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SERIES Q: SWITCHING AND SIGNALLING

Digital subscriber Signalling System No. 1 – Stage 3 description for supplementary services using DSS 1

Stage 3 description for call offering supplementary services using DSS 1: Explicit Call Transfer (ECT)

ITU-T Recommendation Q.952.7

(Previously CCITT Recommendation)

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ITU-T RECOMMENDATION Q.952.7

STAGE 3 DESCRIPTION FOR CALL OFFERING SUPPLEMENTARY SERVICES USING DSS 1: EXPLICIT CALL TRANSFER (ECT)

Summary

This Recommendation specifies the DSS 1 signalling requirement on the N-ISDN user-network interface for the Explicit Call Transfer (ECT) supplementary service. The ECT supplementary service enables an ISDN user who has two calls, into one call.

Source

ITU-T Recommendation Q.952.7 was prepared by ITU-T Study Group 11 (1997-200) and was approved under the WTSC Resolution No. 1 procedure on the 5th of June 1997.

FOREWORD

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The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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As of the date of approval of this Recommendation, the ITU had/had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

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Recommendation Q.952.7

STAGE 3 DESCRIPTION FOR CALL OFFERING SUPPLEMENTARY SERVICES USING DSS 1: EXPLICIT CALL TRANSFER (ECT)

(Geneva, 1997)

7 Explicit call transfer

7.1 Scope

This Recommendation specifies the stage 3 of the Explicit Call Transfer (ECT) supplementary service for the Integrated Services Digital Network (ISDN) at the T reference point or coincident S and T reference point (as defined in Recommendation I.411 [3]) by means of the Digital subscriber Signalling System No. 1 (DSS 1) protocol. Stage 3 identifies the protocol procedures and switching functions needed to support a telecommunications service (see Recommendation I.130 [1]).

In addition, this Recommendation specifies the protocol requirements at the T reference point where the service is provided to the user via an intermediate private ISDN.

This Recommendation does not specify the additional protocol requirements where the service is provided to the user via a telecommunications network that is not an ISDN.

The ECT supplementary service enables a user who has two calls, each of which can be an incoming call or an outgoing call, to connect together the other users in the two calls, into one call. One of the two calls shall be answered, the other call can be either answered or, as a network option, in the alerting phase.

The ECT supplementary service is applicable to all circuit-switched basic telecommunication services using one B-channel.

Further parts of this Recommendation shall specify the method of testing required to identify conformance to this Recommendation.

This Recommendation is applicable to equipment, supporting ECT supplementary service, to be attached at either side of a T reference point or coincident S and T reference point when used as an access to the public ISDN.

7.2 References

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

[1] CCITT Recommendation I.130 (1988), *Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN.*

[2] ITU-T Recommendation I.252.7 (1997), *Call offering supplementary services: Explicit Call Transfer*.

[3] CCITT Recommendation I.411 (1988), *ISDN user-network interfaces – Reference configurations*.

[4] ITU-T Recommendation I.112 (1993), *Vocabulary of terms for ISDNs*.

[5] ITU-T Recommendation I.210 (1993), *Principles of telecommunication services supported by an ISDN and the means to describe them.*

[6] ITU-T Recommendation Q.932 (1993), *Generic procedures for the control of ISDN supplementary services.*

[7] CCITT Recommendation E.164 (1991), *Numbering plan for the ISDN era*.

[8] ITU-T Recommendation Q.953 (1993), *Stage 3 description for call completion supplementary services using DSS 1*.

[9] CCITT Recommendation X.208 (1988), *Specification of Abstract Syntax Notation One (ASN.1).*

[10] CCITT Recommendation X.219 (1988), *Remote Operations: Model, notation and service Definition*.

[11] ITU-T Recommendation Q.931 (1993), *ISDN user-network interface layer 3 specifications for basic call control*.

[12] ITU-T Recommendation Q.952 (1993), *Stage 3 service description for call offering supplementary services using DSS 1 – Diversion supplementary services.*

[13] ITU-T Recommendation Q.951 (1993), *Stage 3 description for number identification supplementary services using DSS 1*.

[14] CCITT Recommendation Z.100 (1988), *Specification and Description Language (SDL).*

[15] ITU-T Recommendation Q.920 (1993), *ISDN user-network interface data link layer – General aspects.*

[16] ITU-T Recommendation Q.956 (1993), *Stage 3 description for charging supplementary services using DSS 1*.

[17] ITU-T Recommendation Q.957 (1993), *Stage 3 description for additional information transfer supplementary services using DSS 1*.

7.3 Definitions

This Recommendation defines the following terms.

7.3.1 call A-C: The call between user A and user C.

7.3.2 call A-B: The call between user A and user B.

7.3.3 call state: A state as defined in 2.1/Q.931 [11], for either the user side or the network side as appropriate. A call state may exist for each call reference value [and for each additional responding Connection Endpoint Identifier (CEI) in the incoming call state].

7.3.4 component: See Appendix IV/Q.932 [6].

7.3.5 connection endpoint identifier: The identifier that identifies the data link connection which is used to transfer the signalling information (for the complete definition see 3.4.1/Q.920 [15]).

7.3.6 integrated services digital network (ISDN): See 2.2/I.112 [4], definition 308.

7.3.7 invoke component: See Appendix IV/Q.932 [6]. Where reference is made to an "xxxx" invoke component, an invoke component is meant with its operation value set to the value of the operation "xxxx".

7.3.8 ISDN number: A number conforming to the numbering and structure specified in Recommendation E.164 [7].

7.3.9 network: DSS 1 protocol entity at the network side of the user-network interface.

7.3.10 network A: The network to which the served user is attached.

7.3.11 network B: The network to which the user B is attached.

7.3.12 network C: The network to which the user C is attached.

7.3.13 public network: The DSS 1 protocol entity at the network side of the user-network interface at the T reference point.

7.3.14 private network: The DSS 1 protocol entity at the user side of the user-network interface at the T reference point.

7.3.15 reject component: See Appendix IV/Q.932 [6].

7.3.16 return error component: See Appendix IV/Q.932 [6]. Where reference is made to an "xxxx" return error component, a return error invoke component is meant with its operation value set to the value of the operation "xxxx".

7.3.17 return result component: See Appendix IV/Q.932 [6]. Where reference is made to an "xxxx" return result component, a return result component is meant with its operation value set to the value of the operation "xxxx".

7.3.18 served user, user A: The served user is the user who invokes the ECT supplementary service.

7.3.19 service: Telecommunications service: see 2.2/I.112 [4], definition 201.

7.3.20 supplementary service: See 2.4/I.210 [5].

7.3.21 user: DSS 1 protocol entity at the user side of the user-network interface.

7.3.22 user B: The other user in one of user A's calls. By convention, in this Recommendation, it is considered that the connection has been established on this call.

7.3.23 user C: The other user in another of user A's calls.

NOTE – In this context, the sequence of the call set-ups is of no consequence, i.e. call A-C may exist before the call A-B.

7.4 Abbreviations

This Recommendation uses the following abbreviations.

AOC Advice of Charge

CEI Connection Endpoint Identifier

CLIR Calling Line Identification Restriction

COLR Connected Line Identification Restriction

CUG Closed User Group

DSS 1 Digital subscriber Signalling System No. 1

ECT Explicit Call Transfer

ISDN Integrated Services Digital Network

ISPBX ISDN Private Branch eXchange

NIE Notification indicator Information Element

NPI Numbering Plan Identifier

RDNIE Redirection Number Information Element

REV Reverse Charging

TON Type of Number

7.5 Description

The ECT supplementary service enables a user (user A) who has two calls, each of which can be an incoming call or an outgoing call, to connect together the other users in the two calls, into one call. One of the two calls shall be answered, the other call can be either answered or, as a network option, in the alerting phase. At the coincident S and T reference point, the two calls shall be controlled using the same data link connection identified by the same CEI value.

When the ECT supplementary service is invoked, the served user shall send a message to the network, identifying the users to be connected. The network responds by releasing both calls at user A and establishing a connection between user B and user C, and at the same time sending a notification of the transfer to both users B and C. See also clause 5/I.252.7 [2].

As a network provider option, the ECT supplementary service can be provided at the T reference point.

7.6 Operational requirements

7.6.1 Provision and withdrawal

The ECT supplementary service is provided by prior arrangements with the service provider.

Withdrawal of the service is made by the service provider upon request by the subscriber or for service provider reasons.

7.6.2 Requirements on the originating network side

The originating network (served user side) may provide the Call Hold supplementary service, Recommendation Q.953 [8], in connection with the ECT supplementary service and shall be capable of sending notifications related to the ECT supplementary service to the destination network sides. In the case where the network supports the option allowing the transfer of an alerting call, the other user shall be notified when the alerting call is answered.

7.6.3 Requirements on the destination network side

The destination network (remote user sides) shall be able to:

– receive an indication of the transfer from the originating network and convey notification of the transfer, and a request for subaddress to the user who remains part of the transferred call;

– receive a subaddress from the remote user and convey it to the network of the other remote user;

– receive a subaddress from the network of the other remote user and convey it to the user.

7.7 Coding requirements

7.7.1 Coding of the Facility information element components

Table 7-1 shows the definition of the operations and errors required for the ECT supplementary service using Abstract Syntax Notation One (ASN.1) as defined in Recommendation X.208 [9] and using the OPERATION and ERROR macro as defined in Recommendation X.219 [10], Figure 4/X.219.

The formal definition of the component types to encode these operations and errors is provided in 8.2.3.1.1/Q.932 [6].

The inclusion of components in Facility information elements is defined in 8.2.3/Q.932 [6].

All components (invoke, return result, return error and reject) shall be included within a Facility information element. This Facility information element may be included in any appropriate message as specified in 6.3.1/Q.932 [6], unless a more restrictive specification is given in 7.9.

Table 7-1/Q.952.7 – Operation and error definitions for the ECT supplementary service

```
Explicit-Call-Transfer-Operations-and-Errors {ccitt recommendation q 952 explicit-call-transfer (7)
                                              operations-and-errors(1)}
DEFINITIONS            ::=
BEGIN
EXPORTS                    EctLinkIdRequest, EctExecute, RequestSubaddress,
                           SubaddressTransfer, ExplicitEctExecute,
                           LinkIdNotAssignedByNetwork, EctLoopTest, EctInform;
IMPORTS                    OPERATION, ERROR
                           FROM     Remote-Operation-Notation
                                    {joint-iso-ccitt remote-operations (4) notation (0)}

                           notAvailable, userNotSubscribed, resourceUnavailable,
                           supplementaryServiceInteractionNotAllowed,
                           invalidCallState
                           FROM     General-Errors
                                    {ccitt recommendation q 950 general-error-list (1)}

                           PartySubaddress, PresentedNumberUnscreened
                           FROM     Addressing-Data-Elements
                                    {ccitt recommendation q 932 addressing-data-elements (7)};

EctLinkIdRequest       ::= OPERATION
                           RESULT   LinkId
                           ERRORS   {resourceUnavailable}

EctExecute             ::= OPERATION
                           RESULT
                           ERRORS   {notAvailable, userNotSubscribed, invalidCallState,
                                    supplementaryServiceInteractionNotAllowed}

ExplicitEctExecute     ::= OPERATION
                           ARGUMENT       LinkId
                           RESULT
                           ERRORS   {notAvailable, userNotSubscribed, invalidCallState,
                                    supplementaryServiceInteractionNotAllowed,
                                    LinkIdNotAssignedByNetwork}

RequestSubaddress      ::= OPERATION
```

Table 7-1/Q.952.7 – Operation and error definitions for the ECT supplementary service *(concluded)*

```
SubaddressTransfer      ::=  OPERATION
                             ARGUMENT        transferredToSubaddress PartySubaddress
EctInform               ::=  OPERATION
                             ARGUMENT SEQUENCE {
                                             ENUMERATED {alerting (0), active (1)},
                                             redirectionNumber PresentedNumberUnscreened
                                             OPTIONAL}

EctLoopTest             ::=  OPERATION
                             ARGUMENT        CallTransferIdentity
                             RESULT          LoopResult
                             ERRORS          {notAvailable}

LoopResult              ::=  ENUMERATED {insufficientInformation(0),
                                         noLoopExists(1),
                                         simultaneousTransfer(2)}

CallTransferIdentity        ::=  INTEGER (–128..127)
LinkIdNotAssignedByNetwork  ::=  ERROR
LinkId                      ::=  INTEGER (–32773..32772)
ectExecute EctExecute                                   ::= 6
explicitEctExecute ExplicitEctExecute                   ::= 90
requestSubaddress RequestSubaddress                     ::= 91
subaddressTransfer SubaddressTransfer                   ::= 92
ectLinkIdRequest EctLinkIdRequest                       ::= 93
ectInform EctInform                                     ::= 94
ectLoopTest EctLoopTest                                 ::= 95
linkIdNotAssignedByNetwork LinkIdNotAssignedByNetwork   ::= 61
END -- Explicit-Call-Transfer-Operations-and-Errors
```

7.7.2 Coding of the Notification indicator information element

For the coding of the Notification indicator information element, see 4.5.22/Q.931 [11].

For the ECT supplementary service, the notification description (octet 3) of the Notification indicator information element shall be coded "call transferred, active" or "call transferred, alerting". The coding is shown in Table 7-2.

Table 7-2/Q.952.7 – The notification description

Bits 7 6 5 4 3 2 1	
1 1 0 1 0 0 1	call transferred, alerting
1 1 0 1 0 1 0	call transferred, active

7.7.3 Coding of the Redirection number information element

The purpose of the Redirection number information element is to identify the ISDN number of the transferred user.

The coding of the Redirection number information element shall be as defined in 4.1.3/Q.952 [12].

7.8 State definitions

The call states as specified in 2.1/Q.931 [11] shall apply.

The auxiliary states as specified in 6.2.1.1/Q.932 [6] shall apply.

For the associated use of the Call Hold supplementary service, the auxiliary states are defined in Recommendation Q.953 [8].

Table 7-3 defines the states for the ECT supplementary service.

Table 7-3/Q.952.7 – States for user A and network A associated to the ECT supplementary service

User A states	
ECT Idle:	An instance of the ECT supplementary service has not been requested.
ECT Link Id Request:	A request for a link identifier has been initiated.
ECT Link Id Assigned:	A LinkId value is assigned.
Await ECT Link Id:	A LinkId value has not yet been assigned.
ECT Implicit Request:	The ECT supplementary service has been requested using the implicit linkage procedure, confirmation is awaited.
ECT Explicit Request:	The ECT supplementary service has been requested using the explicit linkage procedure, confirmation is awaited.
Network A state	
ECT Idle:	An instance of the ECT supplementary service has not been requested.

7.9 Signalling procedures at the coincident S and T reference point

7.9.1 Activation, deactivation and registration

Not applicable.

7.9.2 Invocation and operation

To perform an explicit call transfer, the states at user A shall be one of the combinations indicated in Table 7-4 or 7-5 depending on the linkage procedure used.

Table 7-4/Q.952.7 – States at user A for the invocation of the ECT supplementary service using either the implicit or explicit linkage procedure

Call A <-> B	**Call A <-> C**	**Examples of signalling flow for information**
(Active call state, Call Held auxiliary state)	(Active call state, Idle auxiliary state)	Figures 7-I.1 and 7-I.6 (Appendix I)
(Active call state, Idle auxiliary state)	(Active call state, Call Held auxiliary state)	Figures 7-I.1 and 7-I.6 (Appendix I)
(Active call state, Call Held auxiliary state)	(Call Delivered call state, Idle auxiliary state) (Note)	Figures 7-I.2 and 7-I.7 (Appendix I)
(Active call state, Idle auxiliary state)	(Call Delivered call state, Call Held auxiliary state) (Note)	Figures 7-I.3 and 7-I.8 (Appendix I)
NOTE – Only applicable for an outgoing call.		

Table 7-5/Q.952.7 – Additional states at user A for the invocation of the ECT supplementary service using the explicit linkage procedure

Call A <-> B	Call A <-> C	Examples of signalling flow for information
(Active call state, Idle auxiliary state)	(Active call state, Idle auxiliary state)	Figure 7-I.6 (Appendix I)
(Active call state, Idle auxiliary state)	(Call Delivered call state, Idle auxiliary state) (Note)	Figures 7-I.7 and I.8 (Appendix I)
NOTE – Only applicable for an outgoing call.		

