

INTERNATIONAL STANDARD

ISO/IEC
15050

First edition
1997-05-15

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*



Reference number
ISO/IEC 15050:1997(E)
AVA Documents
Document Sharing Hub

Contents

Foreword	iv
Introduction	v
1 Scope	1
2 Conformance	1
3 Normative references	1
4 Definitions	2
4.1 External definitions	2
4.2 Other definitions	3
5 List of acronyms	3
6 Signalling protocol for the support of SS-AOC	3
6.1 SS-AOC description	3
6.2 SS-AOC operational requirements	4
6.2.1 Requirements on the Originating PINX	4
6.2.2 Requirements on the Terminating PINX	4
6.2.3 Requirements on the Outgoing Gateway PINX	4
6.2.4 Requirements on a Transit PINX	4
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	4
6.3 SS-AOC coding requirements	5
6.3.1 Operations	5
6.3.2 Information elements	11
6.3.3 Messages	11
6.4 SS-AOC State definitions	11
6.4.1 States at the Originating PINX	11
6.4.2 States at the Outgoing Gateway PINX	11
6.5 SS-AOC Signalling procedures for activation, deactivation and registration	12
6.6 SS-AOC Signalling procedures for invocation and operation	12
6.6.1 Actions at the Originating PINX	12
6.6.2 Actions at the Outgoing Gateway PINX	14
6.6.3 Actions at a Transit PINX	16
6.6.4 Actions at the Terminating PINX	16
6.7 SS-AOC Impact of interworking with public ISDNs	16
6.8 SS-AOC Impact of interworking with non-ISDNs	16
6.9 Protocol interactions between SS-AOC and other supplementary services and ANFs	16

© ISO/IEC 1997

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

ISO/IEC Copyright Office • Case postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

6.9.1	Interaction with Calling Name Identification Presentation (SS-CNIP)	16
6.9.2	Interaction with Connected Name Identification Presentation (SS-CONP)	16
6.9.3	Interaction with Call Transfer (SS-CT)	16
6.9.4	Interaction with Call Diversion (SS-DIV)	17
6.9.5	Interaction with Completion of Call on Busy Subscriber (SS-CCBS)	18
6.9.6	Interaction with Completion of Call on No Reply (SS-CCNR)	18
6.9.7	Interaction with Call Offer (SS-CO)	18
6.9.8	Interaction with Call Intrusion (SS-CI)	18
6.9.9	Interaction with Do Not Disturb (SS-DND)	18
6.9.10	Interaction with Do Not Disturb Override (SS-DNDO)	18
6.9.11	Interaction with Path Replacement (ANF-PR)	18
6.9.12	Interaction with Recall (SS-RE)	18
6.9.13	Interaction with Call Interception (ANF-CINT)	18
6.10	SS-AOC Parameter values (timers)	18
Annex A	- Protocol Implementation Conformance Statement (PICS) Proforma	19
Annex B	- Examples of message sequences	25
Annex C	- Specification and Description Language (SDL) Representation of procedures	29
Annex D	- Imported ASN.1 definitions	50

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. 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.

International Standard 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.

Annex A forms an integral part of this International Standard. Annexes B, C and D are for information only.

Introduction

This International Standard is one of a series of standards defining services and signalling protocols applicable to Private Integrated Services Networks. The series uses the ISDN concepts as developed by ITU-T (formerly CCITT) and is also within the framework of standards for open systems interconnection as defined by ISO.

This International Standard specifies the signalling protocol for use at the Q reference point in support of the Advice Of Charge supplementary services.

The 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.

This page intentionally left blank

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 CCITT Recommendation I.130. 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 standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO/IEC 11572:1997, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Circuit mode bearer services - Inter-exchange signalling procedures and protocol.*

ISO/IEC 11574:1994,	<i>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.</i>
ISO/IEC 11579-1:1994,	<i>Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Part 1: Reference configuration for PISN Exchanges (PINX).</i>
ISO/IEC 11582:1995,	<i>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.</i>
ISO/IEC 13865:1995,	<i>Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Specification, functional model and information flows - Call transfer supplementary service.</i>
ISO/IEC 13869:1995,	<i>Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Inter-exchange signalling protocol - Call transfer supplementary service.</i>
ISO/IEC 13873:1995,	<i>Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Inter-exchange signalling protocol - Call diversion supplementary services.</i>
ISO/IEC 15049:1997,	<i>Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Specification, functional model and information flows - Advice of charge supplementary services.</i>
ISO/IEC 15054:1997,	<i>Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Inter-exchange signalling protocol - Call interception additional network feature.</i>
CCITT Rec. I.112:1988,	<i>Vocabulary of terms for ISDNs.</i>
CCITT Rec. I.130:1988,	<i>Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN.</i>
CCITT Rec. I.210:1988,	<i>Principles of telecommunication services supported by an ISDN and the means to describe them.</i>
CCITT Rec. Z.100:1988,	<i>Specification and description language.</i>
ITU-T Rec. Q.950:1993,	<i>Digital Subscriber Signalling System No. 1 (DSS1) - Supplementary services protocols, structure and general principles.</i>

