**3GPP TSG-SA5 Meeting #137eS5-215359**

**11 – 20 Oct 2021**

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| *CR-Form-v11.4* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **28.532** | **CR** | **0177** | **rev** | **3** | **Current version:** | **16.9.0** |  |
|  | | | | | | | | |
| *For* [***HELP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network | **X** | Core Network | **X** |

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|  | | | | | | | | | | |
| ***Title:*** | Add Exception Reporting Support to PM XML File Schema | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson | | | | | | | | | |
| ***Source to TSG:*** | S5 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | ePM\_KPI\_5G | | | | |  | ***Date:*** | | | 2021-10-01 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **C** |  | | | | | ***Release:*** | | | Rel-17 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) Rel-12 (Release 12) Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | There is no consistent way to report exceptions, or distinguish ambiguous values, using the existing PM XML Schema. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Add standardized element to report measurement result exceptions in the PM XML Schema. Editorial update to correct section header number. | | | | | | | | |
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| ***Consequences if not approved:*** | | Vendors requiring such exception reporting must do so with their own non-standard elements, and/or documentation. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 11.3.2.1, 12.3.2.2, 12.3.2.4 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | | Forge link: <https://forge.3gpp.org/rep/sa5/MnS/blob/S5_213396_Add_Exception_Reporting_Support_to_PM_XML_File_Schema/xsd/measData.xsd> | | | | | | | | |

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| **1st Modified Section** |

#### 11.3.2.1 Performance data file

##### 11.3.2.1.1 Void

##### 11.3.2.1.2 Performance data file content description

Table 11.3.2.1.2-1 provides the content definition of a performance data file.