NOTE – In Tables 7-4 and 7-5 and throughout the text, the term "Idle auxiliary state" is used for a call not on hold, also in cases where the call hold supplementary service does not apply.

In order to invoke the ECT supplementary service, an implicit or an explicit linkage mechanism may be used in the invocation procedure to identify the two calls to be transferred. The implicit linkage mechanism or explicit linkage mechanism can be used if the served user has only one call in the Idle auxiliary state and at least one call in the Call Held auxiliary state. The explicit linkage mechanism shall be used if the served user has more than one call in the Idle auxiliary state.

7.9.2.1 Explicit call transfer request using implicit linkage procedures

7.9.2.1.1 Normal operation

In order to transfer the two calls into one call between user B and user C using the implicit linkage procedure, one of the combination of the states in Table 7-4 shall apply. User A shall send a FACILITY message according to the procedures of 6.3.1/Q.932 [6] with the call reference of the call in the Call Held auxiliary state and with a Facility information element containing an EctExecute invoke component.

Network A, on receiving such a transfer request, shall follow the procedure of 7.9.2.3.

7.9.2.1.2 Exceptional procedures

If network A cannot accept the transfer request, network A shall send a FACILITY message containing an EctExecute return error component to user A, within a Facility information element, using the procedures in 6.3.1/Q.932 [6], and indicating one of the following error values:

– "userNotSubscribed", if the ECT supplementary service is not subscribed to;

– "notAvailable", if the ECT supplementary service is invoked on a non-circuit-switched connection;

– "notAvailable", if network A recognizes a looping condition;

– "notAvailable", if network A cannot accept the transfer request due to internal network restrictions;

– "invalidCallState", if the ECT supplementary service is invoked when the call indicated by the call reference is not in the Active call state (N10) or, as a network option, in the Call Delivered call state (N4);

– "invalidCallState", if the ECT supplementary service is invoked when the call indicated by the call reference is not in the Call Held auxiliary state;

– "invalidCallState", if the ECT supplementary service is invoked when the call in the Idle auxiliary state is not in a compatible call state or if there is more than one call in the Idle auxiliary state;
– "supplementaryServiceInteractionNotAllowed", if the ECT supplementary service is invoked when another supplementary service is already activated and network A does not allow this supplementary service interaction.

At user A, on receiving the FACILITY message containing the EctExecute return error component the calls A-C and A-B shall remain in the call states in which they were before transfer was attempted.

At user A, on receiving the FACILITY message containing a reject component the calls A-C and A-B shall remain in the call states in which they were before transfer was attempted.

7.9.2.2 Explicit call transfer request using explicit linkage procedures

7.9.2.2.1 Requesting a LinkId value

7.9.2.2.1.1 Normal operation

In order to initiate the explicit linkage procedure, user A shall send a FACILITY message to network A according to the procedures of 6.3.1/Q.932 [6] with the call reference of a call to be transferred and with a Facility information element containing an EctLinkIdRequest invoke component.

Network A, on receiving such a request shall:

– issue a LinkId value and associate this value with that call. The LinkId value shall be unique within the data link connection used to control the call; and
– send a FACILITY message according to the procedures of 6.3.1/Q.932 [6] to user A, with a Facility information element containing an EctLinkIdRequest return result component carrying the LinkId value.

User A on receiving a FACILITY message with a Facility information element containing the issued LinkId value in the EctLinkIdRequest return result component, shall store this value for use in subsequent explicit call transfer requests.

When the call associated with a LinkId value is cleared, the LinkId value shall be released by network A and user A.

7.9.2.2.1.2 Exceptional procedures

If network A receives the EctLinkIdRequest invoke component and is unable to allocate a LinkId value, then network A shall send a FACILITY message according to the procedures of 6.3.1/Q.932 [6] with a Facility information element containing an ectLinkIdRequest return error component to the served user. The error shall indicate "resourceUnavailable".

If network A receives the EctLinkIdRequest invoke component when the call indicated by the call reference has already allocated a LinkId value, then network A shall send a FACILITY message according to the procedures of 6.3.1/Q.932 [6] with the Facility information element containing a EctLinkIdRequest return result component. The EctLinkIdRequest return result shall indicate the current LinkId value. At user A, on receiving the FACILITY message with the EctLinkIdRequest return result component indicating the current LinkId value, normal procedures shall apply.

At user A, on receiving the FACILITY message with the EctLinkIdRequest return error component shall remain in the basic call states in which they were before the LinkId value was requested.

User A, on receiving the FACILITY message with a reject component shall remain in the basic call states in which they were before the LinkId value was requested.

7.9.2.2.2 Requesting call transfer

7.9.2.2.2.1 Normal operation

In order to transfer the two calls into one call between user B and user C, one of the combinations of the states in Tables 7-4 or 7-5 shall apply. A LinkId value shall have been assigned for one of the calls to be transferred. This call shall be in the Idle auxiliary state.

User A shall send a FACILITY message according to the procedures of 6.3.1/Q.932 [6] with the call reference of the call for which a LinkId value has not been assigned. The FACILITY message shall contain a Facility information element with an ExplicitEctExecute invoke component including the LinkId value received using the procedures in 7.9.2.2.1.

Network A, on receiving such a transfer request shall release the LinkId value and follow the procedures of 7.9.2.3.

7.9.2.2.2.2 Exceptional procedures

If network A cannot accept the transfer request, network A shall send a FACILITY message containing an ExplicitEctExecute return error component to user A, within a Facility information element, using the procedures in 6.3.1/Q.932 [6], and indicating one of the following error values:

– "userNotSubscribed", if the ECT supplementary service is not subscribed to;

– "notAvailable", if the ECT supplementary service is invoked on a non-circuit-switched connection;

– "notAvailable", if network A recognizes a looping condition;

– "notAvailable", if network A cannot accept the transfer request due to internal network restrictions;

– "invalidCallState", if the ECT supplementary service is invoked when the call indicated by the call reference is not in the Active call state (N10) or, as a network option, in the Call Delivered call state (N4);

– "invalidCallState", if the ECT supplementary service is invoked when the call identified by the LinkId value is not in a compatible call state;

– "supplementaryServiceInteractionNotAllowed", if the ECT supplementary service is invoked when another supplementary service is already activated and network A does not allow this supplementary service interaction;

– "LinkIdNotAssignedByNetwork", if the received LinkId value has not been assigned.

At user A, on receiving an ExplicitEctExecute return error component the calls A-C and A-B shall remain in the basic call states in which they were before transfer was attempted.

At user A, on receiving a reject component the calls A-C and A-B shall remain in the basic call states in which they were before transfer was attempted.

7.9.2.3 Confirmation of call transfer

7.9.2.3.1 Normal operation

If the request for call transfer is accepted, network A shall:

– through-connect between the networks of user B and user C;

– send a DISCONNECT message with the call reference of the call on which the EctExecute or ExplicitEctExecute invoke component was received, and with a Facility information element containing an EctExecute return result component (if the procedure in 7.9.2.1 has been used) or an ExplicitEctExecute return result component (if the procedure in 7.9.2.2 has

been used), thereby initiating clearing of the call towards user A according to the procedures of 5.3.4/Q.931 [11];

– initiate normal clearing towards user A of the other call in accordance with the procedures of 5.3.4/Q.931 [11].

User A on receiving the DISCONNECT messages shall continue call clearing in accordance with 5.3.4/Q.931 [11].

7.9.2.3.2 Exceptional procedures

Not applicable.

7.9.2.4 Procedures for remote users when both users are in the Active call state

7.9.2.4.1 Normal operation

When call transfer is indicated to the remote networks while user C is in the Active call state:

– network C shall send a FACILITY message to user C according to the procedures of 6.3.1/Q.932 [6], with a Notification indicator information element carrying information about the transfer and a Redirection number information element containing the ISDN number of user B (subject to restriction) and a Facility information element containing a RequestSubaddress invoke component. The information sent to user C shall be according to Table 7-6 or 7-7;

– network B shall send a FACILITY message to user B according to the procedures of 6.3.1/Q.932 [6], with a Notification indicator information element carrying information about the transfer and a Redirection number information element containing the ISDN number of user C (subject to restriction) and a Facility information element containing a RequestSubaddress invoke component. The information sent to user C shall be according to Table 7-8 or 7-9.

When user C receives a RequestSubaddress invoke component, user C may send a FACILITY message to network C according to the procedures of 6.3.1/Q.932 [6] with a Facility information element containing the C user's subaddress in a SubaddressTransfer invoke component. This indication shall be passed by network C to network B.

On receipt of this indication, network B shall send a FACILITY message according to the procedures of 6.3.1/Q.932 [6] to user B with a Facility information element containing the SubaddressTransfer invoke component, with user C's subaddress.

When user B receives a RequestSubaddress invoke component, user B may send a FACILITY message to network B according to the procedures of 6.3.1/Q.932 [6] with a Facility information element containing the B user's subaddress in a SubaddressTransfer invoke component. This indication shall be passed by network B to network C.

On receipt of this indication, network C shall send a FACILITY message according to the procedures of 6.3.1/Q.932 [6] to user C with a Facility information element containing the SubaddressTransfer invoke component, with user B's subaddress.

7.9.2.4.2 Exceptional procedures

Not applicable.

7.9.2.5 Procedures for remote users with one user in the Call Delivered call state (network option)

7.9.2.5.1 Normal operation

When call transfer is indicated to the remote networks while user C is in the Call Delivered call state:

– network B shall send a FACILITY message according to the procedures of 6.3.1/Q.932 [6] to user B, with a Notification indicator information element carrying information about the transfer and a Facility information element containing a RequestSubaddress invoke component. The information sent to user B shall be according to Table 7-8;

– network C shall send a NOTIFY message according to the procedures of 9.2/Q.932 [6] to user C, with a Notification indicator information element carrying information about the transfer and a Redirection number information element containing the ISDN number of user B (subject to restriction). If a point-to-multipoint configuration exists at user C's interface, the network shall send a NOTIFY message to each responding user. The information sent to user C shall be according to Table 7-6 or 7-7.

When user B receives a RequestSubaddress invoke component, user B may send a FACILITY message to network B according to the procedures of 6.3.1/Q.932 [6] with a Facility information element containing the B user's subaddress in a SubaddressTransfer invoke component. This indication shall be passed by network B to network C.

On receipt of this indication, network C shall send a FACILITY message according to the procedures of 6.3.1/Q.932 [6] to user C with a Facility information element containing the SubaddressTransfer invoke component and with user B's subaddress. If a point-to-multipoint configuration exists at user C's interface, network C shall send a FACILITY message to each responding user.

When network C receives a CONNECT message from user C, network C shall proceed with basic call procedures for user C in accordance with 5.2.8/Q.931 [11].

On receipt of the indication that the call to user C has been established, network B shall:

– if user C has provided a subaddress and the address is not subject to restriction, network B shall send a FACILITY message to user B according to the procedures of 6.3.1/Q.932 [6], with a Notification indicator information element carrying information about the transfer, a Redirection number information element containing the ISDN number of user C and a Facility information element containing the SubaddressTransfer invoke component with user C's subaddress. The information shall be according to Table 7-8;

– if user C has not provided a subaddress, or the address is subject to restriction network B shall send a NOTIFY message to user B according to the procedures of 9.2/Q.932 [6], with a Notification indicator information element carrying information about the transfer, and a Redirection number information element containing the ISDN number of user C information (subject to restriction). The information shall be according to Table 7-8.

7.9.2.5.2 Exceptional procedures

Not applicable.

7.9.3 Content of notification information

Tables 7-6 to 7-9 indicate the information to be provided in the Notification indicator information element and Redirection number information element when the users B and C are notified. Call states at the time of ECT invocation. If user B was the called user in the call A-B, Table 7-6 applies to the information supplied to user C, otherwise Table 7-7 is used. Likewise, if user C was called

user in the call A-C, Table 7-8 applies to the information supplied to user B, otherwise Table 7-9 is used.

Table 7-6/Q.952.7 – Information provided to user C when user B is the called user in the call A-B

Call states	COLR indication received from network B	Information provided to user C
A-B Active A-C Active/ Call Delivered	Indicated "allowed"	At time of transfer: Nie: "call transferred, active". Rdnie: B's No. (Note 1)
A-B Active A-C Active/ Call Delivered	Indicated "restricted"	At time of transfer: Nie: "call transferred, active". Rdnie: (Note 2)
A-B Active A-C Active/ Call Delivered	No indication received (e.g. interworking)	At time of transfer: Nie: "call transferred, active". Rdnie: (Note 3)

NOTE 1 – The fields within the Redirection number information element shall be processed as defined for the equivalent fields in the Connected number information element in Recommendation Q.951 [13]. In particular:

– the numbering plan identifier field shall be processed as specified in 5.5.2.1.1, third paragraph of Recommendation Q.951 [13];

– the presentation indicator field shall be processed as specified in 5.5.2.1.1, second paragraph of Recommendation Q.951 [13];

– the type of number field shall follow any of the network options specified in Table 5-2/Q.951 and Table 5-3/Q.951 [13], and the number digits field shall be processed appropriately for the setting of the type of number field.

NOTE 2 – The fields within the Redirection number information element shall be processed as defined for the equivalent fields in the Connected number information element in 5.5.2.1.1, fourth paragraph of Recommendation Q.951 [13].

NOTE 3 – The fields within the Redirection number information element shall be processed as defined for the equivalent fields in the Connected number information element in 5.5.2.1.1, sixth paragraph of Recommendation Q.951 [13].

Table 7-7/Q.952.7 – Information provided to user C when user B is the calling user in the call A-B

Call states	CLIR indication received from network B	Information provided to user C
A-B Active A-C Active/ Call Delivered	Indicated "allowed"	At time of transfer: Nie: "call transferred, active". Rdnie: B's No. (Note 1)
A-B Active A-C Active/ Call Delivered	Indicated "restricted"	At time of transfer: Nie: "call transferred, active". Rdnie: (Note 2)
A-B Active A-C Active/ Call Delivered	No indication received (e.g. interworking)	At time of transfer: Nie: "call transferred, active". Rdnie: (Note 3)

NOTE 1 – The fields within the Redirection number information element shall be processed as defined for the equivalent fields in the Calling party number information element in Recommendation Q.951 [13]. In particular:

– the numbering plan identifier field shall be processed as specified in 3.5.2.3.1, third paragraph of Recommendation Q.951 [13];

– the presentation indicator field shall be processed as specified in 3.5.2.3.1, second paragraph of Recommendation Q.951 [13];

– the type of number field shall follow any of the network options specified in Table 3-1/Q.951 and Table 3-2/Q.951 [13], and the number digits field shall be processed appropriately for the setting of the type of number field.

NOTE 2 – The fields within the Redirection number information element shall be processed as defined for the equivalent fields in the Calling party number information element in 3.5.2.3.1, fourth paragraph of Recommendation Q.951 [13].

NOTE 3 – The fields within the Redirection number information element shall be processed as defined for the equivalent fields in the Calling party number information element in 3.5.2.3.1, sixth paragraph of Recommendation Q.951 [13].

Table 7-8/Q.952.7 – Information provided to user B when user C is the called user in the call A-C

Call states	COLR indication received from network C	Information provided to user B
A-B Active A-C Active	Indicated "allowed"	At time of transfer: Nie: "call transferred, active". Rdnie: (Note 1)
A-B Active A-C Active	Indicated "restricted"	At time of transfer: Nie: "call transferred, active". Rdnie: (Note 2)
A-B Active A-C Active	No indication received (e.g. interworking)	At time of transfer: Nie: "call transferred, active". Rdnie: (Note 3)
A-B Active A-C Call Delivered	Indicated "allowed" at receipt of connect indication	At time of transfer: Nie: "call transferred, alerting". At user C CONNECT: Nie: "call transferred, active". Rdnie: (Note 1)
A-B Active A-C Call Delivered	Indicated "restricted" at receipt of connect indication	At time of transfer: Nie: "call transferred, alerting". At user C CONNECT: Nie: "call transferred, active". Rdnie: (Note 2)
A-B Active A-C Call Delivered	No indication received (e.g. interworking)	At time of transfer: Nie: "call transferred, alerting". At user C CONNECT: Nie: "call transferred, active". Rdnie: (Note 3)

NOTE 1 – The fields within the Redirection number information element shall be processed as defined for the equivalent fields in the Connected number information element in Recommendation Q.951 [13]. In particular:

– the numbering plan identifier field shall be processed as specified in 5.5.2.1.1, third paragraph of Recommendation Q.951 [13];

– the presentation indicator field shall be processed as specified in 5.5.2.1.1, second paragraph of Recommendation Q.951 [13];

– the type of number field shall follow any of the network options specified in Table 5-2/Q.951 and Table 5-3/Q.951 [13], and the number digits field shall be processed appropriately for the setting of the type of number field.

