Technical Specification Group Services and System Aspects   **TSGS#8(00)0232**
Meeting #8, Düsseldorf, Germany, 26-28 June 2000

Source:	SA5 (Telecom Management)
Title:	**32.104 CR, "Inclusion of XML file format definition" (S5-000315)**
Document for:	**Approval**
Agenda Item:	**6.5.3**

Spec	CR	Phas	Subject	Ca	Versi	Versi	Doc-2nd-
32.104	004	R99	Inclusion of XML file format definition	B	3.1.1	3.2.0	S5-000315

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

| **32.104** | CR | **004** | Current Version: | **V.3.1.1** |

GSM (AA.BB) or 3G (AA.BBB) specification number ↑   ↑ *CR number as allocated by MCC support team*

For submission to:	**SA#8**	for approval	**X**	strategic		*(for SMG*
list expected approval meeting # here ↑		for information		non-strategic		*use only)*

Form: CR cover sheet, version 2 for 3GPP and SMG   The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc

Proposed change affects:
(at least one should be marked with an X)

(U)SIM [ ]   ME [ ]   UTRAN / Radio **X**   Core Network **X**

Source:	SA5#12	**Date:**	9 June 2000

Subject:	Inclusion of XML file format definition

Work item:	Performance Management

Category:
(only one category shall be marked with an X)

				Release:	
F	Correction			Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature	**X**		Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	**X**
				Release 00	

Reason for change:	This CR proposes the inclusion of an XML file format definition for measurement result files into Annex A of TS 32.104. The proposed format is mapped 1:1 onto the already existing ASN.1 format definition. Operators and manufacturers may choose which of the two alternative formats to implement and use. This CR includes a complete revision of annex A of TS 32.104 since the addition of the XML format necessitates some editorial changes and re-arrangements of existing text.

Clauses affected:	Annex A

Other specs affected:

Other 3G core specifications		→ List of CRs:	
Other GSM core specifications		→ List of CRs:	
MS test specifications		→ List of CRs:	
BSS test specifications		→ List of CRs:	
O&M specifications		→ List of CRs:	

Other comments:	This CR also includes the corrections to the ASN.1 file format definition introduced with the separate CR "Correction of ASN.1 errors", so the latter CR is not needed if the current CR is accepted.

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. Two alternative format definitions are specified, one using ASN.1 with binary encoding (BER), the other applying XML, which is ASCII based. Each 3G system implementation complying with this TS must support at least one of the two alternatives.

Both the ASN.1 and XML file format definitions implement the measurement result structure and parameters defined in subclauses 5.2 and 5.3 of this TS, 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 subclause 5.2.1.4. The two defined file format definitions correspond 1:1 to each other. 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 two format definitions can be regarded as two different instances of the same single format.

The following conditions have been considered in defining theis 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.1.1 of this TS;

∗ 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 ellipse notation. XML allows such additions through extra DTDs, provided by the definer of the non-standard extension.

A.1 Parameter description and mapping table

The following table maps the tags defined in the ASN.1 file format definition to those used in the XML file format definition. It also provides an explanation of the individual parameters. The XML tags defined in the DTD (see annex A.3.1 below) have been kept as short as possible in order to minimise the size of the XML measurement result files.

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

ASN.1 Tag	XML tag	Description
MeasDataCollection	mdc	This is the top-level tag which identifies the file as a collection of measurement data. The file contents is made up of a header ("measFileHeader"), the collection of measurement result items ("measData"), and a measurement file footer ("measFileFooter").
measFileHeader	mfh	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

ASN.1 Tag	XML tag	Description
		("collectionBeginTime").
measData	md	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	mff	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	ffv	This parameter identifies the file format version applied by the sender. The format version defined in this TS shall be "1" for both the XML and ASN.1 formats alike.
senderName	sn	The senderName uniquely identifies the NE or EM that assembled this measurement file, according to the definitions in TS 32.106. It is identical to the sender's nEDistinguishedName. The string may be empty (i.e. string size =0) in case it is not configured in the sender.
senderType	st	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.
vendorName	vn	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.
collectionBeginTime	cbt	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.
nEId	neid	The unique identification of the NE in the system. It includes the user name ("nEUserName") and the distinguished name ("nEDistinguishedName") of the NE.
nEUserName	neun	This is the user definable NE name, cf. TS 32.106. The string may be empty (i.e. string size =0) if the "nEUserName" is not configured.
nEDistinguishedName	nedn	This is the distinguishedName defined for the NE in TS 32.106. 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.
measInfo	mi	The sequence of measurements, values and related information. It includes a list of measurement types ("measTypes") and the corresponding results ("measResults"), together with the time stamp ("measTimeStamp") and granularity period

ASN.1 Tag	XML tag	Description
		("granularityPeriod") pertaining to these measurements.
measTimeStamp	mts	Time stamp referring to the end of the granularity period.
granularityPeriod	gp	Granularity period of the measurement(s) in seconds.
measTypes	mt	This is the list of measurement types for which the following, analogous list of measurement values ("measValues") pertains. The 3G standard measurement types are defined in annex C of this TS.
measValues	mv	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").
measObjInstId	moid	The "measObjInstId" field identifies the measured object class and its instance, e.g. trunk1 means object class is trunk and instance #1 is being measured The values for this parameter are defined in annex C of this TS.
measResults	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.
suspectFlag	sf	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	GeneralizedTime format. The minimum required information within timestamp is year, month, day, hour, minute, and second.

