

DCC User Gateway Interface Design Specification

Annex - Service Request Definitions 19 – SMETS1 Device Response and Alert

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19 SMETS1 Responses and SMETS1 Alerts

19.1 Introduction

This document contains the description of the SMETS1 Response Message, which is defined in the DUIS XML Schema and is the XML structure used by the DCC Data Systems to return Countersigned SMETS1 Responses and Countersigned SMETS1 Alerts to DCC Service Users. The SMETS1 Response Message structure contains the Service Responses and Alerts as defined in the MMC XML Schema. These 2 XML Schemas are referred to as follows:

- The DUIS XML Schema XSD (document 3 of this documentation set);
- the MMC XML Schema XSD (document 4 of this documentation set).

The DCC Data Systems receives SMETS1 Responses and SMETS1 Alerts from the SMETS1 Service Provider(s) and forwards these responses to DCC Service Users.

The SEC SMETS1 Supporting Requirements Document defines obligations on S1SPs and alternative definitions to replace GBCS definitions for SMETS1 Devices.

This section and its contents shall only be used by DCC Service Users who interact with SMETS1 Devices via Service Requests. The content of this Annex 19 is not applicable to other DCC Service Users.

19.2 Context

Where possible and to minimise impact on the DCC Service User systems, the SMETS1 Response Format is identical to that of the Parse Output for the same Service Response for SMETS2 or later Devices.

The Main Document section 2.10 describes the context in which the SMETS1 Responses are applicable.

19.3 Use of XML Schemas

The DUIS XML representation of the SMETS1 Response in response to each Service Request incorporates XML elements defined in the MMC XML Schema, including information based on the same name as the corresponding Service Request in the DUIS XML schema, with the addition of the suffix "Rsp" at the end, for example UpdateMeterBalance and UpdateMeterBalanceRsp. The SMETS1 Response also includes additional information from the S1SP such as a signature. Service Requests for which there is no corresponding response from a Device, e.g. DCC Only Service Requests, will continue to use the existing DUIS XML Response corresponding to the SMETS2 or later Service Request, i.e. Acknowledgement or DCC Only specific response.

SMETS1 Alerts are also passed from the DCC Data Systems to the DCC Service Users in conformance to the DUIS and MMC XML Schemas, as described in section 19.4.3.2.

The DSP wraps and signs a SMETS1 Response to produce a Countersigned SMETS1 Response and a SMETS1 Alert to produce a Countersigned SMETS1 Alert.

19.4 XML High-Level Response Structure

Because SMETS1 Responses and Alerts are included in the DUIS XML Schema, their high level structure (SMETS1 Response Message) is as defined in the Main Document section 9.3.

SMETS1 DCC Only Service Responses and DCC Alerts also use the XML structure defined in the Main Document section 9.3.

This Annex 19 defines the specific XML structure for SMETS1 Responses and SMETS1 Alerts.

The top-level structure DUIS Response (see Main Document section 9.3 for details) is shown in the following diagram:

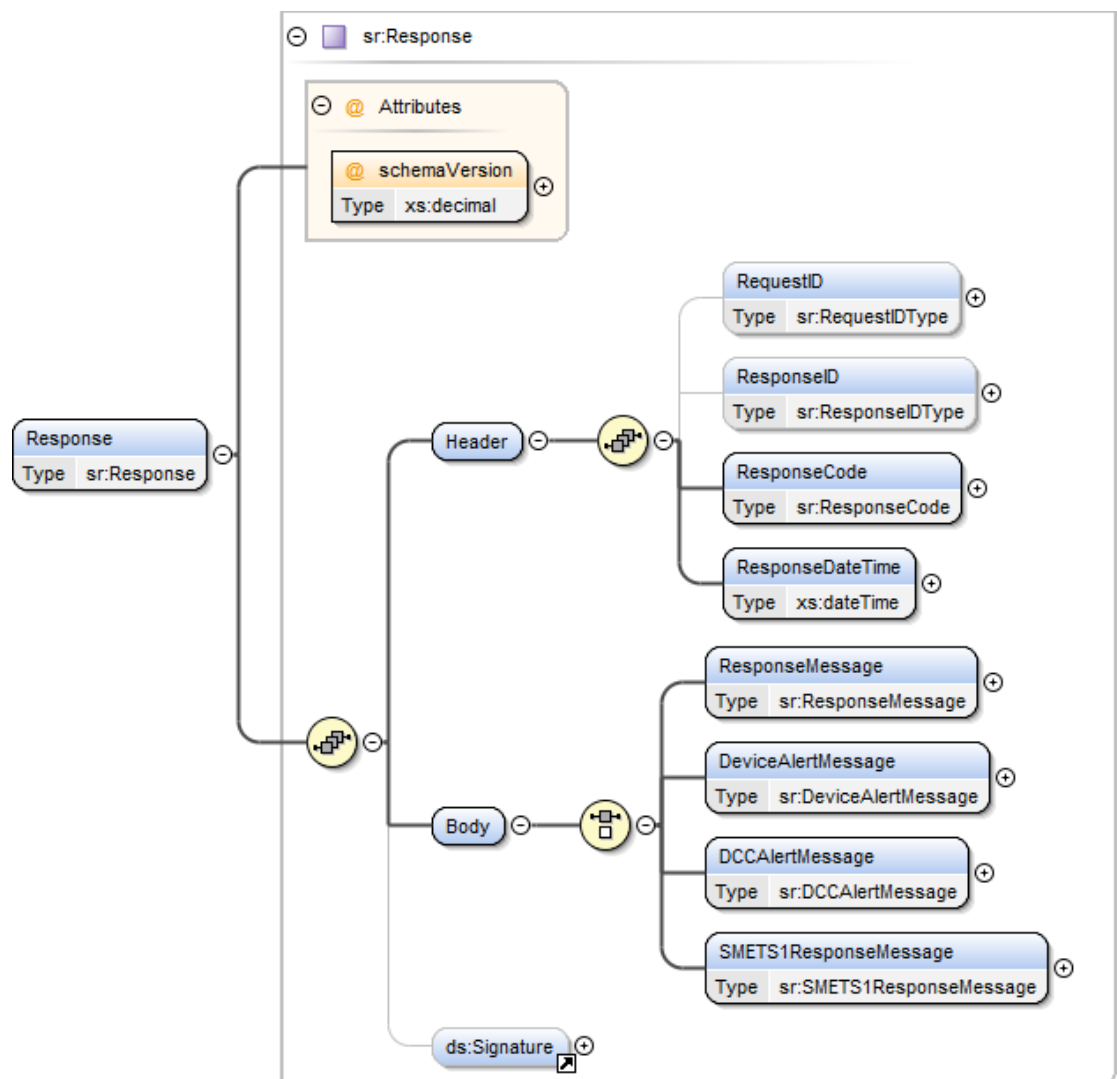


Figure 1 High-level DUIS XML Response structure

The Main Document section 9.3 defines the Header and the Response Message, Device Alert Message and DCC Alert Message. This Annex 19 defines the SMETS1 Response Message, which includes the SMETS1 Response Message and the SMETS1 Alert Message.

19.4.1 SMETS1 Response Message Structure

The SMETS1ResponseMessage format is used for all solicited SMETS1 Responses and unsolicited SMETS1 Alerts received from SMETS1 Devices.

The Service Response specific XML section depends on the actual Service Request or Alert. See the corresponding Annex for details of each SMETS1 Response, e.g. Annex section 4 contains the Service Responses to read Service Requests such as 4.1.1. For SMETS1 Alerts with specific payload see Annex section 15.

The Response structure for a SMETS1 Response Message is as follows:

- Header.
 - SMETS1 Responses:

- It shall always include a RequestID (except for DSP Scheduled Service Requests, this will be the RequestID of the original single Service Request sent by the DCC Service User for which this is the response), a ResponseID (generated by the DSP from data provided by the SMETS1 Service Provider), a Response Code (generated by the DCC Data Systems) and a Response Date Time (generated by the DCC Data Systems).
 - SMETS1 Alerts:
 - It shall always include a ResponseID (generated by the SMETS1 Service Provider), a Response Code (generated by the SMETS1 Service Provider) and a Response Date Time (generated by the SMETS1 device) .
- Body.
 - SMETS1 Responses:
 - It shall always include the Service Reference and Service Reference Variant. For DSP Scheduled Requests, it will also include the DSP Schedule ID generated when the Schedule was created via Service Request 5.1.
 - It shall also include the SMETS1 Signed Response generated by the SMETS1 Service Provider corresponding to the Service Response.
 - SMETS1 Alerts:
 - It shall always include the SMETS1 Signed Response generated by the SMETS1 Service Provider corresponding to the Device Alert.
- Signature. All SMETS1 Response Messages will be signed by the DCC Data Systems using the same security credentials as for SMETS2 or later Responses.

