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SERIES Q: SWITCHING AND SIGNALLING

Digital subscriber Signalling System No. 1 – Stage 3
description for supplementary services using DSS1

**Stage 3 description for call completion
supplementary services using DSS1: Call
Completion on No Reply (CCNR)**

ITU-T Recommendation Q.953.5

(Previously CCITT Recommendation)

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ITU-T RECOMMENDATION Q.953.5

STAGE 3 DESCRIPTION FOR CALL COMPLETION SUPPLEMENTARY SERVICES USING DSS1: CALL COMPLETION ON NO REPLY (CCNR)

Summary

This Recommendation specifies the stage three of the Call Completion on No Reply (CCNR) supplementary service for the Integrated Services Digital Network (ISDN) at the T reference point or the coincident S and T reference point by means of the Digital Subscriber System No. 1 (DSS1) protocol. Stage three identifies the protocol procedures and switching functions needed to support a telecommunication service.

The CCNR supplementary service enables a calling user A, encountering a destination B which does not answer the call (No Reply), to be notified, when the destination B becomes not busy after having initiated an activity. If user A desires, then the network will reinitiate the call to the specified destination B.

This Recommendation includes an electronic attachment containing the SDL diagrams in reprocessable SDT format.

Source

ITU-T Recommendation Q.953.5 was prepared by ITU-T Study Group 11 (1997-2000) and was approved under the WTSC Resolution No. 1 procedure on 3 December 1999.

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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Electronic attachment:

SDL diagrams in reprocessable SDT format

Recommendation Q.953.5

STAGE 3 DESCRIPTION FOR CALL COMPLETION SUPPLEMENTARY SERVICES USING DSS1: CALL COMPLETION ON NO REPLY (CCNR)¹

(Geneva, 1999)

1 Scope

This Recommendation specifies the stage three of the completion of calls on no reply (CCNR) supplementary service for the Integrated Service Digital Network (ISDN) at the T reference point or coincident S and T reference point (as defined in Recommendation I.411 [11]) by means of the Digital Subscriber System No. 1 (DSS1) protocol. Stage three identifies the protocol procedures and switching functions needed to support a telecommunication service (see Recommendation I.130 [12]).

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 telecommunication network that is not an ISDN.

The CCNR supplementary service enables a calling user A, encountering a destination B which does not answer the call (No Reply), to be notified, when the destination B becomes not busy after having initiated an activity. If user A desires, then the network will reinitiate the call to the specified destination B.

The CCNR supplementary service is applicable to all circuit-switched basic telecommunication services with the following exceptions:

- a) call 2 of the videotelephony teleservice (see Recommendation F.721) [16];
- b) all other circuit-switched telecommunication services requiring the use of more than 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 the CCNR supplementary service, to be attached at either side of the T reference point or coincident S and T reference point when used as an access to the public ISDN.

2 References

The following ITU-T Recommendations 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] ITU-T Recommendation Q.931 (1998), *ISDN user-network interface layer 3 specification for basic call control*.

¹ This Recommendation includes an electronic attachment containing the SDL diagrams in reprocessible SDT format.

- [2] ITU-T Recommendation Q.932 (1998), *Digital subscriber signalling system No. 1 – Generic procedures for the control of ISDN supplementary services.*
- [3] ITU-T Recommendation I.112 (1993), *Vocabulary of terms for ISDNs.*
- [4] ITU-T Recommendation I.210 (1993), *Principles of telecommunication services supported by an ISDN and the means to describe them.*
- [5] ITU-T Recommendation E.164 (1997), *The international public telecommunication numbering plan.*
- [6] ITU-T Recommendation I.221 (1993), *Common specific characteristics of services.*
- [7] CCITT Recommendation Q.9 (1988), *Vocabulary of switching and signalling terms.*
- [8] CCITT Recommendation X.208 (1988), *Specification of Abstract Syntax Notation One (ASN.1).*
ISO/IEC 8824:1990, *Information technology – Open Systems Interconnection – Specification of Abstract Syntax Notation One (ASN.1).*
- [9] CCITT Recommendation X.219 (1988), *Remote operations: Model, notation and service definition.*
ISO/IEC 9072-1:1989, *Information processing systems – Text communication – Remote operations – Part 1: Model, notation and service definition.*
- [10] ITU-T Recommendation Z.100 (1993), *CCITT Specification and description language (SDL).*
- [11] ITU-T Recommendation I.411 (1993), *ISDN user-network interfaces – Reference configurations.*
- [12] CCITT Recommendation I.130 (1988), *Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN.*
- [13] ITU-T Recommendation I.253.4 (1996), *Call completion supplementary services: Completion of calls on no reply (CCNR).*
- [14] ITU-T Recommendation Q.953.3 (1997), *Stage 3 description for call completion supplementary services using DSSI: Completion of Calls to Busy Subscribers (CCBS).*
- [15] ITU-T Recommendation Q.733.5 (1999), *Stage 3 description for call completion supplementary services using Signalling System No. 7: Completion of Calls on No Reply (CCNR).*
- [16] CCITT Recommendation F.721 (1992), *Videotelephony teleservice for ISDN.*

3 Definitions

This Recommendation defines the following terms:

3.1 Activity: The activity condition applies, if at least one CCNR request is in queue B and any user at destination B either:

- initiates an outgoing call with a SETUP message; or
- answers an incoming call with a CONNECT message; or
- clears an established call; or
- clears an outgoing call.

3.2 Busy: See 2.1/I.221 [6].

3.3 Call: See 2.2/Q.9 [7], definition 2201.

- 3.4 Call information retention:** A procedure of network A to store the call information of a specific call so that it can be used for that call.
- 3.5 Call state:** A state as defined in 2.1/Q.931 [1] for either the user or the network as appropriate. A call state may exist for each call reference value (and for each additional responding CEI in the incoming call states).
- 3.6 CCNR busy:** Any one of the following conditions will cause a CCNR busy condition:
- maximum number of calls reached;
 - no B-channels available at user A;
 - CCNR or CCBS recall pending on user A.
- 3.7 CCNR call:** A call which is established under the control of the CCNR supplementary service.
- 3.8 CCNR recall:** The procedure where user A is requested to complete the communication when user B ceases to be busy after having initiated an activity.
- 3.9 CCBS request retention:** If an attempt to establish a CCNR call fails because the destination is busy, then the network provider option "CCBS request retention" defines whether the CCNR supplementary service shall continue or not, i.e. if the "CCBS request retention" is supported, the original CCNR request shall retain its position in the user B queue, and monitoring of user B shall continue. Otherwise, on receiving an indication that user alerting has been initiated at the called address the CCNR request will be deactivated.
- 3.10 Destination B:** The entity addressed in the original call.
- 3.11 Existing service:** The basic telecommunication service associated with speech, 3.1 kHz audio and 64 kbit/s unrestricted bearer capabilities.
- 3.12 Integrated Services Digital Network (ISDN):** See 2.3/I.112 [3], definition 308.
- 3.13 ISDN number:** A number conforming to the numbering plan and structure specified in Recommendation E.164 [5].
- 3.14 Invoke component:** See 8.2.3.1.1/Q.932 [2]. 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".
- 3.15 Network:** The DSS1 protocol entity at the network side of the user-network interface.
- 3.16 Network A:** The network, at the coincident S and T reference point, to which user A is attached.
- 3.17 Network B:** The network, at the coincident S and T reference point, which is identified as destination B.
- 3.18 Private network:** The DSS1 protocol entity at the user side of the user-network interface at the T reference point.
- 3.19 Public network:** The DSS1 protocol entity at the network side of the user-network interface at the T reference point.
- 3.20 Originating network:** The network at the served user.
- 3.21 Destination network:** The network at the remote user.
- 3.22 Queue A:** A buffer at network A for the control of CCNR requests associated with user A, provided on a per-ISDN number basis.

3.23 Queue B: A buffer at network B for the control of CCNR requests associated with destination B. Resource is provided in the buffer for each ISDN number, but the buffer is processed on a per-access basis. The buffer is used to support the monitoring of user B to become not busy after having initiated an activity.

3.24 Reject component: See 8.2.3.1.1/Q.932 [2].

3.25 Return error component: See 8.2.3.1.1/Q.932 [2]. Where reference is made to an "xxxx" return error component, a return error component is meant which is related to an "xxxx" invoke component.

3.26 Return result component: See 8.2.3.1.1/Q.932 [2]. Where reference is made to an "xxxx" return result component, a return result component is meant which is related to an "xxxx" invoke component.

3.27 Service; telecommunication service: See 2.2/I.112 [3], definition 201.

3.28 Supplementary service: See 2.4/I.210 [4].

3.29 User: The DSS1 protocol entity at the user side of the user-network interface.

3.30 User A: The user, at the coincident S and T reference point, who originated the call and to whom the CCNR supplementary service is provided.

