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SERIES M: TMN AND NETWORK MAINTENANCE: INTERNATIONAL TRANSMISSION SYSTEMS, TELEPHONE CIRCUITS, TELEGRAPHY, FACSIMILE AND LEASED CIRCUITS

Integrated services digital networks

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# Network performance measurements of ISDN calls

ITU-T Recommendation M.3650

(Previously CCITT Recommendation)

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|---|---|
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| International transport network | M.2000–M.2999 |
| Telecommunications management network | M.3000–M.3599 |
| **Integrated services digital networks** | **M.3600–M.3999** |
| Common channel signalling systems | M.4000–M.4999 |

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**ITU-T RECOMMENDATION M.3650**

# NETWORK PERFORMANCE MEASUREMENTS OF ISDN CALLS

**Source**

ITU-T Recommendation M.3650 was prepared by ITU-T Study Group 4 (1997-2000) and was approved under the WTSC Resolution No. 1 procedure on the 19th of April 1997.

## FOREWORD

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## CONTENTS


| | | Page |
|---|---|---|
| 1 | Scope | 1 |
| 2 | References | 1 |
| 3 | Abbreviations and definitions | 3 |
| 3.1 | Abbreviations | 3 |
| 3.2 | Definitions | 3 |
| 4 | Principles for network performance measurements | 3 |
| 5 | Network performance parameters | 4 |
| 5.1 | Access delay | 5 |
| 5.1.1 | Connection set-up delay | 5 |
| 5.1.2 | Alerting delay | 7 |
| 5.1.3 | Layer 1 activation delay | 10 |
| 5.1.4 | Layer 2 activation delay | 11 |
| 5.2 | Access accuracy | 11 |
| 5.3 | Access dependability | 11 |
| 5.4 | Information transfer time | 13 |
| 5.5 | Information transfer accuracy | 13 |
| 5.6 | Information transfer dependability | 14 |
| 5.7 | Disengagement delay | 15 |
| 5.8 | Disengagement accuracy | 16 |
| 5.9 | Disengagement dependability | 16 |
| 6 | Overview of measured parameters | 16 |
| 7 | Description of management information | 17 |
| 8 | Management information model | 21 |
| 8.1 | Managed object classes | 21 |
| 8.1.1 | Call performance log | 22 |
| 8.1.2 | Layer 1 performance log record | 22 |
| 8.1.3 | Layer 2 performance log record | 22 |
| 8.1.4 | Layer 3 performance log record | 23 |
| 8.1.5 | Monitored access | 23 |
| 8.2 | Packages | 23 |
| 8.2.1 | Call performance log | 23 |
| 8.2.2 | Layer 1 performance log record | 23 |
| 8.2.3 | Layer 1 performance notification | 24 |

Page

8.2.4 Layer 2 performance log record ..... 24
8.2.5 Layer 2 performance notification ..... 24
8.2.6 Layer 3 access delay ..... 24
8.2.7 Layer 3 access dependability ..... 24
8.2.8 Layer 3 disengagement delay ..... 25
8.2.9 Layer 3 disengagement dependability ..... 25
8.2.10 Layer 3 information transfer dependability ..... 25
8.2.11 Layer 3 information transfer time-package ..... 25
8.2.12 Layer 3 performance log record ..... 25
8.2.13 Layer 3 performance notification ..... 26
8.2.14 Monitored Access ..... 26
8.3 Name bindings ..... 26
8.3.1 callPerformanceLog-monitoredAccess ..... 26
8.3.2 monitoredAccess-accessPort ..... 26
8.3.3 monitoredAccess-dChannel ..... 27
8.4 Attributes ..... 27
8.4.1 Called number ..... 27
8.4.2 Called subaddress ..... 27
8.4.3 Calling number ..... 27
8.4.4 Calling subaddress ..... 27
8.4.5 Information transfer capability ..... 27
8.4.6 Information transfer mode ..... 28
8.4.7 Information transfer rate ..... 28
8.4.8 Layer 1 access delay ..... 28
8.4.9 Layer 1 access dependability ..... 28
8.4.10 Layer 1 information transfer dependability ..... 28
8.4.11 Layer 2 access delay ..... 29
8.4.12 Layer 2 access dependability ..... 29
8.4.13 Layer 3 access delay ..... 29
8.4.14 Layer 3 access dependability ..... 29
8.4.15 Layer 3 disengagement delay ..... 29
8.4.16 Layer 3 disengagement dependability ..... 29
8.4.17 Layer 3 information transfer dependability ..... 30
8.4.18 Layer 3 information transfer time ..... 30
8.4.19 Monitored Access Id ..... 30
8.4.20 Type of call ..... 30
8.4.21 Types monitoring ..... 30

**Page**

8.5 Actions ..... 31
8.5.1 Start Monitoring ..... 31
8.5.2 Stop Monitoring ..... 31
8.6 Notifications ..... 31
8.6.1 Layer 1 performance recorded ..... 31
8.6.2 Layer 2 performance recorded ..... 31
8.6.3 Layer 3 performance recorded ..... 32
8.7 ASN.1 Type definitions module ..... 32
9 Support objects from other Recommendations ..... 35
10 Functional unit ..... 35
10.1 Definition of functional units ..... 35
10.2 Negotiation of functional units ..... 37
11 Conformance ..... 37
Annex A – MCS and MOCS proforma ..... 38
A.0 MCS proforma ..... 38
A.0.1 Introduction ..... 38
A.0.2 Identification of the implementation ..... 38
A.0.3 Identification of the document in which the management information is defined ..... 39
A.0.4 Management conformance summary ..... 39
A.1 MOCS proforma ..... 41
A.1.1 Introduction ..... 41
A.1.2 CallPerformanceLog ..... 42
A.2 layer1PerformanceLogRecord ..... 54
A.3 layer2PerformanceLogRecord ..... 59
A.4 layer3PerformanceLogRecord ..... 64
A.5 monitoredAccess ..... 70
Annex B – Network management level ..... 77

**Recommendation M.3650**

# NETWORK PERFORMANCE MEASUREMENTS OF ISDN CALLS

*(Geneva, 1997)*

## 1 Scope

This Recommendation defines in-service measurements of ISDN calls and defines the related management information that shall be available at management interfaces of the ISDN local exchanges. This information can be used by the TMN for performance management activities. ISDN-specific in-service measurements are defined for several of the I.350 [4] parameters in order to provide the TMN with an approximation of the user perspective of these parameters. The TMN capabilities defined by this Recommendation will be applicable to all ISDN D-channels. Actual measurements will take place on a selectable subset of the available D-channels.

This Recommendation has been developed to:

– provide a network or service provider with a means to get information about the performance of ISDN calls as far as they are related to the customer access and public part of ISDN.

This Recommendation will:

– provide the network performance measurement service descriptions at the network element management layer of the TMN as defined in Recommendation M.3010 [6];

– specify the management information model to support this network performance measurement service. This will be done in terms of managed object classes, packages, attributes, notifications, actions and behaviour, using the OSI management templates defined in X.722 as notation tool and using ASN.1 for type definitions. Reuse of OSI Management specifications in the X.700-series of Recommendations will be performed as much as possible.

This Recommendation currently only defines measurements on separate calls. It gives no information on how to determine statistical results over several calls.

This Recommendation only gives performance information on the selected D-channels. It should be used in conjunction with Recommendation M.3641, which provides information on all D-channels. Besides, this Recommendation is only involved with performance aspects of the public part of the network. For performance or fault information on the user side, M.3641 management information needs to be used.

## 2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; all users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

[1] ITU-T Recommendation E.800 (1994), *Terms and definitions related to quality of service and network performance including dependability.*

[2] CCITT Recommendation E.845 (1988), *Connection accessibility objective for the international telephone service.*

[3] ITU-T Recommendation G.960 (1993), *Access digital section for ISDN basic rate access.*

[4] ITU-T Recommendation I.350 (1993), *General aspects of quality of service and network performance in digital networks, including ISDNs.*

[5] ITU-T Recommendation I.352 (1993), *Network performance objectives for connection processing delays in an ISDN.*

[6] ITU-T Recommendation M.3010 (1996), *Principles for a telecommunications management network.*

[7] ITU-T Recommendation M.2100 (1995), *Performance limits for bringing-into-service and maintenance of international PDH paths, sections and transmission systems.*

[8] ITU-T Recommendation M.3100 (1995), *Generic network information model.*

[9] CCITT Recommendation M.3640 (1992), *Management of the D-channel – Data link layer and network layer.*

[10] ITU-T Recommendation M.3641 (1994), *Management information model for the management of the data link and network layer of the ISDN D-channel.*

[11] ITU-T Recommendation Q.764 (1993), *ISDN user part signalling procedures.*

[12] ITU-T Recommendation Q.824.0 (1995), *Stage 2 and stage 3 description for the Q3 interface – Customer administration: Common information.*

[13] ITU-T Recommendation Q.824.1 (1995), *Stage 2 and stage 3 description for the Q3 interface – Customer administration*: *Integrated Services Digital Network (ISDN) basic and primary rate access.*

[14] ITU-T Recommendation Q.850 (1993), *Usage of cause and location in the digital subscriber Signalling System No. 1 and in the Signalling System No. 7 ISDN user part.*

[15] CCITT Recommendation X.701 (1992) | ISO/IEC 10040:1992, *Information technology – Open Systems Interconnection – Systems management overview.*

[16] CCITT Recommendation X.710 (1991), *Common management information service definition for CCITT applications.*

[17] CCITT Recommendation X.711 (1991), *Common management information protocol specification for CCITT applications.*

[18] CCITT Recommendation X.721 (1992), *Information technology – Open Systems Interconnection – Structure of management information: Definition of management information.*

[19] CCITT Recommendation X.722 (1992), *Information technology – Open Systems Interconnection – Structure of management information: Guidelines for the definition of managed objects.*

[20] CCITT Recommendation X.734 (1992), *Information technology – Open Systems Interconnection – Systems management: Event report management function.*

[21] CCITT Recommendation X.735 (1992), *Information technology – Open Systems Interconnection – Systems management: Log control function.*

[22] ITU-T Recommendation X.739 (1993), *Information technology – Open Systems Interconnection – Systems management: Metric objects and attributes.*

## 3 Abbreviations and definitions

### 3.1 Abbreviations

This Recommendation uses the following abbreviations:

| | |
|---|---|
| DS | Digital Section |
| ET | Exchange Termination |
| FE | Function Element |
| ISUP | ISDN User Part |
| LEX | Local EXchange |
| LPN | Private Network serving the Local user |
| LT | Line Termination |
| MPI | Measurement Point International |
| MPT | Measurement Point T interface |
| NT | Network Termination |
| OSF | Operations System Function |
| RPN | Private Network serving the Remote user |
| SABME | Set Asynchronous Balanced Mode Extended |
| TE | Terminal Equipment |
| TEX | Transit EXchange |
| U | User |
| UA | Unnumbered Acknowledgement |

### 3.2 Definitions

This Recommendation defines the following terms:

**3.2.1** **incoming call**: Call set-up from the network to the user and thus incoming to the user.

**3.2.2** **outgoing call**: Call set-up from the user to the network and thus outgoing from the user.

## 4 Principles for network performance measurements

Network performance measurements have to be performed at the ISDN local exchanges (LEXs). Measurements may be performed both for outgoing calls as well as incoming calls. An architectural overview is presented in Figure 1.

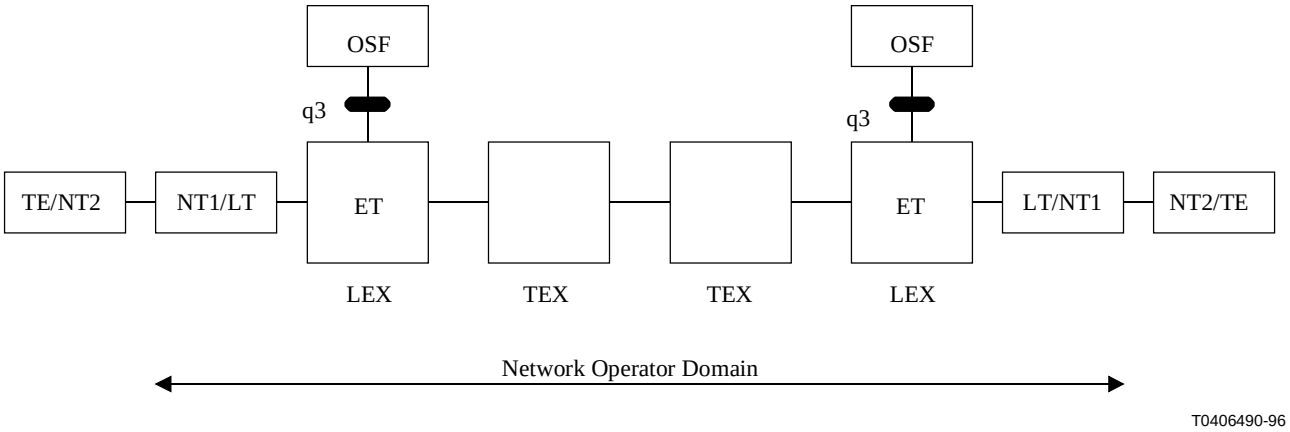


**Figure 1/M.3650 – TMN functional architecture for performance measurements of ISDN calls**

At the Network Management level, information from several LEXs may be gathered. This Recommendation does not define how information from originating and destination LEXs can be related to a single call at the Network Management level. For more information, see Annex B.

It shall be possible to perform performance measurements of ISDN calls on selected D-channels. Measuring a specific D-channel can be activated or deactivated. Finer filtering mechanisms can be implemented in an OSF and are therefore outside the scope of this Recommendation.

The performance of an ISDN call has to be expressed by parameters. For this purpose this Recommendation will use the definitions of the I.350-Series. Recommendation I.352 involves connection processing delays. It defines two Measurement Points at which protocol events (e.g. transfer of a message) are detected: MPT at the T interface and MPI at the international border. At the MPTs, the end-to-end network performance between two T interfaces can be measured. This is on the boundary of the network of the operator.

In the context of this Recommendation, a TMN needs to obtain management information to determine the performance of ISDN calls. This involves information about real traffic, using information from *within* the network of the operators. Arrival times of messages at the T interface cannot be extracted from a LEX, since the T interface is not directly accessible by a LEX. In the case of this Recommendation, arrival times of layer 2 and layer 3 messages at the Exchange Termination (ET) in a LEX are measured. In this way a service or network provider obtains a close approximation of the connection processing delays as defined in Recommendation I.352. It is noteworthy that an even closer approximation is possible when the transmission times between the T interfaces and LEXs are deduced on the basis of the length of the access line. These transmission times could also be deduced from loopback tests.

Measurements at a LEX are required both at the D-channel protocols and at the SS No. 7 ISUP protocol, see [7].

## 5 Network performance parameters

In Recommendation I.350, a list of generic parameters is given which can be used to derive specific parameters and required measurements. The derivation is done by applying the following three aspects for each of the three communication functions: *access*, *information transfer* and *disengagement*.

1) Delay

Delay describes the time interval that is used to perform the communication function.

2) Accuracy

Accuracy describes the degree of correctness with which the function is performed.

3) Dependability

Dependability describes the degree of certainty with which the function is performed, regardless of delay or accuracy.

This results in the following parameters:

- access delay[1];
- access accuracy;
- access dependability;
- information transfer time[2];
- information transfer accuracy;
- information transfer dependability;
- disengagement delay;
- disengagement accuracy;
- disengagement dependability.

In the following subclauses, these generic parameters will be specifically defined for the purpose of performance measurements for ISDN calls. For each aspect, specific requirements for management information are recommended.

## 5.1 Access delay

Access delay is the time that is needed to establish a connection. Two types of access delay are distinguished: connection set-up delay and alerting delay. Connection set-up delay is the period that begins immediately after the user has completed the connection request and ends when the user experiences that the connection has been established. Alerting delay (applicable in case of manual answering terminals and some automatic answering terminals) is the period that begins immediately after the user has completed the connection request until the user experiences that the called user alerting has been initiated.

Connection set-up delay and alerting delay are determined at the destination LEX for incoming calls because they might be used for correction of measured delays at the side of the originating LEX. Relating measurements at the incoming and outgoing exchanges could be part of a TMN application.

### 5.1.1 Connection set-up delay

Measurements at D-channel layer 3 at the originating and destination LEXs can be used for this purpose.

The time periods for outgoing calls measured at the originating LEXs include the delay in the called user equipment as well as the delay caused by the called user itself. These delays can be measured at incoming calls at the destination LEXs.

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[1] Instead of the term "speed" used in Recommendation I.350, the term "delay" is used, because delay is expressed in units of time.

[2] Instead of the term "speed" used in Recommendation I.350, the term "time" is used, because it is not the information transfer speed, but the information transfer time that is experienced by a user.

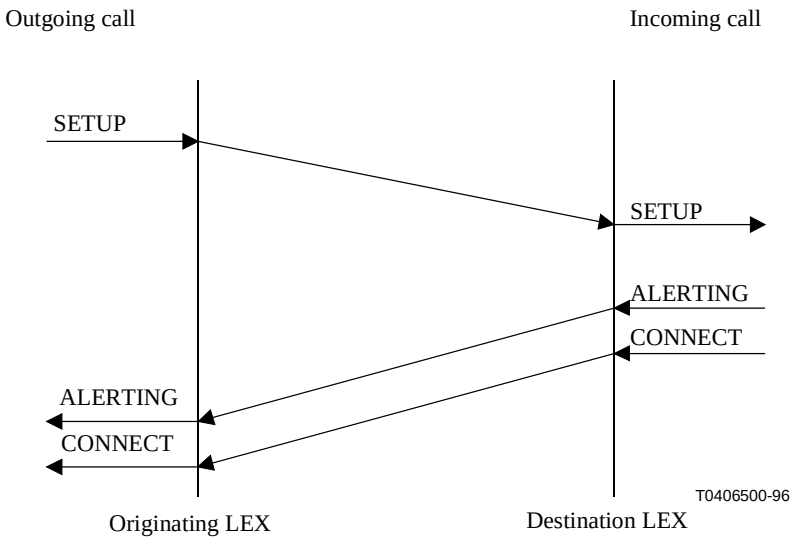


**Figure 2/M.3650 – Connection set-up delays for en-bloc sending and receiving**

In case of en-bloc sending, the period that has to be measured for outgoing calls is:

- the time between a layer 3 SETUP message is received from the calling user at the originating LEX and the time that a layer 3 CONNECT message is sent from the originating LEX to the calling user.

In case of en-bloc receiving, the period that has to be measured for incoming calls is:

- the time between a layer 3 SETUP message is sent from the destination LEX to the called user and the time that a layer 3 CONNECT message is received at the destination LEX from the called user.

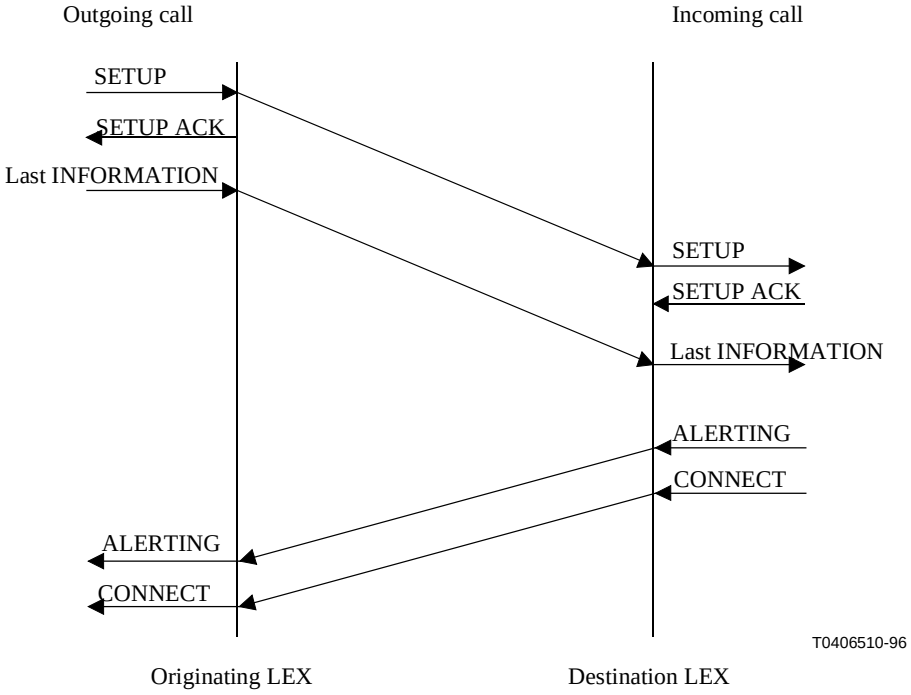


**Figure 3/M.3650 – Connection set-up delays for overlap sending and receiving**

In case of overlap sending, the following time periods have to be measured and added up for outgoing calls:

- the time between a layer 3 SETUP message is received from the calling user at the originating LEX and the time that a layer 3 SETUP ACKNOWLEDGE message is sent from the originating LEX to the calling user;
- the time between the *last* layer 3 INFORMATION message is received from the calling user at the originating LEX, and the time that a layer 3 CONNECT message is sent from the originating LEX to the calling user. For the time of the reception of the last INFORMATION frame, the time of the first event that occurs of the following events is taken:
  - reception of an INFORMATION message with "sending complete indication" from the calling user at the originating LEX;
  - sending a CALL PROCEEDING message from the originating LEX to the calling user.

In case of overlap receiving, the following time periods have to be measured and added up for incoming calls:

- the time between a layer 3 SETUP message is sent from the destination LEX to the called user and the time that a layer 3 SETUP ACKNOWLEDGE message is received at the destination LEX from the called user;
- the time between the last layer 3 INFORMATION message is sent from the destination LEX to the called user, and the time that a layer 3 CONNECT message is received at the destination LEX from the called user. For the time of the sending of the last INFORMATION frame, the time of the first event that occurs of the following events is taken:
  - sending of an INFORMATION message with "sending complete indication" from the destination LEX to the called user;
  - receiving a CALL PROCEEDING, ALERTING or CONNECT message at the destination LEX from the called user[3].

### 5.1.2 Alerting delay

Measurements at D-channel layer 3 at the originating and destination LEXs can be used for this purpose. The time periods measured for outgoing calls at the originating LEX include the delay in the called user equipment but not the delay caused by the called user itself. The delay in the called user equipment can be measured at incoming calls at the destination LEXs.

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[3] Note that the whole time interval may be 0 seconds if the reception of the CONNECT message is the first event that occurs.