This is illustrated in the following diagram:

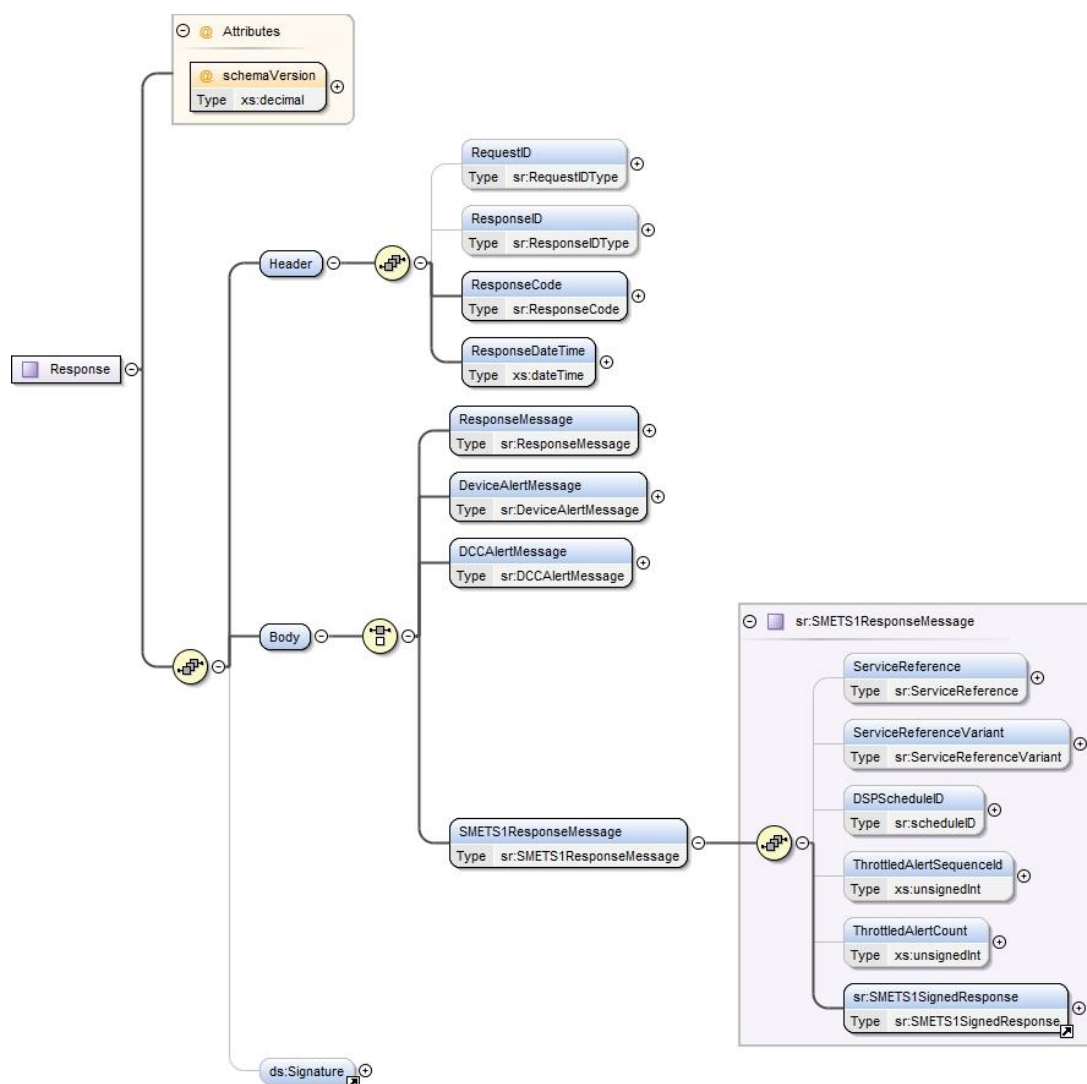


Figure 2 Response Body SMETS1ResponseMessage XML type

The following table details the data items in the SMETS1ResponseMessage format.

The XML elements “ThrottledAlertSequenceID and ThrottledAlertCount are used for throttling of Alerts; see section 2.12 in the main document of this DUGIDS document set for further information.

Data Item	Description / Valid Set	Type	Mandatory	Default	Units	Sensitivity
ServiceReference	Identifier that signals the particular Request to DCC (and is driven from the DCC Service User's selection of Request) See 'Service Reference' column in Main Document section 9.4 table	sr:ServiceReference (see Annex section 17)	SMETS1 Response: Yes SMETS1 Alert: N/A	None	N/A	Non-Sensitive
ServiceReferenceVariant	Identifier that signals the particular Request Variant to DCC (and is driven from the DCC Service User's selection of Request) See 'Service Reference Variant' column in Main Document section 9.4 table	sr:ServiceReferenceVariant (see Annex section 17)	SMETS1 Response: Yes SMETS1 Alert: N/A	None	N/A	Non-Sensitive

Data Item	Description / Valid Set	Type	Mandatory	Default	Units	Sensitivity
DSPScheduleID	Schedule ID generated by the DCC Data Systems when the Schedule was created >= 0	sr:scheduleID (See Annex section 17)	SMETS1 DSP Scheduled Service Response: Yes SMETS1 Alert: N/A	None	N/A	Non-Sensitive
ThrottledAlertSequenceID	An optional data item that identifies that this Alert Code is currently subject to throttling by the DCC Data Systems. If this attribute is included in the Alert then it indicates the sequence number for this Alert message since Alert throttling began.	xs:unsignedInt	No	None	N/A	Non-Sensitive
ThrottledAlertCount	An optional data item used to indicate the number of Alerts that have been consolidated by DCC Data Systems since the last Alert was forwarded to the Service User.	xs:unsignedInt	No	None	N/A	Non-Sensitive
SMETS1SignedResponse	Message sent and signed by the SMETS1 Service Provider to the DCC Data Systems. It contains a SMETS1 Response or a SMETS1 Alert	sr:SMETS1SignedResponse (see section 19.4.2)	Yes	None	N/A	Non-Sensitive

Table 1 Response – SMETS1ResponseMessage Data Items

Note: For DSP Scheduled responses, the ServiceReference and ServiceReferenceVariant are those of the original single ServiceReferenceVariant being scheduled, e.g. if SR 5.1 Create Schedule includes DSPScheduledServiceReference = 4.8 and DSPScheduledServiceReferenceVariant = 4.8.1, each activation instance SMETS1 Response will include ServiceReference = 4.8 and ServiceReferenceVariant = 4.8.1.

There is an XML sample showing the use of throttling of SMETS1 Alerts in Annex 15 section 15.2.3.

19.4.2 SMETS1 Signed Response Structure

The SMETS1SignedResponse format is used for all solicited and unsolicited SMETS1 Responses received from the Device. It includes the SMETS1Response and the SMETS1 Service Provider signature.

