**3GPP TSG-CT WG1 Meeting #146 C1-240188**

**Online, 22– 26 January 2024**

**Source: Ericsson**

**Title: Pseudo-CR on Alignment of Transmission quality management messages**

**Spec: 3GPP TS 24.543 V1.0.0**

**Agenda item: 18.2.16**

**Document for: Decision**

**1. Introduction**

**2. Reason for Change**

SA6 decided to change message names used in the SEALDD enabled data transmission quality guarantee procedure specified in clause 9.9 of TS 23.433:

- "Transmission quality guarantee" request and response are renamed to "Transmission quality management" request and response; and

- name of the IE "Transmission quality guarantee action" is changed to "Transmission quality management action".

To make easier traceability between stage 2 and stage 3 requirements names used in this specification should be aligned with the names used in TS 23.433.

Furthermore, "Transmission quality management action" IE is updated to indicate an optimization action (back to single transmission path because the SEALDD server may send a Transmission quality management request to the SEALDD client requesting to use single transmission if the SEALDD measurement results indicated that the SEALDD data transmission has good performance according to policy guarantee threshold. TS 23.433 specifies the following values for the Transmission quality management action IE:

- redundant transmission path,

- re-establish transmission path,

- switch to backup transmission path; and

- back to single transmission path

This specification should be aligned with the above values i.e., a new value "Back to single transmission path" needs to be added and the existing value "Redundant transmission path that can be released" should be changed to "Redundant transmission path".

**3. Conclusions**

**4. Proposal**

It is proposed to agree the following changes to 3GPP TS 24.543 V1.0.0.

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

#### 7.2.15.1 SDDM client HTTP procedure

Upon receiving an HTTP POST request containing:

a) an Accept header field set to "application/vnd.3gpp.seal-data-delivery-info+xml";

b) a Content-Type header field set to "application/vnd.3gpp.seal-data-delivery-info+xml"; and

c) an application/vnd.3gpp.seal-data-delivery-info+xml MIME body with a <tx-quality-management-req> element included in the <data-delivery-info> root element;

the SDDM-C:

a) shall generate an HTTP 200 (OK) response message to the SDDM-S according to IETF RFC 9110 [18]. In the HTTP 200 (OK) response message, the SDDM-C:

1) shall include a Content-Type header field set to "application/vnd.3gpp.seal-data-delivery-info+xml"; and

2) shall include an application/vnd.3gpp.seal-data-delivery-info+xml MIME body with a <tx-quality-management-rsp> element in the <data-delivery-info> root element which:

i) shall include a <result> element set to "success" or "failure" indicating success or failure of the SEALDD data transmission quality management request operation.

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

#### 7.2.15.2 SDDM server HTTP procedure

The SDDM-S sends a SEALDD data transmission quality management request when it needs to request data transmission quality management towards an SDDM-C, the SDDM-S shall send an HTTP POST request message according to procedures specified in IETF RFC 9110 [18]. In the HTTP POST request message, the SDDM-S:

a) shall include a Request-URI set to the URI corresponding to the identity of the SDDM-C;

b) shall include an Authorization header field with the "Bearer" authentication scheme set to an access token of the "bearer" token type as specified in IETF RFC 6750 [12]; and

c) shall include an application/vnd.3gpp.seal-data-delivery-info+xml MIME body with an <tx-quality-management-req> element in the <data-delivery-info> root element which:

1) shall include a <sealdd-flow-id> element set to the identity of the SDDM flow used by the SDDM-C and SDDM-S; and

2) shall include a <tx-quality-management-action> element set to the data transmission quality guarantee action (e.g. redundant transmission path, re-establish transmission path, switch to backup transmission path ) or optimization action (back to single transmission path) that was triggered by an event (e.g. measurement threshold).

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

## 8.3 Structure

The data delivery management document shall conform to the XML schema described in clause 8.4.

The <data-delivery-info> element shall be the root element of the SEALDataDeliveryManagement document.

The <establishment-req> element:

a) shall include a <requestor-id> element;

b) shall include a <sealdd-flow-id> element;

c) may include a <server-id> element;

d) may include a <endpoint-id> element;

e) may include a <VAL-service-id> element;

f) may include a <sealdd-communication-lifetime> element;

g) may include a <traffic-descriptor-info> element which shall include at least one of the following sub-elements:

1) a <user-plane-address> element;

2) a <port-number> element;

3) a <URL> element; or

4) a <transport-layer-protocol> element; and

h) may include an <identity> element.

The <identity> element shall include one of the following:

a) a <VAL-user-id> element may include a <VAL-client-id> element; or

b) a <VAL-ue-id> element.

The <establishment-rsp> element:

a) shall include a <result> element which may include a <cause> sub-element; and

b) may include a <traffic-descriptor-info> element which shall include at least one of the following sub-elements:

1) a <user-plane-address> element;

2) a <port-number> element;

3) a <URL> element; or

4) a <transport-layer-protocol> element; and

c) a <expiry-time> element; and

d) a <traffic-transmission-bandwidth> element.

The <release-req> element:

a) may include either a <server-id> element or a <sealdd-client-identity> element; and

b) shall include a <sealdd-flow-id> element.

The <release-rsq> element:

a) shall include a <result> element which may include a <cause> sub-element.

The <URLLC-establishment-req> element:

a) shall include a <sealdd-client-identity> element;

b) shall include a <sealdd-flow-id> element;

c) may include a <identity> element;

d) may include a <server-id> element;

e) may include a <VAL-service-id> element;

f) may include a <traffic-descriptor-info> element which shall include at least one of the following sub-elements:

1) a <user-plane-address> element;

2) a <port-number> element;

3) a <URL> element; or

4) a <transport-layer-protocol> element.

The <identity> element shall include one of the following:

a) a <VAL-user-id> element may include a <VAL-client-id> element; or

b) a <VAL-ue-id> element.

The <URLLC-establishment-rsp> element:

a) shall include a <result> element which may include a <cause> sub-element; and

b) may include a <traffic-descriptor-info> element which shall include at least one of the following sub-elements:

1) a <user-plane-address> element;

2) a <port-number> element;

3) a <URL> element; or

4) a <transport-layer-protocol> element.

