
**Information technology —
Telecommunications and information
exchange between systems — Private
Integrated Services Network —
Inter-exchange signalling protocol — Do not
disturb and do not disturb override
supplementary services**

*Technologies de l'information — Télécommunications et échange
d'information entre systèmes — Réseau privé à intégration de services —
Protocole de signalisation d'interéchange — Services supplémentaires ne
pas déranger et dérogation à ne pas déranger*



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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. 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 14844 was prepared by ECMA (as Standard ECMA-194) 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.

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

Introduction

This International Standard is one of a series of International 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 particular International Standard specifies the signalling protocol for use at the Q reference point in support of the Do Not Disturb (DND) and Do Not Disturb Override (DNDO) supplementary services.

Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Inter-exchange signalling protocol - Do not disturb and do not disturb override supplementary services

1 Scope

This International Standard specifies the signalling protocol for the support of the Do Not Disturb and Do Not Disturb Override supplementary services (SS-DND and SS-DNDO) at the Q reference point between Private Integrated Services Network Exchanges (PINXs) connected together within a Private Integrated Services Network (PISN).

SS-DND is a supplementary service which enables a served user to cause the PISN to reject any calls, or just those associated with a specified basic service, addressed to the served user's PISN number. The calling user is given an indication. Incoming calls are rejected as long as the service is active. The served user's outgoing service is unaffected.

SS-DNDO is a supplementary service which enables a served user to override SS-DND at a called number; that is, to allow the call to proceed as if the called user had not activated SS-DND.

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 14842.

The signalling protocols for SS-DND(O) operate on top of the signalling protocol for basic circuit switched call control, as specified in ISO/IEC 11572, and use 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-DND and other supplementary services and ANFs and between SS-DNDO 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 B.

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 11572:1996,	<i>Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Circuit-mode bearer services - Inter-exchange signalling procedures and protocol.</i>
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 13870:1995, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Inter-exchange signalling protocol - Call completion supplementary services.*
- ISO/IEC 13873:1995, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Inter-exchange signalling protocol - Call diversion supplementary services.*
- ISO/IEC 14842:1996, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Specification, functional model and information flows - Do not disturb and do not disturb override supplementary services.*
- ISO/IEC 14843:1996, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Inter-exchange signalling protocol - Call offer supplementary service.*
- ISO/IEC 14846:1996, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Inter-exchange signalling protocol - Call intrusion supplementary service.*
- CCITT Rec. I.112:1988, *Vocabulary of terms for ISDNs (Blue Book).*
- CCITT Rec. I.210:1988, *Principles of telecommunication services supported by an ISDN and the means to describe them (Blue Book).*
- CCITT Rec. Z.100:1988, *Specification and Description Language (Blue Book).*
- CCITT Rec. Q.950:1994 *Digital Subscriber Signalling System No. 1 (DSS1) supplementary services protocols; Structure and general principles.*

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)
- Coordination Function (ISO/IEC 11582)
- End PINX (ISO/IEC 11582)
- Gateway PINX (ISO/IEC 11572);
- Interpretation APDU (ISO/IEC 11582)
- Network Facility Extension (NFE) (ISO/IEC 11582)
- Originating PINX (ISO/IEC 11582)
- Private Integrated Services Network (PISN) (ISO/IEC 11579-1)
- Private Integrated Services Network Exchange (PINX) (ISO/IEC 11579-1)
- Rerouting PINX (ISO/IEC 13873)
- Served user (ISO/IEC 14842);
- Signalling (CCITT Rec. I.112)
- Supplementary Service (CCITT Rec. I.210)
- Supplementary Services Control Entity (ISO/IEC 11582)

- Terminating PINX (ISO/IEC 11582)
- Transit PINX (ISO/IEC 11582)
- User (ISO/IEC 11574)

4.2 Other definitions

Activating PINX : The PINX serving the activating user.

Deactivating PINX : The PINX serving the deactivating user.

inter-PINX link : The totality of a signalling channel and a number of information channels at the Q reference point.

Interrogating PINX : The PINX serving the interrogating user.

path retention : The retaining of the network connection between the Originating PINX and the Terminating PINX so that a supplementary service (such as SS-DNDO) can be invoked without establishing a new connection.