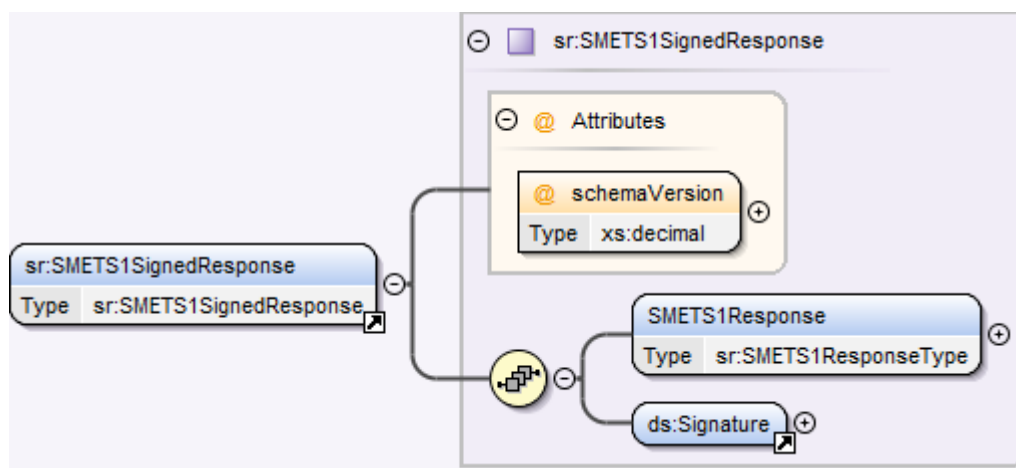


Figure 3 SMETS1SignedResponse XML type

The following table details the data items in the SMETS1SignedResponse format:

Data Item	Description / Valid Set	Type	Mandatory	Default	Units	Sensitivity
SMETS1Response	Contains the SMETS1 Response or SMETS1 Alert as received from the SMETS1 Service Provider	sr:SMETS1ResponseType (see section 19.4.3)	Yes	None	N/A	Non-Sensitive
ds:signature	SMETS1 Service Provider Digital Signature (defined in a separate schema). See Main Document XMLDGIS XSD for details on the signature schema	ds:signature	Yes	None	N/A	Non-Sensitive

Table 2 Response – SMETS1SignedResponse Data Items

19.4.3 SMETS1 Response Structure

The SMETS1Response format is used for all solicited SMETS1 Responses and unsolicited SMETS1 Alerts received from the Device.

The SMETS1 Response structure is as follows:

- Header.
 - SMETS1 Responses
 - It will always include the Response Business Originator ID (Device), Business Target ID (DCC Service User ID or DSP Access Control Broker for DSP Scheduled Service Requests), Originator Counter, [Service Reference](#) and [Service Reference Variant](#). See Annex 18 section 18.4.1 for details.
 - SMETS1 Alerts
 - It will always include the Response Business Originator ID (Device), Business Target ID (DCC Service User ID, provided by the SMETS1 Service Provider) and Originator Counter. See Annex 18 section 18.4.1 for details.
- Body.
 - SMETS1 Responses
 - It will include the specific data for the SMETS1 Response in ResponseMessage. See section 19.4.3.1 for details.
 - SMETS1 Alerts
 - It will include the SMETS1 Alert in DeviceAlertMessage. See section 19.4.3.2 for details.

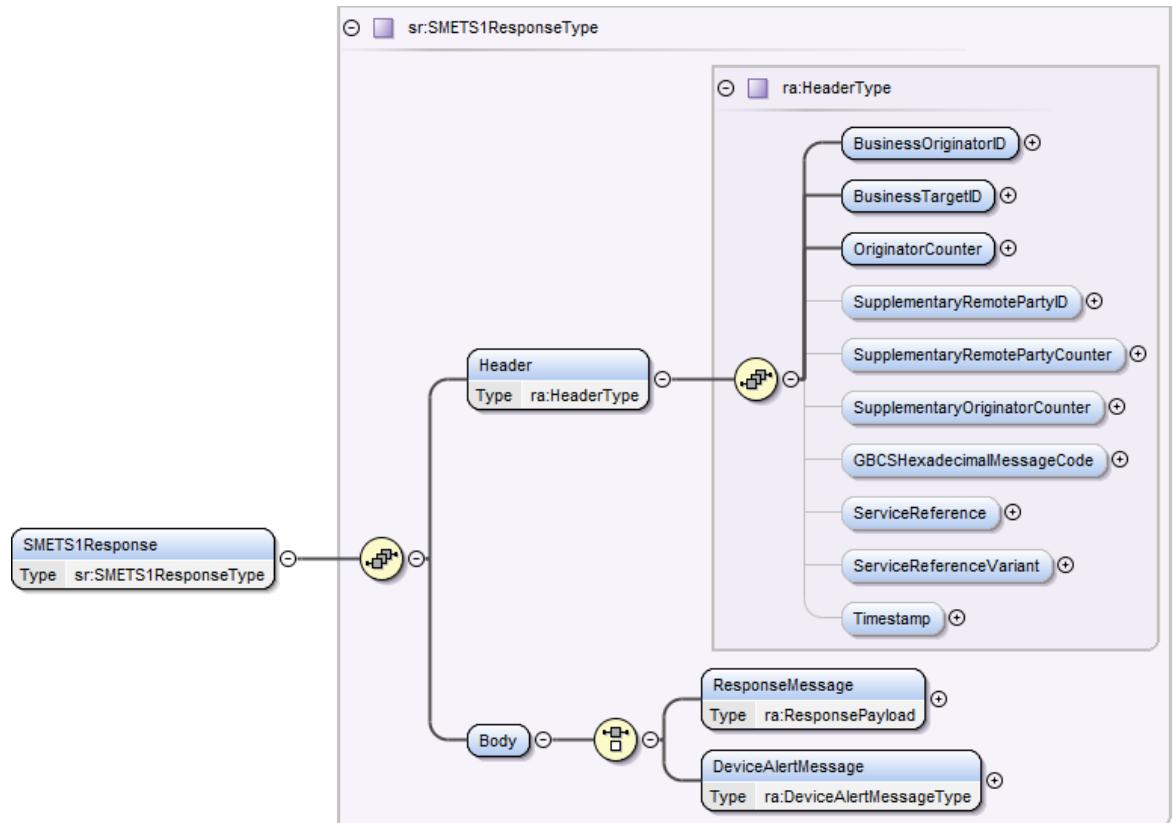


Figure 4 SMETS1Response XML type

The following table details the data items in the SMETS1Response format:

Data Item	Description / Valid Set	Type	Mandatory	Default	Units	Sensitivity
Header	See Annex 18 section 18.4.1	ra:HeaderType	Yes	None	N/A	Non-Sensitive
ResponseMessage	It contains the SMETS1 Response details	ra:ResponsePayload (see section 19.4.3.1)	SMETS1 Response: Yes SMETS1 Alert: N/A	None	N/A	Non-Sensitive
DeviceAlertMessage	It contains the SMETS1 Alert details	ra:DeviceAlertMessageType (see section 19.4.3.2)	SMETS1 Response: N/A SMETS1 Alert: Yes	None	N/A	Non-Sensitive

Table 3 Response – SMETS1Response Data Items

19.4.3.1 ResponseMessage Structure

The ResponseMessage format is used for all solicited SMETS1 Responses received from SMETS1 Devices.

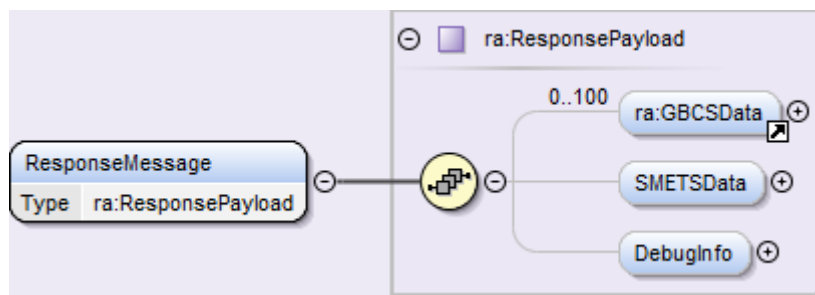


Figure 5 ResponseMessage

The following table details the data items in the ResponseMessage format:

Data Item	Description / Valid Set	Type	Mandatory	Default	Units	Sensitivity
ra:GBCSData	N/A to SMETS1 Devices	ra:GBCSDataType	N/A	None	N/A	Non-Sensitive
SMETSData	This structure will always be present It holds the SMETS1 Device Response translated to XML by the S1SP. In most cases this will be the only XML structure in the ResponseMessage. It contains the overall status of the SMETS1 Device response and, where applicable, specific data from SMETS1 responses. This is the same structure as used for SMETS2 or later Device responses	ra:SMETSData (see Annex 18 section 18.4. 2)	Yes	None	N/A	Non-Sensitive
DebugInfo	It contains error / status information returned as part of an unsuccessful SMETS1 Device Response. This structure will be present when SMETSData includes an indication of error (specific Service Response Message Success set to "false") and the Service Request is not one of: 6.11 (Gas), 6.15.1, 6.21, 6.23, 8.1.1 (Gas), 8.7.2 – Note that for these Service Requests the error response is embedded in SMETSData	ra:DebugInfo (see section 19.6)	No	None	N/A	Non-Sensitive

Table 4 Response – ResponseMessage Data Items

The SMETSData element contains a choice of structures dependent on which Service Request it is responding to. Each structure will include:

- A Boolean attribute called MessageSuccess, which defines the overall status of the message, where the Boolean attribute shall be **true** for a message which was returned by the SMETS1 Service Provider with no errors from the Device, and **false** if any error responses were returned by the SMETS1 Service Provider;
- a set of elements corresponding to individual data items relevant to the SMETS1 Response. These are the same elements used for SMETS2 or later Device responses.

