

AS/NZS 15049:1999
ISO/IEC 15049:1997

AS/NZS 15049

Australian/New Zealand Standard™

**Information technology—
Telecommunications and
information exchange between
systems—Private integrated
services network—Specification,
functional model and information
flows—Advice of charge
supplementary services**

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This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee IT/16, Private Telecommunications Networking. It was approved on behalf of the Council of Standards Australia on 6 November 1998 and on behalf of the Council of Standards New Zealand on 12 November 1998. It was published on 5 March 1999.

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Optus Communications, Australia
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This Standard was issued in draft form for comment as DR 98451.

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee IT/16, Private Telecommunications Networking.

This Standard is identical with, and has been reproduced from, 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*.

The objective of this Standard is to provide private integrated services network (PISN) designers and users with the specification for the provision of charging information in order to allow the user to receive advice of charge information worldwide.

The Standard is one of a series of emerging ISO/IEC Standards applicable to private integrated services networking. The series uses the ISDN concepts as developed by ITU-T and is also within the framework of Standards for Open Systems Interconnection (OSI) as defined by ISO/IEC JTC 1.

The number of this Standard is not reproduced on each page; its identity is shown only on the cover and title page.

The terms 'normative' and 'informative' have been used in this Standard to define the application of the annex to which they apply. A 'normative' annex is an integral part of a Standard, whereas an 'informative' annex is only for information and guidance.

For the purpose of this Standard, the ISO/IEC text should be modified as follows:

- (a) The words 'this Australian/New Zealand Standard' should replace the words 'this International Standard' wherever they appear.
- (b) References to International Standards should be replaced by references, where appropriate, to the following Australian/New Zealand Standards:

*Reference to International Standard
or other publication*

Australian/New Zealand Standard

ISO/IEC

AS/NZS

11574	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	4135	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
11579	Information technology— Telecommunication and information exchange between systems— Private Integrated Service Network	4136	Information technology— Telecommunications and information exchange between systems— Private integrated services network
11579-1	Part 1: Reference configuration for PISN Exchanges (PINX)	4136.1	Part 1: Reference configuration for PISN exchanges (PINX)

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ISO/IEC		AS/NZS	
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13872	Information technology— Telecommunications and information exchange between systems— Private Integrated Services Network— Specification, functional model and information flows—Call diversion supplementary services	4341	Information technology— Telecommunications and information exchange between systems— Private integrated services network— Specification, functional model and information flows—Call diversion supplementary services
CCITT			
Rec. I.112	Vocabulary of terms for ISDNs	—	
Rec. I.130	Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN	—	
Rec. I.210	Principles of telecommunication services supported by an ISDN and the means to describe them	—	
Rec. Z.100	Specification and description language	—	

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AUSTRALIAN/NEW ZEALAND STANDARD

Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Specification, functional model and information flows - Advice of charge supplementary services**1 Scope**

This International Standard specifies the Supplementary Services Advice of Charge (SS-AOC), which are applicable to various basic services supported by Private Integrated Services Networks (PISN). Basic services are specified in ISO/IEC 11574.

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.

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.

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

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

The provision of charging information to the called user, the provision of charging information for calls that do not leave the PISN, and PISN accounting are outside the scope of this International Standard.

Charging assumptions which apply to the specification of SS-AOC in this International Standard are contained in annex D.

Service specifications are produced in three stages, according the method described in CCITT Rec. I.130. This International Standard contains the stage 1 and stage 2 specifications of SS-AOC. The stage 1 specifications (clauses 6, 7, 8) specify the supplementary services as seen by users of PISNs. The stage 2 specification (clause 9) identifies the functional entities involved in the supplementary services and the information flows between them.

2 Conformance

In order to conform to this International Standard, a Stage 3 standard shall specify signalling protocols and equipment behaviour that are capable of being used in a PISN which supports the supplementary services specified in this International Standard. This means that, to claim conformance, a Stage 3 standard is required to be adequate for the support of those aspects of clauses 6, 7 and 8 (stage 1) and clause 9 (stage 2) which are relevant to the interface or equipment to which the Stage 3 standard applies.

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 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 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 13872:1995, | <i>Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Specification, functional model and information flows - Call diversion supplementary services.</i> |
| CCITT Rec. I.112:1988, | <i>Vocabulary of terms for ISDNs.</i> |

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CCITT Rec. I.130:1988, *Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN.*

CCITT Rec. I.210:1988, *Principles of telecommunication services supported by an ISDN and the means to describe them.*

CCITT Rec. Z.100:1988, *Specification and description language.*

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:

- Basic Service (CCITT Rec. I.210)
- Connection (CCITT Rec. I.112)
- Private Integrated Services Network (PISN) (ISO/IEC 11579-1)
- Private Integrated Services Network Exchange (PINX) (ISO/IEC 11579-1)
- Service (CCITT Rec. I.112)
- Signalling (CCITT Rec. I.112)
- Supplementary Service (CCITT Rec. I.210)
- User (ISO/IEC 11574)

For the description of the interaction with the supplementary service Call Transfer, the following terms are used, which are defined in ISO/IEC 13865:

- Primary call
- Secondary call
- User A (the transferring user)
- User B
- User C
- Transfer by join
- Transfer by rerouting

For the description of the interaction with the Diversion supplementary services, the following terms are used, which are defined in ISO/IEC 13872:

- Diverting user
- Deflecting user

This International Standard refers to the following basic call functional entities (FEs) defined in ISO/IEC 11574:

- Call Control (CC)
- Call Control Agent (CCA)

This International Standard refers to the following basic call inter-FE relationships defined in ISO/IEC 11574:

- r1
- r2

This International Standard refers to the following basic call information flows defined in ISO/IEC 11574:

- SETUP request/indication
- SETUP response/confirmation
- CHANNEL ACKNOWLEDGE request/indication
- REPORT request/indication
- DISCONNECT request/indication
- RELEASE request/indication

This International Standard refers to the following Call Transfer functional entities (FEs) defined in ISO/IEC 13865:

- FE1
- FE2
- FE3

- FE5
- FE6
- FE7

This International Standard refers to the following Call Transfer inter-FE relationship defined in ISO/IEC 13865:

- rr

This International Standard refers to the following Call Diversion functional entities (FEs) defined in ISO/IEC 13872:

- FE3
- FE4
- FE5
- FE6

This International Standard refers to the following Call Diversion inter-FE relationship defined in ISO/IEC 13872:

- rc
- rd
- re

This International Standard refers to the following Call Diversion information flows defined in ISO/IEC 13872:

- rc-DIVERT request/indication
- rc-DIVERT response/confirmation
- re-INFORM4 request/indication

4.2 Other definitions

Additional Network Feature : A capability, over and above that of a basic service, provided by a PISN, but not directly to a PISN user.

call, basic call : An instance of the use of a basic service.

charged call : A call that can potentially attract charges as a result of being routed to another network.

Note - A charged call can be found to be free of charge e.g. if it remains within the PISN or is not charged for by the network to which it was routed. A PISN can treat all calls or only certain classes of calls as charged calls (e.g. based on the number of the called user).

local currency unit : The currency unit of the country in which the served user's PINX is located.

served user : The charged user who is provided with advice of charge information.

5 List of acronyms

ANF	Additional Network Feature
AOC	Advice of Charge
AOC-S	Advice of Charge: charging information at call set-up time
AOC-D	Advice of Charge: charging information during the call
AOC-E	Advice of Charge: charging information at the end of the call
CC	Call Control (functional entity)
CCA	Call Control Agent (functional entity)
CT	Call Transfer
DIV	Call Diversion
FE	Functional Entity
PINX	Private Integrated Services Network Exchange
PISN	Private Integrated Services Network
PSTN	Public Switched Telephone Network
SDL	Specification and Description Language
SS	Supplementary Service
TE	Terminal Equipment

6 SS-AOC-S stage 1 specification

6.1 Description

6.1.1 General description

SS-AOC-S provides the served user with information about the charging rates for its current call. This can be at the moment of call establishment or, if the request is made later, at a later moment during the call. In addition, the served user is informed if a change in charging rates takes place during the call. The information can be sent for all charged calls, or on a per call basis. The charge information given relates to the call charges incurred on the PISN by the (public) network with which the PISN interworks.

Note - In some cases, e.g. due to off-line processing of charges, or timing considerations, the charge calculated by the user or the user's equipment based on the charging rate information provided may not precisely reflect the actual cost incurred.

The structure, contents and application of charging information are given in annex A.

6.1.2 Qualifications on applicability to telecommunication services

SS-AOC-S is applicable to all circuit mode basic services defined in ISO/IEC 11574.

6.2 Procedures

6.2.1 Provision/withdrawal

SS-AOC-S shall either be provided after pre-arrangement with the service provider, or be generally available.

SS-AOC-S can be provided either for all charged calls automatically or on a per call basis.

Withdrawal shall be at the request of the user or for service provider reasons.

6.2.2 Normal procedures

6.2.2.1 Activation/deactivation/registration/interrogation

SS-AOC-S shall be activated on provision, and deactivated on withdrawal.

SS-AOC-S requires no registration, and interrogation is not applicable.

6.2.2.2 Invocation and operation

If SS-AOC-S is provided on a per call basis, the user shall be able to invoke this service when originating a call or at any time during a call.

If SS-AOC-S is invoked for all charged calls automatically or if the served user invokes it when originating a call, the charging information shall be provided by the PISN during call establishment. This can occur, at the latest, when the calling user is informed that the called user has accepted the call.

If the served user invokes SS-AOC-S after originating a call, but prior to release of the call, the charging information shall be provided by the PISN as soon as possible after this invocation.

When there is a change in the charging rate during a call for which SS-AOC-S has been successfully invoked, the PISN shall send information about the new charging rate to be applied for the remainder of the call.

If a call for which SS-AOC-S has been successfully invoked is free of charge, or becomes free of charge during the active phase for the remainder of the call (e.g. in case of reverse charging), the specific rate "free of charge" shall be given.

If a call for which SS-AOC-S has been successfully invoked becomes free of charge for the user during the active phase for the whole call (i.e. from the beginning of the active phase of the call), the specific rate "free of charge from the beginning" shall be given.

The structure, contents and application of charging information are given in annex A.

6.2.3 Exceptional procedures

6.2.3.1 Activation/deactivation/registration/interrogation

Not applicable.

6.2.3.2 Invocation and operation

If a user who is not provided with SS-AOC-S on a per-call basis attempts to invoke SS-AOC-S, then the attempt shall be rejected by the PISN and the user shall be informed of the reason.

Note - An invocation for all calls automatically may proceed successfully.

