Source: **SA5 (Telecom Management)**

Title: **3 Rel-6 CR 32.401 (Performance Management (PM); Concept and requirements)**

Document for: **Approval**

Agenda Item: **7.5.3**

Doc-1st-Level	Spec	CR	Rev	Phase	Subject	Cat	Version-Current	Doc-2nd-Level	Workitem
SP-030430	32.401	009	-	Rel-6	Addition of "jobId" and "reportingPeriod" parameters in the file format definition	C	5.2.0	S5-038548	OAM-PM
SP-030430	32.401	010	-	Rel-6	Removal of measurement job state and status attributes	C	5.2.0	S5-038549	OAM-PM
SP-030430	32.401	011	-	Rel-6	Refinement of the conditions for setting "suspect flag"	C	5.2.0	S5-038551	OAM-PM

3GPP TSG-SA5 (Telecom Management) **S5-038548**
Meeting #35, Sophia Antipolis, FRANCE, 27 Aug - 12 Sep 2003

CR-Form-v7

CHANGE REQUEST

⌘ **32.401** **CR** **009** ⌘**rev** **-** ⌘ Current version: **5.2.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ [ ] ME [ ] Radio Access Network [X] Core Network [X]

Title:	⌘	Addition of "jobId" and "reportingPeriod" parameters in the file format definition
Source:	⌘	SA5 (China Mobile, RUI Lanlan)
Work item code:	⌘	OAM-PM
Date:	⌘	05/09/2003
Category:	⌘	**C**
Release:	⌘	Rel-6

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction 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.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change:	⌘	Alignment with the parameter definitions for measurement job in Performance Management IRP Information Service TS 32.412.
Summary of change:	⌘	Add "jobId" and "reportingPeriod" parameters in the file format definition.
Consequences if not approved:	⌘	
Clauses affected:	⌘	Annex A, Annex C

		Y	N		
Other specs affected:	⌘		X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

Change in Annex A

Annex A (normative): Measurement Report File Format

This annex describes the format of measurement result files that can be transferred from the network (NEs or EM) to the NM. Three alternative format definitions are specified, one using ASN.1 with binary encoding (BER), the two others applying XML (see [25]), which is ASCII based. Of the two alternative XML format definitions, one is based on DTD, while the other is based on XML schema (see [26], [27] and [28]). Each 3G-system implementation complying with the present document shall support at least one of the three alternatives.

NOTE: It is not intended to have the DTD based XML format from Release 6 onwards defined as one of the alternate valid file formats for measurement result files.

Both the ASN.1 and XML file format definitions implement the measurement result structure and parameters defined in clauses 5.2 and 5.3 of the present document~~, except from the measurement job id, which is only needed to correlate measurement result reports with measurement jobs within the area of measurement administration (see clause 5.2.1.4)~~. The three defined file format definitions correspond to each other (except with some minor XML specific optimisations). This implies that the value ranges and size constraints defined in the ASN.1 definition shall also be valid for implementations of the XML format definition. From that perspective, the three format definitions can be regarded as three different instances of the same single format.

The following conditions have been considered in defining this file format:

- Since the files are transferred via a machine-machine interface, the files applying the format definitions should be machine readable using standard tools.
- The file format should be independent of the data transfer protocol used to carry the file from one system to another.
- The file format should be generic across 3G systems.
- The file format should be flexible enough to include all possible measurement types, i.e. those specified within annex C as well as measurements defined within other standards bodies, or vendor specific measurement types.
- The file format should not impose any dependency between granularity periods for the generation of measurement results and file upload cycles for the file transfer from the network to the NM.
- The file format should be flexible enough to support both the NE-based and the EM-based approaches, as discussed in annex B, clause B.1.1 of the present document.
- The file format should be usable for other interfaces than Itf-N if required. The measurement file header could be augmented to indicate this other usage, however this would be a non-standard extension. In the ASN.1 file format definition, this is accommodated by the use of the ellips~~e~~is notation. XML allows such additions through extra DTDs, provided by the definer of the non-standard extension.

A.1 Parameter description and mapping table

Table A.1 maps the tags defined in the ASN.1 file format definition to those used in the XML file format definitions, DTD based and XML schema based. It also provides an explanation of the individual parameters. The XML tags defined in the DTD (see clause A.3.1) have been kept as short as possible in order to minimise the size of the XML measurement result files. XML tag attributes are useful where data values bind tightly to its parent element. They have been used where appropriate.

Table A.1 Mapping of ASN.1 Measurement Report File Format tags to XML tags

ASN.1 Tag	DTD based XML tag	XML schema based XML tag	Description
MeasDataCollection	mdc	measCollecFile	This is the top-level tag, which identifies the file as a collection of measurement data. The file content is made up of a header ("measFileHeader"), the collection of measurement result items ("measData"), and a measurement file footer ("measFileFooter").
~~measFileHeader~~ MeasFileHeader	mfh	fileHeader	This is the measurement result file header to be inserted in each file. It includes a version indicator, the name, type and vendor name of the sending network node, and a time stamp ("collectionBeginTime").
~~measData~~MeasData	md	measData	The "measData" construct represents the sequence of zero or more measurement result items contained in the file. It can be empty in case no measurement data can be provided. The individual "measData" elements can appear in any order. Each "measData" element contains the name of the NE ("nEId") and the list of measurement results pertaining to that NE ("measInfo").
~~measFileFooter~~MeasFileFooter	mff	fileFooter	The measurement result file footer to be inserted in each file. It includes a time stamp, which refers to the end of the overall measurement collection interval that is covered by the collected measurement results being stored in this file.
~~fileFormatVersion~~FileFormatVersion	ffv	fileHeader fileFormatVersion	This parameter identifies the file format version applied by the sender. The format version defined in the present document shall be the abridged number and version of this 3GPP document (see below) for XML formats and the ASN.1 format alike. The abridged number and version of a 3GPP document is constructed from its version specific full reference "3GPP […] (yyyy-mm)" by: - removing the leading "3GPP TS" - removing everything including and after the version third digit, representing editorial only changes, together with its preceding dot character - from the resulting string, removing leading and trailing white space, replacing every multi character white space by a single space character and changing the case of all characters to uppercase.
~~senderName~~SenderName	sn	fileHeader dnPrefix and fileSender localDn	The senderName uniquely identifies the NE or EM that assembled this measurement file by its Distinguished Name (DN), according to the definitions in 3GPP TS 32.300 [10]. In the case of the NE-based approach, it is identical to the sender's "nEDistinguishedName". For ASN.1 and DTD based XML format, the string may be empty (i.e. string size =0) in case the DN is not configured in the sender. For the XML schema based XML format, the DN is split into the DN prefix and the Local DN (LDN) (see 3GPP TS 32.300 [10]). XML attribute specification "dnPrefix" may be absent in case the DN prefix is not configured in the sender. XML attribute specification "localDn" may be absent in case the LDN is not configured in the sender.
~~senderType~~SenderType	st	fileSender elementType	This is a user configurable identifier of the type of network node that generated the file, e.g. NodeB, EM, SGSN. The string may be empty (i.e. string size =0) in case the "senderType" is not configured in the sender. For the XML schema based XML format, XML attribute specification "elementType" may be absent in case the "senderType" is not configured in the sender.
~~vendorName~~VendorName	vn	fileHeader vendorName	The "vendorName" identifies the vendor of the equipment that provided the measurement file. The string may be empty (i.e. string size =0) if the "vendorName" is not configured in the sender. For the XML schema based XML format, XML attribute specification "vendorName" may be absent in case the "vendorName" is not configured in the sender.
~~collectionBeginTime~~CollectionBeginTime	cbt	measCollec beginTime	The "collectionBeginTime" is a time stamp that refers to the start of the first measurement collection interval (granularity period) that is covered by the collected measurement results that are stored in this file.