The following diagram shows an illustration of some of the response types available in SMETSData. In the full list (available in the MMC XML Schema) there is an XML type for the Service Response corresponding to each SMETS2 or later and / or SMETS1 Service Request.

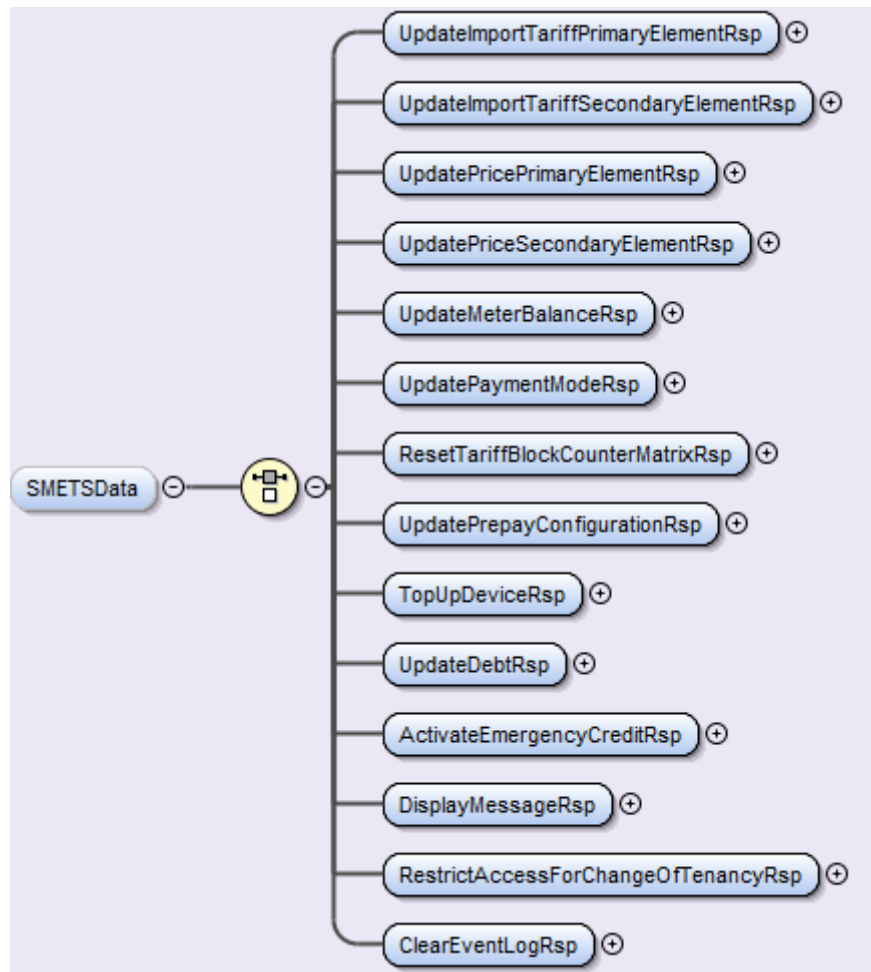


Figure 6 SMETSData with subset of response XML types (truncated for readability)

The structures corresponding to individual SMETS1 Response types are shown in the annexes corresponding to groups of Service Requests, e.g. Annex section 4 contains the SMETS1 Responses to read Service Requests such as 4.1.1.

Where applicable, common data returned by Electricity Smart Meters and Gas Smart Meters or Gas Proxy Functions are shared data items in the Service Responses to individual Service Requests. In cases where a response data item is applicable only to one of gas or electricity, this is found in a fuel-specific XML choice structure within the response message, and identified in data description tables for the response in the appropriate annex.

An example of Service Response with data differences between electricity and gas is shown below.

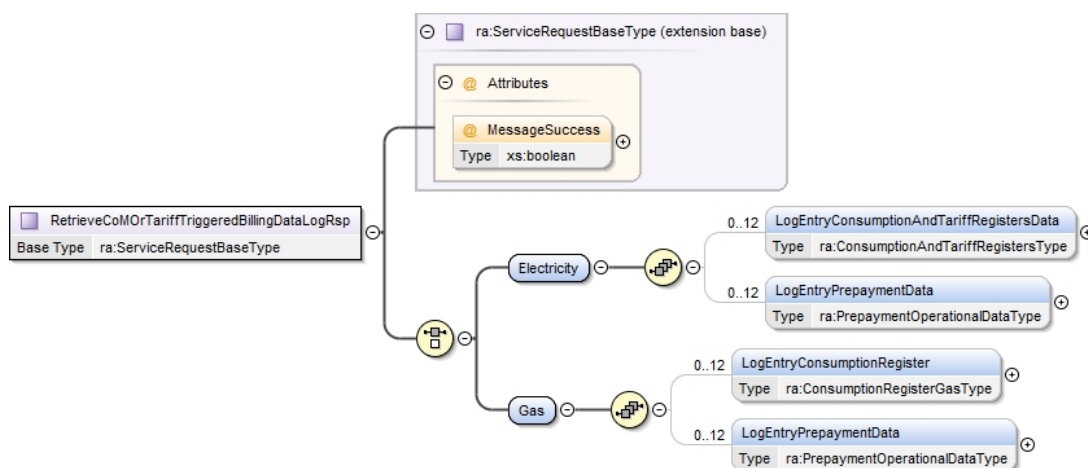


Figure 7 Response Body Example

19.4.3.2 DeviceAlertMessage Structure

The DeviceAlertMessage format is used for all unsolicited SMETS1 Alerts from the Device.

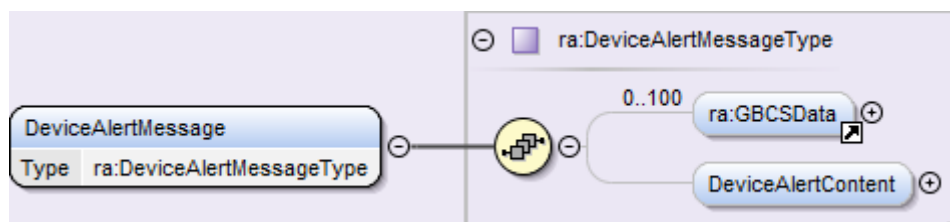


Figure 8 DeviceAlertMessage

The following table details the data items in the DeviceAlertMessage format:

Data Item	Description / Valid Set	Type	Mandatory	Default	Units	Sensitivity
ra:GBCSData	N/A to SMETS1 Devices	ra:GBCSDataType	N/A	None	N/A	Non-Sensitive
DeviceAlertContent	It contains data from the SMETS1 Alert. SMETS1 Alerts do not return any specific additional information other than the identifier of the SMETS1 Alert and the time it was generated by the SMETS1 Device. Data common to all SMETS1 Alerts is shown in Table 6 SMETS1 Alert Data Items below. Each SMETS1 Alert will also have a timestamp, which is included within the header of the SMETS1Response XML	ra:DeviceAlertContent Type (see Annex 18 section 18.4.3)	Yes	None	N/A	Non-Sensitive