3.31 User B: The user, at the coincident S and T reference point, which is identified as destination B.

4 Abbreviations

This Recommendation uses the following abbreviations:

ASN.1	Abstract Syntax Notation One
CCBS	Completion of Calls to Busy Subscriber
CCNR	Completion of Calls on No Reply
DCR	Dummy Call Reference
DSS1	Digital Signalling System No. 1
ISDN	Integrated Services Digital Network

5 Description

When user A encounters a destination B not answering the call, user A can request the CCNR supplementary service. The network will then monitor destination B for becoming not busy after having initiated an activity.

When the destination B becomes not busy (i.e. access resources e.g. one B-channel are not busy), after having initiated an activity, then the network will wait a short time in order to allow the resources to be reused for originating a call. If the resources are not reused within this time by destination B, then the network will automatically recall user A.

When user A accepts the CCNR recall, then the network will automatically generate a CCNR call to destination B.

NOTE – The procedures for the CCNR supplementary service are similar to the procedures specified in the CCBS standard. Therefore, where possible, the terms (e.g. CCBSReference parameter) as defined for the CCBS supplementary service are used and in some cases a reference to the subclauses in Recommendation Q.953.3 [14] is made.

6 Operational requirements

6.1 Provision/withdrawal

The network shall select one of the following network provider options (see Table 6-1).

Table 6 -1/Q.953.5 – Network options

Option	Value	
Check for identical calls	Yes:	The network checks if CCNR is requested for a call identical to a call for which CCNR is already activated.
	No:	The network does not check if CCNR is requested for a call identical to a call for which CCNR is already activated.
CCBS request retention	Supported:	User A's CCNR request is continued if user B does not answer the CCNR call or user B is busy.
	Not Supported:	User A's CCNR request does not continue if user A receives an ALERTING message or user B is busy. User A can activate CCNR again after having received the ALERTING message.

The CCNR supplementary service may be provided to subscribers by the network provider on a subscription basis or may be generally available.

The CCNR supplementary service may be withdrawn at the subscriber's request or for administrative reasons.

As a network option, the CCNR supplementary service can be offered with a subscription option which shall apply to the whole access of user A (see Table 6-2).

Table 6-2/Q.953.5 – Subscription option

Option	Value	
Recall mode	Global recall	CCNR recall offered to all compatible terminals.
	Specific recall	CCNR recall offered to the terminal which has activated the CCNR supplementary service.

If the subscription option is not offered, one of the two values shall be chosen by the network provider.

6.2 Requirements on the originating network side

The originating network side shall register whether the CCNR supplementary service specific functions have to be performed in the originating network or in an attached private ISDN.

6.3 Requirements on the destination network side

The destination network side shall register whether the CCNR supplementary service specific functions have to be performed in the destination network or in an attached private ISDN.

7 Coding requirements

Table 7-1 and Table 7-2 show the definition of the operations and errors required for the CCNR supplementary service using Abstract Syntax Notation One (ASN.1) as defined in Recommendation X.208 [8] and using the OPERATION and ERROR macro as defined in Figure 4/X.219 [9].

The formal definition of the component types to encode these operations is provided in 8.2.3.1.1/Q.932 [2].

The inclusion of components in Facility information elements is defined in 8.2.3/Q.932 [2].

Table 7-1/Q.953.5 – ASN.1 description of CCNR-operations and errors

CCNR-Operations-and-Errors {ccitt recommendation q 953 ccnr (5) operations-and-errors(1)}			
DEFINITIONS EXPLICIT TAGS ::=			
BEGIN			
EXPORTS	CCNRRequest, CCNRInterrogate		
;			
IMPORTS	OPERATION, ERROR		
	FROM Remote-Operation-Notation		
	{joint-iso-ccitt remote-operations(4) notation(0)}		
	notSubscribed, supplementaryServiceInteractionNotAllowed		
	FROM General-Error-List		
	{ccitt recommendation q 950 general-error-list(2)}		
	PartyNumber, PartySubaddress		
	FROM Addressing-Data-Elements		
	{ccitt recommendation q 932 addressing-data-elements(7)}		
	CallInfoRetain, CCBSDeactivate, CCBSerase, CCBSRemoteUserFree, CCBSCall, CCBSStatusRequest, CCBSBFree, CCBSStopAlerting, InvalidCCBSReference, EraseCallLinkageID, InvalidCallLinkageID, LongTermDenial, ShortTermDenial, CCBSIsAlreadyActivated, AlreadyAccepted, OutgoingCCBSQueueFull, NotReadyForCall, CallDetails, CallInformation, CallLinkageID, CCBSReference, RecallMode		
	FROM CCBS-Operations-and-Errors		
	{ccitt recommendation q 953 ccbs (3) operations-and-errors(1)}		
;			
CCNRRequest	::= OPERATION		
	ARGUMENT	callLinkageID	CallLinkageID
	RESULT SEQUENCE {		
		recallMode	RecallMode,
		cCBSReference	CCBSReference}
	ERRORS	{notSubscribed, InvalidCallLinkageID, ShortTermDenial, LongTermDenial, CCBSIsAlreadyActivated, supplementaryServiceInteractionNotAllowed, OutgoingCCBSQueueFull}	
CCNRInterrogate	::= OPERATION		
	ARGUMENT SEQUENCE {		
		cCBSReference	CCBSReference OPTIONAL,
		partyNumberOfA	PartyNumber OPTIONAL}
	RESULT SEQUENCE {		
		recallMode	RecallMode,
		callDetails	CallDetails OPTIONAL}
	ERRORS	{InvalidCCBSReference, notSubscribed}	

Table 7-1/Q.953.5 – ASN.1 description of CCNR-operations and errors (concluded)

cCNRRequest	CCNRRequest	::= 96
cCNRInterrogate	CCNRInterrogate	::= 97
<i>-- The operations and errors below are defined in Recommendation Q.953.3 and should be imported from there</i>		
callInfoRetain	CallInfoRetain	::= 70
cCBSDeactivate	CCBSDeactivate	::= 72
cCBSErase	CCBSErase	::= 74
cCBSRemoteUserFree	CCBSRemoteUserFree	::= 75
cCBSCall	CCBSCall	::= 76
cCBSStatusRequest	CCBSStatusRequest	::= 77
cCBSBFree	CCBSBFree	::= 78
eraseCallLinkageID	EraseCallLinkageID	::= 79
cCBSStopAlerting	CCBSStopAlerting	::= 80
invalidCallLinkageID	InvalidCallLinkageID	::= 50
invalidCCBSReference	InvalidCCBSReference	::= 51
longTermDenial	LongTermDenial	::= 52
shortTermDenial	ShortTermDenial	::= 53
cCBSIsAlreadyActivated	CCBSIsAlreadyActivated	::= 54
alreadyAccepted	AlreadyAccepted	::= 55
outgoingCCBSQueueFull	OutgoingCCBSQueueFull	::= 56
notReadyForCall	NotReadyForCall	::= 58
END -- of CCNR-Operations-and-Errors		

Table 7-2/Q.953.5 – ASN.1 description of CCNR-private network operations and errors

CCNR-private-networks-Operations-and-Errors		{ccitt recommendation q 953 ccnr (5) private-networks-operations-and-errors(2)}
DEFINITIONS EXPLICIT TAGS ::=		
BEGIN		
EXPORTS	CCNR-T-Request;	
IMPORTS	OPERATION, ERROR FROM Remote-Operation-Notation {joint-iso-ccitt remote-operations(4) notation (0)} notSubscribed FROM General-Error-List {ccitt recommendation q 950 general-error-list(1)} Address FROM Addressing-Data-Elements {ccitt recommendation q 932 addressing-data-elements(7)} Q931InformationElement FROM Embedded-Q931-Types {ccitt recommendation q 932 embedded-q931-types(5)} CCBS-T-Call, CCBS-T-Suspend, CCBS-T-Resume, CCBS-T-RemoteUserFree, CCBS-T-Available, LongTermDenial, ShortTermDenial FROM CCBS-private-networks-Operations-and-Errors {ccitt recommendation q 953 ccbs (3) private-networks-operations-and-errors(2)};	

Table 7-2/Q.953.5 – ASN.1 description of CCNR-private network operations and errors (*concluded*)

