ETSI

INTERIM
EUROPEAN
TELECOMMUNICATION
STANDARD

FINAL DRAFT

pr I-ETS 300 819

April 1998

Source: NA

Reference: DI/NA-043321

ICS: 33.020

Key words: TMN, information model, NE, Q3 interface

Telecommunications Management Network (TMN);
Functional specification of the usage metering
information management on the
Operations System/Network Element (OS/NE) interface

ETSI

European Telecommunications Standards Institute

ETSI Secretariat

Postal address: F-06921 Sophia Antipolis CEDEX - FRANCE
Office address: 650 Route des Lucioles - Sophia Antipolis - Valbonne - FRANCE
Internet: secretariat@etsi.fr - http://www.etsi.fr - http://www.etsi.org

Tel.: +33 4 92 94 42 00 - Fax: +33 4 93 65 47 16

Contents

Foreword

This final draft Interim European Telecommunication Standard (I-ETS) has been produced by the Network Aspects (NA) Technical Committee of the European Telecommunications Standards Institute (ETSI), and is now submitted for the Voting phase of the ETSI standards approval procedure.

An ETSI standard may be given I-ETS status either because it is regarded as a provisional solution ahead of a more advanced standard, or because it is immature and requires a "trial period". The life of an I-ETS is limited to three years after which it can be converted into an ETS, have it's life extended for a further two years, be replaced by a new version, or be withdrawn.

Proposed announcement date	
Date of latest announcement of this I-ETS (doa):	3 months after ETSI publication

Blank page

1 Scope

This Interim European Telecommunication Standard (I-ETS) specifies the management information model which covers the management aspects of the "usage metering information" function.

The model specified in this I-ETS applies to the Operations System to Network Element (OS/NE) interface.

The scope is further limited to the following priorities assigned for the scope of the work:

- modelling of the requirements for the analogue, digital and Integrated Services Digital Network (ISDN) subscribers;

- modelling of these subscribers requirements in connection with Intelligent Networks (INs).

The scope of this I-ETS is also to give a list of elements needed to provide a complete usage information record to be utilized for charging and itemized billing and accounting. Collected data will be formatted and sent to the specialized centre (OS). The use of this data for other purposes, e.g. statistics, customer care etc. is possible, but out of the scope of this I-ETS.

Usage metering in connection with operator assisted calls is out of the scope of this I-ETS.

> NOTE: The modelling of the charging and the billing processes is outside the scope of this I-ETS. Nevertheless, the usage metering record defined in this I-ETS may contain charge information if the calculation of charge is performed by the NE itself.

2 Normative references

This I-ETS incorporates by dated and undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this I-ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

[1]   ETS 300 182 (1993): "Integrated Services Digital Network (ISDN); Advice of Charge (AOC) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol".

[2]   ETS 300 196-1 (1993): "Integrated Services Digital Network (ISDN); Generic functional protocol for the support of supplementary services; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[3]   ETS 300 356-1 (1994): "Integrated Services Digital Network (ISDN); Signalling System No.7; ISDN User Part (ISUP) version 2 for the international interface; Part 1: Basic services [ITU-T Recommendations Q.761 to Q.764 (1993), modified]".

[4]   ETS 300 374-1 (1994): "Intelligent Network (IN); Intelligent Network Capability Set 1 (CS1); Core Intelligent Network Application Protocol (INAP)".

[5]   EN 300 403-1 (1994): "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Signalling network layer for circuit-mode basic call control; Part 1: Protocol specification [ITU-T Recommendation Q.931 (1993), modified]".

[6]   ETS 300 738 (1996): "Human Factors (HF): Minimum Man-Machine Interface (MMI) to public network based supplementary services".

[7]   ITU-T Recommendation M.3100 (1992): "Generic network information model".

[8]   ITU-T Recommendation M.3200 (1992): "TMN Management Service: Overview".

[9]   ITU-T Recommendation Q.811 (1993): "Lower layer protocol profiles for the Q3 X interface".

[10]   ITU-T Recommendation Q.812 (1993): "Upper layer protocol profiles for the Q3 and X interfaces".

[11]   ITU-T Recommendation Q.850 (1993): "Usage of cause and location in the digital subscriber signalling system no. 1 and signalling system no. 7 ISDN user part".

[12]   ITU-T Recommendation X.209 (1988): "Specification of basic encoding rules for Abstract Syntax Notation One (ASN.1)".

[13]   ITU-T Recommendation X.680 (1993): "Information technology - Abstract Syntax Notation One (ASN.1): Specification of basic notation".

[14]   ITU-T Recommendation X.681 (1993): "Information technology - Abstract Syntax Notation One (ASN.1): Information object specification".

[15]   ITU-T Recommendation X.682 (1993): "Information technology - Abstract Syntax Notation One (ASN.1): Constraint specification".

[16]   ITU-T Recommendation X.683 (1993): "Information technology - Abstract Syntax Notation One (ASN.1): Parameterization of ASN.1 specifications".

[17]   ITU-T Recommendation X.701 (1992): "Information technology - Open Systems Interconnection - Systems management overview".

[18]   ITU-T Recommendation X.721 (1992): "Information technology - Open Systems Interconnection - Structure of management information: definition of management information".

[19]   ITU-T Recommendation X.722 (1992): "Information technology - Open Systems Interconnection - Structure of management information: Guidelines for the definition of managed objects".

[20]   ITU-T Recommendation X.730 (1992): "Information technology - Open Systems Interconnection - Systems Management: Object Management Function".

[21]   ITU-T Recommendation X.734 (1992): "Information technology - Open Systems Interconnection - Systems management: Event report management function".

[22]   ITU-T Recommendation X.735 (1992): "Information technology - Open Systems Interconnection - Systems management: Log control function".

[23]   ITU-T Recommendation X.742 (1994): "Information technology - Open Systems Interconnection - Systems management - Usage metering function for accounting purposes".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of this I-ETS, the following definitions apply:

charging: The set of functions needed to determine the amount of charge units to be assigned to the service utilization.

service subscriber: Is the legal entity, which has subscribed to a certain service type. It is not necessarily a different party from the service user. (The calling and called parties of a service transaction are service users).

usage metering: The abstraction of activities that monitor the utilization of resources, for the purpose of accounting and controlling the recording of usage data.

usage metering data: Data which represents usage from which usage metering records may be derived.

usage metering record: A data item containing usage information relating to a specific period of resource utilization by a specific user.

usage: Quantification of the utilization of a resource from which information may be derived for the purpose of accounting.

user: An identifiable entity whose use of resources shall be accounted.

3.2 Abbreviations

For the purposes of this I-ETS, the following abbreviations apply:

ACM	Address Complete Message
AOC	Advice of Charge
ASN.1	Abstract Syntax Notation No.1
CLIP	Calling Line Identity Presentation
DDI	Direct Dialling In
DN	Directory Number
EFD	Event Forwarding Discriminator
FCI	Furnish Charging Information
IAM	Initial Address Message
IN	Intelligent Network
INAP	Intelligent Network Application Protocol
ISDN	Integrated Services Digital Network
ISUP	ISDN User Part
MF	Management Function
MML	Man Machine Language
MOCS	Managed Objects Conformance Statement
MSN	Multiple Subscriber Number
NE	Network Element
NEF	Network Element Function
NPI	Numbering Plan Identification
OS	Operations System
OSF	Operations System Function
PSTN	Public Switched Telephone Network
TMN	Telecommunications Management Network
TON	Type Of Number
UMR	Usage Metering Record
UPT	Universal Personal Telecommunication
VAS	Value Added Service

4 General

4.1 Requirements for usage metering

The usage measuring function shall fulfil the requirements by which resource utilization is determined so that the data that are gathered may be used for the process of accounting management and the generation of bills. The following requirements should be met:

- the function shall allow sufficient control over the collection of usage data so that the relevant information can be made available when required. A management system should have the capability to access individual usage records almost instantaneously. This feature is required e.g. for real time cost calculation like hot billing;

- a management system shall have a standardized way of obtaining and representing usage information to advise subscribers of their usage and to facilitate exchange of usage information with other suppliers;

- the usage record shall be self-contained, i.e. the interpretation of the record shall not be dependent on the system where the usage record was created;

- several resources may be utilized to provide a service. The function should make it possible to relate usage-records to the resources that are actually used for providing the requested service;

- the function should support a number of conditions for reporting of a usage record. Conditions that will cause the reporting of a usage record are:

    - termination of a service;
    - change of service e.g. due to change of charging conditions;
    - reaching a volume threshold;
    - at regular intervals during a practical service transaction.

4.2 Use of Usage Metering Records (UMR)

Subscriber billing

The usage metering data collected from the Network Elements (NE) is employed to determine the network resources utilization charges for the basic and supplementary services utilized by the subscriber. The charges calculated are then combined with the network access (subscription) charges and billed to those customers served by the Operations System Function (OSF).

Account settlement management

The settlement of accounts with the operators of other networks for traffic carried, is generally performed on a bulk basis. Accounting information may also be used for settlement of accounts with services provided by services centres and other Value Added Service (VAS) providers. The charges for the various traffic shares may be determined on the basis of the call records generated by the NEs or on the basis of bulk counters (accounting meter records) in the gateway exchanges. For the purpose of this specification, the management information required is assumed to be derived from usage metering records. The management of bulk meters is outside the scope of this I-ETS.

Service provision

The usage metering data collected from the NEs may be used to provide statistical information concerning the use of services within the network. In addition, the introduction of new services and/or modifications to the tariffs of existing services may also require the distribution of the appropriate tariff information to the NEs for Advice Of Charge (AOC) purposes. The management of tariff information is outside the scope of this I-ETS.

Customer administration

The call data collected from the NEs provides a historic record of subscriber activity and may be used for the handling of customer care enquiries such as billing complaints, statistic analysis, detection of abnormal use etc.

5 Conceptual model
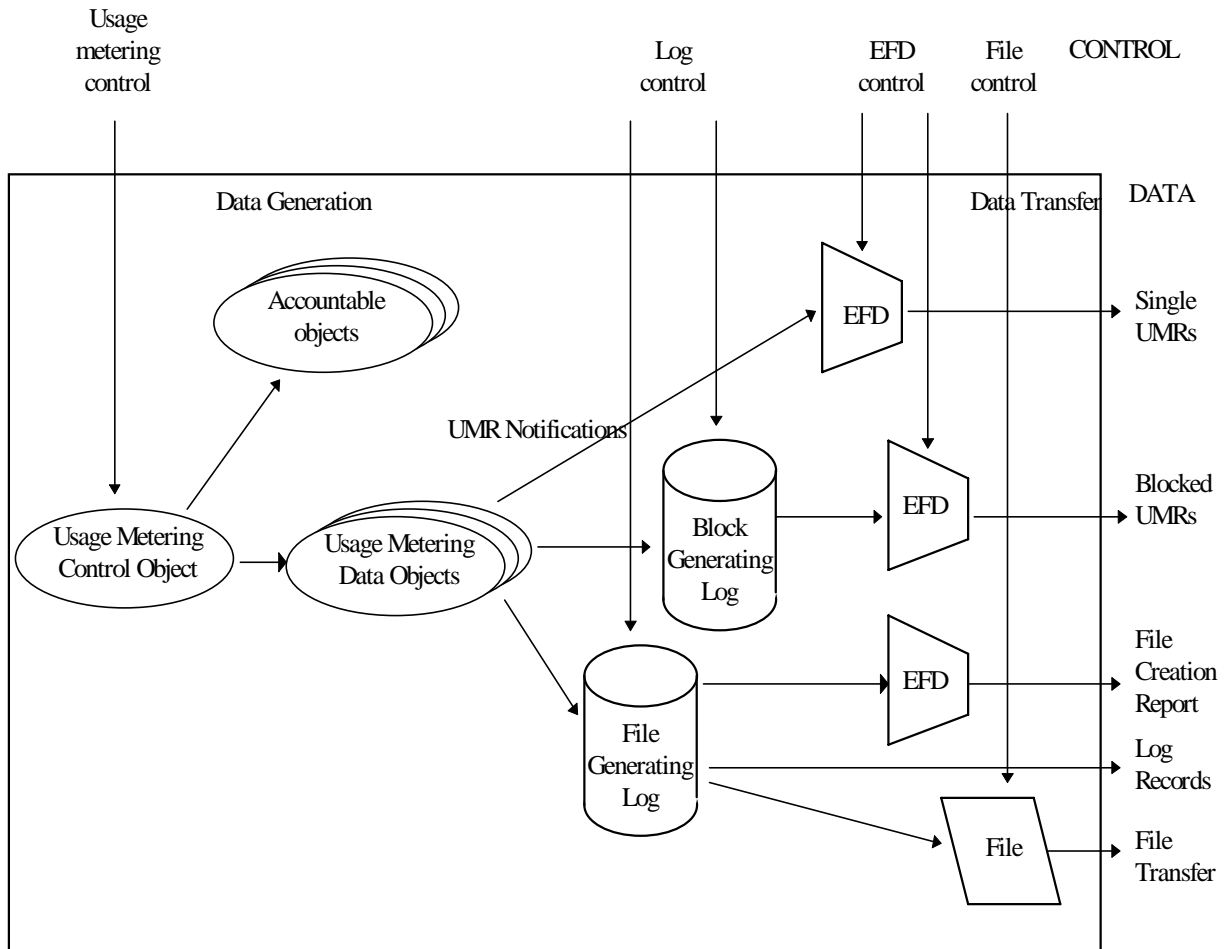
Figure 1: Data collection model

This I-ETS is a specialization of ITU-T Recommendation X.742 [23]. ITU-T Recommendation X.742 [23] defines the following object classes to control and collect the usage metering data:

- **Usage metering control object** that is used to control the collection of usage data for one or more accountable objects (resource being used);

- **Usage metering data object** that contains the collected information.

The accountable object may be any resource (logical or physical) for which usage is to be measured. Examples of such resources can be: call attempts, calls, connections, number of protocol data units, etc. The collected usage data is stored in the usageMeteringData object which is contained in the accountable object (representing the resource which usage is being measured). Notifications containing the measured data will be emitted by the usageMeteringData object, upon the occurrence of a reporting trigger, and may be stored in the local log thus forming the usage metering record, or may be transmitted to a remote Operations System (OS) as specified in an Event Forwarding Discriminator (EFD). In addition, for efficient transmission, the individual notifications may be grouped into blocks for near real-time usage data reporting. This grouping is accomplished by temporarily storing the UMRs in a blockGeneratingLog and then generating a new notification from that log upon occurrence of a reporting trigger.

UsageMeteringData objects are created and deleted implicitly, that is, they are created and deleted upon the occurrence of defined trigger events and are not explicitly manipulated by a managing system. To support recording data in a usageMeteringData object two sets of triggers are defined:

- Creation Triggers: events that cause creation of a usageMeteringData object, these triggers are defined as part of the control object;

- Termination Triggers: events that cause deletion of a usageMeteringData object, these triggers are defined as part of the data object. Currently the termination triggers are defined implicitly as part of the data object behaviour. Deletion occurs upon completion of usage data collection for that instance of service.

An other set of triggers named reporting triggers are also defined as part of the usage metering control object, triggers the emission of UMR notifications.

This I-ETS defines the simpleUsageMeteringControl object class that allows the definition of different types of triggers for usage metering recording. One of the defined reporting triggers requires periodic reporting and can be used to transfer partial service usage data to a log or remote OS for long duration service usage. Another type of trigger is determined by the occurrence of a particular event during usage of the service, e.g. completion of usage.

6 Management Functions (MFs) and services

The TMN management service "Tariff and charging administration" (see ITU-T Recommendation M.3200 [8]) covers those management activities related to the tariffs in the network and to the collection of service usage data.

This I-ETS only covers the management part concerned with the collection of data from the NE. It includes the specification of the data to be collected as well as the mechanisms required for the data transfer of the OS.

The following MFs are required:

- Usage metering control Function;
- Usage metering data Function;
- Real-time UMR reporting Function;
- Near Real-time UMR Reporting Function;
- UMR transfer via the fileGeneratingLog (for bulk billing applications).

This I-ETS defines four new services.

- UM-USAGE-METERING-REPORT;
- UM-BLOCK-RECORD-REPORT;
- UM-FILE-CREATION-ACTION;
- UM-FILE-CREATION-REPORT.

These services and the use of additional services defined in ITU-T Recommendations X.730 [20] (Object management Function), X.734 [13] (Event Reporting Management Function) and X.735 [22] (Log Control Function) is described below.

6.1 Usage metering control function

This function controls the generation and reporting of UMRs and allows specification of the events and resources whose usage is to be recorded.

The following control functions are available:

1)   Recording Control: Recording controls allow specification of the event that, if it occurs, will cause creation of a usage data object which will generate usage records. This control function enables the reduction of records collected in a NE. The record generation can be triggered to make a record for events based on several types of criteria such as off-hook (seizure) first digit dialled, Address Complete Message (ACM) received, B-answer, supplementary service invocation and supplementary service input. These criteria may be described in the creationTriggers attributes of the control object. If a potentially recordable call (i.e. a call associated with an identified accountable resource) matches the criteria specified in the creationTriggers attribute, a usage data object will be created resulting in the generation of one or more usage records. If the creationTriggers list is empty, no usage data objects are created i.e. no UMRs are generated.