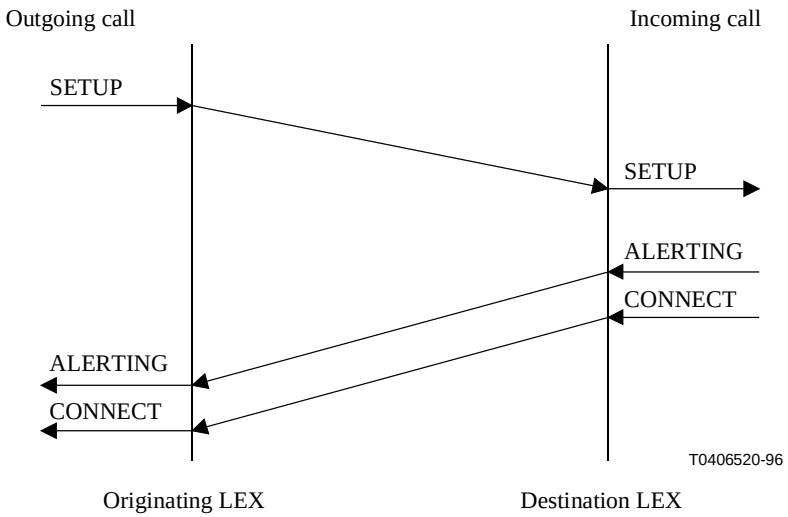


**Figure 4/M.3650 – Alerting delays for en-bloc sending and receiving**

In case of en-bloc sending, the period that has to be measured for outgoing calls is:

- the time between a layer 3 SETUP message is received from the calling user at the originating LEX and the time that a layer 3 ALERTING message is sent from the originating LEX to the calling user.

In case of en-bloc receiving, the period that has to be measured for incoming calls is:

- the time between a layer 3 SETUP message is sent from the destination LEX to the called user and the time that a layer 3 ALERTING message is received at the destination LEX from the called user.

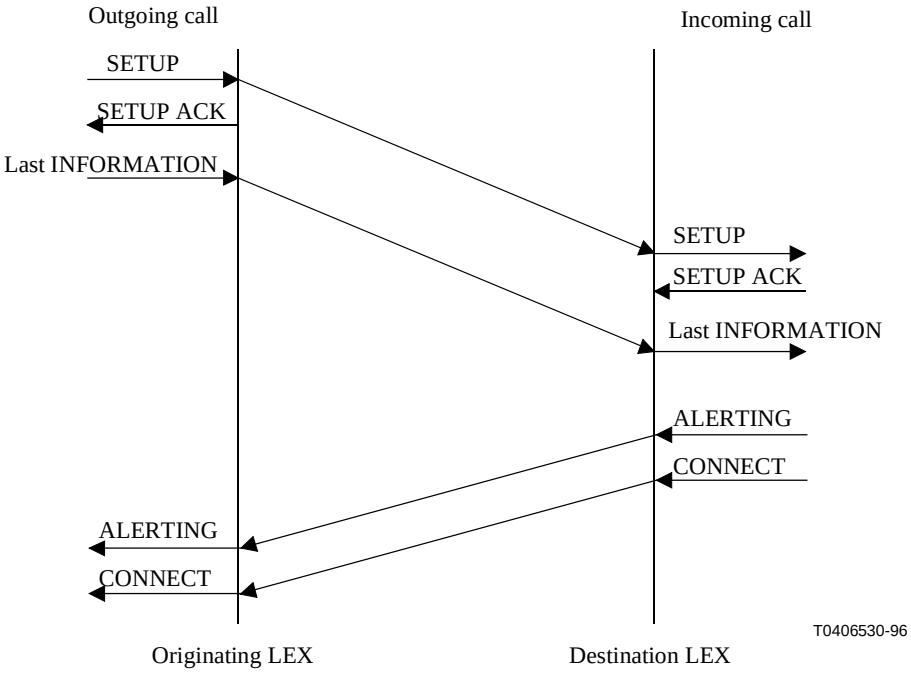


**Figure 5/M.3650 – Alerting delays for overlap sending and receiving**

In case of overlap sending, the following time periods have to be measured and added up for outgoing calls:

- the time between a layer 3 SETUP message is received from the calling user at the originating LEX and the time that a layer 3 SETUP ACKNOWLEDGE message is sent from the originating LEX to the calling user;
- the time between the last layer 3 INFORMATION message is received from the calling user at the originating LEX, and the time that a layer 3 ALERTING message is sent from the originating LEX to the calling user. For the time of the reception of the last INFORMATION frame, the time of the first event that occurs of the following events is taken:
  - reception of an INFORMATION message with "sending complete indication" from the calling user at the originating LEX;
  - sending a CALL PROCEEDING message from the originating LEX to the calling user.

In case of overlap receiving, the following time periods have to be measured and added up for incoming calls:

- the time between a layer 3 SETUP message is sent from the destination LEX to the called user and the time that a layer 3 SETUP ACKNOWLEDGE message is received at the destination LEX from the called user;
- the time between the last layer 3 INFORMATION message is sent from the destination LEX to the called user, and the time that a layer 3 ALERTING message is received at the destination LEX from the called user. For the time of the sending of the last INFORMATION frame, the time of the first event that occurs of the following events is taken:
  - sending of an INFORMATION message with "sending complete indication" from the destination LEX to the called user;
  - receiving a CALL PROCEEDING or ALERTING message at the destination LEX from the called user[4].

[4] Note that the whole time interval may be 0 seconds if the reception of the ALERTING message is the first event that occurs.

### 5.1.3 Layer 1 activation delay

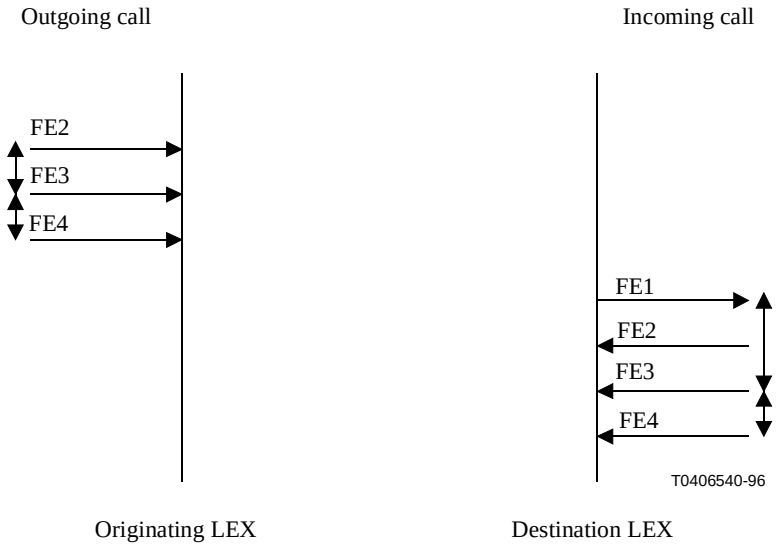


**Figure 6/M.3650 – Layer 1 activation delay**

From Recommendation G.960, it follows that for outgoing calls for the access activation delay at layer 1, the following times have to be measured:

- Digital Section (DS) activation time: time from the moment the originating LEX has received FE2 from the direction of the calling user (access activation initiated) until it receives FE3 (Digital Section activated) from the direction of the calling user. Note that the reception of FE2 from the direction of the calling user is accompanied by the issuing of the MPH-AWI (AWake Indication) primitive and that the reception of FE3 from the direction of the calling user, is accompanied by the issuing of the MPH-DSAI (Digital Section Activate Indication) primitive.
- Terminal Equipment (TE) activation time: time from the moment the originating LEX has received FE3 (Digital Section activated) until it receives FE4 (user-network interface at the T reference point is activated or loopback is operated). Note that the reception of FE3 from the direction of the calling user is accompanied by the issuing of the MPH-DSAI (Digital Section Activate Indication) primitive and that the reception of FE4 from the direction of the calling user, is accompanied by the issuing of the MPH-AI (Activate Indication) primitive.

For incoming calls, the following times have to be measured:

- Digital Section activation time: time from the moment the destination LEX has issued FE1 (activate access) towards the direction of the called user until it receives FE3 (Digital Section activated) from the direction of the called user. Note that the issuing of FE1 towards the direction of the called user is accompanied by the issuing of the MPH-AR (Activate Request) primitive and that the reception of FE3 from the direction of the called user, is accompanied by the issuing of the MPH-DSAI (Digital Section Activate Indication) primitive.
- Terminal Equipment activation time: time from the moment the destination LEX has received FE3 (Digital Section activated) until it receives FE4 (user-network interface at the T reference point is activated or loopback is operated). Note that the reception of FE3 from the direction of the called user is accompanied by the issuing of the MPH-DSAI (Digital

Section Activate Indication) primitive and that the reception of FE4 from the direction of the called user, is accompanied by the issuing of the MPH-AI (Activate Indication) primitive.

The Digital Section activation time is determined by network equipment behaviour. The Terminal Equipment activation time is determined by terminal equipment behaviour.

### 5.1.4 Layer 2 activation delay

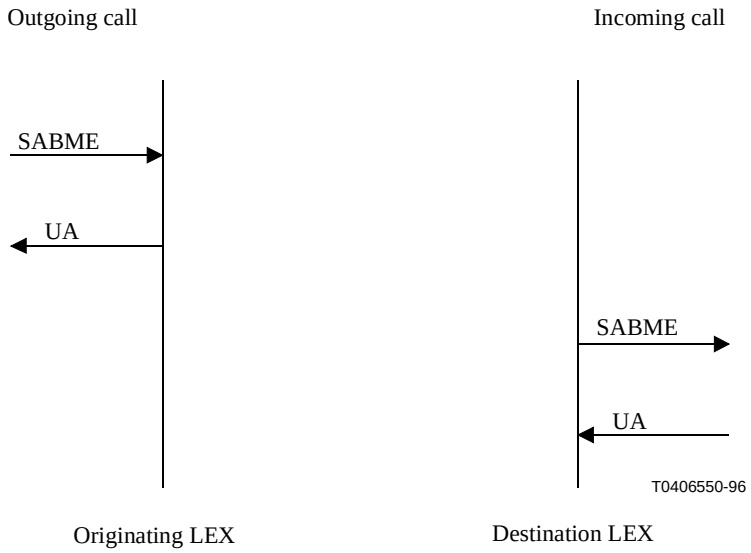


**Figure 7/M.3650 – Layer 2 activation delay**

For the access delay for outgoing calls at layer 2, the following has to be measured:

- the time between a SABME frame was received from the calling user at the originating LEX and the time a UA is sent from the originating LEX to the calling user. This time is determined by network equipment behaviour.

For the access delay for incoming calls at layer 2, the following has to be measured:

- the time between a SABME frame was issued from the destination LEX to the called user and the time a UA is sent from the called user to the destination LEX. This time is determined by terminal equipment behaviour.

## 5.2 Access accuracy

The access accuracy is covered by the dependability aspect. (As a service access function is considered to be either successful or not, a degree of correctness is not considered useful.)

## 5.3 Access dependability

In order to determine the access dependability, this Recommendation will measure whether a call set-up was successful or not. There is an unsuccessful connection establishment, when a connection establishment attempt does not result in the target connection, while the connection establishment was not interrupted by the calling party or called party or caused by a failure in their equipment. An access dependability parameter that could be derived is the "Connection failure probability". This parameter is defined in [2] as "Probability that a desired connection is not established due to a failure in the network". This is the ratio between unsuccessful calls and successful calls.

An unsuccessful connection establishment can be:

- a connection establishment to the wrong destination;
- an unwanted termination of the connection establishment.

The connection establishment to a wrong destination will not be considered in this Recommendation, as very complex detection methods would be needed for probably a few number of failed connection establishments.

When a connection establishment is unsuccessful due to a network failure, the reason has to be registered. With these reasons registered, an indication can be given what to improve to be able to increase the performance of the ISDN-access.

For determination of the access dependability, only measurements are performed for outgoing calls.

For the determination of unsuccessful connection establishments caused by a network failure, measurements of the D-channel layer 2 and layer 3 protocols at the customer access can give useful information. In the context of this Recommendation, call establishments are only considered unsuccessful if the location field in the cause information element indicates a location in the public network, i.e. the location is not at the user (U), at the private network that serves the local user (LPN) or at the private network that serves the remote user (RPN) (see Recommendation Q.850 [14]). In the following situations, there is an unsuccessful connection establishment, caused by a network failure:

- A SETUP or INFORMATION message is received from the calling user at the originating LEX, that is responded by a RELEASE COMPLETE message with cause value No. 58 "*bearer capability not presently available*".
- After the originating LEX has received a SETUP or INFORMATION message from the calling user, no call is established because that message is not answered by a permitted response message from the originating LEX to the calling user.
- A call set-up is terminated by a RELEASE, RELEASE COMPLETE or DISCONNECT message containing cause value No. 38 "*network out of order*".
- Calls in the overlap sending mode are cleared when layer 3 is informed of a data link layer reset. In that case, a DISCONNECT message is sent with cause value No. 41 "*temporary failure*".
- A call is released (initiated by ISUP) with cause value No. 42 "*switching equipment congestion*".
- A call is released with cause value No. 97 "*message type non-existent or not implemented, discarded*" as a result of an unrecognized ISUP message.
- A call is released with the cause value No. 99 "*parameter non-existent or not implemented, discarded*" as a result of an unrecognized ISUP parameter.

When performance monitoring of the access dependability according to this Recommendation is not supported, it may be possible to monitor the access dependability per call in an alternative way. The log records of Recommendation M.3641 [10] could be processed and the relevant information could be extracted. This processing can take place in the Operations System. It will be complicated to relate the M.3641 events to a single call. One needs accurate time stamps for the M.3650 access delay events. Using these time stamps, M.3641 events in call establishment phase can be selected, but accurate time stamps for the M.3641 events and time synchronization with the M.3650 events is required.

The following ISUP events are indications for unsuccessful call set-ups:

- Upon expiry of ISUP timer T7, no ISUP Address Complete Message or ISUP Connect message was received by the originating LEX after the latest address message was issued from the originating LEX.
- Upon expiry of ISUP timer T8, no ISUP Continuity message was received by the originating LEX after an ISUP Continuity Check request was issued from the originating LEX.

Layer 1 and 2 errors may also result in an unsuccessful connection establishment. Layer 1 and layer 2 errors are only considered during the times that layer 3 does not exist yet. When layer 3 exists, it is assumed that unsuccessful connection establishments can be detected at layer 3.

The following layer 1 event is an indication for unsuccessful call set-ups. At layer 1, it is not visible whether a call is setup, active or released. The only thing that makes sense is that a basic rate access may be activated when a call is setup. So, a failed basic rate access activation can be considered as an unsuccessful connection establishment:

- After the originating LEX has received FE2 from the direction of the calling user (access activation initiated), it receives no FE3 (Digital Section activated) from the direction of the calling user.

The following layer 2 event is an indication for unsuccessful call set-ups. Layer 2 may cause an unsuccessful connection establishment in the period between the sending of a SABME frame from the calling user to the originating LEX and the sending of a SETUP message from the calling user to the originating LEX:

- A correct SABME frame, received at the originating LEX, is not responded by a UA frame, but is responded with a DM response with the F-bit set to the same binary value as the P-bit in the received SABME command.

### 5.4 Information transfer time

Information transfer time is the time that is needed to send user information through the network. This period is the time that elapsed from the moment that user information (via the D- or B-channel) is received at the originating LEX until it is issued from the destination LEX to the user at the other end.

ISUP allows for determination of the propagation delay and for counting the number of satellite hops. In the ISUP connect message, the optional Call history information is returned which contains the propagation delay of the call. The propagation delay is determined by increasing a counter depending on the selected circuit. In ISUP also a hop counter has been defined for containing the number of satellite hops.

### 5.5 Information transfer accuracy

Information transfer accuracy is measured by the difference between the information that was offered to the LEX by one of the users and the information that was delivered by the peer LEX to the addressed user(s).

In Recommendation M.2100 [7], a method is given for deriving information transfer accuracy parameters from in-service measurements. For network performance management, the following events have to be measured at layer 1, at the LEXs, transit exchanges and international exchanges:

- Loss Of Signal (LOS);
- Loss Of Frame alignment (LOF);
- Cyclic Redundancy Check error (CRC-error);

- Remote Alarm Indication (RAI);
- Alarm Indication Signal (AIS);
- Activation/deactivation failure.

For in-service determination of the above-listed information transfer accuracy parameters and events by only measuring at the LEXs, no standardized solutions are available. Only methods for determining the transmission performance of single links (primary rate paths) are available, but not for determining the overall transmission accuracy of, for instance, 64-kbit/s end-to-end paths.

Information transfer accuracy can be determined on a statistical base. However, that is out of the scope of this Recommendation. Note that the information transfer accuracy could be considered as satisfactory for all calls when all primary rate paths that are involved with an end-to-end path fulfil the requirements of Recommendation M.2100.

### 5.6 Information transfer dependability

In order to determine the information transfer dependability, this Recommendation will measure whether a call was prematurely released or not. Prematurely released calls are calls that are released for a reason other than intentionally by any of the parties involved in the call. An information transfer dependability parameter that could be derived is the "Premature release probability". This parameter is defined in [1] as "The probability that an established connection will be released, for a reason other than intentionally by one of the parties involved in the call". This is the ratio between prematurely released calls and successful calls.

With respect to the information transfer dependability, the same measurements are performed at both outgoing and incoming calls. In the context of this Recommendation, calls are only considered prematurely released if the location field in the cause information element indicates a location in the public network, i.e. the location is not at the user (U), at the private network that serves the local user (LPN), or at the private network that serves the remote user (RPN) (see Recommendation Q.850 [14]).

In the following situations, there are prematurely released connections when they occur when a call is in the active (established) state:

- When a DL-RELEASE-INDICATION primitive was received from layer 2, timer T309 shall be started. Upon T309 expiry, the network connection shall be cleared. The remote user shall be informed by a DISCONNECT message with cause value No. 27 "*destination out of order*". This is not necessarily caused by a network failure, but may also be caused due to a failure at the user side.
- When a STATUS message is not returned by a LEX after the maximum number of retransmissions of a STATUS ENQUIRY message received from the user. In that case, the network connection shall be cleared by a DISCONNECT message, using cause value No. 41 "*temporary failure*".
- A RESUME message was received from the user at the network, but no RESUME ACKNOWLEDGE or RESUME REJECT was returned before T318 expiry. In that case, the user clears the call, by sending a RELEASE message with cause value No. 102 "*recovery on timer expiry*" (T318).

When performance monitoring of the information dependability according to this Recommendation is not supported, it may be possible to monitor the information transfer dependability per call in an alternative way. The log records of Recommendation M.3641 [10] could be processed and the relevant information could be extracted. This processing can take place in the Operations System. It will be complicated to relate the M.3641 events to a single call. One needs accurate time stamps for

the M.3650 access delay events and for the disengagement delay events. In that case, the time that the call existed is known. M.3641 events in that time interval can be used, but accurate time stamps for the M.3641 events and time synchronization with the M.3650 events is required.

The following layer 1 event causes a prematurely released connection, in the case when a call is in the active state:

- FE7, see [3], is received from the direction of the calling user at the originating LEX or from the direction of the called user at the destination LEX, and this is followed by issuing FE5 (access is deactivated) from the LEX to the direction where the FE7 was received from. In this case, Loss Of Signal or Loss Of Frame alignment occurred on the transmission system or power has been lost at the NT.

There are no layer 2 events that are relevant for indicating a prematurely released connection.

## 5.7 Disengagement delay

Disengagement delay is measured by the time that is needed to release a connection. This is the time elapsed between the moment the user issues the termination request and ending when the user experiences that the connection has been released and the same resources can be used to establish a new connection. Disengagement delay is measured both at the side(s) where the user initiates call clearing (disconnecting side) and at the side where the network initiates call clearing (disconnected side). It is meaningful because resources used by the network could be claimed longer than expected by the user.

Measurements at D-channel layer 3 at the customer access can be used for this purpose.

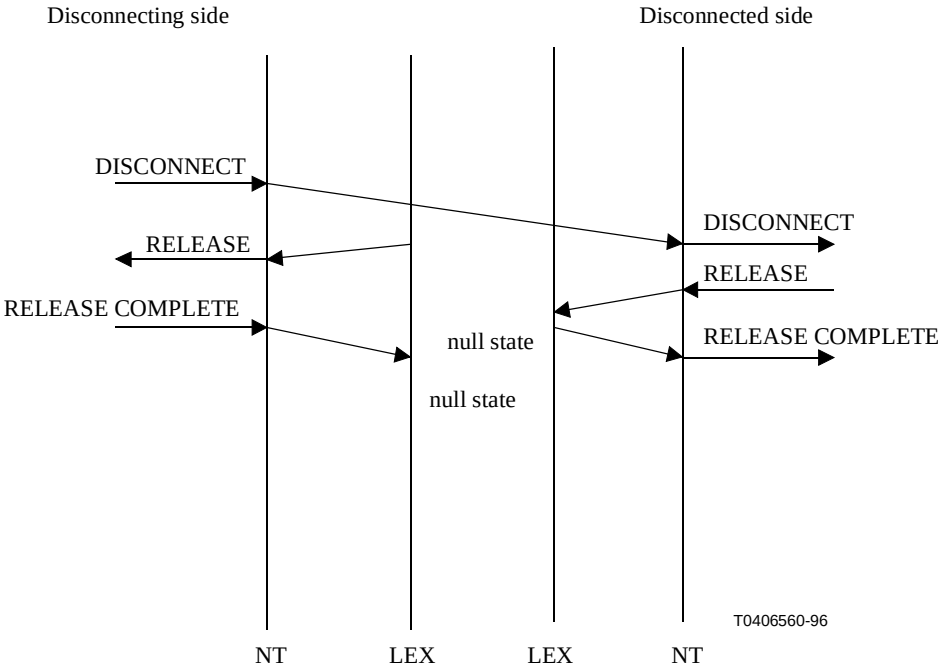


**Figure 8/M.3650 – Disengagement delays**

The period that has to be measured at the side where the user initiates call clearing is:

- the time between a layer 3 DISCONNECT message is received at the LEX and the time that a layer 3 RELEASE message is sent back to the terminal that sent the termination request.

The following time period should be added:

- the time between a layer 3 RELEASE COMPLETE message is received at the LEX and the time the B-channel is released by the LEX[5].

In this way, a correction is made for the delay caused by the user equipment. This is the time between a RELEASE sent from the LEX to the user and the time a RELEASE COMPLETE is received at the LEX.

The period that has to be measured at the side where the network initiates call clearing is:

- the time between the layer 3 RELEASE message is sent by the user and the time the RELEASE COMPLETE message is sent to the user.