The <URLLC-update-req> element:

a) shall include a <sealdd-client-identity> element;

b) shall include a <sealdd-flow-id> element;

c) may include a <server-id> element

d) may include a <VAL-service-id> element;

e) may include a <traffic-descriptor-info> element which shall include at least one of the following sub-elements:

1) a <user-plane-address> element;

2) a <port-number> element;

3) a <URL> element; or

4) a <transport-layer-protocol> element.

The <URLLC-update-rsp> element:

a) shall include a <result> element which may include a <cause> sub-element.

The <data-storage-creation-req> element:

a) shall include a <application-data> element;

b) may include a <access-control-policy> element;

c) may include a <expiry-time> element; and

d) may include a <status-information-req> element which shall include at least one of the following sub-elements:

1) a <no-times-data-accessed> element; and

2) a <no-times-data-managed> element.

The <data-storage-creation-rsp> element:

a) shall include a <result> element; and

b) may include a <data-identifier> element.

The <data-storage-reservation-req> element:

a) shall include a <VAL-service-id> element;

b) may include a <data-length> element.

The <data-storage-reservation-rsp> element:

a) shall include a <result> element; and

b) may include a <address> element.

The <data-status-notification> element:

a) shall include a <data-identifier> element; and

b) shall include a <status-information-rsp> element which shall include at least one of the following sub-elements:

1) a <no-times-data-accessed-value> element; and

2) a <no-times-data-managed-value> element.

The <data-storage-query-req> element:

a) shall include a <data-identifier> element.

The <data-storage-query-rsp> element:

a) shall include a <result> element;

b) shall include a <data-identifier> element; and

c) may include a <application-data> element.

The <data-storage-mgt-req> element:

a) shall include a <data-identifier> element; and

b) shall include a <operation> element.

The <data-storage-mgt-rsp> element:

a) shall include a <result> element;

b) shall include a <data-identifier> element; and

c) may include a <application-data> element.

The <measurements-subscription-req> element:

a) shall include a <sealdd-flow-id> element;

b) shall include a <measurement-requirement-list> element which shall include at least one of the following sub-elements:

1) a <measurement-id> element;

2) a <reporting-frequency> element;

3) a <reporting-periodicity> element;

4) a <measurement-window> element;

5) a <expiry time > element;

6) a <service-policy> element which shall include the following sub-elements:

i) a <quality-guarantee-event> element; and

ii) a <quality-guarantee-action> element; and

7) a <reporting-criteria> element; and

c) may include a <measurement-conditions> element.

The <measurements-subscription-rsp> element:

a) shall include a <result> element; and

b) may include a <expiry-time> element.

The <measurements-notification> element:

a) shall include a <measurement-requirement-notify-list> element which shall include at least one of the following sub-elements:

1) a <measurement-id> element;

2) a <average-measurement-value> element;

3) a <minimum-measurement-value> element;

4) a <maximum-measurement-value> element;

5) a <standard-deviation-measurement-value> element;

6) a <kpercentile-measurement-value> element:

7) a <measurement-period> element; and

8) a <timestamp> element.

The <tx-quality-management-req> element:

a) shall include a <sealdd-flow-id> element; and

b) shall include a <tx-quality-management-action> element.

The <tx-quality-management-rsp> element:

a) shall include a <result> element.

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

### 8.4.2 XML schema

<?xml version="1.0" encoding="UTF-8"?>

<xs:schema xmlns:xs="<http://www.w3.org/2001/XMLSchema>"

targetNamespace="urn:3gpp:ns:sealDataDeliveryInfo:1.0"

xmlns:sealdatadelivery="urn:3gpp:ns:sealDataDeliveryInfo:1.0"

elementFormDefault="qualified"

attributeFormDefault="unqualified"

xmlns:xenc="http://www.w3.org/2001/04/xmlenc#">

<xs:annotation>

 <xs:documentation>

 3GPP - SDDM messages syntax based on 3GPP TS 24.543.

 </xs:documentation>

</xs:annotation>

<xs:import namespace="http://www.w3.org/XML/1998/namespace"

 schemaLocation="http://www.w3.org/2001/xml.xsd"/>

 <!-- the root element which contains the SEALDD protocol messages -->

 <xs:element name="data-delivery-info" id="DataDelivery">

 <xs:complexType>

 <xs:choice>

 <xs:element name="EstablishmentReq" type="sealdatadelivery:tEstablishmentReqType"/>

 <xs:element name="EstablishmentRsp" type="sealdatadelivery:tEstablishmentRspType"/>

 <xs:element name="ReleaseReq" type="sealdatadelivery:tReleaseReqType"/>

 <xs:element name="ReleaseRsp" type="sealdatadelivery:tReleaseRspType"/>

 <xs:element name="URLLCEstablishmentReq" type="sealdatadelivery:tURLLCEstablishmentReqType"/>

 <xs:element name="URLLCEstablishmentRsp" type="sealdatadelivery:tURLLCEstablishmentRspType"/>

 <xs:element name="URLLCUpdateReq" type="sealdatadelivery:tURLLCUpdateReqType"/>

 <xs:element name="URLLCUpdateRsp" type="sealdatadelivery:tURLLCUpdatetRspType"/>

 <xs:element name="DataStorageCreationReq" type="sealdatadelivery:tDataStorageReqType"/>

 <xs:element name="DataStorageCreationRsp" type="sealdatadelivery:tDataStorageRspType"/>

 <xs:element name="DataStorageReservationReq" type="sealdatadelivery:tDataStorageReqType"/>

 <xs:element name="DataStorageReservationRsp" type="sealdatadelivery:tDataStorageRspType"/>

 <xs:element name="DataStatusNotification" type="sealdatadelivery:tDataStatusNotificationType"/>

 <xs:element name="DataStorageQueryReq" type="sealdatadelivery:tDataStorageQueryReqType"/>

 <xs:element name="DataStorageQueryRsp" type="sealdatadelivery:tDataStorageQueryRspType"/>

 <xs:element name="DataStorageMgtReq" type="sealdatadelivery:tDataStorageMgtReqType"/>

 <xs:element name="DataStorageMgtRsp" type="sealdatadelivery:tDataStorageMgtRspType"/>

 <xs:element name="MeasurementsSubscriptionReq" type="sealdatadelivery:tMeasurementsSubscriptionReqType"/>

