INTERNATIONAL STANDARD

ISO/IEC 15050

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Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Inter-exchange signalling protocol — Advice Of Charge supplementary services

Technologies de l'information — Télécommunications et échange d'information entre systèmes — Réseau privé à intégration de services — Protocole de signalisation d'interéchange — Orientation des services supplémentaires de charge

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 15050 was prepared by ECMA (as ECMA-212) and was adopted, under a special "fast-track procedure", by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, in parallel with its approval by national bodies of ISO and IEC.

This second edition cancels and replaces the first edition (ISO/IEC 15050:1997), which has been technically revised.

Introduction

This International Standard is one of a series of Standards defining services and signalling protocols applicable to Private Integrated Services Networks (PISNs). The series uses ISDN concepts as developed by ITU-T and conforms to the framework of International Standards for Open Systems Interconnection as defined by ISO/IEC.

This International Standard specifies the signalling protocol for use at the Q reference point in support of the Advice Of Charge supplementary services. The protocol defined in this International Standard forms part of the PSS1 protocol (informally known as QSIG).

This International Standard is based upon the practical experience of ECMA member companies and the results of their active and continuous participation in the work of ISO/IEC JTC 1, ITU-T, ETSI and other international and national standardization bodies. It represents a pragmatic and widely based consensus.

Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Inter-exchange signalling protocol — Advice Of Charge supplementary services

1 Scope

This International Standard specifies the signalling protocol for the support of the Advice Of Charge supplementary services (SS-AOC) at the Q reference point between Private Integrated services Network eXchanges (PINX) connected together within a Private Integrated Services Network (PISN).

SS-AOC is a set of supplementary services which enable a user to receive information about the charging of its calls that leave the PISN and enter another network.

The three AOC supplementary services are:

a) Charging information at call set-up time (AOC-S)

SS-AOC-S enables the user to receive information about the charging rates at call set-up time and also to receive further information during the call if there is a change of charging rates.

b) Charging information during the call (AOC-D)

SS-AOC-D enables a user to receive information on the recorded charges for a call during the active phase of the call.

c) Charging information at the end of the call (AOC-E)

SS-AOC-E enables a user to receive information on the recorded charges for a call when the call is terminated.

The Q reference point is defined in ISO/IEC 11579-1.

Service specifications are produced in three stages and according to the method specified in ETS 300 387. This International Standard contains the stage 3 specification for the Q reference point and satisfies the requirements identified by the stage 1 and stage 2 specifications in ISO/IEC 15049.

The signalling protocol for SS-AOC operates on top of the signalling protocol for basic circuit switched call control, as specified in ISO/IEC 11572, and uses certain aspects of the generic procedures for the control of supplementary services specified in ISO/IEC 11582.

This International Standard also specifies additional signalling protocol requirements for the support of interactions at the Q reference point between SS-AOC and other supplementary services and ANFs.

NOTE - Additional interactions that have no impact on the signalling protocol at the Q reference point can be found in the relevant stage 1 specifications.

This International Standard is applicable to PINXs which can interconnect to form a PISN.

2 Conformance

In order to conform to this International Standard, a PINX shall satisfy the requirements identified in the Protocol Implementation Conformance Statement (PICS) proforma in annex A.

Conformance to this International Standard includes conforming to those clauses that specify protocol interactions between SS-AOC and other supplementary services and ANFs for which signalling protocols at the Q reference point are supported in accordance with the stage 3 standards concerned.

3 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 11572:2000, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Circuit mode bearer services - Inter-exchange signalling procedures and protocol*

ISO/IEC 11574:2000, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Circuit-mode 64 kbit/s bearer services - Service description, functional capabilities and information flows*

ISO/IEC 11579-1:1994, *Information technology - Telecommunications and information exchange between systems - Private integrated services network - Part 1: Reference configuration for PISN Exchanges (PINX)*

ISO/IEC 11582:2002, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Generic functional protocol for the support of supplementary services - Inter-exchange signalling procedures and protocol*

ISO/IEC 13865:2003, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Specification, functional model and information flows - Call Transfer supplementary service*