### 5.8 Disengagement accuracy

The disengagement accuracy is covered by the dependability aspect. (As a service disengagement function is considered to be successful or not, a degree of correctness is not considered useful.)

### 5.9 Disengagement dependability

In order to determine the disengagement dependability, this Recommendation will measure whether a call termination was successful or not. There is a failed connection release if a release request was issued, but the allocated resources were not really released. Difference is made between call clearing initiated by the user and call clearing initiated by the network (remote user). No difference is made between outgoing or incoming calls.

**Call clearing initiated by the user**

A failed connection release caused by a network failure is detected when:

- the user sends a correct layer 3 DISCONNECT message to the LEX that does not result in at least a layer 3 RELEASE message sent from the LEX to that user. Note that this is not a likely event.

**Call clearing initiated by the network (remote user)**

A failed connection release caused by a network failure is detected when:

- after the LEX sent a DISCONNECT to the user, the user sends a layer 3 RELEASE message to the LEX that does not result in at least a layer 3 RELEASE COMPLETE message sent from the LEX to the user.

## 6 Overview of measured parameters

The first column in Table 1 gives the generic performance parameters used in this Recommendation. The access accuracy, information transfer accuracy and disengagement accuracy parameters are not in the table, because no measurements are defined for these parameters. The second column indicates which aspects can be determined when measurements are performed for outgoing calls. The third column indicates which aspects can be determined when measurements are performed for incoming calls.

---

[5] The accurate detection of the moment when the B-channel resources are freed by the LEX can only be done by the LEX. Therefore, care is needed that the measurement of this moment does not interfere with the actual freeing of the resources.

**Table 1/M.3650 – Overview of measured parameters**

| | **Measurements at outgoing calls; the following aspects can be determined:** | **Measurements at incoming calls; the following aspects can be determined:** |
|---|---|---|
| Access delay | Connection set-up delay and alerting delay without correction for delays caused by the called user or called user equipment. | Connection set-up delay and alerting delay cannot be measured. The delays caused by the called user or called user equipment can be determined. |
| Access dependability | Failed connection set-ups due to a network failure can be determined. | Not applicable. |
| Information transfer time | If the ISUP option for determination of the propagation delay is supported, this parameter can be determined. Also, the number of satellite hops can be counted. | If the ISUP option for determination of the propagation delay is supported, this parameter can be determined. Also, the number of satellite hops can be counted. |
| Information transfer dependability | Prematurely released connections due to a network failure can be detected, but not in all cases. | Prematurely released connections due to a network failure can be detected, but not in all cases. |
| Disengagement delay | The delay for releasing a connection can be determined. | The delay for releasing a connection can be determined. |
| Disengagement dependability | Unsuccessful released connections due to a network failure can be detected. | Unsuccessful released connections due to a network failure can be detected. |

## 7 Description of management information

For the selected D-channels, for each of the outgoing and incoming calls a log record will be created. The log record contains the information specified below. The GDMO and ASN.1 is normative and can be found in clause 8. At the Network Element level, outgoing call performance records and incoming call performance records are defined for layers 1, 2 and 3. The corresponding managed objects shall be contained in the Q.824.1 D-channel managed object or in the Q.824.1 accessPortISDN managed object. They shall at least have the following contents:

| **Information for the layer 1 outgoing call performance record** | |
|---|---|
| **Attribute name** | **Attribute value type** |
| *For access delay:* | |
| Layer 1 FE2 received | Time stamp |
| Layer 1 FE3 received | Time stamp |
| Layer 1 FE4 received | Time stamp |
| *For access dependability:* | |
| Causes non-successful | Layer 1 activation failure |
| *For information transfer dependability:* | |
| Causes non-successful | FE7 received, layer 1 deactivated |

| Information for the layer 1 incoming call performance record | |
|---|---|
| **Attribute name** | **Attribute value type** |
| *For access delay:* | |
| Layer 1 FE1 sent | Time stamp |
| Layer 1 FE2 received | Time stamp |
| Layer 1 FE3 received | Time stamp |
| Layer 1 FE4 received | Time stamp |
| *For access dependability:* | |
| Causes non-successful | Layer 1 activation failure |
| *For information transfer dependability:* | |
| Causes non-successful | FE7 received, layer 1 deactivated |
| **Information for the layer 2 outgoing call performance record** | |
| **Attribute name** | **Attribute value type** |
| *For access delay:* | |
| Layer 2 SABME received | Time stamp |
| Layer 2 UA issued | Time stamp |
| *For access dependability:* | |
| Causes non-successful | Layer 2 establishment failure |
| **Information for the layer 2 incoming call performance record** | |
| **Attribute name** | **Attribute value type** |
| *For access delay:* | |
| Layer 2 SABME issued | Time stamp |
| Layer 2 UA received | Time stamp |
| **Information for the layer 3 outgoing call performance record** | |
| **Attribute name** | **Attribute value type** |
| *General information:* | |
| Called Number | Directory number |
| Calling Number | Directory number |
| Called Subaddress | Numericstring |
| Calling Subaddress | Numericstring |
| Information transfer capability | Speech |
| | 3.1 kHz Audio |
| | Unrestricted digital information |
| | etc. |
| Information transfer mode | Circuit mode |
| | Packet mode |
| Information transfer rate | 64 kbit/s |
| | etc. |
| *For access delay* | |
| Start-time call initiation (SETUP received) | Time stamp |

| | |
|---|---|
| Confirmation of call set-up (SETUP ACK issued) | Time stamp |
| All address information received (last INFORMATION received) | Time stamp |
| Start-time route ready (CONNECT or ALERTING issued, which comes first) | Time stamp |
| Start-time connection established (CONNECT issued) | Time stamp |
| *For access dependability:* | |
| Causes non-successful | Bearer capability not presently available |
| | No response on SETUP or INFORMATION |
| | Network out of order |
| | Temporary failure |
| | ISUP timer T7 expired |
| | ISUP timer T8 expired |
| | Switching equipment congestion |
| | ISUP message type non-existent or not implementeddiscarded |
| | ISUP parameter non-existent or not implemented, discarded |
| *For information transfer time:* | |
| Information transfer time | Number of satellite hops |
| | Propagation delay |
| *For information transfer dependability:* | |
| Causes non-successful | FE7 received, layer 1 deactivated |
| | T309 expired, destination out of order |
| | Temporary failure, no STATUS response |
| | Network out of order |
| | Recovery on timer T318 expiry |
| *For disengagement delay:* | |
| Disengagement initiation (DISCONNECT received) | Time stamp |
| Exchange side released (RELEASE issued) | Time stamp |
| User side released (RELEASE COMPLETE received) | Time stamp |
| End-time call (B-channel is released) | Time stamp |
| *For disengagement dependability:* | |
| Causes non-successful | No RELEASE issued from LEX |
| | No RELEASE COMP issued from LEX |
| **Information for the layer 3 incoming call performance record** | |
| *General Information:* | |
| Called Number | Directory number |
| Calling Number | Directory number |
| Called Subaddress | Numericstring |
| Calling Subaddress | Numericstring |

| | |
|---|---|
| Information transfer capability | Speech<br>3.1 kHz Audio<br>Unrestricted digital information<br>etc. |
| Information transfer mode | Circuit mode<br>Packet mode |
| Information transfer rate | 64 kbit/s<br>etc. |
| *For access delay:* | |
| Start-time call initiation (SETUP sent to called party) | Time stamp |
| Confirmation of call set-up (SETUP ACK received) | Time stamp |
| All address information issued (last INFORMATION issued) | Time stamp |
| Start-time route ready (CONNECT or ALERTING received, which comes first) | Time stamp |
| Start-time connection established (CONNECT received) | Time stamp |
| *For information transfer time:* | |
| Information transfer time | Number of satellite hops<br>Propagation delay |
| *For information transfer dependability:* | |
| Causes non-successful | T309 expired, destination out of order<br>Temporary failure, no STATUS response<br>Network out of order<br>Recovery on timer T318 expiry<br>ISUP timer T33 expired<br>ISUP timer T36 expired |
| *For disengagement delay:* | |
| Disengagement initiation (DISCONNECT received) | Time stamp |
| Exchange side released (RELEASE issued) | Time stamp |
| User side released (RELEASE COMPLETE received) | Time stamp |
| End-time call (B-channel is released) | Time stamp |
| *For disengagement dependability:* | |
| Causes non-successful | No RELEASE issued from LEX<br>No RELEASE COMP issued from LEX |

In order to fulfil the requirement to indicate in the LEXs for which D-channels this Recommendation's measurements need to be performed, a monitoredAccess managed object will be defined that will be contained by the Q.824.1 D-channel managed object or by the accessPortISDNBasicRate or accessPortISDNPrimaryRate managed object. The monitoredAccess

managed object will have actions for starting and ending call performance monitoring and will contain the following information:

| | |
|---|---|
| Start-time monitoring: | Date and time stamp |
| End-time monitoring: | Date and time stamp |
| Types of calls to be monitored: | layer 1 outgoing |
| | layer 1 incoming |
| | layer 2 outgoing |
| | layer 2 incoming |
| | layer 3 outgoing |
| | layer 3 incoming |

# 8 Management information model

## 8.1 Managed object classes

The managed objects within the dotted box are defined in this Recommendation.

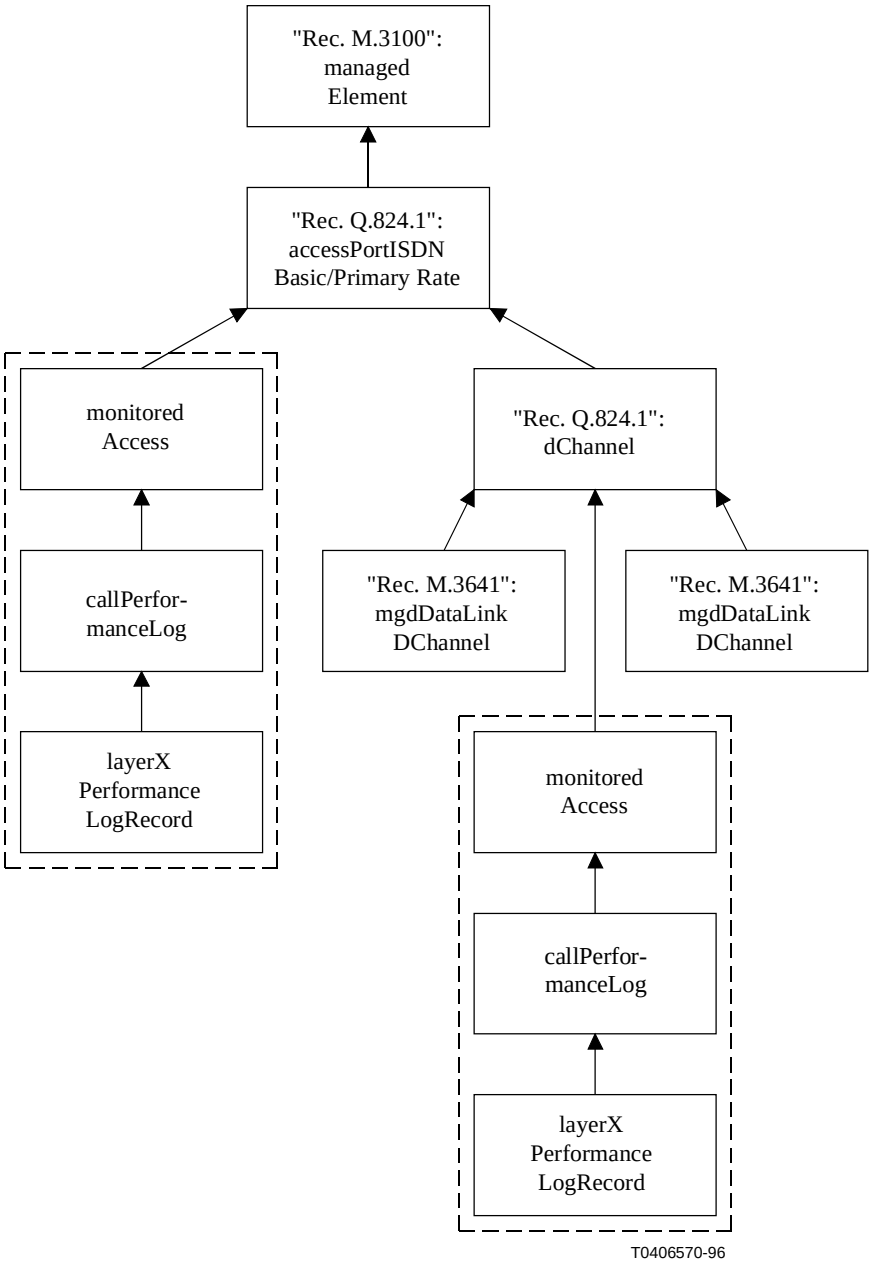


**Figure 9/M.3650 – Illustration of the naming schema**

### 8.1.1 Call performance log

**callPerformanceLog MANAGED OBJECT CLASS**
**DERIVED FROM "Recommendation X.721 : 1992":log;**
**CHARACTERIZED BY callPerformanceLog-package;**
**REGISTERED AS { m3650ManagedObjectClass 1 };**

### 8.1.2 Layer 1 performance log record

**layer1PerformanceLogRecord MANAGED OBJECT CLASS**
**DERIVED FROM "Recommendation X.721 : 1992":eventLogRecord;**
**CHARACTERIZED BY layer1PerformanceLogRecord-package;**
**REGISTERED AS { m3650ManagedObjectClass 2 };**

### 8.1.3 Layer 2 performance log record

**layer2PerformanceLogRecord MANAGED OBJECT CLASS**
**DERIVED FROM "Recommendation X.721 : 1992":eventLogRecord;**

```
        CHARACTERIZED BY        layer2PerformanceLogRecord-package;
REGISTERED AS { m3650ManagedObjectClass 3 };
```

### 8.1.4 Layer 3 performance log record

```
layer3PerformanceLogRecord MANAGED OBJECT CLASS
        DERIVED FROM        "Recommendation X.721 : 1992":eventLogRecord;
        CHARACTERIZED BY        layer3PerformanceLogRecord-package;
        CONDITIONAL PACKAGES
                layer3AccessDelay-package                       PRESENT IF
                "The implementation supports monitoring of layer 3 access delay",
                layer3AccessDependability-package               PRESENT IF
                "The implementation supports monitoring of layer 3 access dependability",
                layer3InformationTransferTime-package           PRESENT IF
                "The implementation supports monitoring of layer 3 information transfer time",
                layer3InformationTransferDependability-package  PRESENT IF
                "The implementation supports monitoring of layer 3 information transfer dependability",
                layer3DisengagementDelay-package                PRESENT IF
                "The implementation supports monitoring of layer 3 disengagement delay",
                layer3DisengagementDependability-package        PRESENT IF
                "The implementation supports monitoring of layer 3 disengagement dependability";
REGISTERED AS { m3650ManagedObjectClass 4 };
```

### 8.1.5 Monitored access

```
monitoredAccess MANAGED OBJECT CLASS
        DERIVED FROM        "Recommendation X.721 : 1992":top;
        CHARACTERIZED BY        monitoredAccess-package;
        CONDITIONAL PACKAGES
                layer1PerformanceNotification-package           PRESENT IF
                "The implementation supports monitoring of layer 1",
                layer2PerformanceNotification-package           PRESENT IF
                "The implementation supports monitoring of layer 2",
                layer3PerformanceNotification-package           PRESENT IF
                "The implementation supports monitoring of layer 3";
REGISTERED AS { m3650ManagedObjectClass 5 };
```

## 8.2 Packages

### 8.2.1 Call performance log

```
callPerformanceLog-package PACKAGE
        BEHAVIOUR
                callPerformanceLogBehaviour BEHAVIOUR
        DEFINED AS
                "The callPerformanceLog contains all log records for performance management of ISDN
                calls.";;
REGISTERED AS { m3650Package 1 };
```

### 8.2.2 Layer 1 performance log record

```
layer1PerformanceLogRecord-package PACKAGE
        BEHAVIOUR
                layer1PerformanceLogRecordBehaviour BEHAVIOUR
        DEFINED AS
                "This package characterizes the layer 1 performance log record object and contains information on
                the performance of layer 1 establishment. The layer1PerformanceLogRecord managed object is used
                to represent logged information from the layer1PerformanceRecorded notification received from the
                monitoredAccess managed object.";;
        ATTRIBUTES
                typeOfCall                      GET,
                layer1AccessDelay               GET,
                layer1AccessDependability       GET,
```

```
        layer1InformationTransferDependability      GET;
REGISTERED AS { m3650Package 2 };
```

### 8.2.3 Layer 1 performance notification

```
layer1PerformanceNotification-package PACKAGE
    BEHAVIOUR
        layer1PerformanceNotificationBehaviour BEHAVIOUR
    DEFINED AS
        "This package defines the layer1PerformanceRecorded notification.";;
    NOTIFICATIONS
        layer1PerformanceRecorded;
REGISTERED AS { m3650Package 3 };
```

### 8.2.4 Layer 2 performance log record

```
layer2PerformanceLogRecord-package PACKAGE
    BEHAVIOUR
        layer2PerformanceLogRecordBehaviour BEHAVIOUR
    DEFINED AS
        "This package characterizes the layer 2 performance log record object and contains information on
        the performance of layer 2 establishment. The layer2PerformanceLogRecord managed object is used
        to represent logged information from the layer2PerformanceRecorded notification received from the
        monitoredAccess managed object.";;
    ATTRIBUTES
        typeOfCall                  GET,
        layer2AccessDelay           GET,
        layer2AccessDependability   GET;
REGISTERED AS { m3650Package 4 };
```

### 8.2.5 Layer 2 performance notification

```
layer2PerformanceNotification-package PACKAGE
    BEHAVIOUR
        layer2PerformanceNotificationBehaviour BEHAVIOUR
    DEFINED AS
        "This package defines the layer2PerformanceRecorded notification.";;
    NOTIFICATIONS
        layer2PerformanceRecorded;
REGISTERED AS { m3650Package 5 };
```

### 8.2.6 Layer 3 access delay

```
layer3AccessDelay-package PACKAGE
    BEHAVIOUR
        layer3AccessDelayPackageBehaviour BEHAVIOUR
    DEFINED AS
        "This package contains information on the layer 3 access delay.";;
    ATTRIBUTES
        layer3AccessDelay           GET;
REGISTERED AS { m3650Package 6 };
```

### 8.2.7 Layer 3 access dependability

```
layer3AccessDependability-package PACKAGE
    BEHAVIOUR
        layer3AccessDependabilityPackageBehaviour BEHAVIOUR
    DEFINED AS
        "This package contains information on the layer 3 access dependability.";;
    ATTRIBUTES
        layer3AccessDependability   GET;
REGISTERED AS { m3650Package 7 };
```

### 8.2.8 Layer 3 disengagement delay

```
layer3DisengagementDelay-package PACKAGE
        BEHAVIOUR
                layer3DisengagementDelayPackageBehaviour BEHAVIOUR
        DEFINED AS
                "This package contains information on the layer 3 disengagement delay.";;
        ATTRIBUTES
                layer3DisengagementDelay                GET;
REGISTERED AS { m3650Package 8 };
```

### 8.2.9 Layer 3 disengagement dependability

```
layer3DisengagementDependability-package PACKAGE
        BEHAVIOUR
                layer3DisengagementDependabilityPackageBehaviour BEHAVIOUR
        DEFINED AS
                "This package contains information on the layer 3 disengagement dependability.";;
        ATTRIBUTES
                layer3DisengagementDependability        GET;
REGISTERED AS { m3650Package 9 };
```

### 8.2.10 Layer 3 information transfer dependability

```
layer3InformationTransferDependability-package PACKAGE
        BEHAVIOUR
                layer3InformationTransferDependabilityPackageBehaviour BEHAVIOUR
        DEFINED AS
                "This package contains information on the layer 3 information transfer dependability.";;
        ATTRIBUTES
                layer3InformationTransferDependability  GET;
REGISTERED AS { m3650Package 10 };
```

### 8.2.11 Layer 3 information transfer time-package

```
layer3InformationTransferTime-package PACKAGE
        BEHAVIOUR
                layer3InformationTransferTimePackageBehaviour BEHAVIOUR
        DEFINED AS
                "This package characterizes the layer 3 performance log record object and contains information
                on the performance of layer 3 establishment.";;
        ATTRIBUTES
                layer3InformationTransferTime           GET;
REGISTERED AS { m3650Package 11 };
```

### 8.2.12 Layer 3 performance log record

```
layer3PerformanceLogRecord-package PACKAGE
        BEHAVIOUR
                layer3PerformanceLogRecordBehaviour BEHAVIOUR
        DEFINED AS
                "This package characterizes the layer 3 performance log record object and contains information on
                ISDN layer 3 parameters and on the performance results of call. The layer3PerformanceLogRecord
                managed object is used to represent logged information from the layer3PerformanceRecorded
                notification received from the monitoredAccess managed object.";;
        ATTRIBUTES
                typeOfCall                              GET,
                callingNumber                           GET,
                calledNumber                            GET,
                callingSubaddress                       GET,
                calledSubaddress                        GET,
                informationTransferCapability           GET,
                informationTransferMode         GET,
                informationTransferRate                 GET;
REGISTERED AS { m3650Package 12 };
```

### 8.2.13 Layer 3 performance notification

```
layer3PerformanceNotification-package PACKAGE
        BEHAVIOUR
                layer3PerformanceNotificationBehaviour BEHAVIOUR
        DEFINED AS
                "This package defines the layer3PerformanceRecorded notification.";;
        NOTIFICATIONS
                layer3PerformanceRecorded;
REGISTERED AS { m3650Package 13 };
```

### 8.2.14 Monitored Access

```
monitoredAccess-package PACKAGE
        BEHAVIOUR
                monitoredAccessBehaviour BEHAVIOUR
        DEFINED AS
                "This package is used by the Monitored Access managed object class. It contains actions to start and
                stop call performance monitoring for a specific ISDN access.";;
        ATTRIBUTES
                monitoredAccessId GET,
                typesMonitoring         INITIAL VALUE ASN1TypeModule.initialTypesMonitoring
                                        GET-REPLACE;
        ACTIONS
                startMonitoring,
                stopMonitoring;
REGISTERED AS { m3650Package 14 };
```

## 8.3 Name bindings

### 8.3.1 callPerformanceLog-monitoredAccess

```
callPerformanceLog-monitoredAccess NAME BINDING
        SUBORDINATE OBJECT CLASS      callPerformanceLog AND SUBCLASSES;
        NAMED BY
                SUPERIOR OBJECT CLASS           monitoredAccess
                AND SUBCLASSES;
                WITH ATTRIBUTE                  "Recommendation X.721 : 1992":logId;
        CREATE
                WITH-REFERENCE-OBJECT,
                WITH-AUTOMATIC-INSTANCE-NAMING;
        DELETE
                DELETES-CONTAINED-OBJECTS;
REGISTERED AS { m3650NameBinding 1 };
```