If a user attempts to invoke SS-AOC-S for a call which is not a charged call, then the attempt shall be rejected by the PISN and the user shall be informed of the reason.

If the charging information related to a call for which SS-AOC-S has been successfully invoked is not available, this shall be indicated to the served user using the specific rate "not available".

If the PISN recognises that the information for a particular charged item is incomplete, the specific rate "not available" shall be used for that charged item.

Note - If for any reason, no charging information is provided at all on a call for which SS-AOC-S has been successfully invoked, then the user should assume that the information is not available. The user should not assume that the call is free of charge.

6.3 Interactions with other supplementary services and ANFs

Interactions with other supplementary services and ANFs for which PISN standards were available at the time of publication of this International Standard are specified below.

6.3.1 Advice of charge: charging information during the call (AOC-D)

No interaction.

6.3.2 Advice of charge: charging information at the end of the call (AOC-E)

No interaction.

6.3.3 Calling Line Identification Presentation (CLIP)

No interaction.

6.3.4 Connected Line Identification Presentation (COLP)

No interaction.

6.3.5 Calling/Connected Line Identification restriction (CLIR)

No interaction.

6.3.6 Calling Name Identification presentation (CNIP)

No interaction.

6.3.7 Connected Name Identification Presentation (CONP)

No interaction.

6.3.8 Calling/Connected Name Identification restriction (CNIR)

No interaction.

6.3.9 Call Diversion (CFU/CFB/CFNR/CD)

If a call is subject to diversion, then the diverted call can be a charged call.

The invocation of SS-AOC-S at the time of the original call establishment by or on behalf of the calling user shall apply to the diverted call.

SS-AOC-S shall not be applicable to the diverting user.

Note - An SS-AOC-S request by or on behalf of the calling user will be rejected if the diverting user is the charged user for the diverted call.

6.3.10 Call Interception (CINT)

If a call is subject to interception, then the intercepted call can be a charged call.

The invocation of SS-AOC-S at the time of the call establishment by or on behalf of the calling user shall apply to the intercepted call.

6.3.11 Call Intrusion (CI)

No interaction.

6.3.12 Call Offer (CO)

No interaction.

6.3.13 Call Transfer (CT)

If, prior to transfer, user A was receiving AOC-S information for the primary call, at the time of transfer, SS-AOC-S shall be stopped. If at the time of the transfer it is decided that user A will not be charged for the call prior to transfer, then the specific rate "free of charge from the beginning" shall be given to user A prior to stopping SS-AOC-S. The same applies for the secondary call if user A was receiving AOC-S information for that call.

User A shall not be allowed to invoke SS-AOC-S on a call resulting from transfer.

After transfer, SS-AOC-S may be invoked for user B (or C) either automatically or on request from the user. If user C has not answered at the time of transfer, it shall not be possible to invoke SS-AOC-S until after user C has answered. If the user for which SS-AOC-S is invoked is to be charged for the call resulting from transfer, AOC-S information in that case may contain charges incurred prior to transfer (as specific rate "flat rate").

6.3.14 Completion of Calls to Busy Subscribers (CCBS)

If SS-AOC-S is invoked for a call and the call encounters a busy called user, then SS-AOC-S shall apply to a call resulting from the use of SS-CCBS.

6.3.15 Completion of Calls on No Reply (CCNR)

If SS-AOC-S is invoked for a call and the call fails to be answered, then SS-AOC-S shall apply to a call resulting from the use of SS-CCNR.

6.3.16 Do Not Disturb (DND)

No interaction.

6.3.17 Do Not Disturb Override (DNDO)

No interaction.

6.3.18 Path replacement (ANF-PR)

The invocation and operation of ANF-PR shall not affect the delivery of AOC-S information to the served user.

6.3.19 Recall (RE)

After recall, SS-AOC-S may be invoked for user A either automatically or on request from the user.

6.4 Interworking considerations**6.4.1 Interworking with public ISDN**

For calls to a public ISDN, the PISN shall relate the charging rate delivered to the served user of SS-AOC-S with the charges that the public ISDN will account the PISN for.

6.4.2 Interworking with PSTN

For calls to a PSTN, the PISN shall relate the charging rate delivered to the served user of SS-AOC-S with the charges that the PSTN will account the PISN for.

6.5 Overall SDL

Figure 1 contains the dynamic description of SS-AOC-S using the Specification and Description Language (SDL) defined in CCITT Rec. Z.100 (1988). The SDL process represents the behaviour of the network in providing SS-AOC-S to a served user.

Input signals from the left and output signals to the left represent primitives from and to the calling user.

Input signals from the right represent inputs from the basic call process or from an internal process.