ISO/IEC 13869:2003, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Inter-exchange signalling protocol - Call Transfer supplementary service*

ISO/IEC 13873:2003, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Inter-exchange signalling protocol - Call Diversion supplementary services*

ISO/IEC 15049:1997, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Specification, functional model and information flows - Advice of charge supplementary services*

ISO/IEC 15054:2003, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Inter-exchange signalling protocol - Call Interception additional network feature*

ISO/IEC 15431:2003, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Inter-exchange signalling protocol - Wireless terminal call handling additional network features*

ETS 300 387:1994, *Private Telecommunication Network (PTN); Method for the specification of basic and supplementary services*

ITU-T Rec. I.112:1993, *Vocabulary of terms for ISDNs*

ITU-T Rec. I.210:1993, *Principles of telecommunication services supported by an ISDN and the means to describe them*

ITU-T Rec. Q.950:2000, *Supplementary services protocols, structure and general principles*

ITU-T Rec. Z.100:1999, *Specification and description language (SDL)*

4 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

4.1 External definitions

This International Standard uses the following terms defined in other documents:

– Application Protocol Data Unit (APDU)	(ISO/IEC 11582)
– Basic Service	(ITU-T Rec. I.210)
– Call, Basic Call	(ISO/IEC 11582)
– Originating PINX	(ISO/IEC 11572)
– Outgoing Gateway PINX	(ISO/IEC 11572)
– Private Integrated Services Network (PISN)	(ISO/IEC 11579-1)
– Private Integrated services Network eXchange (PINX)	(ISO/IEC 11579-1)
– Signalling	(ITU-T Rec. I.112)
– Supplementary Service	(ITU-T Rec. I.210)
– Supplementary Service Control Entity	(ISO/IEC 11582)

– Terminating PINX (ISO/IEC 11572)

– Transit PINX (ISO/IEC 11572)

– User (ISO/IEC 11574)

– User A (ISO/IEC 13865)

4.2 Other definitions

4.2.1 Advice mode

The mode in which an Originating PINX receives advice of charge information from a Gateway PINX. This can be charge rate provision, interim charge provision or final charge provision.

4.2.2 Advice mode combination

A combination of one or more advice modes operating simultaneously.

4.2.3 Charge rate provision

The provision to the Originating PINX of information concerning the charge rate for the call.

4.2.4 Interim charge provision

The provision to the Originating PINX of subtotal charge information at intervals during the call and of the total charge information at the end of the call.

NOTE - When interim charge provision is used and the call is transferred, if the transferring user continues to be charged after transfer, no total charge information is provided when the call resulting from transfer finishes.

4.2.5 Final charge provision

The provision to the Originating PINX of total charge information at the end of the call.

NOTE - When final charge provision is used and the call is transferred, if the transferring user continues to be charged after transfer, the total charge information is provided to the Transferring PINX when the call resulting from transfer finishes.

4.2.6 Charging Association Information

Information that allows final charge information to be associated with the call to which it relates.

4.2.7 Accounting Function

The entity that is able to determine charges incurred in another network (e.g. by counting meter pulses, by use of a public ISDN AOC service, or by calculation) and the assignment of these charges to the PISN user(s) involved.

5 List of acronyms

ANF	Additional Network Feature
AOC	Advice of Charge
APDU	Application Protocol Data Unit
ASN.1	Abstract Syntax Notation no. 1
ISDN	Integrated Services Digital Network
NFE	Network Facility Extension
PICS	Protocol Implementation Conformance Statement
PINX	Private Integrated services Network eXchange
PISN	Private Integrated Services Network
SDL	Specification and Description Language
SS	Supplementary Service

6 Signalling protocol for the support of SS-AOC

6.1 SS-AOC description

SS-AOC is a set of supplementary services which enable a user to receive information about the charging of its calls that leave the PISN and enter another network.