CCNR-T-Request	::= OPERATION	ARGUMENT SEQUENCE {
		destinationAddress Address,
		q931InfoElement Q931InformationElement,
		<i>-- contains HLC, LLC and BC information</i>
		retentionSupported [1] IMPLICIT BOOLEAN
		DEFAULT FALSE,
		presentationAllowedIndicator [2] IMPLICIT BOOLEAN
		OPTIONAL,
		originatingAddress Address OPTIONAL}
	RESULT	retentionSupported BOOLEAN -- Default False
	ERRORS	{ShortTermDenial, notSubscribed, LongTermDenial}
cCNR-T-Request	CCNR-T-Request	::= 98
<i>-- The operations and errors below are defined in Q.953.3 and should be imported from there</i>		
cCBS-T-Call	CCBS-T-Call	::= 84
cCBS-T-Suspend	CCBS-T-Suspend	::= 85
cCBS-T-Resume	CCBS-T-Resume	::= 86
cCBS-T-RemoteUserFree	CCBS-T-RemoteUserFree	::= 87
cCBS-T-Available	CCBS-T-Available	::= 88
longTermDenial	LongTermDenial	::= 59
shortTermDenial	ShortTermDenial	::= 60
END -- of CCNR-private-networks-operations-and-errors		

8 State definitions

8.1 User states

The following states have been defined for user A:

CCNR Idle:	The CCNR supplementary service is not activated.
CCNR Requested:	The user has sent a CCNR request to the network and is waiting for a response.
CCNR Activated:	The CCNR supplementary service has been activated.
CCNR Free:	The user has received a B free indication.
CCNR Call Init:	The user has accepted the recall.
CCNR Interrogation Requested:	The user has requested interrogation and is waiting for a response.
CCNR DeactivationRequested:	The user has requested deactivation and is waiting for a response.

8.2 Network states

The following states have been defined for the network:

Originating network side

CCNR Idle:	The CCNR supplementary service is not activated.
CCNR Requested:	The network A has sent a CCNR request to network B and is waiting for a response.

CCNR Activated:	The CCNR supplementary service has been activated.
CCNR Free:	The destination network has received a B free indication and has informed user A.
CCNR Suspended:	The CCNR supplementary service has been suspended.
CCNR Call Init:	The destination network has initiated the CCNR call.
CCNR Check A:	Waiting for a response from user A to the CCNR status request procedure.

Destination network side

CCNR Idle:	There are no outstanding requests.
CCNR Await Processing:	The request is in the queue B, user B is being monitored.
CCNR Await Status:	Idle Waiting for a response from user B to the status request procedure.
CCNR WAIT T-CCBS4:	Waiting for idle guard timer to expire.
CCNR Free:	User B is free, awaiting CCNR call.

9 Signalling procedures at the coincident S and T reference point

9.1 Procedures at the served user's interface

9.1.1 Activation

9.1.1.1 Normal operation

In order that a user A who has subscribed to the CCNR supplementary service may utilize the service when a destination B, which does not answer a call, is encountered, it is necessary for the network to utilize the call information retention procedure.

The network shall provide the call information retention procedure, according to the procedures in 9.1.11, when the following set of conditions apply:

- CCNR is subscribed to;
- an alerting indication has been received from user B;
- CCNR is available (as determined by the destination network);
- the user's outgoing CCNR queue limit has not been exceeded;
- CCNR has not been activated for an identical call (network option); and
- there are no supplementary service interactions that preclude CCNR.

However, these conditions shall not prevent the network from providing the call information retention procedure in other circumstances.

Call information retained by the network in support of CCNR shall be the following basic call information from the initial call, if available, in order to enable an identical basic call to be made:

- Bearer capability information;
- high layer compatibility information;
- low layer compatibility information;
- calling party address information; and
- called party address information.

NOTE 1 – This information may be derived from user-provided information or may be network-provided, e.g. the calling party number may be user or network A provided. For some basic services the information may be derived from more than one information element, e.g. for the 7 kHz telephony teleservice the bearer capability information may include information from two Bearer capability information elements and details on the priority of this information.

Furthermore, the network shall retain the CCNR available indication, determined by the destination network, which may be used to decide whether CCNR is permitted.

NOTE 2 – When interacting with other supplementary services, retention of further information may be mandatory. Furthermore, the retention of addresses is independent of any supplementary service, although the address information retained may be influenced by other supplementary services. Refer to clause 10 for details on supplementary service interactions.

In addition to the procedures described in 9.1.11, on receiving an indication from the network that the call has been accepted, network A shall release the callLinkageID parameter value and make the value available for subsequent use, release all retained call information, and send an EraseCallLinkageID invoke component containing the callLinkageID parameter to user A.

If the network knows that a point-to-point configuration exists at user A's access, the network shall send this information according to the procedure in 6.3.2.2/Q.932 [2]. Otherwise, the network shall send this information according to the procedure in 6.3.2.3/Q.932 [2].

If the call is cleared after the ALERTING message has been sent to user A and the CCNR supplementary service has not been activated, the network shall continue retaining the call information, the callLinkageID parameter and start timer T-RETENTION. The further procedures for timer T-RETENTION are described in 9.1.11.

To activate the CCNR supplementary service, user A shall send a CCNRRequest invoke component including the callLinkageID parameter to the network, using the procedures in 6.3.2.2/Q.932 [2]. The callLinkageID parameter is determined according to the procedures in 9.1.11.

On receiving this invoke component, the network shall start the CCNR procedure.

On accepting the CCNR request by the originating network i.e.:

- CCNR is subscribed to;
- user A CCNR queue limit has not been exceeded;
- CCNR has not been activated for an identical call (network option);
- a valid callLinkageID parameter has been provided; and
- there are no supplementary service interactions that preclude CCNR;

the originating network shall request activation of the CCNR supplementary service at the destination network.

If the CCNR supplementary service was requested by user A after the ALERTING message has been sent to user A and before the call is cleared, the network shall clear the call with cause #31 "normal, unspecified" according to 5.3.4/Q.931 [1]. Furthermore, the originating network shall initiate normal call clearing towards network B.

On receiving confirmation that the CCNR supplementary service has been activated at the destination network B, the originating network shall select a new value for the cCBSReference parameter, send a CCNRRequest return result component to user A including the cCBSReference parameter and the recallMode parameter, as described in 6.3.2.2/Q.932 [2], place the CCNR request in queue A, and start timer T-CCBS2. The status notification procedure does not apply. The recallMode parameter shall be set according to the value of the subscription option "recall mode". The cCBSReference parameter shall have significance on the whole access, i.e. a cCBSReference parameter value shall not be reused for subsequent CCNR or CCBS requests on an access before it is released.

If user A receives a correctly encoded CCNRRequest return result component, then user A shall follow the procedure described in 6.3.2.2/Q.932 [2].

If the recallMode parameter indicates "specificRecall", then user A shall retain the cCBSReference parameter. If the recallMode parameter indicates "globalRecall", then on receipt of the CCNRRequest return result component, user A may retain the cCBSReference parameter, e.g. for the purpose of interrogation and deactivation.

9.1.1.2 Exceptional procedures

If the network cannot accept the CCNR request because user A has not subscribed to the CCNR supplementary service, then the network shall send a CCNRRequest return error component indicating "notSubscribed" to user A, using the procedure in 6.3.2.2/Q.932 [2].

If the network cannot accept the CCNR request because user A has provided an invalid callLinkageID parameter then the network shall send a CCNRRequest return error component indicating "invalidCallLinkageID" to user A, using the procedure in 6.3.2.2/Q.932 [2].

If the network cannot accept the CCNR request because user A's outgoing queue is full, then the network shall send a CCNRRequest return error component indicating "outgoingCCBSQueueFull" to user A, using the procedure in 6.3.2.2/Q.932 [2].

If the network cannot accept the CCNR request because user A has already activated the CCNR supplementary service for the call identified by the callLinkageID parameter, then network A shall send a CCNRRequest return error component indicating "cCBSIsAlreadyActivated" to user A, using the procedure in 6.3.2.2/Q.932 [2].

If the network option "check for identical calls" is set to "yes", the network shall check if the call for which CCNR is requested and a call in queue A are identical.

If the network cannot accept the CCNR request because user A has already activated the CCNR supplementary service for an identical call, then the network shall send a CCNRRequest return error component indicating "cCBSIsAlreadyActivated" to user A, using the procedure in 6.3.2.2/Q.932 [2].

To determine whether the call indicated by the callLinkageID parameter and a call in the outgoing CCNR queue are identical, the following basic call information shall be compared, if available:

- Bearer capability information;
- high layer compatibility information;
- low layer compatibility information;
- called party address information; and
- calling party address information.

If the network cannot accept the CCNR request because there are invalid supplementary service interactions between the CCNR supplementary service and the call identified by the callLinkageID parameter, then the network shall send a CCNRRequest return error component indicating "supplementaryServiceInteractionNotAllowed" to user A, using the procedure in 6.3.2.2/Q.932 [2].