Table 11.3.2.1.2-1: Performance data file content description

| File content item | Description |
| --- | --- |
| measDataFile | Top-level tag indicating the file contains performance metrics. Each file includes a header ("measFileHeader"), a collection of information elements with produced performance metrics and associated meta data ("measData") and a footer ("measFileFooter"). |
| measFileHeader | File header including the file format version, information about the sending node (DN, type and vendor) and a time stamp indicating the begin of the first granularity period contained in the file ("collectionBeginTime"). |
| measData | Information element containing the DN of the common root of the measured object instances ("measObjRootDn ") included in that information element, followed by a list of information elements containing the produced performance metrics and associated meta data ("measInfo"). A "MeasDataFile" contains zero, one or more "measData" elements. |
| measFileFooter | File footer with a time stamp indicating the end of the last granularity period contained in the file ("collectionEndTime"). |
| fileFormatVersion | File format version applied by the sender as indicated by the specific format version identifier provided for each version. |
| senderName | DN of the entity, that generated and sent the file. The entity is either a managed element represented by a "ManagedElement" or a management node represented by a "ManagementNode" |
| senderType | Type of the entity, that generated and sent the file, as defined in 3GPP TS 28.620 [y]. The type of a management node is "MANAGEMENT\_NODE". |
| vendorName | Vendor of the the entity, that generated and sent the file. |
| collectionBeginTime | Time stamp indicating the begin of the first granularity period for which performance metrics are stored in the file. |
| measObjRootDn | DN of the measured object root. The measured object root is the first common object name-containing all objects that the metrics in one "measData" element are related to. When the metrics are produced by a managed element, the root object is the "ManagedElement" representing this managed element. When (aggregated) metrics are produced by a management node (based on input metrics from managed elements), such as metrics for sub-networks or network slices, the root object is the root "SubNetwork" of this management node. |
| measObjRootUserLabel | User label of the measured object root. |
| measObjRootSwVersion | Software version of the measured object root, allowing post-processing systems to take care of vendor specific performance metrics. It is either the software version of a managed element or of a management node. |
| measInfo | Information element added to "measData" for each expired granularity period, containing information on the produced performance metrics, starting with a time stamp ("measTimeStamp"), the granularity period ("granularityPeriod") and reporting period ("reportingPeriod") that are associated to the following performance metrics ("measValues"), for which is indicated the performance metric name, the measured or computed performance metric value and the object instance to which the performance metric is related to. |
| measInfoId | Identifier of a "measInfo". |
| jobId | Job identifier of the related "PerfMetricJob" in this "measInfo". |
| reportingPeriod | Period used for performance metric reporting in this "measInfo". Unit is seconds |
| granularityPeriod | Period used for performance metric production in a "measInfo". Unit is seconds. |
| measTimeStamp | End time of the granularity period in a "measInfo". |
| measTypes | Performance metric names in a "measInfo" |
| measValues | Performance metric values in a "measInfo". Each item in this list includes the LDN of the object the metrics are related to ("measObjLdn"), the measured or computed values of the metrics ("measResults"), the list of exception codesand a flag that indicates whether the metrics are reliable ("suspectFlag"). |
| measObjLdn | Local distinguished name (LDN) of the object the performance metrics are related to (measured object) within the scope defined by the "measObjRootDn". The concatenation of the "measObjRootDn" and the "measObjLdn" is the DN of the measured object. The "measObjLdn" is therefore empty if the "measObjRootDn" already specifies completely the DN of the measured object, which is the case for metrics associated to "ManagedElement" or the root "SubNetwork".  For example, if the measured object is a "ManagedElement" representing RNC "RNC-Gbg-1", then the "measObjRootDn" may look like  "DC=a1.operatorNN.com,SubNetwork=CountryNN,ManagedElement=RNC-Gbg-1"  and the "measObjLdn" is empty. However, if the measured object is an "UtranCell" representing cell "Gbg-997" managed by that RNC, then the "measObjRootDn" is the same as above, i.e.  "DC=a1.companyNN.com,SubNetwork=CountryNN,ManagedElement=RNC-Gbg-1"  and the "measObjLdn" is  "RncFunction=RF-1,UtranCell=Gbg-997".  The class of the measured object is defined in item f) of measurement definitions (3GPP TS 32.404 [47], TS 28.552 [18]) and in item d) of KPI definitions (TS 28.554 [6]). |
| measResults | List of result values for the observed or computed performance metrics. The "measResults" sequence shall have the same number of elements and follow the same order as the "measTypes" sequence. The NULL value is reserved to indicate that the performance metric is not applicable or could not be produced for the object instance. |
| suspectFlag | Reliability of the performance metrics. FALSE means the metrics are reliable, TRUE means they are not reliable. The default value is "FALSE". |
| exceptionCode | For a result value indicative of an error, this provides the exception code. |
| timestamp | This tag carries the time stamp that refers to the end of the measurement collection interval (granularity period) that is covered by the collected measurement results that are stored in this file. The minimum required information within timestamp is year, month, day, hour, minute, and second. |

The representation of all timestamps in PM files shall follow the representations allowed by the ISO 8601 [20].   
The precise format for timestamp representation shall be determined by the technology used for encoding the PM file (e.g. ASN.1, XML DTD, and XML Schema). The choice of technology should ensure that this representation is derived from ISO 8601 [20]. Based on the representation used, the timestamp shall refer to either UTC time or local time or local time with offset from UTC.

The supported exception codes provide additional information for errors in the reported data. Each exception code element identifies the measurement for which an error occurred along with a value indicating the specific error. In addition to the standardized codes defined below, vendor specific exception code values can also be reported.

Table 4.1-x: Exception Codes

|  |  |
| --- | --- |
| **Exception Code** | **Description** |
| NEGATIVE\_VALUE | A counter has been stepped in negative direction. |
| WRAPPED\_VALUE | An unexpected high value has caused the counter to wrap. |
| INVALID\_VALUE | A calculation error has occurred. |

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| **2nd Modified Section** |

#### 12.3.2.2 Mapping table

Table 12.3.2.2-1 maps the file content items in the clause 11.3.2.1.2 to those used in the XML schema based file format definitions. XML attributes are useful where data values bind tightly to its parent XML element. They have been used where appropriate.