Measurement types and measurement groups will be defined in release 2000. This also applies to the exact details concerning the arrangement of the information in the files, since that aspect may be dependent on the measurement type/group definitions.

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 annex C, which discusses and specifies the measurement definition.

A.~~1~~2   ASN.1 file format definition~~description~~

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

    }

~~The measData can be an empty sequence in case no measurement data can be provided.~~

~~The individual MeasData can appear in any order.~~

MeasFileHeader::= SEQUENCE

    {

      fileFormatVersion   INTEGER,

      senderName   PrintableString (SIZE (0..400)),

      senderType   SenderType,

      vendorName   PrintableString (SIZE (0..32)),

      collectionBeginTime TimeStamp,

  ...

    }

-- ~~The fileFormatVersion identifies the file format version applied by the sender. The only defined value is "1" for the format defined here. The senderName uniquely identifies the NE or OS that assembled this measurement file, according to the definitions in TS 32.106. The senderType refers to the type of entity that has delivered the measurement file, e.g. RNC, EM. The vendorName identifies the vendor of the equipment that provided the measurement file. A size of "0" for the above "PrintableString" data items means that the respective string value is not configured in the sender. The collectionBeginTime refers to the start of the first measurement collection interval that is covered by the collected measurement results that are stored in this file.~~

The sole purpose of the ellipse 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))

~~This is a user configurable identifier of the type of network node that generated the file, e.g. NodeB, EM, SGSN, a.s.o. A size of "0" means that the "senderType" string is not configured in the sender.~~

TimeStamp::= GeneralizedTime

~~The minimum required information within timestamp is year, month, day, hour, minute, and second.~~

```
MeasData::= SEQUENCE

        {

          nEId                      NEId,

          measInfo                  SEQUENCE OF MeasInfo

        }


NEId::= SEQUENCE

        {

          nEUserName                PrintableString (SIZE (0..64)),        this is the user definable NE name, cf.
TS 32.106

          nEDistinguishedName       PrintableString (SIZE (0..400))tbd     this is the unique distinguishedName
          defined for the

                                                        NE in TS 32.106

        }


MeasInfo::= SEQUENCE

        {

          measStartTimeStamp        TimeStamp,

          granularityPeriod         INTEGER,              granularity period of the measurement(s) in seconds

          measTypes                 SEQUENCE OF MeasType,

          measValues                SEQUENCE OF MeasValue

        }


MeasType::= PrintableString (SIZE (1..32))              as defined in annex C

MeasValue::= SEQUENCE

        {

          measObjInstId             MeasObjInstId,

          measResults               SEQUENCE OF MeasResult,

          suspectFlag               BOOLEAN DEFAULT FALSE        Used as an indication of the quality of
the scanned data

                                                        FALSE in case of reliable data, TRUE if not reliable

        }
```

The "measObjInstId" field identifies the measured object class and its instance, e.g. trunk1 means object class is trunk and instance #1 is being measured.. The values for this parameter are defined in annex C.

The "measResults" sequence shall have the same number of elements which follow the same order as the measTypes sequence.

MeasObjInstId::= PrintableString (SIZE (1..64))

MeasResult::= CHOICE

```
        {
           iValue              INTEGER,
           rValue              REAL,
           noValue             NULL,

           ...
        }
```

-- 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 notation used in the MeasResult choice is to facilitate inter-release compatibility in case the choice needs to be extended in future releases.
~~MeasResult::= ANY DEFINED BY measType~~

MeasFileFooter::= TimeStamp

~~The TimeStamp in the MeasFileFooter refers to the end of the overall measurement collection interval that is covered by the collected measurement results being stored in this file.~~

END

~~Measurement types and measurement groups will be defined in release 2000. This also applies to the exact details concerning the arrangement of the information in the files, since that aspect is dependent on the measurement type/group definitions.~~

~~At least for those measurement types that are re-used from non 3GPP standards, 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 annex C, which discusses and specifies the measurement definition.~~

A.3   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 declaration** contains the mark-up declarations that provide a grammar for the measurement file format. This grammar is known as a document type definition, or **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 1.1-->
<!ELEMENT mdc (mfh , md*, mff )>
```

```
<!ELEMENT mfh (ffv, sn, st, vn, cbt) >
<!ELEMENT md (neid , mi*)>
<!ELEMENT neid (neun, nedn)>
<!ELEMENT mi (mts,gp, mt*, mv*)>
<!ELEMENT mv (moid , r*, sf? )>
<!ELEMENT mff (ts)>
<!ELEMENT ts (#PCDATA)>
<!ELEMENT sf (#PCDATA)>
<!ELEMENT r (#PCDATA)>
<!ELEMENT mt (#PCDATA)>
<!ELEMENT moid (#PCDATA)>
<!ELEMENT gp (#PCDATA)>
<!ELEMENT mts (#PCDATA)>
<!ELEMENT nedn (#PCDATA)>
<!ELEMENT neun (#PCDATA)>
<!ELEMENT cbt (#PCDATA)>
<!ELEMENT vn (#PCDATA)>
<!ELEMENT st (#PCDATA)>
<!ELEMENT sn (#PCDATA)>
<!ELEMENT ffv (#PCDATA)>

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

Notes:

The number of Measurement Result tags (r) per observed object instance tags (moid) must 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"?>
<?xml-stylesheet type="text/xsl" href="MeasDataCollection.xsl" ?>
<!DOCTYPE MeasDataCollection 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