If the network cannot accept the CCNR request identified by the callLinkageID parameter because CCNR is not available to the destination, then the network shall send a CCNRRequest return error component indicating "longTermDenial" to user A, using the procedure in 6.3.2.2/Q.932 [2].

NOTE – This includes the case that the destination network did not indicate that CCNR was available when alerting has been initiated at the called address and the case that the request for CCNR was rejected by the destination network.

If the network cannot accept the CCNR request identified by the callLinkageID parameter because the CCNR supplementary service is not available to the destination at this time, then the network

shall send a CCNRRequest return error component indicating "shortTermDenial" to user A, using the procedure in 6.3.2.2/Q.932 [2].

If timer T-CCBS2 expires, the network shall deactivate the CCNR supplementary service activation according to the procedures in 9.1.8. The cCBSEraseReason parameter shall indicate "t-CCBS2-timeout".

On expiration of timer T-ACTIVATE and user A has not received any response to the CCNRRequest invoke component, then user A shall consider that this request for the CCNR supplementary service has failed.

On receipt of a CCNRRequest return error component indicating "invalidCallLinkageID", then user A shall remove knowledge of this callLinkageID parameter.

If the return error component indicates any other reason, then user A shall take no action.

If a reject component is received and the invoke identifier is included, user A shall ignore the received component.

Subsequent procedures for the originating network and user A are as specified in 6.3.2.2/Q.932 [2] for terminating the transaction.

9.1.2 Deactivation

The procedures in 3.9.1.2/Q.953.3 [14] shall apply.

9.1.3 General interrogation

9.1.3.1 Normal operation

To perform an interrogation of all CCNR requests, user A shall send a CCNRInterrogate invoke component without a cCBSReference parameter to the network using the procedure described in 6.3.2.2/Q.932 [2]. User A may provide the partyNumberOfA parameter in the CCNRInterrogate invoke component.

On receiving this invoke component, the network shall send a CCNRInterrogate return result component to user A according to the procedure defined in 6.3.2.2/Q.932 [2]. The return result component shall contain as arguments the recallMode parameter and a list in chronological order of the CCNR requests for this access, if any. The recallMode parameter shall be set according to the value of the subscription option "recall mode".

For each active request, the network shall provide the cCBSReference parameter, and according to the procedures in 9.1.12, the addressOfB parameter, q931InfoElement parameter, and, if available, the subAddressOfA parameter. If no requests exist the callDetails parameter shall not be included. The network shall ignore the partyNumberOfA parameter, if provided by the user.

NOTE 1 – Other uses of the partyNumberOfA parameter e.g. the interaction with multiple subscriber number supplementary service are specified in 12.14.

On receipt of this return result component, user A shall follow the procedure described in 6.3.2.2/Q.932 [2] and shall discard details of those requests that are not compatible with user A's service compatibility information according to the procedure in 9.1.12.

NOTE 2 – In the case of "globalRecall" any cCBSReference parameter may be retained by a user e.g. for the purpose of deactivation.

9.1.3.2 Exceptional procedures

If the network cannot accept the request because user A has not subscribed to the CCNR supplementary service, then the network shall send a CCNRInterrogate return error component, indicating "notSubscribed" to user A using the procedure described in 6.3.2.2/Q.932 [2].

On receipt of this return error component, user A shall remove knowledge of all CCNR requests, if any.

Subsequent procedures for the originating network and user A are as specified in 6.3.2.2/Q.932 [2] for terminating the transaction.

If user A receives a reject component and the invoke identifier is included, then user A shall take no protocol action.

On expiration of timer T-INTERROGATE and user A has not received any response to the CCNRInterrogate invoke component, then the user A shall consider that this attempt to interrogate the CCNR supplementary service has failed.

9.1.4 Particular interrogation

9.1.4.1 Normal operation

To perform an interrogation of a specific active CCNR request, user A shall send a CCNRInterrogate invoke component with the cCBSReference parameter of the request to be interrogated to the network using the procedure described in 6.3.2.2/Q.932 [2].

On receiving this invoke component, the network shall send a CCNRInterrogate return result component to user A using the procedure described in 6.3.2.2/Q.932 [2]. The return result component shall contain as arguments the recallMode parameter, the cCBSReference parameter and according to the procedures in 9.1.12, the addressOfB parameter, the q931InfoElement parameter, and, if available, the subaddressOfA parameter. The recallMode parameter shall be set according to the value of the subscription option "recall mode".

On receipt of this return result component, user A shall follow the procedure described in 6.3.2.2/Q.932 [2] and shall take no further protocol actions.

9.1.4.2 Exceptional procedures

If the network cannot accept the request because user A has not subscribed to the CCNR supplementary service, then the network shall send a CCNRInterrogate return error component indicating "notSubscribed" to user A using the procedure described in 6.3.2.2/Q.932 [2].

On receipt of this return error component, user A shall remove knowledge of all CCNR requests.

If the network cannot accept the request because user A has provided an invalid cCBSReference parameter, then network A shall send a CCNRInterrogate return error component indicating "invalidCCBSReference" to user A using the procedure described in 6.3.2.2/Q.932 [2].

On receipt of this return error component, user A shall remove knowledge of the CCNR request identified by the cCBSReference parameter.

Subsequent procedures for the network and the user A are as specified in 6.3.2.2/Q.932 [2] for terminating the transaction.

If user A receives a reject component and the invoke identifier is included, then user A shall retain knowledge of the CCNR request identified by the cCBSReference parameter.

On expiration of timer T-INTERROGATE and user A has not received any response to the CCNRInterrogate invoke component, then user A shall consider that this attempt to interrogate the CCNR supplementary service has failed.

9.1.5 Recall indication

9.1.5.1 Normal operation

If the network is informed that user B is not busy after having initiated an activity, the network shall determine whether user A is neither busy nor CCNR busy by using the procedures in 9.1.10.

If user A is neither busy nor CCNR busy, then the network shall start timer T-CCBS3 and indicate that it is prepared for establishment of the requested call, by sending a CCBSRemoteUserFree invoke component to user A. If the network knows that a point-to-point configuration exists at user A's access, the network shall send this invoke component according to the procedure in 6.3.2.2/Q.932 [2]. Otherwise the network shall send this invoke component according to the procedure in 6.3.2.3/Q.932 [2]. The invoke component shall contain as arguments the recallMode parameter, the cCBSReference parameter, and, according to the procedures in 9.1.12, the addressOfB parameter and q931InfoElement parameter. The recallMode parameter shall be set according to the value of the subscription option "recall mode".

If user A is busy or CCNR busy, then the network shall proceed according to 9.1.8.

On receipt of the CCBSRemoteUserFree invoke component, user A shall ignore the invoke component, unless the service provided by user A is compatible with the service indicated in the CCBSRemoteUserFree invoke component as determined by the procedure in 9.1.12.

Users accepting this invoke component shall retain the cCBSReference parameter value and may proceed to establish a call using the procedures in 9.1.6.

9.1.5.2 Exceptional procedures

If on receipt of the CCBSRemoteUserFree invoke component user A does not want to accept the CCNR recall, then user A shall either:

- ignore the CCBSRemoteUserFree invoke component; or
- shall initiate the deactivation procedure as described in 9.1.2.

If timer T-CCBS2 or T-CCBS3 expire, the CCNR supplementary service shall be deactivated according to the procedures in 9.1.8. The cCBSEraseReason parameter shall indicate "t-CCBS2-timeout" respectively "t-CCBS3-timeout".

If a reject component is received and the invoke identifier is included, then network A shall take no action.

9.1.6 CCNR call request

The procedures in 3.9.1.6/Q.953.3 [14] shall apply.

9.1.7 CCNR call establishment

9.1.7.1 Normal operation

On accepting a CCBSCall invoke component, network A shall proceed to establish a call to user B.

On receiving an indication that the call has been accepted, with or without having first received an indication of user alerting, network A shall proceed with basic call procedures as specified in 5.1.8/Q.931 [1]. Furthermore, if the CCNR request has not been deactivated, the CCNR supplementary service shall be deactivated according to the procedures in 9.1.8. The cCBSEraseReason parameter shall indicate "normal-unspecified".

9.1.7.2 Exceptional procedures

If the CCNR call is cleared by user A or by the network (e.g. due to expiry of timer NT301) after the ALERTING message has been sent to user A, and the CCNR request has not been deactivated, and the network option "CCBS request retention" is set to "yes", then normal call clearing procedures shall follow and, network B shall resume monitoring user B for being not busy after having initiated an activity.

On receiving an indication that user alerting has been initiated at the called address and the network option "CCBS request retention" is set to "no", the normal basic call procedures shall follow and network A shall allow user A to activate the CCNR supplementary service again using the

procedures in 9.1.1. Furthermore, the CCNR supplementary service shall be deactivated according to the procedures in 9.1.8. The cCBSEraseReason parameter shall indicate "normal-unspecified".