Table 5 Response – DeviceAlertMessage Data Items

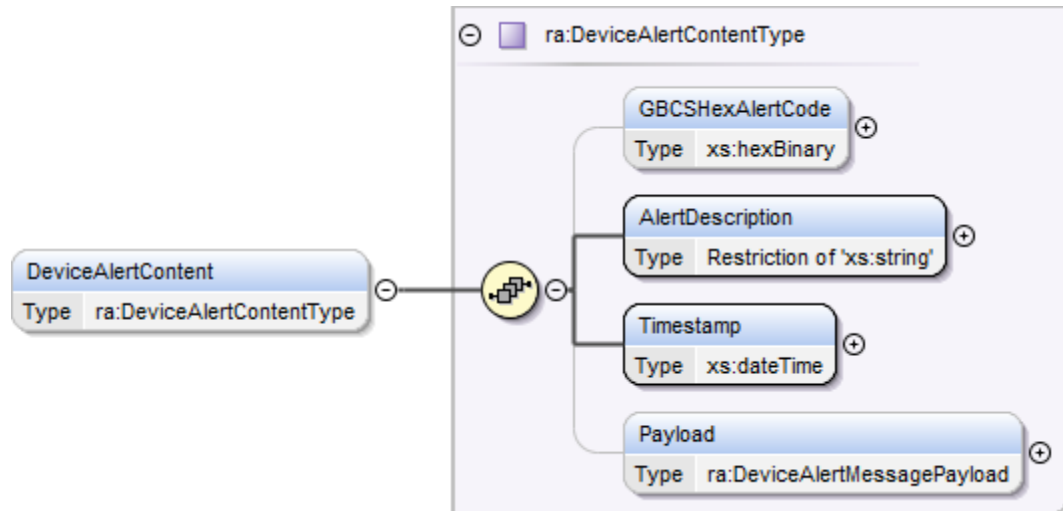


Figure 9 DeviceAlertContent

The Device Alert Content XML structure includes the following fields:

Data Item	Description	Type	Mandatory	Valid Values
GBCSHexAlertCode	The Alert Code corresponding to the Device Alert defined in GBCS, e.g. 0x000C. This is displayed in XML in format of 4 characters e.g. 000C. This field will be populated where the SMETS1 Alert can be mapped to an equivalent GBCS Alert code.	xs:hexBinary	Yes	GBCS: Values in 16 bit hexadecimal from 0001, as defined in GBCS section 16. SMETS1: Subset of GBCS values
AlertDescription	Description of the Device Alert as defined in GBCS or SMETS1 Supporting Requirements	xs:string (maxLength = 250)	Yes	GBCS: See GBCS section 16 SMETS1: SMETS1 Supporting Requirements
Timestamp	The SMETS1 Alert timestamp as sent by the Device, in UTC time.	xs:dateTime (formatted as described in the Main Document section 2.6)	Yes	UTC Date-Time
Payload	This is additional data specific to the GBCS Use Case, where there is data additional to the Alert Code. Most Alerts will not have additional data.	ra:DeviceAlertMessagePayload	GBCS: No SMETS1: N/A	See Annex section 15.

Table 6 SMETS1 Alert Data Items

19.5 Sample Successful Responses

Two sample XML documents conforming to the DUIS XML Schema are shown below, one each for Electricity and Gas Smart Meters. These are shown as full XML documents conforming to the DUIS XML Schema.

In other annexes in this documentation set, header sections and the wrapping Body, SMETS1ResponseMessage, SMETS1SignedResponse, SMETS1Response and ResponseMessage data types are omitted from XML samples for specific Service Requests and corresponding responses.

```
<?xml version="1.0" encoding="UTF-8"?>
<Response xmlns:ds="http://www.w3.org/2000/09/xmldsig#"
  xmlns="http://www.dccinterface.co.uk/ServiceUserGateway"
  xmlns:ra="http://www.dccinterface.co.uk/ResponseAndAlert"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" schemaVersion="3.0">
  <Header>
    <RequestID>11-22-33-44-55-66-77-88-99-00-AA-BB-CC-DD-EE-FF:50</RequestID>
    <ResponseCode>10</ResponseCode>
    <ResponseDateTime>2017-08-25T03:04:05.00</ResponseDateTime>
  </Header>
  <Body>
    <SMETS1ResponseMessage>
      <ServiceReference>4.1</ServiceReference>
      <ServiceReferenceVariant>4.1.1</ServiceReferenceVariant>
      <SMETS1SignedResponse schemaVersion="3.0">
        <SMETS1Response>
          <Header>
            <ra:BusinessOriginatorID>99-00-AA-BB-CC-DD-EE-FF</ra:BusinessOriginatorID>
            <ra:BusinessTargetID>11-22-33-44-55-66-77-88</ra:BusinessTargetID>
            <ra:OriginatorCounter>50</ra:OriginatorCounter>
            <ra:ServiceReference>4.1</ra:ServiceReference>
            <ra:ServiceReferenceVariant>4.1.1</ra:ServiceReferenceVariant>
          </Header>
          <Body>
            <ResponseMessage>
              <ra:SMETSData>
                <ra:ReadInstantaneousImportRegistersRsp MessageSuccess="true">
                  <ra:Electricity>
                    <ra:ActiveImportRegister>
                      <ra:Value>10</ra:Value>
                      <ra:ActiveEnergyUnit>Wh</ra:ActiveEnergyUnit>
                    </ra:ActiveImportRegister>
                    <ra:ReactiveImportRegister>
                      <ra:Value>20</ra:Value>
                      <ra:ReactiveEnergyUnit>varh</ra:ReactiveEnergyUnit>
                    </ra:ReactiveImportRegister>
                  </ra:Electricity>
                </ra:ReadInstantaneousImportRegistersRsp>
              </ra:SMETSData>
            </ResponseMessage>
          </Body>
        </SMETS1Response>
      <Signature xmlns="http://www.w3.org/2000/09/xmldsig#">
        <SignedInfo>
          <CanonicalizationMethod Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#" />
          <SignatureMethod Algorithm="http://www.w3.org/2001/04/xmldsig-more#ecdsa-sha256" />
          <Reference URI="">
            <Transforms>
              <Transform Algorithm="http://www.w3.org/2000/09/xmldsig#enveloped-signature" />
            </Transforms>
            <DigestMethod Algorithm="http://www.w3.org/2001/04/xmldsig-more#sha256" />
            <DigestValue>ZGVmYXVsdA==</DigestValue>
          </Reference>
        </SignedInfo>
        <SignatureValue>ZGVmYXVsdA==</SignatureValue>
      </Signature>
    </SMETS1SignedResponse>
  </SMETS1ResponseMessage>
</Body>
<Signature xmlns="http://www.w3.org/2000/09/xmldsig#">
  <SignedInfo>
    <CanonicalizationMethod Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#" />
```

```
<SignatureMethod Algorithm="http://www.w3.org/2001/04/xmldsig-more#ecdsa-sha256"/>
<Reference URI="">
  <Transforms>
    <Transform Algorithm="http://www.w3.org/2000/09/xmldsig#enveloped-signature"/>
  </Transforms>
  <DigestMethod Algorithm="http://www.w3.org/2001/04/xmlenc#sha256"/>
  <DigestValue>ZGVmYXVsdA==</DigestValue>
</Reference>
</SignedInfo>
<SignatureValue>ZGVmYXVsdA==</SignatureValue>
<KeyInfo>
  <X509Data>
    <X509IssuerSerial>
      <X509IssuerName>CN=dsp broker,OU=smart metering,O=dcc,L=london,ST=england,C=uk</X509IssuerName>
      <X509SerialNumber>7432112347</X509SerialNumber>
    </X509IssuerSerial>
  </X509Data>
</KeyInfo>
</Signature>
</Response>
```