 <xs:element name="MeasurementsSubscriptionRsp" type="sealdatadelivery:tMeasurementsSubscriptionRspType"/>

 <xs:element name="MeasurementsNotification" type="sealdatadelivery:tMeasurementsNotificationType"/>

 <xs:element name="tx-quality-management-req" type="sealdatadelivery:tTxQualityManagementReqType"/>

 <xs:element name="tx-quality-management-rsp" type="sealdatadelivery:tTxQualityManagementRspType"/>

 <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs= "unbounded"/>

 </xs:choice>

 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

 </xs:element>

 <xs:complexType name="tEstablishmentReqType">

 <xs:choice>

 <xs:element name="requestor-id" type="sealdatadelivery:tRequestorIdType" minOccurs="1" maxOccurs="1"/>

 <xs:element name="sealdd-flow-id" type="sealdatadelivery:tSealFlowIdType" minOccurs="1" maxOccurs="1"/>

 <xs:element name="server-id" type="xs:string" minOccurs="0" maxOccurs="1"/>

 <xs:element name="endpoint-id" type="xs:string" minOccurs="0" maxOccurs="1"/>

 <xs:element name="VAL-service-id" type="xs:string" minOccurs="0" maxOccurs="1"/>

 <xs:element name="sealdd-communication-lifetime" type="xs:string" minOccurs="0" maxOccurs="1"/>

 <xs:element name="traffic-descriptor-info" type="sealdatadelivery:tTrafficDescriptorInfoType" minOccurs="0" maxOccurs="1"/>

 <xs:element name="Identity" type="sealdatadelivery:tIdentityType" minOccurs="0" maxOccurs="1"/>

 <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

 <xs:element name="anyExt" type="sealdatadelivery:anyExtType" minOccurs="0"/>

 </xs:choice>

 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

 <xs:simpleType name="tRequestorIdType">

 <xs:restriction base="xs:string">

 <xs:enumeration value="sealddclient"/>

 <xs:enumeration value="sealddserver"/>

 </xs:restriction>

 </xs:simpleType>

 <xs:simpleType name="tSealFlowIdType">

 <xs:restriction base="xs:positiveInteger">

 <xs:minInclusive value="1"/>

 <xs:maxInclusive value="65535"/>

 </xs:restriction>

 </xs:simpleType>

 <xs:complexType name="tIdentityType">

 <xs:choice>

 <xs:element name="VAL-user-id" type="sealdatadelivery:contentType" minOccurs="0" maxOccurs="1"/>

 <xs:element name="VAL-ue-id" type="xs:string" minOccurs="0"/>

 <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

 <xs:element name="anyExt" type="sealdatadelivery:anyExtType" minOccurs="0"/>

 </xs:choice>

 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

 <xs:complexType name="tTrafficDescriptorInfoType">

 <xs:choice>

 xs:element name="IP-address" type="xs:string" minOccurs="0" maxOccurs="1"/>

 <xs:element name="port-number" type="sealdatadelivery:tPortNumberType" minOccurs="0" maxOccurs="1"/>

 <xs:element name="URL" type="xs:string" minOccurs="0" maxOccurs="1"/>

 <xs:element name="transport-layer-protocol" type="xs:string" minOccurs="0" maxOccurs="1"/>

 <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

 <xs:element name="anyExt" type="sealdatadelivery:anyExtType" minOccurs="0"/>

 </xs:choice>

 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

 <xs:simpleType name="tPortNumberType">

 <xs:restriction base="xs:positiveInteger">

 <xs:minInclusive value="1"/>

 <xs:maxInclusive value="65535"/>

 </xs:restriction>

 </xs:simpleType>

 <xs:complexType name="tEstablishmentRspType">

 <xs:choice>

 <xs:element name="result" type="sealdatadelivery:tResultType" minOccurs="1" maxOccurs="1"/>

 <xs:element name="traffic-descriptor-info" type="sealdatadelivery:tTrafficDescriptorInfoType" minOccurs="0" maxOccurs="1"/>

 <xs:element name="expiry-time" type="xs:nonPositiveInteger" minOccurs="0" maxOccurs="1"/>

 <xs:element name="traffic-transmission-bandwidth" type="xs:positiveInteger" minOccurs="0" maxOccurs="1"/>

 <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

 <xs:element name="anyExt" type="sealdatadelivery:anyExtType" minOccurs="0"/>

 </xs:choice>

 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

 <xs:complexType name="tResultType">

 <xs:choice>

 <xs:element name="operation-result" type="sealdatadelivery:tOperationResultType" minOccurs="1" maxOccurs="1"/>

 <xs:element name="cause" type="sealdatadelivery:tCauseType" minOccurs="0" maxOccurs="1"/>

 </xs:choice>

 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

 <xs:simpleType name="tOperationResultType">

 <xs:restriction base="xs:string">

 <xs:enumeration value="Sucess"/>

 <xs:enumeration value="Failure"/>

 </xs:restriction>

 </xs:simpleType>

 <xs:simpleType name="tCauseType">

 <xs:restriction base="xs:string">

 <xs:enumeration value="SEALDD policy mismatch"/>

 <xs:enumeration value="VAL client error"/>

 <xs:enumeration value="Other"/>

 </xs:restriction>

 </xs:simpleType>

 <xs:complexType name="tReleaseReqType">

 <xs:choice>

 <xs:element name="server-id" type="xs:string" minOccurs="1" maxOccurs="1"/>

 <xs:element name="sealdd-client-identity" type="xs:string" minOccurs="0" maxOccurs="1"/>

 <xs:element name="sealdd-flow-id" type="sealdatadelivery:tSealFlowIdType" minOccurs="1" maxOccurs="1"/>

 <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

 <xs:element name="anyExt" type="sealdatadelivery:anyExtType" minOccurs="0"/>

 </xs:choice>

 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

 <xs:complexType name="tReleaseRspType">

 <xs:choice>

 <xs:element name="result" type="sealdatadelivery:tResultType" minOccurs="1" maxOccurs="1"/>

 <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

 <xs:element name="anyExt" type="sealdatadelivery:anyExtType" minOccurs="0"/>

 < /xs:choice>

 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

 <xs:complexType name="tURLLCEstablishmentReqType">

 <xs:choice>

 <xs:element name="sealdd-client-identity" type="xs:string" minOccurs="1" maxOccurs="1"/>