4 Definitions

For the purposes of this International Standard, the following 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	(CCITT 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	(CCITT Rec. I.112)
– Supplementary Service	(CCITT 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

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.

advice mode combination : A combination of one or more advice modes operating simultaneously.

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

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.

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.

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

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.

Table 1 - Operations in Support of SS-AOC

SS-AOC-Operations		{iso (1) standard (0) pss1-advice-of-charge (15050) advice-of-charge-operations (0)}
DEFINITIONS EXPLICIT TAGS ::=		
BEGIN		
IMPORTS	OPERATION, ERROR FROM Remote-Operation-Notation {joint-iso-ccitt (2) remote-operations (4) notation (0)} Extension FROM Manufacturer-specific-service-extension-definition {iso (1) standard (0) pss1-generic-procedures (11582) msi-definition (0)} notAvailable, supplementaryServiceInteractionNotAllowed FROM General-Error-List {ccitt (0) recommendation (0) q (17) 950 general-error-list (1)} PartyNumber FROM Addressing-Data-Elements { iso (1) standard (0) pss1-generic-procedures (11582) addressing-data-elements (9) } ;	
AocRate	::=	OPERATION ARGUMENT AocRateArg
AocRateArg	::=	SEQUENCE { aocRate CHOICE { chargeNotAvailable NULL, aocSCurrencyInfoList AOCSCurrencyInfoList }, rateArgExtension CHOICE { extension [1] IMPLICIT Extension, multipleExtension [2] IMPLICIT SEQUENCE OF Extension } OPTIONAL }
AocInterim	::=	OPERATION ARGUMENT AocInterimArg
AocInterimArg	::=	SEQUENCE { interimCharge CHOICE { chargeNotAvailable [0] IMPLICIT NULL, freeOfCharge [1] IMPLICIT NULL, specificCurrency SEQUENCE { recordedCurrency [1] IMPLICIT RecordedCurrency,

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

		<pre> interimBillingId[2] IMPLICIT InterimBillingId OPTIONAL } }, interimArgExtension CHOICE { extension [1]IMPLICIT Extension, multipleExtension [2] IMPLICIT SEQUENCE OF Extension } OPTIONAL } </pre>
AocFinal	::=	<pre> OPERATION ARGUMENT AocFinalArg </pre>
AocFinalArg	::=	<pre> 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, multipleExtension [2] IMPLICIT SEQUENCE OF Extension } OPTIONAL } </pre>
AOCSCurrencyInfoList	::=	SEQUENCE SIZE(1..10) OF AOCSCurrencyInfo
AOCSCurrencyInfo	::=	<pre> 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 } } </pre>
ChargedItem	::=	<pre> ENUMERATED { basicCommunication (0), callAttempt (1), callSetup (2), userToUserInfo (3), operationOfSupplementaryServ (4) } </pre>

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

DurationCurrency	::=	SEQUENCE { dCurrency [1] IMPLICITCurrency, dAmount [2] IMPLICITAmount, dChargingType [3] IMPLICITChargingType, dTime [4] IMPLICITTime, dGranularity [5] IMPLICITTime 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) }
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)

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

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) }
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 }
GetFinalcharge	::=	OPERATION ARGUMENT DummyArg