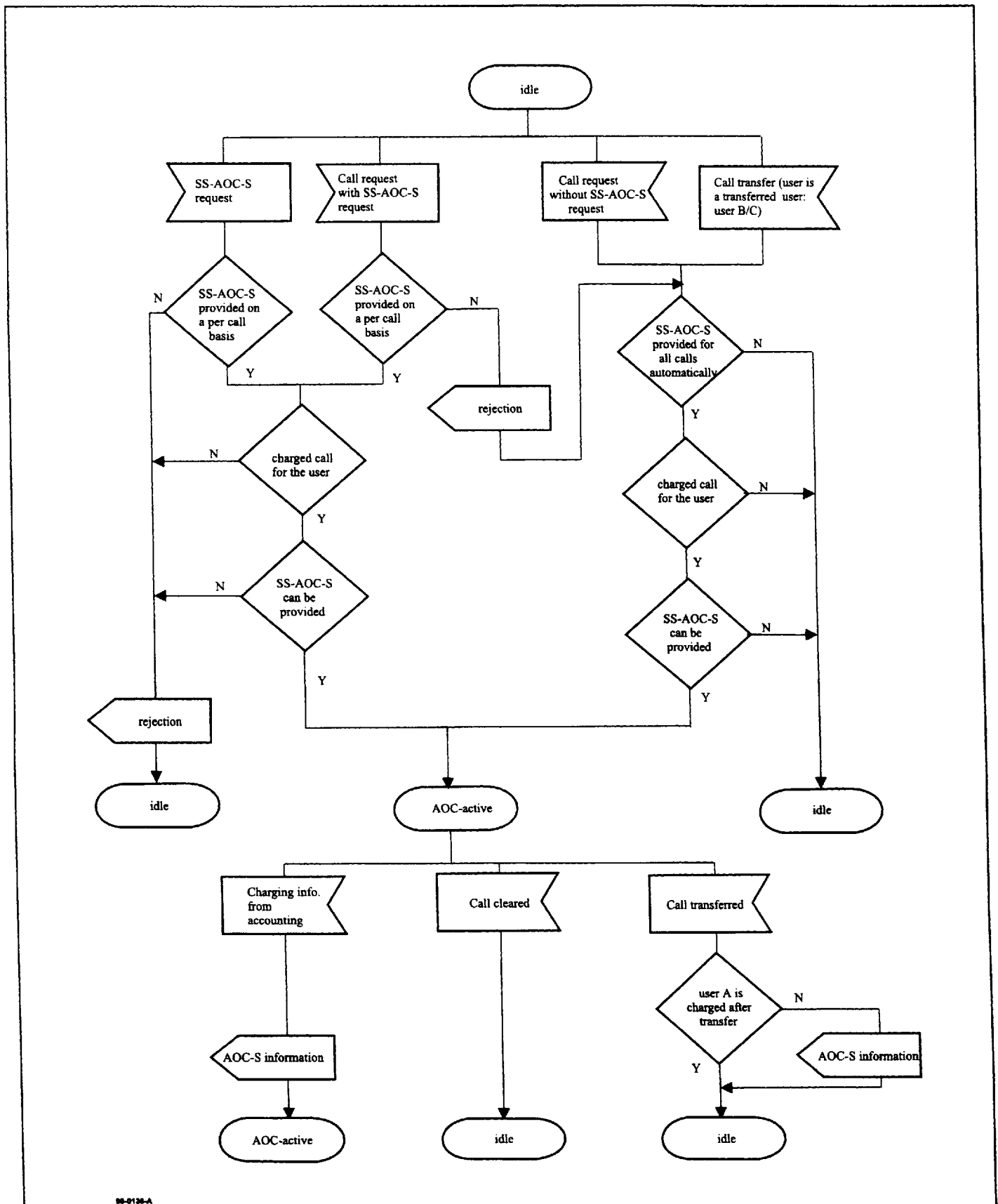


Figure 1 - SS-AOC-S, overall SDL

7 SS-AOC-D stage 1 specification

7.1 Description

7.1.1 General description

SS-AOC-D provides the served user with cumulative charging information on its account and for its current call during the active phase of the call. The information can be sent for all charged calls, or on a per call basis. The charge information given relates to the call charges incurred on the PISN by the (public) network with which the PISN interworks.

The structure, contents and application of charging information are given in annex B.

7.1.2 Qualifications on applicability to telecommunication services

SS-AOC-D is applicable to all circuit mode basic services defined in ISO/IEC 11574.

7.2 Procedures

7.2.1 Provision/withdrawal

SS-AOC-D shall either be provided after pre-arrangement with the service provider, or be generally available.

SS-AOC-D can be provided either for all charged calls automatically or on a per call basis.

Charging information shall be given in local currency units.

The PISN may also provide the option of delivering the charging information in charging units of the type(s) used in the country of the served user, instead of in local currency units.

Withdrawal shall be at the request of the user or for service provider reasons.

7.2.2 Normal procedures

7.2.2.1 Activation/deactivation/registration/interrogation

SS-AOC-D shall be activated on provision, and deactivated on withdrawal.

SS-AOC-D requires no registration, and interrogation is not applicable.

7.2.2.2 Invocation and operation

If SS-AOC-D is provided on a per call basis, the user shall be able to invoke this service when originating a call or at any time during a call.

If SS-AOC-D is provided for all charged calls automatically, it shall be invoked on behalf of the calling user when a charged call is established.

If SS-AOC-D has been successfully invoked, the PISN shall transfer charging information to the served user when a appropriate cost increment occurs.

The rate of sending information can be limited such that information is not sent more frequently than every t seconds, i.e. information is sent every t seconds, or when the increment occurs, whichever is later. The value of t is an implementation option.

If a call for which SS-AOC-D has been successfully invoked is or becomes free of charge to the served user, this shall be indicated to the served user, either by the value "0", or by "free of charge". This indication shall not be repeated periodically.

When a call for which SS-AOC-D has been successfully invoked is terminated, the overall charge for the call, even if it was free of charge, shall be sent to the served user.

The structure, contents and application of charging information are given in annex B.

7.2.3 Exceptional procedures

7.2.3.1 Activation/deactivation/registration/interrogation

Not applicable.