 <xs:element name="sealdd-flow-id" type="sealdatadelivery:tSealFlowIdType" minOccurs="1" maxOccurs="1"/>

 <xs:element name="Identity" type="sealdatadelivery:tIdentityType" minOccurs="0" maxOccurs="1"/>

 <xs:element name="server-id" type="xs:string" minOccurs="0" maxOccurs="1"/>

 <xs:element name="VAL-server-id" type="xs:string" minOccurs="0" maxOccurs="1"/>

 <xs:element name="traffic-descriptor-info" type="sealdatadelivery:tTrafficDescriptorInfoType" minOccurs="0" maxOccurs="1"/>

 <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

 <xs:element name="anyExt" type="sealdatadelivery:anyExtType" minOccurs="0"/>

 </xs:choice>

 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

 <xs:complexType name="contentType">

 <xs:choice>

 <xs:element name="sealURI" type="xs:anyURI"/>

 <xs:element name="sealString" type="xs:string"/>

 <xs:element name="sealBoolean" type="xs:boolean"/>

 <xs:any namespace="##other" processContents="lax"/>

 </xs:choice>

 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

 <xs:complexType name="tURLLCEstablishmentRspType">

 <xs:choice>

 <xs:element name="result" type="sealdatadelivery:tResultType" minOccurs="1" maxOccurs="1"/>

 <xs:element name="traffic-descriptor-info" type="sealdatadelivery:tTrafficDescriptorInfoType" minOccurs="0" maxOccurs="1"/>

 <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

 <xs:element name="anyExt" type="sealdatadelivery:anyExtType" minOccurs="0"/>

 </xs:choice>

 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

 <xs:complexType name="tURLLCUpdateReqType">

 <xs:choice>

 <xs:element name="sealdd-client-identity" type="xs:string" minOccurs="1" maxOccurs="1"/>

 <xs:element name="sealdd-flow-id" type="sealdatadelivery:tSealFlowIdType" minOccurs="1" maxOccurs="1"/>

 <xs:element name="Identity" type="sealdatadelivery:tIdentityType" minOccurs="0" maxOccurs="1"/>

 <xs:element name="server-id" type="xs:string" minOccurs="0" maxOccurs="1"/>

 <xs:element name="VAL-server-id" type="xs:string" minOccurs="0" maxOccurs="1"/>

 <xs:element name="traffic-descriptor-info" type="sealdatadelivery:tTrafficDescriptorInfoType" minOccurs="0" maxOccurs="1"/>

 <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

 <xs:element name="anyExt" type="sealdatadelivery:anyExtType" minOccurs="0"/>

 </xs:choice>

 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

 <xs:complexType name="tURLLCUpdateRspType">

 <xs:choice>

 <xs:element name="result" type="sealdatadelivery:tResultType" minOccurs="1" maxOccurs="1"/>

 <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

 <xs:element name="anyExt" type="sealdatadelivery:anyExtType" minOccurs="0"/>

 </xs:choice>

 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

 <xs:complexType name="tDataStorageCreationReqType">

 <xs:choice>

 <xs:element name="application-data" type="xs:hexBinary" minOccurs="1" maxOccurs="1"/>

 <xs:element name="access-control-policy" type="sealdatadelivery:tAccessControlPolicyType" minOccurs="0" maxOccurs="1"/>

 <xs:element name="expiry-time" type="xs:nonPositiveInteger" minOccurs="0" maxOccurs="1"/>

 <xs:element name="status-information-req" type="sealdatadelivery:tStatusInformationReqType" minOccurs="0" maxOccurs="1"/>

 <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

 <xs:element name="anyExt" type="sealdatadelivery:anyExtType" minOccurs="0"/>

 </xs:choice>

 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

 <xs:complexType name="tStatusInformationReqType">

 <xs:sequence>

 <xs:element name="no-times-data-accessed" type="boolean" minOccurs="0" maxOccurs="1"/>

 <xs:element name="no-times-data-managed" type="boolean" minOccurs="0" maxOccurs="1"/>

 <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

 xs:element name="anyExt" type="sealloc:anyExtType" minOccurs="0"/>

 </xs:sequence>

 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

 <xs:simpleType name="tAccessControlPolicyType">

 <xs:restriction base="xs:string">

 <xs:enumeration value="SDDM-C"/>

 <xs:enumeration value="VAL-server"/>

 <xs:enumeration value="SDDM-S"/>

 </xs:restriction>

 </xs:simpleType>

 <xs:complexType name="tDataStorageCreationRspType">

 <xs:choice>

 <xs:element name="result" type="sealdatadelivery:tOperationResultType" minOccurs="1" maxOccurs="1"/>

 <xs:element name="data-identifier" type="xs:string" minOccurs="0" maxOccurs="1"/>

 <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

 <xs:element name="anyExt" type="sealdatadelivery:anyExtType" minOccurs="0"/>

 </xs:choice>

 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

 <xs:complexType name="tDataStorageReservationReqType">

 <xs:choice>

 <xs:element name="VAL-service-id" type="xs:string" minOccurs="1" maxOccurs="1"/>

 <xs:element name="data-length" type="xs:positiveInteger" minOccurs="0" maxOccurs="1"/>

 <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

 <xs:element name="anyExt" type="sealdatadelivery:anyExtType" minOccurs="0"/>

 </xs:choice>

 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

 <xs:complexType name="tDataStorageReservationRspType">

 <xs:choice>

 <xs:element name="result" type="sealdatadelivery:tOperationResultType" minOccurs="1" maxOccurs="1"/>

 <xs:element name="address" type="xs:string" minOccurs="0" maxOccurs="1"/>

 <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

 <xs:element name="anyExt" type="sealdatadelivery:anyExtType" minOccurs="0"/>

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 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

 <xs:complexType name="tDataStatusNotificationType">

 <xs:choice>

 <xs:element name="data-identifier" type="xs:string" minOccurs="0" maxOccurs="1"/>

 <xs:element name="status-information-rsp" type="sealdatadelivery:tStatusInformationRspType" minOccurs="1" maxOccurs="1"/>

 <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

 <xs:element name="anyExt" type="sealdatadelivery:anyExtType" minOccurs="0"/>

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 <xs:anyAttribute namespace="##any" processContents="lax"/>

