTSCFeedbackList PRESENCE optional }|

{ ID id-UplinkTLContainer CRITICALITY ignore EXTENSION TLContainer PRESENCE optional },

...

}

\*\* unchanged text skipped \*\*

QosFlowAdditionalInfoListRelCom ::= SEQUENCE (SIZE(1..maxnoofQosFlows)) OF QosFlowAdditionalInfoItemRelCom

QosFlowAdditionalInfoItemRelCom ::= SEQUENCE {

qosFlowIdentifier QosFlowIdentifier,

downlinkTLContainer TLContainer OPTIONAL,

iE-Extensions ProtocolExtensionContainer { {QosFlowAdditionalInfoItemRelCom-ExtIEs} } OPTIONAL,

...

}

QosFlowAdditionalInfoItemRelCom-ExtIEs NGAP-PROTOCOL-EXTENSION ::= {

...

}

QosFlowAdditionalInfoListRelRes ::= SEQUENCE (SIZE(1..maxnoofQosFlows)) OF QosFlowAdditionalInfoItemRelRes

QosFlowAdditionalInfoItemRelRes ::= SEQUENCE {

qosFlowIdentifier QosFlowIdentifier,

uplinkTLContainer TLContainer OPTIONAL,

iE-Extensions ProtocolExtensionContainer { {QosFlowAdditionalInfoItemRelRes-ExtIEs} } OPTIONAL,

...

}

QosFlowAdditionalInfoItemRelRes-ExtIEs NGAP-PROTOCOL-EXTENSION ::= {

...

}

QosFlowAddOrModifyRequestList ::= SEQUENCE (SIZE(1..maxnoofQosFlows)) OF QosFlowAddOrModifyRequestItem

QosFlowAddOrModifyRequestItem ::= SEQUENCE {

qosFlowIdentifier QosFlowIdentifier,

qosFlowLevelQosParameters QosFlowLevelQosParameters OPTIONAL,

e-RAB-ID E-RAB-ID OPTIONAL,

iE-Extensions ProtocolExtensionContainer { {QosFlowAddOrModifyRequestItem-ExtIEs} } OPTIONAL,

...

}

QosFlowAddOrModifyRequestItem-ExtIEs NGAP-PROTOCOL-EXTENSION ::= {

{ID id-TSCTrafficCharacteristics CRITICALITY ignore EXTENSION TSCTrafficCharacteristics PRESENCE optional }|

{ID id-RedundantQosFlowIndicator CRITICALITY ignore EXTENSION RedundantQosFlowIndicator PRESENCE optional }|

{ID id-DownlinkTLContainer CRITICALITY ignore EXTENSION TLContainer PRESENCE optional },

...

}

QosFlowAddOrModifyResponseList ::= SEQUENCE (SIZE(1..maxnoofQosFlows)) OF QosFlowAddOrModifyResponseItem

QosFlowAddOrModifyResponseItem ::= SEQUENCE {

qosFlowIdentifier QosFlowIdentifier,

iE-Extensions ProtocolExtensionContainer { {QosFlowAddOrModifyResponseItem-ExtIEs} } OPTIONAL,

...

}

QosFlowAddOrModifyResponseItem-ExtIEs NGAP-PROTOCOL-EXTENSION ::= {

{ ID id-CurrentQoSParaSetIndex CRITICALITY ignore EXTENSION AlternativeQoSParaSetIndex PRESENCE optional }|

{ ID id-TSCTrafficCharacteristicsFeedback CRITICALITY ignore EXTENSION TSCTrafficCharacteristicsFeedback PRESENCE optional }|

{ ID id-UplinkTLContainer CRITICALITY ignore EXTENSION TLContainer PRESENCE optional },

...

}

\*\* unchanged text skipped \*\*

TimeToTrigger ::= ENUMERATED {ms0, ms40, ms64, ms80, ms100, ms128, ms160, ms256, ms320, ms480, ms512, ms640, ms1024, ms1280, ms2560, ms5120}

TLContainer ::= OCTET STRING

TWAP-ID ::= OCTET STRING

*next modification*

### 9.4.7 Constant Definitions

-- ASN1START

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Constant definitions

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

NGAP-Constants {

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

ngran-Access (22) modules (3) ngap (1) version1 (1) ngap-Constants (4) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

\*\* unchanged text skipped \*\*

id-ExtendedMobilityInformation ProtocolIE-ID ::= 366

id-RANTimingSynchronisationStatusInfo ProtocolIE-ID ::= 500 -- To be assigned

id-RAN-TSSRequestType ProtocolIE-ID ::= 501 -- To be assigned

id-RAN-TSSScope ProtocolIE-ID ::= 502 -- To be assigned

id-ClockQualityReportingControlInfo ProtocolIE-ID ::= 900 -- To be assigned

id-RANfeedbacktype ProtocolIE-ID ::= 901 -- To be assigned

id-QoSFlowTSCFeedbackList ProtocolIE-ID ::= 902 -- To be assigned

id-TSCTrafficCharacteristicsFeedback ProtocolIE-ID ::= 903 -- To be assigned

id-DownlinkTLContainer ProtocolIE-ID ::= 904 -- To be assigned

id-UplinkTLContainer ProtocolIE-ID ::= 905 -- To be assigned

END

-- ASN1STOP

*End of modifications*