If network B cannot establish the CCNR call because user B is busy, and the CCNR request has not been deactivated, and the network option "CCBS request retention" is set to "yes", then as a result of network B proceeding with normal call clearing, network A shall clear the call according to the procedures in 5.3.4/Q.931 [1] and network B shall resume monitoring user B for being not busy.

If network B cannot establish the CCNR call because user B is busy and the network option "CCBS request retention" is set to "no", then as a result of network B proceeding with normal call clearing, network A shall clear the call according to the procedures in 5.3.4/Q.931 [1]. Furthermore, the CCNR supplementary service shall be deactivated according to the procedures in 9.1.8. The cCBSEraseReason parameter shall indicate "basic-call-failed". If network B cannot establish the call for any reason other than user B being busy, then as a result of network B proceeding with normal call clearing, network A shall clear the call according to the procedures in 5.3.4/Q.931 [1]. Furthermore, if the CCNR request has not been deactivated the CCNR supplementary service shall be deactivated according to the procedures in 9.1.8. The cCBSEraseReason parameter shall indicate "basic-call-failed".

In case of the network option "CCBS request retention" set to "yes" and user B rejects the CCNR call after having sent the ALERTING message, then as a result of network B proceeding with normal call clearing, network A shall clear the call according to the procedures in 5.3.4/Q.931 [1]. Furthermore, if the CCNR request has not been deactivated the CCNR supplementary service shall be deactivated according to the procedures in 9.1.8. The cCBSEraseReason parameter shall indicate "basic-call-failed".

If timer T-CCBS2 expires before sending the ALERTING or CONNECT message or after sending the ALERTING message to user A, the CCNR supplementary service shall be deactivated according to the procedures in 9.1.8. The cCBSEraseReason parameter shall indicate "t-CCBS2-timeout". Furthermore, the CCNR call shall be allowed to proceed according to the procedures in Recommendation Q.931 [1].

If clearing of the CCNR call is initiated by user A before the ALERTING message is sent to user A or before a CONNECT message is sent to user A without having first sent an ALERTING message, network A shall proceed with clearing according to the procedures in 5.3.3/Q.931 [1]. Furthermore the CCNR supplementary service shall be deactivated according to the procedures in 9.1.8. The cCBSEraseReason parameter shall indicate "basic-call-failed".

If user A requests deactivation of a CCNR request while the CCNR call associated with that request is in the process of being established, then the procedures in 9.1.2 shall be followed and the establishment of the CCNR call shall continue according to the procedures in Recommendation Q.931 [1].

9.1.8 Network initiated deactivation procedures

The procedures in 3.9.1.8/Q.953.3 [14] shall apply.

9.1.9 B free but A busy procedure

9.1.9.1 Normal operation

If the originating network is informed that user B is not busy after having initiated an activity, and user A is either busy or CCNR busy (as determined using the procedures in 9.1.10), then network A shall inform user A by sending a CCBSBFree invoke component to user A, suspend CCNR processing and wait for user A becoming not CCNR busy.

The network shall send the CCBSBFree invoke component to user A containing as arguments the recallMode parameter, the cCBSReference parameter, and, according to the procedure in 9.1.12, the addressOfB parameter and q931InfoElement parameter. If the network knows that a point-to-point

configuration exists at user A's access, the network shall send this invoke component according to the procedure in 6.3.2.2/Q.932 [2]. Otherwise the network shall send this invoke component according to the procedure in 6.3.2.3/Q.932 [2].

On receipt of the CCBSBFree invoke component, user A shall ignore the invoke component unless it is compatible with the request as determined by the procedure in 9.1.12. Users accepting this invoke component shall treat it as an indication that user B is now free.

In case of CCNR request(s) being suspended, the network shall apply the user A monitoring procedure in 9.1.10 for all suspended requests in the following situations:

- on user A becoming not CCNR busy; or
- if a busy or reserved B-channel becomes free while user A is not CCNR busy.

Each request for which user A indicates to be free shall be resumed. For each resumed CCNR request, the network shall continue according to the procedures in 9.1.10. CCNR requests for which user A indicates to be busy shall remain suspended.

9.1.9.2 Exceptional procedures

If a reject component is received and the invoke identifier is included, then the network shall take no action.

9.1.10 User A monitoring procedure

9.1.10.1 Normal operation

Whenever the network needs to know the status of user A, the network shall decide if user A is CCNR busy.

In the case that user A is not CCNR busy, in order to determine if user A is not busy, network A shall start timer T-CCBS1 and send a CCBSStatusRequest invoke component to user A. The invoke component shall contain as arguments the cCBSReference parameter, the recallMode parameter, and, according to the procedure in 9.1.12, the q931InfoElement parameter. The recallMode parameter shall be set according to the value of the subscription option "recall mode". If the network knows that a point-to-point configuration exists at user A's access, the network shall send this invoke component according to the procedure in 6.3.2.2/Q.932 [2]. Otherwise the network shall send this invoke component according to the procedure in 6.3.2.3/Q.932 [2].

On receiving this invoke component, user A shall ignore the invoke component unless the service it provides is compatible with the request as determined by the procedure in 9.1.12.

Users accepting this invoke component shall send a CCBSStatusRequest return result component to the network according to the procedures in 6.3.2.2/Q.932 [2]. The return result component shall indicate the user A status for a call compatible with the request as determined by the q931InfoElement parameter according to the procedure in 9.1.12.

On the receipt of the first CCBSStatusRequest return result component indicating "free" and provided user A is not CCNR busy, network A shall stop timer T-CCBS1 and determine user A to be not busy.

On receipt of a CCBSStatusRequest return result component indicating "busy" and the network has knowledge that a point-to-point configuration exists, then the network shall stop timer T-CCBS1 and determine user A to be busy.

If timer T-CCBS1 expires and only CCBSStatusRequest return result component(s) indicating "busy" are received, the network shall determine that user A is busy.

9.1.10.2 Exceptional procedures

If timer T-CCBS1 expires and no CCBSStatusRequest return result component has been received by the network, the network shall deactivate the CCNR supplementary service according to 9.1.8. The cCBSEraseReason parameter shall indicate "normal-unspecified".

If a reject component is received and the invoke identifier is included, the user or the network shall ignore this component.

9.1.11 Call information retention

The call information retention procedure is used for a specific call if a supplementary service which needs the call information may be in operation for that call.

NOTE – The call information retention procedure shall be considered as generic. This implies that the retained information may be available for a number of supplementary services applicable to the specific call.

9.1.11.1 Normal operation

To provide the call information retention procedure, the network shall:

- select a new value for the callLinkageID parameter;
- retain the call information and the callLinkageID parameter;
- start timer T-RETENTION; and
- send a CallInfoRetain invoke component containing the callLinkageID parameter to user A in an ALERTING message according to the procedures in 6.3.1/Q.932 [2].

NOTE – The conditions for the provision of the call information retention procedure is described in the specific supplementary service.

A network may restrict the number of calls that can simultaneously be subject to the generic call information retention procedure.

The callLinkageID parameter is an identifier used to make reference to the retained call information. The callLinkageID parameter has significance on the whole access.

On receipt of the CallInfoRetain invoke component, the user may retain the callLinkageID parameter and use it to control a supplementary service(s).

On operation of a supplementary service that requires the call information, the network shall make the call information available for the supplementary service. The network may then release the retained call information if it has knowledge that no other supplementary service will need the information. Alternatively, the network shall retain the call information for other supplementary services until timer T-RETENTION expires.

If the network releases the call information on operation of a supplementary service, the network shall stop timer T-RETENTION, release the callLinkageID parameter and make the value available for subsequent use, release unwanted retained call information, and send an EraseCallLinkageID invoke component containing the callLinkageID parameter to user A. If the network knows that a point-to-point configuration exists at user A's access, the network shall send this information according to the procedure in 6.3.2.2/Q.932 [2]. Otherwise the network shall send this information according to the procedure in 6.3.2.3/Q.932 [2].

If timer T-RETENTION expires, the network shall release the callLinkageID parameter value and make the value available for subsequent use, release all retained call information, and send an EraseCallLinkageID invoke component containing the callLinkageID parameter to user A. If network A knows that a point-to-point configuration exists at user A's access, network A shall send this information according to the procedure in 6.3.2.2/Q.932 [2]. Otherwise, network A shall send this information according to the procedure in 6.3.2.3/Q.932 [2].

On receipt of an EraseCallLinkageID invoke component, the user shall remove knowledge, if any, of the callLinkageID parameter value.

9.1.11.2 Exceptional procedures

If the network receives a reject component and the invoke identifier is included, then the network may wait for the expiry of timer T-RETENTION, else may stop timer T-RETENTION, release the callLinkageID parameter value and make the value available for subsequent use, and release all retained call information.