7.2.3.2 Invocation and operation

If a user who is not provided with SS-AOC-D on a per-call basis attempts to invoke SS-AOC-D, then the attempt shall be rejected by the PISN and the user shall be informed of the reason.

Note - An invocation for all calls automatically may proceed successfully.

If a user attempts to invoke SS-AOC-D for a call which is not a charged call, then the attempt shall be rejected by the PISN and the user shall be informed of the reason.

If the charging information related to a call for which SS-AOC-D has been successfully invoked is not available, this shall be indicated to the served user using the type of charging information "not available" and shall not be repeated periodically.

If at the end of the call, the PISN recognises that the information for a particular recorded charge is incomplete, then the recorded charge "not available" shall be included in the type of charging information relating to "total charges".

Note - If for any reason, no charging information is provided at all on a call for which SS-AOC-D has been successfully invoked, then the user should assume that the information is not available. The user should not assume that the call is free of charge.

7.3 Interactions with other supplementary services and ANFs

Interactions with other supplementary services and ANFs for which PISN Standards were available at the time of publication of this International Standard are specified below.

7.3.1 Advice of charge: charging information at call set-up time (AOC-S)

No interaction.

7.3.2 Advice of charge: charging information at the end of the call (AOC-E)

If both SS-AOC-D and SS-AOC-E have been invoked, when the call is terminated, no information related to SS-AOC-D shall be given.

7.3.3 Calling Line Identification Presentation (CLIP)

No interaction.

7.3.4 Connected Line Identification Presentation (COLP)

No interaction.

7.3.5 Calling/Connected Line Identification restriction (CLIR)

No interaction.

7.3.6 Calling Name Identification presentation (CNIP)

No interaction.

7.3.7 Connected Name Identification Presentation (CONP)

No interaction.

7.3.8 Calling/Connected Name Identification restriction (CNIR)

No interaction.

7.3.9 Call Diversion (CFU/CFB/CFNR/CD)

If a call is subject to diversion, then the diverted call can be a charged call.

The invocation of SS-AOC-D at the time of the original call establishment by or on behalf of the calling user A shall apply to the diverted call.

SS-AOC-D shall not be applicable to the diverting user.

Note - An SS-AOC-D request by or on behalf of the calling user will be rejected if the diverting user is the charged user for the diverted call.

7.3.10 Call Interception (CINT)

If a call is subject to interception, then the intercepted call can be a charged call.

The invocation of SS-AOC-D at the time of the call establishment by or on behalf of the calling user shall apply to the intercepted call.

7.3.11 Call Intrusion (CI)

No interaction.

7.3.12 Call Offer (CO)

No interaction.

7.3.13 Call Transfer (CT)

If, prior to transfer, user A was receiving AOC-D information for the primary call, then at the time of transfer, the (sub)total charges shall be sent to user A and SS-AOC-D shall be stopped. If at the time of the transfer it is decided that user A will not be charged for the call prior to transfer, then the (sub)total charges sent to user A will have value "0" or "free of charge". The same applies for the secondary call if user A was receiving AOC-D information for that call.

Note - The charges will be total charges if user A is not charged for the call resulting from transfer and sub-total charges otherwise.

User A shall not be allowed to invoke SS-AOC-D on a call resulting from transfer.

After transfer SS-AOC-D may be invoked for user B (or C) either automatically or on request from the user. If user C has not answered at the time of transfer, it shall not be possible to invoke SS-AOC-D until after user C has answered. If the user for which SS-AOC-D is invoked is to be charged for the call resulting from transfer, AOC-D information in that case may contain charges incurred prior to transfer.

7.3.14 Completion of Calls to Busy Subscribers (CCBS)

If SS-AOC-D is invoked for a call and the call encounters a busy called user, then SS-AOC-D shall apply to a call resulting from the use of SS-CCBS.

7.3.15 Completion of Calls on No Reply (CCNR)

If SS-AOC-D is invoked for a call and the call fails to be answered, then SS-AOC-D shall apply to a call resulting from the use of SS-CCNR.

7.3.16 Do Not Disturb (DND)

No interaction.

7.3.17 Do Not Disturb Override (DNDO)

No interaction.

7.3.18 Path replacement (ANF-PR)

The invocation and operation of ANF-PR shall not affect the delivery of AOC-D information to the served user.

7.3.19 Recall (RE)

After recall, SS-AOC-D may be invoked for user A either automatically or on request from the user.

7.4 Interworking considerations**7.4.1 Interworking with public ISDN**

For calls to a public ISDN, the PISN shall relate the cumulative charging information delivered to the served user of AOC with the charges that the public ISDN will account the PISN for.

7.4.2 Interworking with PSTN

For calls to a PSTN, the PISN shall relate the cumulative charging information delivered to the served user of AOC with the charges that the PSTN will account the PISN for.

7.5 Overall SDL

Figure 2 contains the dynamic description of SS-AOC-D using the Specification and Description Language (SDL) defined in CCITT Rec. Z.100 (1988). The SDL process represents the behaviour of the network in providing SS-AOC-D to a served user.

Input signals from the left and output signals to the left represent primitives from and to the calling user.

Input signals from the right represent inputs from the basic call process or from an internal process.