2)   Reporting Control: This control allows specification of the conditions under which a UMR notification will be omitted by the usage metering data object. The triggers may be events occurring during the life of the service or based on elapsed time since the last notification or start of service. This function covers the need for specification of a partial record interval timer for long hold calls. The timer may take any value within the range of 10 minutes to 24 hours. A value 0 means that no partial records will be generated for long hold calls.

To manage the Usage metering control, the operations required are:

-       Initiate usage metering;
-       Terminate usage metering;
-       Get usage metering control data;
-       Modify usage metering control data.

6.1.1 Initiate usage metering

The PT-CREATE service defined in ITU-T Recommendation X.730 [20] is used to create an instance of the simpleUsageMeteringControl object (only one instance is allowed per NE). For the lifetime of the simpleUsageMeteringControl object, data are collected and reported as indicated by the attribute values. The formal description of the attributes can be found in annex A.

The following describes the values that will be assigned to the control attributes in response to a PT-CREATE request:

reporting triggers:

This attribute is imported from ITU-T Recommendation X.742 [23]. It is defined as a CHOICE of which only "time period" is supported by this I-ETS. If this parameter is not specified, the default value of 30 minutes is used.

accountable object reference list:

This attribute is imported from ITU-T Recommendation X.742 [23]. Only references to objects belonging to an "accountable object class" are valid. Object classes which describe accountable resources should be known at design time.

The specification of (new or existing) accountable object classes may be operator or manufacturer specific and is outside the scope of this I-ETS. DN and trunk groups are valid candidates for inclusion as accountable objects.

data object reference list:

This attribute is imported from ITU-T Recommendation X.742 [23]. The reference list contains pointers to the data objects controlled by the control object. The list is maintained by the NE and can not be specified as part of the create request, nor can it be queried by the manager.

creation trigger list:

This attribute specifies the events leading to the implicit creation of a data object. Triggers can be call related (Seizure **or** first digit received **or** ACM received **or** B-answer received) and non-call related (supplementary service invocation and/or input).

6.1.2   Terminate usage metering

The PT-DELETE service defined in ITU-T Recommendation X.730 [20] is used to delete the instance of the simpleUsageMeteringControl object.

6.1.3   Get usage metering control data

The PT-GET service defined in ITU-T Recommendation X.730 [20] may be used to retrieve the values of the readable attributes except for the attribute dataObjectReferenceList. The data object reference list is maintained by the NE and changes continually (it contains an entry for each connection of which data are being collected).

6.1.4   Modify usage metering control data

The PT-SET service defined in ITU-T Recommendation X.730 [20] is used to manage the setable attributes.

6.2   Usage metering data function

This function emits the UMR notification for usage selected by the Usage metering control function. A UMR notification may be sent out if one of the following events occurs during the transaction:

-       termination of a service;
-       change of service e.g. due to change of charging conditions;
-       reaching a volume threshold - this may also be due to NE internal reasons;
-       at regular intervals during a practical service transaction;
-       expiration of the periodic timer (defined in the Usage metering control).

The PT-EVENT-REPORT service defined in ITU-T Recommendation X.730 [20] is used to report the UMR.

The formal description of the attributes can be found in annex A.

6.3   Real-time UMR reporting function

This function controls the generation and transmission of notifications from NE to the OS. Event reporting will normally be used for hot billing purposes. To simplify the necessary eventForwardingDiscriminator (EFD), a special boolean field "immediate notification" is included in the UMR, which can be screened by the EFD. If the value is TRUE, the UMR is forwarded as an event report. The value of the field may be derived by a subscriber action or by other means specific to the implementation.

The presence of more than one OS interested in real time collection of usage metering data may be a practical issue. "Hot billing" may be requested for different purposes by different OSs at the same time. The possibility of multiple instances of the EFD is therefore not precluded.

The operations required to manage the UMR reporting are:

- initiation of event report forwarding;
- termination of event report forwarding;
- event forwarding modification;
- retrieval of eventForwardingDiscriminator attributes.

All these operations are defined in the Event Report Systems Management Function (ITU-T Recommendation X.734 [21], clause 9).

To transmit the real time billing information the NE uses the UM-USAGE-METERING-REPORT service. Table 1 shows the parameters required in the event report. The event reports may be send in confirmed or unconfirmed mode. Determination of whether or not a confirmation is required is determined by the mode parameter in the EFD. Confirmations contain no parameters.

Table 1: UM-USAGE-METERING-REPORT

Parameter Name	Req/Ind	Resp/Cfm
Invoke Identifier	P	P
Mode	P	-
Managed Object Class	P	-
Managed Object Instance	P	-
Event Type	P	P
Event Time	U	U
Event Information		
Record Type	M	-
Start Time Stamp	M	-
Participant Information	M	-
Service Type	M	-
Service User	M	-
Call Identification Number	M	-
Record Id	U	-
Data Validity	C c3	
Network Provider Id	C c6	-
Supplementary Service List	C c1	-
Immediate Notification	U	-
Cause	C c2	-
IN Service Information List	C c4	-
IN Specific Information	C c4	-
Partial Generation	C c5	-
Exchange Information	U	-
Related Call Number	U	-
UMR Purpose	U	-
Additional Participant Information	U	-
Calling Party Category	U	-
Calling Party Type	U	-
Charging Information	U	-
Progress	U	-
Access Delivery	U	-
Trunk Group Outgoing	U	-
Trunk Group Incoming	U	-
Fallback Service	C c7	-
Call Duration	C c8	-
User-to-User Information Counter	U	-
Standard Extensions	U	-
Record Extension	U	-
Current Time	-	U
Event Reply	-	-
Errors	-	P

M = Mandatory, P = Pass-through, U = User Option, c = Conditional
c1:   This parameter shall be present if this is a supplementary service input record or if the user invoked a supplementary service as part of the call.
c2:   This parameter shall be present if the exchange has determined that the connection was unsuccessful.
c3:   This parameter shall be present if the exchange has determined that the data contained in this notification may be inaccurate.
c4:   This parameter shall be present if an IN service is invoked that makes use of this information.
c5:   This parameter shall be present if this notification only contains information about a part of the call.
c6:   This parameter shall be present if the exchange supports multiple network providers.
c7:   This parameter shall be present only if the network is providing the fallback bearer service instead of the bearer service requested by the user.
c8:   This parameter shall be present in any call record.

6.4   Near real-time UMR reporting function

To enable the NE to transfer blocks of UMRs to the OS with a higher efficiency than the standard EFD, individual notifications may be grouped and transferred as a single unit by first storing these notifications in the blockGeneratingLog. To further add to the efficiency only stripped records are sent in the notification. These stripped records are defined as RecordContent and do not include information added by the log i.e. current logging time, managed object class, managed object instance and logRecordId. The presence of more than one OS interested in collection of usage metering data may be a practical issue. Usage metering data may be requested for different purposes by different OSs at the same time. The possibility of multiple instances of the blockGeneratingLog is therefore not precluded.

Emission of a blockRecordNotification (and subsequent emptying of the log) may be triggered by one of the following events:

−   maximum time period elapsed;
−   maximum number of UMRs reached;
−   internal size limit reached.

The operations required to manage the near Real-time UMR reporting are:

-       initiation of UMR Block logging;
            (see subclause 6.4.1)
-       termination of logging;
            (defined in the Log Control Function ITU-T Recommendation X.735 [22], clause 9)
-       modification of log attributes;
            (defined in the Log Control Function ITU-T Recommendation X.735 [22], clause 9)
-       retrieval of log attributes;
            (defined in the Log Control Function ITU-T Recommendation X.735 [22], clause 9)
-       initiation of event report forwarding;
            (defined in the Event Report Systems Management Function
            ITU-T Recommendation X.734 [21], clause 9)
-       termination of event report forwarding;
            (defined in the Event Report Systems Management Function
            ITU-T Recommendation X.734 [21], clause 9)
-       event forwarding modification;
            (defined in the Event Report Systems Management Function
            ITU-T Recommendation X.734 [21], clause 9)
-       retrieval of eventForwardingDiscriminator attributes;
            (defined in the Event Report Systems Management Function
            ITU-T Recommendation X.734 [21], clause 9).

        NOTE: Other operations on the log described in ITU-T Recommendation X.735 [22] clause 9 (retrieval of log records, deletion of log records) are not allowed.

6.4.1　Initiation of UMR block logging

The PT-CREATE service defined in ITU-T Recommendation X.730 [20] is used to create an instance of the UMR blockGeneratingLog. The UMR blockGeneratingLog behaves as if it were a log of infinite size derived from the Log described in ITU-T Recommendation X.735 [22].

If there is an internal implementation specific limit of the length of the blockGeneratingLog or notification (buffer size, max. message length, etc.), this may be signalled internally to the blockGeneratingLog, which will emit a notification with the trigger cause "internalSizeLimitReached".

The conditional packages from ITU-T Recommendation X.735 [22] (finite log size package, scheduling package and alarm package) are irrelevant.

The formal description of the blockGeneratingLog can be found in annex A.

The following describes the values that will be assigned to the attributes in response to a PT-CREATE request:

Log full action: This attribute is inherited from ITU-T Recommendations X.735 [22] and X.721 [18]. It specifies the action to be taken when the maximum capacity of the log is reached. Only "wrap" is allowed (infinite log). If this parameter is not specified "wrap" is assumed.

Discriminator construct: This attribute is inherited from ITU-T Recommendations X.735 [22] and X.721 [18]. It specifies the test conditions which will be used by the log in testing potential log records. Normally, the discriminator will filter on the "immediateNotification" boolean field in the usageMeteringRecordNotification.

Administrative state: This attribute is inherited from ITU-T Recommendations X.735 [22] and X.721 [18]. It specifies the administrative state in which the log is to be created. The log may be created in a Unlocked or Locked state. If no administrative state is specified, the Unlocked state is assumed.

Packages: None of the inherited conditional packages will be instantiated.

Maximum block size: This maxBlockSize attribute specifies the maximum number of UMRs to be included in a blockRecord notification. An internal counter within the blockGeneratingLog counts the number of UMRs currently in the log. If the value maxBlockSize is reached, a "blockRecordNotification" is emitted, the contained records are deleted and the internal counter is reset to zero. The internal counter is also reset to zero if another notification triggering event happens.

Maximum time period: The maxTimeInterval attribute specifies the maximum amount of time that is allowed to elapse prior to generation of a blockRecordNotification. That means, that the block transfer is triggered periodically i. e. every n seconds. The time period is also reset to zero if another event happens.

6.4.2 Transmission of record blocks

Block UMRs are sent via the UM-BLOCK-RECORD-REPORT to the OS. The UM-BLOCK-RECORD-REPORT has the parameters shown in table 2:

Table 2: UM-BLOCK-RECORD-REPORT

Parameter Name	Req/Ind	Resp/Cfm
Invoke Identifier	P	P
Mode	P	-
Managed Object Class	P	-
Managed Object Instance	P	-
Event Type	P	P
Event Time	U	U
Event Information		
Block Header Record	O	-
Usage Records	M	-
Current Time	-	U
Event Reply	-	-
Errors	-	P

blockHeaderRecord: This parameter carries information that is common to all records in the block or pertains to the record as a whole, such information consists of exchangeInfo, reasonForOutput, a sequenceNumber and managementExtensions.

usageRecords: This parameter consists of a sequence of records. The content of each record is the set of parameters specified in clause A.10, with the Exchange Information parameter optionally moved to the block header.

6.5 UMR transfer via file generating log

The special "fileGeneratingLog" is derived from the standard log function as defined in ITU-T Recommendation X.735 [22].

The record notifications generated by the simpleUsageMeteringData object instance are stored locally in the NE using the logging functionality described in ITU-T Recommendation X.735 [22].

The function for deletion of log entries provided by the ITU-T Recommendation X.735 [22] is not supported, log records are deleted automatically from the log. The fileGeneratingLog control provides an extra functionality to support retrieval of UMR records by a suitable file transfer protocol. This functionality is supported by providing for the creation of a UsageMeteringRecordFile either by means of create request from the OS or a trigger event internal to the NE. When the file has been created initiated by the NE a notification is emitted allowing managing systems to be notified of the existence of the file. The records copied to the file are automaticaly deleted from the log.

To add to the efficiency of UMR transfer, only stripped records are placed in the created file. These stripped records are defined as RecordContent and do not include information added by the log i.e. current logging time, managed object class, managed object instance and logRecordId.

The presence of more than one OS interested in collection of usage metering data may be a practical issue. Usage Metering Data may be requested for different purposes by different OSs at the same time. The possibility of multiple OSs accessing the fileGeneratingLog and UsageMeteringRecordFile is therefore not precluded.

For the internal creation triggers, the filename is created automatically by the NE and the file name is communicated to the OS through a notification (UM-FILE-CREATION-REPORT). In case of the action from the OS, a specific filename can be given, which overrides the automatic file naming.

The operations required to manage UMR logging and UMR file handling are:

- initiation of UMR logging;
   (see subclause 6.5.1)
- termination of UMR logging;
   (defined in the Log Control Function ITU-T Recommendation X.735 [22], clause 9)
- modification of log attributes;
   (defined in the Log Control Function ITU-T Recommendation X.735 [22], clause 9)
- retrieval of log attributes;
   (defined in the Log Control Function ITU-T Recommendation X.735 [22], clause 9)
- retrieval of log records;
   (defined in the Log Control Function ITU-T Recommendation X.735 [22], clause 9)
- generation of a UMR file;
   (see subclause 6.5.2)
- UMR file transfer;
   (see subclause 6.5.3).

6.5.1 Initiation of UMR logging

The PT-CREATE service defined in ITU-T Recommendation X.730 [20] is used to create an instance of the fileGeneratingLog. The fileGeneratingLog is derived from the Log described in ITU-T Recommendation X.735 [22].

The formal description of the fileGeneratingLog can be found in annex A.

The following describes the values that will be assigned to the attributes in response to a PT-CREATE request:

Inherited attributes: For the values of the inherited attributes and conditional packages: see ITU-T Recommendation X.735 [22], clause 9 (initiation of logging).

Times of day: This attribute specifies a list of times at which a UsageMeteringRecordFile should be automatically generated on a daily basis.

6.5.2 Generation of a UMR file

The UM-FILE-CREATION-ACTION is used to generate a usageMeteringRecordFile containing UMRs collected in the log.

Table 3 describes the parameters that are supported in the action information and in the action result.

Table 3: UM-FILE-CREATION-ACTION

Parameter Name	Req/Ind	Resp/Cfm
Invoke Identifier	P	P
Mode	P	-
Managed Object Class	P	-
Managed Object Instance	P	-
Action Type	P	P
Action Information		
File Name	U	M
Current Time	-	U
Action Reply	-	-
Errors	-	P

file name: This parameter contains the file name of the generated usageMeteringRecordFile.

6.5.3 Internal generation of a UMR file

UMR files may be generated by the fileGeneratingLog due to internal file creation triggers. The internal file creation trigger events can be one of the following:

- daily absolute times;
- internal size limit reached;
- If there is an internal implementation specific limit of the length of a file or Log (buffer size, max. message length, etc.), this may be signalled internally to the Log, which may create a new file with the file trigger cause "internalSizeLimitReached".

When a file is created due to an internal trigger the UM-FILE-CREATION-REPORT may be used to report the existence of this file to external systems. The UM-FILE-CREATION-REPORT has the parameters defined in table 4:

Table 4: UM-FILE-CREATION-REPORT

Parameter Name	Req/Ind	Resp/Cfm
Invoke Identifier	P	P
Mode	P	-
Managed Object Class	P	-
Managed Object Instance	P	-
Event Type	P	P
Event Time	U	U
Event Information		
File Name	M	-
Reason For Output	M	-
Current Time	-	U
Action Reply	-	-
Errors	-	P

6.5.4 File transfer and deletion

File transfer and deletion is initiated by the OS using a Q3 file transfer protocol.

If the receiving OS is an intermediate OS that makes data available to other OSs, that data can be stored in its original record format, by expanding the UMR records with the event log record information, including the current logging time and a new logRecordId. Upstream OSs can then manipulate this log like any other fileGeneratingLog.