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

ChargeRequestArg	::=	SEQUENCE { adviceModeCombinations SEQUENCE SIZE(0..7) OF AdviceModeCombination, chargeReqArgExtension CHOICE { extension [1]IMPLICIT Extension, multipleExtension [2] IMPLICIT SEQUENCE OF Extension } OPTIONAL }
ChargeRequestRes	::=	SEQUENCE { adviceModeCombination AdviceModeCombination, chargeReqResExtension CHOICE { extension [1]IMPLICIT Extension, multipleExtension [2] IMPLICIT SEQUENCE OF Extension } OPTIONAL }
AdviceModeCombination	::=	ENUMERATED { -- advice mode combination rate (0), -- charge rate provision rateInterim (1), -- charge rate and interim charge provision rateFinal (2), -- charge rate and final charge provision interim (3), -- interim charge provision final (4), -- final charge provision interimFinal (5), -- interim charge and final charge provision rateInterimFinal (6)} -- charge rate, interim charge and final -- charge provision
DummyArg	::=	CHOICE{ none NULL, extension [1] IMPLICIT Extension, multipleExtension [2] IMPLICIT SEQUENCE OF Extension }
-- The following OPERATION applies for the interaction with Call Transfer		
AocComplete	::=	OPERATION ARGUMENT AocCompleteArg RESULT AocCompleteRes ERRORS {supplementaryServiceInteractionNotAllowed}
AocCompleteArg	::=	SEQUENCE { chargedUser PartyNumber, chargingAssociation ChargingAssociation OPTIONAL, completeArgExtension CHOICE { extension [1]IMPLICIT Extension, multipleExtension [2] IMPLICIT SEQUENCE OF Extension } OPTIONAL }

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

AocCompleteRes::=	SEQUENCE { chargingOption ChargingOption, completeResExtension CHOICE { extension [1]IMPLICIT Extension, multipleExtension [2] IMPLICIT SEQUENCE OF Extension } OPTIONAL }
ChargingOption	::= ENUMERATED{ aocFreeOfCharge (0), aocContinueCharging (1), aocStopCharging (2) }
-- The following OPERATION applies for the interaction with Call Diversion	
AocDivChargeReq	::= OPERATION ARGUMENT AocDivChargeReqArg
AocDivChargeReqArg	::= SEQUENCE { divertingUser PartyNumber, chargingAssociation ChargingAssociation OPTIONAL, diversionType DiversionType, aocDivChargeReqArgExt CHOICE { extension [1]IMPLICIT Extension, multipleExtension [2] IMPLICIT SEQUENCE OF Extension } OPTIONAL }
DiversionType	::= ENUMERATED { callForwardingUnconditional (0), callForwardingBusy (1), callForwardingNoReply (2), callDeflection (3) }
chargeRequest	ChargeRequest ::= 59
getFinalCharge	GetFinalcharge ::= 60
aocFinal	AocFinal ::= 61
aocInterim	AocInterim ::= 62
aocRate	AocRate ::= 63
aocComplete	AocComplete ::= 64
aocDivChargeReq	AocDivChargeReq ::= 65
Unspecified	::= ERROR PARAMETER Extension
unspecified	Unspecified ::= 1008
freeOfCharge	ERROR ::= 1016
END	-- of SS-AOC-Operations

6.3.2 Information elements

6.3.2.1 Facility information element

The operations defined in 6.3.1 shall be coded in the Facility information element in accordance with ISO/IEC 11582.

When conveying the invoke APDU of operations defined in 6.3.1, the destination Entity data element of the NFE shall contain value endPINX.

When conveying the invoke APDU of operation aocFinal, aocInterim, aocRate, or aocDivChargeReq the Interpretation APDU shall contain value discardAnyUnrecognisedInvokePdu.

When conveying the invoke APDU of operation getFinalcharge, the Interpretation APDU shall contain value clearCallIfAnyInvokePduNotRecognised.

For the invoke APDU for all the other operations, the Interpretation APDU shall be either omitted or included with the value rejectUnrecognisedInvokePDU.

6.3.2.2 Other information elements

Any other information element (e.g. Calling party number) shall be coded in accordance with ISO/IEC 11572.

6.3.3 Messages

The Facility information element shall be conveyed in the messages as specified in clause 10 of ISO/IEC 11582.

6.4 SS-AOC State definitions

6.4.1 States at the Originating PINX

The procedures for the Originating PINX are written in terms of the following conceptual states existing within the SS-AOC Supplementary Service Control entity in that PINX in association with a particular call.

6.4.1.1 State Aoc-Orig-Idle

SS-AOC is not operating.

6.4.1.2 State Aoc-Orig-Wait1-Ack

The chargeRequest invoke APDU has been sent at call establishment with a SETUP message and the Originating PINX is waiting for a response from the Terminating or the Outgoing Gateway PINX.

6.4.1.3 State Aoc-Orig-Wait2-Ack

The chargeRequest invoke APDU has been sent during the call with a FACILITY message and the Originating PINX is waiting for a response from the Terminating or the Outgoing Gateway PINX.