9.1.12 Basic call information and compatibility checking

The procedures in 3.9.1.12/Q.953.3 [14] shall apply.

9.2 Procedures at the remote user's interface

9.2.1 Acceptance of a CCNR request

9.2.1.1 Normal operation

A request to activate CCNR to a given destination shall be accepted by the remote user's network and queued if:

- the remote user has subscribed to the given basic service;
- the limit on the number of CCNR requests to the given destination has not been exceeded (this limit is a network provider option with a maximum value of 5);
- the remote user has not invoked a supplementary service which prohibits the activation of the CCNR supplementary service against that destination; and
- at least one compatible terminal exists.

9.2.1.2 Exceptional procedures

The following situation shall be treated as "longTermDenial":

- the length of queue B is zero; or
- user B has not subscribed to the basic service.

If network B cannot accept the request to activate CCNR for any other reason, then network B shall inform network A that the CCNR request shall be rejected indicating "shortTermDenial".

9.2.2 CCNR queue processing

9.2.2.1 Normal operation

The CCNR requests in the queue shall be processed in chronological order, although the actual mechanism for processing the queue is outside the scope of this Recommendation. During the processing of the queue, the CCNR requests which are currently suspended shall be ignored.

Queue processing shall start if an activity has been recognized at destination B and after that a B-channel becomes free. This means that the network shall retain knowledge that an activity has occurred and remove this knowledge, when a B-channel becomes free.

If on resumption of a CCNR request queue processing is not active, then for the resumed CCNR request (and only this) the determination of user B free shall take place according to the procedures in 9.2.3.

On selection of a CCNR request the determination of user B free shall take place according to the procedure in 9.2.3.

If, for any reason, no CCNR call results from the processing of a CCNR request, then the next CCNR request against the user shall be selected for processing.

If the whole queue has been processed and no CCNR call results, processing is complete and shall only be restarted, if the conditions for starting (as specified above) are fulfilled again or became fulfilled again while the previous processing of the queue was ongoing.

9.2.2.2 Exceptional procedures

Not applicable.

9.2.3 Determination of user B free

The procedures in 3.9.2.3/Q.953.3 [14] shall apply.

9.2.4 CCNR call

9.2.4.1 Normal operation

If user A establishes the CCNR call, then network B shall cancel the B-channel reservation and offer the call to user B according to the procedures in 5.2/Q.931 [1].

If user B accepts the CCNR call with an ALERTING message, then depending on the "CCBS request retention" option being used, network B shall either deactivate or maintain the CCNR request.

If user B accepts the CCNR call with a CONNECT message, network B shall deactivate the CCNR request and proceed according to the procedures in Recommendation Q.931 [1].

9.2.4.2 Exceptional procedures

If user A establishes the CCNR call, and user B is determined to be busy, then network B shall inform network A, and, depending on the "CCBS request retention" option being used, shall either maintain the CCNR request, or deactivate the CCNR request.

If user A does not establish the CCNR call and network A deactivates the CCNR request, then network B shall deactivate the CCNR request and cancel the B-channel reservation.

If user A establishes the CCNR call and the CCNR call is cleared for any reason except busy before the ALERTING message has been sent from user B, then network B shall deactivate the CCNR request and inform network A.

If user A establishes the CCNR call, the "CCBS request retention" option is set to "yes" and user B rejects the CCNR call after having sent the ALERTING message, then network B shall deactivate the CCNR request and inform network A.

If user A establishes the CCNR call and user B does not answer the CCNR call (i.e. the CCNR call is cleared by the network or user A after the ALERTING message and before the CONNECT message), then the CCNR request, depending on the "CCBS request retention" option being used, shall either be maintained or deactivated. If network A indicates suspension of the CCNR request, then network B shall suspend the CCNR request and cancel the B-channel reservation.

10 Procedures for interworking with private ISDNs

The following subclauses cover the procedures associated with the original call attempt, a signalling connection to determine when the CCNR call can be established, and the establishment of the CCNR call. The protocols associated with these three procedures need not exist at the same interface.

10.1 Procedures for the originating T reference point

10.1.1 CCNR available indication

10.1.1.1 Normal operation

If on the attempt to establish a call according to the procedures in 5.1/Q.931 [1] the public network encounters or is notified of a destination, which is in the alerting state, and CCNR is available to the destination and the private network has subscribed to the CCNR supplementary service, then the public network shall send a CCBS-T-Available invoke component to the private network in an ALERTING message according to the procedures in 6.3.1/Q.932 [2].

On receipt of the CCBS-T-Available invoke component, the private network may invoke CCNR according to the procedures in 10.1.2.

10.1.1.2 Exceptional procedures

Not applicable.

10.1.2 CCNR supplementary service request

10.1.2.1 Normal operation

To setup the signalling connection with the public network and to request the activation of CCNR, the private network shall send a CCNR-T-Request invoke component to the public network according to the procedures defined in 6.3.2.1.1/Q.932 [2]. The CCNR-T-Request invoke component shall contain as parameters the Bearer capability information element, destinationAddress parameter, retentionSupported parameter, and if available the High layer compatibility information element and Low layer compatibility information element. The retentionSupported parameter shall be set to "TRUE" if the private network supports the "CCBS request retention" option. The retentionSupported parameter shall be set to "FALSE" if the private network does not support the "CCBS request retention" option. In addition the public network shall start the timer T-CCBS6.

NOTE 1 – The functionality of timer T-CCBS6 need not be provided in the DSS1 protocol if equivalent functionality is provided at the same network by Signalling System No. 7.

NOTE 2 – The originationAddress and presentationAllowedIndicator parameters may be included and are used to support the interaction between CCNR and Calling Line Identification Presentation and Calling Line Identification Restriction supplementary services. These interactions are specified in clause 12.

The call reference established as part of the procedures in 6.3.2.1.1/Q.932 [2] shall be used in all subsequent messages using the signalling connection to identify this instance of the CCNR supplementary service.

On receipt of the CCNR-T-Request invoke component the public network shall start monitoring the destination for being not busy after having initiated an activity and send a CCNR-T-Request return result component to the private network according to the procedures defined in 6.3.2.1.2/Q.932 [2]. The CCNR-T-Request return result component shall contain the retentionSupported parameter. The retentionSupported parameter in the return result component shall be set to "TRUE" if the retentionSupported parameter value in the invoke component was set to "TRUE" and the network supports the "CCBS request retention" option. The retentionSupported parameter shall be set to "FALSE" if the retentionSupported parameter value in the invoke component was set to "TRUE" and the network does not support the "CCBS request retention" option. If the retentionSupported parameter value in the invoke component was set to "FALSE", then the retentionSupported parameter in the return result component is not significant.

On receipt of the CCNR-T-Request return result component the private network shall await an indication that the destination is not busy after having initiated an activity according to the procedures in 10.1.3. If both the private network and the public network support the "CCBS request

retention" option then the "CCBS request retention" option shall be used in the subsequent procedures. If either or both the private network and the public network do not support the "CCBS request retention" option then the "CCBS request retention" option shall not be used in the subsequent procedures.

10.1.2.2 Exceptional procedures

If the public network receives a request for establishment of the signalling connection indicating a CCNR-related invoke component different from CCNR-T-Request, the public network shall clear the signalling connection according to the procedures defined in 6.3.2.1.3/Q.932 [2] with cause #29 "facility rejected".

If the public network cannot accept the CCNR request because the CCNR supplementary service is not subscribed to, then the public network shall clear the signalling connection to the private network according to the procedures defined in 6.3.2.1.3/Q.932 [2] and shall include in the RELEASE message a CCNR-T-Request return error component indicating "notSubscribed".

If the public network cannot accept the CCNR request because CCNR is not available to the destination (e.g. interworking with a non-CCNR network), then the public network shall clear the signalling connection to the private network according to the procedures defined in 6.3.2.1.3/Q.932 [2] and shall include in the RELEASE message a CCNR-T-Request return error component indicating "longTermDenial".

If the public network cannot accept the CCNR request because CCNR cannot be provided to the destination at this time (e.g. due to queue congestion, or supplementary service interaction), then the public network shall clear the signalling connection to the private network according to the procedures defined in 6.3.2.1.3/Q.932 [2] and shall include in the RELEASE message a CCNR-T-Request return error component indicating "shortTermDenial".

If the private network receives a reject component on the signalling connection from the public network then the private network shall clear the signalling connection according to the procedures defined in 6.3.2.1.3/Q.932 [2].

When clearing of the signalling connection is complete, the public network shall stop timer T-CCBS6.

10.1.3 Remote user free indication

The procedures in 3.10.1.3/Q.953.3 [14] shall apply.