### 8.3.2 monitoredAccess-accessPort

```
monitoredAccess-accessPortISDN NAME BINDING
        SUBORDINATE OBJECT CLASS      monitoredAccess AND SUBCLASSES;
        NAMED BY
                SUPERIOR OBJECT CLASS           "Recommendation Q.824.1:1995":accessPort
                                        AND SUBCLASSES;
                WITH ATTRIBUTE                  monitoredAccessId;
        CREATE
                WITH-REFERENCE-OBJECT,
                WITH-AUTOMATIC-INSTANCE-NAMING;
        DELETE
                DELETES-CONTAINED-OBJECTS;
REGISTERED AS { m3650NameBinding 2 };
```

### 8.3.3 monitoredAccess-dChannel

```
monitoredAccess-dChannel NAME BINDING
        SUBORDINATE OBJECT CLASS        monitoredAccess AND SUBCLASSES;
        NAMED BY
                SUPERIOR OBJECT CLASS           "Recommendation Q.824.1:1995":dChannel
                                        AND SUBCLASSES;
                WITH ATTRIBUTE                  monitoredAccessId;
        CREATE
                WITH-REFERENCE-OBJECT,
                WITH-AUTOMATIC-INSTANCE-NAMING;
        DELETE
                DELETES-CONTAINED-OBJECTS;
REGISTERED AS { m3650NameBinding 3 };
```

## 8.4 Attributes

### 8.4.1 Called number

```
calledNumber ATTRIBUTE
        WITH ATTRIBUTE SYNTAX   ASN1TypeModule.DirectoryNumber;
        MATCHES FOR                     EQUALITY;
        BEHAVIOUR
                calledNumberBehaviour           BEHAVIOUR
        DEFINED AS
                "This attribute contains the called party number.";;
REGISTERED AS { m3650Attribute 1 };
```

### 8.4.2 Called subaddress

```
calledSubaddress ATTRIBUTE
        WITH ATTRIBUTE SYNTAX   ASN1TypeModule.Subaddress;
        MATCHES FOR                     EQUALITY;
        BEHAVIOUR
                calledSubaddressBehaviour       BEHAVIOUR
        DEFINED AS
                "This attribute contains the called party subaddress.";;
REGISTERED AS { m3650Attribute 2 };
```

### 8.4.3 Calling number

```
callingNumber ATTRIBUTE
        WITH ATTRIBUTE SYNTAX   ASN1TypeModule.DirectoryNumber;
        MATCHES FOR                     EQUALITY;
        BEHAVIOUR
                callingNumberBehaviour          BEHAVIOUR
        DEFINED AS
                "This attribute contains the calling party number.";;
REGISTERED AS { m3650Attribute 3 };
```

### 8.4.4 Calling subaddress

```
callingSubaddress ATTRIBUTE
        WITH ATTRIBUTE SYNTAX   ASN1TypeModule.Subaddress;
        MATCHES FOR                     EQUALITY;
        BEHAVIOUR
                callingSubaddressBehaviour      BEHAVIOUR
        DEFINED AS
                "This attribute contains the calling party subaddress.";;
REGISTERED AS { m3650Attribute 4 };
```

### 8.4.5 Information transfer capability

```
informationTransferCapability ATTRIBUTE
        WITH ATTRIBUTE SYNTAX   ASN1TypeModule.InformationTransferCapability;
        MATCHES FOR                     EQUALITY;
```

```
        BEHAVIOUR
                informationTransferCapabilityBehaviour       BEHAVIOUR
        DEFINED AS
                "This attribute contains the information transfer capability of the call, see Recommendation
                Q.931.";;
REGISTERED AS { m3650Attribute 5 };
```

### 8.4.6 Information transfer mode

```
informationTransferMode ATTRIBUTE
        WITH ATTRIBUTE SYNTAX   ASN1TypeModule.InformationTransferMode;
        MATCHES FOR                     EQUALITY;
        BEHAVIOUR
                informationTransferModeBehaviour     BEHAVIOUR
        DEFINED AS
                "This attribute contains the information transfer mode of the call, see Recommendation
                Q.931.";;
REGISTERED AS { m3650Attribute 6 };
```

### 8.4.7 Information transfer rate

```
informationTransferRate ATTRIBUTE
        WITH ATTRIBUTE SYNTAX   ASN1TypeModule.InformationTransferRate;
        MATCHES FOR                     EQUALITY;
        BEHAVIOUR
                informationTransferRateBehaviour      BEHAVIOUR
        DEFINED AS
                "This attribute contains the information transfer capability of the call, see Recommendation
                Q.931.";;
REGISTERED AS { m3650Attribute 7 };
```

### 8.4.8 Layer 1 access delay

```
layer1AccessDelay ATTRIBUTE
        WITH ATTRIBUTE SYNTAX   ASN1TypeModule.Layer1AccessDelay;
        MATCHES FOR                     EQUALITY;
        BEHAVIOUR
                layer1AccessDelayBehaviour      BEHAVIOUR
        DEFINED AS
                "This attribute contains the several important events for layer 1 access delay. The events that did
                not happen in an aborted call get a value –1 for all integers in the TimeStamp type.";;
REGISTERED AS { m3650Attribute 8 };
```

### 8.4.9 Layer 1 access dependability

```
layer1AccessDependability ATTRIBUTE
        WITH ATTRIBUTE SYNTAX   ASN1TypeModule.Layer1AccessDependability;
        MATCHES FOR                     EQUALITY;
        BEHAVIOUR
                layer1AccessDependabilityBehaviour    BEHAVIOUR
        DEFINED AS
                "This attribute indicates successful or unsuccessful layer 1 establishment.";;
REGISTERED AS { m3650Attribute 9 };
```

### 8.4.10 Layer 1 information transfer dependability

```
layer1InformationTransferDependability ATTRIBUTE
        WITH ATTRIBUTE SYNTAX   ASN1TypeModule.Layer1InformationTransferDependability;
        MATCHES FOR                     EQUALITY;
        BEHAVIOUR
                layer1InformationTransferDependabilityBehaviour   BEHAVIOUR
        DEFINED AS
                "This attribute indicates successful or unsuccessful layer 1 information transfer. In the latter
                case, it contains the cause of the unsuccessful information transfer. For a call that was not
```

**successfully established, this attribute gets the value not applicable.";;**
**REGISTERED AS { m3650Attribute 10 };**

### 8.4.11 Layer 2 access delay

**layer2AccessDelay ATTRIBUTE**
**WITH ATTRIBUTE SYNTAX ASN1TypeModule.Layer2AccessDelay;**
**MATCHES FOR EQUALITY;**
**BEHAVIOUR**
**layer2AccessDelayBehaviour BEHAVIOUR**
**DEFINED AS**
**"This attribute contains the several important events for layer 2 access delay. The events that did not happen in an aborted call get a value 0 for all digits in the GeneralizedTime type.";;**
**REGISTERED AS { m3650Attribute 11 };**

### 8.4.12 Layer 2 access dependability

**layer2AccessDependability ATTRIBUTE**
**WITH ATTRIBUTE SYNTAX ASN1TypeModule.Layer2AccessDependability;**
**MATCHES FOR EQUALITY;**
**BEHAVIOUR**
**layer2AccessDependabilityBehaviour BEHAVIOUR**
**DEFINED AS**
**"This attribute indicates successful or unsuccessful layer 2 establishment.";;**
**REGISTERED AS { m3650Attribute 12 };**

### 8.4.13 Layer 3 access delay

**layer3AccessDelay ATTRIBUTE**
**WITH ATTRIBUTE SYNTAX ASN1TypeModule.Layer3AccessDelay;**
**MATCHES FOR EQUALITY;**
**BEHAVIOUR**
**layer3AccessDelayBehaviour BEHAVIOUR**
**DEFINED AS**
**"This attribute contains the several important events for layer 3 access delay. The events that did not happen in an aborted call get a value –1 for all integers in the TimeStamp type.";;**
**REGISTERED AS { m3650Attribute 13 };**

### 8.4.14 Layer 3 access dependability

**layer3AccessDependability ATTRIBUTE**
**WITH ATTRIBUTE SYNTAX ASN1TypeModule.Layer3AccessDependability;**
**MATCHES FOR EQUALITY;**
**BEHAVIOUR**
**layer3AccessDependabilityBehaviour BEHAVIOUR**
**DEFINED AS**
**"This attribute indicates successful or unsuccessful layer 3 establishment.";;**
**REGISTERED AS { m3650Attribute 14 };**

### 8.4.15 Layer 3 disengagement delay

**layer3DisengagementDelay ATTRIBUTE**
**WITH ATTRIBUTE SYNTAX ASN1TypeModule.Layer3DisengagementDelay;**
**MATCHES FOR EQUALITY;**
**BEHAVIOUR**
**layer3DisengagementDelayBehaviour BEHAVIOUR**
**DEFINED AS**
**"This attribute contains the several important events for layer 3 disengagement delay. The events that did not happen in an aborted call get a value –1 for all integers in the TimeStamp type.";;**
**REGISTERED AS { m3650Attribute 15 };**

### 8.4.16 Layer 3 disengagement dependability

**layer3DisengagementDependability ATTRIBUTE**
**WITH ATTRIBUTE SYNTAX ASN1TypeModule.Layer3DisengagementDependability;**

```
        MATCHES FOR                     EQUALITY;
        BEHAVIOUR
                layer3DisengagementDependabilityBehaviour BEHAVIOUR
        DEFINED AS
                "This attribute indicates successful or unsuccessful layer 3 disengagement. In the latter case, it
                contains the cause of the unsuccessful disengagement. For a call that was not successfully
                established, this attribute gets the value not applicable.";;
REGISTERED AS { m3650Attribute 16 };
```

### 8.4.17 Layer 3 information transfer dependability

```
layer3InformationTransferDependability ATTRIBUTE
        WITH ATTRIBUTE SYNTAX   ASN1TypeModule.Layer3InformationTransferDependability;
        MATCHES FOR             EQUALITY;
        BEHAVIOUR
                layer3InformationTransferDependabilityBehaviour     BEHAVIOUR
        DEFINED AS
                "This attribute indicates successful or unsuccessful information transfer. In the latter case, it
                contains the cause of the unsuccessful information transfer. For a call that was not successfully
                established, this attribute gets the value not applicable.";;
REGISTERED AS { m3650Attribute 17 };
```

### 8.4.18 Layer 3 information transfer time

```
layer3InformationTransferTime ATTRIBUTE
        WITH ATTRIBUTE SYNTAX   ASN1TypeModule.Layer3InformationTransferTime;
        MATCHES FOR             EQUALITY;
        BEHAVIOUR
                layer3InformationTransferTimeBehaviour     BEHAVIOUR
        DEFINED AS
                "This attribute contains the relevant parameters of the information transfer time of a call.";;
REGISTERED AS { m3650Attribute 18 };
```

### 8.4.19 Monitored Access Id

```
monitoredAccessId ATTRIBUTE
        WITH ATTRIBUTE SYNTAX   ASN1TypeModule.NameType;
        MATCHES FOR             EQUALITY, ORDERING;
        BEHAVIOUR
                monitoredAccessIdBehaviour     BEHAVIOUR
        DEFINED AS
                "This attribute represents the identification of the monitoredAccess managed object class.";;
REGISTERED AS { m3650Attribute 19 };
```

### 8.4.20 Type of call

```
typeOfCall ATTRIBUTE
        WITH ATTRIBUTE SYNTAX   ASN1TypeModule.TypeOfCall;
        MATCHES FOR             EQUALITY;
        BEHAVIOUR
                typeOfCallBehaviour             BEHAVIOUR
        DEFINED AS
                "This attribute specifies whether the monitored call was an incoming or an outgoing call.";;
REGISTERED AS { m3650Attribute 20 };
```

### 8.4.21 Types monitoring

```
typesMonitoring ATTRIBUTE
        WITH ATTRIBUTE SYNTAX   ASN1TypeModule.TypesMonitoring;
        MATCHES FOR             EQUALITY;
        BEHAVIOUR
                typesMonitoringBehaviour        BEHAVIOUR
        DEFINED AS
                "This attribute specifies whether layer 1, 2 and 3 outgoing calls and incoming calls have to be
```

```
            monitored or not.";;
REGISTERED AS { m3650Attribute 21 };
```

## 8.5 Actions

### 8.5.1 Start Monitoring

```
startMonitoring ACTION
        BEHAVIOUR
                startMonitoringBehaviour BEHAVIOUR
        DEFINED AS
                "This action initiates performance monitoring of the calls at the ISDN access at the
                specified time. When the action is performed while performance monitoring was already active,
                performance monitoring is continued. If the value of the TypesMonitoring attribute had been
                changed, the ISDN access or D-channel is now monitored according to the modified
                TypesMonitoring.";;
        MODE CONFIRMED;
        WITH INFORMATION SYNTAX ASN1TypeModule.MonitoringTimeStamp;
REGISTERED AS { m3650Action 1 };
```

### 8.5.2 Stop Monitoring

```
stopMonitoring ACTION
        BEHAVIOUR
                stopMonitoringBehaviour BEHAVIOUR
        DEFINED AS
                "This action ends performance monitoring of the calls at the ISDN access at the specified
                time.";;
        MODE CONFIRMED;
        WITH INFORMATION SYNTAX ASN1TypeModule.MonitoringTimeStamp;
REGISTERED AS { m3650Action 2 };
```

## 8.6 Notifications

### 8.6.1 Layer 1 performance recorded

```
layer1PerformanceRecorded NOTIFICATION
        BEHAVIOUR
                layer1PerformanceRecordedBehaviour BEHAVIOUR
        DEFINED AS
                "This notification is emitted when layer 1 is terminated or not successfully established.";;
        WITH INFORMATION SYNTAX      ASN1TypeModule.Layer1PerformanceRecorded
        AND ATTRIBUTE IDS
                        typeOfCall                          typeOfCall,
                        layer1AccessDelay                   layer1AccessDelay,
                        layer1AccessDependability           layer1AccessDependability,
                        layer1InformationTransferDependability  layer1InformationTransferDependability;
REGISTERED AS { m3650Notification 1 };
```

### 8.6.2 Layer 2 performance recorded

```
layer2PerformanceRecorded NOTIFICATION
        BEHAVIOUR
                layer2PerformanceRecordedBehaviour BEHAVIOUR
        DEFINED AS
                "This notification is emitted when layer 2 is terminated or not successfully established.";;
        WITH INFORMATION SYNTAX      ASN1TypeModule.Layer2PerformanceRecorded
        AND ATTRIBUTE IDS
                        typeOfCall                          typeOfCall,
                        layer2AccessDelay                   layer2AccessDelay,
                        layer2AccessDependability           layer2AccessDependability;
REGISTERED AS { m3650Notification 2 };
```

### 8.6.3 Layer 3 performance recorded

```
layer3PerformanceRecorded NOTIFICATION
        BEHAVIOUR
                layer3PerformanceRecordedBehaviour BEHAVIOUR
        DEFINED AS
                "This notification is emitted when layer 3 is terminated or not successfully established.";;
WITH INFORMATION SYNTAX       ASN1TypeModule.Layer3PerformanceRecorded
AND ATTRIBUTE IDS
                        typeOfCall                              typeOfCall,
                        callingNumber                           callingNumber,
                        calledNumber                            calledNumber,
                        callingSubaddress                       callingSubaddress,
                        calledSubaddress                        calledSubaddress,
                        informationTransferCapability           informationTransferCapability,
                        informationTransferMode         informationTransferMode,
                        informationTransferRate                 informationTransferRate,
                        layer3AccessDelay                       layer3AccessDelay,
                        layer3AccessDependability               layer3AccessDependability,
                        layer3InformationTransferTime           layer3InformationTransferTime,
                        layer3InformationTransferDependability  layer3InformationTransferDependability,
                        layer3DisengagementDelay                layer3DisengagementDelay,
                        layer3DisengagementDependability        layer3DisengagementDependability;
REGISTERED AS { m3650Notification 3 };
```

## 8.7 ASN.1 Type definitions module

This subclause contains the abstract syntax in ASN.1 for the management information defined in this Recommendation.

```
ASN1TypeModule { itu-t(0) recommendation(0) m(13) m3650(3650) informationModel(0) asn1Module(2)
asn1TypeModule(0)}
DEFINITIONS IMPLICIT TAGS ::=
BEGIN
-- EXPORTS everything
IMPORTS
DirectoryNumber FROM CAISDNModule {itu-t(0) recommendation(0) q(17) q824(824) informationModel(0)
asn1Module(2) asn1DefinedTypesModule(0)}
NameType FROM ASN1DefinedTypesModule {ccitt(0) recommendation(0) m(13) gnm(3100)
informationModel(0) asn1Modules(2) asn1DefinedTypesModule(0)}
TimePeriod FROM MetricModule {joint-iso-ccitt ms(9) function(2) part11(11) asn1Module(2) 0};

m3650InformationModel OBJECT IDENTIFIER ::= { itu-t(0) recommendation(0) m(13) m3650(3650)
informationModel(0)}

m3650StandardSpecificExtension OBJECT IDENTIFIER ::= { m3650InformationModel
standardSpecificExtension (0)}

m3650ManagedObjectClass OBJECT IDENTIFIER ::= { m3650InformationModel managedObjectClass (3)}

m3650Package OBJECT IDENTIFIER ::= { m3650InformationModel package(4)}

m3650NameBinding OBJECT IDENTIFIER ::= { m3650InformationModel nameBinding (6)}

m3650Attribute OBJECT IDENTIFIER ::= { m3650InformationModel attribute (7)}

m3650Action OBJECT IDENTIFIER ::= { m3650InformationModel action (9)}

m3650Notification OBJECT IDENTIFIER ::= { m3650InformationModel notification (10)}

initialTypesMonitoring     TypesMonitoring ::=  { TRUE, TRUE, TRUE, TRUE, TRUE, TRUE}
```

```
InformationTransferCapability ::= ENUMERATED          {
        speech                                  (0),
        unrestrictedDigitalInformation          (1),
        restrictedDigitalInformation            (2),
        threeDotOneKHzAudio                     (3),
        sevenKHzAudio                           (4),
        video                                   (5)}

InformationTransferMode ::= ENUMERATED                {
        circuitMode                             (0),
        packetMode                              (1)}

InformationTransferRate ::= ENUMERATED                {
        packetMode                              (0),
        kBits64                                 (1),
        kBits2x64                               (2),
        kBits384                                (3),
        kBits1536                               (4),
        kBits1920                               (5)}

Layer1AccessDelay ::= SEQUENCE {
        layer1FE1               TimeStamp,
        layer1FE2               TimeStamp,
        layer1FE3               TimeStamp,
        layer1FE4               TimeStamp}

Layer1AccessDependability ::= ENUMERATED              {
        successfulLayer1AccessDependability     (0),
        layer1Failure                           (1)}

Layer1InformationTransferDependability ::= ENUMERATED     {
        successfulInformationTransfer           (0),
        layer1Failure                           (1)}

Layer1PerformanceRecorded ::= SEQUENCE {
        typeOfCall                              TypeOfCall,
        layer1AccessDelay                       Layer1AccessDelay,
        layer1AccessDependability               Layer1AccessDependability,
        layer1InformationTransferDependability  Layer1InformationTransferDependability}

Layer2AccessDelay ::= SEQUENCE {
        layer2SABME             TimeStamp,
        layer2UA                TimeStamp}

Layer2AccessDependability ::= ENUMERATED              {
        successfulLayer2AccessDependability     (0),
        layer2Failure                           (1)}

Layer2PerformanceRecorded ::= SEQUENCE {
        typeOfCall                              TypeOfCall,
        layer2AccessDelay                       Layer2AccessDelay,
        layer2AccessDependability               Layer2AccessDependability}

Layer3AccessDelay ::= SEQUENCE {
        layer3SETUP             [0]     TimeStamp,
        layer3SETACK            [1]     TimeStamp       OPTIONAL,
        layer3INF               [2]     TimeStamp       OPTIONAL,
        layer3ALERT             [3]     TimeStamp       OPTIONAL,
        layer3CONNECT           [4]     TimeStamp       OPTIONAL}
```

```
Layer3AccessDependability ::= ENUMERATED      {
        successfulLayer3AccessDependability   (0),
        bearerCapabilityNotAvailable          (1),
        noResponseSETUPorINF                  (2),
        networkOutOfOrder                     (3),
        temporaryFailure                      (4),
        iSUPT7Expired                         (5),
        iSUPT8Expired                         (6),
        switchingEquipmentCongestion          (7),
        iSUPMessageError                      (8),
        iSUPParameterError                    (9),
        otherUnsuccessful                     (10)}

Layer3DisengagementDelay ::= SEQUENCE {
        layer3DISCONNECT      TimeStamp,
        layer3RELEASE         TimeStamp,
        layer3RELCOMP         TimeStamp,
        bChannelFree          TimeStamp}

Layer3DisengagementDependability ::= ENUMERATED    {
        successfulDisengagement  (0),
        noRELEASE                (1),
        noRELCOMP                (2),
        otherUnsuccessful        (3),
        notApplicable            (4)}

Layer3InformationTransferDependability ::= ENUMERATED                {
        successfulInformationTransfer   (0),
        destinationOutOfOrder           (1),
        t318Expired                     (2),
        temporaryFailure                (3),
        networkOutOfOrder               (4),
        otherUnsuccessful               (5),
        notApplicable                   (6)}

Layer3InformationTransferTime ::= SEQUENCE {
        numberOfSatelliteHops   INTEGER         OPTIONAL,
        propagationDelay        TimePeriod      OPTIONAL}

Layer3PerformanceRecorded ::= SEQUENCE {
        typeOfCall                              TypeOfCall,
        callingNumber                           DirectoryNumber,
        calledNumber                            DirectoryNumber,
        callingSubaddress                       Subaddress,
        calledSubaddress                        Subaddress,
        informationTransferCapability           InformationTransferCapability,
        informationTransferMode                 InformationTransferMode,
        informationTransferRate                 InformationTransferRate,
        layer3AccessDelay                       Layer3AccessDelay,
        layer3AccessDependability               Layer3AccessDependability,
        layer3InformationTransferTime           Layer3InformationTransferTime,
        layer3InformationTransferDependability  Layer3InformationTransferDependability,
        layer3DisengagementDelay                Layer3DisengagementDelay,
        layer3DisengagementDependability        Layer3DisengagementDependability}

MonitoringTimeStamp ::= GeneralizedTime

Subaddress  ::=     OCTET STRING
```

```
TimeStamp ::= SEQUENCE      {
        hours           INTEGER,        -- –1 to 23
        minutes         INTEGER,        -- –1 to 59
        seconds         INTEGER,        -- –1 to 59
        milliseconds    INTEGER}        -- –1 to 999

TypesMonitoring ::= SEQUENCE        {
        outgoingLayer1      BOOLEAN,
        incomingLayer1      BOOLEAN,
        outgoingLayer2      BOOLEAN,
        incomingLayer2      BOOLEAN,
        outgoingLayer3      BOOLEAN,
        incomingLayer3      BOOLEAN}

TypeOfCall ::= ENUMERATED {
        outgoing                        (0),
        incoming                        (1)}

END
```

## 9 Support objects from other Recommendations

The following support object classes (or their subclasses) should be used to support the performance measurements of ISDN calls management functions specified in this Recommendation:

- eventForwardingDiscriminator (defined in Recommendation X.721 [18]);
- eventLogRecord (defined in Recommendation X.721 [18]);
- log (defined in Recommendation X.721 [18]).