Figure 10 Sample ReadInstantaneousImporRegistersRsp SMETS1 Response Document for Electricity

```
<?xml version="1.0" encoding="UTF-8"?>
<Response xmlns:ds="http://www.w3.org/2000/09/xmldsig#"
  xmlns="http://www.dccinterface.co.uk/ServiceUserGateway"
  xmlns:ra="http://www.dccinterface.co.uk/ResponseAndAlert"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" schemaVersion="3.0">
  <Header>
    <RequestID>11-22-33-44-55-66-77-88-99-00-AA-BB-CC-DD-EE-FF:50</RequestID>
    <ResponseCode>I0</ResponseCode>
    <ResponseDateTime>2017-08-25T03:04:05.00</ResponseDateTime>
  </Header>
  <Body>
    <SMETS1ResponseMessage>
      <ServiceReference>4.1</ServiceReference>
      <ServiceReferenceVariant>4.1.1</ServiceReferenceVariant>
      <SMETS1SignedResponse schemaVersion="3.0">
        <SMETS1Response>
          <Header>
            <ra:BusinessOriginatorID>99-00-AA-BB-CC-DD-EE-FF</ra:BusinessOriginatorID>
            <ra:BusinessTargetID>11-22-33-44-55-66-77-88</ra:BusinessTargetID>
            <ra:OriginatorCounter>50</ra:OriginatorCounter>
            <ra:ServiceReference>4.1</ra:ServiceReference>
            <ra:ServiceReferenceVariant>4.1.1</ra:ServiceReferenceVariant>
          </Header>
          <Body>
            <ResponseMessage>
              <ra:SMETSData>
                <ra:ReadInstantaneousImporRegistersRsp MessageSuccess="true">
                  <ra:Gas>
                    <ra:ConsumptionRegister>
                      <ra:Value>10</ra:Value>
                      <ra:Unit>m3</ra:Unit>
                    </ra:ConsumptionRegister>
                  </ra:Gas>
                </ra:ReadInstantaneousImporRegistersRsp>
              </ra:SMETSData>
            </ResponseMessage>
          </Body>
        </SMETS1Response>
      </SMETS1SignedResponse>
    </SMETS1ResponseMessage>
    <Signature xmlns="http://www.w3.org/2000/09/xmldsig#">
      <SignedInfo>
        <CanonicalizationMethod Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#"/>
        <SignatureMethod Algorithm="http://www.w3.org/2001/04/xmldsig-more#ecdsa-sha256"/>
        <Reference URI="">
          <Transforms>
            <Transform Algorithm="http://www.w3.org/2000/09/xmldsig#enveloped-signature"/>
          </Transforms>
          <DigestMethod Algorithm="http://www.w3.org/2001/04/xmlenc#sha256"/>
          <DigestValue>ZGVmYXVsdA==</DigestValue>
        </Reference>
      </SignedInfo>
      <SignatureValue>ZGVmYXVsdA==</SignatureValue>
      <KeyInfo>
        <X509Data>
          <X509IssuerSerial>
            <X509IssuerName>CN=S1SP,OU=SMETS1,O=S1SP,L=london,ST=england,C=uk</X509IssuerName>
            <X509SerialNumber>7432112348</X509SerialNumber>
          </X509IssuerSerial>
        </X509Data>
      </KeyInfo>
    </Signature>
  </Body>
</Response>
```

```

        </X509IssuerSerial>
        </X509Data>
        </KeyInfo>
        </Signature>
        </SMETS1SignedResponse>
        </SMETS1ResponseMessage>
    </Body>
    <Signature xmlns="http://www.w3.org/2000/09/xmldsig#">
        <SignedInfo>
            <CanonicalizationMethod Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#" />
            <SignatureMethod Algorithm="http://www.w3.org/2001/04/xmldsig-more#ecdsa-sha256" />
            <Reference URI="">
                <Transforms>
                    <Transform Algorithm="http://www.w3.org/2000/09/xmldsig#enveloped-signature" />
                </Transforms>
                <DigestMethod Algorithm="http://www.w3.org/2001/04/xmldsig#sha256" />
                <DigestValue>ZGVmYXVsdA==</DigestValue>
            </Reference>
        </SignedInfo>
        <SignatureValue>ZGVmYXVsdA==</SignatureValue>
    </KeyInfo>
    <X509Data>
        <X509IssuerSerial>
            <X509IssuerName>CN=dsp broker,OU=smart metering,O=dcc,L=london,ST=england,C=uk</X509IssuerName>
            <X509SerialNumber>7432112347</X509SerialNumber>
        </X509IssuerSerial>
    </X509Data>
    </KeyInfo>
    </Signature>
</Response>

```

Figure 11 Sample ReadInstantaneousImporRegistersRsp SMETS1 Response Document for Gas

19.6 Error Status in MMC XML Schema for SMETS1 Responses

19.6.1 Overview

This section applies to SMETS1 Responses. SMETS1 Alerts do not have a status of this nature, since if a SMETS1 Alert has been received it must have been produced successfully by definition.

For each SMETS1 Response, the SMETSData XML structure in the response Body has an overall Boolean status, called MessageSuccess, indicating the overall status of the message, where the Boolean attribute shall be true (success) or false (failure). The status will be provided by the SMETS1 Service Provider.

Where there has been a failure in the execution of the request to a Device, the error statuses and descriptions are described below. An exception to this are Service Requests 6.11 (Gas), 6.15.1, 6.21, 6.23, 8.1.1 (Gas), 8.7.2, since for these Service Requests the error response is embedded in SMETSData.

19.6.1.1 SMETS1Debug Structure

Debug information for SMETS1 messages are returned using the structure below.

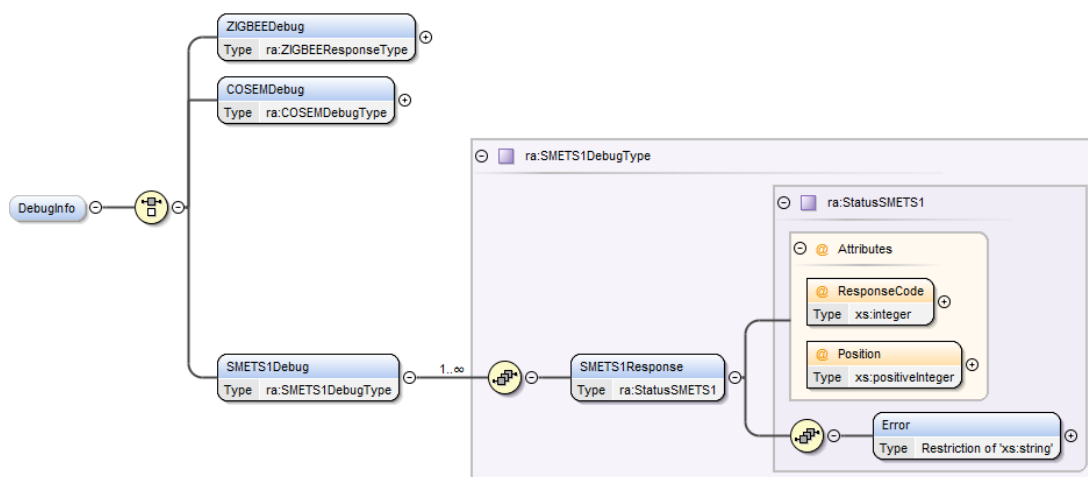


Figure 12 – SMETS1Debug Structure

19.6.1.1.1 Data Items Definition

The following table details the data items in the SMETS1Debug format:

Data Item	Description / Valid Set	Type	Mandatory	Valid Values
ResponseCode	This contains the numerical code returned by the Device, which corresponds to the text string.	xs:integer	Yes	TBD
Position	This is an incrementing value showing the position of the response code in the order in which it was executed.	xs:positiveInteger	Yes	Positive integer starting from 1
Error	A string detailing an error	xs:string	Yes	As defined in the SMETS1 Supporting Requirements