10.1.4 Suspend request

The procedures in 3.10.1.4/Q.953.3 [14] shall apply.

10.1.5 Resume request

The procedures in 3.10.1.5/Q.953.3 [14] shall apply.

10.1.6 CCNR call establishment

The procedures in 3.10.1.6/Q.953.3 [14] shall apply.

10.1.7 Deactivation

The procedures in 3.10.1.7/Q.953.3 [14] shall apply.

10.2 Procedures for the destination T reference point

10.2.1 CCNR available indication

10.2.1.1 Normal operation

If on the attempt to establish a call according to the procedures in 5.2/Q.931 [1] the private network encounters a destination, which does not answer the call, and CCNR is available to the destination, then the private network shall send a CCBS-T-Available invoke component to the public network in an ALERTING message according to the procedures in 6.3.1.1/Q.932 [2].

If the CCBS-T-Available invoke component is received, the CCNR possible condition exists.

10.2.1.2 Exceptional procedures

Not applicable.

10.2.2 CCNR supplementary service request

10.2.2.1 Normal operation

To setup the signalling connection with the private network and to request the activation of CCNR, the public network shall send a CCNR-T-Request invoke component to the private network according to the procedures defined in 6.3.2.1.1/Q.932 [2]. The CCNR-T-Request invoke component shall contain as parameters the Bearer capability information element, destinationAddress parameter, retentionSupported parameter, and, if available, the High layer compatibility information element and Low layer compatibility information element. The retentionSupported parameter shall be set to "TRUE" if the public network supports the "CCBS request retention" option. The retentionSupported parameter shall be set to "FALSE" if the public network does not support the "CCBS request retention" option. In addition the public network shall start timer T-CCBS5.

NOTE – The functionality of timer T-CCBS5 need not be provided in the DSS1 protocol if equivalent functionality is provided at the same network by Signalling System No. 7.

The call reference established as part of the procedures in 6.3.2.1.1/Q.932 [2] shall be used in all subsequent messages using the signalling connection to identify this instance of the CCNR supplementary service.

On receipt of the CCNR-T-Request invoke component the private network shall start monitoring the destination for being not busy after having initiated an activity and send a CCNR-T-Request return result component to the public network according to the procedures defined in 6.3.2.1.2/Q.932 [2]. The CCNR-T-Request return result component shall contain the retentionSupported parameter. The retentionSupported parameter in the return result component shall be set to "TRUE" if the retentionSupported parameter value in the invoke component was set to "TRUE" and the network supports the "CCBS request retention" option. The retentionSupported parameter shall be set to "FALSE" if the retentionSupported parameter value in the invoke component was set to "TRUE" and the network does not support the "CCBS request retention" option. If the retentionSupported parameter value in the invoke component was set to "FALSE" then the retentionSupported parameter in the return result component is not significant. On receipt of the CCNR-T-Request return result component, the public network shall await an indication that the destination is not busy after having initiated an activity according to the procedures in 10.2.3.

If both the public network and the private network support the "CCBS request retention" option, then the "CCBS request retention" option shall be used in the subsequent procedures. If either or both the public network and the private network do not support the "CCBS request retention" option, then the "CCBS request retention" option shall not be used in the subsequent procedures.

10.2.2.2 Exceptional procedures

If the private network has not registered for the CCNR supplementary service, the public network shall reject the CCNR request towards network A indicating "longTermDenial".

If the private network receives a request for establishment of the signalling connection indicating a CCNR-related invoke component different from CCNR-T-Request, the private network shall clear the signalling connection according to the procedures defined in 6.3.2.1.3/Q.932 [2] with cause #29 "facility rejected".

If the private network cannot accept the CCNR request because CCNR is not available to the destination (e.g. interworking with a non-CCNR network), then the private network shall clear the signalling connection to the public network according to the procedures defined in 6.3.2.1.3/Q.932 [2] and shall include in the RELEASE message a CCNR-T-Request return error component indicating "longTermDenial".

If the private network cannot accept the CCNR request because CCNR cannot be provided to the destination at this time (e.g. due to queue congestion, or supplementary service interaction), then the private network shall clear the signalling connection to the public network according to the procedures defined in 6.3.2.1.3/Q.932 [2] and shall include in the RELEASE message a CCNR-T-Request return error component indicating "shortTermDenial".

If the public network receives a CCNR-T-Request return error component indicating "notSubscribed" it shall be treated as "longTermDenial".

If the public network receives a reject component on the signalling connection from the private network then the public network shall clear the signalling connection according to the procedures defined in 6.3.2.1.3/Q.932 [2]. When clearing of the signalling connection is complete, the public network shall stop timer T-CCBS5.

10.2.3 Remote user free indication

The procedures in 3.10.2.3/Q.953.3 [14] shall apply.

10.2.4 Suspend request

The procedures in 3.10.2.4/Q.953.3 [14] shall apply.

10.2.5 Resume request

The procedures in 3.10.2.5/Q.953.3 [14] shall apply.

10.2.6 CCNR call establishment

The procedures in 3.10.2.6/Q.953.3 [14] shall apply.

10.2.7 Deactivation

The procedures in 3.10.2.7/Q.953.3 [14] shall apply.

11 Interactions with other networks

11.1 Interaction with non-ISDNs

Interaction with other networks (e.g. a PSTN) is only possible if the network is capable to perform the functions as specified for the ISDN network B and the gateway signalling is compatible with regard to the CCNR supplementary service.

12 Interaction with other supplementary services

12.1 Call Waiting (CW)

The procedures in 3.12.1/Q.953.3 [14] shall apply.

12.2 Explicit Call Transfer (ECT)

No impact.

12.3 Connected Line Identification Presentation (COLP)

No impact.

12.4 Connected Line Identification Restriction (COLR)

No impact.

12.5 Calling Line Identification Presentation (CLIP)

12.5.1 Coding requirements

No impact.

12.5.2 Procedures at the coincident S and T reference point

The procedures in 3.12.5.2/Q.953.3 [14] shall apply.

12.5.3 Procedures for interworking with private ISDNs

12.5.3.1 Procedures for the originating T reference point

12.5.3.1.1 Normal operation

If the private network provides an originatingAddress in the CCNR-T-Request invoke component, and the public network supports the originatingAddress, then the public network shall transfer the originatingAddress parameter to the destination network.

12.5.3.1.2 Exceptional procedures

Not applicable.

12.5.3.2 Procedures for the destination T reference point

12.5.3.2.1 Normal operation

If a calling party address is available, and the network supports the originatingAddress in the CCNR-T-Request invoke component, and the user subscribes to the CLIP supplementary service, then the network shall include the originatingAddress in the CCNR-T-Request invoke component, subject to any CLIR supplementary service restriction.

12.5.3.2.2 Exceptional procedures

Not applicable.

12.6 Calling Line Identification Restriction (CLIR)

12.6.1 Coding requirements

The procedures in 3.12.6.1/Q.953.3 [14] shall apply.

12.6.2 Procedures at the coincident S and T reference point

The procedures in 3.12.6.2/Q.953.3 [14] shall apply.

12.6.3 Procedures for interworking with private ISDNs

12.6.3.1 Procedures for the originating T reference point

12.6.3.1.1 Normal operation

If the public network supports the originatingAddress parameter, then the following procedures shall apply:

- if the CLIR supplementary service is not provided, then the network shall ignore any PresentationAllowedIndicator in the CCNR-T-Request invoke component and shall not apply restriction to the transfer of the calling address;
- if the CLIR supplementary service is provided in permanent mode, then the network shall ignore any PresentationAllowedIndicator in the CCNR-T-Request invoke component and shall apply the appropriate restriction to the transfer of the calling address;
- if the CLIR supplementary service is provided in temporary mode and the PresentationAllowedIndicator is provided in the CCNR-T-Request invoke component and set to "true", then the network shall not apply restriction to the transfer of the calling address;
- if the CLIR supplementary service is provided in temporary mode, and the PresentationAllowedIndicator is provided in the CCNR-T-Request invoke component and set to "false", then the network shall apply the appropriate restriction to the transfer of the calling address;
- if the CLIR supplementary service is provided in temporary mode and the PresentationAllowedIndicator is not provided in the CCNR-T-Request invoke component and the default is "presentation restricted", then the network shall apply the appropriate restriction to the transfer of the calling address;
- if the CLIR supplementary service is provided in temporary mode and the PresentationAllowedIndicator is not provided in the CCNR-T-Request invoke component and the default is "presentation allowed", then the network shall not apply restriction to the transfer of the calling address.

12.6.3.1.2 Exceptional procedures

Not applicable.