7 Functional units

Table 5: Functional units

Functional unit	Managed Object (MO) Class	Function (Services)
Usage metering control	simpleUsageMeteringControl	Usage metering control Function: - initiate usage metering; (PT-CREATE) - terminate usage metering; (PT-DELETE) - Get usage metering control data; (PT-GET) - Modify usage metering control data; (PT-SET)
This is the standardized Event Reporting management function. The functional units are defined in ITU-T Rec. X.734 [21]: *- event report Management functional unit.* *- monitor event report management functional unit.*	eventForwardingDiscriminator	Real-time UMR reporting Function: - initiation of event report forwarding; (PT-CREATE) - termination of event report forwarding; (PT-DELETE) - event forwarding modification; (PT-SET) - retrieval of discriminator attributes; (PT-GET) Near Real-time UMR Reporting Function: - initiation of event report forwarding; (PT-CREATE) - termination of event report forwarding; (PT-DELETE) - event forwarding modification; (PT-SET) - retrieval of discriminator attributes(PT-GET)
UMR blockGeneratingLog control	blockGeneratingLog usageMeteringLogRecord	Near Real-time UMR Reporting Function: - initiation of UMR Block logging; (PT-CREATE) - termination of logging; (PT-DELETE) - modification of log attributes; (PT-SET) - retrieval of log attributes; (PT-GET)
UMR file log control	fileGeneratingLog usageMeteringLogRecord	UMR transfer via the fileGeneratingLog: - initiation of UMR logging; (PT-CREATE) - termination of UMR logging; (PT-DELETE) - modification of log attributes; (PT-SET) - retrieval of log attributes; (PT-GET)
UMR log record retrieve	usageMeteringLogRecord	UMR transfer via the fileGeneratingLog: - retrieval of log records; (PT-GET)
UMR file creation	fileGeneratingLog	UMR transfer via the fileGeneratingLog: - generation of a UMR file; (PT-ACTION)
Usage metering agent	simpleUsageMeteringControl usageMeteringData eventForwardingDiscriminator and/or blockGeneratingLog usageMeteringLogRecord	- transmit real-time report (UM-USAGE-METERING-REPORT) - transmit near real-time report (UM-BLOCK-RECORD-REPORT)
Usage metering monitor		-receive real-time report (UM-USAGE-METERING-REPORT) -receive near real-time report (UM-BLOCK-RECORD-REPORT)

7.1 Functional units

1) Usage metering control: this functional unit allows a manager to control for which accountable objects usage data is collected and reported.

2) UMR blockGeneratingLog control: this functional unit allows a manager to create a special blockGeneratingLog to batch UMRs for a short time before they are being issued as "blockRecordNotification"s.

3) UMR file log control: this functional unit allows a manager to create (delete/modify) a special UMR log called fileGeneratingLog to store UMRs.

4) UMR log record retrieve: this functional unit allows a manager to retrieve UMRs from a fileGeneratingLog.

5) UMR file creation: this functional unit allows a manager to create a UMR file from a fileGeneratingLog.

6)   Usage metering agent: this functional unit is used by the NE to transmit both UMR- and UMR block -reports.

7)   Usage metering monitor: this functional unit is used by the OS to receive both UMR- and UMR block -reports.

7.2   Functional units from other Recommendations

This I-ETS also supports the functional units out of the Event Report MFaI Unit (ITU-T Recommendation X.734 [21]).

7.3   Negotiation of functional units

This I-ETS assigns the following object identifier value:

{ccitt(0) identified-organization(4) etsi(0) usageMeteringInformationManagement(819) informationModel(0) functionalUnitPackage(1)}

as a value of the Abstract Syntax Notation (ASN.1) type FunctionalUnitPackageId defined in ITU-T Recommendation X.701 [17] to use for negotiating the following functional units:

1)   Usage metering control;
2)   UMR blockGeneratingLog control;
3)   UMR file log control;
4)   UMR log record retrieve;
5)   UMR file creation;
6)   Usage metering agent;
7)   Usage metering Monitor.

Where the number identifies the bit positions in the BIT STRING assigned to the functional units, and the names referencing the functional units are defined in subclause 7.1 of this I-ETS.

Within the Systems management application context, the mechanism for negotiating the functional units is described by ITU-T Recommendation X.701 [17].

8   Conformance

8.1   Static conformance

An implementation claiming conformance in either a manager or an agent role shall at least support the following capabilities:

-    Capability to control data generation and notification, implying support of the functional unit usage metering control. It should be defined in the Managed Objects Conformance Statement (MOCS) which managed object classes are supported as accountable objects.

-    Capability to transfer data from the NE to the OS, by one or more of the following means:

    -    real time UMR reporting, implying support of the functional units defined in ITU-T Recommendation X.734 [21] (Event Reporting management), usage metering agent and usage metering monitor.

    -    near real-time UMR reporting, implying support of the functional unit UMR blockGeneratingLog control and the functional units defined in ITU-T Recommendation X.734 [21] (Event Reporting management), usage metering agent and usage metering monitor.

    -    UMR logging and retrieval of log records, implying support of the functional units UMR file log control and UMR log record retrieve.

    -    UMR logging and retrieval through file transfer, implying support of the functional units UMR file log control, UMR file creation and the appropriate file transfer capability.

The managed objects and services that need to be supported are formally described in annex A.

The implementation shall support:

- Q3 interface as defined in ITU-T Recommendations Q.811 [9] and Q.812 [10];
- transfer syntax derived from the basic encoding rules specified in ITU-T Recommendation X.209 [12];
- for the data types referenced by the definitions for which support is claimed.

8.2 Dynamic conformance

The system shall, in the role(s) for which conformance is claimed, support the elements of procedure defined in:

- ITU-T Recommendation X.730 [20] for the PT-GET, PT-CREATE, PT-DELETE, PT-SET, PT-EVENT-REPORT, PT-ACTION, object creation reporting, object deletion reporting and attribute change reporting services.

Annex A (normative): Information model

A.1 Overview

This annex contains the formal description of the information model for this I-ETS. It consists of a simplified Entity-Relationship (ER) diagram, a naming tree, an inheritance tree and an object model specified in ITU-T Recommendation X.722 [19] templates.
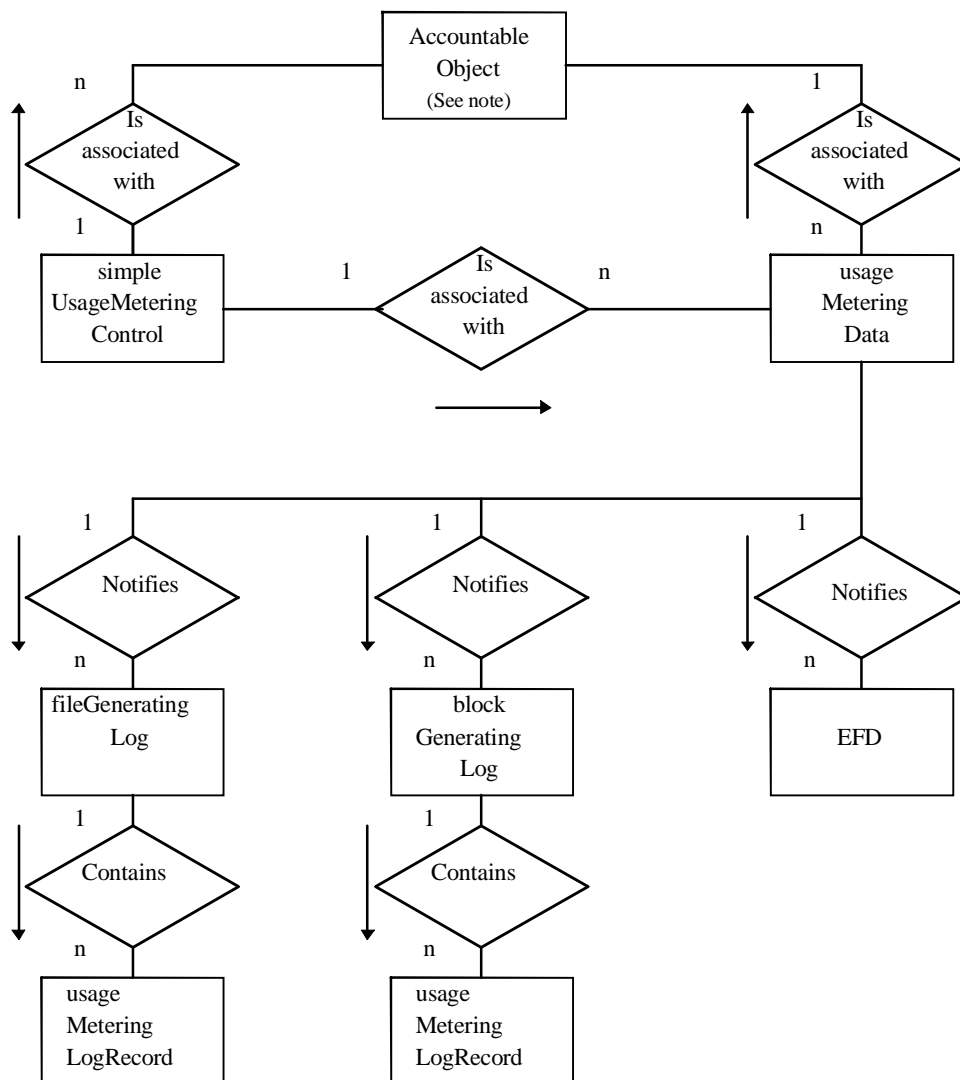
NOTE: An accountable object is not a real object class, it is a place holder for the object classes identified as accountable objects in the Managed Object Conformance Statements (MOCS tables).

Figure A.1: The usage metering recording view

A.2 Naming hierarchy

The naming (containment) tree for the objects defined within this I-ETS is illustrated in figure A.2.
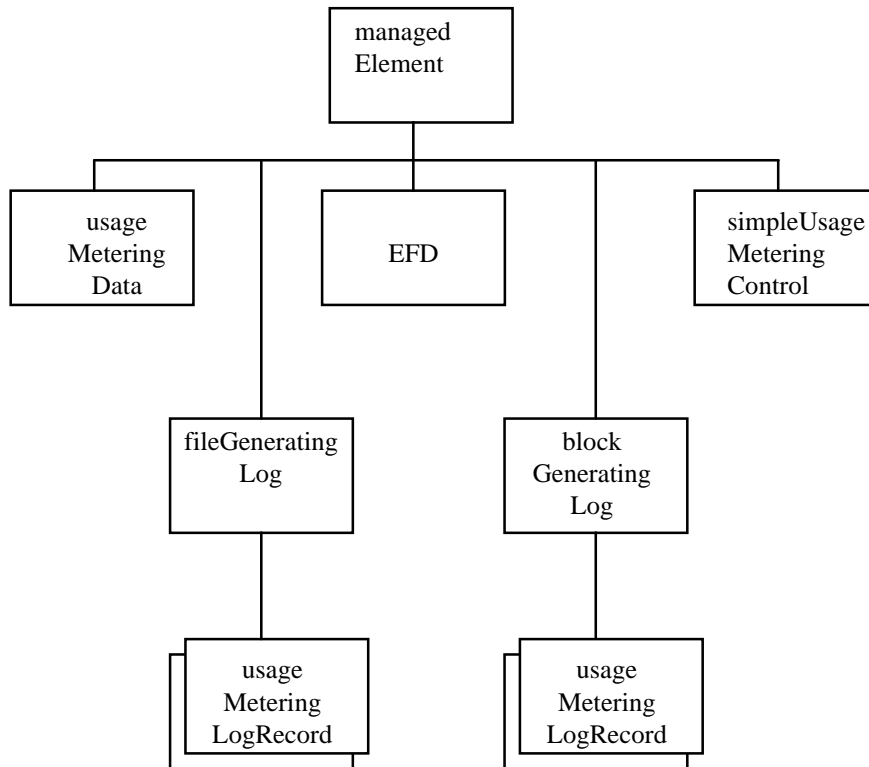
Figure A.2: The naming tree

A.3 Inheritance

The inheritance tree for this I-ETS is illustrated in figure A.3.
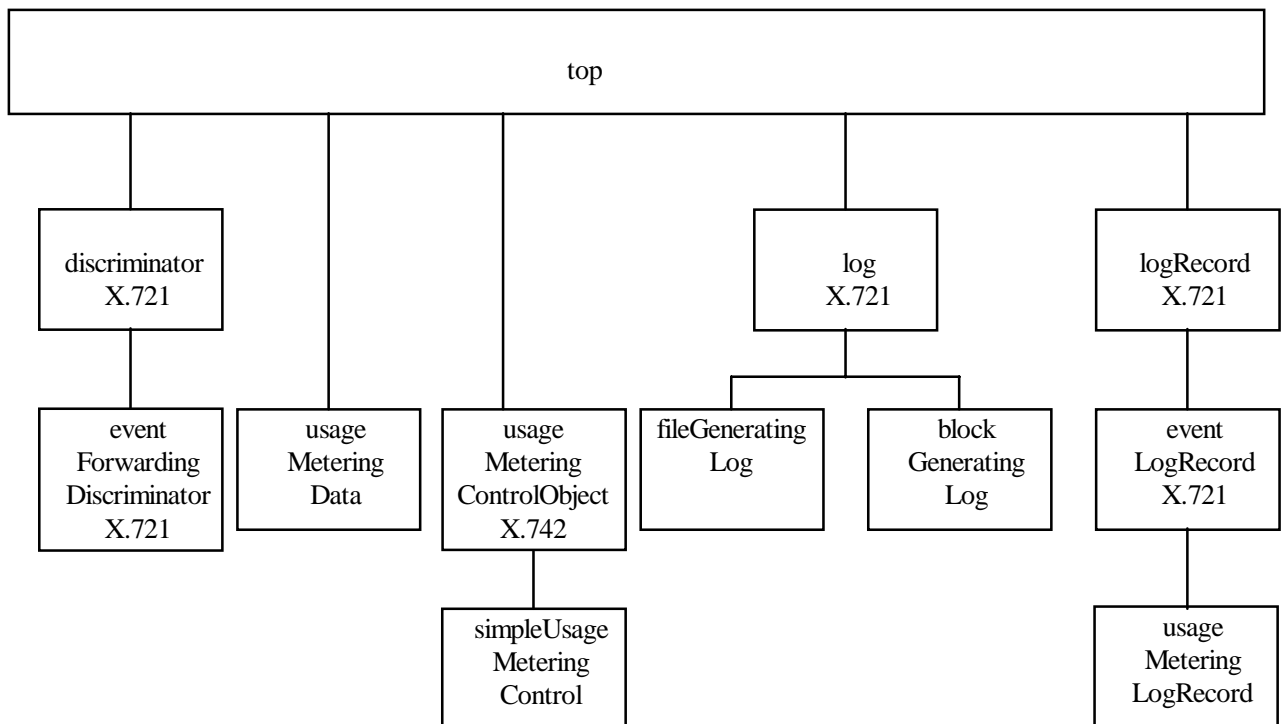
Figure A.3: The inheritance tree

A.4   Managed object classes

A.4.1   Block generating log

This managed object class is a subclass of the "Log" class described in ITU-T Recommendation X.735 [22] and defined in ITU-T Recommendation X.721 [18] and therefore inherits all of the properties of the "log" class.

blockGeneratingLog MANAGED OBJECT CLASS
      DERIVED FROM "Recommendation X.721 | ISO/IEC 10165-2: 1992": log;
      CHARACTERIZED BY
      blockGeneratingLogPackage PACKAGE
      BEHAVIOUR   blockGeneratingLogBehavior BEHAVIOUR
      DEFINED AS "This log is considered to be infinite and therefore it does not have to instantiate   the finite-log size package from its superclass log. The blockGeneratingLog stores all records   that satisfy its discriminator construct. The log provides the value (sequence number) for the 'recordId' (field of tne UMR).
An instance of this log emits the blockRecord   Notification when any of the following events occurs:
      -     the number of records in the log becomes equal to the maximum block size,
      -     the time interval elapsed since the first record currently contained in the log exceeds the value maxTimeInterval attribute,
   -   an internal system limitation has been exceeded, including the block generating log itself overflowing.
      Upon emitting the blockRecordNotification all records stored in the block generating log are
      deleted and the log is ready to store new records. Because of the self-emptying nature of this log,
any of the inherited log-full action may be selected and the behaviour of the log will not   change.";;
      ATTRIBUTES
      maxBlockSize   GET-REPLACE,
      maxTimeInterval   GET-REPLACE;
      NOTIFICATIONS
      blockRecordNotification;;;
REGISTERED AS {managedObjectClass 3};

A.4.2   File generating log

This managed object class is a subclass of the "Log" class described in ITU-T Recommendation X.735 [22] and defined in ITU-T Recommendation X.721 [18] and therefore inherits all of the properties of the "log" class.

fileGeneratingLog MANAGED OBJECT CLASS
DERIVED FROM "Recommendation X.721 | ISO/IEC 10165-2: 1992": log;
CHARACTERIZED BY
fileGeneratingLogPkg PACKAGE
      BEHAVIOUR
      fileGeneratingLogBhv BEHAVIOUR
DEFINED AS "This log is used to create files that can be exchanged using an appropriate file transfer
protocol. The log provides the value (sequence number) for the 'recordId' (field of tne UMR) .
-     The action create file is used to generate the file to be exchanged. The file created consists of a concatenation of stripped record,; i.e. the UMRs without the log overhead (Log Record Id, Managed Object Class and Instance and Logging Time). The layout of the file is defined in the ASN1 module as UsageMeteringRecordFile. The firstRecordId and LastRecordId included in the file header and trailer contain the record id of the first and the last UMR stored in the file.
-     To avoid duplication of UMRs, logging of blockRecord notifications emitted by the block generating log should be excluded by configuration of the fileGeneratingLog's discriminator construct. Files may also be created due to internal trigger events. One such internal trigger is based on time of day. When files are created the corresponding records in the log will be deleted automatically.";;
      ACTIONS
      createFile;;;

CONDITIONAL PACKAGES
    dailyTriggeringPackage
        PRESENT IF   "if the file creation is to be triggered on a daily basis",
    fileCreationNotificationPackage
        PRESENT IF   "if the file creation is triggered using the
                daily scheduling mechanism triggering method
                or an internal mechanism.";
REGISTERED AS {managedObjectClass 2};

A.4.3 Simple usage metering control

simpleUsageMeteringControl MANAGED OBJECT CLASS
DERIVED FROM "Recommendation X.742 | ISO/IEC 10164-10: 1995": usageMeteringControlObject;
CHARACTERIZED BY
simpleUsageMeteringControlPackage PACKAGE
    BEHAVIOUR usageMeteringControlBehaviour BEHAVIOUR
    DEFINED AS
    "This object class controls the generation of UMRs in the NE. See subclause 6.1 for details";;
    ATTRIBUTES
    creationTriggerList   GET-REPLACE
                       DEFAULT VALUE ASN1UsageMeteringModule.defaultCreationTrigger;;;
REGISTERED AS {managedObjectClass 4};

A.4.4 Usage metering data

This managed object class emits notifications that permit the NE to transmit UMRs to the OS.