Served User PINX : The PINX serving the served user.

5 List of acronyms

ANF	Additional Network Feature
APDU	Application Protocol Data Unit
ASN.1	Abstract Syntax Notation no. 1
DNDOCL	DNDO Capability Level
DNDPL	DND Protection Level
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-DND	Supplementary Service Do Not Disturb
SS-DNDO	Supplementary Service Do Not Disturb Override
TE	Terminal Equipment

6 Signalling protocol for the support of SS-DND and SS-DNDO

6.1 SS-DND and SS-DNDO description

SS-DND is a supplementary service which enables a served user to cause the PISN to reject any calls, or just those associated with a specified basic service, addressed to the served user's PISN number. The calling user is given an appropriate indication. Incoming calls are rejected as long as the service is active. The served user's outgoing service is unaffected.

SS-DNDO is a supplementary service which enables a calling user to override SS-DND at a called user, allowing the call to proceed as if the called user had not activated SS-DND.

Both SS-DND and SS-DNDO are applicable to all circuit mode basic services defined in ISO/IEC 11574.

6.2 SS-DND and SS-DNDO operational requirements

6.2.1 Provision/withdrawal

6.2.1.1 Provision/withdrawal of SS-DND

SS-DND is provided or withdrawn after pre-arrangement with the service provider.

SS-DND is provided on a per PISN number basis and per basic service basis. For each PISN number, the supplementary service can be subscribed to for every basic service subscribed to by that PISN number, or for only some of the basic services subscribed to by that PISN number.

SS-DND subscription parameters may apply separately to each basic service to which SS-DND is subscribed, or for all the basic services to which SS-DND is subscribed.

If SS-DNDO is implemented then the subscription parameter "DND protection level" (DNDPL) shall be provided. The DNDPL has a value in the range 0 to 3 where 0 means no protection against DNDO and 3 means total protection against DNDO. The values 0 and 3 shall be offered. The values 1 and 2 may, as an implementation option, be offered. The effect of the subscription parameter DNDPL shall be as described in subclause 6.3.10 of ISO/IEC 14842.

The subscription parameter "Served user notification of SS-DND" may be provided. If it is not provided, as an implementation option, the network may or may not notify the served user of DND invocation.

6.2.1.2 Provision/withdrawal of SS-DNDO

SS-DNDO is provided or withdrawn after pre-arrangement with the service provider.

SS-DNDO is provided on a per PISN number basis and per basic service basis. For each PISN number, the supplementary service can be subscribed to for every basic service subscribed to by that PISN number, or for only some of the basic services subscribed to by that PISN number.

SS-DNDO subscription parameters may apply separately to each basic service to which SS-DNDO is subscribed, or for all the basic services to which SS-DNDO is subscribed.

The subscription parameter "DNDO capability level" (DNDOCL) shall be provided. The DNDOCL has a value in the range 1 (lowest capability) to 3 (highest capability). At least one of the DNDOCL levels shall be offered. The effect of the subscription parameter "DNDO capability level" shall be as described in subclause 6.3.10 of ISO/IEC 14842.

6.2.2 Requirements on a 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 the call-related control of supplementary services, as specified in ISO/IEC 11582 for an End PINX, shall apply. In addition, the generic procedures for notification, as specified in ISO/IEC 11582 for an End PINX, shall apply.

6.2.3 Requirements on an 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 the call-related control of supplementary services, as specified in ISO/IEC 11582 for an End PINX, shall apply. In addition, the generic procedures for notification, as specified in ISO/IEC 11582 for an End PINX, shall apply.

6.2.4 Requirements on an Activating PINX

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

6.2.5 Requirements on a Deactivating PINX

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

6.2.6 Requirements on an Interrogating PINX

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

6.2.7 Requirements on a SS-DND Served User PINX

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

6.2.8 Requirements on a Transit PINX

The basic call procedures for call establishment and call clearing at a Transit PINX, as specified in ISO/IEC 11572, shall apply.

Generic procedures for the call-related control and call-independent control (connection oriented) of supplementary services, as specified in ISO/IEC 11582 for a Transit PINX, shall apply. In addition, the generic procedures for notification, as specified in ISO/IEC 11582 for a Transit PINX, shall apply.