NOTE 2 – The fields within the Redirection number information element shall be processed as defined for the equivalent fields in the Connected number information element in 5.5.2.1.1, fourth paragraph of Recommendation Q.951 [13].

NOTE 3 – The fields within the Redirection number information element shall be processed as defined for the equivalent fields in the Connected number information element in 5.5.2.1.1, sixth paragraph of Recommendation Q.951 [13].

Table 7-9/Q.952.7 – Information provided to user B when user C is the calling user in the call A-C

Call states	CLIR indication received from network C	Information provided to user B
A-B Active A-C Active	Indicated "allowed"	At time of transfer: Nie: "call transferred, active". Rdnie: C's No. (Note 1)
A-B Active A-C Active	Indicated "restricted"	At time of transfer: Nie: "call transferred, active". Rdnie: (Note 2)
A-B Active A-C Active	No indication received (e.g. interworking)	At time of transfer: Nie: "call transferred, active". Rdnie: (Note 3)

NOTE 1 – The fields within the Redirection number information element shall be processed as defined for the equivalent fields in the Calling party number information element in Recommendation Q.951 [13]. In particular:

– the numbering plan identifier field shall be processed as specified in 3.5.2.3.1, third paragraph of Recommendation Q.951 [13];

– the presentation indicator field shall be processed as specified in 3.5.2.3.1, second paragraph of Recommendation Q.951 [13];

– the type of number field shall follow any of the network options specified in Table 3-1/Q.951 and Table 3-2/Q.951 [13], and the number digits field shall be processed appropriately for the setting of the type of number field.

NOTE 2 – The fields within the Redirection number information element shall be processed as defined for the equivalent fields in the Calling party number information element in 3.5.2.3.1, fourth paragraph of Recommendation Q.951 [13].

NOTE 3 – The fields within the Redirection number information element shall be processed as defined for the equivalent fields in the Calling party number information element in 3.5.2.3.1, sixth paragraph of Recommendation Q.951.3 [13].

7.10 Procedures for interworking with private ISDNs

As a network provider option, the ECT supplementary service can be provided at the T reference point.

The private ISDN and the public ISDN can interwork using two different procedures depending on which of the users are located in the public ISDN and which are located in the private ISDN. Three scenarios exist:

1) if the served user is located in the public ISDN and one or both remote users are located in the private ISDN, the call transfer is performed by the public ISDN. In this case, the procedures of 7.10.2 and optionally 7.10.3 shall apply, i.e. exchange of notifications and number information applies at the T reference point;

2) if the served user is located in the private ISDN and only one of the remote users is located in the public ISDN, the call transfer is performed by the private ISDN. In this case, the

procedures of 7.10.1 and optionally 7.10.3 shall apply, i.e. exchange of notifications and number information applies at the T reference point;

3) if the served user is located in the private ISDN and both remote users are located in the public ISDN, the call transfer may be performed by the private ISDN using the procedures of 7.10.1 and 7.10.3, or, alternatively, the private ISDN may invoke call transfer in the public ISDN using the procedures of 7.10.4 and optionally 7.10.3.

7.10.1 Call transfer performed in the private network, served user is connected to the private ISDN

7.10.1.1 Normal operation

When the ECT supplementary service is invoked in a private network, the transfer of the involved users shall be performed within the private network.

In such a situation user B and/or user C can be located in the public network, i.e. the private network has one or two calls to the public network.

In order to avoid looping of uncontrolled circuits, the optional procedures specified in 7.10.3.1 may be applied.

For each call to the public network the following procedure shall apply:

After transfer, the private network shall send a FACILITY message to the public network using the call reference of the call to the remote user and the procedures of 6.3.1/Q.932 [6]. The FACILITY message shall contain a Facility information element with an EctInform invoke component indicating if the other call is "alerting" or "active" and, if that indication is "active", containing the redirectionNumber parameter.

When the public network receives the FACILITY message with the EctInform invoke component, the public network shall send a NOTIFY message according to the procedures of 9.2/Q.932 [6] (if the call is alerting) or a FACILITY message (if the call is active) to user B (C) according to the procedures of 6.3.1/Q.932 [6]. The message shall have the same contents as specified in 7.9.2.4 and 7.9.2.5, but the contents of the Redirection number information element shall be as received from the private network, i.e. no restriction check shall be performed by the public network.

If, as a result of the notification, the user B (C) responds with its subaddress by sending a SubaddressTransfer invoke component according to the procedures in 7.9.2.4 and 7.9.2.5, the public network shall convey this subaddress information in a FACILITY message according to the procedures of 6.3.1/Q.932 [6], with a Facility information element containing the SubaddressTransfer invoke component and user B (C)'s subaddress to the private network. If user C (B) is located in the public network, the private network shall then convey the subaddress information to user C (B) by sending a similar FACILITY message to the public network which shall convey it to the user C (B).

If transfer occurs before call completion, then when the private network is informed that the other remote user has answered the call, the private network shall send a FACILITY message to the public network using the call reference of the call to the remote user and the procedures of 6.3.1/Q.932 [6]. The FACILITY message shall contain:

– a Facility information element with an EctInform invoke component indicating the other call is "active" and containing the redirectionNumber parameter;

– a Facility information element with a SubaddressTransfer invoke component indicating the subaddress supplied by the other user, if available and not restricted.

When the private network includes an EctInform invoke component containing a redirectionNumber parameter, the field shall be processed as defined for the equivalent fields in the Calling party number information element in Recommendation Q.951 [13]. In particular:

– the numbering plan identifier field shall be processed as specified in 3.5.2.3.1, third paragraph of Recommendation Q.951 [13];

– the presentation indicator field shall be processed as specified in 3.5.2.3.1, second paragraph of Recommendation Q.951 [13];

– the type of number field shall follow any of the network options specified in Table 3-1/Q.951 and Table 3-2/Q.951 [13], and the number digits field shall be processed appropriately for the setting of the type of number field.

7.10.1.2 Exceptional procedures

If the private network receives a FACILITY message containing a reject component as a response to sending an EctInform invoke component, the private network shall take no action.

7.10.2 Call transfer performed in the public network, remote user is connected to the private ISDN

7.10.2.1 Normal operation

When the ECT supplementary service is invoked in a public network and user B and/or user C is attached to a private ISDN, the following procedure shall apply for each of the users connected to a private network.

In order to avoid looping of uncontrolled circuits, the optional procedures specified in 7.10.3.2 may be applied.

After transfer, the public network shall send a FACILITY message to the private network using the call reference of the call to the private network user and the procedures in 6.3.1/Q.932 [6]. The FACILITY message shall contain a Facility information element with an EctInform invoke component indicating if the other call is "alerting" or "active" and, if that indication is "active", containing the redirectionNumber parameter taking into account the restrictions described in 7.9.2.

If the private network wants to send its user's subaddress to the other user, the private network shall send a FACILITY message according to the procedures of 6.3.1/Q.932 [6], with a Facility information element containing the SubaddressTransfer invoke component with the subaddress to the public network.

The public network shall convey the subaddress to the other user according to 7.9.2.4.1 or 7.9.2.5.1 respectively by sending a FACILITY message according to the procedures of 6.3.1/Q.932 [6] to that user or to the private network depending on the user's location.

If transfer occurs before call completion, then when the public network is informed that the other remote user has answered to the call, the public network shall send a FACILITY message to the private network using the call reference of the call to the remote user and the procedures of 6.3.1/Q.932 [6]. The FACILITY message shall contain:

– a Facility information element with an EctInform invoke component indicating the other call is "active" and containing the redirectionNumber parameter;

– a Facility information element with a SubaddressTransfer invoke component indicating the subaddress supplied by the other user, if available and not restricted.

When the public network includes an EctInform invoke component containing a redirectionNumber parameter, the field shall be processed as defined for the equivalent fields in the Calling party number information element in Recommendation Q.951 [13]. In particular:

– the numbering plan identifier field shall be processed as specified in 3.5.2.3, third paragraph of Recommendation Q.951 [13];

– the presentation indicator field shall be processed as specified in 3.5.2.3, second paragraph of Recommendation Q.951 [13];

– the type of number field shall follow any of the network options specified in Table 3-1/Q.951 and Table 3-2/Q.951 [13], and the number digits field shall be processed appropriately for the setting of the type of number field.

7.10.2.2 Exceptional procedures

If the public network receives a FACILITY message containing a reject component as a response to sending an EctInform invoke component, the public network shall take no action.

7.10.3 Procedures for the mechanism to avoid looping of uncontrolled circuits

This subclause specifies optional procedures which, prior to transfer, can be used by the private network and the public network to avoid looping of uncontrolled circuits.

7.10.3.1 Procedures at the served network side

7.10.3.1.1 Normal operation

If the private network supports "the mechanism to avoid looping of uncontrolled circuits", it shall before transfer, for each of the individual calls involved in the transfer, send a FACILITY message to the public network using the call reference of that call and the procedures of 6.3.1/Q.932 [6]. The FACILITY message shall contain a Facility information element with an EctLoopTest invoke component. The CallTransferIdentity parameter shall contain a value to identify the specific loop test.

If the public network supports the network option "mechanism to avoid looping of uncontrolled circuits" and based on the result of the treatment of the loop test in the remote user's network, the public network shall send a FACILITY message according to the procedures of 6.3.1/Q.932 [6], with a Facility information element containing an EctLoopTest return result component according to 6.3.1/Q.932 [6]. The LoopResult parameter shall indicate either "insufficientInformation", "noLoopExists" or "simultaneousTransfer".

NOTE – The decision as to whether the transfer can occur is the responsibility of the private ISDN.

7.10.3.1.2 Exceptional procedures

If the public network has implemented "the mechanism to avoid looping of uncontrolled circuits" but cannot support the loop checking for this particular call, and it receives a FACILITY message with a Facility information element containing an EctLoopTest invoke component, it shall send a FACILITY message with a Facility information element and with a EctLoopTest return error component to the private network according to 6.3.1/Q.932 [6]. The error value shall indicate "notAvailable".

If the private network receives a FACILITY message containing a reject component as a response to sending an EctLoopTest invoke component, the private network shall take no action.

7.10.3.2 Procedures at the remote network side

7.10.3.2.1 Normal operation

Before transfer, provided that the public network supports the network option "mechanism to avoid looping of uncontrolled circuits", it shall, based on the receipt of a request from the served user's network, send a FACILITY message to the private network using the call reference of the individual

call and according to the procedures of 6.3.1/Q.932 [6]. The FACILITY message shall contain a Facility information element with an EctLoopTest invoke component. The CallTransferIdentity parameter shall contain the value received from the remote network, if available.

The private network when receiving a FACILITY message with a Facility information element and with an EctLoopTest invoke component shall send a FACILITY message with a Facility information element containing an EctLoopTest return result component according to 6.3.1/Q.932 [6]. The LoopResult parameter shall indicate either "insufficientInformation", "noLoopExists" or "simultaneousTransfer".

NOTE – The decision as to whether the transfer can occur is the responsibility of the public ISDN.

7.10.3.2.2 Exceptional procedures

If the private network has implemented "the mechanism to avoid looping of uncontrolled circuits" but cannot support the loop checking for this particular call, and it receives a FACILITY message with a Facility information element containing an EctLoopTest invoke component, it shall send a FACILITY message according to the procedures of 6.3.1/Q.932 [6], with a Facility information element and with an EctLoopTest return error component to the public network. The error value shall indicate "notAvailable".

If the public network receives a FACILITY message containing a reject component as a response to sending an EctLoopTest invoke component, the public network shall take no action.

7.10.4 Call transfer performed by the public ISDN, served user is connected to the private ISDN

If the served user is located at the private ISDN and both remote users are located at the public ISDN, the private ISDN may invoke call transfer in the public ISDN. The calls to the remote users may exist on different T reference points, but the T reference points shall be connected to the same local exchange and the same ISPBX.

NOTE – If the ECT supplementary service is provided at the T reference point, some public networks do not support the invocation of the ECT supplementary service where the two calls are on different interfaces.

The procedures specified in 7.9 shall be used with the following exceptions:

1) In order to avoid looping of uncontrolled circuits, the optional procedures specified in 7.10.3.1 may be applied.
2) As the call hold supplementary service does not apply at the T reference point, the combinations of call states defined in Table 7-4/Q.952 do not apply.
3) The explicit call transfer request shall make use of the explicit linkage procedures as specified in 7.9.2.2.
4) The LinkId value, as requested according to 7.9.2.2.1, shall be unique within one or more T reference points connected to the same local exchange and the same ISPBX.

7.11 Interactions with other networks

If a transferred user is not within the ISDN, it need not be possible to notify that user about the transfer. Also, the address of a transferred user that is not within the ISDN may be unavailable (e.g. no information available or information not available due to restrictions agreed between the network providers). The delivery of address information in such cases is given in Tables 7-6/Q.952 to 7-9/Q.952.

7.12 Interaction with other supplementary services

7.12.1 Call Waiting

No impact.

7.12.2 Call Transfer

Not applicable.

7.12.3 Connected Line Identification Presentation

No impact.

7.12.4 Connected Line Identification Restriction

No impact.

7.12.5 Calling Line Identification Presentation

No impact.

7.12.6 Calling Line Identification Restriction

No impact.

7.12.7 Closed User Group

7.12.7.1 Coding requirements

No impact.

7.12.7.2 Signalling procedures at the coincident S and T reference point

7.12.7.2.1 Invocation of the ECT supplementary service

7.12.7.2.1.1 Normal operation

No impact.

7.12.7.2.1.2 Exceptional procedures

If the user requests a transfer of two calls using the implicit linkage procedures according to 7.9.2.1.1, and the two calls were established with different closed user group requirements, then the network shall reject the request according to 7.9.2.1.2. The error shall indicate "supplementaryServiceInteractionNotAllowed".

If the user requests a transfer of two calls using the explicit linkage procedures according to 7.9.2.2.1, and the two calls were established with different closed user group requirements, then the network shall reject the request according to 7.9.2.2.2. The error shall indicate "supplementaryServiceInteractionNotAllowed".

The network shall not take into account any closed user group requirements on receiving an EctLinkIdRequest invoke component.

7.12.7.3 Procedures for interworking with private ISDNs

7.12.7.3.1 Normal operation

No impact.

7.12.7.3.2 Exceptional procedure

If the user requests a transfer of two calls using the explicit linkage procedures according to 7.10.4, and the two calls were established with different closed user group requirements, then the network shall reject the request according to 7.9.2.2.2. The error shall indicate "supplementaryServiceInteractionNotAllowed".

The network shall not take into account any closed user group requirements on receiving an EctLinkIdRequest invoke component.

7.12.8 Conference Calling

7.12.8.1 Coding requirements

No impact.

7.12.8.2 Signalling procedures at the coincident S and T reference point

7.12.8.2.1 Served user uses the ECT supplementary service

7.12.8.2.1.1 Normal operation

No impact.

NOTE – The invocation of the ECT supplementary service is not allowed for the served user of the CONF supplementary service.

7.12.8.2.1.2 Exceptional procedures

If the user invokes the ECT supplementary service using the implicit linkage procedures according to 7.9.2.1.1 and the call is also the controlling call in the CONF supplementary service (local interaction for the call), then the network shall reject the EctExecute invoke component according to 7.9.2.1.2. The error shall indicate "supplementaryServiceInteractionNotAllowed".

If the user invokes the ECT supplementary service using the implicit linkage procedures according to 7.9.2.1.1, and the call not on hold is also the controlling call in the CONF supplementary service (local interaction for the call), then the network shall reject the EctExecute invoke component according to 7.9.2.1.2. The error shall indicate "supplementaryServiceInteractionNotAllowed".