The following system management functions define management capabilities which are used in the management information model of the performance measurements of ISDN calls:

- event report management function [20];
- log control function [21].

## 10 Functional unit

### 10.1 Definition of functional units

Three functional units are defined in this Recommendation for performance measurements of ISDN calls:

- *iSDNLayer1PerfMeasurements functional unit*

  This functional unit supports the following Event Reporting Service:

  – Layer1 Performance Recorded Reporting Service;
- *iSDNLayer2PerfMeasurements functional unit*

  This functional unit supports the following Event Reporting Service:

  – Layer2 Performance Recorded Reporting Service;
- *iSDNLayer3PerfMeasurements functional unit*

  This functional unit supports the following Event Reporting Service:

  – Layer3 Performance Recorded Reporting Service.

To provide the mapping between the parameters for the event reports (result of the notifications) and CMIS M-EVENT-REPORT [16], [17], the Event Reporting Services are defined as follows:

The Layer1 Performance Recorded Reporting Service, the Layer2 Performance Recorded Reporting Service and the Layer3 Performance Recorded Reporting Service allow a managed system to report that a call has been completed and gives detailed information on the performance of the call.

Table 2 contains the parameters for these Event Reporting Services. The Event Information parameter will indicate which Event Reporting Service is invoked.

**Table 2/M.3650 – Event Reporting Service parameters**

| Parameter name | Req./Ind. | Rsp./Cnf. |
|---|---|---|
| Invoke Identifier | P | P |
| Mode | P | – |
| Managed Object Class | P | P |
| Managed Object Instance | P | P |
| Event Type | M | C(=) |
| Event Time | P | – |
| Event Information | M | – |
| Current Time | – | P |
| Event reply | – | C |
| Errors | – | P |
| The meaning of the symbols "M", "C" and "(=)" used in this table are the same as used in the tables for the CMISE description [16]. The symbol "P" means "subject to the constraints imposed on the parameter by CCITT Rec. X.710 \| ISO/IEC 9595". | | |

The following parameters are defined for use in the Event Reporting Service:

- Invoke Identifier: see Invoke Identifier [16].
- Mode: see Mode [16]. The values for this parameter are either confirmed or unconfirmed.
- Managed Object Class: see Managed Object Class [16]. This parameter shall indicate the monitoredAccess managed object class.
- Managed Object Instance: see Managed Object Instance [16].
- Event Type: this parameter specifies the type of event being reported and the value shall be as indicated by Table 3.

**Table 3/M.3650 – Event Type values for the Event Reporting Services**

| Event Reporting Service | Event Type value |
|---|---|
| Layer1 Performance Recorded | layer1PerformanceRecorded |
| Layer2 Performance Recorded | layer2PerformanceRecorded |
| Layer3 Performance Recorded | layer3PerformanceRecorded |

The Event Type parameter may be included in the response if the Event Reply parameter is present in the response.

- Event Time: see Event Time [16].
- Event Information: see Event Information [16]. This parameter contains a subparameter. The subparameter specifies the following information as indicated by Table 4.

**Table 4/M.3650 – Information included in Event Information Subparameter**

| Subparameter Name | Information |
|---|---|
| Layer1PerformanceRecorded | type of call, layer1 access delay, layer 1 access dependability, layer 1 information transfer dependability |
| Layer2PerformanceRecorded | type of call, layer2 access delay, layer 2 access dependability |
| Layer3PerformanceRecorded | type of call, calling number, called number, calling subaddress, called subaddress, information transfer capability, information transfer mode, information transfer rate, layer3 access delay, layer 3 access dependability, layer 3 information transfer time, layer 3 information transfer dependability, layer 3 disengagement delay, layer 3 disengagement dependability |

- Current Time: see Current Time [16].
- Event Reply: see Event Reply [16]. The inclusion of this parameter in the response is conditional upon the successful receipt of the event report in the confirmed mode.
- Errors: see Errors [16]. This parameter shall be included in a failure confirmation.

## 10.2 Negotiation of functional units

This specification assigns the following object identifier value:
**{itu(0) recommendation (0) m(13) m3650(3650) functionalUnitPackage(1)} as a value for the ASN.1 type FunctionalUnitPackageID defined in X.701 | ISO/IEC 10040 [15] to use for negotiation the following functional units:**

**0 iSDNLayer1PerfMeasurements**
**1 iSDNLayer2PerfMeasurements**
**2 iSDNLayer3PerfMeasurements**

where the numbers (0), (1) and (2) identify the bit position in the BITSTRING assigned to the functional unit.

The mechanism for negotiating the functional units is described in Recommendation X.701 | ISO/IEC 10040 [15].

# 11 Conformance

The system shall comply to the following conformance statements:

- support the role of manager or agent or both, with respect to the functional units defined in this Recommendation;
- for each dChannel, accessPortISDNBasicRate and accessPortISDNPrimaryRate managed object, it should be possible to instantiate exactly one instance of the monitoredAccess managed object;
- for each monitoredAccess managed object, it should be possible to instantiate the callPerformanceLog managed object.

The MCS and MOCS proforma for this Recommendation are defined in Annex A.

ANNEX A

**MCS and MOCS proforma**

## A.0 MCS proforma

### A.0.1 Introduction

#### A.0.1.1 Purpose and structure

The Management Conformance Summary (MCS) is a statement by a supplier that identifies an implementation and provides information on whether the implementation claims conformance to any of the listed set of documents that specify conformance requirements to OSI management.

The MCS proforma is a document in the form of a questionnaire that when completed by the supplier of an implementation becomes the MCS.

#### A.0.1.2 Instructions for completing the MCS proforma to produce an MCS[6]

The supplier of the implementation shall enter an explicit statement in each of the boxes provided. Specific instruction is provided in the text which precedes each table.

### A.0.2 Identification of the implementation

#### A.0.2.1 Date of statement

The supplier of the implementation shall enter the date of this statement in the box below. Use the format DD-MM-YYYY.

| Date of statement |
|---|
| |

#### A.0.2.2 Identification of the implementation

The supplier of the implementation shall enter information necessary to uniquely identify the implementation and the system(s) in which it may reside, in the box below.

| |
|---|
| |

6 Instructions for MCS proforma are specified in ITU-T Rec. X.724 | ISO 10165-6.

### A.0.2.3 Contact

The supplier of the implementation shall provide information on whom to contact if there are any queries concerning the content of the MCS, in the box below.

| |
|---|
| |

### A.0.3 Identification of the document in which the management information is defined

The supplier of the implementation shall enter the title, reference number and date of the publication of the document which specifies the management information to which conformance is claimed in the box below.

| Document to which conformance is claimed |
|---|
| |

### A.0.3.1 Technical corrigenda implemented

The supplier of the implementation shall enter the reference numbers of implemented technical corrigenda which modify the specification in the identified document, in the box below.

| |
|---|
| |

### A.0.3.2 Amendments implemented

The supplier of the implementation shall state the titles and reference numbers of implemented addenda to the identified document, in the box below.

| |
|---|
| |

### A.0.4 Management conformance summary

The supplier of the implementation shall provide information on whether the implementation claims conformance to any of the set of documents globally representing the implementation under claim. For each document the supplier of the implementation claims conformance to, the corresponding

conformance statement(s) shall be filled in, or referenced by, the MCS. Columns 7 (Support), 8 (Table numbers of PICS/MOCS/MRCS ) and 9 (Additional information) are to be filled in by the supplier of the implementation.

The following common notations, defined in CCITT Recommendation X.291 | ISO/IEC 9646-2 and ITU-T Recommendation X.296 | ISO/IEC 9646-7 are used for the status value column:

- m mandatory;
- o optional;
- c conditional;
- x prohibited;
- – not applicable or out of scope.

NOTE 1 – The notations "c", "m", "o", and "x" are prefixed by a "c:" when nested under a conditional or optional item of the same table.

NOTE 2 – The notation "o" may be suffixed by ".n" (where "n" is a unique number) for mutually exclusive or selectable options among a set of status values. The requirement for this numbered set shall be explicitly stated, preferably in a footnote to the relevant table.

The following common notations, defined in CCITT Recommendation X.291 | ISO/IEC 9646-2 and ITU-T Recommendation X.296 ISO/IEC 9646-7 are used for the support answer column:

- Y implemented;
- N not implemented;
- – no answer required;
- Ig the item is ignored (i.e. processed syntactically but not semantically).

In the status column, the static requirements are stated. The status will be as follows:

- m for characteristics contained in mandatory packages or in conditional packages if the GDMO condition is always true;
- o for characteristics of conditional packages with GDMO conditions that indicate static optionality, e.g. "if an instance supports it";
- cn for all other conditions, where "n" is a unique integer and "cn" is a reference to a conditional status expression.
- x for characteristics explicitly prohibited in the definition;
- – for characteristics that are not mentioned in the definition.

**Table A.0.1 – PICS support summary**

| Index | Identification of the document that includes the PICS proforma | Table numbers of PICS proforma | Description | Constraints and values | Status | Support | Table numbers of PICS | Additional information |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | | | | | | |

**Table A.0.2 – MOCS support summary**

| Index | Identification of the document that includes the MOCS proforma | Table numbers of MOCS proforma | Description | Constraints and values | Status | Support | Table numbers of MOCS | Additional information |
|---|---|---|---|---|---|---|---|---|
| 1 | "ITU-T Rec. M.3650 (1996)" | A.1.1-A.1.10 | callPerformanceLog | | | | A.1.1-A.1.10 | |
| 2 | "ITU-T Rec. M.3650 (1996)" | A.2.1-A.2.10 | layer1PerformanceLogRecord | | | | A.2.1-A.2.10 | |
| 3 | "ITU-T Rec. M.3650 (1996)" | A.3.1-A.3.10 | layer2PerformanceLogRecord | | | | A.3.1-A.3.10 | |
| 4 | "ITU-T Rec. M.3650 (1996)" | A.4.1-A.4.10 | layer3PerformanceLogRecord | | | | A.4.1-A.4.10 | |
| 5 | "ITU-T Rec. M.3650 (1996)" | A.5.1-A.5.10 | monitoredAccess | | | | A.5.1-A.5.10 | |

**Table A.0.3 – MRCS support summary**

| Index | Identification of the document that includes the MRCS proforma | Table numbers of MRCS proforma | Description | Constraints and values | Status | Support | Table numbers of MRCS | Additional information |
|---|---|---|---|---|---|---|---|---|
| 1 | "ITU-T Rec. M.3650 (1996)" | A.1.10 | callPerformanceLog-monitoredAccess | | | | A.1.10 | |
| 2 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992" | A.1.10 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992":log-system | | | | A.1.10 | |
| 3 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992" | A.2.10 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992":logRecord-log | | | | A.2.10 | |
| 4 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992" | A.3.10 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992":logRecord-log | | | | A.3.10 | |
| 5 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992" | A.4.10 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992":logRecord-log | | | | A.4.10 | |
| 6 | "ITU-T Rec. M.3650 (1996)" | A.5.10 | monitoredAccess-accessPortISDN | | | | A.5.10 | |
| 7 | "ITU-T Rec. M.3650 (1996)" | A.5.10 | monitoredAccess-dChannel | | | | A.5.10 | |

## A.1 MOCS proforma

### A.1.1 Introduction

The purpose of this MOCS proforma is to provide a mechanism for a supplier of an implementation which claims conformance to a managed object class to provide conformance information in a standard form.

### A.1.1.1 Instructions for completing the MOCS proforma to produce a MOCS[7]

The supplier of the implementation shall state which items are supported in the tables below and if necessary provide additional information.

### A.1.1.2 Statement of conformance to the managed object class

These tables have been prepared without regard to manager or agent role, so they can be used in either situation. An implementation that supports both roles could either use one set of tables if all support details are the same, or a different set of tables for each role.

These tables were generated mechanically from the GDMO templates, with additions and clarifications added by hand.

These tables have columns for the "Base Status" and the "Profile Status", where the entries are identical, allowing the tables to be used directly. Other profiles, such as an Ensemble, may modify these tables by replacing the "Profile Status" entries, using the normal rules for defining a profile.

## A.1.2 CallPerformanceLog

**Table A.1.1 – callPerformanceLog Managed object class support**

| Index | Managed object class template label | Value of object identifier for class | Support of all mandatory features? (Y/N) | Is the actual class the same as the managed object class to which conformance is claimed? (Y/N) |
|---|---|---|---|---|
| 1 | callPerformanceLog | {0 0 13 3650 0 3 1} | | |

**Table A.1.2 – callPerformanceLog Actual class support**

| Index | Managed object class template for actual class | Value of object identifier for managed object class definition of actual class | Additional information |
|---|---|---|---|
| | | | |
| | | | |

[7] Instructions for MOCS proforma are specified in ITU-T Rec. X.724 | ISO/IEC 10165-6.

## Table A.1.3 – callPerformanceLog Package support

| Index | Package template label | Value of object identifier for package | Constraints and values | Status | Support | Additional information |
|---|---|---|---|---|---|---|
| 1 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": allomorphicPackage | {2 9 3 2 4 17} | "if an object supports allomorphism" | o | | |
| 2 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": availabilityStatusPackage | {2 9 3 2 4 22} | "any of the scheduling packages (duration, weekly scheduling, external) are present. The presence of this package makes available the off-duty value of the available status attribute to the object." | c1 | | |
| 3 | callPerformanceLog-package | {0 0 13 3650 0 4 1} | Mandatory | m | | |
| 4 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": dailyScheduling | {2 9 3 2 4 25} | "both the weekly scheduling package and external scheduler packages are not present in an instance and daily scheduling is supported by that instance." | c2 | | |
| 5 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": duration | {2 9 3 2 4 26} | "the logging function is scheduled to start at a specified time and stop at either a specified time or function continuously." | c3 | | |
| 6 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": externalScheduler | {2 9 3 2 4 27} | "both the daily scheduling package and weekly scheduling packages are not present in an instance and external scheduling is supported by that instance." | c4 | | |
| 7 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": finiteLogSizePackage | {2 9 3 2 4 12} | "an instance supports it" | o | | |
| 8 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": logAlarmPackage | {2 9 3 2 4 13} | "a log is of finite size and halts logging when the availability status has the log full value." | c5 | | |
| 9 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": logPackage | | Mandatory | m | | |
| 10 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": packagesPackage | {2 9 3 2 4 16} | "any registered package, other than this package has been instantiated" | c6 | | |
| 11 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": topPackage | | Mandatory | m | | |
| 12 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": weeklyScheduling | {2 9 3 2 4 29} | "both the daily scheduling package and external scheduler packages are not present in an instance and weekly scheduling is supported by that instance." | c7 | | |

## Table A.1.4 – callPerformanceLog Attribute support

| | | | | Set by create | | Get | | Replace | |
|---|---|---|---|---|---|---|---|---|---|
| **Index** | **Attribute template label** | **Value of object identifier for attribute** | **Constraints and values** | **Status** | **Support** | **Status** | **Support** | **Status** | **Support** |
| 1 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": administrativeState | {2 9 3 2 7 31} | ENUMERATED | m | | m | | m | |
| 2 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": allomorphs | {2 9 3 2 7 50} | SET OF CHOICE | – | | o | | – | |
| 3 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": availabilityStatus | {2 9 3 2 7 33} | SET OF INTEGER | – | | m | | – | |
| 4 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": availabilityStatus | {2 9 3 2 7 33} | SET OF INTEGER | – | | – | | – | |
| 5 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": capacityAlarmThreshold | {2 9 3 2 7 52} | SET OF INTEGER | c5 | | c5 | | c5 | |
| 6 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": currentLogSize | {2 9 3 2 7 54} | INTEGER | – | | o | | – | |
| 7 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": discriminatorConstruct | {2 9 3 2 7 56} | CHOICE | m | | m | | m | |
| 8 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": intervalsOfDay | {2 9 3 2 7 57} | SET OF SEQUENCE | c2 | | c2 | | c2 | |
| 9 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": logFullAction | {2 9 3 2 7 58} | ENUMERATED | m | | m | | m | |
| 10 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": logId | {2 9 3 2 7 2} | CHOICE | – | | m | | – | |
| 11 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": maxLogSize | {2 9 3 2 7 62} | INTEGER | o | | o | | o | |
| 12 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": nameBinding | {2 9 3 2 7 63} | OBJECT IDENTIFIER | o | | m | | – | |

**Table A.1.4 – callPerformanceLog Attribute support** *(continued)*

| | | | | Set by create | | Get | | Replace | |
|---|---|---|---|---|---|---|---|---|---|
| **Index** | **Attribute template label** | **Value of object identifier for attribute** | **Constraints and values** | **Status** | **Support** | **Status** | **Support** | **Status** | **Support** |
| 13 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": numberOfRecords | {2 9 3 2 7 64} | INTEGER | – | | o | | – | |
| 14 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": objectClass | {2 9 3 2 7 65} | CHOICE | – | | m | | – | |
| 15 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": operationalState | {2 9 3 2 7 35} | ENUMERATED | – | | m | | – | |
| 16 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": packages | {2 9 3 2 7 66} | SET OF OBJECT IDENTIFIER | o | | c6 | | – | |
| 17 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": schedulerName | {2 9 3 2 7 67} | CHOICE | – | | c4 | | – | |
| 18 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": startTime | {2 9 3 2 7 68} | GeneralizedTime | c3 | | c3 | | c3 | |
| 19 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": stopTime | {2 9 3 2 7 69} | CHOICE | c3 | | c3 | | c3 | |
| 20 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": weekMask | {2 9 3 2 7 71} | SET OF SEQUENCE | c7 | | c7 | | c7 | |

**Table A.1.4 – callPerformanceLog Attribute support** *(concluded)*

| | Add | | Remove | | Set to default | | |
|---|---|---|---|---|---|---|---|
| **Index** | **Status** | **Support** | **Status** | **Support** | **Status** | **Support** | **Additional information** |
| 1 | – | | – | | – | | |
| 2 | – | | – | | – | | |
| 3 | – | | – | | – | | |
| 4 | – | | – | | – | | |
| 5 | c5 | | c5 | | – | | |
| 6 | – | | – | | – | | |
| 7 | – | | – | | – | | |
| 8 | c2 | | c2 | | c2 | | |

**Table A.1.4 – callPerformanceLog Attribute support** *(concluded)*

| | Add | | Remove | | Set to default | | |
|---|---|---|---|---|---|---|---|
| **Index** | **Status** | **Support** | **Status** | **Support** | **Status** | **Support** | **Additional information** |
| 9 | – | | – | | – | | |
| 10 | – | | – | | – | | |
| 11 | – | | – | | – | | |
| 12 | – | | – | | – | | |
| 13 | – | | – | | – | | |
| 14 | – | | – | | – | | |
| 15 | – | | – | | – | | |
| 16 | – | | – | | – | | |
| 17 | – | | – | | – | | |
| 18 | – | | – | | – | | |
| 19 | – | | – | | c3 | | |
| 20 | c7 | | c7 | | c7 | | |

**Table A.1.5 – callPerformanceLog Attribute group support**

There are no attribute groups specified for this managed object class.

**Table A.1.6 – callPerformanceLog Action support**

There are no actions specified for this managed object class.