A UMR notification is sent out if one of the following events occurs:

-     change or termination of the service;
-     expiration of the periodic timer (defined in the usage metering control object);
-     NE internal reasons e.g. reaching a volume threshold (this may also be manufacture specific).

usageMeteringData MANAGED OBJECT CLASS
DERIVED FROM "Recommendation X.721 | ISO/IEC 10165-2: 1992": top;
CHARACTERIZED BY
usageMeteringDataPackage PACKAGE
    BEHAVIOUR usageMeteringDataBehaviour BEHAVIOUR
    DEFINED AS
    "The only purpose of this object class is to emit usageMeteringRecordNotification, and no
    management operation is allowed on this object class.

    NOTE: the indication of the GET action on the usageMeteringDataId was kept for formal
                (compiler) reasons. .";;

    ATTRIBUTES
    usageMeteringDataId   GET;
    NOTIFICATIONS
    usageMeteringRecordNotification;;;
REGISTERED AS {managedObjectClass 5};

A.4.5 Usage metering log record

This managed object class is a subclass of the "eventLogRecord" class described in ITU-T Recommendation X.735 [22] and defined in ITU-T Recommendation X.721 [18] and therefore inherits all of the properties of both the "logRecord" and eventLogRecord" classes.

```
usageMeteringLogRecord MANAGED OBJECT CLASS
DERIVED FROM "Recommendation X.721 | ISO/IEC 10165-2: 1992": eventLogRecord;
CHARACTERIZED BY
usageMeteringLogRecordPackage       PACKAGE
      BEHAVIOUR
      usageMeteringLogRecordBehaviour BEHAVIOUR
      DEFINED AS "This object class describes the layout of a log record created for each single
      usage metering record notification";;
      ATTRIBUTES
      recordType              GET,
      startTimeStamp          GET,
      serviceType             GET,
      serviceUser             GET,
      callIdentificationNumber  GET;;;
      CONDITIONAL PACKAGES
            recordIdPackage
                  PRESENT IF        "this parameter was present in the received notification",
            dataValidityPackage
                  PRESENT IF        "this parameter was present in the received notification",
            networkProviderIdPackage
                  PRESENT IF        "this parameter was present in the received notification",
            callingPartyNumberPackage
                  PRESENT IF        "this parameter was present in the received notification",
            calledPartyNumberPackage
                  PRESENT IF        "this parameter was present in the received notification",
            redirectingNumberPackage
                  PRESENT IF        "this parameter was present in the received notification",
            redirectionNumberPackage
                  PRESENT IF        "this parameter was present in the received notification",
            originalCalledNumberPackage
                  PRESENT IF        "this parameter was present in the received notification",
            callingPartyNumberNotScreenedPackage
                  PRESENT IF        "this parameter was present in the received notification",
            operatorSpecific1NumberPackage
                  PRESENT IF        "this parameter was present in the received notification",
            operatorSpecific2NumberPackage
                  PRESENT IF        "this parameter was present in the received notification",
            operatorSpecific3NumberPackage
                  PRESENT IF        "this parameter was present in the received notification",
                  supplementaryServiceListPackage
                  PRESENT IF        "this parameter was present in the received notification",
            immediateNotificationPackage
                  PRESENT IF        "this parameter was present in the received notification",
            causePackage
                  PRESENT IF        "this parameter was present in the received notification",
            iNPackage
                  PRESENT IF        "this parameter was present in the received notification",
            partialGenerationPackage
                  PRESENT IF        "this parameter was present in the received notification",
            exchangeInfoPackage
                  PRESENT IF        "this parameter was present in the received notification",
                  relatedCallNumberPackage
                  PRESENT IF        "this parameter was present in the received notification",
            uMRPurposePackage
                  PRESENT IF        "this parameter was present in the received notification",
                  physicalLineCodePackage
                  PRESENT IF        "this parameter was present in the received notification",
```

receivedDigitsPackage
        PRESENT IF   "this parameter was present in the received notification",
        operatorSpecific1AdditionalNumberPackage
        PRESENT IF   "this parameter was present in the received notification",
operatorSpecific2AdditionalNumberPackage
        PRESENT IF   "this parameter was present in the received notification",
operatorSpecific3AdditionalNumberPackage
        PRESENT IF   "this parameter was present in the received notification",
callingPartyCategoryPackage
        PRESENT IF   "this parameter was present in the received notification",
callingPartyTypePackage
        PRESENT IF   "this parameter was present in the received notification",
chargingInformationPackage
        PRESENT IF   "this parameter was present in the received notification",
progressPackage
        PRESENT IF   "this parameter was present in the received notification",
accessDeliveryPackage
        PRESENT IF   "this parameter was present in the received notification",
trunkGroupOutgoingPackage
        PRESENT IF   "this parameter was present in the received notification",
trunkGroupIncomingPackage
        PRESENT IF   "this parameter was present in the received notification",
fallbackServicePackage
        PRESENT IF   "this parameter was present in the received notification",

conversationTimePackage
        PRESENT IF   "this parameter was present in the received notification",
durationTimeACMPackage
        PRESENT IF   "this parameter was present in the received notification",
durationTimeB-AnswerPackage
        PRESENT IF   "this parameter was present in the received notification",
durationTimeNoB-AnswerPackage
        PRESENT IF   "this parameter was present in the received notification",
uUInfoCountersPackage
        PRESENT IF   "this parameter was present in the received notification",
standardExtensionsPackage
        PRESENT IF   "this parameter was present in the received notification",
recordExtensionsPackage
        PRESENT IF   "this parameter was present in the received notification";
REGISTERED AS {managedObjectClass 1};

A.5   Packages

A.5.1   Access delivery package

accessDeliveryPackage   PACKAGE
        ATTRIBUTES
        accessDelivery   GET;
REGISTERED AS {package 1};

A.5.2   Called party number package

calledPartyNumberPackage   PACKAGE
        ATTRIBUTES
        calledPartyNumber   GET;
REGISTERED AS {package 2};

A.5.3 Calling party category package

```
callingPartyCategoryPackage              PACKAGE
        ATTRIBUTES
        callingPartyCategory            GET;
REGISTERED AS {package 3};
```

A.5.4 Calling party number not screened package

```
callingPartyNumberNotScreenedPackage    PACKAGE
        ATTRIBUTES
        callingPartyNumberNotScreened   GET;
REGISTERED AS {package 4};
```

A.5.5 Calling party number package

```
callingPartyNumberPackage               PACKAGE
        ATTRIBUTES
        callingPartyNumber              GET;
REGISTERED AS {package 5};
```

A.5.6 Calling party type package

```
callingPartyTypePackage                 PACKAGE
        ATTRIBUTES
        callingPartyType                GET;
REGISTERED AS {package 6};
```

A.5.7 Cause package

```
causePackage                            PACKAGE
        ATTRIBUTES
        cause                           GET;
REGISTERED AS {package 7};
```

A.5.8 Charging information package

```
chargingInformationPackage              PACKAGE
        ATTRIBUTES
        chargingInformation             GET;
REGISTERED AS {package 8};
```

A.5.9 Conversation time package

```
conversationTimePackage                 PACKAGE
        ATTRIBUTES
        conversationTime                GET;
REGISTERED AS {package 9};
```

A.5.10 Daily triggering package

```
dailyTriggeringPackage                  PACKAGE
        ATTRIBUTES
        timesOfDay                      GET-REPLACE ADD-REMOVE;
REGISTERED AS {package 10};
```

A.5.11 Data validity package

```
dataValidityPackage                     PACKAGE
        ATTRIBUTES
        dataValidity                    GET;
REGISTERED AS {package 11};
```

A.5.12   Duration time ACM package

```
durationTimeACMPackage              PACKAGE
      ATTRIBUTES
      durationTimeACM           GET;
REGISTERED AS {package 12};
```

A.5.13   Duration time B-answer package

```
durationTimeB-AnswerPackage         PACKAGE
      ATTRIBUTES
      durationTimeB-Answer      GET;
REGISTERED AS {package 13};
```

A.5.14   Duration time No B-answer package

```
durationTimeNoB-AnswerPackage       PACKAGE
      ATTRIBUTES
      durationTimeNoB-Answer    GET;
REGISTERED AS {package 14};
```

A.5.15   Exchange info package

```
exchangeInfoPackage                 PACKAGE
      ATTRIBUTES
      exchangeInfo              GET;
REGISTERED AS {package 15};
```

A.5.16   Fallback service package

```
fallbackServicePackage              PACKAGE
      ATTRIBUTES
      fallbackService           GET;
REGISTERED AS {package 16};
```

A.5.17   File creation notification package

```
fileCreationNotificationPackage     PACKAGE
      NOTIFICATIONS
      fileCreationNotification;
REGISTERED AS {package 17};
```

A.5.18   Immediate notification package

```
immediateNotificationPackage        PACKAGE
      ATTRIBUTES
      immediateNotification     GET;
REGISTERED AS {package 18};
```

A.5.19   IN package

```
iNPackage                           PACKAGE
      ATTRIBUTES
      iNServiceInformationList  GET;
      iNSpecificInformation     GET;
REGISTERED AS {package 19};
```

A.5.20   Network provider Id package

```
networkProviderIdPackage            PACKAGE
      ATTRIBUTES
      networkProviderId         GET;
REGISTERED AS {package 20};
```

A.5.21 Operator specific1 additional number package

```
operatorSpecific1AdditionalNumberPackage PACKAGE
      ATTRIBUTES
      operatorSpecific1AdditionalNumber    GET;
REGISTERED AS {package 21};
```

A.5.22 Operator specific1 number package

```
operatorSpecific1NumberPackage        PACKAGE
      ATTRIBUTES
      operatorSpecific1Number      GET;
REGISTERED AS {package 22};
```

A.5.23 Operator specific2 additional number package

```
operatorSpecific2AdditionalNumberPackage PACKAGE
      ATTRIBUTES
      operatorSpecific2AdditionalNumber    GET;
REGISTERED AS {package 23};
```

A.5.24 Operator specific2 number package

```
operatorSpecific2NumberPackage        PACKAGE
      ATTRIBUTES
      operatorSpecific2Number      GET;
REGISTERED AS {package 24};
```

A.5.25 Operator specific3 additional number package

```
operatorSpecific3AdditionalNumberPackage PACKAGE
      ATTRIBUTES
      operatorSpecific3AdditionalNumber    GET;
REGISTERED AS {package 25};
```

A.5.26 Operator specific3 number package

```
operatorSpecific3NumberPackage        PACKAGE
      ATTRIBUTES
      operatorSpecific3Number      GET;
REGISTERED AS {package 26};
```

A.5.27 Original called number package

```
originalCalledNumberPackage        PACKAGE
      ATTRIBUTES
      originalCalledNumber      GET;
REGISTERED AS {package 27};
```

A.5.28 Partial generation package

```
partialGenerationPackage        PACKAGE
      ATTRIBUTES
      partialGeneration        GET;
REGISTERED AS {package 28};
```

A.5.29 Physical line code package

```
physicalLineCodePackage        PACKAGE
      ATTRIBUTES
      physicalLineCode        GET;
REGISTERED AS {package 29};
```

A.5.30   Progress package

```
progressPackage                        PACKAGE
        ATTRIBUTES
        progress                GET;
REGISTERED AS {package 30};
```

A.5.31   Received digits package

```
receivedDigitsPackage                  PACKAGE
        ATTRIBUTES
        receivedDigits          GET;
REGISTERED AS {package 31};
```

A.5.32   Record extensions package

```
recordExtensionsPackage                PACKAGE
        ATTRIBUTES
        recordExtensions        GET;
REGISTERED AS {package 32};
```

A.5.33   Record Id package

```
recordIdPackage                        PACKAGE
        ATTRIBUTES
        recordId                GET;
REGISTERED AS {package 33};
```

A.5.34   Redirecting number package

```
redirectingNumberPackage               PACKAGE
        ATTRIBUTES
        redirectingNumber       GET;
REGISTERED AS {package 34};
```

A.5.35   Redirection number package

```
redirectionNumberPackage               PACKAGE
        ATTRIBUTES
        redirectionNumber       GET;
REGISTERED AS {package 35};
```

A.5.36   Related call number package

```
relatedCallNumberPackage               PACKAGE
        ATTRIBUTES
        relatedCallNumber       GET;
REGISTERED AS {package 36};
```

A.5.37   Standard extensions package

```
standardExtensionsPackage              PACKAGE
        ATTRIBUTES
        standardExtensions      GET;
REGISTERED AS {package 37};
```

A.5.38   Supplementary service list package

```
supplementaryServiceListPackage        PACKAGE
        ATTRIBUTES
        supplementaryServiceList   GET;
REGISTERED AS {package 38};
```

A.5.39 Trunk group incoming package

```
trunkGroupIncomingPackage              PACKAGE
      ATTRIBUTES
      trunkGroupIncoming            GET;
REGISTERED AS {package 39};
```

A.5.40 Trunk group outgoing package

```
trunkGroupOutgoingPackage              PACKAGE
      ATTRIBUTES
      trunkGroupOutgoing            GET;
REGISTERED AS {package 40};
```

A.5.41 UMR purpose package

```
uMRPurposePackage                      PACKAGE
      ATTRIBUTES
      uMRPurpose                   GET;
REGISTERED AS {package 41};
```

A.5.42 User to user info counters package

```
uUInfoCountersPackage                    PACKAGE
      ATTRIBUTES
      uUInfoCounters               GET;
REGISTERED AS {package 42};
```

A.6 Attributes

A.6.1 Access delivery

```
accessDelivery                         ATTRIBUTE
      WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.AccessDelivery;
      MATCHES FOR EQUALITY;
      BEHAVIOUR
      accessDeliveryBehaviour BEHAVIOUR
      DEFINED AS      " This attribute contains the Access delivery information which indicates if the
      call has been delivered to the called subscriber. Normally the value is derived from the ISDN User
      Part (ISUP) signalling. In the case of local calls, where no ISUP signalling is used, a similar value
      shall be adopted. Access delivery can be used for statistical purposes or to determine whether the
      charged subscriber should be charged with call attempt charge or not.";;
REGISTERED A {attribute 1};
```

A.6.2 Call identification number

```
callIdentificationNumber               ATTRIBUTE
      WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.CallIdentificationNumber;
      MATCHES FOR EQUALITY;
      BEHAVIOUR
      callIdentificationNumberBehaviour BEHAVIOUR
      DEFINED AS      "An identification number that identifies the call. All records produced for the
      same call have the same call identification number.
      With the call identification number it is possible to link partial outputs, outputs due to supplementary
      services during the call and to discriminate between simultaneous call establishments. If a global
      call reference is received through signalling, this can be used as call identification number thus
      allowing the correlation of UMRs generated for the same call in different NEs. If no global call
      reference is signalled in the network, the call identification will only have local significance";;
REGISTERED AS {attribute 2};
```

A.6.3   Called party number

calledPartyNumber   ATTRIBUTE
     WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.CalledPartyNumber;
     MATCHES FOR EQUALITY;
     BEHAVIOUR
     calledPartyNumberBehaviour BEHAVIOUR
     DEFINED AS   "This attribute contains the telephone number of the called subscriber if the
     UMR is generated due to a call.
     If the UMR is generated due to activation or invocation of the diversion supplementary service, then
     attribute contains the telephone number of the diverted - to number. In special cases this attribute
     may contain the translated number. This would be the case when abbreviated dialling is used. As
     an option, this information element may also include information to indicate the Numbering Plan
     Identification (NPI) and the Type Of Number (TON) of the called party number. In EN 300 403-1 [5]
     the different NPI-values and possible TON-values are defined. ";
REGISTERED AS {attribute 3};