ASN.1 Tag	DTD based XML tag	XML schema based XML tag	Description
~~nEId~~NEId	neid	managedElement	The unique identification of the NE in the system. It includes the user name ("nEUserName"), the distinguished name ("nEDistinguishedName") and the software version ("nESoftwareVersion") of the NE.
~~nEUserName~~NEUserName	neun	managedElement userLabel	This is the user definable name ("userLabel") defined for the NE in 3GPP TS 32.622 [24]. The string may be empty (i.e. string size =0) if the "nEUserName" is not configured in the CM applications. For the XML schema based XML format, XML attribute specification "userLabel" may be absent in case the "nEUserName" is not configured in the CM applications.
~~nEDistinguishedName~~ NEDistinguishedName	nedn	fileHeader dnPrefix and managedElement localDn	This is the Distinguished Name (DN) defined for the NE in 3GPP TS 32.300 [10]. It is unique across an operator's 3G network. The string may be empty (i.e. string size =0) if the "nEDistinguishedName" is not configured in the CM applications. For the XML schema based XML format, the DN is split into the DN prefix and the Local DN (LDN) (see 3GPP TS 32.300 [10]). XML attribute specification "localDn" may be absent in case the LDN is not configured in the CM applications.
~~nESoftwareVersion~~NE SoftwareVersion	nesw	managedElement swVersion	This is the software version ("`swVersion`") defined for the NE in 3GPP TS 32.622 [24]. This is an optional parameter which allows post-processing systems to take care of vendor specific measurements modified between software versions. For the XML schema based XML format, XML attribute specification "swVersion" may be absent in case the "nESoftwareVersion" is not configured in the CM applications.
~~measInfo~~MeasInfo	mi	measInfo	The sequence of measurements, values and related information. It includes a list of measurement types ("measTypes") and the corresponding results ("measValues"), together with the time stamp ("measTimeStamp") and granularity period ("granularityPeriod") pertaining to these measurements.
~~measTimeStamp~~MeasTimeStamp	mts	granPeriod endTime	Time stamp referring to the end of the granularity period.
JobId	jobid	job jobId	The "jobId" represents the job with which measurement result contained in the file is associated. The "jobId" is mandatory when PMIRP is supported.
~~granularityPeriod~~GranularityPeriod	gp	granPeriod duration	Granularity period of the measurement(s) in seconds. For the XML schema based XML format, the value of XML attribute specification "duration" shall use the truncated representation "PT*n*S" (see [28]).
ReportingPeriod	rp	repPeriod duration	Reporting period of the measurement(s) in seconds. For the XML schema based XML format, the value of XML attribute specification "duration" shall use the truncated representation "PT*n*S" (see [28]). The "reportingPeriod" is mandatory when PMIRP is supported.
~~measTypes~~MeasTypes	mt	measTypes or measType	This is the list of measurement types for which the following, analogous list of measurement values ("measValues") pertains. The GSM only measurement types are defined in TS 52.402 [22]. The measurement types for UMTS and combined UMTS/GSM implementations are specified in TS 32.403 [23]. For the XML schema based XML format, depending on sender's choice for optional positioning presence, either XML element "measTypes" or XML elements "measType" will be used.
~~measValues~~MeasValues	mv	measValue	This parameter contains the list of measurement results for the resource being measured, e.g. trunk, cell. It includes an identifier of the resource ("measObjInstId"), the list of measurement result values ("measResults") and a flag that indicates whether the data is reliable ("suspectFlag").

ASN.1 Tag	DTD based XML tag	XML schema based XML tag	Description
~~measObjInstId~~MeasObjInstId	moid	measValue measObjLdn	The "measObjInstId" field contains the local distinguished name (LDN) of the measured object within the scope defined by the "nEDistinguishedName" (see 3GPP TS 32.300 [10]). The concatenation of the "nEDistinguishedName" and the "measObjInstId" yields the DN of the measured object. The "measObjInstId" is therefore empty if the "nEDistinguishedName" already specifies completely the DN of the measured object, which is the case for all measurements specified on NE level. For example, if the measured object is a "ManagedElement" representing RNC "RNC-Gbg-1", then the "nEDistinguishedName" will be for instance "DC=a1.companyNN.com,SubNetwork=1,IRPAgent=1,SubNetwork=CountryNN,MeContext=MEC-Gbg-1,ManagedElement=RNC-Gbg-1", and the "measObjInstId" will be empty. On the other hand, if the measured object is a "UtranCell" representing cell "Gbg-997" managed by that RNC, then the "nEDistinguishedName" will be for instance the same as above, i.e. "DC=a1.companyNN.com,SubNetwork=1,IRPAgent=1,SubNetwork=CountryNN,MeContext=MEC-Gbg-1,ManagedElement=RNC-Gbg-1", and the "measObjInstId" will be for instance "RncFunction=RF-1,UtranCell=Gbg-997". The class of the "measObjInstId" is defined in item F of each measurement definition template.
~~measResults~~MeasResults	r	measResults or r	This parameter contains the sequence of result values for the observed measurement types. The "measResults" sequence shall have the same number of elements, which follow the same order as the measTypes sequence. Normal values are INTEGERs and REALs. The NULL value is reserved to indicate that the measurement item is not applicable or could not be retrieved for the object instance. For the XML schema based XML format, depending on sender's choice for optional positioning presence, either XML element "measResults" or XML elements "r" will be used.
~~suspectFlag~~SuspectFlag	sf	suspect	Used as an indication of quality of the scanned data. FALSE in the case of reliable data, TRUE if not reliable. The default value is "FALSE", in case the suspect flag has its default value it may be omitted.
TimeStamp	ts	measCollec endTime	ASN.1 GeneralizedTime format. The minimum required information within timestamp is year, month, day, hour, minute, and second.
Not Required	mt p	measType p	An optional positioning XML attribute specification of XML elements "mt" (DTD based) and "measType" (XML schema based), used to identify a measurement type for the purpose of correlation to a result. The value of this XML attribute specification is expected to be a non-zero, non-negative integer value that is unique for each instance of XML element "mt" or "measType" that is contained within the measurement data collection file.
Not Required	r p	r p	An optional positioning XML attribute specification of XML element "r", used to correlate a result to a measurement type. The value of this XML attribute specification should match the value of XML attribute specification "p" of corresponding XML element "mt" " (DTD based) or "measType" (XML schema based).