6.3 SS-DND and SS-DNDO 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-DND(O)

Do-Not-Disturb-Operations	{iso(1) standard(0) pss1-do-not-disturb(14844) do-not-disturb-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)} basicServiceNotProvided, invalidServedUserNumber, notAvailable, userNotSubscribed, supplementaryServiceInteractionNotAllowed FROM General-Error-List {ccitt recommendation q 950 general-error-list (1)} PartyNumber FROM Addressing-Data-Elements {iso(1) standard(0) pss1-generic-procedures(11582) addressing-data-elements(9)} BasicService FROM Call-Diversion-Operations {iso(1) standard(0) pss1-call-diversion(13873) call-diversion-operations(0) } -- Note. The definition of BasicService is reproduced in annex E ;
DoNotDisturbActivate	::= OPERATION ARGUMENT DNDAActivateArg RESULT DNDAActivateRes ERRORS { userNotSubscribed, notAvailable, invalidServedUserNumber, basicServiceNotProvided, temporarilyUnavailable, supplementaryServiceInteractionNotAllowed, unspecified}

Table 1 - Operations in support of SS-DND(O) (continued)

DoNotDisturbDeactivate	::= OPERATION ARGUMENT DNDDeactivateArg RESULT DummyRes ERRORS { userNotSubscribed, notAvailable, invalidServedUserNumber, notActivated, temporarilyUnavailable, supplementaryServiceInteractionNotAllowed, unspecified}
DoNotDisturbInterrogate	::= OPERATION ARGUMENT DNDInterrogateArg RESULT DNDInterrogateRes ERRORS { userNotSubscribed, notAvailable, invalidServedUserNumber, temporarilyUnavailable, supplementaryServiceInteractionNotAllowed, unspecified}
DoNotDisturbOverride	::= OPERATION ARGUMENT DNDOVERRIDEArg
PathRetain	::= OPERATION ARGUMENT PathRetainArg -- this operation may be used by other -- Supplementary Services using other -- values of the argument
ServiceAvailable	::= OPERATION ARGUMENT ServiceAvailableArg -- this operation may be used by other -- Supplementary Services using other -- values of the argument
DoNotDisturbOvrExecute	::= OPERATION ARGUMENT DummyArg RESULT DummyResult ERRORS { notAvailable, temporarilyUnavailable, supplementaryServiceInteractionNotAllowed, unspecified}
DummyArg	::= CHOICE { null NULL, extension [1] IMPLICIT Extension, sequenceOfExtn [2] IMPLICIT SEQUENCE OF Extension }

Table 1 - Operations in support of SS-DND(O) (continued)

DummyRes	<pre> ::= CHOICE { null NULL, extension [1] IMPLICIT Extension, sequenceOfExtn [2] IMPLICIT SEQUENCE OF Extension } </pre>
DNDActivateArg	<pre> ::= SEQUENCE { basicService BasicService, servedUserNr PartyNumber, argumentExtension CHOICE{ extension [1] IMPLICIT Extension, sequenceOfExtn [2] IMPLICIT SEQUENCE OF Extension } OPTIONAL } </pre>
DNDActivateRes	<pre> ::= SEQUENCE { status SET OF SEQUENCE{ basicService BasicService, dndProtectionLevel DNDProtectionLevel OPTIONAL } OPTIONAL resultExtension CHOICE{ extension [1] IMPLICIT Extension, sequenceOfExtn [2] IMPLICIT SEQUENCE OF Extension } OPTIONAL } </pre>
DNDDeactivateArg	<pre> ::= SEQUENCE { basicService BasicService, servedUserNr PartyNumber, argumentExtension CHOICE{ extension [1] IMPLICIT Extension, sequenceOfExtn [2] IMPLICIT SEQUENCE OF Extension } OPTIONAL } </pre>
DNDInterrogateArg	<pre> ::= SEQUENCE { servedUserNr PartyNumber, argumentExtension CHOICE{ extension [1] IMPLICIT Extension, sequenceOfExtn [2] IMPLICIT SEQUENCE OF Extension } OPTIONAL } </pre>

Table 1 - Operations in support of SS-DND(O) (continued)