If the user invokes the ECT supplementary service using the explicit linkage procedures according to 7.9.2.2.1, and either call is also the controlling call in the CONF supplementary service (local interaction for the call), then the network shall reject the ExplicitEctExecute invoke component according to 7.9.2.2.2. The error shall indicate "supplementaryServiceInteractionNotAllowed".

The network shall not reject an EctLinkIdRequest invoke component due to the user being the served user in the CONF supplementary service.

7.12.8.2.2 Remote user uses the ECT supplementary service

7.12.8.2.2.1 Normal operation

Conferees can invoke the ECT supplementary service in order to transfer their connection to the conference to another user after that call is answered.

If, during operation of the CONF supplementary service, a remote user uses the ECT supplementary service (remote interaction), then notifications concerning the ECT supplementary service shall be sent as normal to the served user of the CONF supplementary service, with the following addition:

– the network shall send the Notification indicator information to the served user in a FACILITY message according to the procedures of 6.3.1/Q.932 [6];

– the network shall include in the same message a Facility information element containing an IdentifyConferee invoke component. The PartyId parameter shall indicate the remote user pertaining to the provided notification.

NOTE – This implies that the served user of the CONF supplementary service and the other remote user will be notified but no notification is given to the other conferees taking part in the conference.

If, during operation of the CONF supplementary service, a remote user uses the ECT supplementary service (remote interaction), then the procedures of 7.9.2.4 and 7.9.2.5 shall apply for the served user of the CONF supplementary service, with the following addition:

– on sending the RequestSubaddress invoke component to the served user of the CONF supplementary service, the network shall include in the same message an IdentifyConferee invoke component indicating the PartyId of the party performing the transfer;

– on sending the SubaddressTransfer invoke component to the network, the served user of the CONF supplementary service shall include in the same message an IdentifyConferee invoke component indicating the PartyId of the party performing the transfer.

A message shall only contain one IdentifyConferee invoke component and hence shall only contain components pertaining to one party.

7.12.8.2.2.2 Exceptional procedures

No impact.

7.12.8.3 Procedures for interworking with private ISDNs

No impact.

7.12.9 Direct-Dialling-In

No impact.

7.12.10 Call Diversion services

7.12.10.1 Call Forwarding Busy

No impact.

7.12.10.2 Call Forwarding No Reply

No impact.

7.12.10.3 Call Forwarding Unconditional

No impact.

7.12.10.4 Call Deflection

No impact.

7.12.11 Line Hunting

No impact.

7.12.12 Three-Party Service

7.12.12.1 Coding requirements

No impact.

7.12.12.2 Signalling procedures at the coincident S and T reference point

7.12.12.2.1 Transfer of a three-way conversation

7.12.12.2.1.1 Normal operation

No impact.

NOTE – The served user can transfer the two calls involved in the three-way conversation by first terminating the three-way conversation and subsequently transferring the two calls.

7.12.12.2.1.2 Exceptional procedures

If the user invokes the ECT supplementary service using the implicit linkage procedures according to 7.9.2.1.1, and the call is part of a three-way conversation controlled by the same served user (local interaction for the call), then the network shall reject the EctExecute invoke component according to 7.9.2.1.2. The error shall indicate "supplementaryServiceInteraction NotAllowed".

If the user invokes the ECT supplementary service using the implicit linkage procedures according to 7.9.2.1.1, and the call not on hold is part of a three-way conversation controlled by the same served user (local interaction for the call), then the network shall reject the EctExecute invoke component according to 7.9.2.1.2. The error shall indicate "supplementaryService InteractionNotAllowed".

If the user invokes the ECT supplementary service using the explicit linkage procedures according to 7.9.2.2.1, and either or both calls are part of a three-way conversation controlled by the same served user (local interaction for the call), then the network shall reject the explicitEctExecute invoke component according to 7.9.2.2.2. The error shall indicate "supplementaryService InteractionNotAllowed".

The network shall not reject the EctLinkIdRequest invoke component due to the call being part of a three-way conversation controlled by the same user.

7.12.12.3 Procedures for interworking with private ISDNs

Not applicable.

7.12.13 User-to-User Signalling

7.12.13.1 Service 1

See 1.6.2/Q.957 [17].

7.12.13.2 Service 2

See 1.6.2/Q.957 [17].

7.12.13.3 Service 3

See 1.6.2/Q.957 [17].

7.12.14 Multiple Subscriber Number

No impact.

7.12.15 Call Hold

No impact.

7.12.16 Advice of Charge

7.12.16.1 Coding requirements

No impact.

7.12.16.2 Signalling procedures at the coincident S and T reference point

7.12.16.2.1 Delivery of charging information to the transferring user

7.12.16.2.1.1 Normal procedures

For each call for which the AOC-D supplementary service is activated, the network shall not send any charging information to the served user after that call has been transferred. When the call transfer is completed and the network releases the served user, the network shall send AOC-D charging information in one of the call control messages clearing that call. If the served user is charged for a part of the transferred call, the network shall set the TypeOfChargingInfo = "subTotal".

If the AOC-S supplementary service is activated and if the charging rate is changed after the call has been transferred, the network shall not send any information about the changed charging rate to the served user.

As a network option, the network shall send AOC-E type charging information pertaining to a transferred call, after the transferred call is released. In this case, the charging information shall be transferred using the procedures specified in 2.9.2.4/Q.956 [16]. If the served user activates the AOC-E supplementary service or if the AOC-E supplementary service is activated for all calls and the user invokes the ECT supplementary service, the user may in addition send an IdentificationOfCharge invoke component containing the argument ChargingAssociation to the network. In order to associate the IdentificationOfCharge invoke component with the call to be transferred, the user shall include the IdentificationOfCharge invoke component within the same FACILITY message that contains either the EctExecute or the ExplicitEctExecute invoke component, as defined in 7.7.1. The user shall choose for each call either the PartyNumber or the ChargeIdentifier type of the ChargingAssociation, when the ChargingAssociation parameter is used.

If the network receives the IdentificationOfCharge invoke component and the network supports the option to send AOC-E charging information in connection with the ECT supplementary service, the network shall retain the provided ChargingAssociation parameter.

When the transferred call is released, the network shall send the retained ChargingAssociation parameter together with the AOC-E charging information to the served user and subsequently release the retained ChargingAssociation parameter. The ChargingAssociation parameter provides additional information for the user to identify the call to which a specific AOC-E charging information is related.

In the case that the user has subscribed to the MSN supplementary service, the network shall return the served user's number associated with the call reference on which the EctExecute or ExplicitEctExecute invoke component was sent in the Called party number information element when the AOC-E charging information is sent to the user.

When the network offers the option of sending charging information for the transferred call and if the served user is charged for both calls (before the ECT supplementary service is invoked) and if the AOC-E supplementary service is activated for each call, then the network shall send the overall charges for both calls to the served user when the transferred call is released. If the AOC-E supplementary service is only activated for one call, then the network shall only send the charge for this call to the served user when the transferred call is released.

The network shall send the charging information in the Facility information element and indicate the following information:

– AOCECurrencyInfo, and optionally the AOCEBillingId = "callTransfer", in an AOCECurrency invoke component; or,

– AOCEChargingUnitInfo, and optionally the AOCEBillingId = "callTransfer", in an AOCEChargingUnit invoke component.

7.12.16.2.1.2 Exceptional procedures

If, on receipt of an IdentificationOfCharge invoke component, the user has not subscribed to the AOC-E supplementary service, the network shall send an IdentificationOfCharge return error component indicating "userNotSubscribed" to the user according to the procedures of 6.3.1/Q.932 [6].

If a user sends an IdentificationOfCharge invoke component to the network and the user has subscribed to AOC-E supplementary service on a per call basis but the user has not activated the AOC-E supplementary service for this particular call, the network shall send an IdentificationOfCharge return error component to the user according to the procedures of 6.3.1.2/Q.932 [6]. The error shall indicate "notAvailable".

7.12.16.3 Procedures for interworking with private ISDNs

The procedures of 7.12.16.2 shall apply.

7.12.17 Sub-addressing

No impact.

7.12.18 Terminal Portability

7.12.18.1 Coding requirements

No impact.

7.12.18.2 Signalling procedures at the coincident S and T reference point

7.12.18.2.1 Remote user of the TP supplementary service uses the ECT supplementary service

7.12.18.2.1.1 Normal operation

If, within the TP supplementary service, the served user has suspended a call, the network cannot send notifications to the served user that are caused by operation of the ECT supplementary service (remote interaction).

The network shall discard these notifications and shall not retain these for later delivery.

7.12.18.2.1.2 Exceptional procedures

No impact.

7.12.18.3 Procedures for interworking with private ISDNs

No impact.

7.12.19 Completion of Calls to Busy Subscribers

No impact.

7.12.20 Malicious Call Identification

7.12.20.1 Coding requirements

No impact.

7.12.20.2 Signalling procedures at the coincident S and T reference point

7.12.20.2.1 Normal operation

No impact.

7.12.20.2.2 Exceptional procedures

If a user invokes the MCID supplementary service, according to 7.9.2.1/Q.951 [13], after the call has been transferred (local interaction for the same call), then the network shall reject the request according to 7.9.2.2/Q.951 [13]. The error shall indicate "supplementaryServiceInteractionNotAllowed".

7.12.21 Reverse Charging

The following interaction procedures apply for the situation where charging for the two calls that are transferred to one call is performed on a per leg basis. This implies that a user, taking part in the ECT supplementary service, can reverse the charging only for the leg of the original call.

7.12.21.1 Coding requirements

No impact.

7.12.21.2 Signalling procedures at the coincident S and T reference point

7.12.21.2.1 Procedures before invocation of call transfer

For the individual calls between the ECT served user and remote users, REV cases A, B, C and D may be invoked without any impact on the DSS 1 protocol.

7.12.21.2.2 Procedures after call transfer

7.12.21.2.2.1 Interaction with REV case A

If REV case A (invocation by the calling user during call request) has already been invoked on a call before invocation of call transfer, the charging for this leg shall continue at the called user after call transfer has taken place.

If the ECT served user has requested REV case A on a call to remote user C and then invokes call transfer in the alerting phase (i.e. before acknowledge of the REV request from the remote user), the network shall react as follows:

– if the REV case A request is accepted by remote user C, the ECT served user shall not be charged for the call. The network shall not notify neither the ECT served user nor remote user B of the result of the REV case A invocation;

– if remote user C clears the call as a result of rejecting the REV case A request, normal call clearing towards users B and C shall take place without any notification of the users about the result of REV case A.

7.12.21.2.2.2 Interaction with REV case B

If REV case B (invocation of reverse charging for the rest of a call, done by the calling/called user during the active state) is requested by user B or C on a transferred call, the following procedures shall apply:

– if the remote user (B or C) is the calling user in the original call, the network shall reject the REV case B request using the procedures in 3.9.2.2.1.2, item i), fourth hyphen of Recommendation Q.956 [16];

– if the remote user (B or C) is the called user in the original call, the procedures of 3.9.2.2.2/Q.956 [16] shall apply with the exception that the ECT served user shall not be notified.

7.12.21.2.2.3 Interaction with REV case C

If REV case C (invocation of reverse charging for the entire call, done by the called user during the active state) is requested by user B or C on a transferred call, the procedures of 3.9.2.3/Q.956 [16] shall apply with the exception that the ECT served user shall not be notified.

7.12.21.2.2.4 Interaction with REV case D

If REV case D (permanent reverse charging) applies to user C and the ECT served user invokes call transfer in the alerting phase (i.e. before notification of reverse charging is received by the ECT served user), then the ECT served user shall not be charged for the call. The network shall not notify neither the ECT served user nor remote user B of the result of the REV case D invocation.

7.12.21.3 Procedures for interworking with private ISDNs

7.12.21.3.1 Procedures before invocation of call transfer

For the individual calls between the ECT served user and remote users, REV cases A, B, C and D may be invoked without any impact on the DSS 1 protocol.

7.12.21.3.2 Procedures after call transfer

If call transfer is performed by the private network according to the procedures described in 7.10.1 and 7.10.2, the interaction with the REV supplementary service has no impact on the DSS 1 protocol.

If call transfer is invoked in the public network according to the procedures of 7.10.4, the interaction as described in 7.12.21.3.1 shall apply.

7.12.22 Multi-level Precedence and Preemption

No applicable interaction at this time.

7.12.23 Support of Private Numbering Plans

No applicable interaction at this time.

7.13 Parameter values (timers)

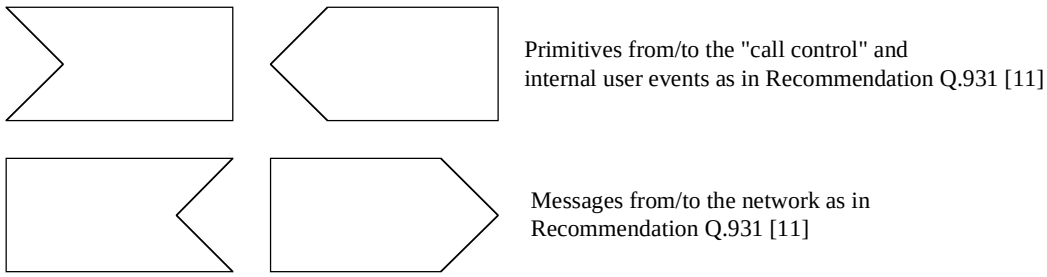
No specific timers are required.

7.14 Dynamic description (SDL diagrams)

The dynamic descriptions are specified in the Figures 7-1 to 7-5 according to Recommendation Z.100 [14].

7.14.1 User side SDL

In the context of this Recommendation, the direction of the input symbol and the output symbol at the user side is defined as follows:



This subclause contains the following user side SDLs:

– Figure 7.1 (sheet 1 of 3): ECT user A, ECT execute, implicit request.
– Figure 7.1 (sheet 2 of 3): ECT user A, ECT execute, explicit request.
– Figure 7.1 (sheet 3 of 3): ECT user A, ECT execute, explicit request.
– Figure 7.2: ECT user A, ECT LinkId request