The measInfo contains the sequence of measurements, values and related information, in a table-oriented structure. A graphical representation of this structure, together with an ASN.1 and a XML example, can be found in annex C.

At least for those measurement types that are re-used from non-3GPP standards (e.g. IP, ATM), it is required that the measType be operator definable. This is necessary to allow the operator to harmonise the numbering between different vendors' systems where appropriate. Through this harmonisation, it can be assured that identical measurements always carry the same measType value, which is required by the post-processing system. This requirement will eventually be reflected in TS 52.402 [22] and TS 32.403 [23], which specify the performance measurements for GSM (TS 52.402 [22]) and UMTS and combined UMTS/GSM systems (TS 32.403 [23]).

A.2 ASN.1 file format definition

For ASN.1 formatted files, BER encoding rules shall apply. Embedded comments are integral parts of the standard format; i.e. any implementation-claiming conformance to this annex shall also conform to the comments.

```
PM-File-Description
DEFINITIONS AUTOMATIC TAGS::= BEGIN

MeasDataCollection::= SEQUENCE
   {
   measFileHeader   MeasFileHeader,
   measData         SEQUENCE OF MeasData,
   measFileFooter   MeasFileFooter
   }

MeasFileHeader::= SEQUENCE
   {
   fileFormatVersion      PrintableString (SIZE (0..15)),
   senderName             PrintableString (SIZE (0..400)),
   senderType             SenderType,
   vendorName             PrintableString (SIZE (0..32)),
   collectionBeginTime    TimeStamp,
   ...
   }
-- The sole purpose of the ellipse ellipsis notation used in the file header
is to facilitate inter-release compatibility, vendor specific additions are not
allowed in implementations claiming conformance to the TS. However, it is
acknowledged that this feature does enable the use of non-standard extensions to
the file header without loosing compatibility to the file format specified in
the present document.

SenderType::= PrintableString (SIZE (0..8))

TimeStamp::= GeneralizedTime

MeasData::= SEQUENCE
   {
   nEId        NEId,
   measInfo    SEQUENCE OF MeasInfo
   }

NEId::= SEQUENCE
   {
   nEUserName           PrintableString (SIZE (0..64)),
   nEDistinguishedName  PrintableString (SIZE (0..400)),
   nESoftwareVersion    PrintableString (SIZE (0..64)) OPTIONAL
   }

MeasInfo::= SEQUENCE
   {
   measTimeStamp     TimeStamp,
   jobId             [1]  INTEGER OPTIONAL,
   granularityPeriod [2]  INTEGER,
   reportingPeriod   [3]  INTEGER OPTIONAL,
   measTypes         [4]  SEQUENCE OF MeasType,
   measValues        SEQUENCE OF MeasValue
   }

MeasType::= PrintableString (SIZE (1..32))

MeasValue::= SEQUENCE
   {
   measObjInstId   MeasObjInstId,
   measResults     SEQUENCE OF MeasResult,
```

```
   suspectFlag    BOOLEAN DEFAULT FALSE
   }

MeasObjInstId::= PrintableString (SIZE (0..64))

MeasResult::= CHOICE
   {
      iValue INTEGER,
      rValue REAL,
      noValueNULL,
      ...
   }

-- Normal values are INTEGERs and REALs. The NULL value is reserved to
indicate that the measurement item is not applicable or could not be retrieved
for the object instance. The sole purpose of the ellipse ellipsis notation used
in the MeasResult choice is to facilitate inter-release compatibility in case
the choice needs to be extended in future releases.

MeasFileFooter::= TimeStamp

END
```

A.3 DTD based XML file format definition

The character encoding shall be a subset of UTF-8. The characters in the ASN.1 type PrintableString are allowed, i.e.:

- A-Z;
- a-z;
- 0-9;
- <space> ' ( ) + , - . / : = ?'.

For encoding of the information content, XML (see Extensible Markup Language (XML) 1.0, W3C Recommendation 10-Feb-98) will be used. The XML **document type definition** contains the mark-up declarations that provide a grammar for the measurement file format. This grammar is known as a Document Type Definition (DTD).
The DTD to be used is defined below. The type definitions and constraints for data types and values defined in the ASN.1 format, such as string sizes, shall implicitly be applied to the XML result files also. The representation of the timestamps within the XML file shall follow the "GeneralizedTime" ASN.1 type.

```
<!-- MeasDataCollection.dtd version 2.0-->
<?xml version="1.0" encoding="UTF-8"?>
<!ELEMENT mdc (mfh, md*, mff)>
<!ELEMENT mfh (ffv, sn, st, vn, cbt)>
<!ELEMENT md (neid, mi*)>
<!ELEMENT neid (neun, nedn, nesw?)>
<!ELEMENT mi (mts, jobid?, gp, rp?, mt*, mv*)>
<!ELEMENT mv (moid, r*, sf?)>
<!ELEMENT mff (ts)>
<!ELEMENT jobid (#PCDATA)>
<!ELEMENT rp (#PCDATA)>
<!ELEMENT ts (#PCDATA)>
<!ELEMENT sf (#PCDATA)>
<!ELEMENT r (#PCDATA)>
<!ATTLIST r p CDATA "">
<!ELEMENT mt (#PCDATA)>
<!ATTLIST mt p CDATA "">
<!ELEMENT moid (#PCDATA)>
<!ELEMENT gp (#PCDATA)>
<!ELEMENT mts (#PCDATA)>
<!ELEMENT nedn (#PCDATA)>
```

```
<!ELEMENT neun (#PCDATA)>
<!ELEMENT nesw (#PCDATA)>
<!ELEMENT cbt (#PCDATA)>
<!ELEMENT vn (#PCDATA)>
<!ELEMENT st (#PCDATA)>
<!ELEMENT sn (#PCDATA)>
<!ELEMENT ffv (#PCDATA)>

<!-- end of MeasDataCollection.dtd -->
```

The number of Measurement Result tags (r) per observed object instance tags (moid) shall always equal the number of Measurement Types (mt) tags. In case the result is a REAL value the decimal separator shall be ".". In case the result is "NULL" then the "r" mark-up shall be empty.