A.6.4   Calling party category

callingPartyCategory   ATTRIBUTE
     WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.CallingPartyCategory;
     MATCHES FOR EQUALITY;
     BEHAVIOUR
     callingPartyCategoryBehaviour BEHAVIOUR
     DEFINED AS   "This attribute contains the calling subscriber category. This information may
     also be related to the redirecting party for a forwarded call in accordance to the definition and use of
     this information in ETS 300 356-1 [3].";
REGISTERED AS {attribute 4};

A.6.5   Calling party number

callingPartyNumber   ATTRIBUTE
     WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.CallingPartyNumber;
     MATCHES FOR EQUALITY;
     BEHAVIOUR
     callingPartyNumberBehaviour BEHAVIOUR
     DEFINED AS   "This attribute contains the telephone number of the calling party.
     The calling party will, for non Universal Personal Telecommunication (UPT) calls be identical to the
     calling party user. For UMRs of record type 'call' and when subscribing to either Multiple Subscriber
     Number (MSN) or Direct Dialling In (DDI) the information element indicates the screened and
     verified number for transfer towards the called subscriber. This attribute contains the default
     number if the exchange is requested to use that number for transfer towards the called subscriber.
     If the UMR is generated due to an event concerning a supplementary service then this attribute
     contains the telephone number of the subscriber that caused the event.
     It should be noted that in the case of an exchange with a diverted call, the subscriber for which the
     UMR is generated is indicated by the redirecting number.";
REGISTERED AS {attribute 5};

A.6.6   Calling party number not screened

callingPartyNumberNotScreened   ATTRIBUTE
     WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.CallingPartyNumberNotScreened;
     MATCHES FOR EQUALITY;
     BEHAVIOUR
     callingPartyNumberNotScreenedBehaviour BEHAVIOUR
     DEFINED AS   "This attribute contains an additional, user-provided, not screened telephone
     number of the calling party if the UMR is generated due to a call.
     This attribute is relevant in connection with users subscribing to the special arrangement according
     to e.g. the Calling Line Identity Presentation (CLIP) supplementary service.";
REGISTERED AS {attribute 6};

A.6.7 Calling party type

callingPartyType   ATTRIBUTE
        WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.CallingPartyType;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
        callingPartyTypeBehaviour BEHAVIOUR
        DEFINED AS   " This information element shall contain the calling subscriber type. This
        information may also be related to the redirecting party for a forwarded call in accordance to the
        definition and use of calling party in ETS 300 356-1 [3].
        The Calling party Type is defined as:
                Analogue;
                Customer link (2 Mbit/s PSTN digital access);
                Basic Access;
                Primary Rate Access;";
REGISTERED AS {attribute 7};

A.6.8 Cause

cause   ATTRIBUTE
        WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.Cause;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
        causeBehaviour BEHAVIOUR
        DEFINED AS   " This attribute indicates the cause and location value for the termination of the
        call. The location value shall indicate the origin of the cause value. Cause and location values are
        defined in ITU-T Recommendation Q.850 [11]. For Public Switched Telephone Network (PSTN) the
        values for call failure shall correspond to the ISDN cause values. Cause and location values can be
        used for statistical purposes or for determining whether the subscriber should be charged with call
        attempt charge or not. In the case this information is not included in the UMR it is assumed that the
        call is successful.";
REGISTERED AS {attribute 8};

A.6.9 Charging information

chargingInformation   ATTRIBUTE
        WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.ChargingInformation;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
        chargingInformationBehaviour BEHAVIOUR
        DEFINED AS   " This attribute contains the charging information generated by an NE which is
        capable of charging. This information can either be passed on to the billing application or in the
        case where the NE calculates charging information for presentation to the user, this information can
        be used to compare the values generated by the off-line charging application. The attribute contains
        the charged amount either in recorded currency or call charge units.";
REGISTERED AS {attribute 9};

A.6.10 Conversation time

conversationTime   ATTRIBUTE
        WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.ConversationTime;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
        conversationTimeBehaviour BEHAVIOUR
        DEFINED AS   " This attribute is only valid for answered calls. If no partial records are
        generated this attribute contains the time consumption from B-answer to termination time. For
        partial call records the first record contains the time consumption from B-answer until reporting
        time. The intermediate partial records contain the time consumption since the previous reporting.
        The final partial record contains the time consumption from the previous reporting until termination
        time. The call is considered terminated when communication between the parties is no longer
        possible.";
REGISTERED AS {attribute 10};

A.6.11   Creation trigger list

creationTriggerList   ATTRIBUTE
WITH ATTRIBUTE SYNTAX   ASN1UsageMeteringModule.CreationTriggerList;
    MATCHES FOR EQUALITY, SET-INTERSECTION;
    BEHAVIOUR
    creationTriggerListBehaviour BEHAVIOUR
    DEFINED AS " This attribute consists of a list of values that specify the conditions that will lead   to
    the creation of usage metering data objects. Triggers can be call related (Seizure or first digit or
    ACM received or B-answer received) and non-call related (supplementary service invocation and/or
    input).";
REGISTERED AS {attribute 11};

A.6.12   Data validity

dataValidity   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.DataValidity;
    MATCHES FOR EQUALITY;
    BEHAVIOUR
    dataValidityBehaviour BEHAVIOUR
    DEFINED AS   " This attribute indicates that the NE is having problems and that the content of
    the generated UMR is not reliable. This indication enables the OS to take the necessary actions on
    the collected UMRs.";
REGISTERED AS {attribute 12};

A.6.13   Duration time ACM

durationTimeACM   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.DurationTimeACM;
    MATCHES FOR EQUALITY;
    BEHAVIOUR
    durationTimeACMBehaviour BEHAVIOUR
    DEFINED AS   " This attribute contains the time consumption from the seizure time until ACM is
    received. This attribute is not included if no ACM is received. In the case of a terminating exchange
    the event ACM received will occur when the ACM is normally generated. This is either when a B-
    subscriber port is free (early ACM) or when a B-subscriber terminal is free (late ACM). The choice
    between early and late ACM is a network option in the terminating network. For local calls a
    corresponding time shall be used.";
REGISTERED AS {attribute 13};

A.6.14   Duration time B-answer

durationTimeB-Answer   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.DurationTimeB-Answer;
    MATCHES FOR EQUALITY;
    BEHAVIOUR
    durationTimeB-AnswerBehaviour BEHAVIOUR
    DEFINED AS   " This attribute contains the time consumption from seizure time until received
    B-Answer. This attribute is only included if B-Answer is received.";
REGISTERED AS {attribute 14};

A.6.15   Duration time no B-answer

durationTimeNoB-Answer   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.DurationTimeNoB-Answer;
    MATCHES FOR EQUALITY;
    BEHAVIOUR
    durationTimeNoB-AnswerBehaviour BEHAVIOUR
    DEFINED AS   " This attribute contains the time consumption from seizure time to termination
    time. This attribute is only included if no B-Answer is received.";
REGISTERED AS {attribute 15};

A.6.16   Exchange info

exchangeInfo   ATTRIBUTE
        WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.ExchangeInfo;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
        exchangeInfoBehaviour BEHAVIOUR
        DEFINED AS "   This attribute contains the exchange identity. By means of the exchange identity
        it is always possible to identify the exchange where a specific UMR was generated. In addition to
        the identity of the exchange, additional information can be added to indicate the program version of
        the originator. This information is provided to assist in interpreting the UMR when new software
        releases, that affect the UMR format, are introduced in the network. When all records to be
        transferred originate from the same exchange, this information can optionally be provided in the file
        header.";
REGISTERED AS {attribute 16};

A.6.17   Fallback service

fallbackService   ATTRIBUTE
        WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.FallbackService;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
        fallbackServiceBehaviour BEHAVIOUR
        DEFINED AS   " This attribute contains the fallback service information for a call or concerning
        a supplementary service. This attribute is only provided in the case of fallback i.e. the bearer and/or
        tele service are not identical to the initial requested service.";
REGISTERED AS {attribute 17};

A.6.18   Immediate notification

This attribute may be used to define the filter of an EFD.
immediateNotification ATTRIBUTE
        WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.ImmediateNotification;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
        immediateNotificationBehaviour BEHAVIOUR
        DEFINED AS   " This attribute shall contain an indication that the record requires immediate
        data transfer to the OS. This I-ETS does not specify if this indication is due to a subscriber action or
        contained in the user data. ";
REGISTERED AS {attribute 18};

A.6.19   IN specific information

iNSpecificInformation   ATTRIBUTE
        WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.INSpecificInformation;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
        iNSpecificInformationBehaviour BEHAVIOUR
        DEFINED AS   " This attribute contains information about the user of the IN service. The user
        information is identified by one or more of the following.

        personalUserId
        This element has only relevance when UPT calls are made. It is a network requirement that the
        provided international personal User Identity is unique and verified by the network

chargedParticipant
This information element shall indicate one of the participants, i.e. calling, called, redirecting, redirection or original called party, etc. to be charged for the usage.

chargedDirectoryNumber
This information element shall contain the charged Directory Number (DN) in the case where the number can not be indicated by the charged participant element.

percentageToBeBilled
This information element shall contain the percentage to be billed in the case where normal billing rules are not followed.

accountCodeInput
This information element shall contain the code to which accounting is to be referred and input by the subscriber. Examples of use are authorization code, PIN, bank account, VPN code or credit card number to be used for billing.";

REGISTERED AS {attribute 19};

A.6.20 IN service information list

iNServiceInformationList   ATTRIBUTE
        WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule. INServiceInformationList;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
        iNServiceInformationListBehaviour BEHAVIOUR
        DEFINED AS   " This attribute contains information about the use of one or more IN services. Information about the use of more than one service is only possible in connection with a call record type. For each service this attribute contains the IN service code, possible queue information and additional information (OCTET STRING).
        Queue information is stored in connection with IN calls to record usage of queuing resources. This information element is present only if the call was queued during its treatment by the IN and contains the time when the call was queued and the duration of the queuing.
        The service information is made available in the Core Intelligent Network Application Protocol (INAP) Furnish Charging Information (FCI) according to ETS 300 374-1 [4].";
REGISTERED AS {attribute 20};

A.6.21 Max block size

maxBlockSize ATTRIBUTE
        WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.MaxBlockSize;
        MATCHES FOR EQUALITY, ORDERING;
        BEHAVIOUR
        maxBlockSizeBehaviour BEHAVIOUR
        DEFINED AS "The value of this attribute specifies the maximum number of UMRs that may be contained in the blockRecordNotification emitted by the blockGeneratingLog. If the value '0' is entered, it means that this output trigger is not used.";
REGISTERED AS {attribute 21};

A.6.22 Max time interval

maxTimeInterval ATTRIBUTE
        WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.MaxTimeInterval;
        MATCHES FOR EQUALITY, ORDERING;
        BEHAVIOUR
        maxTimeIntervalBehaviour BEHAVIOUR
        DEFINED AS "The value of this attribute specifies the maximum time interval that may elapse from receipt of the first record currently in the log to the time at which a blockRecordNotification shall be emitted. This value, therefore, specifies the maximum latency with which near-real-time UMR data will be transmitted to the upstream system. If the value '0' is entered, it means that this output trigger is not used.";
REGISTERED AS {attribute 22};

A.6.23 Network provider Id

networkProviderId   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.NetworkProviderId;
    MATCHES FOR EQUALITY;
    BEHAVIOUR
    networkProviderIdBehaviour BEHAVIOUR
    DEFINED AS   " This information element indicates the network provider for whom the UMR is
    generated. This information is only necessary in the case of multiple providers.";
REGISTERED AS {attribute 23};

A.6.24 Operator specific1 additional number

operatorSpecific1AdditionalNumber   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.OperatorSpecific1AdditionalNumber;
    MATCHES FOR EQUALITY;
    BEHAVIOUR
    operatorSpecific1AdditionalNumberBehaviour BEHAVIOUR
    DEFINED AS   " This attribute contains operator defined additional participant information and is
    used when the elements defined elsewhere are not adequate.";
REGISTERED AS {attribute 24};

A.6.25 Operator specific1 number

operatorSpecific1Number   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.OperatorSpecific1Number;
    MATCHES FOR EQUALITY;
    BEHAVIOUR
    operatorSpecific1NumberBehaviour BEHAVIOUR
    DEFINED AS   " This attribute contains operator defined participant information and is used
    when the elements defined elsewhere are not adequate.";
REGISTERED AS {attribute 25};

A.6.26 Operator specific2 additional number

operatorSpecific2AdditionalNumber ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.OperatorSpecific2AdditionalNumber;
    MATCHES FOR EQUALITY;
    BEHAVIOUR
    operatorSpecific2AdditionalNumberBehaviour BEHAVIOUR
    DEFINED AS   " This attribute contains operator defined additional participant information and is
    used when the elements defined elsewhere are not adequate.";
REGISTERED AS {attribute 26};

A.6.27 Operator specific2 number

operatorSpecific2Number ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.OperatorSpecific2Number;
    MATCHES FOR EQUALITY;
    BEHAVIOUR
    operatorSpecific2NumberBehaviour BEHAVIOUR
    DEFINED AS   " This attribute contains operator defined participant information and is used
    when the elements defined elsewhere are not adequate.";
REGISTERED AS {attribute 27};

A.6.28   Operator specific3 additional number

operatorSpecific3AdditionalNumber ATTRIBUTE
        WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.OperatorSpecific3AdditionalNumber;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
        operatorSpecific3AdditionalNumberBehaviour BEHAVIOUR
        DEFINED AS   " This attribute contains operator defined additional participant information and is
        used when the elements defined elsewhere are not adequate.";
REGISTERED AS {attribute 28};

A.6.29   Operator specific3 number

operatorSpecific3Number ATTRIBUTE
        WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.OperatorSpecific3Number;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
        operatorSpecific3NumberBehaviour BEHAVIOUR
        DEFINED AS   " This attribute contains operator defined participant information and is used
        when the elements defined elsewhere are not adequate.";
REGISTERED AS {attribute 29};

A.6.30   Original called number

originalCalledNumber ATTRIBUTE
        WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.OriginalCalledNumber;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
        originalCalledNumberBehaviour BEHAVIOUR
        DEFINED AS   " This information element shall contain the telephone number of the original
        called party. This is the information, when using ISUP, that is sent in the forward direction when a
        call is redirected and identifies the original called party.";
REGISTERED AS {attribute 30};

A.6.31   Partial generation

partialGeneration   ATTRIBUTE
        WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.PartialGeneration;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
        partialGenerationBehaviour BEHAVIOUR
        DEFINED AS   "This attribute is included if the UMR output is partial. Included in the element is
        a field indicating the partial record number and the reason for partial output.
        The partial record number, is a sequential number which consecutively numbers the partial records
        in a specific call.";
REGISTERED AS {attribute 31};

A.6.32   Physical line code

physicalLineCode   ATTRIBUTE
        WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.PhysicalLineCode;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
        physicalLineCodeBehaviour BEHAVIOUR
        DEFINED AS "This information element shall be used to identify the physical line used by the calling
        subscriber. This element is used for customer care purposes and is only relevant in the case where
        multiple lines are used by a common DN.";
REGISTERED AS {attribute 32};

A.6.33 Progress

progress   ATTRIBUTE
        WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.Progress;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
        progressBehaviour BEHAVIOUR
        DEFINED AS   " This attribute describes an event which has occurred during the life of a call.
        The attribute contains a location value as well as the progress description. Progress information can
        be used e.g. for determining whether the subscriber shall be charged for the use of a
        supplementary service towards a non-ISDN user. Only the Progress indicator received from the far
        end is of relevance and should be used. In the case where more than one value is received only the
        last Progress indicator is used. The location and progress description values are defined in
        EN 300 403-1 [5].";
REGISTERED AS {attribute 33};

A.6.34 Received digits

receivedDigits   ATTRIBUTE
        WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.ReceivedDigits;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
        receivedDigitsBehaviour BEHAVIOUR
        DEFINED AS   "This attribute contains the digits dialled by the subscriber or sent by the
        subscriber terminal. Normally this information is only included for customer care purposes. It should
        however be noted that the use of functional signalling in ISDN as well as requirements to restrict
        this information, will require operator or manufacturer specific coding of this element. Alternatively
        functional information should be included in the supplementary service field.";
REGISTERED AS {attribute 34};

A.6.35 Record extensions

recordExtensions ATTRIBUTE
        WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.RecordExtensions;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
        recordExtensionBehaviour BEHAVIOUR
        DEFINED AS   " This attribute shall contain information elements that network operators and/ or
        manufacturers have added to the standard UMR. This information element contains a set of
        'management extensions' as defined in ITU-T Recommendation X.721 [18].";
REGISTERED AS {attribute 35};

A.6.36 Record Id

recordId ATTRIBUTE
        WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.RecordId;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
        recordIdBehaviour BEHAVIOUR
        DEFINED AS   " This attribute is used for audit trail purposes to check if all logged UMRs are
        transfered to the OS. It is a sequential number provided by the log object when the UMR is logged.";
REGISTERED AS {attribute 36};