The three AOC supplementary services are:

a) Charging information at call set-up time (AOC-S)

   SS-AOC-S enables the user to receive information about the charging rates at call set-up time and also to receive further information during the call if there is a change of charging rates.

b) Charging information during the call (AOC-D)

   SS-AOC-D enables a user to receive information on the recorded charges for a call during the active phase of the call.

c) Charging information at the end of the call (AOC-E)

   SS-AOC-E enables a user to receive information on the recorded charges for a call when the call is terminated.

These three supplementary services are supported across the PISN by charge rate provision, interim charge provision and final charge provision or combinations thereof.

NOTE - For example, SS-AOC-D could be supported by charge rate provision, by interim charge provision, or by charge rate provision in conjunction with final charge provision.

6.2 SS-AOC operational requirements

6.2.1 Requirements on the Originating PINX

Call establishment procedures for the outgoing side of an inter-PINX link and call release procedures, as specified in ISO/IEC 11572 shall apply.

Generic procedures for call-related control of supplementary services, as specified in ISO/IEC 11582 for an End PINX, shall apply.

6.2.2 Requirements on the Terminating PINX

Call establishment procedures for the incoming side of an inter-PINX link and call release procedures, as specified in ISO/IEC 11572, shall apply.

Generic procedures for call-related control of supplementary services, as specified in ISO/IEC 11582 for an End PINX, shall apply.

6.2.3 Requirements on the Outgoing Gateway PINX

Call establishment procedures for the incoming side of an inter-PINX link and call release procedures, as specified in ISO/IEC 11572, shall apply.

Generic procedures for call-related control of supplementary services, as specified in ISO/IEC 11582 for an End PINX, shall apply.

Generic procedures for the call independent control (connection oriented) of supplementary services, as specified in ISO/IEC 11582 for an Outgoing Gateway PINX, shall apply.

6.2.4 Requirements on a Transit PINX

Basic call procedures specified in ISO/IEC 11572 for a Transit PINX shall apply.

Generic procedures for call-related control of supplementary services, as specified in ISO/IEC 11582 for a Transit PINX, shall apply.

6.2.5 Additional requirements for a Transferring or Diverting PINX that can receive final charge information for a call resulting from transfer or a diverted call

Generic procedures for the call independent control (connection oriented) of supplementary services, as specified in ISO/IEC 11582 for a Terminating PINX, shall apply.

6.3 SS-AOC coding requirements

6.3.1 Operations

The operations defined in Abstract Syntax Notation number 1 (ASN.1) in table 1 shall apply. The notation is in accordance with ITU-T Rec. X.680 and X.690. The ITU-T Rec. X.208 and X.209 superseded version is in annex E.

Table 1 - Operations in Support of SS-AOC

```
SS-AOC-Operations-asn1-97
{iso (1) standard (0)  pss1-advice-of-charge (15050) advice-of-charge-operations-asn1-97 (1)}

DEFINITIONS EXPLICIT TAGS ::=

BEGIN

IMPORTS                 OPERATION, ERROR FROM Remote-Operations-Information-Objects
                              {joint-iso-itu-t (2) remote-operations (4) informationObjects(5) version1(0)}
                        EXTENSION, Extension{} FROM Manufacturer-specific-service-extension-class-asn1-97
                              {iso (1) standard (0) pss1-generic-procedures (11582) msi-class-asn1-97 (11)}
                        notAvailable, supplementaryServiceInteractionNotAllowed
                        FROM General-Error-List
                              {ccitt recommendation q 950 general-error-list (1)}
                        PartyNumber FROM Addressing-Data-Elements-asn1-97
                         { iso (1) standard (0) pss1-generic-procedures (11582)
                              addressing-data-elements-asn1-97 (20) };

AOC-Operations OPERATION ::=    { chargeRequest | getFinalCharge | aocFinal | aocInterim | aocRate |
                                  aocComplete | aocDivChargeReq }

aocRate                         OPERATION ::= {
                                ARGUMENT                AocRateArg
                                RETURN RESULT           FALSE
                                ALWAYS RESPONDS         FALSE
                                CODE                    local:  63}

AocRateArg              ::=     SEQUENCE {
                                      aocRate       CHOICE {
                                                    chargeNotAvailable    NULL,
                                                    aocSCurrencyInfoList AOCSCurrencyInfoList
                                                          },
                                      rateArgExtension   CHOICE {
                                            extension [1]IMPLICIT Extension{{AOCExtSet}},
                                            multipleExtension   [2] IMPLICIT SEQUENCE OF
                                                          Extension{{AOCExtSet}} } OPTIONAL
                                            }
```