DNDInterrogateRes	<pre> ::= SEQUENCE { status SET OF SEQUENCE { basicService BasicService, dndProtectionLevel DNDProtectionLevel OPTIONAL } OPTIONAL resultExtension CHOICE{ extension [1] IMPLICIT Extension, sequenceOfExtn [2] IMPLICIT SEQUENCE OF Extension } OPTIONAL } </pre>
DNDOVERRIDEArg	<pre> ::= SEQUENCE { dndoCapabilityLevel DNDOCapabilityLevel, argumentExtension CHOICE{ extension [1] IMPLICIT Extension, sequenceOfExtn [2] IMPLICIT SEQUENCE OF Extension } OPTIONAL } </pre>
PathRetainArg	<pre> ::= CHOICE { serviceList ServiceList, extendedServiceList SEQUENCE { serviceList ServiceList, extension Extension } } </pre>
ServiceAvailableArg	<pre> ::= CHOICE { serviceList ServiceList, extendedServiceList SEQUENCE { serviceList ServiceList, extension Extension } } </pre>
DNDProtectionLevel	<pre> ::= ENUMERATED { lowProtection(0), mediumProtection(1), highProtection(2), fullProtection(3) } </pre>
DNDOCapabilityLevel	<pre> ::= ENUMERATED { overrideLowProt(1), overrideMediumProt(2), overrideHighProt(3) } </pre>

Table 1 - Operations in support of SS-DND(O) (concluded)

ServiceList	::= BIT STRING { dndo-low(1), dndo-medium(2), dndo-high(3) } (SIZE (1..32)) -- bits other than dndo-low, dndo-medium, or dndo-high, are reserved -- for other Supplementary Services	
temporarilyUnavailable	ERROR	::= 1000
notActivated	ERROR	::= 43
Unspecified	::= ERROR PARAMETER Extension	
unspecified	Unspecified	::= 1008
doNotDisturbActivateQ	DoNotDisturbActivate	::= 35
doNotDisturbDeactivateQ	DoNotDisturbDeactivate	::= 36
doNotDisturbInterrogateQ	DoNotDisturbInterrogate	::= 37
doNotDisturbOverrideQ	DoNotDisturbOverride	::= 38
doNotDisturbOvrExecuteQ	DoNotDisturbOvrExecute	::= 39
pathRetain	PathRetain	::= 41
serviceAvailable	ServiceAvailable	::= 42
END	-- of Do-Not-Disturb-Operations	

6.3.2 Notifications

The notification defined in Abstract Syntax Notation number 1 (ASN.1) in table 2 shall apply.

Table 2 - Notification in support of SS-DND

Do-Not-Disturb-Notifications		
{ iso(1) standard(0) pss1-do-not-disturb(14844) do-not-disturb-notifications(1) }		
DEFINITIONS EXPLICIT TAGS ::=		
BEGIN		
IMPORTS	NOTIFICATION FROM Notification-Data-Structure { iso(1) standard(0) pss1-generic-procedures (11582) notification-data-structure (7) } ;	
DoNotDisturb	::= NOTIFICATION ARGUMENT NULL	
doNotDisturb	DoNotDisturb ::= 2002	
END	-- of Do-Not-Disturb-Notifications	

6.3.3 Information elements

6.3.3.1 Facility information element

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

When conveying APDUs of operations defined in subclause 6.3.1, the destinationEntity data element of the NFE shall contain value endPINX.

When conveying the invoke APDU of operation doNotDisturbOverrideQ, the Interpretation APDU shall contain value discardAnyUnrecognisedInvokePdu.

When conveying the invoke APDUs of operations doNotDisturbOvrExecuteQ, doNotDisturbActivateQ, doNotDisturbDeactivateQ or doNotDisturbInterrogateQ, the Interpretation APDU shall be omitted.

Note - Additional requirements for the conveyance of APDUs of operations pathRetain and serviceAvailable are given in A.3.2 of annex A.

6.3.3.2 Notification indicator information element

The notification defined in subclause 6.3.2 shall be coded in the Notification indicator information element in accordance with ISO/IEC 11582.

6.3.3.3 Other information elements

Any other information elements (e.g. Progress indicator) shall be coded in accordance with the rules of ISO/IEC 11572 and ISO/IEC 11582.