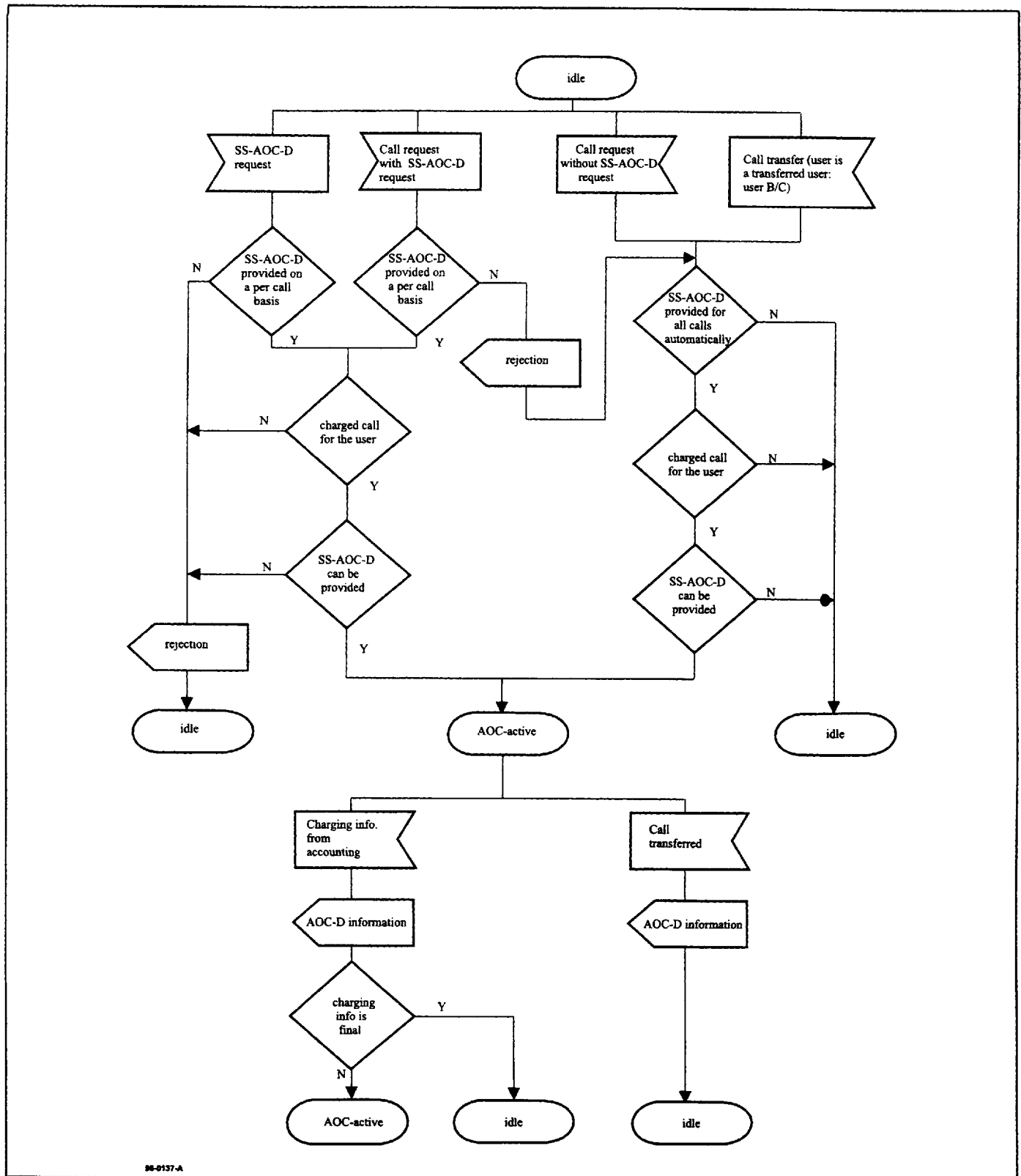


Figure 2 - SS-AOC-D, overall SDL

8 SS-AOC-E stage 1 specification

8.1 Description

8.1.1 General description

SS-AOC-E provides the served user with the final charging information on its account for a call when that call is terminated. The information can be sent for all charged calls, or on a per call basis. The charge information given relates to the call charges incurred on the PISN by the (public) network with which the PISN interworks.

The structure, contents and application of charging information are given in annex C.

8.1.2 Qualifications on applicability to telecommunication services

SS-AOC-E is applicable to all circuit mode basic services defined in ISO/IEC 11574.

8.2 Procedures

8.2.1 Provision/withdrawal

SS-AOC-E shall either be provided after pre-arrangement with the service provider, or be generally available.

SS-AOC-E can be offered either for all charged calls automatically or on a per call basis.

Charging information shall be given in local currency units.

The PISN may provide the option of delivering the charging information in charging units of the type(s) used in the country of the served user instead of in local currency units.

Withdrawal shall be at the request of the user or for service provider reasons.

8.2.2 Normal procedures

8.2.2.1 Activation/deactivation/registration/interrogation

SS-AOC-E shall be activated on provision, and deactivated on withdrawal.

SS-AOC-E requires no registration, and interrogation is not applicable.

8.2.2.2 Invocation and operation

If SS-AOC-E is provided on a per call basis, the user shall be able to invoke this service when originating a call or at any time during a call.

If SS-AOC-E is provided for all charged calls automatically, it shall be invoked on behalf of the calling user when a charged call is established.

If SS-AOC-E has been successfully invoked, the charging information shall be provided by the PISN when the call is terminated.

If a call for which SS-AOC-E has been successfully invoked is free of charge, this shall be indicated (either by the value "0" or by "free of charge").