**Table A.1.7 – callPerformanceLog Notification support**

| | | | | | Support | | |
|---|---|---|---|---|---|---|---|
| **Index** | **Notification type template label** | **Value of object identifier for notification type** | **Constraints and values** | **Status** | **Confirmed** | **Non-confirmed** | **Additional information** |
| 1 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": attributeValueChange | {2 9 3 2 10 1} | | m | | | |
| 2 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": objectCreation | {2 9 3 2 10 6} | | m | | | |
| 3 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": objectDeletion | {2 9 3 2 10 7} | | m | | | |

## Table A.1.7 – callPerformanceLog Notification support *(continued)*

| Index | Notification type template label | Value of object identifier for notification type | Constraints and values | Status | Support | | Additional information |
|---|---|---|---|---|---|---|---|
| | | | | | Confirmed | Non-confirmed | |
| 4 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": processingErrorAlarm | {2 9 3 2 10 10} | | m | | | |
| 5 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": stateChange | {2 9 3 2 10 14} | | m | | | |

## Table A.1.7 – callPerformanceLog Notification support *(concluded)*

| Index | Subindex | Notification field name label | Value of object identifier of attribute type associated with field | Constraints and values | Status | Support | Additional information |
|---|---|---|---|---|---|---|---|
| 1 | 1.1 | AttributeValueChangeInfo | | **Information Syntax** SEQUENCE | m | | |
| | 1.1.1 | sourceIndicator | {2 9 3 2 7 26} | ENUMERATED | o | | |
| | 1.1.2 | attributeIdentifierList | {2 9 3 2 7 8} | SET OF CHOICE | o | | |
| | 1.1.2.1 | globalForm | – | OBJECT IDENTIFIER | c:o.1 | | |
| | 1.1.2.2 | localForm | – | INTEGER | c:o.1 | | |
| | 1.1.3 | attributeValueChangeDefinition | {2 9 3 2 7 10} | SET OF SEQUENCE | m | | |
| | 1.1.3.1 | attributeID | – | CHOICE | m | | |
| | 1.1.3.1.1 | globalForm | – | OBJECT IDENTIFIER | o.2 | | |
| | 1.1.3.1.2 | localForm | – | INTEGER | o.2 | | |
| | 1.1.3.2 | oldAttributeValue | – | ANY DEFINED BY attributeID | o | | |
| | 1.1.3.3 | newAttributeValue | – | ANY DEFINED BY attributeID | m | | |
| | 1.1.4 | notificationIdentifier | {2 9 3 2 7 16} | INTEGER | o | | |
| | 1.1.5 | correlatedNotifications | {2 9 3 2 7 12} | SET OF SEQUENCE | o | | |
| | 1.1.5.1 | correlatedNotifications | {2 9 3 2 7 12} | SET OF INTEGER | c:m | | |
| | 1.1.5.2 | sourceObjectInst | – | CHOICE | c:o | | |
| | 1.1.5.2.1 | distinguishedName | – | SEQUENCE OF SET OF SEQUENCE | c:o.3 | | |
| | 1.1.5.2.1.1 | type | – | OBJECT IDENTIFIER | c:m | | |
| | 1.1.5.2.1.2 | value | – | ANY | c:m | | |

## Table A.1.7 – callPerformanceLog Notification support *(concluded)*

| Index | Subindex | Notification field name label | Value of object identifier of attribute type associated with field | Constraints and values | Status | Support | Additional information |
|---|---|---|---|---|---|---|---|
| | 1.1.5.2.2 | nonSpecificForm | – | OCTET STRING | c:o.3 | | |
| | 1.1.5.2.3 | localDistinguishedName | – | SEQUENCE OF SET OF SEQUENCE | c:o.3 | | |
| | 1.1.5.2.3.1 | type | – | OBJECT IDENTIFIER | c:m | | |
| | 1.1.5.2.3.2 | value | – | ANY | c:m | | |
| | 1.1.6 | additionalText | {2 9 3 2 7 7} | GraphicString | o | | |
| | 1.1.7 | additionalInformation | {2 9 3 2 7 6} | SET OF SEQUENCE | o | | |
| | 1.1.7.1 | identifier | – | OBJECT IDENTIFIER | c:m | | |
| | 1.1.7.2 | significance | – | BOOLEAN | c:o | | |
| | 1.1.7.3 | information | – | ANY DEFINED BY identifier | c:m | | |
| 2 | 2.1 | ObjectInfo | | **Information Syntax** SEQUENCE | m | | |
| | 2.1.1 | sourceIndicator | {2 9 3 2 7 26} | ENUMERATED | o | | |
| | 2.1.2 | attributeList | {2 9 3 2 7 9} | SET OF SEQUENCE | o | | |
| | 2.1.2.1 | attributeId | – | CHOICE | c:m | | |
| | 2.1.2.1.1 | globalForm | – | OBJECT IDENTIFIER | c:o.4 | | |
| | 2.1.2.1.2 | localForm | – | INTEGER | c:o.4 | | |
| | 2.1.2.2 | attributeValue | – | ANY DEFINED BY attributeId | c:m | | |
| | 2.1.3 | notificationIdentifier | {2 9 3 2 7 16} | INTEGER | o | | |
| | 2.1.4 | correlatedNotifications | {2 9 3 2 7 12} | SET OF SEQUENCE | o | | |
| | 2.1.4.1 | correlatedNotifications | {2 9 3 2 7 12} | SET OF INTEGER | c:m | | |
| | 2.1.4.2 | sourceObjectInst | – | CHOICE | c:o | | |
| | 2.1.4.2.1 | distinguishedName | – | SEQUENCE OF SET OF SEQUENCE | c:o.5 | | |
| | 2.1.4.2.1.1 | type | – | OBJECT IDENTIFIER | c:m | | |
| | 2.1.4.2.1.2 | value | – | ANY | c:m | | |
| | 2.1.4.2.2 | nonSpecificForm | – | OCTET STRING | c:o.5 | | |
| | 2.1.4.2.3 | localDistinguishedName | – | SEQUENCE OF SET OF SEQUENCE | c:o.5 | | |
| | 2.1.4.2.3.1 | type | – | OBJECT IDENTIFIER | c:m | | |
| | 2.1.4.2.3.2 | value | – | ANY | c:m | | |

## Table A.1.7 – callPerformanceLog Notification support *(concluded)*

| Index | Subindex | Notification field name label | Value of object identifier of attribute type associated with field | Constraints and values | Status | Support | Additional information |
|---|---|---|---|---|---|---|---|
| | 2.1.5 | additionalText | {2 9 3 2 7 7} | GraphicString | o | | |
| | 2.1.6 | additionalInformation | {2 9 3 2 7 6} | SET OF SEQUENCE | o | | |
| | 2.1.6.1 | identifier | – | OBJECT IDENTIFIER | c:m | | |
| | 2.1.6.2 | significance | – | BOOLEAN | c:o | | |
| | 2.1.6.3 | information | – | ANY DEFINED BY identifier | c:m | | |
| 3 | 3.1 | ObjectInfo | | **Information Syntax** SEQUENCE | m | | |
| | 3.1.1 | sourceIndicator | {2 9 3 2 7 26} | ENUMERATED | o | | |
| | 3.1.2 | attributeList | {2 9 3 2 7 9} | SET OF SEQUENCE | o | | |
| | 3.1.2.1 | attributeId | – | CHOICE | c:m | | |
| | 3.1.2.1.1 | globalForm | – | OBJECT IDENTIFIER | c:o.6 | | |
| | 3.1.2.1.2 | localForm | – | INTEGER | c:o.6 | | |
| | 3.1.2.2 | attributeValue | – | ANY DEFINED BY attributeId | c:m | | |
| | 3.1.3 | notificationIdentifier | {2 9 3 2 7 16} | INTEGER | o | | |
| | 3.1.4 | correlatedNotifications | {2 9 3 2 7 12} | SET OF SEQUENCE | o | | |
| | 3.1.4.1 | correlatedNotifications | {2 9 3 2 7 12} | SET OF INTEGER | c:m | | |
| | 3.1.4.2 | sourceObjectInst | – | CHOICE | c:o | | |
| | 3.1.4.2.1 | distinguishedName | – | SEQUENCE OF SET OF SEQUENCE | c:o.7 | | |
| | 3.1.4.2.1.1 | type | – | OBJECT IDENTIFIER | c:m | | |
| | 3.1.4.2.1.2 | value | – | ANY | c:m | | |
| | 3.1.4.2.2 | nonSpecificForm | – | OCTET STRING | c:o.7 | | |
| | 3.1.4.2.3 | localDistinguishedName | – | SEQUENCE OF SET OF SEQUENCE | c:o.7 | | |
| | 3.1.4.2.3.1 | type | – | OBJECT IDENTIFIER | c:m | | |
| | 3.1.4.2.3.2 | value | – | ANY | c:m | | |
| | 3.1.5 | additionalText | {2 9 3 2 7 7} | GraphicString | o | | |
| | 3.1.6 | additionalInformation | {2 9 3 2 7 6} | SET OF SEQUENCE | o | | |
| | 3.1.6.1 | identifier | – | OBJECT IDENTIFIER | c:m | | |

## Table A.1.7 – callPerformanceLog Notification support *(concluded)*

| Index | Subindex | Notification field name label | Value of object identifier of attribute type associated with field | Constraints and values | Status | Support | Additional information |
|---|---|---|---|---|---|---|---|
| | 3.1.6.2 | significance | – | BOOLEAN | c:o | | |
| | 3.1.6.3 | information | – | ANY DEFINED BY identifier | c:m | | |
| 4 | 4.1 | AlarmInfo | | **Information Syntax** SEQUENCE | m | | |
| | 4.1.1 | probableCause | {2 9 3 2 7 18} | CHOICE | m | | |
| | 4.1.1.1 | globalValue | – | OBJECT IDENTIFIER | o.8 | | |
| | 4.1.1.2 | localValue | – | INTEGER | o.8 | | |
| | 4.1.2 | specificProblems | {2 9 3 2 7 27} | SET OF OBJECT IDENTIFIER | o | | |
| | 4.1.3 | perceivedSeverity | {2 9 3 2 7 17} | ENUMERATED | m | | |
| | 4.1.4 | backedUpStatus | {2 9 3 2 7 11} | BOOLEAN | o | | |
| | 4.1.5 | backUpObject | {2 9 3 2 7 40} | CHOICE | o | | |
| | 4.1.5.1 | distinguishedName | – | SEQUENCE OF SET OF SEQUENCE | c:o.9 | | |
| | 4.1.5.1.1 | type | – | OBJECT IDENTIFIER | c:m | | |
| | 4.1.5.1.2 | value | – | ANY | c:m | | |
| | 4.1.5.2 | nonSpecificForm | – | OCTET STRING | c:o.9 | | |
| | 4.1.5.3 | localDistinguishedName | – | SEQUENCE OF SET OF SEQUENCE | c:o.9 | | |
| | 4.1.5.3.1 | type | – | OBJECT IDENTIFIER | c:m | | |
| | 4.1.5.3.2 | value | – | ANY | c:m | | |
| | 4.1.6 | trendIndication | {2 9 3 2 7 30} | ENUMERATED | o | | |
| | 4.1.7 | thresholdInfo | {2 9 3 2 7 29} | SEQUENCE | o | | |
| | 4.1.7.1 | triggeredThreshold | – | CHOICE | c:m | | |
| | 4.1.7.1.1 | globalForm | – | OBJECT IDENTIFIER | c:o.10 | | |
| | 4.1.7.1.2 | localForm | – | INTEGER | c:o.10 | | |
| | 4.1.7.2 | observedValue | – | CHOICE | c:m | | |
| | 4.1.7.2.1 | integer | – | INTEGER | c:o.11 | | |
| | 4.1.7.2.2 | real | – | REAL | c:o.11 | | |
| | 4.1.7.3 | thresholdLevel | – | CHOICE | c:o | | |
| | 4.1.7.3.1 | up | – | SEQUENCE | c:o.12 | | |
| | 4.1.7.3.1.1 | high | – | CHOICE | c:m | | |
| | 4.1.7.3.1.1.1 | integer | – | INTEGER | c:o.13 | | |
| | 4.1.7.3.1.1.2 | real | – | REAL | c:o.13 | | |
| | 4.1.7.3.1.2 | low | – | CHOICE | c:o | | |

## Table A.1.7 – callPerformanceLog Notification support *(concluded)*

| Index | Subindex | Notification field name label | Value of object identifier of attribute type associated with field | Constraints and values | Status | Support | Additional information |
|---|---|---|---|---|---|---|---|
| | 4.1.7.3.1.2.1 | integer | – | INTEGER | c:o.14 | | |
| | 4.1.7.3.1.2.2 | real | – | REAL | c:o.14 | | |
| | 4.1.7.3.2 | down | – | SEQUENCE | c:o.12 | | |
| | 4.1.7.3.2.1 | high | – | CHOICE | c:m | | |
| | 4.1.7.3.2.1.1 | integer | – | INTEGER | c:o.15 | | |
| | 4.1.7.3.2.1.2 | real | – | REAL | c:o.15 | | |
| | 4.1.7.3.2.2 | low | – | CHOICE | c:m | | |
| | 4.1.7.3.2.2.1 | integer | – | INTEGER | c:o.16 | | |
| | 4.1.7.3.2.2.2 | real | – | REAL | c:o.16 | | |
| | 4.1.7.4 | armTime | – | GeneralizedTime | c:o | | |
| | 4.1.8 | notificationIdentifier | {2 9 3 2 7 16} | INTEGER | o | | |
| | 4.1.9 | correlatedNotifications | {2 9 3 2 7 12} | SET OF SEQUENCE | o | | |
| | 4.1.9.1 | correlatedNotifications | {2 9 3 2 7 12} | SET OF INTEGER | c:m | | |
| | 4.1.9.2 | sourceObjectInst | – | CHOICE | c:o | | |
| | 4.1.9.2.1 | distinguishedName | – | SEQUENCE OF SET OF SEQUENCE | c:o.17 | | |
| | 4.1.9.2.1.1 | type | – | OBJECT IDENTIFIER | c:m | | |
| | 4.1.9.2.1.2 | value | – | ANY | c:m | | |
| | 4.1.9.2.2 | nonSpecificForm | – | OCTET STRING | c:o.17 | | |
| | 4.1.9.2.3 | localDistinguishedName | – | SEQUENCE OF SET OF SEQUENCE | c:o.17 | | |
| | 4.1.9.2.3.1 | type | – | OBJECT IDENTIFIER | c:m | | |
| | 4.1.9.2.3.2 | value | – | ANY | c:m | | |
| | 4.1.10 | stateChangeDefinition | {2 9 3 2 7 28} | SET OF SEQUENCE | o | | |
| | 4.1.10.1 | attributeID | – | CHOICE | c:m | | |
| | 4.1.10.1.1 | globalForm | – | OBJECT IDENTIFIER | c:o.18 | | |
| | 4.1.10.1.2 | localForm | – | INTEGER | c:o.18 | | |
| | 4.1.10.2 | oldAttributeValue | – | ANY DEFINED BY attributeID | c:o | | |
| | 4.1.10.3 | newAttributeValue | – | ANY DEFINED BY attributeID | c:m | | |
| | 4.1.11 | monitoredAttributes | {2 9 3 2 7 15} | SET OF SEQUENCE | o | | |
| | 4.1.11.1 | attributeId | – | CHOICE | c:m | | |
| | 4.1.11.1.1 | globalForm | – | OBJECT IDENTIFIER | c:o.19 | | |
| | 4.1.11.1.2 | localForm | – | INTEGER | c:o.19 | | |

## Table A.1.7 – callPerformanceLog Notification support *(concluded)*

| Index | Subindex | Notification field name label | Value of object identifier of attribute type associated with field | Constraints and values | Status | Support | Additional information |
|---|---|---|---|---|---|---|---|
| | 4.1.11.2 | attributeValue | – | ANY DEFINED BY attributeId | c:m | | |
| | 4.1.12 | proposedRepairActions | {2 9 3 2 7 19} | SET OF OBJECT IDENTIFIER | o | | |
| | 4.1.13 | additionalText | {2 9 3 2 7 7} | GraphicString | o | | |
| | 4.1.14 | additionalInformation | {2 9 3 2 7 6} | SET OF SEQUENCE | o | | |
| | 4.1.14.1 | identifier | – | OBJECT IDENTIFIER | c:m | | |
| | 4.1.14.2 | significance | – | BOOLEAN | c:o | | |
| | 4.1.14.3 | information | – | ANY DEFINED BY identifier | c:m | | |
| 5 | 5.1 | StateChangeInfo | | **Information Syntax** SEQUENCE | m | | |
| | 5.1.1 | sourceIndicator | {2 9 3 2 7 26} | ENUMERATED | o | | |
| | 5.1.2 | attributeIdentifierList | {2 9 3 2 7 8} | SET OF CHOICE | o | | |
| | 5.1.2.1 | globalForm | – | OBJECT IDENTIFIER | c:o.20 | | |
| | 5.1.2.2 | localForm | – | INTEGER | c:o.20 | | |
| | 5.1.3 | stateChangeDefinition | {2 9 3 2 7 28} | SET OF SEQUENCE | m | | |
| | 5.1.3.1 | attributeID | – | CHOICE | m | | |
| | 5.1.3.1.1 | globalForm | – | OBJECT IDENTIFIER | o.21 | | |
| | 5.1.3.1.2 | localForm | – | INTEGER | o.21 | | |
| | 5.1.3.2 | oldAttributeValue | – | ANY DEFINED BY attributeID | o | | |
| | 5.1.3.3 | newAttributeValue | – | ANY DEFINED BY attributeID | m | | |
| | 5.1.4 | notificationIdentifier | {2 9 3 2 7 16} | INTEGER | o | | |
| | 5.1.5 | correlatedNotifications | {2 9 3 2 7 12} | SET OF SEQUENCE | o | | |
| | 5.1.5.1 | correlatedNotifications | {2 9 3 2 7 12} | SET OF INTEGER | c:m | | |
| | 5.1.5.2 | sourceObjectInst | – | CHOICE | c:o | | |
| | 5.1.5.2.1 | distinguishedName | – | SEQUENCE OF SET OF SEQUENCE | c:o.22 | | |
| | 5.1.5.2.1.1 | type | – | OBJECT IDENTIFIER | c:m | | |
| | 5.1.5.2.1.2 | value | – | ANY | c:m | | |
| | 5.1.5.2.2 | nonSpecificForm | – | OCTET STRING | c:o.22 | | |
| | 5.1.5.2.3 | localDistinguishedName | – | SEQUENCE OF SET OF SEQUENCE | c:o.22 | | |

**Table A.1.7 – callPerformanceLog Notification support** *(concluded)*

| Index | Subindex | Notification field name label | Value of object identifier of attribute type associated with field | Constraints and values | Status | Support | Additional information |
|---|---|---|---|---|---|---|---|
| | 5.1.5.2.3.1 | type | – | OBJECT IDENTIFIER | c:m | | |
| | 5.1.5.2.3.2 | value | – | ANY | c:m | | |
| | 5.1.6 | additionalText | {2 9 3 2 7 7} | GraphicString | o | | |
| | 5.1.7 | additionalInformation | {2 9 3 2 7 6} | SET OF SEQUENCE | o | | |
| | 5.1.7.1 | identifier | – | OBJECT IDENTIFIER | c:m | | |
| | 5.1.7.2 | significance | – | BOOLEAN | c:o | | |
| | 5.1.7.3 | information | – | ANY DEFINED BY identifier | c:m | | |

**Table A.1.8 – callPerformanceLog Parameter support**

There are no parameters specified for this managed object class.

**Table A.1.9 – callPerformanceLog Conditions**

| Condition number | Condition | Reference |
|---|---|---|
| c1 | IF 1.3/2 THEN m ELSE – | "any of the scheduling packages (duration, weekly scheduling, external) are present. The presence of this package makes available the off-duty value of the available status attribute to the object." |
| c2 | IF 1.3/4 THEN m ELSE – | "both the weekly scheduling package and external scheduler packages are not present in an instance and daily scheduling is supported by that instance." |
| c3 | IF 1.3/5 THEN m ELSE – | "the logging function is scheduled to start at a specified time and stop at either a specified time or function continuously." |
| c4 | IF 1.3/6 THEN m ELSE – | "both the daily scheduling package and weekly scheduling packages are not present in an instance and external scheduling is supported by that instance." |
| c5 | IF 1.3/8 THEN m ELSE – | "a log is of finite size and halts logging when the availability status has the log full value." |
| c6 | IF 1.3/10 THEN m ELSE – | "any registered package, other than this package, has been instantiated" |
| c7 | IF 1.3/12 THEN m ELSE – | "both the daily scheduling package and external scheduler packages are not present in an instance and weekly scheduling is supported by that instance." |

**Table A.1.10 – callPerformanceLog Name Binding support**

| Index | Name binding template label | Value of object identifier for name binding | Constraints and values | Status | Support | Additional information |
|---|---|---|---|---|---|---|
| 1 | callPerformanceLog-monitoredAccess | {0 0 13 3650 0 6 1} | Superior class: monitoredAccess AND SUBCLASSES | o | | |
| 2 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": log-system | {2 9 3 2 6 2} | Superior class: "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": system AND SUBCLASSES | o | | |

**Table A.1.10 – callPerformanceLog Name Binding support** *(concluded)*

| Index | Subindex | Operation | Constraints and values | Status | Support | Additional information |
|---|---|---|---|---|---|---|
| 1 | 1.1 | Create support | | c:m | | |
| | 1.2 | Create with reference object | | c:m | | |
| | 1.3 | Create with automatic instance naming | | c:m | | |
| | 1.4 | Delete support | | c:m | | |
| | 1.5 | Delete only if no contained objects | | c:x | | |
| | 1.6 | Delete contained objects | | c:m | | |
| 2 | 2.1 | Create support | | c:m | | |
| | 2.2 | Create with reference object | | c:m | | |
| | 2.3 | Create with automatic instance naming | | c:m | | |
| | 2.4 | Delete support | | c:m | | |
| | 2.5 | Delete only if no contained objects | | c:m | | |
| | 2.6 | Delete contained objects | | c:x | | |

## A.2 layer1PerformanceLogRecord

**Table A.2.1 – layer1PerformanceLogRecord Managed object class support**

| Index | Managed object class template label | Value of object identifier for class | Support of all mandatory features? (Y/N) | Is the actual class the same as the managed object class to which conformance is claimed? (Y/N) |
|---|---|---|---|---|
| 1 | layer1PerformanceLogRecord | {0 0 13 3650 0 3 2} | | |

## Table A.2.2 – layer1PerformanceLogRecord Actual class support

| Index | Managed object class template for actual class | Value of object identifier for managed object class definition of actual class | Additional information |
|---|---|---|---|
| | | | |
| | | | |

## Table A.2.3 – layer1PerformanceLogRecord Package support

| Index | Package template label | Value of object identifier for package | Constraints and values | Status | Support | Additional information |
|---|---|---|---|---|---|---|
| 1 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": additionalInformation Package | {2 9 3 2 4 18} | "the Additional information parameter is present in the notification or report corresponding to the instance of event record or an instance of its subclasses" | c1 | | |
| 2 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": additionalTextPackage | {2 9 3 2 4 19} | "the Additional text parameter is present in the notification or report corresponding to the instance of event record or an instance of its subclasses" | c2 | | |
| 3 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": allomorphicPackage | {2 9 3 2 4 17} | "if an object supports allomorphism" | o | | |
| 4 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": correlatedNotifications Package | {2 9 3 2 4 23} | "the correlatedNotifications parameter is present in the notification or event report corresponding to the instance of an event record or an instance of its subclasses" | c3 | | |
| 5 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": eventLogRecordPackage | | Mandatory | m | | |
| 6 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": eventTimePackage | {2 9 3 2 4 11} | "the event time parameter was present in the received event report" | c4 | | |
| 7 | layer1PerformanceLog Record-package | {0 0 13 3650 0 4 2} | Mandatory | m | | |
| 8 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": logRecordPackage | | Mandatory | m | | |
| 9 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": notificationIdentifier Package | {2 9 3 2 4 24} | "the notification Identifier parameter is present in the notification or event report corresponding to the instance of an event record or an instance of its subclasses" | c5 | | |

## Table A.2.3 – layer1PerformanceLogRecord Package support *(continued)*

| Index | Package template label | Value of object identifier for package | Constraints and values | Status | Support | Additional information |
|---|---|---|---|---|---|---|
| 10 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": packagesPackage | {2 9 3 2 4 16} | "any registered package, other than this package, has been instantiated" | c6 | | |
| 11 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": topPackage | | Mandatory | m | | |