Table 1 - Operations in Support of SS-AOC (continued)

```
aocInterim                  OPERATION ::= {
                            ARGUMENT AocInterimArg
                            RETURN RESULT          FALSE
                            ALWAYS RESPONDS        FALSE
                            CODE                   local:  62}

AocInterimArg          ::=  SEQUENCE {
                                interimCharge   CHOICE {
                                    chargeNotAvailable [0] IMPLICIT      NULL,
                                    freeOfCharge       [1] IMPLICIT      NULL,
                                    specificCurrency       SEQUENCE {
                                        recordedCurrency  [1] IMPLICIT RecordedCurrency,
                                        interimBillingId[2] IMPLICIT InterimBillingId OPTIONAL }
                                                },
                                interimArgExtension    CHOICE {
                                    extension [1]IMPLICIT Extension{{AOCExtSet}},
                                    multipleExtension   [2] IMPLICIT SEQUENCE OF
                                                        Extension{{AOCExtSet}} } OPTIONAL
                                    }

aocFinal                    OPERATION ::= {
                            ARGUMENT AocFinalArg
                            RETURN RESULT          FALSE
                            ALWAYS RESPONDS        FALSE
                            CODE                   local:  61}

AocFinalArg            ::=  SEQUENCE {
                                finalCharge  CHOICE {
                                    chargeNotAvailable [0] IMPLICIT NULL,
                                    freeOfCharge [1] IMPLICIT NULL,
                                    specificCurrency    SEQUENCE {
                                        recordedCurrency  [1] IMPLICIT RecordedCurrency,
                                           finalBillingId[2]   IMPLICIT FinalBillingId OPTIONAL }
                                                        },
                                chargingAssociation    ChargingAssociation          OPTIONAL,
                                finalArgExtension   CHOICE {
                                    extension [1]IMPLICIT Extension{{AOCExtSet}},
                                    multipleExtension   [2] IMPLICIT SEQUENCE OF
                                                        Extension{{AOCExtSet}} } OPTIONAL
                                    }

AOCSCurrencyInfoList   ::= SEQUENCE SIZE(1..10) OF AOCSCurrencyInfo
```

Table 1 - Operations in Support of SS-AOC (continued)

```
AOCSCurrencyInfo ::= SEQUENCE {
                      chargedItem      ChargedItem,
                      rateType   CHOICE {
                           durationCurrency            [1] IMPLICIT DurationCurrency,
                           flatRateCurrency            [2] IMPLICIT FlatRateCurrency,
                           volumeRateCurrency          [3] IMPLICIT VolumeRateCurrency,
                           specialChargingCode      SpecialChargingCode,
                           freeOfCharge                [4] IMPLICIT NULL,
                           currencyInfoNotAvailable    [5] IMPLICIT NULL,
                           freeOfChargefromBeginning [6] IMPLICIT NULL
                                 }   }

ChargedItem      ::= ENUMERATED {
                           basicCommunication          (0),
                           callAttempt                 (1),
                           callSetup                   (2),
                           userToUserInfo              (3),
                           operationOfSupplementaryServ (4) }

DurationCurrency ::= SEQUENCE {
                           dCurrency       [1] IMPLICIT      Currency,
                           dAmount         [2] IMPLICIT      Amount,
                           dChargingType   [3] IMPLICIT      ChargingType,
                           dTime           [4] IMPLICIT      Time,
                           dGranularity    [5] IMPLICIT      Time OPTIONAL }

FlatRateCurrency ::= SEQUENCE {
                           fRCurrency  [1] IMPLICIT Currency,
                           fRAmount    [2] IMPLICIT Amount }

VolumeRateCurrency ::= SEQUENCE {
                           vRCurrency      [1] IMPLICIT Currency,
                           vRAmount        [2] IMPLICIT Amount,
                           vRVolumeUnit    [3] IMPLICIT VolumeUnit
                                 }

SpecialChargingCode ::= INTEGER (1..10)

RecordedCurrency ::= SEQUENCE {
                           rCurrency    [1] IMPLICIT Currency,
                           rAmount      [2] IMPLICIT Amount }

InterimBillingId ::= ENUMERATED {
                           normalCharging        (0),
                           creditCardCharging    (2) }
```