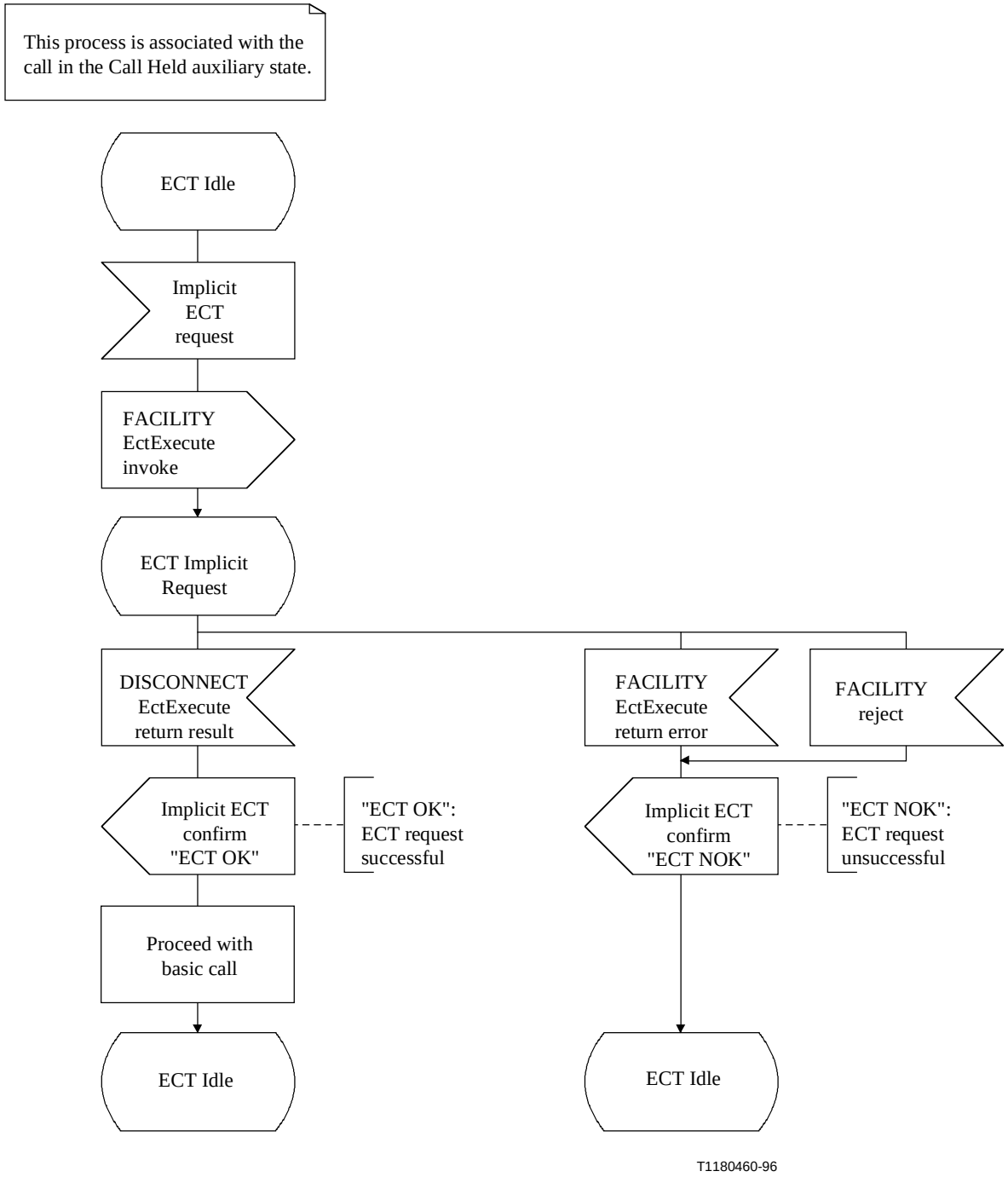


Figure 7-1/Q.952.7 (sheet 1 of 3) – ECT user A, ECT execute, implicit request

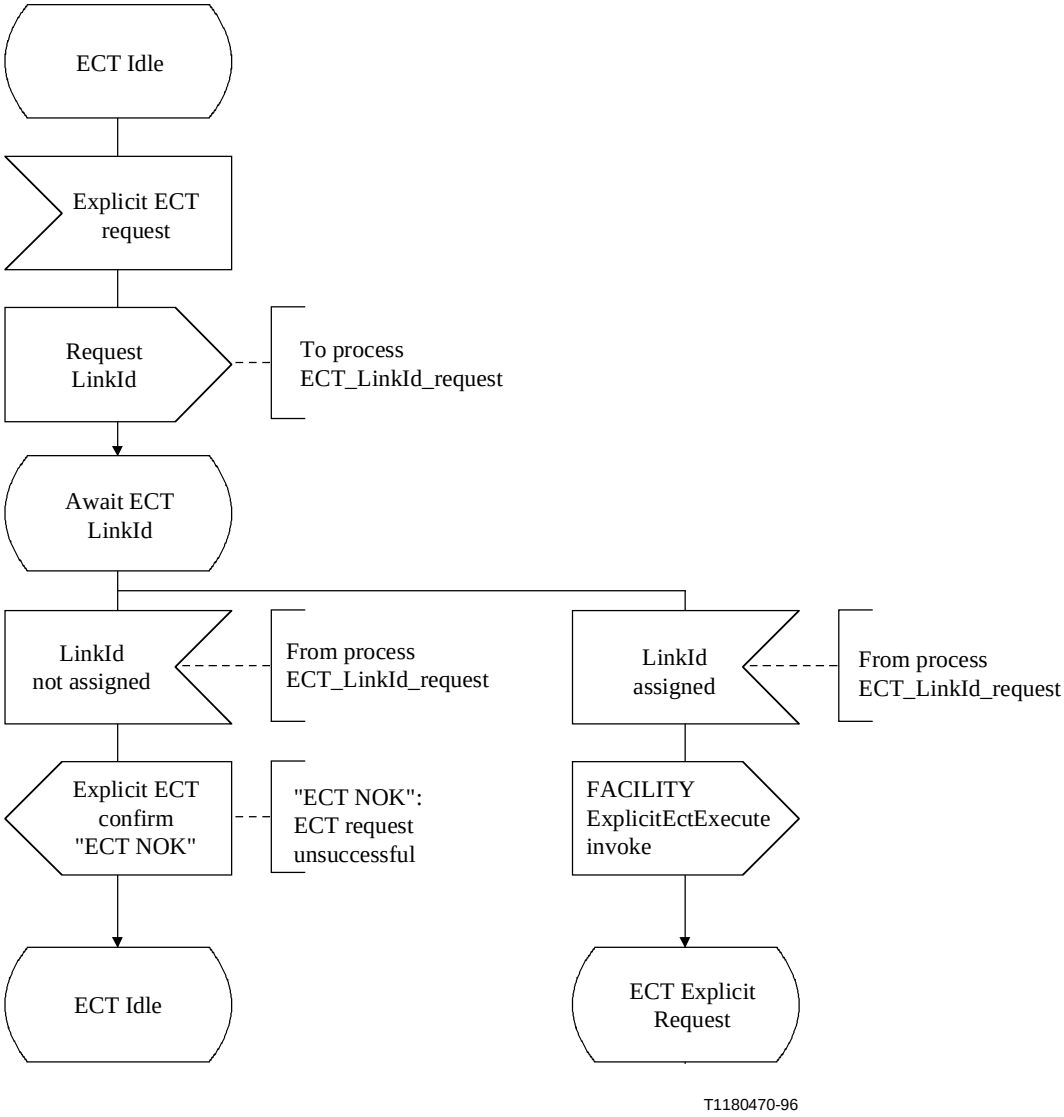


Figure 7-1/Q.952.7 (sheet 2 of 3) – ECT user A, ECT execute, explicit request

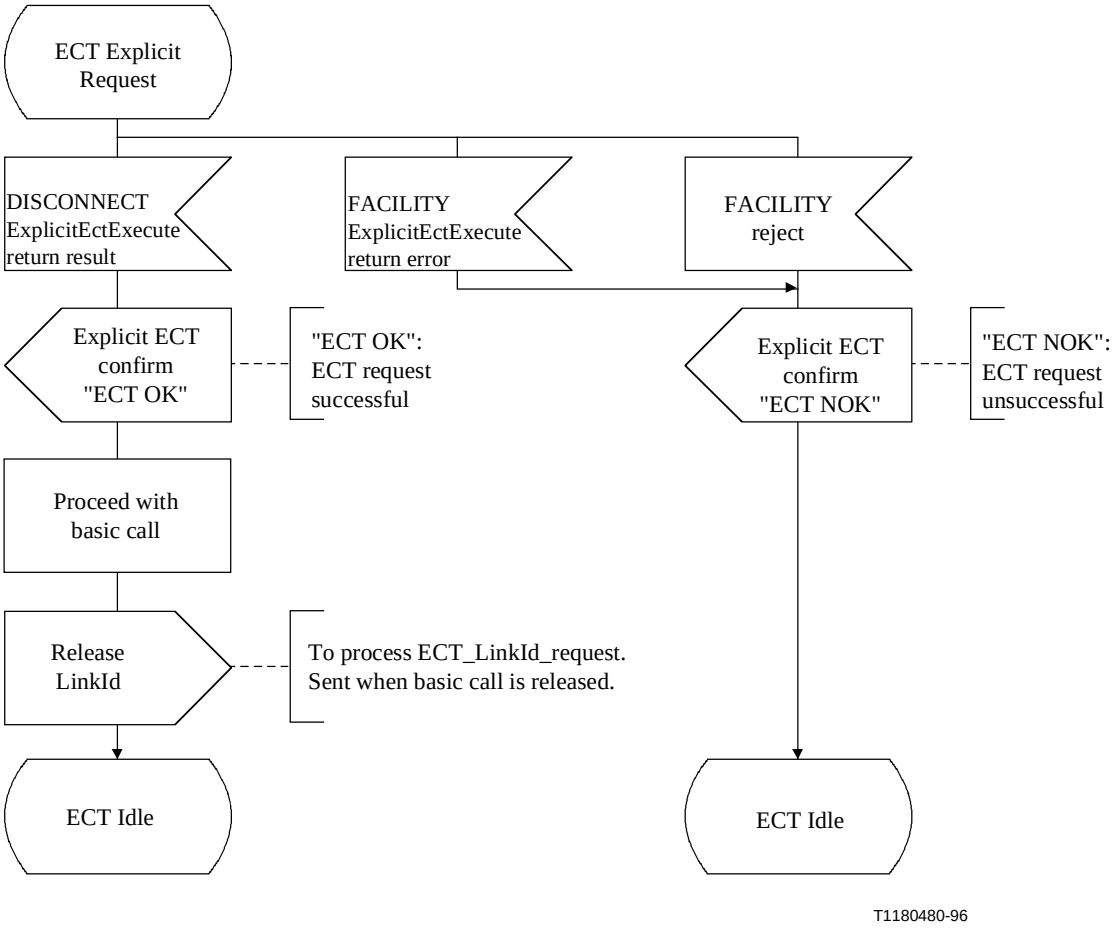


Figure 7-1/Q.952.7 (sheet 3 of 3) – ECT user A, ECT execute, explicit request

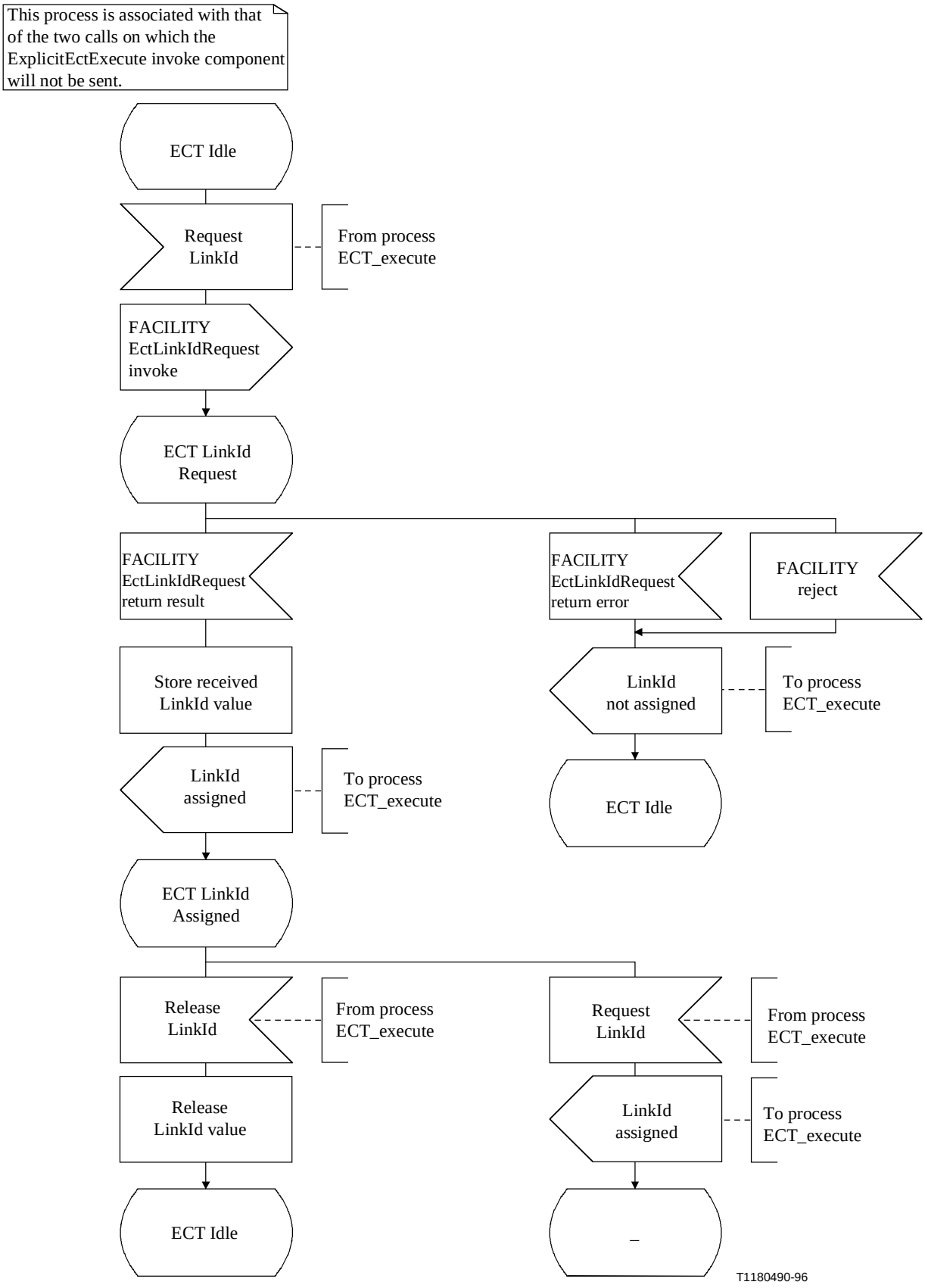
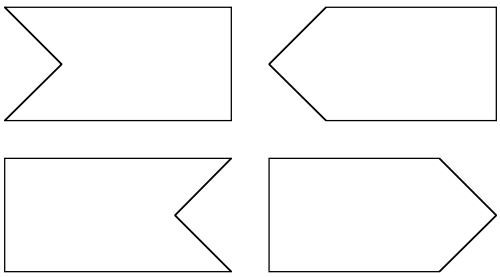


Figure 7-2/Q.952.7 – ECT user A, ECT LinkId request

7.14.2 Network side SDL

In the context of this Recommendation, the direction of the input symbol and the output symbol at the network side is defined as follows:



In Figures 7-3 to 7-5, the following definitions apply:

TRANSFER COMPLETE: An indication to network B and network C containing the transferred number, the transferred subaddress and the "alerting" or "active" indication.

TRANSFER INFORM: An indication to network B and network C containing the transferred subaddress and the "active" indication.

This subclause contains the following network side SDLs:

– Figure 7-3: ECT network A.

– Figure 7-4: ECT network B.

– Figure 7-5: ECT network C.