The following header shall be used in actual XML measurement result files (cf. annex D for an example):

```
<?xml version="1.0" encoding="UTF-8"?>
<?xml-stylesheet type="text/xsl" href="MeasDataCollection.xsl"?>
<!DOCTYPE mdc SYSTEM "MeasDataCollection.dtd">
<mdc xmlns:HTML="http://www.w3.org/TR/REC-xml">
```

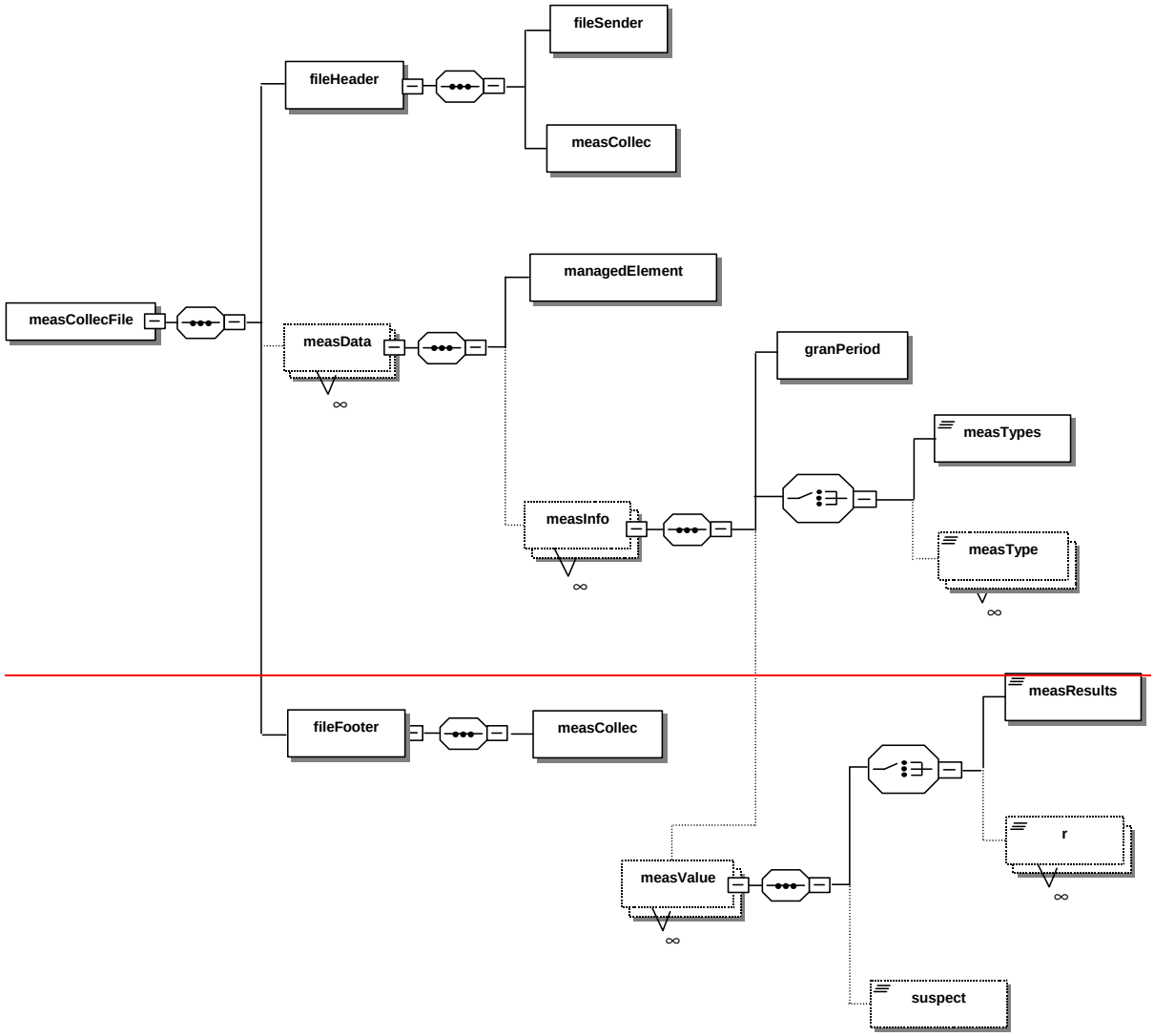
- Line 1: xml version number 1 shall be used.
- The reference to an XSL (Extensible Stylesheet Language) or CSS (Cascading Style Sheet) file in line 2 of the header is optional. It may be configured by the operator to be inserted for the purpose of presenting the XML file in a web browser GUI. It is up to the receiver of the file to decide on the usage of this stylesheet reference, e.g. ignore it if not needed or choosing a configured default if no style sheet reference is supplied in the file.
- Line 4: A reference to the W3C Recommendation web page for XML.

  Quick guide to XML notation: ? zero or one occurrence
  + one or more occurrences
  * zero or more occurrences
  #PCDATA parsed character data

A.4 XML schema based XML file format definition

A.4.1 Measurement collection data file XML diagram

Figure A.1 describes the XML element structure of the measurement collection data file:



xxx	Element named xxx. The maximum number of occurrence is 1.
xxx ∞	Element named xxx. The maximum number of occurrences is unbounded. There may be no occurrence.
———	Required element
.....	Optional element
	Sequence
	Choice
	Element with a data content