6.4.1.4 State Aoc-Orig-Active

SS-AOC has been invoked successfully.

6.4.1.5 State Aoc-Orig-Wait-Charge

The Originating PINX has sent the getFinalcharge invoke APDU to the Outgoing Gateway PINX in order to obtain the final charge.

6.4.1.6 State Aoc-Orig-Wait-Completion

The aocComplete invoke APDU has been sent to inform the Outgoing Gateway that call transfer is in progress and the Originating PINX is waiting for a response from the Outgoing Gateway PINX.

6.4.2 States at the Outgoing Gateway PINX

The procedures for the Outgoing Gateway PINX are written in terms of the following conceptual states existing within the SS-AOC Supplementary Service Control entity in that PINX in association with a particular call.

6.4.2.1 State Aoc-Ogw-Idle

SS-AOC is not operating.

6.4.2.2 State Aoc-Ogw-Active

SS-AOC has been invoked successfully.

6.4.2.3 State Aoc-Accounting

The Outgoing Gateway PINX waits for an acknowledge or a reject from the accounting function after having received a chargeRequest invoke APDU.

6.4.2.4 State Aoc-Transfer-Accounting

The Outgoing Gateway waits for the charging policy decision taken by the accounting function after a transfer.

6.4.2.5 State Aoc-Final-Accounting

The Outgoing Gateway waits for final charge information at the time of the transfer.

6.4.2.6 State Aoc-Release-Accounting

The Outgoing Gateway waits for final charge information.

6.5 SS-AOC Signalling procedures for activation, deactivation and registration

Not applicable.

6.6 SS-AOC Signalling procedures for invocation and operation

Examples of message sequences are shown in annex B.

6.6.1 Actions at the Originating PINX

The SDL representation of procedures at the Originating PINX is shown in C.1 of annex C.

6.6.1.1 Normal procedures

SS-AOC can be started at call set-up or during the call.

6.6.1.1.1 Invocation of SS-AOC at call set-up

When a new call is established, if there is a requirement to invoke one or more AOC services, the Originating PINX shall select the advice mode combination or combinations that can provide sufficient information to support the particular supplementary service(s) concerned, include a chargeRequest invoke APDU in the SETUP message, and enter state Aoc-Orig-Wait1-Ack. The argument of the invoke APDU shall be encoded in accordance with 6.6.1.1.4.

In state Aoc-Orig-Wait1-Ack, on receipt of a chargeRequest return result APDU in a PROGRESS, an ALERTING, a CONNECT or a FACILITY message, the Originating PINX shall enter state Aoc-Orig-Active. The result indicates the advice mode combination that is in operation.

6.6.1.1.2 Invocation of SS-AOC during the call

During a call while in state Aoc-Orig-Idle, if there is a requirement to invoke one or more AOC services, the Originating PINX shall select the advice mode combination or combinations that can provide sufficient information to support the particular supplementary service(s) concerned, send a chargeRequest invoke APDU in a FACILITY message, start timer T1 and enter state Aoc-Orig-Wait2-Ack. The argument of the invoke APDU shall be encoded in accordance with 6.6.1.1.4.

In state Aoc-Orig-Wait2-Ack, on receipt of a chargeRequest return result APDU in a FACILITY message, the Originating PINX shall stop timer T1 and shall enter state Aoc-Orig-Active. The result indicates the advice mode combination that is in operation.

During a call while in state Aoc-Orig-Active, if there is a requirement to invoke one or more additional AOC supplementary services that cannot be supported by the advice modes that are currently in operation, the Originating PINX shall select the advice mode combination or combinations that can provide sufficient information to support all the required AOC supplementary services (including those already in progress), send a chargeRequest invoke APDU in a FACILITY message, start timer T1 and remain in the same state. The argument of the invoke APDU shall be encoded in accordance with 6.6.1.1.4, except that there shall be at least one element of type AdviceModeCombination.

In state Aoc-Orig-Active, on receipt of a chargeRequest return result APDU in a FACILITY message, the Originating PINX shall stop timer T1 and stay in the same state. The result indicates the new advice modes in operation.

6.6.1.1.3 Normal operation

In state Aoc-Orig-Active, on receipt of an aocInterim or aocRate invoke APDU, the Originating PINX shall stay in state Aoc-Orig-Active.

Note - The charging information received should be used to provide charging information to the calling user in accordance with the particular AOC supplementary service(s) invoked.