A.6.37 Record type

recordType   ATTRIBUTE
        WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.RecordType;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
        recordTypeBehaviour BEHAVIOUR
        DEFINED AS   " This information element indicates the type of the UMR and it also indicates
        the way some of the following information elements are used.";
REGISTERED AS {attribute 37};

A.6.38 Redirecting number

redirectingNumber   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.RedirectingNumber;
    MATCHES FOR EQUALITY;
    BEHAVIOUR
    redirectingNumberBehaviour BEHAVIOUR
    DEFINED AS   "This attribute contains the telephone number of the party who has redirected the call. This is the information, when using ISUP, that is sent in the forward direction when a call is redirected, indicating the number from which the call was diverted. This number is identical to the original called number for a single diversion. In the case of a diverted call the Service User will be indicated by the redirecting number.";
REGISTERED AS {attribute 38};

A.6.39 Redirection number

redirectionNumber   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.RedirectionNumber;
    MATCHES FOR EQUALITY;
    BEHAVIOUR
    redirectionNumberBehaviour BEHAVIOUR
    DEFINED AS   "This attribute contains the telephone number of the party that the call shall be forwarded to. This is the information, when using ISUP, that is sent in the backward direction indicating the number towards which the call shall be re-routed or has been forwarded. The redirection number is identical to the diverted to number which can be either a forwarded to number or a deflected to number.";
REGISTERED AS {attribute 39};

A.6.40 Related call number

relatedCallNumber   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.RelatedCallNumber;
    MATCHES FOR EQUALITY;
    BEHAVIOUR
    relatedCallNumberBehaviour BEHAVIOUR
    DEFINED AS   "This attribute contains the Call identification number of an associated call record. This number is used for associating different call records generated in the same exchange.";
REGISTERED AS {attribute 40};

A.6.41 Service type

serviceType   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.serviceType;
    MATCHES FOR EQUALITY;
    BEHAVIOUR
    bearerServiceBehaviour BEHAVIOUR
    DEFINED AS   " This attribute contains the information on the bearer capability / tele service / basic service for a call or concerning a supplementary service. The bearer service coding shall be based on EN 300 403-1 [5]. The bearer service allocated to PSTN is 'audio 3,1 kHz'. The tele service element shall contain the high layer compatibility information, the coding shall be based on EN 300 403-1 [5]. The basic service coding shall be based on ETS 300 196 [2].";
REGISTERED AS {attribute 41};

A.6.42   Service user

serviceUser   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.ServiceUser;
    MATCHES FOR EQUALITY;
    BEHAVIOUR
    serviceUserBehaviour BEHAVIOUR
    DEFINED AS   "This attribute provides information of the party whose use of resources has
    been accounted for. The information provided in this element is a pointer to the party number
    provided elsewhere in the record. In the case where e.g. the UMR is generated on a transit
    exchange and no calling party number is available, this element will indicate that the service user is
    unknown.";
REGISTERED AS {attribute 42};

A.6.43   Standard extensions

standardExtensions ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.StandardExtensions;
    MATCHES FOR EQUALITY;
    BEHAVIOUR
    standardExtensionBehaviour BEHAVIOUR
    DEFINED AS   " This attribute shall contain standardized extensions that are added to the
    standard UMR. This field contains a set of 'management extensions' as defined in
    ITU-T Recommendation X.721 [18].";
REGISTERED AS {attribute 43};

A.6.44   Start time stamp

startTimeStamp   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.StartTimeStamp;
    MATCHES FOR EQUALITY;
    BEHAVIOUR
    startTimeStampBehaviour BEHAVIOUR
    DEFINED AS   " This attribute contains a time stamp for the start of the call. The start time is
    defined as either the seizure time for a non-answered call, when the exchange is ready for receiving
    digits or for an answered call, the time when a call is answered, i.e. the receipt of an answer
    message. For transit calls the start time stamp (seizure) will relate to the first message   received
    e.g. Initial Address Message (IAM).
    If the UMR is generated by an event concerning a supplementary service not related to a call, then
    this information element contains the time stamp for that event.
    Date and time values shall be derived from the exchange clock. This attribute includes year, month,
    day, hour, minute, second and centisecond.
    For partial outputs the start date time is the end time when the previous output was made.";
REGISTERED AS {attribute 44};

A.6.45   Supplementary service list

supplementaryServiceList   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.SupplementaryServiceList;
    MATCHES FOR EQUALITY;
    BEHAVIOUR
    supplementaryServiceBehaviour BEHAVIOUR
    DEFINED AS   " This attribute contains relevant information about the use of one or more
    supplementary services. For each recorded service this attribute contains a service code identifying
    the supplementary service and in addition information about the action taken. An optional time
    stamp is provided for time dependent charging of supplementary services. The time stamp is a
    duration time relative to the startTimeStamp and is recorded in centisecond.
    The supplementary service codes shall be based on ETS 300 738 [6].

For each service code information is provided indicating the action taken. Following actions are defined:

- Provision of supplementary service;
- Withdrawal of supplementary service;
- Registration of supplementary service;
- Erasure of supplementary service;
- Activation of supplementary service;
- Deactivation of supplementary service;
- Invocation of supplementary service;
- Disabling of supplementary service;
- Interrogation of supplementary service.

If provided by the network, actions can be made on supplementary service by the operator. In such a case the service user element in the UMR will indicate the operator as the initiator of the action.
In the case of functional signalling on ISDN further information of the supplementary service usage is provided by the optional functional information field. This field contains a set of 'management extensions' as defined by ITU-T Recommendation X.721 [18].";
REGISTERED AS {attribute 45};

A.6.46   Times of day

timesOfDay ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.TimesOfDay;
MATCHES FOR EQUALITY;
BEHAVIOUR
timesOfDayBehaviour BEHAVIOUR
DEFINED AS "This attribute specifies the times of the day at which the log will automatically generate a   file.";
REGISTERED AS {attribute 46};

A.6.47   Trunk group incoming

trunkGroupIncoming   ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.TrunkGroupIncoming;
MATCHES FOR EQUALITY;
BEHAVIOUR
trunkGroupIncomingBehaviour BEHAVIOUR
DEFINED AS   " This attribute contains the symbolic name of the trunk that is used by the incoming call as seen by the NE. If the calling subscriber is a local subscriber then this information element is not relevant.";
REGISTERED AS {attribute 47};

A.6.48   Trunk group outgoing

trunkGroupOutgoing   ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.TrunkGroupOutgoing;
MATCHES FOR EQUALITY;
BEHAVIOUR
trunkGroupOutgoingBehaviour BEHAVIOUR
DEFINED AS   " This attribute contains the symbolic name of the trunk that is used by the outgoing call as seen from the NE. If the called subscriber is a local subscriber then this information element is not relevant.";
REGISTERED AS {attribute 48};

A.6.49 UMR purpose

uMRPurpose   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.UMRPurpose;
    MATCHES FOR EQUALITY;
    BEHAVIOUR
    uMRPurposeBehaviour BEHAVIOUR
    DEFINED AS   "This attribute provides information to the OS on the reason for triggering of the
    record. In most networks the OS will be aware of the triggering conditions of the network and hence
    this information will not be required.";
REGISTERED AS {attribute 49};

A.6.50 Usage metering data identifier

usageMeteringDataId ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.UsageMeteringDataId;
    BEHAVIOUR
    usageMeteringDataIdBehaviour BEHAVIOUR
    DEFINED AS "This attribute uniquely identifies the usageMeteringData object.";;
REGISTERED AS {attribute 50};

A.6.51 User to user info counters

uUInfoCounters ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1UsageMeteringModule.UUInfoCounters;
    MATCHES FOR EQUALITY;
    BEHAVIOUR
    uUInfoCountersBehaviour BEHAVIOUR
    DEFINED AS   " This attribute shall contain the User To User info counters. The counters shall
    indicate the total number of octets and/or messages transmitted or received by the subscriber using
    the User to user signalling supplementary service. Separate counters can be assigned   to   the   3
    different User to user signalling services. ";
REGISTERED AS {attribute 51};

A.7 Actions

A.7.1 Create file

createFile   ACTION
    BEHAVIOUR
    createFileBehaviour   BEHAVIOUR
    DEFINED AS " Receipt of this action causes the creation of a file containing the concatenated
    content of all the records currently contained in the log.
    The records shall be deleted from the log upon successful creation of the file.
As action input a file name can be given by the OS. If no file name is entered, the NE will generate the file
name.
    The action response contains the name of the created file." ;;
    MODE CONFIRMED;
    WITH INFORMATION SYNTAX   ASN1UsageMeteringModule. FileName;
    WITH REPLY SYNTAX   ASN1UsageMeteringModule.CreatedFile;
REGISTERED AS { action 1};

A.8   Notifications

Unless otherwise stated, all notifications shall be sent via the M-EVENT-REPORT operation in confirmed mode.

A.8.1   Block record notification

blockRecordNotification   NOTIFICATION
      BEHAVIOUR
      blockRecordNotificationBehaviour BEHAVIOUR
      DEFINED AS   "This notification is emitted whenever one of the triggering events described in the object class template occurs. The notification consists of a concatenation of stripped records; i.e. the UMRs without the log overhead (Log Record Id, Managed Object Class and   Instance and Logging Time).";
      WITH INFORMATION SYNTAX ASN1UsageMeteringModule.BlockRecordInfo;
REGISTERED AS {notification 1};

A.8.2   File creation notification

fileCreationNotification   NOTIFICATION
      BEHAVIOUR
      fileCreationNotificationBehaviour   BEHAVIOUR
      DEFINED AS " This notification is emitted whenever the fileGeneratingLog creates a new file in order to let the managing system know that the file is available for retrieval.";
      WITH INFORMATION SYNTAX   ASN1UsageMeteringModule.FileCreationInfo;
REGISTERED AS {notification 2};

A.8.3   UMR notification

usageMeteringRecordNotification   NOTIFICATION
      BEHAVIOUR
      usageMeteringRecordNotificationBehaviour BEHAVIOUR
       DEFINED AS
      "This notification is issued to transmit a UMR. The 'immediate notification' may be used by the Call Forwarding Discriminator to select records requiring real time handling by the OS.";
      WITH INFORMATION SYNTAX ASN1UsageMeteringModule.RecordContent;
REGISTERED AS {notification 3};

A.9   Name bindings

blockGeneratingLog-managedElement NAME BINDING
      SUBORDINATE OBJECT CLASS blockGeneratingLog;
      NAMED BY SUPERIOR OBJECT CLASS
      "ITU-T Recommendation M.3100 [7] ⎮ 1992": managedElement AND SUBCLASSES;
      WITH ATTRIBUTE "Recommendation X.721 | ISO/IEC 10165-2: 1992": logId;
      CREATE;
      DELETE DELETES-CONTAINED-OBJECTS;
REGISTERED AS {nameBinding 1};

fileGeneratingLog-managedElement NAME BINDING
      SUBORDINATE OBJECT CLASS   fileGeneratingLog;
      NAMED BY SUPERIOR OBJECT CLASS
      "ITU-T Recommendation M.3100 [7] ⎮ 1992": managedElement AND SUBCLASSES;
      WITH ATTRIBUTE "Recommendation X.721 | ISO/IEC 10165-2: 1992": logId;
      CREATE;
      DELETE DELETES-CONTAINED-OBJECTS;
REGISTERED AS {nameBinding 2};

simpleUsageMeteringControl-managedElement NAME BINDING
    SUBORDINATE OBJECT CLASS simpleUsageMeteringControl;
    NAMED BY SUPERIOR OBJECT CLASS
    "ITU-T Recommendation M.3100 [7] │ 1992": managedElement AND SUBCLASSES;
    WITH ATTRIBUTE "Recommendation X.742 | ISO/IEC 10164-10: 1995": controlObjectId;
    CREATE;
    DELETE DELETES-CONTAINED-OBJECTS;
REGISTERED AS {nameBinding 3};

usageMeteringData-managedElement NAME BINDING
    SUBORDINATE OBJECT CLASS usageMeteringData;
    NAMED BY SUPERIOR OBJECT CLASS
    "ITU-T Recommendation M.3100 [7] │ 1992": managedElement AND SUBCLASSES;
    WITH ATTRIBUTE usageMeteringDataId;

REGISTERED AS {nameBinding 4};

usageMeteringLogRecord-fileGeneratingLog NAME BINDING
    SUBORDINATE OBJECT CLASS usageMeteringLogRecord AND SUBCLASSES;
    NAMED BY SUPERIOR OBJECT CLASS fileGeneratingLog
    WITH ATTRIBUTE "Recommendation X.721 | ISO/IEC 10165-2: 1992": logRecordId;

REGISTERED AS {nameBinding 5};

usageMeteringLogRecord-blockGeneratingLog NAME BINDING
    SUBORDINATE OBJECT CLASS usageMeteringLogRecord AND SUBCLASSES;
    NAMED BY SUPERIOR OBJECT CLASS blockGeneratingLog
    WITH ATTRIBUTE "Recommendation X.721 | ISO/IEC 10165-2: 1992": logRecordId;

REGISTERED AS {nameBinding 6};

A.10   ASN.1 defined types module

-- For a better understanding of this module please refer to the definitions of record types and record
-- elements given in annex B.

-- **Rules of extensibility**
-- The following types will be indicated as being extensible:
-- ENUMERATED;
-- named INTEGER;
-- named BIT STRING;
-- tagged SET;
-- tagged SEQUENCE;
-- tagged CHOICE;
-- Under the rules of extensibility new enumeration's (for ENUMERATED types), new bit name
-- assignments (for named BIT STRING types), new named numbers (for named INTEGER types), and
-- new tagged elements (for tagged SET, SEQUENCE, and CHOICE types) may be added in future
-- versions of this Recommendation.
-- When processing information in a System Management Protocol (SMAP) PDU, the accepting SMAP
-- machine shall ignore:
-- enumeration's not recognized;
-- unrecognized named numbers;
-- unrecognized named bits;
-- unrecognized tagged elements of sets, sequences, and choices.

```
ASN1UsageMeteringModule {ccitt(0) identified-organization(4) etsi(0)
        usageMeteringInformationManagement (819) informationModel(0) asn1Module(2)
        asn1UsageMeteringModule(0)}


DEFINITIONS IMPLICIT TAGS        ::=
BEGIN
-- EXPORTS everything
IMPORTS


ManagementExtension    FROM Attribute-ASN1Module { joint-iso-ccitt ms(9) smi (3) part2 (2)
                                                       asn1Module(1) 1}
---see ITU-T Recommendation X.721 [18]


BasicService         FROM Basic-Service-Elements { ccitt identified-organization etsi(0) 196 basic-service-
                        elements(8)}
---see ETSI Standard ETS 300 196 [2]


NameType FROM ASN1DefinedTypesModule {ccitt(0) recommendation(0) m(13) gnm(3100)
                        informationModel(0) asn1Modules(2) asn1DefinedTypesModule(0)};
---see ITU-T Recommendation M.3100 [7]


-- OBJECT IDENTIFIERS
informationModel OBJECT IDENTIFIER::= { ccitt(0) identified-organization(4) etsi(0)
                        usageMeteringInformationManagement(819) informationModel(0)}
managedObjectClass OBJECT IDENTIFIER::= {informationModel managedObjectClass(3)}
package OBJECT IDENTIFIER::= {informationModel package(4)}
nameBinding OBJECT IDENTIFIER::= {informationModel nameBinding(6)}
attribute OBJECT IDENTIFIER::= {informationModel attribute(7)}
action OBJECT IDENTIFIER::= {informationModel action(9)}
notification OBJECT IDENTIFIER::= {informationModel notification(10)}
behaviour OBJECT IDENTIFIER::= {informationModel behaviour(11)}


-- BLOCK CONTENTS


BlockRecordInfo          ::= SEQUENCE            {
        blockHeaderRecord           [0]     BlockHeaderRecord       OPTIONAL,
        usageRecords                [1]     SEQUENCE OF RecordContent }


BlockHeaderRecord            ::= SEQUENCE      {
        exchangeInfo                [0]     ExchangeInfo OPTIONAL,
        sequenceNumber       [1]     SequenceNumber,
        reasonForOutput      [2]     ReasonForOutput OPTIONAL,
        blockExtensions      [3]     ManagementExtensions OPTIONAL }

-- FILE CONTENTS


UsageMeteringRecordFile      ::=     SEQUENCE{
        header           FileHeaderRecord,
        body         SEQUENCE OF RecordContent ,
        trailer       Trailer       OPTIONAL}


FileHeaderRecord         ::=     SEQUENCE{
        productionDateTime          [0]     StartDateTime,
        exchangeInfo                [1]     ExchangeInfo,
        fileName             [2]     FileName,
        reasonForOutput             [3]     ReasonForOutput,
        firstRecordId               [4]     RecordId,
        fileHeaderExtensions        [5]     ManagementExtensions OPTIONAL}
```

```
Trailer                          ::=     SEQUENCE{
     numberOfRecords          [0]     INTEGER,
     lastRecordId             [1]     RecordId }

-- USAGE METERING RECORDS

RecordContent                    ::=     CHOICE    {
callRecord                       [0]     CallRecord,
supplServiceInputRecord          [1]     SupplServiceInputRecord,
standardAdditionalRecordTypes    [2]     ManagementExtensions,
additionalRecordTypes            [3]     ManagementExtensions }

CallRecord               ::=     SEQUENCE       {
     recordType               [0]     RecordType,
     startTimeStamp           [1]     StartTimeStamp,
     participantInfo          [2]     ParticipantInfo,
     serviceType              [3]     ServiceType,
     serviceUser              [4]     ServiceUser,
     callIdentificationNumber [5]     CallIdentificationNumber,
     recordId                 [6]     RecordId                    OPTIONAL,
     dataValidity             [7]     DataValidity                OPTIONAL,
     networkProviderId        [8]     NetworkProviderId           OPTIONAL,
     supplementaryServiceLis  [9]     SupplementaryServiceList    OPTIONAL,
     immediateNotification    [10]    ImmediateNotification       OPTIONAL,
     cause                    [11]    Cause                       OPTIONAL,
     iNServiceInformationList [12]    INServiceInformationList    OPTIONAL,
     iNSpecificInformation    [13]    INSpecificInformation       OPTIONAL,
     partialGeneration        [14]    PartialGeneration           OPTIONAL,
     exchangeInfo             [15]    ExchangeInfo                OPTIONAL,
     relatedCallNumber        [16]    RelatedCallNumber           OPTIONAL,
     uMRPurpose               [17]    UMRPurpose                  OPTIONAL,
     additionalParticipantInfo [18]  AdditionalParticipantInfo   OPTIONAL,
     callingPartyCategory     [19]    CallingPartyCategory        OPTIONAL,
     callingPartyType         [20]    CallingPartyType            OPTIONAL,
     chargingInformation      [21]    ChargingInformation         OPTIONAL,
     progress                 [22]    Progress                    OPTIONAL,
     accessDelivery           [23]    AccessDelivery              OPTIONAL,
     trunkGroupOutgoing       [24]    TrunkGroupOutgoing          OPTIONAL,
     trunkGroupIncoming       [25]    TrunkGroupIncoming          OPTIONAL,
     fallbackService          [26]    FallbackService             OPTIONAL,
     callDuration             [27]    CallDuration                OPTIONAL,
     uUInfo                   [28]    UUInfoCounters              OPTIONAL,
     standardExtensions       [29]    StandardExtensions          OPTIONAL,
     recordExtensions         [30]    RecordExtensions            OPTIONAL }
```

```
upplServiceInputRecord  ::=    CallRecord
      (WITH COMPONENTS {
      recordType              PRESENT,
      startTimeStamp                  PRESENT,
      participantInfo                 PRESENT,
      serviceType             PRESENT,
      serviceUser             PRESENT,
      callIdentificationNumber PRESENT,
      recordId                OPTIONAL,
      dataValidity            OPTIONAL,
      networkProviderId       OPTIONAL,
      supplementaryServiceList        PRESENT,
      immediateNotification           OPTIONAL,
      cause                   OPTIONAL,
      iNServiceInformationList OPTIONAL,
      iNSpecificInformation           OPTIONAL,
      exchangeInfo                    OPTIONAL,
      uMRPurpose                      OPTIONAL,
      additionalParticipantInfo OPTIONAL,
      callingPartyCategory            OPTIONAL,
      callingPartyType        OPTIONAL,
      chargingInformation             OPTIONAL,
      standardExtensions              OPTIONAL,
      recordExtensions        OPTIONAL })
```