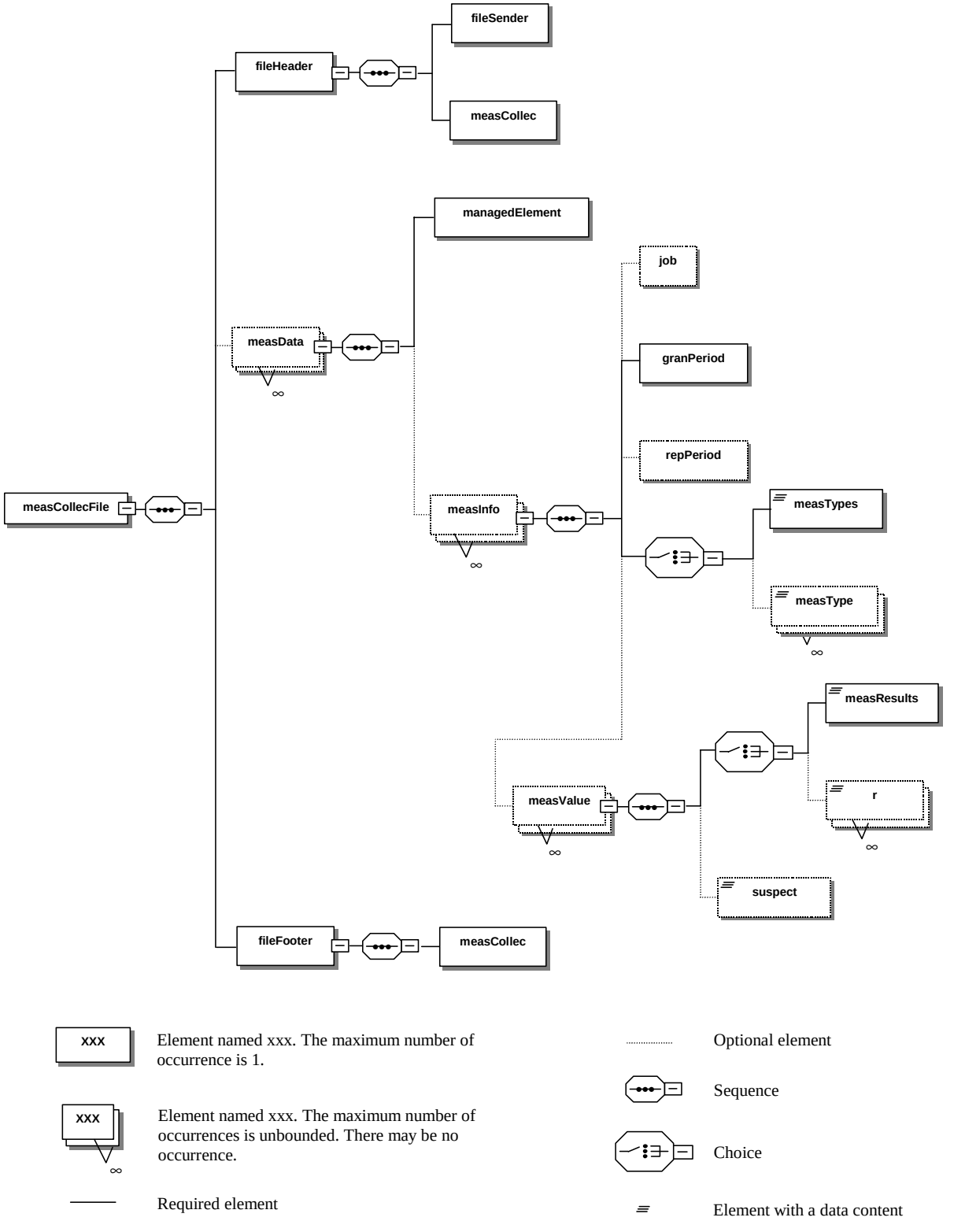


Figure A.1: XML diagram of the measurement collection data file

A.4.2 Measurement collection data file XML schema

The following XML schema `measCollec.xsd` is the schema for measurement collection data XML files:

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

<!--
  3GPP TS 32.401 PM Concept and Requirements
  Measurement collection data file XML schema
  measCollec.xsd
-->

<schema
  targetNamespace=
"http://www.3gpp.org/ftp/specs/latest/rel-56/32_series/32401-
500600.zip#measCollec"
  elementFormDefault="qualified"
  xmlns="http://www.w3.org/2001/XMLSchema"
  xmlns:mc=
"http://www.3gpp.org/ftp/specs/latest/rel-56/32_series/32401-
500600.zip#measCollec"
>

  <!-- Measurement collection data file root XML element -->

  <element name="measCollecFile">
    <complexType>
      <sequence>
        <element name="fileHeader">
          <complexType>
            <sequence>
              <element name="fileSender">
                <complexType>
                  <attribute name="localDn" type="string" use="optional"/>
                  <attribute name="elementType" type="string" use="optional"/>
                </complexType>
              </element>
              <element name="measCollec">
                <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="managedElement">
                <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="mc:measResultType"/>
                              </simpleType>
                            </element>
                            <element name="r"
                                     minOccurs="0" maxOccurs="unbounded">
                              <complexType>
                                <simpleContent>
                                  <extension base="mc:measResultType">
                                    <attribute name="p" type="positiveInteger"
                                                                    use="required"/>
                                  </extension>
                                </simpleContent>
                              </complexType>
                            </element>
                          </choice>
                          <element name="suspect" type="boolean" minOccurs="0"/>
                        </sequence>
                        <attribute name="measObjLdn"
                                   type="string" use="required"/>
                      </complexType>
```

```
                  </element>
                </sequence>
              </complexType>
            </element>
          </sequence>
        </complexType>
      </element>
      <element name="fileFooter">
        <complexType>
          <sequence>
            <element name="measCollec">
              <complexType>
                <attribute name="endTime" type="dateTime" use="required"/>
              </complexType>
            </element>
          </sequence>
        </complexType>
      </element>
    </sequence>
  </complexType>
</element>

<simpleType name="measResultType">
  <union memberTypes="decimal">
    <simpleType>
      <restriction base="string">
        <enumeration value="NIL"/>
      </restriction>
    </simpleType>
  </union>
</simpleType>

</schema>
```

A.4.3 Measurement collection data file XML header

The following header shall be used in actual XML measurement result files (cf. annex D for examples):

```
<?xml version="1.0" encoding="UTF-8"?>
<?xml-stylesheet type="text/xsl" href="MeasDataCollection.xsl"?>
<measCollecFile
  xmlns=
~~"http://www.3gpp.org/ftp/specs/latest/rel-5/32_series/32401-500.zip#measCollec"~~
"http://www.3gpp.org/ftp/specs/latest/rel-6/32_series/32401-600.zip#measCollec"
>
```

End of Change in Annex A

Change in Annex C

Annex C (informative): The table oriented file format structure

Measurement Items (counters) are typically grouped according functionality (cf. GSM 12.04 [8] Measurement Function). The term "measured object class" is used to identify such a group. The file format is based on the fact that the measurements are always collected in sets of one functional group.

The measInfo contains the sequence of measurements, values and related information, in a table-oriented structure. It includes a list of measurement types ("measTypes") and the corresponding values ("measValues"), together with the time stamp ("measTimeStamp"), ~~and~~ granularity period ("granularityPeriod") and reporting period ("reportingPeriod") pertaining to these measurements. Whenever one of these 4 elements changes, then a new measInfo sequence is started. If the "measTypes" change, then also the "measValues" change, because these elements are connected in the following way: the "measTypes" correspond to a specific measurement object (NE, trunk, cell, …), of which one or more instances can exist inside the NE.

Hence for one set of "measTypes", there can be one or more sets of "measValues", according to the "measObjInstId".

The above is best explained with an example: consider the CELL measurement function (GSM 12.04 [8]). Then the measured object class is Cell. The measInfo contains a "header" line defining which measurements related to Cell are collected (measTypes), and in which order. The subsequent "data" lines will then contain the values of the measurements for each specific cell, which is measured, one data line per cell (measValues).

This format will generate a kind of table with as column headings the measurement names, and in the rows the corresponding measurement values per measured instance.

C.1 Graphical representation of the table structure

For clarity, the table in the example below only contains the measTypes and measValues (and suspectFlag), not the granularityPeriod, reportingPeriod and the measTimeStamp.

	attTCHSeizures	succTCHSeizures	attImmediateAssignProcs	succImmediateAssignProcs	
cell=997	234	345	567	789	false
cell=998	890	901	123	234	false
cell=999	456	567	678	789	false

C.2 Example of ASN.1 Measurement Report File

For readability, a kind of pseudo ASN.1 was used in stead of the BER encoding.