Table 12.3.2.2-1: Mapping of File Content Items to XML tags

| File Content Item | XML schema based XML tag | Description |
| --- | --- | --- |
| measDataFile | XML element: measDataFile | Document element |
| measFileHeader | XML element: fileHeader |  |
| measData | XML element: measData |  |
| measFileFooter | XML element: fileFooter |  |
| fileFormatVersion | XML element: fileHeader  XML attribute: fileFormatVersion |  |
| senderName | XML element: fileHeader  XML attribute: dnPrefix  XML element: fileHeader:fileSender  XML attribute: senderName | The DN of the sender is split into the DN prefix contained in "dnPrefix" and the Local DN (LDN) contained in "senderName". |
| senderType | XML element fileHeader:fileSender  XML attribute: senderType |  |
| vendorName | XML element fileHeader  XML attribute vendorName |  |
| collectionBeginTime | XML element: fileHeader:measData  XML attribute beginTime |  |
| measObjRootDn | XML element fileHeader  XML attribute dnPrefix  XML element measData:measEntity  XML attribute localDn | The DN of the root object is split into the DN prefix contained in "dnPrefix" and the Local DN (LDN) contained in "localDn". |
| measObjRootUserLabel | XML element: measData:measEntity  XML attribute: userLabel |  |
| measObjRootSwVersion | XML element: measData:measEntity  XML attribute: swVersion |  |
| measInfo | XML element measInfo | An instance of this XML element is added for each expired granularity period. |
| measInfoId | XML element measData:measInfo  XML attribute measInfoId |  |
| jobId | XML element measData:measInfo:job  XML attribute jobId |  |
| reportingPeriod | XML element measData:measInfo:repPeriod  XML attribute duration | The XML attribute "duration" shall use the truncated representation for duration "PT*n*S" (see [28]). |
| granularityPeriod | XML element measData:measInfo:granPeriod  XML attribute duration | The XML attribute "duration" shall use the truncated representation for duration "PT*n*S" (see [28]). |
| measTimeStamp | XML element measData:measInfo:granPeriod  XML attribute endTime |  |
| measTypes | XML element measData:measInfo:measTypes  or  XML element measData:measInfo:measType  XML attribute p | Depending on sender's choice for optional positioning presence, either XML element "measTypes" or XML elements "measType" will be used. |
| measValues | XML element measData:measInfo:measValue |  |
| measObjLdn | XML element measData:measInfo:measValue  XML attribute measObjLdn |  |
| measResults | XML element measData:measInfo:measValue:measResults  or, when the positioning option is used,  measData:measInfo:measValue:r | Depending on sender's choice for optional positioning, either XML element "measResults" or XML elements "r" is used. |
| exceptionCode | XML element:exceptionCode | In the event of error this element provides the exception codes.  If no errors occur then this element is absent.  For reporting with optional positioning the attribute meas value equals p value of the associated element r.  For reporting without optional positioning the attribute meas identifies the measType. |
| suspectFlag | XML element measData:measInfo:measValue:suspect |  |
| collectionEndTime | XML element fileFooter:measData  XML attribute endTime |  |
| There is no corresponding File Content Item. | XML element measType  XML attribute p | Only for the positioning option: XML attribute "p" of XML element "measType", used to link the performance metric type specified in "measType" to the result value. Its value is a positive integer (excl. zero) and shall be unique for each instance of "measType" in a file. |
| There is no corresponding File Content Item. | XML element r  XML attribute p | Only for the positioning option: XML attribute "p" of the XML element "r", used to link the result value in "r" to its performance metric type in "measType". The value of "p" shall match the value of the XML attribute "p" in the corresponding XML element "measType". |

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| **3rd Modified Section** |

##### 

#### 12.3.2.4 XML schema

This clause specifies the XML schema that shall be used for XML files containing performance data.