## Table A.2.4 – layer1PerformanceLogRecord Attribute support

| | | | | Set by create | | Get | | Replace | |
|---|---|---|---|---|---|---|---|---|---|
| Index | Attribute template label | Value of object identifier for attribute | Constraints and values | Status | Support | Status | Support | Status | Support |
| 1 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": additionalInformation | {2 9 3 2 7 6} | SET OF SEQUENCE | – | | c1 | | – | |
| 2 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": additionalText | {2 9 3 2 7 7} | GraphicString | – | | c2 | | – | |
| 3 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": allomorphs | {2 9 3 2 7 50} | SET OF CHOICE | – | | o | | – | |
| 4 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": correlatedNotifications | {2 9 3 2 7 12} | SET OF SEQUENCE | – | | c3 | | – | |
| 5 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": eventTime | {2 9 3 2 7 13} | GeneralizedTime | – | | c4 | | – | |
| 6 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": eventType | {2 9 3 2 7 14} | CHOICE | – | | m | | – | |
| 7 | layer1AccessDelay | {0 0 13 3650 0 7 8} | SEQUENCE | – | | m | | – | |
| 8 | layer1AccessDependability | {0 0 13 3650 0 7 9} | ENUMERATED | – | | m | | – | |
| 9 | layer1InformationTransfer Dependability | {0 0 13 3650 0 7 10} | ENUMERATED | – | | m | | – | |
| 10 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": logRecordId | {2 9 3 2 7 3} | CHOICE | – | | m | | – | |

## Table A.2.4 – layer1PerformanceLogRecord Attribute support *(continued)*

| | | | | Set by create | | Get | | Replace | |
|---|---|---|---|---|---|---|---|---|---|
| **Index** | **Attribute template label** | **Value of object identifier for attribute** | **Constraints and values** | **Status** | **Support** | **Status** | **Support** | **Status** | **Support** |
| 11 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": loggingTime | {2 9 3 2 7 59} | GeneralizedTime | – | | m | | – | |
| 12 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": managedObjectClass | {2 9 3 2 7 60} | CHOICE | – | | m | | – | |
| 13 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": managedObjectInstance | {2 9 3 2 7 61} | CHOICE | – | | m | | – | |
| 14 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": nameBinding | {2 9 3 2 7 63} | OBJECT IDENTIFIER | o | | m | | – | |
| 15 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": notificationIdentifier | {2 9 3 2 7 16} | INTEGER | – | | c5 | | – | |
| 16 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": objectClass | {2 9 3 2 7 65} | CHOICE | – | | m | | – | |
| 17 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": packages | {2 9 3 2 7 66} | SET OF OBJECT IDENTIFIER | o | | c6 | | – | |
| 18 | typeOfCall | {0 0 13 3650 0 7 20} | ENUMERATED | – | | m | | – | |

## Table A.2.4 – layer1PerformanceLogRecord Attribute support *(concluded)*

| | Add | | Remove | | Set to default | | |
|---|---|---|---|---|---|---|---|
| **Index** | **Status** | **Support** | **Status** | **Support** | **Status** | **Support** | **Additional information** |
| 1 | – | | – | | – | | |
| 2 | – | | – | | – | | |
| 3 | – | | – | | – | | |
| 4 | – | | – | | – | | |
| 5 | – | | – | | – | | |
| 6 | – | | – | | – | | |
| 7 | – | | – | | – | | |
| 8 | – | | – | | – | | |
| 9 | – | | – | | – | | |
| 10 | – | | – | | – | | |

**Table A.2.4 – layer1PerformanceLogRecord Attribute support** *(concluded)*

| | Add | | Remove | | Set to default | | |
|---|---|---|---|---|---|---|---|
| **Index** | **Status** | **Support** | **Status** | **Support** | **Status** | **Support** | **Additional information** |
| 11 | – | | – | | – | | |
| 12 | – | | – | | – | | |
| 13 | – | | – | | – | | |
| 14 | – | | – | | – | | |
| 15 | – | | – | | – | | |
| 16 | – | | – | | – | | |
| 17 | – | | – | | – | | |
| 18 | – | | – | | – | | |

**Table A.2.5 – layer1PerformanceLogRecord Attribute group support**

There are no attribute groups specified for this managed object class.

**Table A.2.6 – layer1PerformanceLogRecord Action support**

There are no actions specified for this managed object class.

**Table A.2.7 – layer1PerformanceLogRecord Notification support**

There are no notifications specified for this managed object class.

**Table A.2.8 – layer1PerformanceLogRecord Parameter support**

There are no parameters specified for this managed object class.

**Table A.2.9 – layer1PerformanceLogRecord Conditions**

| Condition number | Condition | Reference |
|---|---|---|
| c1 | IF 2.3/1 THEN m ELSE – | "the Additional information parameter is present in the notification or report corresponding to the instance of event record or an instance of its subclasses" |
| c2 | IF 2.3/2 THEN m ELSE – | "the Additional text parameter is present in the notification or report corresponding to the instance of event record or an instance of its subclasses" |
| c3 | IF 2.3/4 THEN m ELSE – | "the correlatedNotifications parameter is present in the notification or event report corresponding to the instance of an event record or an instance of its subclasses" |
| c4 | IF 2.3/6 THEN m ELSE – | "the event time parameter was present in the received event report" |
| c5 | IF 2.3/9 THEN m ELSE – | "the notification Identifier parameter is present in the notification or event report corresponding to the instance of an event record or an instance of its subclasses" |
| c6 | IF 2.3/10 THEN m ELSE – | "any registered package, other than this package has been instantiated" |

**Table A.2.10 – layer1PerformanceLogRecord Name Binding support**

| Index | Name binding template label | Value of object identifier for name binding | Contraints and values | Status | Support | Additional information |
|---|---|---|---|---|---|---|
| 1 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": logRecord-log | {2 9 3 2 6 3} | Superior class: "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": log AND SUBCLASSES | o | | |

**Table A.2.10 – layer1PerformanceLogRecord Name Binding support** *(concluded)*

| Index | Subindex | Operation | Constraints and values | Status | Support | Additional information |
|---|---|---|---|---|---|---|
| 1 | 1.1 | Create support | | – | | |
| | 1.2 | Create with reference object | | – | | |
| | 1.3 | Create with automatic instance naming | | – | | |
| | 1.4 | Delete support | | c:m | | |
| | 1.5 | Delete only if no contained objects | | c:m | | |
| | 1.6 | Delete contained objects | | c:x | | |

## A.3 layer2PerformanceLogRecord

**Table A.3.1 – layer2PerformanceLogRecord Managed object class support**

| Index | Managed object class template label | Value of object identifier for class | Support of all mandatory features? (Y/N) | Is the actual class the same as the managed object class to which conformance is claimed? (Y/N) |
|---|---|---|---|---|
| 1 | layer2PerformanceLogRecord | {0 0 13 3650 0 3 3} | | |

**Table A.3.2 – layer2PerformanceLogRecord Actual class support**

| Index | Managed object class template for actual class | Value of object identifier for managed object class definition of actual class | Additional information |
|---|---|---|---|
| | | | |
| | | | |

## Table A.3.3 – layer2PerformanceLogRecord Package support

| Index | Package template label | Value of object identifier for package | Constraints and values | Status | Support | Additional information |
|---|---|---|---|---|---|---|
| 1 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": additionalInformation Package | {2 9 3 2 4 18} | "the Additional information parameter is present in the notification or report corresponding to the instance of event record or an instance of its subclasses" | c1 | | |
| 2 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": additionalTextPackage | {2 9 3 2 4 19} | "the Additional text parameter is present in the notification or report corresponding to the instance of event record or an instance of its subclasses" | c2 | | |
| 3 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": allomorphicPackage | {2 9 3 2 4 17} | "if an object supports allomorphism" | o | | |
| 4 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": correlatedNotifications Package | {2 9 3 2 4 23} | "the correlatedNotifications parameter is present in the notification or event report corresponding to the instance of an event record or an instance of its subclasses" | c3 | | |
| 5 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": eventLogRecordPackage | | Mandatory | m | | |
| 6 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": eventTimePackage | {2 9 3 2 4 11} | "the event time parameter was present in the received event report" | c4 | | |
| 7 | layer2PerformanceLog Record-package | {0 0 13 3650 0 4 4} | Mandatory | m | | |
| 8 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": logRecordPackage | | Mandatory | m | | |
| 9 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": notificationIdentifier Package | {2 9 3 2 4 24} | "the notification Identifier parameter is present in the notification or event report corresponding to the instance of an event record or an instance of its subclasses" | c5 | | |
| 10 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": packagesPackage | {2 9 3 2 4 16} | "any registered package, other than this package, has been instantiated" | c6 | | |
| 11 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": topPackage | | Mandatory | m | | |

## Table A.3.4 – layer2PerformanceLogRecord Attribute support

| | | | | Set by create | | Get | | Replace | |
|---|---|---|---|---|---|---|---|---|---|
| **Index** | **Attribute template label** | **Value of object identifier for attribute** | **Constraints and values** | **Status** | **Support** | **Status** | **Support** | **Status** | **Support** |
| 1 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": additionalInformation | {2 9 3 2 7 6} | SET OF SEQUENCE | – | | c1 | | – | |
| 2 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": additionalText | {2 9 3 2 7 7} | GraphicString | – | | c2 | | – | |
| 3 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": allomorphs | {2 9 3 2 7 50} | SET OF CHOICE | – | | o | | – | |
| 4 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": correlatedNotifications | {2 9 3 2 7 12} | SET OF SEQUENCE | – | | c3 | | – | |
| 5 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": eventTime | {2 9 3 2 7 13} | GeneralizedTime | – | | c4 | | – | |
| 6 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": eventType | {2 9 3 2 7 14} | CHOICE | – | | m | | – | |
| 7 | layer2AccessDelay | {0 0 13 3650 0 7 11} | SEQUENCE | – | | m | | – | |
| 8 | layer2AccessDependability | {0 0 13 3650 0 7 12} | ENUMERATED | – | | m | | – | |
| 9 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": logRecordId | {2 9 3 2 7 3} | CHOICE | – | | m | | – | |
| 10 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": loggingTime | {2 9 3 2 7 59} | GeneralizedTime | – | | m | | – | |
| 11 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": managedObjectClass | {2 9 3 2 7 60} | CHOICE | – | | m | | – | |
| 12 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": managedObjectInstance | {2 9 3 2 7 61} | CHOICE | – | | m | | – | |
| 13 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": nameBinding | {2 9 3 2 7 63} | OBJECT IDENTIFIER | o | | m | | – | |

**Table A.3.4 – layer2PerformanceLogRecord Attribute support** *(continued)*

| | | | | Set by create | | Get | | Replace | |
|---|---|---|---|---|---|---|---|---|---|
| **Index** | **Attribute template label** | **Value of object identifier for attribute** | **Constraints and values** | **Status** | **Support** | **Status** | **Support** | **Status** | **Support** |
| 14 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": notificationIdentifier | {2 9 3 2 7 16} | INTEGER | – | | c5 | | – | |
| 15 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": objectClass | {2 9 3 2 7 65} | CHOICE | – | | m | | – | |
| 16 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": packages | {2 9 3 2 7 66} | SET OF OBJECT IDENTIFIER | o | | c6 | | – | |
| 17 | typeOfCall | {0 0 13 3650 0 7 20} | ENUMERATED | – | | m | | – | |

**Table A.3.4 – layer2PerformanceLogRecord Attribute support** *(concluded)*

| | Add | | Remove | | Set to default | | |
|---|---|---|---|---|---|---|---|
| **Index** | **Status** | **Support** | **Status** | **Support** | **Status** | **Support** | **Additional information** |
| 1 | – | | – | | – | | |
| 2 | – | | – | | – | | |
| 3 | – | | – | | – | | |
| 4 | – | | – | | – | | |
| 5 | – | | – | | – | | |
| 6 | – | | – | | – | | |
| 7 | – | | – | | – | | |
| 8 | – | | – | | – | | |
| 9 | – | | – | | – | | |
| 10 | – | | – | | – | | |
| 11 | – | | – | | – | | |
| 12 | – | | – | | – | | |
| 13 | – | | – | | – | | |
| 14 | – | | – | | – | | |
| 15 | – | | – | | – | | |
| 16 | – | | – | | – | | |
| 17 | – | | – | | – | | |

**Table A.3.5 – layer2PerformanceLogRecord Attribute group support**

There are no attribute groups specified for this managed object class.

### Table A.3.6 – layer2PerformanceLogRecord Action support

There are no actions specified for this managed object class.

### Table A.3.7 – layer2PerformanceLogRecord Notification support

There are no notifications specified for this managed object class.

### Table A.3.8 – layer2PerformanceLogRecord Parameter support

There are no parameters specified for this managed object class.

### Table A.3.9 – layer2PerformanceLogRecord Conditions

| Condition number | Condition | Reference |
|---|---|---|
| c1 | IF 3.3/1 THEN m ELSE – | "the Additional information parameter is present in the notification or report corresponding to the instance of event record or an instance of its subclasses" |
| c2 | IF 3.3/2 THEN m ELSE – | "the Additional text parameter is present in the notification or report corresponding to the instance of event record or an instance of its subclasses" |
| c3 | IF 3.3/4 THEN m ELSE – | "the correlatedNotifications parameter is present in the notification or event report corresponding to the instance of an event record or an instance of its subclasses" |
| c4 | IF 3.3/6 THEN m ELSE – | "the event time parameter was present in the received event report" |
| c5 | IF 3.3/9 THEN m ELSE – | "the notification Identifier parameter is present in the notification or event report corresponding to the instance of an event record or an instance of its subclasses" |
| c6 | IF 3.3/10 THEN m ELSE – | "any registered package, other than this package, has been instantiated" |

### Table A.3.10 – layer2PerformanceLogRecord Name Binding support

| Index | Name binding template label | Value of object identifier for name binding | Contraints and values | Status | Support | Additional information |
|---|---|---|---|---|---|---|
| 1 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": logRecord-log | {2 9 3 2 6 3} | Superior class: "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": log AND SUBCLASSES | o | | |

**Table A.3.10 – layer2PerformanceLogRecord Name Binding support** *(concluded)*

| Index | Subindex | Operation | Constraints and values | Status | Support | Additional information |
|---|---|---|---|---|---|---|
| 1 | 1.1 | Create support | | – | | |
| | 1.2 | Create with reference object | | – | | |
| | 1.3 | Create with automatic instance naming | | – | | |
| | 1.4 | Delete support | | c:m | | |
| | 1.5 | Delete only if no contained objects | | c:m | | |
| | 1.6 | Delete contained objects | | c:x | | |

## A.4 layer3PerformanceLogRecord

**Table A.4.1 – layer3PerformanceLogRecord Managed object class support**

| Index | Managed object class template label | Value of object identifier for class | Support of all mandatory features? (Y/N) | Is the actual class the same as the managed object class to which conformance is claimed? (Y/N) |
|---|---|---|---|---|
| 1 | layer3PerformanceLogRecord | {0 0 13 3650 0 3 4} | | |

**Table A.4.2 – layer3PerformanceLogRecord Actual class support**

| Index | Managed object class template for actual class | Value of object identifier for managed object class definition of actual class | Additional information |
|---|---|---|---|
| | | | |
| | | | |

**Table A.4.3 – layer3PerformanceLogRecord Package support**

| Index | Package template label | Value of object identifier for package | Constraints and values | Status | Support | Additional information |
|---|---|---|---|---|---|---|
| 1 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": additionalInformation Package | {2 9 3 2 4 18} | "the Additional information parameter is present in the notification or report corresponding to the instance of event record or an instance of its subclasses" | c1 | | |
| 2 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": additionalTextPackage | {2 9 3 2 4 19} | "the Additional text parameter is present in the notification or report corresponding to the instance of event record or an instance of its subclasses" | c2 | | |
| 3 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": allomorphicPackage | {2 9 3 2 4 17} | "if an object supports allomorphism" | o | | |

## Table A.4.3 – layer3PerformanceLogRecord Package support *(continued)*

| Index | Package template label | Value of object identifier for package | Constraints and values | Status | Support | Additional information |
|---|---|---|---|---|---|---|
| 4 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": correlatedNotifications Package | {2 9 3 2 4 23} | "the correlatedNotifications parameter is present in the notification or event report corresponding to the instance of an event record or an instance of its subclasses" | c3 | | |
| 5 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": eventLogRecordPackage | | Mandatory | m | | |
| 6 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": eventTimePackage | {2 9 3 2 4 11} | "the event time parameter was present in the received event report" | c4 | | |
| 7 | layer3AccessDelay-package | {0 0 13 3650 0 4 6} | "The implementation supports monitoring of layer 3 access delay" | c5 | | |
| 8 | layer3AccessDependability-package | {0 0 13 3650 0 4 7} | "The implementation supports monitoring of layer 3 access dependability" | c6 | | |
| 9 | layer3DisengagementDelay-package | {0 0 13 3650 0 4 8} | "The implementation supports monitoring of layer 3 disengagement delay" | c7 | | |
| 10 | layer3Disengagement Dependability-package | {0 0 13 3650 0 4 9} | "The implementation supports monitoring of layer 3 disengagement dependability" | c8 | | |
| 11 | layer3InformationTransfer Dependability-package | {0 0 13 3650 0 4 10} | "The implementation supports monitoring of layer 3 information transfer dependability" | c9 | | |
| 12 | layer3InformationTransfer Time-package | {0 0 13 3650 0 4 11} | "The implementation supports monitoring of layer 3 information transfer time" | c10 | | |
| 13 | layer3PerformanceLog Record-package | {0 0 13 3650 0 4 12} | Mandatory | m | | |
| 14 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": logRecordPackage | | Mandatory | m | | |
| 15 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": notificationIdentifier Package | {2 9 3 2 4 24} | "the notification Identifier parameter is present in the notification or event report corresponding to the instance of an event record or an instance of its subclasses" | c11 | | |
| 16 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": packagesPackage | {2 9 3 2 4 16} | "any registered package, other than this package, has been instantiated" | c12 | | |
| 17 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": topPackage | | Mandatory | m | | |

## Table A.4.4 – layer3PerformanceLogRecord Attribute support

| | | | | Set by create | | Get | | Replace | |
|---|---|---|---|---|---|---|---|---|---|
| **Index** | **Attribute template label** | **Value of object identifier for attribute** | **Constraints and values** | **Status** | **Support** | **Status** | **Support** | **Status** | **Support** |
| 1 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": additionalInformation | {2 9 3 2 7 6} | SET OF SEQUENCE | – | | c1 | | – | |
| 2 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": additionalText | {2 9 3 2 7 7} | GraphicString | – | | c2 | | – | |
| 3 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": allomorphs | {2 9 3 2 7 50} | SET OF CHOICE | – | | o | | – | |
| 4 | calledNumber | {0 0 13 3650 0 7 1} | SEQUENCE | – | | m | | – | |
| 5 | calledSubaddress | {0 0 13 3650 0 7 2} | OCTET STRING | – | | m | | – | |
| 6 | callingNumber | {0 0 13 3650 0 7 3} | SEQUENCE | – | | m | | – | |
| 7 | callingSubaddress | {0 0 13 3650 0 7 4} | OCTET STRING | – | | m | | – | |
| 8 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": correlatedNotifications | {2 9 3 2 7 12} | SET OF SEQUENCE | – | | c3 | | – | |
| 9 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": eventTime | {2 9 3 2 7 13} | GeneralizedTime | – | | c4 | | – | |
| 10 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": eventType | {2 9 3 2 7 14} | CHOICE | – | | m | | – | |
| 11 | informationTransfer Capability | {0 0 13 3650 0 7 5} | ENUMERATED | – | | m | | – | |
| 12 | informationTransferMode | {0 0 13 3650 0 7 6} | ENUMERATED | – | | m | | – | |
| 13 | informationTransferRate | {0 0 13 3650 0 7 7} | ENUMERATED | – | | m | | – | |
| 14 | layer3AccessDelay | {0 0 13 3650 0 7 13} | SEQUENCE | – | | c5 | | – | |
| 15 | layer3AccessDependability | {0 0 13 3650 0 7 14} | ENUMERATED | – | | c6 | | – | |
| 16 | layer3DisengagementDelay | {0 0 13 3650 0 7 15} | SEQUENCE | – | | c7 | | – | |
| 17 | layer3Disengagement Dependability | {0 0 13 3650 0 7 16} | ENUMERATED | – | | c8 | | – | |
| 18 | layer3InformationTransfer Dependability | {0 0 13 3650 0 7 17} | ENUMERATED | – | | c9 | | – | |

## Table A.4.4 – layer3PerformanceLogRecord Attribute support *(continued)*

| | | | | Set by create | | Get | | Replace | |
|---|---|---|---|---|---|---|---|---|---|
| **Index** | **Attribute template label** | **Value of object identifier for attribute** | **Constraints and values** | **Status** | **Support** | **Status** | **Support** | **Status** | **Support** |
| 19 | layer3InformationTransferTime | {0 0 13 3650 0 7 18} | SEQUENCE | – | | c10 | | – | |
| 20 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": logRecordId | {2 9 3 2 7 3} | CHOICE | – | | m | | – | |
| 21 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": loggingTime | {2 9 3 2 7 59} | GeneralizedTime | – | | m | | – | |
| 22 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": managedObjectClass | {2 9 3 2 7 60} | CHOICE | – | | m | | – | |
| 23 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": managedObjectInstance | {2 9 3 2 7 61} | CHOICE | – | | m | | – | |
| 24 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": nameBinding | {2 9 3 2 7 63} | OBJECT IDENTIFIER | o | | m | | – | |
| 25 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": notificationIdentifier | {2 9 3 2 7 16} | INTEGER | – | | c11 | | – | |
| 26 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": objectClass | {2 9 3 2 7 65} | CHOICE | – | | m | | – | |
| 27 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": packages | {2 9 3 2 7 66} | SET OF OBJECT IDENTIFIER | o | | c12 | | – | |
| 28 | typeOfCall | {0 0 13 3650 0 7 20} | ENUMERATED | – | | m | | – | |

**Table A.4.4 – layer3PerformanceLogRecord Attribute support** *(concluded)*

| | Add | | Remove | | Set to default | | |
|---|---|---|---|---|---|---|---|
| **Index** | **Status** | **Support** | **Status** | **Support** | **Status** | **Support** | **Additional information** |
| | | | | | | | |
| 1 | – | | – | | – | | |
| 2 | – | | – | | – | | |
| 3 | – | | – | | – | | |
| 4 | – | | – | | – | | |
| 5 | – | | – | | – | | |
| 6 | – | | – | | – | | |
| 7 | – | | – | | – | | |
| 8 | – | | – | | – | | |
| 9 | – | | – | | – | | |
| 10 | – | | – | | – | | |
| 11 | – | | – | | – | | |
| 12 | – | | – | | – | | |
| 13 | – | | – | | – | | |
| 14 | – | | – | | – | | |
| 15 | – | | – | | – | | |
| 16 | – | | – | | – | | |
| 17 | – | | – | | – | | |
| 18 | – | | – | | – | | |
| 19 | – | | – | | – | | |
| 20 | – | | – | | – | | |
| 21 | – | | – | | – | | |
| 22 | – | | – | | – | | |
| 23 | – | | – | | – | | |
| 24 | – | | – | | – | | |
| 25 | – | | – | | – | | |
| 26 | – | | – | | – | | |
| 27 | – | | – | | – | | |
| 28 | – | | – | | – | | |

**Table A.4.5 – layer3PerformanceLogRecord Attribute group support**

There are no attribute groups specified for this managed object class.