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 <xs:complexType name="tStatusInformationRspType">

 <xs:sequence>

 <xs:element name="no-times-data-accessed-value" type="xs:unsignedInt " minOccurs="0" maxOccurs="1"/>

 <xs:element name="no-times-data-managed-value" type="xs:unsignedInt" minOccurs="0" maxOccurs="1"/>

 <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

 <xs:element name="anyExt" type="sealloc:anyExtType" minOccurs="0"/>

 </xs:sequence>

 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

 <xs:complexType name="tDataStorageQueryReqType">

 <xs:choice>

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 <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

 <xs:element name="anyExt" type="sealdatadelivery:anyExtType" minOccurs="0"/>

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 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

 <xs:complexType name="tDataStorageQueryRspType">

 <xs:choice>

 <xs:element name="result" type="sealdatadelivery:tOperationResultType" minOccurs="1" maxOccurs="1"/>

 <xs:element name="data-identifier" type="xs:string" minOccurs="1" maxOccurs="1"/>

 <xs:element name="application-data" type="xs:hexBinary" minOccurs="0" maxOccurs="1"/>

 <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

 <xs:element name="anyExt" type="sealdatadelivery:anyExtType" minOccurs="0"/>

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 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

 <xs:complexType name="tDataStorageMgtReqType">

 <xs:choice>

 <xs:element name="data-identifier" type="xs:string" minOccurs="1" maxOccurs="1"/>

 <xs:element name="operation" type="xs:sealdatadelivery:tOperationType" minOccurs="1" maxOccurs="1"/>

 <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

 <xs:element name="anyExt" type="sealdatadelivery:anyExtType" minOccurs="0"/>

 </xs:choice>

 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

 <xs:simpleType name="tOperationType">

 <xs:restriction base="xs:string">

 <xs:enumeration value="Update"/>

 <xs:enumeration value="Refresh"/>

 <xs:enumeration value="Delete"/>

 </xs:restriction>

 </xs:simpleType>

 <xs:complexType name="tDataStorageMgtRspType">

 <xs:choice>

 <xs:element name="result" type="sealdatadelivery:tOperationResultType" minOccurs="1" maxOccurs="1"/>

 <xs:element name="data-identifier" type="xs:string" minOccurs="1" maxOccurs="1"/>

 <xs:element name="application-data" type="xs:hexBinary" minOccurs="1" maxOccurs="1"/>

 <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

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 </xs:choice>

 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

 <xs:complexType name="tMeasurementsSubscriptionReqType">

 <xs:choice>

 <xs:element name="sealdd-flow-id" type="sealdatadelivery:tSealFlowIdType" minOccurs="1" maxOccurs="1"/>

 <xs:element name="measurement-requirement-list" type="sealdatadelivery:tMeasurementRequirementListType" minOccurs="1" maxOccurs="1"/>

 <xs:element name="measurement-conditions" type="sealdatadelivery:tMeasurementConditionsType" minOccurs="0" maxOccurs="1"/>

 <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

 <xs:element name="anyExt" type="sealdatadelivery:anyExtType" minOccurs="0"/>

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 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

 <xs:complexType name="tMeasurementConditionsType">

 <xs:choice>

 <xs:element name="temporal-conditions" type="sealdatadelivery:tTemporalConditionsType" minOccurs="0" maxOccurs="unbounded"/>

 <xs:element name="spacial-conditions" type="sealdatadelivery:tSpatialConditionsType" minOccurs="0"/ maxOccurs="unbounded">

 <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

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 </xs:choice>

 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

 <xs:simpleType name="tTemporalConditionsType">

 <xs:element name="date-and-time" type="xs:dateTime" minOccurs="0"/>

 </xs:simpleType>

 <xs:complexType name="tSpatialConditionsType">

 <xs:sequence>

 <xs:element name="PolygonArea" type="sealdatadelivery:tPolygonAreaType" minOccurs="0"/>

 <xs:element name="EllipsoidArcArea" type="sealdatadelivery:tEllipsoidArcType" minOccurs="0"/>

 <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

 <xs:element name="anyExt" type="sealloc:anyExtType" minOccurs="0"/>

 </xs:sequence>

 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

 <xs:complexType name="tPolygonAreaType">

 <xs:sequence>

 <xs:element name="Corner" type="sealdatadelivery:tPointCoordinateType" minOccurs="3" maxOccurs="15"/>

 <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

 <xs:element name="anyExt" type="sealdatadelivery:anyExtType" minOccurs="0"/>

 </xs:sequence>

 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

 <xs:complexType name="tEllipsoidArcType">

 <xs:sequence>

 <xs:element name="Center" type="sealdatadelivery:tPointCoordinateType"/>

 <xs:element name="Radius" type="xs:nonNegativeInteger"/>

 <xs:element name="OffsetAngle" type="xs:unsignedByte"/>

 <xs:element name="IncludedAngle" type="xs:unsignedByte"/>

 <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

 <xs:element name="anyExt" type="sealdatadelivery:anyExtType" minOccurs="0"/>

 </xs:sequence>

 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

 <xs:complexType name="tPointCoordinateType">

 <xs:sequence>

 <xs:element name="longitude" type="sealdatadelivery:tCoordinateType"/>

 <xs:element name="latitude" type="sealdatadelivery:tCoordinateType"/>

 <xs:element name="altitude" type="sealdatadelivery:tCoordinateType" minOccurs="0"/>

 <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

 <xs:element name="anyExt" type="sealloc:anyExtType" minOccurs="0"/>

 </xs:sequence>

 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

 <xs:complexType name="tCoordinateType">

 <xs:choice minOccurs="1" maxOccurs="1">

 <xs:element name="threebytes" type="sealdatadelivery:tThreeByteType" minOccurs="0"/>

 <xs:any namespace="##other" processContents="lax"/>

 <xs:element name="anyExt" type="sealdatadelivery:anyExtType" minOccurs="0"/>

 </xs:choice>

 <xs:attribute name="type" type="sealdatadelivery:protectionType"/>

 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

 <xs:simpleType name="tThreeByteType">

 <xs:restriction base="xs:integer">

 <xs:minInclusive value="0"/>

 <xs:maxInclusive value="16777215"/>

 </xs:restriction>

 </xs:simpleType>

 <xs:complexType name="tMeasurementRequirementListType">

 <xs:choice>

 <xs:element name="measurement-id" type="sealdatadelivery:tMeasurementIdType" minOccurs="1" maxOccurs="unbounded"/>