6.3.4 Messages

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

Messages used for call establishment and release shall be as specified in ISO/IEC 11572.

6.4 SS-DND and SS-DNDO state definitions

6.4.1 State at the Terminating PINX

The procedures for the Terminating PINX are written in terms of the following conceptual state existing within the SS-DND Supplementary Service Control entity in that PINX in association with a particular incoming call for the served user.

6.4.1.1 DND-tIdle

SS-DND or SS-DNDO operation is not in progress.

6.4.2 States at the Originating PINX

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

6.4.2.1 DNDO-oIdle

SS-DNDO is not operating.

6.4.2.2 DNDO-oAwaitExecResult

A doNotDisturbOvrExecuteQ invoke APDU has been sent.

6.4.3 States at the Activating PINX

The procedures for the Activating PINX for remote activation of SS-DND are written in terms of the following conceptual states existing within the SS-DND Supplementary Service Control entity in that PINX in association with a particular activation request from the activating user.

6.4.3.1 DND-aIdle

Activation not in progress.

6.4.3.2 DND-aWait

A doNotDisturbActivateQ invoke APDU has been sent. The Activating PINX is waiting for the response.

6.4.4 States at the Deactivating PINX

The procedures for the Deactivating PINX for remote deactivation of SS-DND are written in terms of the following conceptual states existing within the SS-DND Supplementary Service Control entity in that PINX in association with a particular deactivation request from the deactivating user.

6.4.4.1 DND-dIdle

Deactivation not in progress.

6.4.4.2 DND-dWait

A doNotDisturbDeactivateQ invoke APDU has been sent. The Deactivating PINX is waiting for the response.

6.4.5 States at the Interrogating PINX

The procedures for the Interrogating PINX for remote interrogation of SS-DND are written in terms of the following conceptual states existing within the SS-DND Supplementary Service Control entity in that PINX in association with a particular interrogation request from the interrogating user.

6.4.5.1 DND-iIdle

Interrogation not in progress.

6.4.5.2 DND-iWait

A doNotDisturbInterrogateQ invoke APDU has been sent. The Interrogating PINX is waiting for the response.

6.4.6 State at the SS-DND Served User PINX

The procedures at the Served User PINX for remote activation, deactivation and interrogation of SS-DND are written in terms of the following conceptual state existing within the SS-DND Supplementary Service Control entity in that PINX in association with a particular call-independent signalling connection for the served user.

6.4.6.1 DND-sIdle

Ready for receipt of a doNotDisturbActivateQ, doNotDisturbDeactivateQ or doNotDisturbInterrogateQ APDU.

6.5 SS-DND signalling procedures

References in this clause to protocol control states refer to basic call protocol control states defined in ISO/IEC 11572.

Annex C contains some examples of message sequences.

6.5.1 Actions at the Terminating PINX

The SDL representation of procedures at the Terminating PINX is shown in D.1 of annex D.

6.5.1.1 Normal procedures

Having agreed the B-channel, and sent back a CALL PROCEEDING message in response to an incoming SETUP message in accordance with the procedures of ISO/IEC 11572, and having determined by a local procedure that SS-DND is to be invoked, the Terminating PINX shall proceed as follows.

Note 1 - If the SETUP message also contains a doNotDisturbOverrideQ invoke APDU or a pathRetain invoke APDU containing a retention request for SS-DNDO, there is interaction with SS-DNDO, and the procedures defined in subclause 6.6.1 apply instead of the procedures defined in this clause.

Note 2 - The Terminating PINX should inform the served user of invocation of SS-DND.

If an optional in-band tone or announcement is to be applied, the Terminating PINX shall connect an in-band tone or announcement to the incoming B-channel and transmit a PROGRESS message containing a Progress indicator information element with progress description 8 "in-band information or appropriate pattern now available", a Cause information element containing cause number 21 "Call rejected", and a Notification indicator information element containing a NotificationDataStructure with value doNotDisturb. The SS-DND entity shall remain in state DND-tIdle.