Name: measData.xsd

Version: 2.0.0

Identifier: measData.xsd-v2.0.0

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

<!--

3GPP TS 28.532 Performance data XML file format definition

measData.xsd-v2.0.0

-->

<schema

xmlns="http://www.w3.org/2001/XMLSchema"

xmlns:md="http://www.3gpp.org/ftp/specs/archive/28\_series/28.532#measData"

targetNamespace="http://www.3gpp.org/ftp/specs/archive/28\_series/28.532#measData"

elementFormDefault="qualified">

<element name="measDataFile">

<complexType>

<sequence>

<element name="fileHeader">

<complexType>

<sequence>

<element name="fileSender">

<complexType>

<attribute name="senderName" type="string" use="optional"/>

<attribute name="senderType" type="string" use="optional"/>

</complexType>

</element>

<element name="measData">

<complexType>

<attribute name="beginTime" type="dateTime" use="required"/>

</complexType>

</element>

</sequence>

<attribute name="fileFormatVersion" type="string" use="required"/>

<attribute name="vendorName" type="string" use="optional"/>

<attribute name="dnPrefix" type="string" use="optional"/>

</complexType>

</element>

<element name="measData" minOccurs="0" maxOccurs="unbounded">

<complexType>

<sequence>

<element name="measEntity">

<complexType>

<attribute name="localDn" type="string" use="optional"/>

<attribute name="userLabel" type="string" use="optional"/>

<attribute name="swVersion" type="string" use="optional"/>

</complexType>

</element>

<element name="measInfo" minOccurs="0" maxOccurs="unbounded">

<complexType>

<sequence>

<element name="job" minOccurs="0">

<complexType>

<attribute name="jobId" type="string" use="required"/>

</complexType>

</element>

<element name="granPeriod">

<complexType>

<attribute name="duration" type="duration" use="required"/>

<attribute name="endTime" type="dateTime" use="required"/>

</complexType>

</element>

<element name="repPeriod" minOccurs="0">

<complexType>

<attribute name="duration" type="duration" use="required"/>

</complexType>

</element>

<choice>

<element name="measTypes">

<simpleType>

<list itemType="Name"/>

</simpleType>

</element> <element name="measType" minOccurs="0" maxOccurs="unbounded">

<complexType>

<simpleContent>

<extension base="Name">

<attribute name="p" type="positiveInteger" use="required"/>

</extension>

</simpleContent>

</complexType>

</element>

</choice>

<element name="measValue" minOccurs="0" maxOccurs="unbounded">

<complexType>

<sequence>

<choice>

<element name="measResults">

<simpleType>

<list itemType="md:measResultType"/>

</simpleType>

</element>

<element name="r" minOccurs="0" maxOccurs="unbounded">

<complexType>

<simpleContent>

<extension base="md:measResultType">

<attribute name="p" type="positiveInteger" use="required"/>

</extension>

</simpleContent>

</complexType>

</element>

</choice>

<element name="exceptionCode” minOccurs="0" maxOccurs="unbounded”>

<complexType>

<simpleContent>

<extension base="string">

<attribute name="meas" type="string" use="required"/>

</extension>

</simpleContent>

</complexType>

</element>

<element name="suspect" type="boolean" minOccurs="0"/>

</sequence>

<attribute name="measObjLdn" type="string" use="required"/>

</complexType>

</element>

</sequence>

<attribute name="measInfoId" type="string" use="optional"/>

</complexType>

</element>

</sequence>

</complexType>

</element>

<element name="fileFooter">

<complexType>

<sequence>

<element name="measData">

<complexType>

<attribute name="endTime" type="dateTime" use="required"/>

</complexType>

</element>

</sequence>

</complexType>

</element>

</sequence>

</complexType>

</element>

<simpleType name="measResultType">

<union memberTypes="integer float string">

<simpleType>

<restriction base="string">

<enumeration value="NULL"/>

</restriction>

</simpleType>

</union>

</simpleType>

</schema>