 <xs:element name="reporting-frequency" type="sealdatadelivery:tReportingFrequencyType" minOccurs="0" maxOccurs="unbounded"/>

 <xs:element name="reporting-periodicity" type="xs:unsignedInt" minOccurs="0" maxOccurs="0"/ maxOccurs="unbounded">

 <xs:element name="measurement-window" type="unsignedInt" minOccurs="0" maxOccurs="unbounded"/>

 <xs:element name="expiry-time" type="xs:nonPositiveInteger" minOccurs="0" maxOccurs="unbounded"/>

 <xs:element name="service-policy" type="sealdatadelivery:tServicePolicyType" minOccurs="0" maxOccurs="unbounded"/>

 <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

 <xs:element name="anyExt" type="sealdatadelivery:anyExtType" minOccurs="0"/>

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 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

 <xs:complexType name="tServicePolicyType">

 <xs:choice>

 <xs:element name="quality-guarantee-event" type="sealdatadelivery:tQualityGuaranteeEventType" minOccurs="1" maxOccurs="1"/>

 <xs:element name="quality-guarantee-action" type="sealdatadelivery:tQualityGuranteeActionType" minOccurs="0" maxOccurs="1"/>

 <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

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 </xs:choice>

 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

 <xs:simpleType name="tReportingFrequencyType">

 <xs:restriction base="xs:string">

 <xs:enumeration value="periodic"/>

 <xs:enumeration value="now"/>

 </xs:restriction>

 </xs:simpleType>

 <xs:simpleType name="tMeasurementIdType">

 <xs:restriction base="xs:string">

 <xs:enumeration value="latency"/>

 <xs:enumeration value="bitrate"/>

 <xs:enumeration value="jitter"/>

 <xs:enumeration value="packetloss"/>

 </xs:restriction>

 </xs:simpleType>

 <xs:complexType name="tQualityGuaranteeEventType">

 <xs:simpleContent>

 <xs:extension base="xs:integer">

 <xs:attribute name="TriggerEvent" type="xs:string" use="required"/>

 </xs:extension>

 </xs:simpleContent>

 </xs:complexType>

 <xs:simpleType name="tQualityGuranteeActionType">

 <xs:restriction base="xs:string">

 <xs:enumeration value="Redundant transmission path"/>

 <xs:enumeration value="Re-establish transmission path"/>

 <xs:enumeration value="Switch to backup transmission path"/>

 <xs:enumeration value="Back to single transmission path"/>

 </xs:restriction>

 </xs:simpleType>

 <xs:complexType name="tMeasurementsSubscriptionRspType">

 <xs:choice>

 <xs:element name="result" type="sealdatadelivery:tOperationResultType" minOccurs="1" maxOccurs="1"/>

 <xs:element name="expiry-time" type="xs:nonPositiveInteger" minOccurs="0" maxOccurs="1"/>

 <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

 <xs:element name="anyExt" type="sealdatadelivery:anyExtType" minOccurs="0"/>

 </xs:choice>

 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

 <xs:complexType name="tMeasurementsNotificationType">

 <xs:choice>

 <xs:element name="measurement-requirement-notify-list" type="sealdatadelivery:tMeasurementRequirementNotifyListType" minOccurs="1" maxOccurs="1"/>

 <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

 <xs:element name="anyExt" type="sealdatadelivery:anyExtType" minOccurs="0"/>

 </xs:choice>

 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

 <xs:complexType name="tMeasurementRequirementNotifyListType">

 <xs:choice>

 <xs:element name="measurement-id" type="sealdatadelivery:tMeasurementIdType" minOccurs="1" maxOccurs="1"/>

 <xs:element name="average-measurement-value" type="xs:integer" minOccurs="0" maxOccurs="1"/>

 <xs:element name="minimum-measurement-value" type="xs:integer" minOccurs="0" maxOccurs="1"/>

 <xs:element name="maximum-measurement-value" type="xs:integer" minOccurs="0" maxOccurs="1"/>

 <xs:element name="standard-deviation-measurement-value" type="xs:integer" minOccurs="0" maxOccurs="1"/>

 <xs:element name="kpercentile-measurement-value" type="xs:integer" minOccurs="0" maxOccurs="1"/>

 <xs:element name="measurement-period" type="xs:positiveInteger" minOccurs="0" maxOccurs="1"/>

 <xs:element name="timestamp" type="xs:dateTime" minOccurs="0" maxOccurs="1"/>

 <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

 <xs:element name="anyExt" type="sealdatadelivery:anyExtType" minOccurs="0"/>

 </xs:choice>

 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

 <xs:complexType name="tTxQualityManagementReqType">

 <xs:choice>

 <xs:element name="sealdd-flow-id" type="sealdatadelivery:tSealFlowIdType" minOccurs="1" maxOccurs="1"/>

 <xs:element name="tx-quality-management-action" type="sealdatadelivery:tQualityGuranteeActionType" minOccurs="1" maxOccurs="1"/>

 <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

 <xs:element name="anyExt" type="sealdatadelivery:anyExtType" minOccurs="0"/>

 </xs:choice>

 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

 <xs:complexType name="tTxQualityManagementRspType">

 <xs:choice>

 <xs:element name="result" type="sealdatadelivery:tOperationResultType" minOccurs="1" maxOccurs="1"/>

 <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

 <xs:element name="anyExt" type="sealdatadelivery:anyExtType" minOccurs="0"/>

 </xs:choice>

 <xs:anyAttribute namespace="##any" processContents="lax"/>

 </xs:complexType>

<!-- XML attribute for any future extension -->

 <xs:complexType name="anyExtType">

 <xs:sequence>

 <xs:any namespace="##any" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

 </xs:sequence>

 </xs:complexType>

</xs:schema>

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

## 8.5 Data semantics

The <data-delivery-info> element is the root element of the XML document. The <data-delivery-info> element contains the <establishment-req>, <establishment-rsp>, <release-req>, <release-rsp>, <URLLC-establishment-req>, <URLLC-establishment-rsq>, <URLLC-update-req>, <URLLC-update-rsp>, <data-storage-creation-req>, <data-storage-creation-rsp>, <data-storage-reservation-req>, <data-storage-reservation-rsp>, <data-status-notification>, <measurements-subscription-req> , <measurements-subscription-rsp>, <data-storage-query-req>, <data-storage-query-rsp>, <data-storage-mgt-req>, <data-storage-mgt-rsp>, <measurements-notification>, <tx-quality-management-req>, <tx-quality-management-rsp> sub-elements.