```
MeasDataCollection ::= {
  measFileHeader ::= {
    fileFormatVersion ::= "32.401 V5V6.0",
    senderName ::=
"DC=a1.companyNN.com,SubNetwork=1,IRPAgent=1,SubNetwork=CountryNN,MeContext=MEC-
Gbg-1,ManagedElement=RNC-Gbg-1",
    senderType ::= "RNC",
    vendorName ::= "Company NN",
    collectionBeginTime ::= 20000301140000
  },
  measData ::= {
    nEId {
```

```
        nEUserName –::= "RNC Telecomville",
        nEDistinguishedName –::=
"DC=a1.companyNN.com,SubNetwork=1,IRPAgent=1,SubNetwork=CountryNN,MeContext=MEC-
Gbg-1,ManagedElement=RNC-Gbg-1",
        nESoftwareVersion –::= "2.1"
     },
     measInfo {
        measTimeStamp ::= 20000301141430,
        jobId ::= "1231",
        granularityPeriod ::= 900,
        reportingPeriod ::= 1800,
        measTypes –{
           –"attTCHSeizures",
           "succTCHSeizures",
           "attImmediateAssignProcs",
           "succImmediateAssignProcs"
        },
        measValues {
           {
              measObjInstId ::= "RncFunction=RF-1,UtranCell=Gbg-997",
              measResults {
                 iValue ::= 234,
                 iValue ::= 345,
                 iValue ::= 567,
                 iValue ::= 789
              },
              suspectFlag ::= FALSE
           },
           {
              measObjInstId ::= "RncFunction=RF-1,UtranCell=Gbg-998",
              measResults {
                 iValue ::= 890,
                 iValue ::= 901,
                 iValue ::= 123,
                 iValue ::= 234
              },
              suspectFlag ::= FALSE
           },
           {
              measObjInstId ::= "RncFunction=RF-1,UtranCell=Gbg-999",
              measResults {
                 iValue ::= 456,
                 iValue ::= 567,
                 iValue ::= 678,
                 iValue ::= 789
              },
              suspectFlag ::= TRUE
           }
        }
     }
  },
  measFileFooter ::= 20000301141500
}
```

C.3 Example of DTD based XML Measurement Report File

The following is an example of a DTD based XML measurement report file without use of optional positioning attributes on measurement types and results:

```
<?xml version="1.0" encoding="UTF-8"?>
<?xml-stylesheet type="text/xsl" href="MeasDataCollection.xsl"?>
```

```
<!DOCTYPE mdc SYSTEM "MeasDataCollection.dtd">
<mdc>
  <mfh>
    <ffv>32.401 V5V6.0</ffv>
    <sn>DC=a1.companyNN.com,SubNetwork=1,IRPAgent=1,SubNetwork=CountryNN,
        MeContext=MEC-Gbg-1,ManagedElement=RNC-Gbg-1</sn>
    <st>RNC</st>
    <vn>Company NN</vn>
    <cbt>20000301140000</cbt>
  </mfh>
  <md>
    <neid>
      <neun>RNC Telecomville</neun>
      <nedn>DC=a1.companyNN.com,SubNetwork=1,IRPAgent=1,SubNetwork=CountryNN,
          MeContext=MEC-Gbg-1,ManagedElement=RNC-Gbg-1</nedn>
    </neid>
    <mi>
      <mts>20000301141430</mts>
      <jobid>1231</jobid>
      <gp>900</gp>
      <rp>1800</rp>
      <mt>attTCHSeizures</mt>
      <mt>succTCHSeizures</mt>
      <mt>attImmediateAssignProcs</mt>
      <mt>succImmediateAssignProcs</mt>
      <mv>
        <moid>RncFunction=RF-1,UtranCell=Gbg-997</moid>
        <r>234</r>
        <r>345</r>
        <r>567</r>
        <r>789</r>
      </mv>
      <mv>
        <moid>RncFunction=RF-1,UtranCell=Gbg-998</moid>
        <r>890</r>
        <r>901</r>
        <r>123</r>
        <r>234</r>
      </mv>
      <mv>
        <moid>RncFunction=RF-1,UtranCell=Gbg-999</moid>
        <r>456</r>
        <r>567</r>
        <r>678</r>
        <r>789</r>
        <sf>TRUE</sf>
      </mv>
    </mi>
  </md>
  <mff>
    <ts>20000301141500</ts>
  </mff>
</mdc>
```

The following is an example of a DTD based XML measurement report file with use of optional positioning attributes on measurement types and results:

```
<?xml version="1.0" encoding="UTF-8"?>
<?xml-stylesheet type="text/xsl" href="MeasDataCollection.xsl"?>
<!DOCTYPE mdc SYSTEM "MeasDataCollection.dtd">
<mdc>
  <mfh>
    <ffv>32.401 V5V6.0</ffv>
    <sn>DC=a1.companyNN.com,SubNetwork=1,IRPAgent=1,SubNetwork=CountryNN,
        MeContext=MEC-Gbg-1,ManagedElement=RNC-Gbg-1</sn>
```

```
    <st>RNC</st>
    <vn>Company NN</vn>
    <cbt>20000301140000</cbt>
  </mfh>
  <md>
    <neid>
      <neun>RNC Telecomville</neun>
      <nedn>DC=a1.companyNN.com,SubNetwork=1,IRPAgent=1,SubNetwork=CountryNN,
            MeContext=MEC-Gbg-1,ManagedElement=RNC-Gbg-1</nedn>
    </neid>
    <mi>
      <mts>20000301141430</mts>
      <jobid>1231</jobid>
      <gp>900</gp>
      <rp>1800</rp>
      <mt p="1">attTCHSeizures</mt>
      <mt p="2">succTCHSeizures</mt>
      <mt p="3">attImmediateAssignProcs</mt>
      <mt p="4">succImmediateAssignProcs</mt>
      <mv>
        <moid>RncFunction=RF-1,UtranCell=Gbg-997</moid>
        <r p="1">234</r>
        <r p="2">345</r>
        <r p="3">567</r>
        <r p="4">789</r>
      </mv>
      <mv>
        <moid>RncFunction=RF-1,UtranCell=Gbg-998</moid>
        <r p="1">890</r>
        <r p="2">901</r>
        <r p="3">123</r>
        <r p="4">234</r>
      </mv>
      <mv>
        <moid>RncFunction=RF-1,UtranCell=Gbg-999</moid>
        <r p="1">456</r>
        <r p="2">567</r>
        <r p="3">678</r>
        <r p="4">789</r>
        <sf>TRUE</sf>
      </mv>
    </mi>
  </md>
  <mff>
    <ts>20000301141500</ts>
  </mff>
</mdc>
```

C.4 Example of XML schema based XML Measurement Report File

The following is an example of a XML schema based XML measurement report file without use of optional positioning attributes on measurement types and results:

```
<?xml version="1.0" encoding="UTF-8"?>
<?xml-stylesheet type="text/xsl" href="MeasDataCollection.xsl"?>
<measCollecFile
  xmlns=
"http://www.3gpp.org/ftp/specs/latest/rel-6/32_series/32401-600.zip#measCollec"
~~"http://www.3gpp.org/ftp/specs/latest/rel-5/32_series/32401-500.zip#measCollec"~~>
  <fileHeader fileFormatVersion="32.401 ~~V5~~V6.0"
```

```
              vendorName="Company NN"
              dnPrefix="DC=a1.companyNN.com,SubNetwork=1,IRPAgent=1">
    <fileSender
      localDn=
        "SubNetwork=CountryNN,MeContext=MEC-Gbg-1,ManagedElement=RNC-Gbg-1"
      elementType="RNC"/>
    <measCollec beginTime="2000-03-01T14:00:00+02:00"/>
  </fileHeader>
  <measData>
    <managedElement
      localDn=
        "SubNetwork=CountryNN,MeContext=MEC-Gbg-1,ManagedElement=RNC-Gbg-1"
      userLabel="RNC Telecomville"/>
    <measInfo>
      <job jobId="1231"/>
      <granPeriod duration="PT900S" endTime="2000-03-01T14:14:30+02:00"/>
      <repPeriod duration="PT1800S"/>
      <measTypes>attTCHSeizures succTCHSeizures attImmediateAssignProcs
        succImmediateAssignProcs</measTypes>
      <measValue measObjLdn="RncFunction=RF-1,UtranCell=Gbg-997">
        <measResults>234 345 567 789</measResults>
      </measValue>
      <measValue measObjLdn="RncFunction=RF-1,UtranCell=Gbg-998">
        <measResults>890 901 123 234</measResults>
      </measValue>
      <measValue measObjLdn="RncFunction=RF-1,UtranCell=Gbg-999">
        <measResults>456 567 678 789</measResults>
        <suspect>true</suspect>
      </measValue>
    </measInfo>
  </measData>
  <fileFooter>
    <measCollec endTime="2000-03-01T14:15:00+02:00"/>
  </fileFooter>
</measCollecFile>
```

The following is an example of a XML schema based XML measurement report file with use of optional positioning attributes on measurement types and results:

```
<?xml version="1.0" encoding="UTF-8"?>
<?xml-stylesheet type="text/xsl" href="MeasDataCollection.xsl"?>
<measCollecFile
  xmlns=
"http://www.3gpp.org/ftp/specs/latest/rel-6/32_series/32401-600.zip#measCollec"
~~"http://www.3gpp.org/ftp/specs/latest/rel-5/32_series/32401-500.zip#measCollec"~~>
  <fileHeader fileFormatVersion="32.401 ~~V5~~V6.0"
              vendorName="Company NN"
              dnPrefix="DC=a1.companyNN.com,SubNetwork=1,IRPAgent=1">
    <fileSender
      localDn=
        "SubNetwork=CountryNN,MeContext=MEC-Gbg-1,ManagedElement=RNC-Gbg-1"
      elementType="RNC"/>
    <measCollec beginTime="2000-03-01T14:00:00+02:00"/>
  </fileHeader>
  <measData>
    <managedElement
      localDn=
        "SubNetwork=CountryNN,MeContext=MEC-Gbg-1,ManagedElement=RNC-Gbg-1"
      userLabel="RNC Telecomville"/>
    <measInfo>
      <job jobId="1231"/>
      <granPeriod duration="PT900S" endTime="2000-03-01T14:14:30+02:00"/>
      <repPeriod duration="PT1800S"/>
      <measType p="1">attTCHSeizures</measType>
      <measType p="2">succTCHSeizures</measType>
```