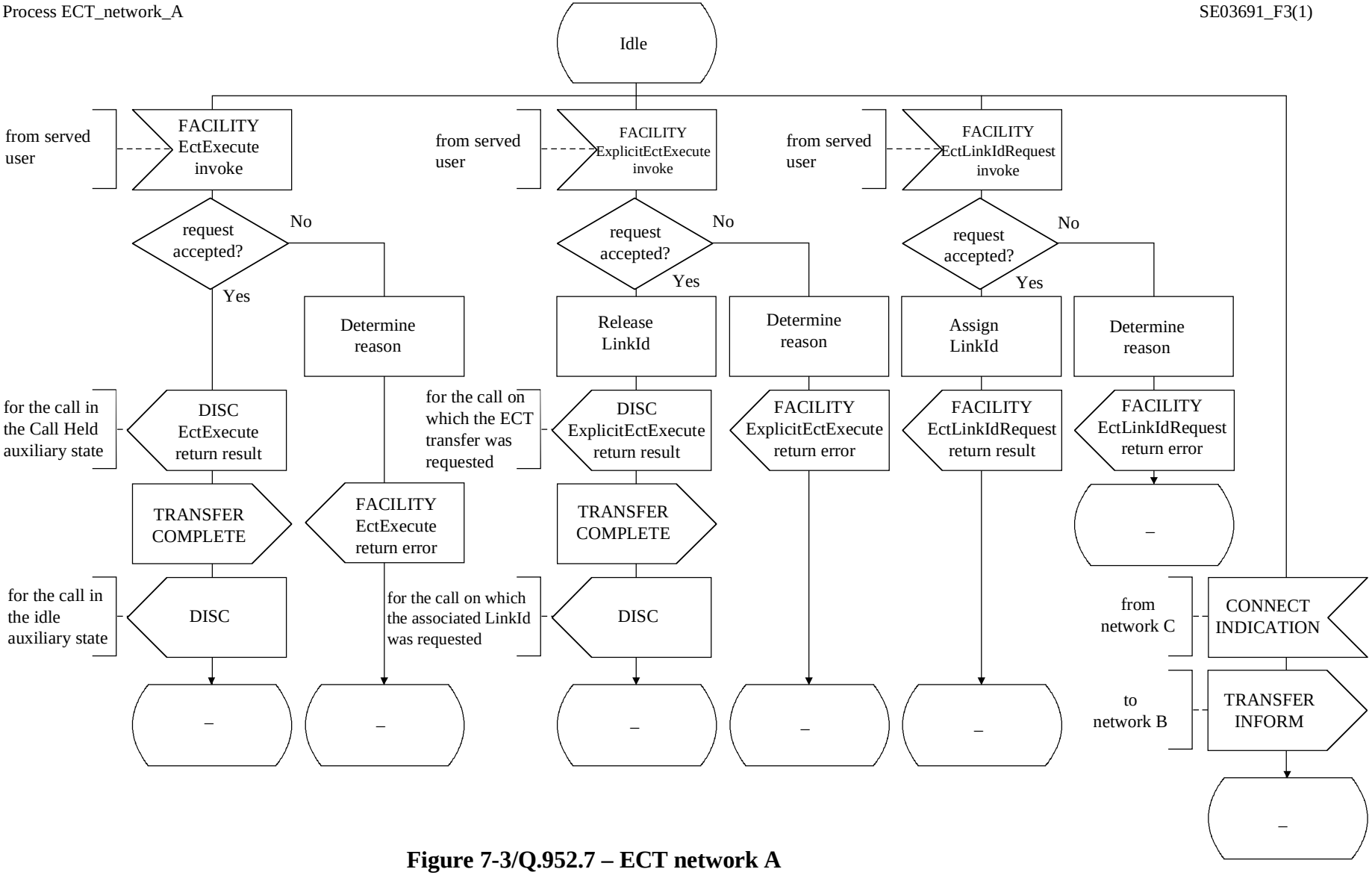


Figure 7-3/Q.952.7 – ECT network A

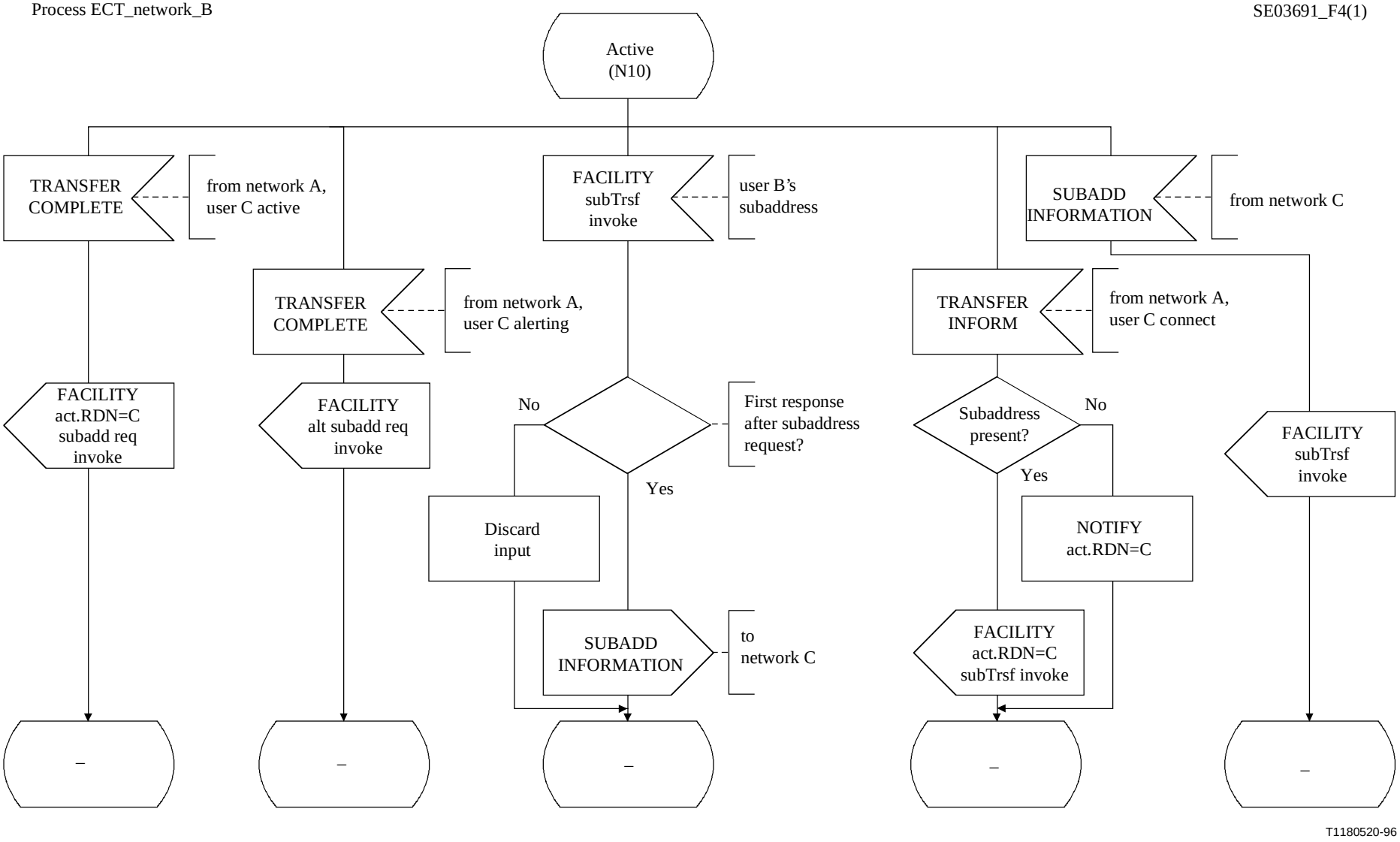


Figure 7-4/Q.952.7 – ECT network B

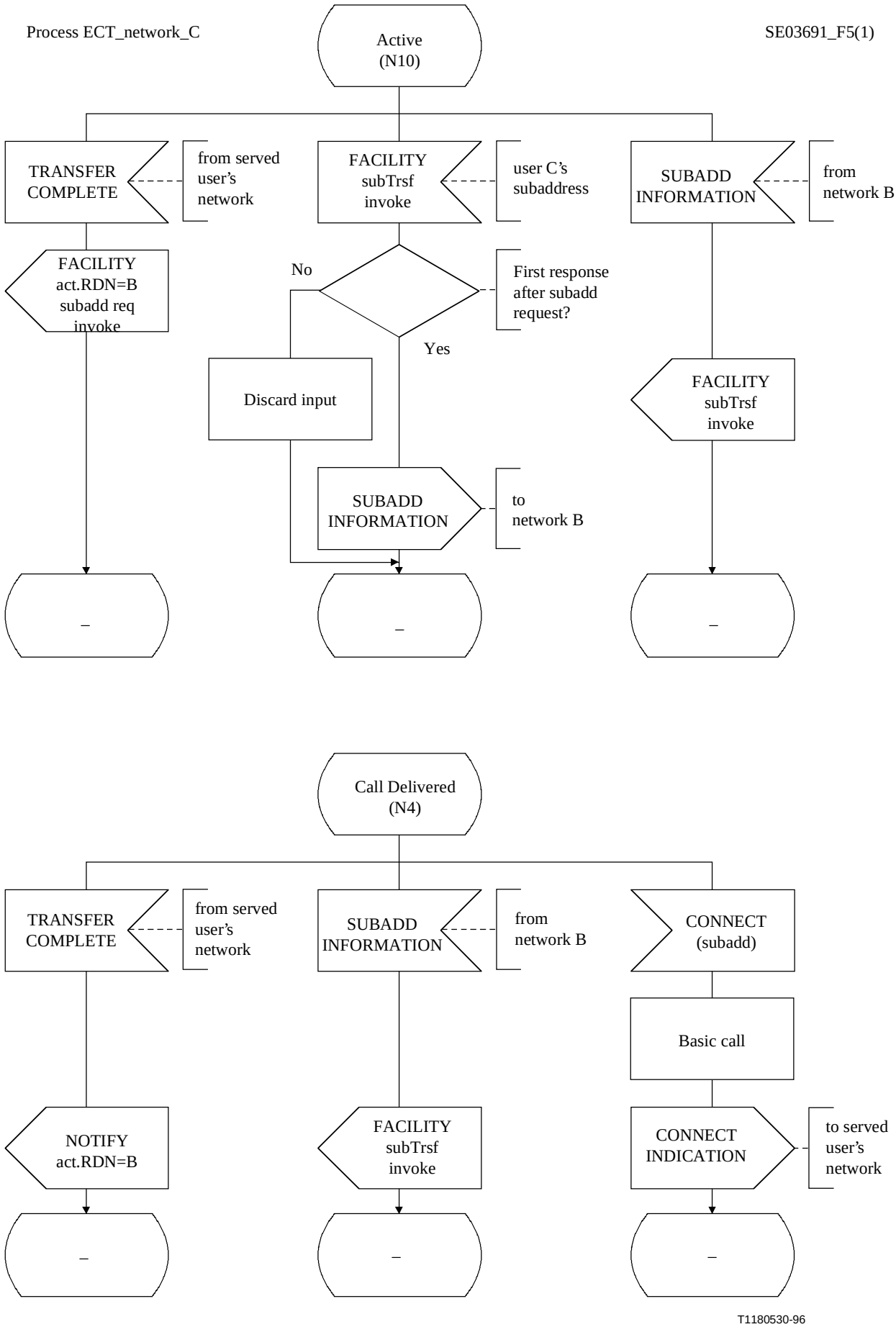


Figure 7-5/Q.952.7 – ECT network C

APPENDIX I

Signalling flows

This Appendix contains the signalling flows for the different cases of the ECT supplementary service.

Figure 7-I.1: ECT implicit invocation (A-B Active, Call Held). Transfer after answer

Figure 7-I.2: ECT implicit invocation (A-C Alerting). Transfer while alerting

Figure 7-I.3: ECT implicit invocation (A-C Alerting, Call Held). Transfer while alerting

Figure 7-I.4: ECT explicit invocation. ExplicitEctExecute fails

Figure 7-I.5: ECT explicit invocation. LinkId request fails

Figure 7-I.6: ECT explicit invocation (A-B Active, Call Held). Transfer after answer

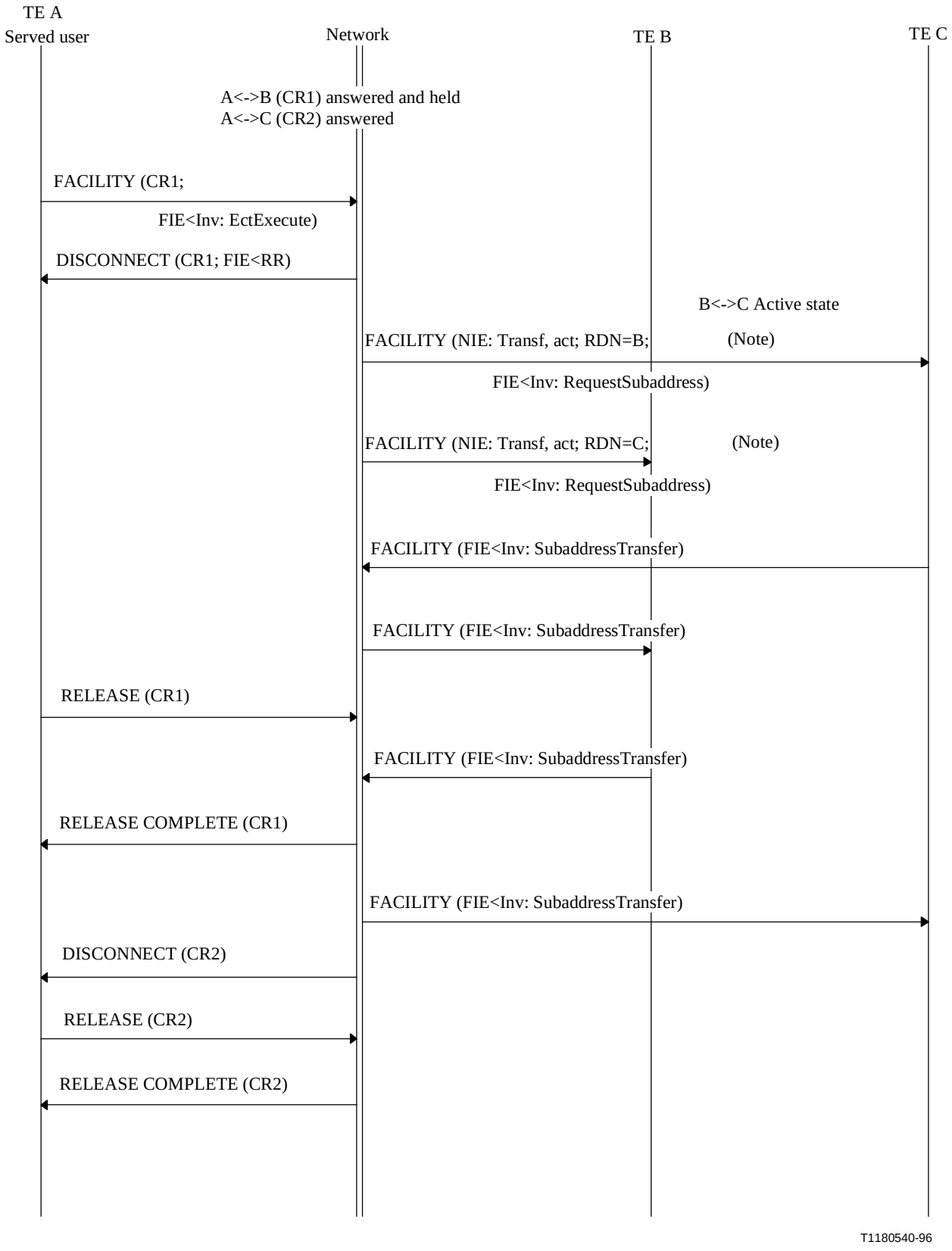
Figure 7-I.7: ECT explicit invocation (A-C Alerting). Transfer while alerting

Figure 7-I.8: ECT explicit invocation (A-C Alerting, Call Held). Transfer while alerting

Figure 7-I.9: Served user in a private ISDN

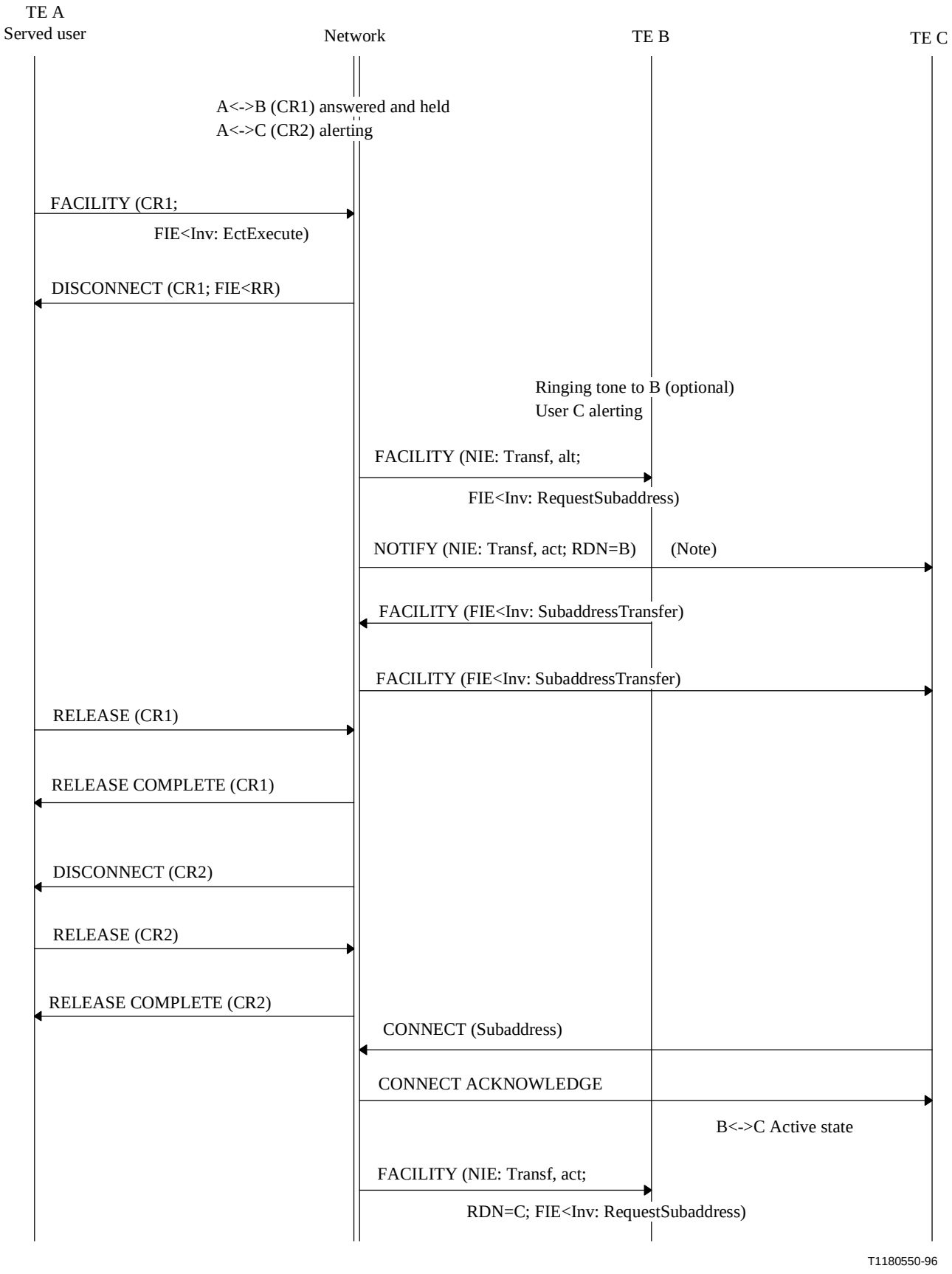
Figure 7-I.10: Remote user in a private ISDN