-- DEFAULT VALUE DEFINITION
defaultCreationTrigger CreationTriggerList ::= {seizure (0)}

--   SUPPORTING PRODUCTIONSAccessDelivery   ::=   BIT STRING {
          setupMessageGenerated (0)} (SIZE(8))
--   Bit 0 (setupMessageGeneration) has the following meaning:
--   0   No set-up message generated
--   1   Set-up message generated
--   Bit 1 to 7 are not used.
--   See ETS 300 356-1 [3].

AccountCodeInput   ::=   OCTET STRING (SIZE (1..18))
--   This type is used to represent information, which is provided by the subscriber necessary for
--   use by some services. Coding is in accordance with Generic digits ETS 300 356-1 [3].
--   a)   bits 876:   Encoding scheme
--   000   BCD even (even number of digits)
--   001   BCD odd (odd number of digits)
--   010   IA5 character
--   011   Binary coded
--   100
--   ...   spare
--   111
--
--   b)   bits 54321: Type of digits
--   00000 reserved for account code
--   00001   reserved for autorization code
--   00010   reserved for private network travelling class mark
--   00011   reserved for business communication
--   00100
--   ...   spare for international use
--   01111
--   10000
--   ...   spare for national use
--   11111
--

```
--      c)      Digits:
--              Coding in accordance to the coding scheme and type of digits.


AdditionalParticipantInfo        ::=     SET {
physicalLineCode                 [0]     PhysicalLineCode OPTIONAL,
receivedDigits                   [1]     ReceivedDigits OPTIONAL,
operatorSpecific1AdditionalNumber [2]    OperatorSpecific1AdditionalNumber OPTIONAL,
operatorSpecific2AdditionalNumber [3]    OperatorSpecific2AdditionalNumber OPTIONAL,
operatorSpecific3AdditionalNumber [4]    OperatorSpecific3AdditionalNumber OPTIONAL}


Amount                          ::=      SEQUENCE {
                        currencyAmount   [0]     NumberOfUnits,
                        multiplier       [1]     Multiplier}


AutomaticRecordDeletion::=       BOOLEAN


BearerService           ::=      SEQUENCE {
        capability      ENUMERATED {
                speech (0),
                audio3dot1kHz (1),
                uni64 (2),
                uni64withT-A (3),
                multipleRate (4),
                packetModeB-Ch (5),
                all (6) },
        multiplier INTEGER (2..30) OPTIONAL}
--      Multiplier present only if capability = multipleRate


CallDuration            ::=      SET {
        conversationTime        [0]     ConversationTime        OPTIONAL,
        durationTimeACM         [1]     DurationTimeACM                 OPTIONAL,
        durationTimeB-Answer    [2]     DurationTimeB-Answer    OPTIONAL,
        durationTimeNoB-Answer  [3]     DurationTimeNoB-Answer  OPTIONAL }


CalledPartyNumber               ::=      Number


CallIdentificationNumber  ::=    OCTET STRING
--      Octet string identifying the call.


CallingPartyCategory            ::=      BIT STRING(SIZE(8))
--      See ETS 300 356-1 [3] subclause 3.9.
CallingPartyNumber              ::=      Number
CallingPartyNumberNotScreened   ::=      Number


CallingPartyType        ::=      ENUMERATED {
        analogue (0),
        customerLink (1),      --      2Mbit/s PSTN digital access
        basicAccess (2),
        primaryRateAccess (3) }


Cause                   ::=      SEQUENCE {
        causeValue CauseValue,
        location        Location}


CauseValue                      ::=      BIT STRING (SIZE(8))
--      Coded according to ITU-T Recommendation Q.850 [11]: Table 1/Q.850


ChargedDirectoryNumber          ::=      Number
```

```
ChargingInformation           ::= CHOICE {
      recordedCurrency [0]    RecordedCurrency,
      recordedUnitsList [1]   RecordedUnitsList,
      freeOfCharge         [2]    NULL,
      chargeInfoNotAvailable [3]  NULL}
```
--   Charging information provided is related to the recorded charges for the usage at the time of
--   UMR generation, see ETS 300 182 [1] AOC-E.

```
ChargedParticipant            ::=   ParticipantType
ConversationTime     ::=   Duration

Count                         ::=   OCTET STRING (SIZE (1..3))
```
--   A maximum 3 byte counter.

```
CreatedFile        ::=   FileName


CreationTriggerList           ::=   SET OF CreationTrigger

CreationTrigger               ::=   ENUMERATED{
            seizure                       (0),
            firstDigitReceived            (1),
            aCMReceived                   (2),
            b-AnswerReceived              (3),
            supplementaryServiceInvocation    (4),
            supplementaryServiceInput     (5)}
```
--   ACMreceived is defined as the receipt of ACM for an external call. In the case of a terminating
--   exchange the event ACM received will occur when the ACM is normally generated. This is either --
          when a B-subscriber port is free (early ACM) or when a B-subscriber terminal is free (late ACM).
--   The choice between early and late ACM is a network option in the terminating network. For local
 --   calls a corresponding time shall be used.

```
DataValidity                  ::=   ENUMERATED{
            unreliableData          (0)}

Duration                      ::=   OCTET STRING (SIZE(1..3))
```
--   Duration in centiseconds. Maximum value in centiseconds is approx. 46 hours.

```
DurationTimeACM               ::=   Duration

DurationTimeB-Answer          ::=   Duration

DurationTimeNoB-Answer            ::=   Duration

ExchangeInfo                  ::=   SET {
      exchangeID      [0]   ExchangeID         OPTIONAL,
      softwareVersion [1]   SoftwareVersion    OPTIONAL}

ExchangeID                    ::=   VisibleString (SIZE (1..11))

FallbackService               ::=   SEQUENCE {
      teleService     [0]   TeleService        OPTIONAL,
      bearerService   [1]   BearerService      OPTIONAL }

FileName           ::=   NameType

FileCreationInfo              ::=   SEQUENCE{
      fileName          FileName,
      reasonForOutput   ReasonForOutput}
```

```
ImmediateNotification          ::=     BOOLEAN

INServiceInformationList ::=    SEQUENCE OF INServiceInformation

INServiceInformation           ::=     SEQUENCE {
        iNServiceCode                  [0] INServiceCode,
        queueInfo              [1] QueueInfo              OPTIONAL,
        serviceSpecificINInformation   [2] OCTET STRING        OPTIONAL }

INSpecificInformation     ::=     SET{
        INpersonalUserId       [0] PersonalUserId         OPTIONAL,
        chargedParticipant     [1] ChargedParticipant           OPTIONAL,
        chargedDirectoryNumber [2] ChargedDirectoryNumber   OPTIONAL,
        percentageToBeBilled          [3] PercentageToBeBilled         OPTIONAL,
        accountCodeInput       [4] AccountCodeInput         OPTIONAL}

INServiceCode                  ::=     OCTET STRING (SIZE (2))

Location              ::=    INTEGER {
        user                   (0),
        localUserPrivateNetwork (1),
        localUserPublicNetwork  (2),
        transitNetwork               (3),
        remoteUserPublicNetwork      (4),
        remoteUsePrivateNetwork      (5),
        internationalNetwork         (7),
        beyondInterworkPoint         (10) }
--      See ITU-T Recommendation Q.850 [11]: subclause 2.2.3

MaxBlockSize                   ::=     INTEGER (0..32767)

MaxTimeInterval        ::=     INTEGER (0..32767)
--      time interval in seconds.

ManagementExtensions           ::=     SET OF ManagementExtension
--      A set of network/manufacturer specific extensions.

NetworkProviderId ::=     VisibleString (SIZE (1..11))

Multiplier                ::=     ENUMERATED {
                oneThousandth          (0),
                oneHundredth           (1),
                oneTenth       (2),
                one            (3),
                ten            (4),
                hundred        (5),
                thousand       (6)}

Number                    ::=     OCTET STRING (SIZE (1 .. 14))
--      This type is used to represent a number for addressing purposes. The used coding is similar to
--      that used for numbers in ETS 300 356-1 [3]. It is composed of
--      a) one octet for odd/even indicator and nature of address indicator
--      b) one octet for numbering plan indicator
--      c) digits of the address encoded as TBCD String
--         a)
--                 bits 8:        Odd/even indicator
--                 0      even number of address signals
--                 1 odd number of address signals
```

```
--                      bits 7654321: Natur of address indicator
--                  0000000         spare
--                  0000001         subscriber number
--                  0000010         unknown
--                  0000011         national (significant) number
--                  0000100         international number
--                  0000101     ⎤
--                  to          ⎬   spare
--                  1101111     ⎦
--                  1110000     ⎤
--                  to          ⎬   reserved for national use
--                  1111110     ⎦
--                  1111111         spare
--          b)
--                      bits 765: numbering plan indicator
--                  000             spare
--                  001             ISDN(Telephony) Number Plan (Rec CCITT E.164)
--                  010             spare
--                  011             data numbering plan (ITU-T Recommendation X.121)
--                  100             telex numbering plan (ITU-T Recommendation F.69)
--                  101             reserved for national use
--                  110             reserved for national use
--                  111             spare
--
--          c) The following octets representing digits of an address encoded as a TBCD-STRING.
--   TBCD-STRING          ::=     OCTET STRING
--   This type (Telephony Binary Coded Decimal String) is used to represent digits from 0
--   through 9, *, #, a, b, c, two digits per octet, each digit encoded 0000 to 1001 (0 to 9), 1010 (*),
--   1011(#), 1100 (a), 1101 (b) or 1110 (c); 1111 (end of pulsing signal-ST); 0000 is used as a filler
--   when there is an odd number of digits.
--   The most significant address signal is sent first. Subsequent address signals are sent in
--   successive 4-bit fields.

NumberOfUnits                    ::=     INTEGER (0..16777215)

OperatorSpecific1AdditionalNumber  ::=   VisibleString

OperatorSpecific2AdditionalNumber  ::=   VisibleString

OperatorSpecific3AdditionalNumber  ::=   VisibleString

OperatorSpecific1Number          ::=     Number

OperatorSpecific2Number          ::=     Number

OperatorSpecific3Number          ::=     Number

OriginalCalledNumber             ::=     Number

ParticipantId            ::=     CHOICE {
        callingPartyNumber          [0]     CallingPartyNumber,
        calledPartyNumber       [1]     CalledPartyNumber,
        redirectingNumber           [2]     RedirectingNumber,
        redirectionNumber           [3]     RedirectionNumber,
        originalCalledNumber        [4]     OriginalCalledNumber,
        callingPartyNumberNotScreened [5]   CallingPartyNumberNotScreened,
        operatorSpecific1Number     [6]     OperatorSpecific1Number,
        operatorSpecific2Number     [7]     OperatorSpecific2Number,
        operatorSpecific3Number     [8]     OperatorSpecific3Number}
```

```
ParticipantInfo              ::=     SET OF ParticipantId

ParticipantType              ::=     ENUMERATED {
          callingPartyNumber              (0),
          calledPartyNumber               (1),
          redirectingNumber               (2),
          redirectionNumber               (3),
          originalCalledNumber            (4),
          callingPartyNumberNotScreened   (5),
          operatorSpecific1Number         (6),
          operatorSpecific2Number         (7),
          operatorSpecific3Number         (8),
          operator                 (9),
          unknown                  (10)}

PartialRecordNumber          ::= BIT STRING (SIZE (8))
--     A sequential number in the range 0-255 indicating the partial record generated for the same call

PartialGeneration       ::= SET {
       partialRecordNumber    [0]    PartialRecordNumber,
       partialRecordReason    [1]    PartialRecordReason}

PartialRecordReason          ::= ENUMERATED {
          timeLimit               (0),
          serviceChange              (1),
          overflow                (2),
          networkInternalReasons  (3),
          lastUMR                 (4)
          }

PercentageToBeBilled         ::=     INTEGER (0..99)

PersonalUserId               ::=     OCTET STRING (SIZE (1 .. 10))
--     This type is used to represent the Personal User Id. For UMT the Personal User Id is defined
--     according to E.212 as a International Mobil Station Identity (IMSI). Accordingly only numerical
--     characters (0-9) are used.
--     The PersonalNumber type does however not exclude the use of other formats. These formats
--     can be indicated in the numbering plan indicator.
--     The type is composed of:
--     a) one octet for odd/even indicator and numbering plan indicator
--     b) digits of the address encoded as TBCD String
--          a)
--               bits 8:       Odd/even indicator
--               0      even number of address signals
--               1      odd number of address signals
--               bits 765: numbering plan indicator
--               000         E.212 (IMSEI)
--               001         ISDN(Telephony) Number Plan (Rec CCITT E.164)
--               010         spare
--               011         spare
--               100         spare
--
--          b) The following octets representing the personal number encoded as a TBCD-STRING.
--     TBCD-STRING    ::=    OCTET STRING
--     This type (Telephony Binary Coded Decimal String) is used to represent digits from 0
--     through 9, *, #, a, b, c, two digits per octet, each digit encoded 0000 to 1001 (0 to 9), 1010 (*),
--     1011(#), 1100 (a), 1101 (b) or 1110 (c); 1111 (end of pulsing signal-ST); 0000 is used as a filler
--     when there is an odd number of digits.
--     The most significant address signal is sent first. Subsequent address signals are sent in
--     successive 4-bit fields.
```

```
PhysicalLineCode              ::=      VisibleString

Progress                 ::=       SEQUENCE {
        description   ProgressDescription,
        location                 Location }

ProgressDescription           ::=       INTEGER {
        notEndToEndISDN             (1),
        nonISDNDestination          (2),
        nonISDNOrigination          (3),
        returnedToISDN          (4),
        interworkingServiceChange   (5),
        inBandInfo              (8) }
--      See EN 300 403-1 [5]

QueueInfo         ::=     SEQUENCE{
        queueTimeStamp [0]     StartDateTime,
        queueDuration          [1]     Duration}

ReasonForOutput        ::=      ENUMERATED {
        absoluteTimeEvent           (0),
        maxBlockSizeReached         (1),
        maxTimeIntervalElapsed (2),
        internalSizeLimitReached(3),
        oSAction                (4)}

ReceivedDigits                ::=      OCTET STRING (SIZE (1 .. 18))
--      This type is used to represent digits input by the subscriber. It is composed of
--      a) one octet for odd/even indicator
--      b) digits of the address encoded as TBCD String
--          a)
--          bits 8:       Odd/even indicator
--              0      even number of address signals
--              1 odd number of address signals
--
--          b) The following octets representing the received digits encoded as a TBCD-STRING.
--      TBCD-STRING           ::=      OCTET STRING
--      This type (Telephony Binary Coded Decimal String) is used to represent digits from 0
--      through 9, *, #, a, b, c, two digits per octet, each digit encoded 0000 to 1001 (0 to 9), 1010 (*),
--      1011(#), 1100 (a), 1101 (b) or 1110 (c); 1111 (end of pulsing signal-ST); 0000 is used as a filler
--      when there is an odd number of digits.
--      The most significant address signal is sent first. Subsequent address signals are sent in
--      successive 4-bit fields.

RecordedCurrency        ::=      CHOICE {
        currency        [0]     IA5String (SIZE (1..10)),
        amount              [1]     Amount    }

RecordExtensions        ::=      ManagementExtensions

RecordedUnitsList       ::=      SEQUENCE SIZE (1.. 32) OF RecordedUnits

RecordedUnits                 ::=      SEQUENCE{
        units  CHOICE {
        recordedNumberOfUnits [0]     NumberOfUnits,
        notAvailable                [1]     NULL },
        recordedTypeOfUnits     INTEGER(1..16) OPTIONAL }

RecordId     ::=     Count
-- The record id is a sequence number that is incremented for each logged UMR. It is generated by the
-- log
```

```
RecordType              ::=     INTEGER {
            call (0),
            supplServiceInputRecord(1) }
RedirectingNumber               ::=     Number

RedirectionNumber               ::=     Number

RelatedCallNumber               ::=     CallIdentificationNumber

ServiceType ::= SEQUENCE{
                    basicService    [0]     BasicService    OPTIONAL,
                    teleService     [1]     TeleService     OPTIONAL,
                    bearerService   [2]     BearerService   OPTIONAL }

ServiceUser             ::=     ParticipantType

SequenceNumber          ::=     Count
--      The record block sequence number is incremented by one for each block generation. This
--      number is locally generated by the exchange.

SoftwareVersion         ::=     VisibleString (SIZE(1..12))

StandardExtensions              ::=     ManagementExtensions

StartTimeStamp          ::=     CHOICE {
            answerTime      [0]             StartDateTime,
            seizureTime     [1]             StartDateTime,
--      For calls a choice between seizure time or answer time
--      is dependent on the occurrence of a B-answer (ANM).
            partialTime  [2]                StartDateTime,
--      Partial time is used for partial records.
            eventTime    [3]                StartDateTime}
--      Event time is used in connection with supplementary service input records.

StartDateTime                   ::=     OCTET STRING (SIZE(7))
--      YYMMDDHHmmSSCC (Year, Month, Day, Hour, Minute, Second, Centisecond),
--      each field one digit, two digits per octet, the digits 0 through 9, encoded as
--      0000 to 1001 "hstring". 1st digit in the LSB.

SupplementaryServiceList                    ::= SEQUENCE OF SupplementaryService

SupplementaryService            ::= SEQUENCE {
            supplementaryServiceCode        [0]     SupplementaryServiceCode,
            supplementaryAction             [1]     SupplementaryAction,
            supplementaryTimeStamp          [2]     Duration OPTIONAL,
            functionalInformation           [3]     OCTET STRING OPTIONAL }

SupplementaryServiceCode    ::= OCTET STRING (SIZE (2))
--      see ETS 300 738 [6]

SupplementaryAction             ::= ENUMERATED {
            provision           (0),
            withdrawal          (1),
            registration        (2),
            erasure             (3),
            activation          (4),
            deactivation        (5),
            invocation          (6),
            disabling           (7),
            interrogation               (8)}
```

```
TeleService                ::=     BIT STRING (SIZE(8))
--      See EN 300 403-1 [5]


TrunkGroupIncoming         ::=     TrunkGroupId


TrunkGroupOutgoing         ::=     TrunkGroupId


TrunkGroupId               ::=     SEQUENCE {
        trunkGroupId       [0] NameType,
        trunkId            [1] NameType      OPTIONAL,
        pCMId              [2] NameType      OPTIONAL,
        channelNumber      [3] INTEGER       OPTIONAL}


TimesOfDay                 ::=     OCTET STRING (SIZE(2))
--      HHmm (Hours, Minutes)
--      each field one digit, two digits per octet, the digits 0 through 9, encoded as
--      0000 to 1001 "hstring". 1st digit in the LSB.


UsageMeteringDataId        ::=     NameType


UMRPurpose                 ::=     ENUMERATED {
        billing            (0),
        accounting         (1),
        billingAndAccounting  (2),
        operatorSpecific1  (3),
        operatorSpecific2  (4),
        operatorSpecific3  (5)}


UUInfoCounters                     ::= SET {
        uu1Info            [0]     UUxInfo   OPTIONAL,
        uu2Info            [1]     UUxInfo   OPTIONAL,
        uu3Info            [2]     UUxInfo   OPTIONAL}


UUxInfo                            ::= SET {
        receivedMessages [0]   Count       OPTIONAL,
        transmittedMessages  [1]   Count       OPTIONAL,
        receivedOctets       [2]   Count       OPTIONAL,
        transmittedOctets [3]  Count       OPTIONAL}


END -- end of ASN1DefinedTypesModule
```