Table 1 - Operations in Support of SS-AOC (continued)

```
FinalBillingId          ::=  ENUMERATED {
                                 normalCharging              (0),
                                 creditCardCharging          (2),
                                 callForwardingUnconditional (3),
                                 callForwardingBusy          (4),
                                 callForwardingNoReply       (5),
                                 callDeflection              (6),
                                 callTransfer                (7) }

Currency                ::=  IA5String (SIZE (0..10))
                             -- SIZE(0) shall indicate the default currency of the PISN
                             -- The representation of other currencies is outside the scope of this standard

Amount                  ::=  SEQUENCE {
                                 currencyAmount    [1] IMPLICIT CurrencyAmount,
                                 multiplier        [2] IMPLICIT Multiplier  }

CurrencyAmount          ::=  INTEGER (0..16777215)
Multiplier              ::=  ENUMERATED {
                                 oneThousandth (0),
                                 oneHundredth  (1),
                                 oneTenth      (2),
                                 one           (3),
                                 ten           (4),
                                 hundred       (5),
                                 thousand      (6) }

Time                    ::=  SEQUENCE {
                                 lengthOfTimeUnit  [1] IMPLICIT LengthOfTimeUnit,
                                 scale             [2] IMPLICIT Scale }

LengthOfTimeUnit        ::=  INTEGER (0..16777215)

Scale                   ::=  ENUMERATED {
                                 oneHundredthSecond (0),
                                 oneTenthSecond     (1),
                                 oneSecond          (2),
                                 tenSeconds         (3),
                                 oneMinute          (4),
                                 oneHour            (5),
                                 twentyFourHours    (6) }

VolumeUnit              ::=  ENUMERATED {
                                 octet      (0),
                                 segment    (1),
                                 message    (2) }
```

Table 1 - Operations in Support of SS-AOC (continued)

```
ChargingType            ::=   ENUMERATED {
                                  continuousCharging   (0),
                                  stepFunction         (1) }

ChargingAssociation     ::=   CHOICE {
                                  chargeNumber  [0]    PartyNumber,
                                  chargeIdentifier ChargeIdentifier }

ChargeIdentifier        ::=   INTEGER (-32768..32767)

chargeRequest                 OPERATION ::= {
                              ARGUMENT       ChargeRequestArg
                              RESULT         ChargeRequestRes
                              ERRORS         {
                                  freeOfCharge |
                                  supplementaryServiceInteractionNotAllowed |
                                  notAvailable | unspecified }
                              CODE           local: 59}

getFinalCharge                OPERATION ::= {
                              ARGUMENT       DummyArg
                              RETURN RESULT  FALSE
                              ALWAYS RESPONDS FALSE
                              CODE           local: 60}

ChargeRequestArg        ::=   SEQUENCE {
                        adviceModeCombinations   SEQUENCE SIZE(0..7) OF
                                                 AdviceModeCombination,
                        chargeReqArgExtension    CHOICE {
                                 extension [1]IMPLICIT Extension{{AOCExtSet}},
                                 multipleExtension  [2] IMPLICIT SEQUENCE OF
                                                        Extension{{AOCExtSet}} } OPTIONAL
                                 }

ChargeRequestRes        ::=   SEQUENCE {
                              adviceModeCombination  AdviceModeCombination,
                              chargeReqResExtension CHOICE {
                                  extension [1]IMPLICIT Extension{{AOCExtSet}},
                                  multipleExtension  [2] IMPLICIT SEQUENCE OF
                                                         Extension{{AOCExtSet}} } OPTIONAL
                                  }
```