CR1, CR2	Call reference values
RDN	Redirection number contained in the EctInform invoke component
A, B, C	ISDN-number of user A, B or C
FIE	Facility information element
RR	Return result
RE	Return error



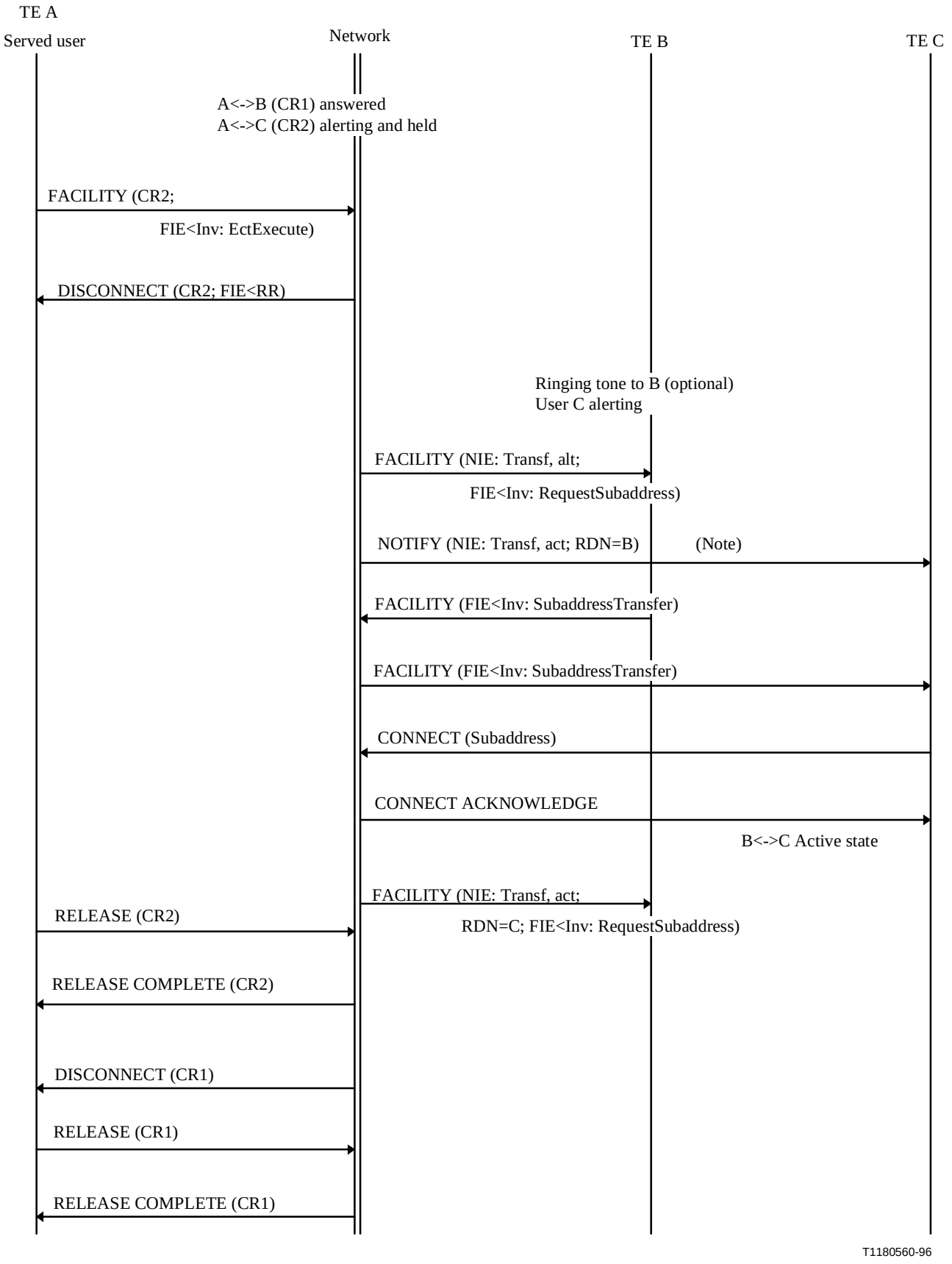
NOTE – RDN included if allowed, see Tables 7-5 to 7-8.

Figure 7-I.1/Q.952.7 – ECT implicit invocation – Transfer after answer



NOTE – RDN included if allowed, see Tables 7-5 to 7-8.

Figure 7-I.2/Q.952.7 – ECT implicit invocation – Transfer while alerting



NOTE – RDN included if allowed, see Tables 7-5 to 7-8.

Figure 7-I.3/Q.952.7 – ECT implicit invocation – Transfer while alerting

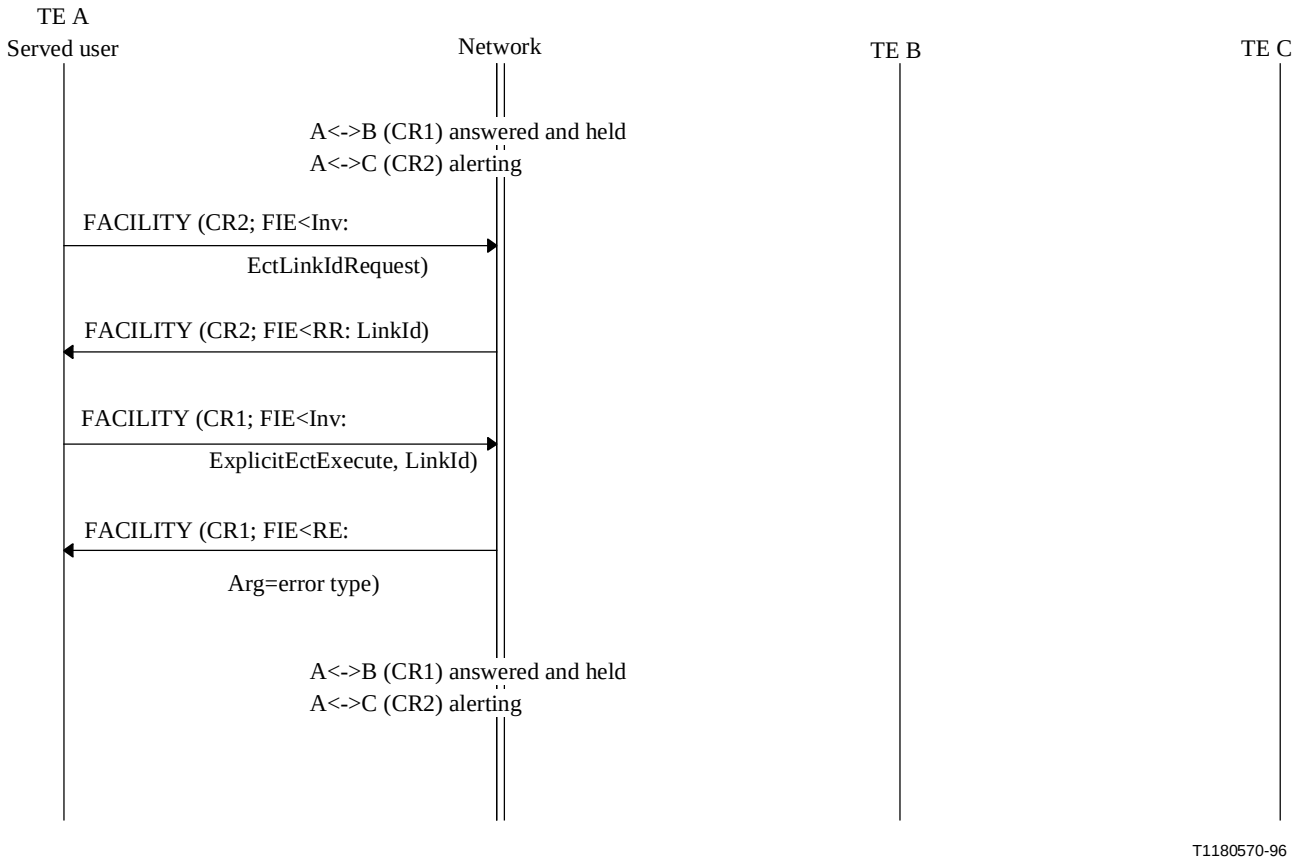


Figure 7-I.4/Q.952.7 – ECT explicit invocation – ExplicitEctExecute fails

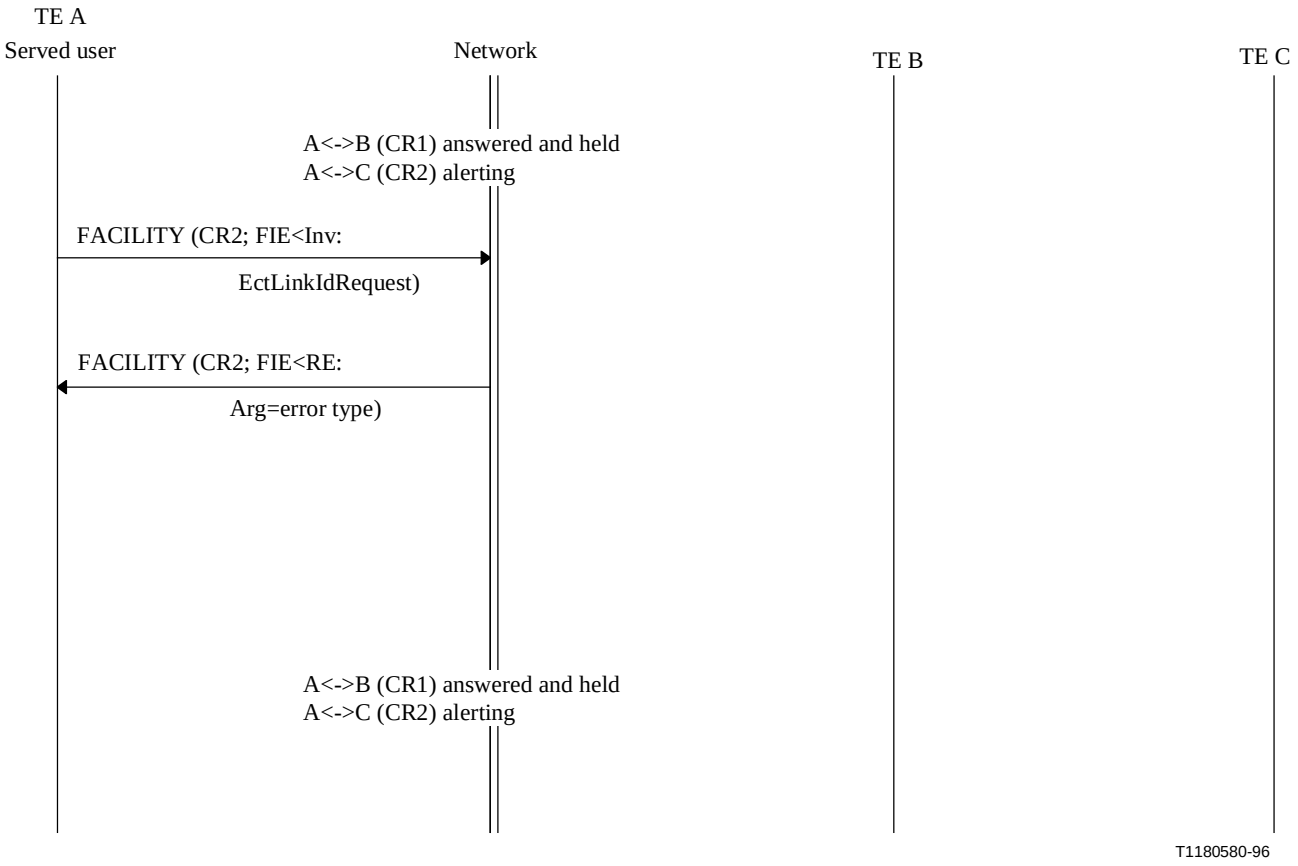
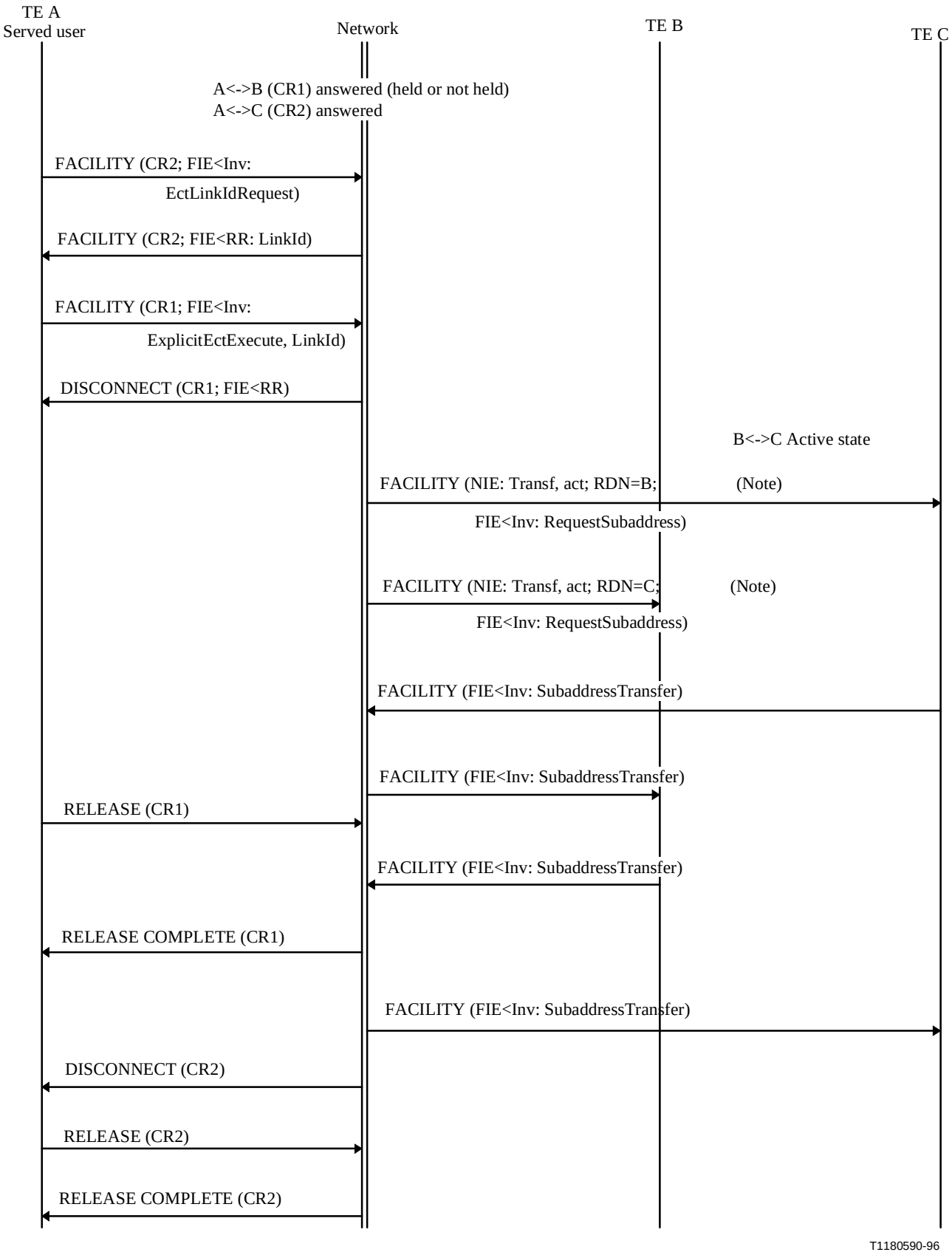
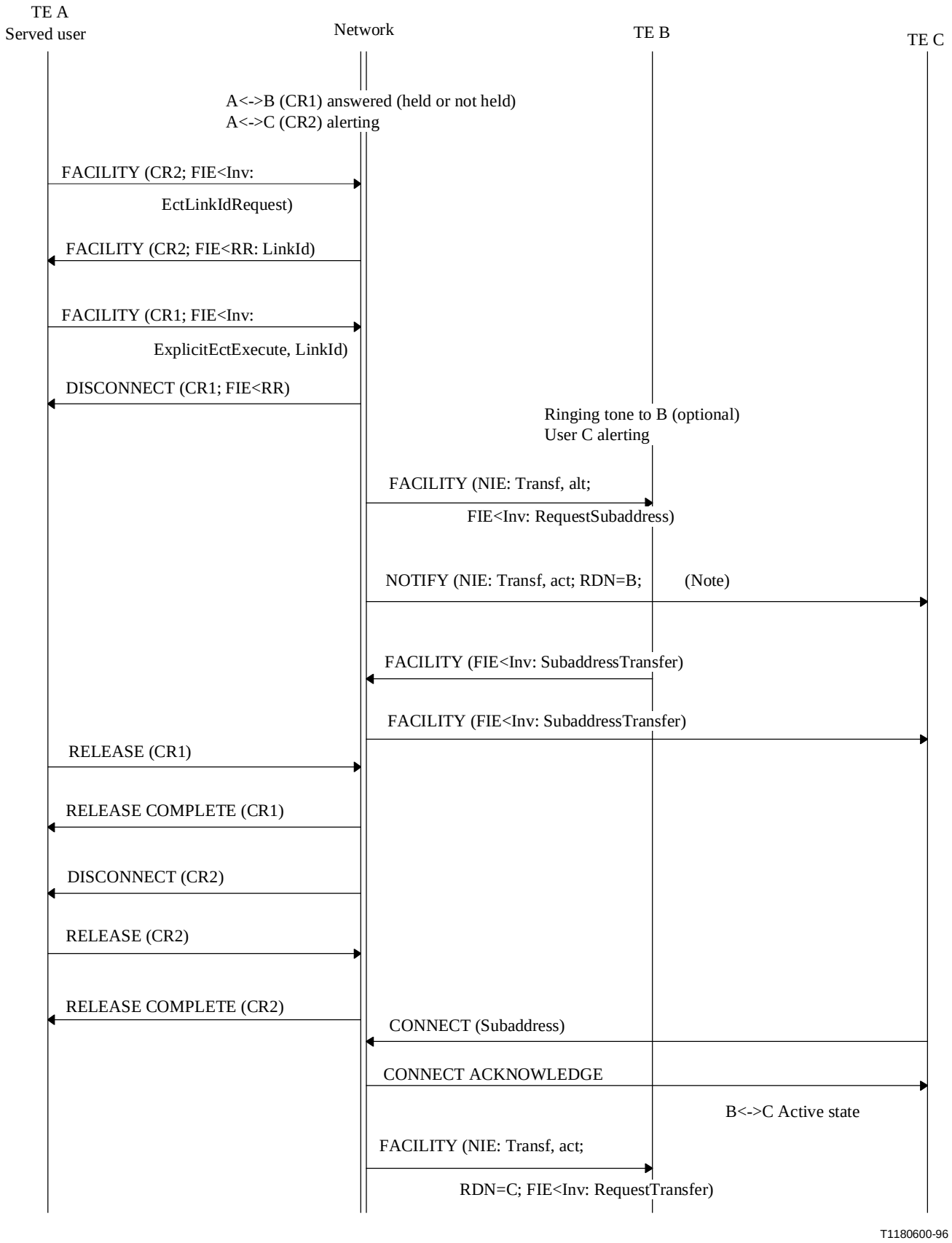