<establishment-req> contains the following sub-elements:

a) <requestor-id>, a mandatory element. This element contains a string set to either "sealddclient" or "sealddserver" used to specify the identity of the requestor being either an SDDM-C or an SDDM-S.

b) <sealdd-flow-id>, a mandatory element specifying the identity of the seal flow.

c) <server-id>, an optional element specifying the VAL server.

d) <endpoint-id>, an optional element specifying the endpoint of a selected VAL server.

e) <sealdd-communication-lifetime>, an optional element specifying the data delivery communication lifetime.

f) <VAL-service-id>, an optional element specifying the VAL service identity of the vertical application.

g) <traffic-descriptor-info>, an optional element specifying the information of the traffic that contains one or more of the following sub-elements:

1) a <user-plane-address> element set to user plane IP address used for the traffic;

2) a <port-number> element set to the port number for the traffic;

3) a <URL> element set to a text format that specifies how to access the resource on the Internet for the traffic; or

4) a <transport-layer-protocol> element set to the transport protocol used for the traffic (e.g. TCP, UDP).

h) <identity>, an optional element set to the identity of the VAL user or the identity of the SDDM-C acting as the VAL UE and performing the request or the SDDM-S that performs the request.

<establishment-rsp> contains the following sub-elements:

a) <result>, a mandatory element set to either "success" or "failure" indicating success or failure of the operation. If the result is "failure", the <result> element may contain a <cause> sub-element set to the cause of the failure of the operation (e.g. SEALDD policy mismatch).

b) <traffic-descriptor-info>, an optional element specifying the information of the traffic that contains one or more of the following sub-elements:

1) a <user-plane-address> element set to user plane IP address used for the traffic;

2) a <port-number> element set to the port number for the traffic;

3) a <URL> element set to a text format that specifies how to access the resource on the Internet for the traffic; or

4) a <transport-layer-protocol> element set to the transport protocol used for the traffic (e.g. TCP, UDP); and

c) a <expiry-time> element set to a time in milliseconds that triggers the re-connection from either the SDDM-C or the SDDM-S when bandwidth limit check has failed; and

d) a <traffic-transmission-bandwidth> element set to the suggested traffic transmission bandwidth to be used by either the SDDM-C or the SDDM-S.

<identity> contains one of following sub-elements:

a) <VAL-user-id> element specifying the identity of the VAL user; or

b) <VAL-UE-id> element specifying the identity of the VAL UE.

<release-req> contains the following sub-elements:

a) <server-id>, an optional element specifying the endpoint of a selected VAL server;

b) <sealdd-client-identity>, an optional element specifying the identity of the SDDM-C; and

c) <sealdd-flow-id>, a mandatory element specifying the identity of the seal flow.

<release-rsp> contains the following sub-elements:

a) <result>, a mandatory element set to either "success" or "failure" indicating success or failure of the operation.

<URLCC-establishment-req> contains the following sub-elements:

a) <sealdd-client-identity>, a mandatory element specifying the identity of the SDDM-C.

b) <sealdd-flow-id>, a mandatory element specifying the identity of the seal flow.

c) <server-id>, a mandatory element specifying the endpoint of a selected VAL server.

d) <identity>, an optional set to the identity of the VAL user or the identity of the SDDM-C acting as the VAL UE and performing the request.

e) <VAL-service-id>, an optional element specifying the VAL service identity of the vertical application.

f) <traffic-descriptor-info>, an optional element specifying the information of the traffic that contains one or more of the following sub-elements:

1) a <user-plane-address> element set to user plane IP address used for the traffic;

2) a <port-number> element set to the port number for the traffic;

3) a <URL> element set to a text format that specifies how to access the resource on the Internet for the traffic; or

4) a <transport-layer-protocol> element set to the transport protocol used for the traffic (e.g. TCP, UDP).

<URLCC-establishment-rsp> contains the following sub-elements:

a) <result>, a mandatory element set to either "success" or "failure" indicating success or failure of the operation. If the result is "failure", the <result> element may contain a <cause> sub-element set to the cause of the failure of the operation (e.g. SEALDD policy mismatch).

b) <traffic-descriptor-info>, an optional element specifying the information of the traffic that contains one or more of the following sub-elements:

1) a <user-plane-address> element set to user plane IP address used for the traffic;

2) a <port-number> element set to the port number for the traffic;

3) a <URL> element set to a text format (URL) that specifies how to access the resource on the Internet for the traffic; or

4) a <transport-layer-protocol> element set to the transport protocol used for the traffic (e.g. TCP, UDP).

<URLCC-update-req> contains the following sub-elements:

a) <sealdd-client-identity>, a mandatory element specifying the identity of the SDDM-C.

b) <sealdd-flow-id>, a mandatory element specifying the identity of the seal flow.

c) <server-id>, a mandatory element specifying the endpoint of a selected VAL server.

d) <VAL-service-id>, an optional element specifying the VAL service identity of the vertical application.

e) <traffic-descriptor-info>, an optional element specifying the information of the traffic that contains one or more of the following sub-elements:

1) a <user-plane-address> element set to user plane IP address used for the traffic;

2) a <port-number> element set to the port number for the traffic;

3) a <URL> element set to a text format that specifies how to access the resource on the Internet for the traffic; or

4) a <transport-layer-protocol> element set to the transport protocol used for the traffic (e.g. TCP, UDP).

<URLCC-update-rsp> contains the following sub-element:

a) <result>, a mandatory element set to either "success" or "failure" indicating success or failure of the operation. If the result is "failure", the <result> element may contain a <cause> sub-element set to the cause of the failure of the operation (e.g. SEALDD policy mismatch).