**Table A.4.6 – layer3PerformanceLogRecord Action support**

There are no actions specified for this managed object class.

### Table A.4.7 – layer3PerformanceLogRecord Notification support

There are no notifications specified for this managed object class.

### Table A.4.8 – layer3PerformanceLogRecord Parameter support

There are no parameters specified for this managed object class.

### Table A.4.9 – layer3PerformanceLogRecord Conditions

| Condition number | Condition | Reference |
|---|---|---|
| c1 | IF 4.3/1 THEN m ELSE – | "the Additional information parameter is present in the notification or report corresponding to the instance of event record or an instance of its subclasses" |
| c2 | IF 4.3/2 THEN m ELSE – | "the Additional text parameter is present in the notification or report corresponding to the instance of event record or an instance of its subclasses" |
| c3 | IF 4.3/4 THEN m ELSE – | "the correlatedNotifications parameter is present in the notification or event report corresponding to the instance of an event record or an instance of its subclasses" |
| c4 | IF 4.3/6 THEN m ELSE – | "the event time parameter was present in the received event report" |
| c5 | IF 4.3/7 THEN m ELSE – | "The implementation supports monitoring of layer 3 access delay" |
| c6 | IF 4.3/8 THEN m ELSE – | "The implementation supports monitoring of layer 3 access dependability" |
| c7 | IF 4.3/9 THEN m ELSE – | "The implementation supports monitoring of layer 3 disengagement delay" |
| c8 | IF 4.3/10 THEN m ELSE – | "The implementation supports monitoring of layer 3 disengagement dependability" |
| c9 | IF 4.3/11 THEN m ELSE – | "The implementation supports monitoring of layer 3 information transfer dependability" |
| c10 | IF 4.3/12 THEN m ELSE – | "The implementation supports monitoring of layer 3 information transfer time" |
| c11 | IF 4.3/15 THEN m ELSE – | "the notification Identifier parameter is present in the notification or event report corresponding to the instance of an event record or an instance of its subclasses" |
| c12 | IF 4.3/16 THEN m ELSE – | "any registered package, other than this package, has been instantiated" |

### Table A.4.10 – layer3PerformanceLogRecord Name Binding support

| Index | Name binding template label | Value of object identifier for name binding | Contraints and values | Status | Support | Additional information |
|---|---|---|---|---|---|---|
| 1 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": logRecord-log | {2 9 3 2 6 3} | Superior class: "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": log AND SUBCLASSES | o | | |

**Table A.4.10 – layer3PerformanceLogRecord Name Binding support** *(concluded)*

| Index | Subindex | Operation | Constraints and values | Status | Support | Additional information |
|---|---|---|---|---|---|---|
| 1 | 1.1 | Create support | | – | | |
| | 1.2 | Create with reference object | | – | | |
| | 1.3 | Create with automatic instance naming | | – | | |
| | 1.4 | Delete support | | c:m | | |
| | 1.5 | Delete only if no contained objects | | c:m | | |
| | 1.6 | Delete contained objects | | c:x | | |

## A.5 monitoredAccess

### Table A.5.1 – monitoredAccess Managed object class support

| Index | Managed object class template label | Value of object identifier for class | Support of all mandatory features? (Y/N) | Is the actual class the same as the managed object class to which conformance is claimed? (Y/N) |
|---|---|---|---|---|
| 1 | monitoredAccess | {0 0 13 3650 0 3 5} | | |

### Table A.5.2 – monitoredAccess Actual class support

| Index | Managed object class template for actual class | Value of object identifier for managed object class definition of actual class | Additional information |
|---|---|---|---|
| | | | |
| | | | |

### Table A.5.3 – monitoredAccess Package support

| Index | Package template label | Value of object identifier for package | Constraints and values | Status | Support | Additional information |
|---|---|---|---|---|---|---|
| 1 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": allomorphicPackage | {2 9 3 2 4 17} | "if an object supports allomorphism" | o | | |
| 2 | layer1Performance Notification-package | {0 0 13 3650 0 4 3} | "The implementation supports monitoring of layer 1" | c1 | | |
| 3 | layer2Performance Notification-package | {0 0 13 3650 0 4 5} | "The implementation supports monitoring of layer 2" | c2 | | |
| 4 | layer3Performance Notification-package | {0 0 13 3650 0 4 13} | "The implementation supports monitoring of layer 3" | c3 | | |

## Table A.5.3 – monitoredAccess Package support *(continued)*

| Index | Package template label | Value of object identifier for package | Constraints and values | Status | Support | Additional information |
|---|---|---|---|---|---|---|
| 5 | monitoredAccess-package | {0 0 13 3650 0 4 14} | Mandatory | m | | |
| 6 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": packagesPackage | {2 9 3 2 4 16} | "any registered package, other than this package, has been instantiated" | c4 | | |
| 7 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": topPackage | | Mandatory | m | | |

## Table A.5.4 – monitoredAccess Attribute support

| | | | | Set by create | | Get | | Replace | |
|---|---|---|---|---|---|---|---|---|---|
| Index | Attribute template label | Value of object identifier for attribute | Constraints and values | Status | Support | Status | Support | Status | Support |
| 1 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": allomorphs | {2 9 3 2 7 50} | SET OF CHOICE | – | | o | | – | |
| 2 | monitoredAccessId | {0 0 13 3650 0 7 19} | CHOICE | – | | m | | – | |
| 3 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": nameBinding | {2 9 3 2 7 63} | OBJECT IDENTIFIER | o | | m | | – | |
| 4 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": objectClass | {2 9 3 2 7 65} | CHOICE | – | | m | | – | |
| 5 | "CCITT Rec. X.721 (1992) \| ISO/IEC 10165-2 : 1992": packages | {2 9 3 2 7 66} | SET OF OBJECT IDENTIFIER | o | | c4 | | – | |
| 6 | typesMonitoring | {0 0 13 3650 0 7 21} | SEQUENCE | m | | m | | m | |

**Table A.5.4 – monitoredAccess Attribute support** *(concluded)*

| | Add | | Remove | | Set to default | | |
|---|---|---|---|---|---|---|---|
| **Index** | **Status** | **Support** | **Status** | **Support** | **Status** | **Support** | **Additional information** |
| 1 | – | | – | | – | | |
| 2 | – | | – | | – | | |
| 3 | – | | – | | – | | |
| 4 | – | | – | | – | | |
| 5 | – | | – | | – | | |
| 6 | – | | – | | – | | |

**Table A.5.5 – monitoredAccess Attribute group support**

There are no attribute groups specified for this managed object class.

**Table A.5.6 – monitoredAccess Action support**

| Index | Action type template label | Value of object identifier for action type | Contraints and values | Status | Support | Additional information |
|---|---|---|---|---|---|---|
| 1 | startMonitoring | {0 0 13 3650 0 9 1} | | m | | |
| 2 | stopMonitoring | {0 0 13 3650 0 9 2} | | m | | |

**Table A.5.6 – monitoredAccess Action support** *(concluded)*

| Index | Subindex | Action field name label | Constraints and values | Status | Support | Additional information |
|---|---|---|---|---|---|---|
| 1 | 1.1 | MonitoringTimeStamp | **Information Syntax** GeneralizedTime | m | | |
| 2 | 2.1 | MonitoringTimeStamp | **Information Syntax** GeneralizedTime | m | | |

**Table A.5.7 – monitoredAccess Notification support**

| | | | | | Support | | |
|---|---|---|---|---|---|---|---|
| **Index** | **Notification type template label** | **Value of object identifier for notification type** | **Constraints and values** | **Status** | **Confirmed** | **Non-confirmed** | **Additional information** |
| 1 | layer1PerformanceRecorded | {0 0 13 3650 0 10 1} | | c1 | | | |
| 2 | layer2PerformanceRecorded | {0 0 13 3650 0 10 2} | | c2 | | | |
| 3 | layer3PerformanceRecorded | {0 0 13 3650 0 10 3} | | c3 | | | |

## Table A.5.7 – monitoredAccess Notification support *(concluded)*

| Index | Subindex | Notification field name label | Value of object identifier of attribute type associated with field | Constraints and values | Status | Support | Additional information |
|---|---|---|---|---|---|---|---|
| 1 | 1.1 | Layer1PerformanceRecorded | | **Information Syntax** SEQUENCE | c1 | | |
| | 1.1.1 | typeOfCall | {0 0 13 3650 0 7 20} | ENUMERATED | c:m | | |
| | 1.1.2 | layer1AccessDelay | {0 0 13 3650 0 7 8} | SEQUENCE | c:m | | |
| | 1.1.2.1 | layer1FE1 | – | SEQUENCE | c:m | | |
| | 1.1.2.1.1 | hours | – | INTEGER | c:m | | |
| | 1.1.2.1.2 | minutes | – | INTEGER | c:m | | |
| | 1.1.2.1.3 | seconds | – | INTEGER | c:m | | |
| | 1.1.2.1.4 | milliseconds | – | INTEGER | c:m | | |
| | 1.1.2.2 | layer1FE2 | – | SEQUENCE | c:m | | |
| | 1.1.2.2.1 | hours | – | INTEGER | c:m | | |
| | 1.1.2.2.2 | minutes | – | INTEGER | c:m | | |
| | 1.1.2.2.3 | seconds | – | INTEGER | c:m | | |
| | 1.1.2.2.4 | milliseconds | – | INTEGER | c:m | | |
| | 1.1.2.3 | layer1FE3 | – | SEQUENCE | c:m | | |
| | 1.1.2.3.1 | hours | – | INTEGER | c:m | | |
| | 1.1.2.3.2 | minutes | – | INTEGER | c:m | | |
| | 1.1.2.3.3 | seconds | – | INTEGER | c:m | | |
| | 1.1.2.3.4 | milliseconds | – | INTEGER | c:m | | |
| | 1.1.2.4 | layer1FE4 | – | SEQUENCE | c:m | | |
| | 1.1.2.4.1 | hours | – | INTEGER | c:m | | |
| | 1.1.2.4.2 | minutes | – | INTEGER | c:m | | |
| | 1.1.2.4.3 | seconds | – | INTEGER | c:m | | |
| | 1.1.2.4.4 | milliseconds | – | INTEGER | c:m | | |
| | 1.1.3 | layer1AccessDependability | {0 0 13 3650 0 7 9} | ENUMERATED | c:m | | |
| | 1.1.4 | layer1InformationTransfer Dependability | {0 0 13 3650 0 7 10} | ENUMERATED | c:m | | |
| 2 | 2.1 | Layer2PerformanceRecorded | | **Information Syntax** SEQUENCE | c2 | | |
| | 2.1.1 | typeOfCall | {0 0 13 3650 0 7 20} | ENUMERATED | c:m | | |
| | 2.1.2 | layer2AccessDelay | {0 0 13 3650 0 7 11} | SEQUENCE | c:m | | |
| | 2.1.2.1 | layer2SABME | – | SEQUENCE | c:m | | |
| | 2.1.2.1.1 | hours | – | INTEGER | c:m | | |
| | 2.1.2.1.2 | minutes | – | INTEGER | c:m | | |
| | 2.1.2.1.3 | seconds | – | INTEGER | c:m | | |
| | 2.1.2.1.4 | milliseconds | – | INTEGER | c:m | | |
| | 2.1.2.2 | layer2UA | – | SEQUENCE | c:m | | |

## Table A.5.7 – monitoredAccess Notification support *(concluded)*

| Index | Subindex | Notification field name label | Value of object identifier of attribute type associated with field | Constraints and values | Status | Support | Additional information |
|---|---|---|---|---|---|---|---|
| | 2.1.2.2.1 | hours | – | INTEGER | c:m | | |
| | 2.1.2.2.2 | minutes | – | INTEGER | c:m | | |
| | 2.1.2.2.3 | seconds | – | INTEGER | c:m | | |
| | 2.1.2.2.4 | milliseconds | – | INTEGER | c:m | | |
| | 2.1.3 | layer2AccessDependability | {0 0 13 3650 0 7 12} | ENUMERATED | c:m | | |
| 3 | 3.1 | Layer3PerformanceRecorded | | **Information Syntax** SEQUENCE | c3 | | |
| | 3.1.1 | typeOfCall | {0 0 13 3650 0 7 20} | ENUMERATED | c:m | | |
| | 3.1.2 | callingNumber | {0 0 13 3650 0 7 3} | SEQUENCE | c:m | | |
| | 3.1.2.1 | countryCode | – | NumericString | c:o | | |
| | 3.1.2.2 | nationalSignificantNumber | – | SEQUENCE | c:m | | |
| | 3.1.2.2.1 | nationalDestinationNumber | – | NumericString | c:o | | |
| | 3.1.2.2.2 | subscriberNumber | – | NumericString | c:m | | |
| | 3.1.3 | calledNumber | {0 0 13 3650 0 7 1} | SEQUENCE | c:m | | |
| | 3.1.3.1 | countryCode | – | NumericString | c:o | | |
| | 3.1.3.2 | nationalSignificantNumber | – | SEQUENCE | c:m | | |
| | 3.1.3.2.1 | nationalDestinationNumber | – | NumericString | c:o | | |
| | 3.1.3.2.2 | subscriberNumber | – | NumericString | c:m | | |
| | 3.1.4 | callingSubaddress | {0 0 13 3650 0 7 4} | OCTET STRING | c:m | | |
| | 3.1.5 | calledSubaddress | {0 0 13 3650 0 7 2} | OCTET STRING | c:m | | |
| | 3.1.6 | informationTransferCapability | {0 0 13 3650 0 7 5} | ENUMERATED | c:m | | |
| | 3.1.7 | informationTransferMode | {0 0 13 3650 0 7 6} | ENUMERATED | c:m | | |
| | 3.1.8 | informationTransferRate | {0 0 13 3650 0 7 7} | ENUMERATED | c:m | | |
| | 3.1.9 | layer3AccessDelay | {0 0 13 3650 0 7 13} | SEQUENCE | c:m | | |
| | 3.1.9.1 | layer3SETUP | – | SEQUENCE | c:m | | |
| | 3.1.9.1.1 | hours | – | INTEGER | c:m | | |
| | 3.1.9.1.2 | minutes | – | INTEGER | c:m | | |
| | 3.1.9.1.3 | seconds | – | INTEGER | c:m | | |
| | 3.1.9.1.4 | milliseconds | – | INTEGER | c:m | | |
| | 3.1.9.2 | layer3SETACK | – | SEQUENCE | c:o | | |
| | 3.1.9.2.1 | hours | – | INTEGER | c:m | | |
| | 3.1.9.2.2 | minutes | – | INTEGER | c:m | | |
| | 3.1.9.2.3 | seconds | – | INTEGER | c:m | | |
| | 3.1.9.2.4 | milliseconds | – | INTEGER | c:m | | |
| | 3.1.9.3 | layer3INF | – | SEQUENCE | c:o | | |
| | 3.1.9.3.1 | hours | – | INTEGER | c:m | | |
| | 3.1.9.3.2 | minutes | – | INTEGER | c:m | | |

## Table A.5.7 – monitoredAccess Notification support *(concluded)*

| Index | Subindex | Notification field name label | Value of object identifier of attribute type associated with field | Constraints and values | Status | Support | Additional information |
|---|---|---|---|---|---|---|---|
| | 3.1.9.3.3 | seconds | – | INTEGER | c:m | | |
| | 3.1.9.3.4 | milliseconds | – | INTEGER | c:m | | |
| | 3.1.9.4 | layer3ALERT | – | SEQUENCE | c:o | | |
| | 3.1.9.4.1 | hours | – | INTEGER | c:m | | |
| | 3.1.9.4.2 | minutes | – | INTEGER | c:m | | |
| | 3.1.9.4.3 | seconds | – | INTEGER | c:m | | |
| | 3.1.9.4.4 | milliseconds | – | INTEGER | c:m | | |
| | 3.1.9.5 | layer3CONNECT | – | SEQUENCE | c:o | | |
| | 3.1.9.5.1 | hours | – | INTEGER | c:m | | |
| | 3.1.9.5.2 | minutes | – | INTEGER | c:m | | |
| | 3.1.9.5.3 | seconds | – | INTEGER | c:m | | |
| | 3.1.9.5.4 | milliseconds | – | INTEGER | c:m | | |
| | 3.1.10 | layer3AccessDependability | {0 0 13 3650 0 7 14} | ENUMERATED | c:m | | |
| | 3.1.11 | layer3InformationTransferTime | {0 0 13 3650 0 7 18} | SEQUENCE | c:m | | |
| | 3.1.11.1 | numberOfSatelliteHops | – | INTEGER | c:o | | |
| | 3.1.11.2 | propagationDelay | – | CHOICE | c:o | | |
| | 3.1.11.2.1 | days | – | INTEGER | c:o.1 | | |
| | 3.1.11.2.2 | hours | – | INTEGER | c:o.1 | | |
| | 3.1.11.2.3 | minutes | – | INTEGER | c:o.1 | | |
| | 3.1.11.2.4 | seconds | – | INTEGER | c:o.1 | | |
| | 3.1.11.2.5 | milliseconds | – | INTEGER | c:o.1 | | |
| | 3.1.11.2.6 | microseconds | – | INTEGER | c:o.1 | | |
| | 3.1.11.2.7 | nanoseconds | – | INTEGER | c:o.1 | | |
| | 3.1.11.2.8 | picoseconds | – | INTEGER | c:o.1 | | |
| | 3.1.12 | layer3InformationTransfer Dependability | {0 0 13 3650 0 7 17} | ENUMERATED | c:m | | |
| | 3.1.13 | layer3DisengagementDelay | {0 0 13 3650 0 7 15} | SEQUENCE | c:m | | |
| | 3.1.13.1 | layer3DISCONNECT | – | SEQUENCE | c:m | | |
| | 3.1.13.1.1 | hours | – | INTEGER | c:m | | |
| | 3.1.13.1.2 | minutes | – | INTEGER | c:m | | |
| | 3.1.13.1.3 | seconds | – | INTEGER | c:m | | |
| | 3.1.13.1.4 | milliseconds | – | INTEGER | c:m | | |
| | 3.1.13.2 | layer3RELEASE | – | SEQUENCE | c:m | | |
| | 3.1.13.2.1 | hours | – | INTEGER | c:m | | |
| | 3.1.13.2.2 | minutes | – | INTEGER | c:m | | |
| | 3.1.13.2.3 | seconds | – | INTEGER | c:m | | |
| | 3.1.13.2.4 | milliseconds | – | INTEGER | c:m | | |
| | 3.1.13.3 | layer3RELCOMP | – | SEQUENCE | c:m | | |

**Table A.5.7 – monitoredAccess Notification support** *(concluded)*

| Index | Subindex | Notification field name label | Value of object identifier of attribute type associated with field | Constraints and values | Status | Support | Additional information |
|---|---|---|---|---|---|---|---|
| | 3.1.13.3.1 | hours | – | INTEGER | c:m | | |
| | 3.1.13.3.2 | minutes | – | INTEGER | c:m | | |
| | 3.1.13.3.3 | seconds | – | INTEGER | c:m | | |
| | 3.1.13.3.4 | milliseconds | – | INTEGER | c:m | | |
| | 3.1.13.4 | bChannelFree | – | SEQUENCE | c:m | | |
| | 3.1.13.4.1 | hours | – | INTEGER | c:m | | |
| | 3.1.13.4.2 | minutes | – | INTEGER | c:m | | |
| | 3.1.13.4.3 | seconds | – | INTEGER | c:m | | |
| | 3.1.13.4.4 | milliseconds | – | INTEGER | c:m | | |
| | 3.1.14 | layer3Disengagement Dependability | {0 0 13 3650 0 7 16} | ENUMERATED | c:m | | |

**Table A.5.8 – monitoredAccess Parameter support**

There are no parameters specified for this managed object class.

**Table A.5.9 – monitoredAccess Conditions**

| Condition number | Condition | Reference |
|---|---|---|
| c1 | IF 5.3/2 THEN m ELSE – | "The implementation supports monitoring of layer 1" |
| c2 | IF 5.3/3 THEN m ELSE – | "The implementation supports monitoring of layer 2" |
| c3 | IF 5.3/4 THEN m ELSE – | "The implementation supports monitoring of layer 3" |
| c4 | IF 5.3/6 THEN m ELSE – | "any registered package, other than this package, has been instantiated" |

**Table A.5.10 – monitoredAccess Name Binding support**

| Index | Name binding template label | Value of object identifier for name binding | Contraints and values | Status | Support | Additional information |
|---|---|---|---|---|---|---|
| 1 | monitoredAccess-accessPortISDN | {0 0 13 3650 0 6 2} | Superior class: "Recommendation Q.824.1:1995": accessPort AND SUBCLASSES | o | | |
| 2 | monitoredAccess-dChannel | {0 0 13 3650 0 6 3} | Superior class: "Recommendation Q.824.1:1995": dChannel AND SUBCLASSES | o | | |

**Table A.5.10 – monitoredAccess Name Binding support** *(concluded)*

| Index | Subindex | Operation | Constraints and values | Status | Support | Additional information |
|---|---|---|---|---|---|---|
| 1 | 1.1 | Create support | | c:m | | |
| | 1.2 | Create with reference object | | c:m | | |
| | 1.3 | Create with automatic instance naming | | c:m | | |
| | 1.4 | Delete support | | c:m | | |
| | 1.5 | Delete only if no contained objects | | c:x | | |
| | 1.6 | Delete contained objects | | c:m | | |
| 2 | 2.1 | Create support | | c:m | | |
| | 2.2 | Create with reference object | | c:m | | |
| | 2.3 | Create with automatic instance naming | | c:m | | |
| | 2.4 | Delete support | | c:m | | |
| | 2.5 | Delete only if no contained objects | | c:x | | |
| | 2.6 | Delete contained objects | | c:m | | |

ANNEX B

## Network management level

At this moment, it is not feasible to relate measurements at the originating and destination LEXs to one call at the network management layer. The main problem is that there is no end-to-end call identifier for ISDN calls.

Here, two methods are given for relating measurements at the originating and destination LEXs. They are not standardized in this Recommendation, because of their complexity:

1) tracing the call, by consulting all network nodes involved;

2) use the combinations of called and calling party numbers together with the time stamps.

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