Figure 7-I.5/Q.952.7 – ECT explicit invocation – LinkId request fails



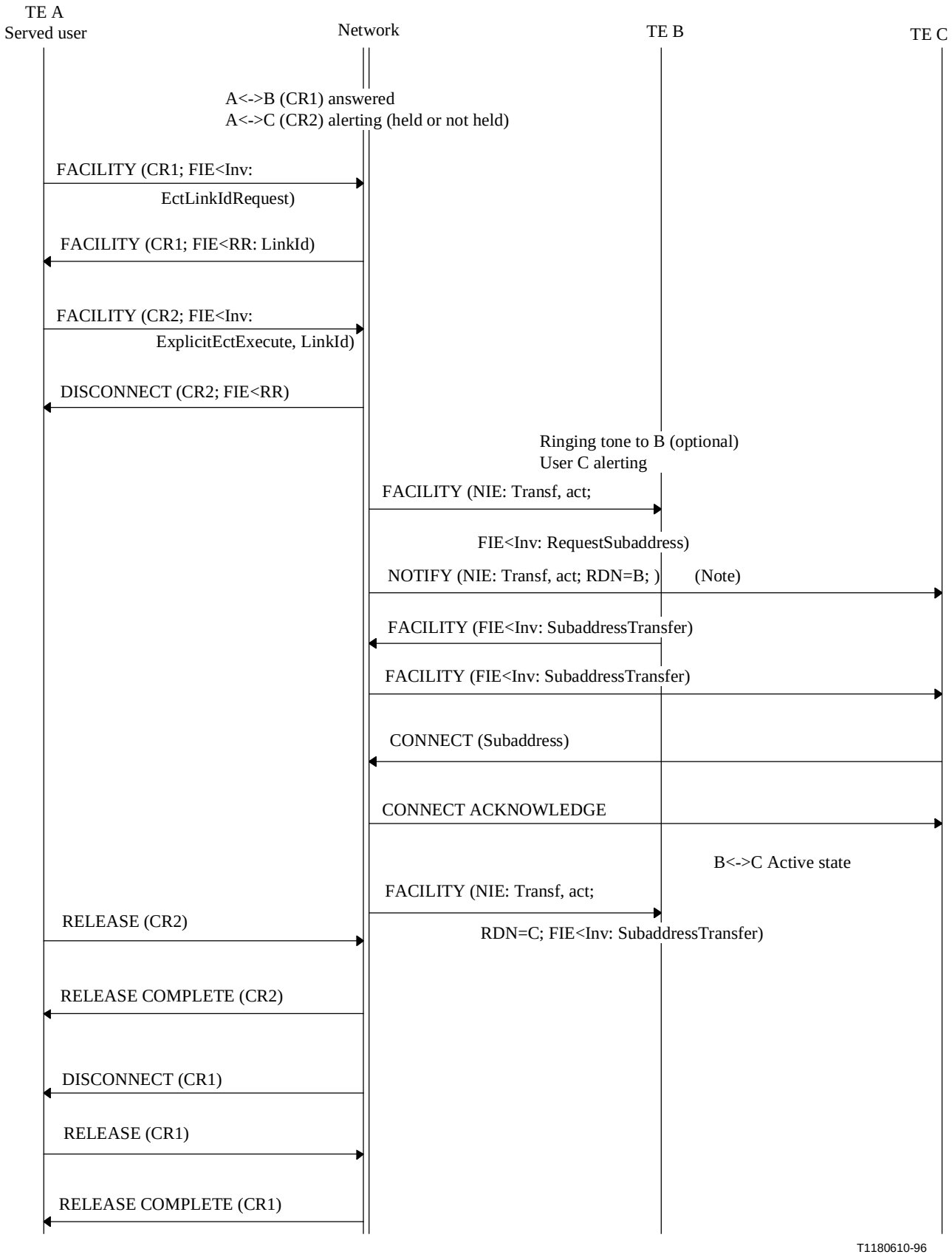
NOTE – RDN included if allowed, see Tables 7-5 to 7-8.

Figure 7-I.6/Q.952.7 – ECT explicit invocation – Transfer after answer



NOTE – RDN included if allowed, see Tables 7-5 to 7-8.

Figure 7-I.7/Q.952.7 – ECT explicit invocation – Transfer while alerting



NOTE – RDN included if allowed, see Tables 7-5 to 7-8.

Figure 7-I.8/Q.952.7 – ECT explicit invocation – Transfer while alerting

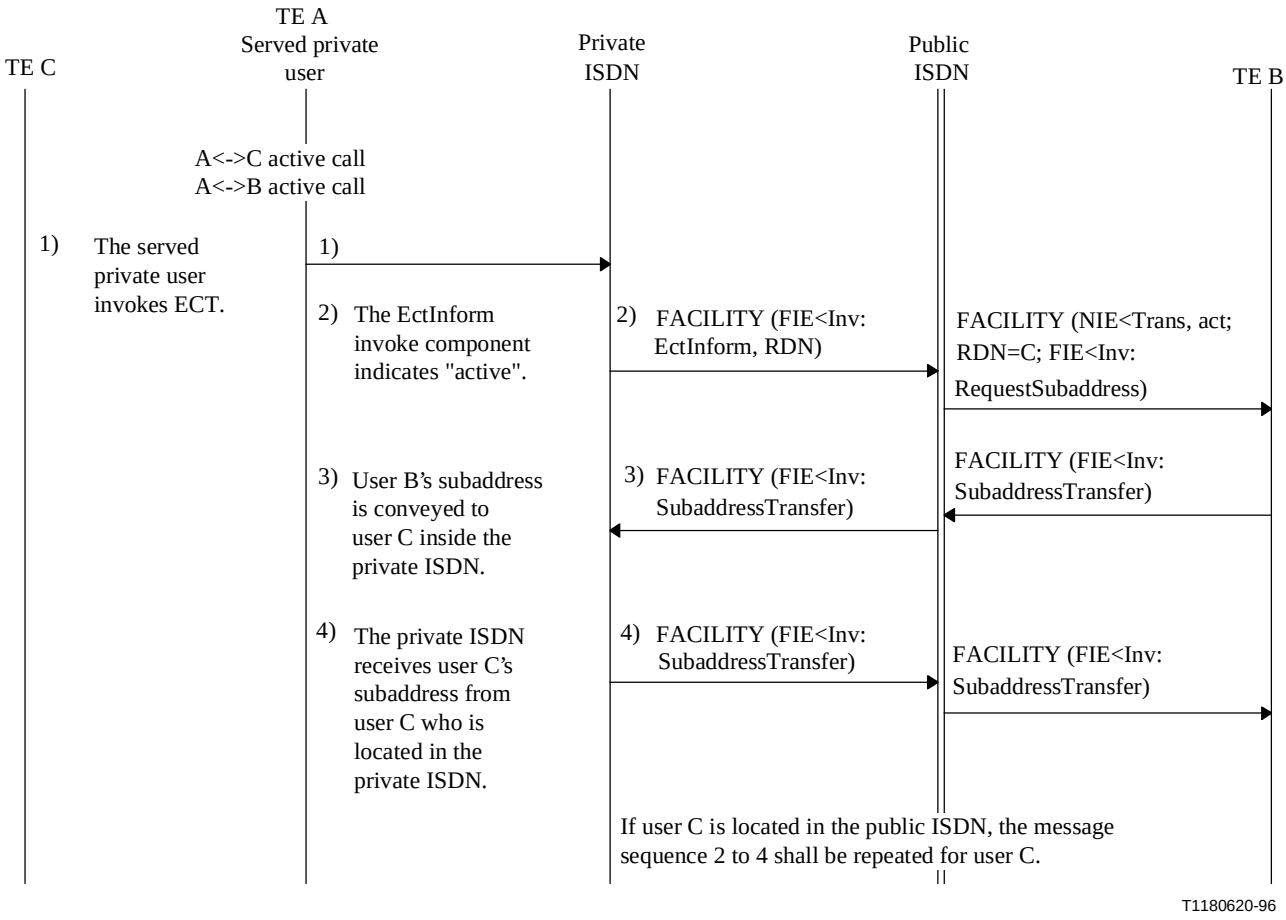


Figure 7-I.9/Q.952.7 – Served user in private ISDN

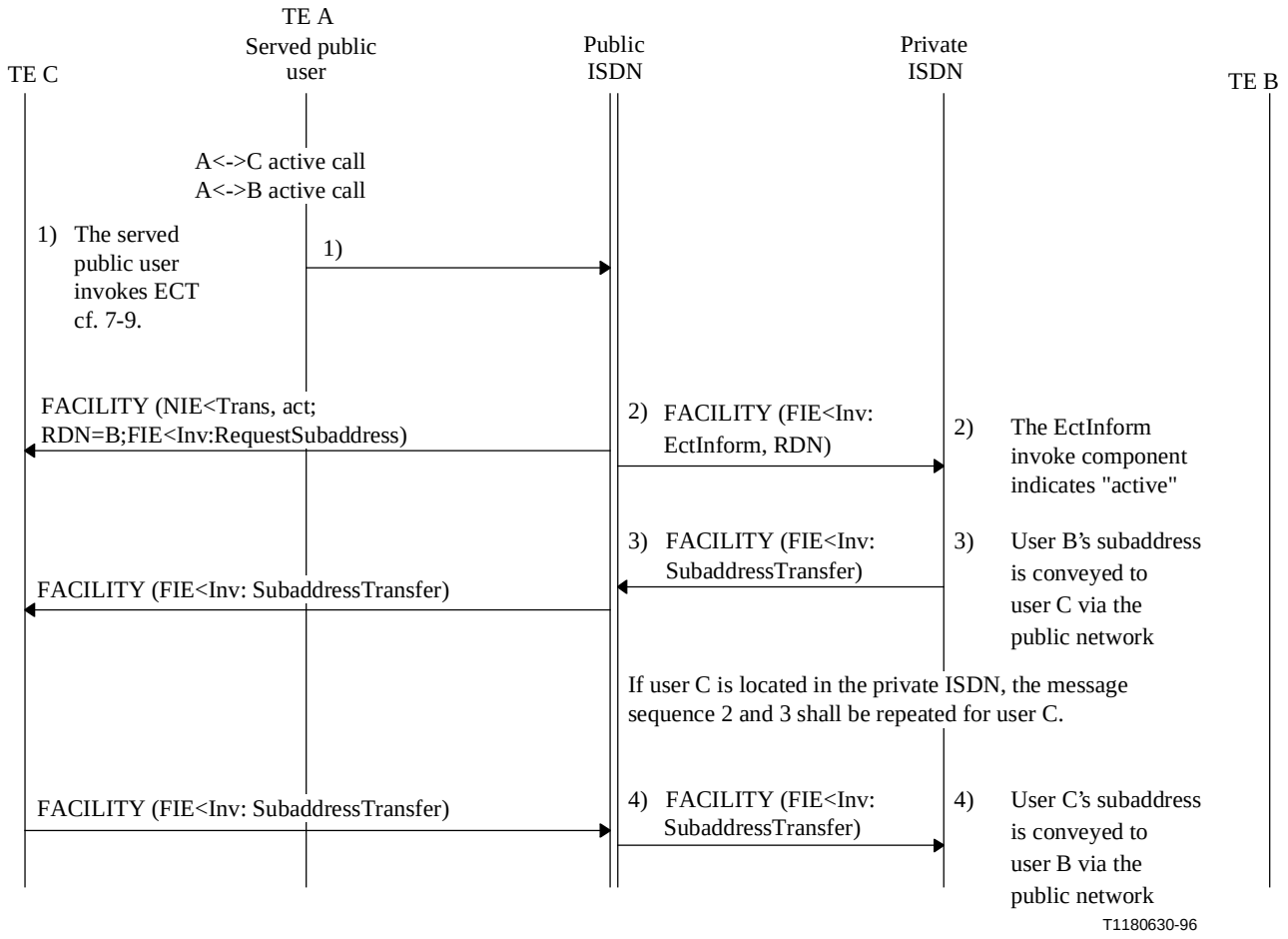


Figure 7-I.10/Q.952.7 – Remote user in private ISDN

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