<data-storage-creation-req> contains the following sub-elements:

a) <application-data>, a mandatory element that provides the application data in hexadecimal to be stored which length is indicated by the <data-length> element;

b) <access-control-policy>, an optional element set to the control policy for the requested data access from other consumers (e.g. SDDM-C, VAL server, other SDDM-S);

c) <expiry-time>, an optional element set to the expiration time in minutes of the data to be stored; and

d) <status-information-req>, an optional element that contains one or more of the following sub-elements:

1) a <no-times-data-accessed> element that indicates whether information of how many times the stored data is accessed is requested for corresponding notifications; and

2) a <no-times-data-managed> element that indicates whether information of how many times the stored data is managed is requested for corresponding notifications.

<data-storage-creation-rsp> contains the following sub-elements:

a) <result>, a mandatory element set to either "success" or "failure" indicating success or failure of the operation; and

b) <data-identifier>, an optional element set to the identity of the stored data.

<data-storage-reservation-req> contains the following sub-elements:

a) <VAL-service-id>, a mandatory element set to the VAL service identity of the vertical application;

b) <data-length>, an optional element set to the data length in bytes to be stored;

<data-storage-reservation-rsp> contains the following sub-elements:

a) <result>, a mandatory element set to either "success" or "failure" indicating success or failure of the operation; and

b) <address>, an optional element set to the reserved address for data storage.

<data-status-notification> contains the following sub-elements:

a) <data-identifier>, a mandatory element set to the identity of the stored data being notified; and

b) <status-information-rsp>, a mandatory element that contains one or more of the following sub-elements:

1) <no-times-data-accessed-value>, an optional element set to the value of how many times the stored data is accessed; and

2) <no-times-data-managed-value> an optional element set to the value of how many times the stored data is managed.

<data-storage-query-req> contains the following sub-element:

a) <data-identifier>, a mandatory element set to the identity of the stored data which is requested to be queried.

<data-storage-query-rsp> contains the following sub-elements:

a) <result>, a mandatory element set to either set to "success" or "failure" indicating success or failure of the operation;

b) <data-identifier>, a mandatory element set to the identity of the stored data which is queried; and

c) <application-data>, an optional element that provides the application data which is queried.

<data-storage-mgt-req> contains the following sub-elements:

a) <data-identifier>, a mandatory element set to the identity of the stored data which is requested to be managed; and

b) <operation>, a mandatory element set to the operation to be performed such as to "update", "refresh" or "delete" the stored data.

<data-storage-mgt-rsp> contains the following sub-elements:

a) <result>, a mandatory element set to either "success" or "failure" indicating success or failure of the operation;

b) <data-identifier>, a mandatory element set to the identity of the stored data which is managed; and

c) <application-data>, an optional element that provides the application data which is managed.

<measurements-subscription-req> contains the following sub-elements:

a) <sealdd-flow-id>, a mandatory element specifying the identity of the seal flow;

b) <measurement-conditions>, an optional element specifying the temporal conditions, spatial conditions or both for the measurements; and

c) <measurement-requirement-list>, a mandatory element that contains one or more of the following sub-elements:

1) a <measurement-id> element set to measurement identifiers "latency", "bitrate", "jitter" or "packet loss";

2) a <reporting-frequency> element set to reporting frequency of measurement results "periodic", "now". If not present, it implies periodic reporting;

3) a <reporting-periodicity> element set to the reporting periodicity in seconds if the reporting frequency is periodic. This child element shall be included when the <reporting-frequency> element is set to "periodic" or not present;

4) a <measurement-window> element set to the measurement period window in milliseconds for transmission quality measurements;

5) a <expiry time > element set to the expiration time in milliseconds of the measurement identifier;

6) a <service-policy>, an optional element that contains the following sub-elements:

i) a <quality-guarantee-event> element set to the event (e.g. measurement threshold) that triggers performing the quality guarantee action. This element contains a mandatory <event-id> attribute (e.g. "measurement threshold value") that shall be set to a unique string and its corresponding value; and

ii) a <quality-guarantee-action> element set to the action to be performed "Redundant transmission", "Re-establish transmission path that can be released", "Switch to backup transmission path" when the measurement event occurs, in order to meet the quality guarantee.

7) a <reporting-criteria> element set to the criteria for reporting measurement results; and

d) a <measurement-conditions> element set to the temporal conditions, spatial conditions or both.

<measurements-subscription-rsp> contains the following sub-elements:

a) <result> element set to either "success" or "failure" indicating success or failure of the operation; and

b) <expiry-time>, an optional element set to the expiration time in milliseconds of the measurement requested.

<measurements-notification> contains the following sub-elements:

a) <measurement-requirement-notify-list>, a mandatory element that contains one or more of the following sub-elements:

1) a <measurement-id> element set to measurement identifiers "latency", "bitrate", "jitter" or "packet loss";

2) a <average-measurement-value> element set to the average measurement value of measurement results ("latency" and "jitter" are in milliseconds, "bitrate" is in Mbps, "packet loss" is in percentage of the number of packets that fail to reach their destination);

3) a <minimum-measurement-value> element set to the minimum measurement value of measurement results ("latency" and "jitter" are in milliseconds, "bitrate", is in Mbps, "packet loss" is in percentage of the number of packets that fail to reach their destination);

4) a <maximum-measurement-value> element set to the maximum measurement value of measurement results ("latency" and "jitter" are in milliseconds, "bitrate", is in Mbps, "packet loss" is in percentage of the number of packets that fail to reach their destination);

5) a <standard-deviation-measurement-value> element set to standard deviation measurement value of measurement results;

6) a <kpercentile-measurement-value> element set to the kpercentile measurement value of measurement results:

7) a <measurement-period> element set to the measurement period in seconds; and

8) a <timestamp> element set to the timestamp in date and time of the measurement results with an offset from the UTC time.

<tx-quality-management-req> element contains the following sub-elements:

a) <sealdd-flow-id>, a mandatory element specifying the identity of the seal flow; and

b) <tx-quality-management-action>, a mandatory element set to the data transmission quality "Redundant transmission path", "Re-establish transmission path", "Switch to backup transmission path" or "Back to single transmission path" that was triggered by an event (e.g. measurement threshold).

 <tx-quality-management-rsp> contains the following sub-element:

a) <result> element set to either "success" or "failure" indicating success or failure of the operation.

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