Table 7 Response – SMETS1Debug Data Items

19.6.2 Sample SMETS1 Error Response

Below there is a sample SMETS1 Response document Body showing error status.

```
<?xml version="1.0" encoding="UTF-8"?>
<Response xmlns:ds="http://www.w3.org/2000/09/xmldsig#"
  xmlns="http://www.dccinterface.co.uk/ServiceUserGateway"
  xmlns:ra="http://www.dccinterface.co.uk/ResponseAndAlert"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" schemaVersion="3.0">
  <Header>
    <RequestID>11-22-33-44-55-66-77-88-99-00-AA-BB-CC-DD-EE-FF:50</RequestID>
    <ResponseCode>10</ResponseCode>
    <ResponseDateTime>2017-08-25T03:04:05.00</ResponseDateTime>
  </Header>
  <Body>
    <SMETS1ResponseMessage>
      <ServiceReference>4.1</ServiceReference>
      <ServiceReferenceVariant>4.1.1</ServiceReferenceVariant>
      <SMETS1SignedResponse schemaVersion="3.0">
```

```
<SMETS1Response>
  <Header>
    <ra:BusinessOriginatorID>99-00-AA-BB-CC-DD-EE-FF</ra:BusinessOriginatorID>
    <ra:BusinessTargetID>11-22-33-44-55-66-77-88</ra:BusinessTargetID>
    <ra:OriginatorCounter>50</ra:OriginatorCounter>
    <ra:ServiceReference>4.1</ra:ServiceReference>
    <ra:ServiceReferenceVariant>4.1.1</ra:ServiceReferenceVariant>
  </Header>
  <Body>
    <ResponseMessage>
      <ra:SMETSData>
        <ra:ReadInstantaneousImportRegistersRsp MessageSuccess="false">
          <ra:Electricity/>
        </ra:ReadInstantaneousImportRegistersRsp>
      </ra:SMETSData>
      <ra:DebugInfo>
        <ra:SMETS1Debug>
          <ra:SMETS1Response ResponseCode="0" Position="1">
            <ra:Error>Description of data returned</ra:Error>
          </ra:SMETS1Response>
          <ra:SMETS1Response ResponseCode="3" Position="2">
            <ra:Error>Description of data returned</ra:Error>
          </ra:SMETS1Response>
        </ra:SMETS1Debug>
      </ra:DebugInfo>
    </ResponseMessage>
  </Body>
</SMETS1Response>
<Signature xmlns="http://www.w3.org/2000/09/xmldsig#">
  <SignedInfo>
    <CanonicalizationMethod Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#">
    <SignatureMethod Algorithm="http://www.w3.org/2001/04/xmldsig-more#ecdsa-sha256">
    <Reference URI="">
      <Transforms>
        <Transform Algorithm="http://www.w3.org/2000/09/xmldsig#enveloped-signature"/>
      </Transforms>
      <DigestMethod Algorithm="http://www.w3.org/2001/04/xmldsig-more#sha256">
      <DigestValue>ZGVmYXVsdA==</DigestValue>
    </Reference>
  </SignedInfo>
  <SignatureValue>ZGVmYXVsdA==</SignatureValue>
  <KeyInfo>
    <X509Data>
      <X509IssuerSerial>
        <X509IssuerName>CN=S1SP,OU=SMETS1,O=S1SP,L=london,ST=england,C=uk</X509IssuerName>
        <X509SerialNumber>7432112348</X509SerialNumber>
      </X509IssuerSerial>
    </X509Data>
  </KeyInfo>
</Signature>
</SMETS1SignedResponse>
</SMETS1ResponseMessage>
</Body>
<Signature xmlns="http://www.w3.org/2000/09/xmldsig#">
  <SignedInfo>
    <CanonicalizationMethod Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#">
    <SignatureMethod Algorithm="http://www.w3.org/2001/04/xmldsig-more#ecdsa-sha256">
    <Reference URI="">
      <Transforms>
        <Transform Algorithm="http://www.w3.org/2000/09/xmldsig#enveloped-signature"/>
      </Transforms>
      <DigestMethod Algorithm="http://www.w3.org/2001/04/xmldsig-more#sha256">
      <DigestValue>ZGVmYXVsdA==</DigestValue>
    </Reference>
  </SignedInfo>
  <SignatureValue>ZGVmYXVsdA==</SignatureValue>
  <KeyInfo>
    <X509Data>
      <X509IssuerSerial>
        <X509IssuerName>CN=dsp broker,OU=smart metering,O=dcc,L=london,ST=england,C=uk</X509IssuerName>
        <X509SerialNumber>7432112347</X509SerialNumber>
      </X509IssuerSerial>
    </X509Data>
  </KeyInfo>
</Signature>
</Response>
```

Figure 13 Sample SMETS1 Error Response - ReadInstantaneousImportRegistersRsp

19.7 Status-Only Responses

Many responses from SMETS1 Devices in response to SMETS1 Service Requests, e.g. those which perform updates, contain no substantial payload, just status information. In successful cases these will simply contain an overall success or failure, within an XML type (under the “SMETSData” attribute). The name is that of the XML type which corresponds to the XML type of the Service Request in the DUIS XML Schema, with the suffix “Rsp”, e.g. ActivateEmergencyCreditRsp for Service Request to activate emergency credit on a meter.

Cases where an error message has been returned from the Device will follow the normal approach to unsuccessful responses, as described in section 19.6.

See the next section 19.7.1 in this document for examples of responses which contain no substantial data other than the status.

In general, annexes in this DUGIDS documentation set will not contain structure diagrams, data diagrams or XML samples for cases like this, as they all follow the pattern in the next section 19.7.1.

19.7.1 Sample Status-Only Responses

Sample status-only DUIS XML Schema response documents are shown below, one successful and one unsuccessful.

```

<?xml version="1.0" encoding="UTF-8"?>
<Response xmlns:ds="http://www.w3.org/2000/09/xmldsig#"
  xmlns="http://www.dccinterface.co.uk/ServiceUserGateway"
  xmlns:ra="http://www.dccinterface.co.uk/ResponseAndAlert"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" schemaVersion="3.0">
  <Header>
    <RequestID>11-22-33-44-55-66-77-88-99-00-AA-BB-CC-DD-EE-FF:50</RequestID>
    <ResponseCode>I0</ResponseCode>
    <ResponseDateTime>2017-08-25T03:04:05.00</ResponseDateTime>
  </Header>
  <Body>
    <SMETS1ResponseMessage>
      <ServiceReference>2.5</ServiceReference>
      <ServiceReferenceVariant>2.5</ServiceReferenceVariant>
      <SMETS1SignedResponse schemaVersion="3.0">
        <SMETS1Response>
          <Header>
            <ra:BusinessOriginatorID>99-00-AA-BB-CC-DD-EE-FF</ra:BusinessOriginatorID>
            <ra:BusinessTargetID>11-22-33-44-55-66-77-88</ra:BusinessTargetID>
            <ra:OriginatorCounter>50</ra:OriginatorCounter>
            <ra:ServiceReference>2.5</ra:ServiceReference>
            <ra:ServiceReferenceVariant>2.5</ra:ServiceReferenceVariant>
          </Header>
          <Body>
            <ResponseMessage>
              <ra:SMETSData>
                <ra:ActivateEmergencyCreditRsp MessageSuccess="true"/>
              </ra:SMETSData>
            </ResponseMessage>
          </Body>
        </SMETS1Response>
        <Signature xmlns="http://www.w3.org/2000/09/xmldsig#">
          <SignedInfo>
            <CanonicalizationMethod Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#" />
            <SignatureMethod Algorithm="http://www.w3.org/2001/04/xmldsig-more#ecdsa-sha256" />
            <Reference URI="">
              <Transforms>
                <Transform Algorithm="http://www.w3.org/2000/09/xmldsig#enveloped-signature" />
              </Transforms>
              <DigestMethod Algorithm="http://www.w3.org/2001/04/xmldsig-more#sha256" />
              <DigestValue>ZGVmYXVsdA==</DigestValue>
            </Reference>
          </SignedInfo>
          <SignatureValue>ZGVmYXVsdA==</SignatureValue>
          <KeyInfo>
            <X509Data>
              <X509IssuerSerial>
                <X509IssuerName>CN=S1SP,OU=SMETS1,O=S1SP,L=london,ST=england,C=uk</X509IssuerName>
                <X509SerialNumber>7432112348</X509SerialNumber>
              </X509IssuerSerial>
            </X509Data>
          </KeyInfo>
        </Signature>
      </SMETS1SignedResponse>
    </SMETS1ResponseMessage>
  </Body>
  <Signature xmlns="http://www.w3.org/2000/09/xmldsig#">
    <SignedInfo>
      <CanonicalizationMethod Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#" />
      <SignatureMethod Algorithm="http://www.w3.org/2001/04/xmldsig-more#ecdsa-sha256" />
      <Reference URI="">
        <Transforms>
          <Transform Algorithm="http://www.w3.org/2000/09/xmldsig#enveloped-signature" />
        </Transforms>
        <DigestMethod Algorithm="http://www.w3.org/2001/04/xmldsig-more#sha256" />
        <DigestValue>ZGVmYXVsdA==</DigestValue>
      </Reference>
    </SignedInfo>
    <SignatureValue>ZGVmYXVsdA==</SignatureValue>
    <KeyInfo>
      <X509Data>
        <X509IssuerSerial>
          <X509IssuerName>CN=dsp broker,OU=smart metering,O=dcc,L=london,ST=england,C=uk</X509IssuerName>
          <X509SerialNumber>7432112347</X509SerialNumber>
        </X509IssuerSerial>
      </X509Data>
    </KeyInfo>
  </Signature>