```
      <measType p="3">attImmediateAssignProcs</measType>
      <measType p="4">succImmediateAssignProcs</measType>
      <measValue measObjLdn="RncFunction=RF-1,UtranCell=Gbg-997">
        <r p="1">234</r>
        <r p="2">345</r>
        <r p="3">567</r>
        <r p="4">789</r>
      </measValue>
      <measValue measObjLdn="RncFunction=RF-1,UtranCell=Gbg-998">
        <r p="1">890</r>
        <r p="2">901</r>
        <r p="3">123</r>
        <r p="4">234</r>
      </measValue>
      <measValue measObjLdn="RncFunction=RF-1,UtranCell=Gbg-999">
        <r p="1">456</r>
        <r p="2">567</r>
        <r p="3">678</r>
        <r p="4">789</r>
        <suspect>true</suspect>
      </measValue>
    </measInfo>
  </measData>
  <fileFooter>
    <measCollec endTime="2000-03-01T14:15:00+02:00"/>
  </fileFooter>
</measCollecFile>
```

End of Change in Annex C
End of Document

Annex D (informative): Change history

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
June 2001	S_12	SP-010237	--	--	Submitted to TSG SA #12 for Information.	--	1.0.0
June 2001	--	--	--	--	MCC editorials	1.0.0	1.0.1
Sep 2001	S_13	SP-010467	--	--	Submitted to TSG SA #13 for Approval	2.0.0	4.0.0
Dec 2001	S_14	SP-010638	001	--	Correction of declaration in XML header	4.0.0	4.1.0
Mar 2002	S_15	--	--	--	Automatic upgrade to Rel-5 (no Rel-5 CR)	4.1.0	5.0.0
Sep 2002	S_17	SP-020502	003	--	Description of Alarm IRP usage for performance alarms	5.0.0	5.1.0
Sep 2002	S_17	SP-020502	004	--	Addition of measurement file XML schema and miscellaneous alignments with CM	5.0.0	5.1.0
Jun 2003	S_20	SP-030291	006	--	Clarification of NE file generation behaviour in case of multiple granularity periods	5.1.0	5.2.0
Jun 2003	S_20	SP-030291	008		Correction of Measurement Result File Name Definition for alignment with Windows based systems	5.1.0	5.2.0

CR-Form-v7

CHANGE REQUEST

⌘ 32.401 CR 010 ⌘rev - ⌘ Current version: 5.2.0 ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ [ ] ME [ ] Radio Access Network [X] Core Network [X]

Title:	⌘	Removal of measurement job state and status attributes
Source:	⌘	SA5 (toche@nortelnetworks.com)
Work item code:	⌘	OAM-PM
Date:	⌘	05/09/2003
Category:	⌘	C
Release:	⌘	Rel-6

Use one of the following categories:
- ***F*** *(correction)*
- ***A*** *(corresponds to a correction 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.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change:	⌘	Measurement job state and status attributes shall not be used in the Performance Management IRP introduced in Rel-6. Measurement job description in TS 32.401 PM Concepts and Requirements and in Draft TS 32.412 PM IRP Information Service have to be aligned accordingly.
Summary of change:	⌘	Clause 5.4.2 “Measurement job state and status attributes” is removed.
Consequences if not approved:	⌘	

Clauses affected:	⌘	5.4.2			
Other specs affected:	⌘	Y	N		⌘
			X	Other core specifications	
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

Change in Clause 5.4.2

5.4.2 Measurement job state and status attributes

~~According to the OSI systems management concept, the state of a resource is reflected in indicators (attributes). Status attributes are provided to qualify these state attributes. Full details are provided in ITU-T Recommendation X.731 [6]. As for a measurement job, the following information is provided:~~

~~**Administrative state:** The administrative state attribute allows the system operator to permit or prohibit administratively the execution of the measurement job (suspend/resume).~~

~~**Operational state:** The operational state attribute reflects the operability of the measurement job.~~

~~**Availability status:** The availability status attribute denotes particular conditions applicable to the measurement job. It indicates:~~

- ~~whether or not the measurement job is collecting measurement data according to its schedule;~~
- ~~if, for whatever reason, some of the requested measurement data cannot be collected by the measurement job, in particular whether the measurement schedule inhibits the collection of measurement data.~~

~~It should be noted that the application of OSI state and status attributes within the 3G measurement concept does not enforce the provision of an OSI interface for measurement administration.~~Void.

End of Change in Clause 5.4.2
End of Document

Annex D (informative): Change history

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
June 2001	S_12	SP-010237	--	--	Submitted to TSG SA #12 for Information.	--	1.0.0
June 2001	--	--	--	--	MCC editorials	1.0.0	1.0.1
Sep 2001	S_13	SP-010467	--	--	Submitted to TSG SA #13 for Approval	2.0.0	4.0.0
Dec 2001	S_14	SP-010638	001	--	Correction of declaration in XML header	4.0.0	4.1.0
Mar 2002	S_15	--	--	--	Automatic upgrade to Rel-5 (no Rel-5 CR)	4.1.0	5.0.0
Sep 2002	S_17	SP-020502	003	--	Description of Alarm IRP usage for performance alarms	5.0.0	5.1.0
Sep 2002	S_17	SP-020502	004	--	Addition of measurement file XML schema and miscellaneous alignments with CM	5.0.0	5.1.0
Jun 2003	S_20	SP-030291	006	--	Clarification of NE file generation behaviour in case of multiple granularity periods	5.1.0	5.2.0
Jun 2003	S_20	SP-030291	008		Correction of Measurement Result File Name Definition for alignment with Windows based systems	5.1.0	5.2.0

CR-Form-v7

CHANGE REQUEST

⌘ **32.401** **CR** **011** ⌘**rev** **-** ⌘ Current version: **5.2.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ [ ] ME [ ] Radio Access Network [X] Core Network [X]

Title:	⌘	Refinement of the conditions for setting “suspect flag”
Source:	⌘	SA5 (ulf.hubinette@ericsson.com)
Work item code:	⌘	OAM-PM
Date:	⌘	05/09/2003
Category:	⌘	**C**
Release:	⌘	Rel-6

Use one of the following categories:
- ***F*** *(correction)*
- ***A*** *(corresponds to a correction 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.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change:	⌘	The conditions for setting “suspect flag” in performance measurement results are not clearly defined.
Summary of change:	⌘	Refinement of the description of system events which can interrupt a measurement collection period, and lead to the setting of the “suspect flag” in the measurement result.
Consequences if not approved:	⌘	

Clauses affected:	⌘	4.3.2

		Y	N		
Other specs affected:	⌘		X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	

Other comments:	⌘	

Change in Clause 4.3.2

4.3.2 Perceived accuracy

The accuracy of measurements can be seen in three ways:

- whether the result produced represents all occurrences of the defined event;
- whether related measurements produced for the same period refer to the same events; or
- whether a measurement result refers to the whole or part of a granularity period.

Representation of all occurrences: the definition of a measurement needs to accurately reflect which types of events are to be included in the collection of the data. If a general event or procedure description can be characterised by several sub-types then the measurement definition will have to be precise as to which sub-types are included or specifically excluded from that measurement. Depending on the measurement definition, it may prove more acceptable to count the event or procedure by causes, e.g. successful termination, unsuccessful termination for all reasons. If the definition of a measurement refers to specific failure causes then care shall be taken to assess whether all causes are included - the sum of which can provide the total number of failures - or whether a count of the total is defined as well as for the specific causes. This is particularly important if not all of the causes are supported by an implementation, or if not all of the causes are requested in the measurement job definition.

Same period for the same two events: consider two events being counted which refer to the same resource allocation procedure, falling on either side of a granularity period boundary. I.e. the attempt is counted in one period while the termination is counted in the subsequent period. This will lead to discrepancies appearing in the actual figures when trying to compare attempt and termination counts for the same period. In order to avoid this discrepancy, implementations shall ensure that the termination of a procedure started within a given granularity period shall be captured within the measurement results for that same period, even if the termination of the procedure falls within the next granularity period.

Measurement collection periods: a typical measurement collection period can be interrupted by system events.

These interruptions can be one or more of the following:

- failure of the measured network resource;
- failure of the measurement procedure ~~being measured, e.g. location update~~;
- the measured network resource only becomes available after the measurement period has commenced;
- the measurement ~~—~~procedure only becomes available after the measurement period has commenced.
- system error (e.g. disk failure/lack of memory);
- communication error (e.g. link failure between the network manager and the measured network resource)

Any such interruption implies that the affected measurement result is incomplete, and in extreme circumstances, no result reports at all can be generated. In these cases the measurement result shall highlight such interruptions to indicate that the result is suspect (see also setting of suspectFlag in Annex A). Any actions to be taken subsequently with regards to the usefulness of the data will depend on the circumstances and the requirements of individual Operators.

End of change in Clause 4.3.2
End of Document

Annex D (informative): Change history

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
June 2001	S_12	SP-010237	--	--	Submitted to TSG SA #12 for Information.	--	1.0.0
June 2001	--	--	--	--	MCC editorials	1.0.0	1.0.1
Sep 2001	S_13	SP-010467	--	--	Submitted to TSG SA #13 for Approval	2.0.0	4.0.0
Dec 2001	S_14	SP-010638	001	--	Correction of declaration in XML header	4.0.0	4.1.0
Mar 2002	S_15	--	--	--	Automatic upgrade to Rel-5 (no Rel-5 CR)	4.1.0	5.0.0
Sep 2002	S_17	SP-020502	003	--	Description of Alarm IRP usage for performance alarms	5.0.0	5.1.0
Sep 2002	S_17	SP-020502	004	--	Addition of measurement file XML schema and miscellaneous alignments with CM	5.0.0	5.1.0
Jun 2003	S_20	SP-030291	006	--	Clarification of NE file generation behaviour in case of multiple granularity periods	5.1.0	5.2.0
Jun 2003	S_20	SP-030291	008		Correction of Measurement Result File Name Definition for alignment with Windows based systems	5.1.0	5.2.0