Annex B (normative):   Usage metering records

B.1   General

This clause includes a specification of the record types and the information elements valid for inclusion in the UMR. To enable for a more flexible formatting of the UMR, dynamic encoding rules shall be adopted. The rules imply that the UMR and each information element has a tag and length parameter for identifying the type and length of the information.

The main advantage of this approach is that only relevant data is generated. To enhance this feature it shall be possible using Man Machine Language (MML) commands to control the number of information elements in the UMR. The control of the number of information elements is not included in this I-ETS.

B.1.1   Use of record types

As the records may be generated under different conditions and therefore may also include different information elements, specific record types have been defined. The following two record types are defined for this I-ETS:

-       Call;
-       Supplementary service input record.

Two extra types are however provided so that standardized (standardAdditionalTypes) or operator specific (additionalRecordTypes) types can be added. The record type may have impact on the way the OS interprets the information elements included in the record. The control to select from the potential recordable events, the events for which a record should be generated, is outlined in subclause 6.1. It should be noted that the absence of certain trigger criteria can lead to the exclusion of a record type as generation is dependent on the criteria selected.

B.1.2   Partial records

In order to increase the security of the recording process and to simplify post-processing, it may be desirable to generate a sequence of call records to describe the service usage. In the case of connections of extended duration, loss of a single record may result in an unacceptable loss of revenue. If a record is only produced after extended duration, employment of credit checking by the billing system will be impossible. The periodic timer provided for the generation of partial UMRs is outlined in subclause 6.1.

All of the records defined in this I-ETS are of variable length and some are potentially unlimited in size. However, due to internal limitations in the Network Element Function (NEF), partial records may be required to circumvent internal resource limitations.

All partial records for the same call shall contain the same call identification number and shall be ordered via a running sequence number. The time stamps involved shall apply to the individual partial records rather than the call as a whole i.e. the "end" time stamp (StartTimeStamp + duration) of a record shall coincide with the "start" time stamp of the next. Each time a new partial record is created the reason for partial generation may be included in the partial generation element. The partial records generated may repeat each of the non-varying fields contained in the initial record. Alternatively, a reduced partial record may be generated which includes only those fields required to identify the initial record together with the field(s) that actually change.

B.1.3   Use of supplementary services

There are basically two kinds of supplementary service actions, call related and non-call related. The non-call related action is recorded in the supplementary service input type record. For the call related supplementary action the call record type is used. Supplementary services that are not time or duration dependent for charging will not include the optional timestamp.

B.2 Record contents

The following table describes the contents of each of the record types defined in this I-ETS.

It should be noted that the elements are ordered in the UMR as indicated in the table. The mandatory elements are grouped in the first part of the UMR and will therefore be easy to recognize as a fixed part of the record. To enable the OS to access and retrieve the UMR data elements from the fileGeneratingLog, each of the above elements are defined as attributes in clause A.6. For a description of the elements please refer to the defined by statements of that subclause.

Each element in the table contains the name of the information element and a key indicating whether or not the field is mandatory. The key has the following meaning:

-     This element is not relevant for this record type.
- M   This element is mandatory and always present.
- C   This element is only available under certain conditions. Under these conditions the field is mandatory.
- O   This element is optional and configurable either via additional Telecommunications Management Network (TMN) MFs
or using MML commands. For the avoidance of doubt, optional does not mean that the parameter is not supported by the NE.

Table B.1: Contents of the record types

Information element	Call	Supplementary Service Input
record type	M	M
start time stamp	M	M
participant Info - calling party number - called party number - redirecting number - redirection number - original called number - calling party number not screened - operator specific1 number - operator specific2 number - operator specific3 number	M	M
service Type	M	M
service User	M	M
call identification number	M	M
record id	O	O
data Validity	C	C
networkProviderId	C	C
supplementary service List	C	M
immediate notification	C	C
cause	C	C
IN Service Information List - IN service code - queue info - service specific IN information	C	C
iN Specific information - personal user identification - charged participant - charged DN - percentage to be billed - account code input	C	C
partial generation	C	-
exchange Info	O	O
related call number	O	-
uMR purpose	O	O
additional participant Information - physical line code - received digits - operator specific1 additional number - operator specific2 additional number - operator specific3 additional number	O	O
calling party category	O	O
calling party type	O	O
charging information	O	O
progress	O	-
access delivery	O	-
trunk group outgoing	O	-
trunk group incoming	O	-
fallback service	O	-
call Duration - conversation time - duration time ACM - duration time B-Answer - duration time No B-Answer.	C	-
user to user info counter	O	-
standard extensions	O	O
record extensions	O	O

Annex C (informative): Alternative ASN.1 definitions

(This annex does not form an integral part of this I-ETS).

C.1 Definition of ASN.1 modules for use of 1994 version of ASN.1

The use of the 1994 version of ASN.1 (ITU-T Recommendations X.680 [13], X.681 [14], X.682 [15] and X.683 [16]) is illustrated by providing an ASN.1 module, ASN1UsageMeteringModuleNew, which defines the data types that are affected by the new notation in a way similar to the way they are defined in the ASN1UsageMeteringModule module in clause A.10.

```
ASN1UsageMeteringModuleNew          {ccitt(0)          identified-organization(4)          etsi(0)
usageMeteringInformationManagement(819)          informationModel(0)          asn1Modules(2)
ASN1UsageMeteringModuleNew(1)}
DEFINITIONS IMPLICIT TAGS::=
BEGIN
-- EXPORTS everything

-- The following ASN.1 provides the means for extending records, record types, IN specific information
-- and record block information. The Management Extension type is redefined using the useful
-- information object class type TYPE-IDENTIFIER. The construct is equivalent to
ITU-T Recommendation X.721 [18]:
-- Attribute -ASN1Module ManagementExtension type and does not use the ANY DEFINED BY construct
-- which is not supported any more by ITU-T Recommendation X.680 [13].

MANAGEMENT-EXTENSION::= TYPE-IDENTIFIER

AdditionalRecordType     ::= INSTANCE OF MANAGEMENT-EXTENSION
        ({AllowedAdditionalRecordTypes})

-- The AllowedAdditionalRecordTypes is the constraint that allows only certain types to be set as
-- AdditionalRecordType.

AdditionalRecordTypes    ::= SET OF AdditionalRecordType

-- The AdditionalRecordTypes type is to be used in the RecordContent type of
-- ASN1UsageMeteringModule module.

BlockExtension           ::= INSTANCE OF MANAGEMENT-EXTENSION ({AllowedBlockExtensions})

-- The AllowedBlockExtensions is the constraint that allows only certain types to be set as BlockExtension.

BlockExtensions    ::= SET OF BlockExtension

-- The BlockExtensions type is to be used in the BlockHeaderRecord type of
-- ASN1UsageMeteringModule
-- module

FileHeaderExtension              ::= INSTANCE OF MANAGEMENT-EXTENSION
                                      ({AllowedFileHeaderExtensions})

-- The AllowedFileHeaderExtensions is the constraint that allows only certain types to be set as
FileHeaderExtension.

FileHeaderExtensions     ::= SET OF FileHeaderExtension

-- The FileHeaderExtensions type is to be used in the FileHeaderRecord type of
-- ASN1UsageMeteringModule
-- module
```

RecordExtension   ::= INSTANCE OF MANAGEMENT-EXTENSION ({AllowedRecordExtensions})

-- The AllowedRecordExtensions is the constraint that allows only certain types to be set as
-- RecordExtension

RecordExtensions::= SET OF RecordExtension

-- The RecordExtensions type is to be used in the CallRecord type of
-- ASN1UsageMeteringModule module

StandardAdditionalRecordType::= INSTANCE OF MANAGEMENT-EXTENSION
 ({AllowedStandardAdditionalRecordTypes})

-- The AllowedStandardAdditionalRecordTypes is the constraint that allows only certain types to be set as
-- StandardAdditionalRecordType.

StandardAdditionalRecordTypes::= SET OF StandardAdditionalRecordType

-- TheStandardAdditionalRecordTypes type is to be used in the RecordContent type of
-- ASN1UsageMeteringModule module.

StandardExtension   ::= INSTANCE OF MANAGEMENT-EXTENSION
 ({AllowedStandardExtensions})

-- The AllowedStandardExtensions is the constraint that allows only certain types to be
-- set as StandardExtension.

StandardExtensions   ::= SET OF StandardExtension

-- TheStandardExtensions type is to be used in the CallRecord type of
-- ASN1UsageMeteringModule module

-- Usually the constraint on the type to be used for extensions is not known and shall be specified
-- at implementation time (in the Protocol Implementation Conformance Statement, PICS).
-- However in the case of standard extensions the allowed types for the constraint may be already
-- defined.
-- Example:
-- TypeA and TypeB types are to be used as a constraint to StandardAdditionalRecordTypes.
-- The AllowedStandardAdditionalRecordType will be then:
-- AllowedStandardAdditionalRecordTypes STANDARD-EXTENSION::= {
-- { TypeA IDENTIFIED BY objectIdentifierA } |
-- { TypeB IDENTIFIED BY objectIdentifierB} }
-- where objectIdentifierA and objectIdentifierB are the OBJECT IDENTIFIER values associated
-- to TypeA and TypeB respectively.

END -- End of ASN1UsageMeteringModuleNew

C.2   Rules of extensibility

> NOTE: This clause substitutes the paragraph on rules of extensibility at the beginning of
> clause A.10.

ITU-T Recommendation X.680 [13] Amendment 1 shall be used when applicable to extend all the types
defined in ASN1UsageInformationModule module.

C.3   Use of management extension

The use of management extensions requires the definition of an object identifier that uniquely refers to the type being used for the extension. This definition avoids any ambiguity when receiving the type at the Q3 interface.

EXAMPLE: The information model defined in this I-ETS is, for instance, to be used to collect usage information from ATM switches. An ATM connection record is standardized in an ATMSwitchASN1Module in another document. The definition of this type in that document should be done as follows:

ATMSwitchASN1Module { ccitt(0) identified-organization(4) etsi(0) ATMSwitchStandard(XXX) informationModel(0) asn1Module(2) ATMSwitchASN1Module(0) }

DEFINITIONS ....
...

ExampleATMConnectionRecordType OBJECT IDENTIFIER::=
 {ATMSwitchASN1Module ExampleATMConnectionRecordType(0) }
-- This object identifier uniquely identifies type ExampleATMConnectionRecord.

...

ExampleATMConnectionRecord::= -- Type definition

...

When the usage metering information management model with a ManagementExtension is used, the object identifier ExampleATMConnectionRecordType should be used so that the ANY DEFINED BY clause in the Management Extension unambiguously determines the ExampleATMConnectionRecord type.
The ExampleATMConnectionRecord shall be specified in the Protocol Implementation Conformance Statement (PICS) of the information model at the time of implementation.

History

Document history			
December 1996	Public Enquiry	PE 120:	1996-12-16 to 1997-04-11
April 1998	Vote	V 9824:	1998-04-14 to 1998-06-12