The structure, contents and application of the charging information are given in annex C.

8.2.3 Exceptional procedures

8.2.3.1 Activation/deactivation/registration/interrogation

Not applicable.

8.2.3.2 Invocation and operation

If a user who is not provided with SS-AOC-E on a per-call basis attempts to invoke SS-AOC-E, then the attempt shall be rejected by the PISN and the user shall be informed of the reason.

Note - An invocation for all calls automatically may proceed successfully.

If a user attempts to invoke SS-AOC-E for a call which is not a charged call, then the attempt shall be rejected by the PISN and the user shall be informed of the reason.

If the charging information related to a call for which SS-AOC-E has been successfully invoked is not available, this shall be indicated to the served user using the recorded charges "not available".

If the PISN recognises that the information for a particular recorded charge is incomplete, then the type of charging information "not available" shall be included.

Note - If for any reason, no charging information is provided at all on a call for which SS-AOC-E has been successfully invoked, then the user should assume that the information is not available. The user should not assume that the call is free of charge.

8.3 Interactions with other supplementary services and ANFs

Interactions with other supplementary services and ANFs for which PISN Standards were available at the time of publication of this International Standard are specified below.

8.3.1 Advice of charge: charging information at call set-up time (AOC-S)

No interaction.

8.3.2 Advice of charge: charging information during the call (AOC-D)

If both SS-AOC-D and SS-AOC-E have been invoked, when the call is terminated, no information related to SS-AOC-D shall be given.

8.3.3 Calling Line Identification Presentation (CLIP)

No interaction.

8.3.4 Connected Line Identification Presentation (COLP)

No interaction.

8.3.5 Calling/Connected Line Identification restriction (CLIR)

No interaction.

8.3.6 Calling Name Identification presentation (CNIP)

No interaction.

8.3.7 Connected Name Identification Presentation (CONP)

No interaction.

8.3.8 Calling/Connected Name Identification restriction (CNIR)

No interaction.

8.3.9 Call Diversion (CFU/CFB/CFNR/CD)

If a call is subject to diversion, then the diverted call can be a charged call.

The invocation of SS-AOC-E at the time of the original call establishment by or on behalf of the calling user shall apply to the diverted call.

As an implementation option, SS-AOC-E may be invoked on behalf of the diverting user if this user is provided with SS-AOC-E for all charged calls automatically. In this case the diverting user is the served user of SS-AOC-E.

In the case of SS-CD, as an implementation option, SS-AOC-E may be invoked by the deflecting user at the time of the SS-CD request, if this user is provided with SS-AOC-E on a per call basis.

Note - An SS-AOC-E request by or on behalf of the diverting user would be rejected if the calling user is the charged user for the diverted call.

With the invocation of SS-CD, the deflecting user may provide an identifier. If the deflecting user is to receive AOC-E information for the diverted call, then together with the AOC-E information, this identifier shall be returned by the PISN to the deflecting user.

8.3.10 Call Interception (CINT)

If a call is subject to interception, then the intercepted call can be a charged call.

The invocation of SS-AOC-E at the time of the call establishment by or on behalf of the calling user shall apply to the intercepted call.

8.3.11 Call Intrusion (CI)

No interaction.

8.3.12 Call Offer (CO)

No interaction.

8.3.13 Call Transfer (CT)

If, prior to transfer, user A was due to receive AOC-E information for the primary call, and if user A continues to be charged for the call resulting from transfer, then at the time of transfer, as an implementation option, SS-AOC-E for user A may remain in progress. If SS-AOC-E remains in progress when the call resulting from transfer is released, AOC-E information (i.e. the total charges incurred for the call prior to transfer and for the call resulting from transfer) shall be sent to user A and AOC-E shall be stopped. If SS-AOC-E does not remain in progress, then at the time of transfer, user A shall be advised that final charge information is not available. The same applies for the secondary call.

With the invocation of Call Transfer, user A may provide an identifier. If user A is to receive AOC-E information then, together with the AOC-E information, this identifier shall be returned by the PISN to user A. If in this situation user A is to receive AOC-E information for both the primary and secondary calls, then in both cases the same identifier shall be used.

If, prior to transfer, user A was due to receive AOC-E information for the primary call, and if user A does not continue to be charged for the call resulting from transfer, then at the time of transfer, (i.e. when the call to user A is cleared) SS-AOC-E for user A shall be stopped and AOC-E information shall be sent to user A. The same applies for the secondary call.

Note - AOC-E information sent in this situation to user A can be either:

- the total charges incurred for the call prior to transfer (if user A is charged for that part of the call);
- total charges with value "0" or "free of charge" if at the time of the transfer the PISN decides that user B or user C is to be charged for the part of the call prior to transfer also.

User A shall not be allowed to invoke AOC-E only for the call resulting from transfer.

After transfer AOC-E may be invoked for user B (or C) either automatically or on request from the user. If user C has not answered at the time of transfer, it shall not be possible to invoke SS-AOC-E until after user C has answered. If the user for which SS-AOC-E is invoked is to be charged for the call resulting from transfer, AOC-E information at the end of the call to user B (or C) may contain charges incurred prior to transfer.

8.3.14 Completion of Calls to Busy Subscribers (CCBS)

If SS-AOC-E is invoked for a call and the call encounters a busy called user, then SS-AOC-E shall apply to a call resulting from the use of SS-CCBS.