If no in-band tone or announcement is to be given, a DISCONNECT message shall be sent to clear the connection. The DISCONNECT message shall contain cause number 21 "Call rejected" in the Cause information element and a Notification indicator information element containing a NotificationDataStructure with value doNotDisturb. The SS-DND entity shall remain in state DND-tIdle.

Note - It is recommended that an in-band tone or announcement be provided by the Terminating PINX only if it conveys call rejection information which is not conveyable by the signalling protocol.

6.5.1.2 Exceptional procedures

Not applicable.

6.5.2 Actions at the Originating PINX

6.5.2.1 Normal procedures

None.

Note - In cases where an outgoing call encounters a do not disturb condition at the Terminating PINX, notification of do not disturb may be received from the Terminating PINX. Such a notification will be handled in accordance with subclause 7.4 of ISO/IEC 11582.

6.5.2.2 Exceptional procedures

Not applicable.

6.5.3 Actions at the Activating PINX

The SDL representation of procedures at the Activating PINX is shown in D.3 of annex D.

6.5.3.1 Normal procedures

On determining that activation of SS-DND for a served user at the Served User PINX is required, the Activating PINX shall send a doNotDisturbActivateQ invoke APDU to the Served User PINX using the call reference of a call-independent signalling connection. The call-independent signalling connection shall be established (or used, if an appropriate connection is already available) in accordance with the procedures specified in subclause 7.3 of ISO/IEC 11582. The Activating PINX shall enter the DND-aWait state and start timer T1. On receipt of the doNotDisturbActivateQ return result APDU, the Activating PINX shall stop timer T1 and revert to the DND-aIdle state.

Note - The Activating PINX should indicate acceptance to the activating user.

The Activating PINX is responsible for clearing the call-independent signalling connection towards the Served User PINX. This may occur on receipt of a return result APDU. Alternatively, the signalling connection may be retained for other applications, if appropriate.

6.5.3.2 Exceptional procedures

On receipt of the doNotDisturbActivateQ return error or reject APDU from the Served User PINX, the Activating PINX shall stop timer T1 and revert to the DND-aIdle state.

If timer T1 expires (i.e. the doNotDisturbActivateQ invoke APDU is not answered by the Served User PINX), the Activating PINX shall enter the DND-aIdle state.

Note - The Activating PINX should indicate rejection to the activating user.

The Activating PINX is responsible for clearing the call-independent signalling connection towards the Served User PINX. This may occur on receipt of a return error or reject APDU or on expiry of timer T1. Alternatively, the signalling connection may be retained for other applications, if appropriate.

6.5.4 Actions at the Deactivating PINX

The SDL representation of procedures at the Deactivating PINX is shown in D.4 of annex D.

6.5.4.1 Normal procedures

On determining that deactivation of SS-DND for a served user at the Served User PINX is required, the Deactivating PINX shall send a doNotDisturbDeactivateQ invoke APDU to the Served User PINX using the call reference of a call-independent signalling connection. The call-independent signalling connection shall be established (or used, if an appropriate connection is already available) in accordance with the procedures specified in subclause 7.3 of ISO/IEC 11582. The Deactivating PINX shall enter the DND-dWait state and start timer T2. On receipt of the doNotDisturbDeactivateQ return result APDU, the Deactivating PINX shall stop timer T2 and revert to the DND-dIdle state.

Note - The Deactivating PINX should indicate acceptance to the deactivating user.

The Deactivating PINX is responsible for clearing the call-independent signalling connection towards the Served User PINX. This may occur on receipt of a return result APDU. Alternatively, the signalling connection may be retained for other applications, if appropriate.

6.5.4.2 Exceptional procedures

On receipt of the doNotDisturbDeactivateQ return error or reject APDU from the Served User PINX, the Deactivating PINX shall stop timer T2 and revert to the DND-dIdle state.

If timer T2 expires (i.e. the doNotDisturbDeactivateQ invoke APDU is not answered by the Served User PINX), the Deactivating PINX shall enter the DND-dIdle state.

Note - The Deactivating PINX should indicate rejection to the deactivating user.

The Deactivating PINX is responsible for clearing the call-independent signalling connection towards the Served User PINX. This may occur on receipt of a return error or reject APDU or on expiry of timer T2. Alternatively, the signalling connection may be retained for other applications, if appropriate.