```

</Signature>
</Response>

Figure 14 Sample Activate Emergency Credit SMETS1 Response Document

```
<?xml version="1.0" encoding="UTF-8"?>
<Response xmlns:ds="http://www.w3.org/2000/09/xmldsig#"
  xmlns="http://www.dccinterface.co.uk/ServiceUserGateway"
  xmlns:ra="http://www.dccinterface.co.uk/ResponseAndAlert"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" schemaVersion="3.0">
  <Header>
    <RequestID>11-22-33-44-55-66-77-88:99-00-AA-BB-CC-DD-EE-FF:50</RequestID>
    <ResponseCode>I0</ResponseCode>
    <ResponseDateTime>2017-08-25T03:04:05.00</ResponseDateTime>
  </Header>
  <Body>
    <SMETS1ResponseMessage>
      <ServiceReference>2.5</ServiceReference>
      <ServiceReferenceVariant>2.5</ServiceReferenceVariant>
      <SMETS1SignedResponse schemaVersion="3.0">
        <SMETS1Response>
          <Header>
            <ra:BusinessOriginatorID>99-00-AA-BB-CC-DD-EE-FF</ra:BusinessOriginatorID>
            <ra:BusinessTargetID>11-22-33-44-55-66-77-88</ra:BusinessTargetID>
            <ra:OriginatorCounter>50</ra:OriginatorCounter>
            <ra:ServiceReference>2.5</ra:ServiceReference>
            <ra:ServiceReferenceVariant>2.5</ra:ServiceReferenceVariant>
          </Header>
          <Body>
            <ResponseMessage>
              <ra:SMETSData>
                <ra:ActivateEmergencyCreditRsp MessageSuccess="false"/>
              </ra:SMETSData>
              <ra:DebugInfo>
                <ra:SMETS1Debug>
                  <ra:SMETS1Response ResponseCode="3" Position="1">
                    <ra:Error>Description of data returned</ra:Error>
                  </ra:SMETS1Response>
                </ra:SMETS1Debug>
              </ra:DebugInfo>
            </ResponseMessage>
          </Body>
        </SMETS1Response>
        <Signature xmlns="http://www.w3.org/2000/09/xmldsig#">
          <SignedInfo>
            <CanonicalizationMethod Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#" />
            <SignatureMethod Algorithm="http://www.w3.org/2001/04/xmldsig-more#ecdsa-sha256" />
            <Reference URI="">
              <Transforms>
                <Transform Algorithm="http://www.w3.org/2000/09/xmldsig#enveloped-signature" />
              </Transforms>
              <DigestMethod Algorithm="http://www.w3.org/2001/04/xmldsig-more#sha256" />
              <DigestValue>ZGVmYXVsdA==</DigestValue>
            </Reference>
          </SignedInfo>
          <SignatureValue>ZGVmYXVsdA==</SignatureValue>
        </KeyInfo>
        <X509Data>
          <X509IssuerSerial>
            <X509IssuerName>CN=S1SP,OU=SMETS1,O=S1SP,L=london,ST=england,C=uk</X509IssuerName>
            <X509SerialNumber>7432112348</X509SerialNumber>
          </X509IssuerSerial>
        </X509Data>
      </KeyInfo>
    </Signature>
  </SMETS1SignedResponse>
</SMETS1ResponseMessage>
</Body>
<Signature xmlns="http://www.w3.org/2000/09/xmldsig#">
  <SignedInfo>
    <CanonicalizationMethod Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#" />
    <SignatureMethod Algorithm="http://www.w3.org/2001/04/xmldsig-more#ecdsa-sha256" />
    <Reference URI="">
      <Transforms>
        <Transform Algorithm="http://www.w3.org/2000/09/xmldsig#enveloped-signature" />
      </Transforms>
      <DigestMethod Algorithm="http://www.w3.org/2001/04/xmldsig-more#sha256" />
      <DigestValue>ZGVmYXVsdA==</DigestValue>
    </Reference>
  </SignedInfo>
  <SignatureValue>ZGVmYXVsdA==</SignatureValue>
</KeyInfo>
<X509Data>
```

```
<X509IssuerSerial>  
  <X509IssuerName>CN=dsp broker,OU=smart  
metering,O=dcc,L=london,ST=england,C=uk</X509IssuerName>  
  <X509SerialNumber>7432112347</X509SerialNumber>  
</X509IssuerSerial>  
</X509Data>  
</KeyInfo>  
</Signature>  
</Response>
```

Figure 15 Sample (Failed) Activate Emergency Credit SMETS1 Response Document

19.8 Mandatory Fields

The data which comes back from the SMETS1 Device in response to Service Requests and is represented in XML in the corresponding SMETS1 Response 'body' must all be regarded as non-mandatory by Users, because in error cases there might not be any data to bring back, or partial data may be returned in an error case where the SMETS1 Device was able to return some of the data successfully. The only mandatory data item in SMETSData is the overall success status (true or false). The status will be provided by the SMETS1 Service Provider.

In the annex sections of this documentation set which describe SMETS1 Responses conforming to the DUIS XML Schema, specifically the "Specific Data Items" sub-sections within "SMETS1 Response Format" sections, a convention has been adopted that data will be present in normal cases where requests completed without errors and data has been returned successfully by the Device, unless otherwise stated. Data items which are not always present in successful Service Responses will be indicated in the "Description/Valid Set" columns.

19.9 Unsupported Values

In some cases SMETS1 Devices do not support the returning of MMC data attributes. In these cases the attributes shall be set to Unsupported Values as follows:

- The largest possible value conforming to the relevant XML type shall be used to indicate a numerical value which the SMETS1 Device in question does not support, namely:
 - for XML type xs:unsignedInt it shall be 4294967295;
 - for XML type xs:int it shall be 2147483647;
 - for XML type xs:integer, xs:positiveInteger & xs:nonNegativeInteger it shall be 4294967295;
 - for XML type xs:decimal it shall be 4294967295.9;
 - for XML type sr:PriceScale or ra:PriceScale it shall be 127;
 - for XML type xs:short it shall be 32767;
- the value "3000-12-31T00:00:00Z" shall be used to indicate a date-time which the SMETS1 Device in question does not support.

Such cases are noted in individual annex Service Reference Variant sections where applicable.

XML samples in individual annex sections are shown for SMETS2 or later cases and do not normally illustrate use of Unsupported Values. An example is shown below of a response to a SMETS1 Service Request where Unsupported Values feature in the Response.

19.9.1 XML Samples With Unsupported Values

The following samples illustrate use of Unsupported Values in Responses.

Figure 16 shows a sample Parse output from the response to the Service Request 6.2.8 Read Device Configuration (Gas) targeted at a SMETS2 or later Device.

Figure 17 shows an equivalent response where the target was a SMETS1 Device, illustrating the use of Unsupported Values in the “FlowStabilisationPeriod” and “FlowMeasurementPeriod” elements.

Note that only the SRV-specific elements are shown, rather than full XML documents.

```
<ra:ReadDeviceConfigurationGasRsp MessageSuccess="true">
  <ra:CalorificValue>110.6</ra:CalorificValue>
  <ra:ConversionFactor>2</ra:ConversionFactor>
  <ra:UncontrolledGasFlowRate>25.5</ra:UncontrolledGasFlowRate>
  <ra:FlowStabilisationPeriod>100</ra:FlowStabilisationPeriod>
  <ra:FlowMeasurementPeriod>200</ra:FlowMeasurementPeriod>
</ra:ReadDeviceConfigurationGasRsp>
```

Figure 16 - Read Device Configuration (Gas) Parse Response Sample

```
<ra:ReadDeviceConfigurationGasRsp MessageSuccess="true">
  <ra:CalorificValue>110.6</ra:CalorificValue>
  <ra:ConversionFactor>2</ra:ConversionFactor>
  <ra:UncontrolledGasFlowRate>25.5</ra:UncontrolledGasFlowRate>
  <ra:FlowStabilisationPeriod>4294967295</ra:FlowStabilisationPeriod>
  <ra:FlowMeasurementPeriod>4294967295</ra:FlowMeasurementPeriod>
</ra:ReadDeviceConfigurationGasRsp>
```

Figure 17 - Read Device Configuration (Gas) SMETS1 Response Sample