8.3.15 Completion of Calls on No Reply (CCNR)

If SS-AOC-E is invoked for a call and the call fails to be answered, then SS-AOC-E shall apply to a call resulting from the use of SS-CCNR.

8.3.16 Do Not Disturb (DND)

No interaction.

8.3.17 Do Not Disturb Override (DNDO)

No interaction.

8.3.18 Path replacement (ANF-PR)

The invocation and operation of ANF-PR shall not affect the delivery of AOC-E information to the served user.

8.3.19 Recall (RE)

After recall, SS-AOC-E may still be active for user A. If not still active, SS-AOC-E may be invoked for user A either automatically or on request from the user.

8.4 Interworking considerations

8.4.1 Interworking with public ISDN

For calls to a public ISDN, the PISN shall relate the final charges delivered to the served user of AOC with the charges that the public ISDN will account the PISN for.

8.4.2 Interworking with PSTN

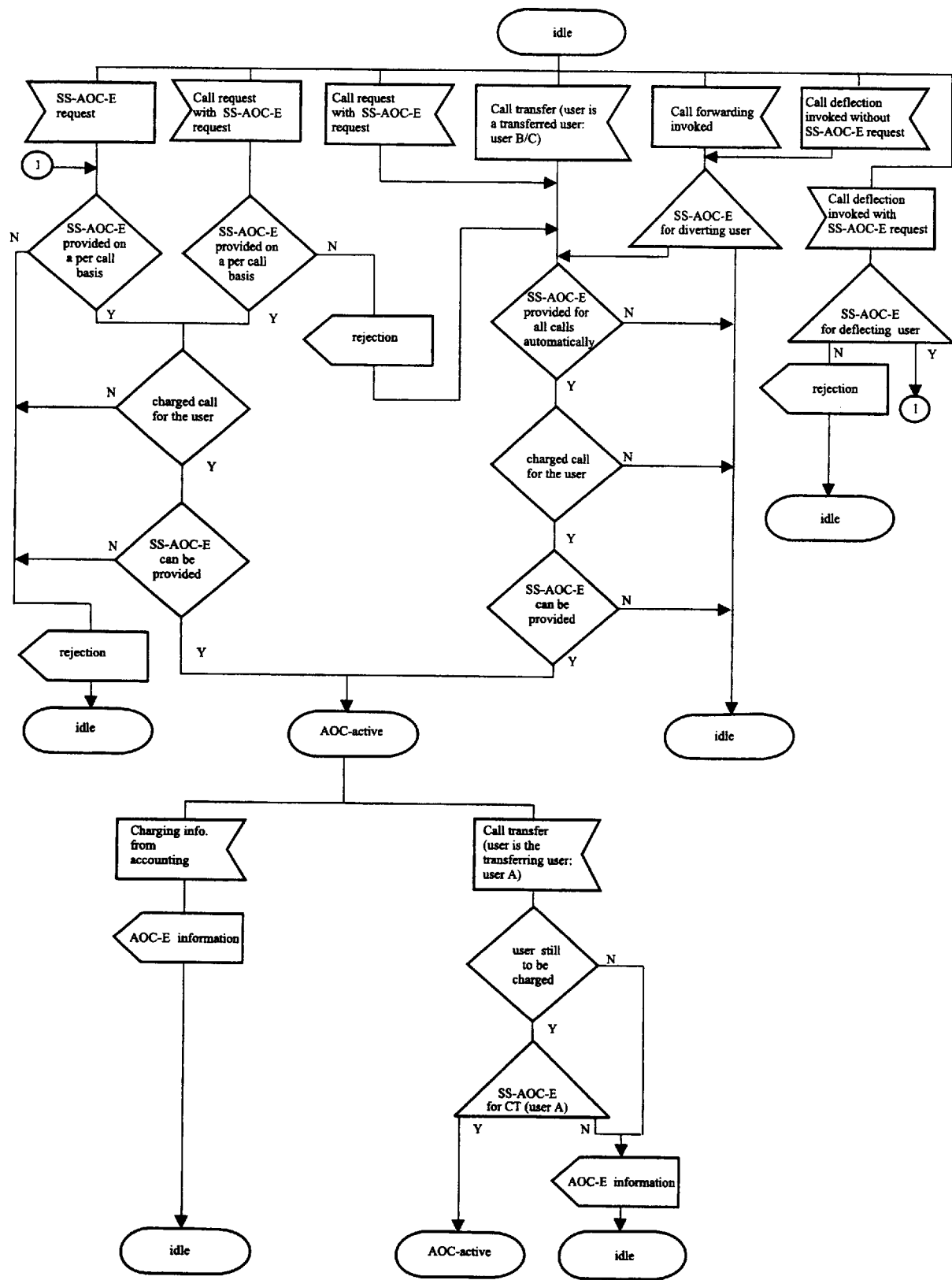
For calls to a PSTN, the PISN shall relate the final charges delivered to the served user of AOC with the charges that the PSTN will account the PISN for.

8.5 Overall SDL

Figure 3 contains the dynamic description of SS-AOC-E using the Specification and Description Language (SDL) defined in CCITT Rec. Z.100 (1988). The SDL process represents the behaviour of the network in providing SS-AOC-E to a served user.

Input signals from the left and output signals to the left represent primitives from and to the calling user.

Input signals from the right represent inputs from the basic call process or from an internal process.



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Figure 3 - SS-AOC-E, overall SDL