12.6.3.2 Procedures for the destination T reference point

12.6.3.2.1 Normal operation

If a calling party address is available in the public network and the network supports the originatingAddress in the CCNR-T-Request invoke component, and presentation is allowed, then the network shall include the originatingAddress and PresentationAllowedIndicator set to "true" in the CCNR-T-Request invoke component.

If a calling party address is available in the public network and the network supports the originatingAddress in the CCNR-T-Request invoke component, and presentation is not allowed, then the network shall not include the originatingAddress and PresentationAllowedIndicator in the CCNR-T-Request invoke component.

12.6.3.2.2 Exceptional procedures

Not applicable.

12.7 Closed User Group (CUG)

The procedures in 3.12.7/Q.953.3 [14] shall apply.

12.8 Conference Calling (CONF)

No impact.

12.9 Direct-Dialling-In (DDI)

No impact.

12.10 Call diversion (call forwarding) services

12.10.1 Call Forwarding Busy (CFB)

No impact.

12.10.2 Call Forwarding No Reply (CFNR)

No impact.

12.10.3 Call Forwarding Unconditional (CFU)

No impact.

12.10.4 Call Deflection (CD)

12.10.4.1 Coding requirements

No impact.

12.10.4.2 Procedures at the coincident S and T reference point

12.10.4.2.1 Procedures for the originating network

12.10.4.2.1.1 Normal operation

If user A calls destination B and the call is deflected to user C by the CD supplementary service and user C is not responding, then a request by user A to activate the CCNR supplementary service shall be applied to destination B.

In the case of CD before alerting, the request from destination B to deflect a CCNR call shall be rejected.

NOTE – The Return Error value for this rejection is defined in the Recommendation for stage 3 description of call deflection.

In the case of CD after alerting, the request from destination B to deflect a CCNR call shall be accepted. The CCNR call shall be deflected as a normal call.

12.10.4.2.1.2 Exceptional procedures

Not applicable.

12.11 Line Hunting (LH)

No impact.

12.12 Three-Party Service (3PTY)

No impact.

12.13 User-to-User Signalling (UUS)

The procedures in 3.12.13/Q.953.3 [14] shall apply.

12.14 Multiple Subscriber Number (MSN)

12.14.1 Coding requirements

No impact.

12.14.2 Signalling procedures at the coincident S and T reference point

12.14.2.1 Procedures for the remote network

12.14.2.1.1 Normal operation

The CCNR supplementary service shall be provided to a user per multiple subscriber number (MSN).

If user A subscribes to the MSN supplementary service, and the user provides a valid multiple subscriber number in the Calling party number information element of the original call, then the network shall include the calling user's identity in a Called party number information element in the FACILITY message containing the CCBSErase, CCBSRemoteUserFree, CCBSBFree and CCBSStatusRequest invoke components. Users not addressed by the calling user's identity shall ignore the FACILITY messages.

If user A subscribes to the MSN supplementary service, and has not provided a multiple subscriber number or has provided an invalid multiple subscriber number in the Calling party number information element of the original call, then the network shall include the calling user's identity as used for the original call in a Called party number information element in the FACILITY message containing the CCBSErase, CCBSRemoteUserFree, CCBSBFree and CCBSStatusRequest invoke components. Users not addressed by the calling user's identity shall ignore the FACILITY messages.

If user A subscribes to the MSN supplementary service and interrogates the CCNR supplementary service related to a specific multiple subscriber number, then the user shall include the appropriate number in the "partyNumberOfA" parameter in the CCNRInterrogate invoke component. The CCNRInterrogate invoke component shall be included in the Facility Information element, within the FACILITY message. The network shall only provide information on CCNR activations related to the number provided in the partyNumberOfA parameter.

NOTE – The information provided relates to the A queue to which CCNR activations are assigned which contained that calling party number in the original setup request or were assigned to that number by default because no calling party number was provided.

12.14.2.1.2 Exceptional procedures

If the partyNumberOfA parameter is not provided, or if the content of the partyNumberOfA parameter is not valid in the CCNRInterrogate invoke component, then the information provided shall relate to the A queue to which also CCNR activations are assigned where the original SETUP message contained no calling party number.

12.14.3 Procedures for the remote network

12.14.3.1 Normal operation

If user B subscribes to the MSN supplementary service, then the network shall provide an incoming CCNR queue per multiple subscriber number, but the maximum number of the CCNR requests may be on a per-access basis.

12.14.3.2 Exceptional procedures

Not applicable.

12.15 Call Hold (HOLD)

No impact.

12.16 Advice of Charge (AOC)

The procedures in 3.12.16/Q.953.3 [14] shall apply.

12.17 Sub-addressing (SUB)

The procedures in 3.12.17/Q.953.3 [14] shall apply.

12.18 Terminal Portability (TP)

No impact.

12.19 Completion of Calls to Busy Subscriber (CCBS)

12.19.1 Coding requirements

No impact.

12.19.2 Signalling procedures at the coincident S and T reference point

12.19.2.1 Normal operation

NOTE 1 – In addition to the definition of "CCBS busy" given in 3.3/Q.953.3 [14], the "CCBS busy" condition is also caused when a CCNR recall is pending on user A.

NOTE 2 – Only one network option "check for identical calls" exists for the CCNR and the CCBS supplementary service.

NOTE 3 – Only one network option "CCBS request retention" exists for the CCNR and the CCBS supplementary service.

The cCBSReference parameter shall have significance on the whole access, i.e. a cCBSReference parameter value shall not be reused for subsequent CCNR or CCBS requests on an access before it is released.

12.19.2.2 Exceptional procedures

If the originating network option "check for identical calls" is set to "yes", the originating network shall check if the call for which CCNR or CCBS is requested and a call in originating user's queue are identical. If the originating network cannot accept the CCNR request because user A has already activated the CCBS supplementary service for an identical call placed in the queue, then the network shall send a CCNRRequest return error component indicating "cCBSIsAlreadyActivated" to user A, using the procedure in 6.3.2.2/Q.932 [2]. If the originating network cannot accept the CCBS request because user A has already activated the CCNR supplementary service for an identical call placed in the queue, then the network shall send a CCBSRequest return error component indicating "cCBSIsAlreadyActivated" to user A, using the procedure in 6.3.2.2/Q.932 [2].

NOTE – If the network option "check for identical calls" is set to "no", the originating network does not check if CCNR is requested for a call identical to a call for which CCBS is already activated and vice versa.

If the destination network cannot establish the CCNR call because user B is busy and the network option "CCBS request retention" is either set to "yes" or to "no", then in addition to the procedures

described in 9.1.7.2, for the activation of the CCBS supplementary service the procedures in 3.9.1.1/Q.953.3 [14] shall apply.

12.20 Malicious Call Identification (MCID)

No impact.

12.21 Reverse Charging (REV)

No impact.

12.22 Multi-Level Precedence and Preemption (MLPP)

The procedures in 3.12.22/Q.953.3 [14] shall apply.

12.23 Support of Private Numbering Plan (SPNP)

No impact.

12.24 International Telecommunication Charge Card (ITCC)

Not applicable this time.

12.25 Global Virtual Network Services (GVNS)

Not applicable this time.

12.26 Call Completion on No Reply (CCNR)

No impact.

13 Parameter values (timers)

Retention timer T-RETENTION

When network A has provided the call information retention option procedure, then this timer is started by the network after call clearing during the alerting phase. User A shall send the CCNRRequest invoke component to the network before expiry of this timer. Network A stores relevant information only for the duration of this timer.

The duration of this timer shall have a minimum of 15 seconds.

Status check timer T-CCBS1

The maximum time the network will wait for user A response for checking for compatible terminals. The value of this timer is 4 seconds.

Status check timer T-STATUS

The maximum time the network will wait for user B response for checking for compatible terminals. The value of this timer is 4 seconds.

CCNR service duration timer T-CCBS2

The maximum time the service will be active within the network. The value is a network option, typically 15-45 minutes.

Recall timer T-CCBS3

The maximum time the network will wait for user A response to a CCNR recall. The value is typically between 10 and 20 seconds.

Destination B idle guard timer T-CCBS4

The time the network will wait after destination B has become not busy after having initiated an activity before indicating a "CCNR recall" or " indication of B idle" to user A. The value of this timer is typically between 0-15 seconds.

Service lifetime supervision timer T-CCBS5

This timer supervises the lifetime of the signalling connection at the destination public network. The value is 60 minutes.

Service lifetime supervision timer T-CCBS6

This timer supervises the lifetime of the signalling connection at the originating public network. The value is 60 minutes.

Activation timer T-ACTIVATE

This timer is started by user A, after sending a CCNRRequest invoke component to network A. The value of this timer is 10 seconds.

Deactivation timer T-DEACTIVATE

This timer is started by user A, after sending a CCBSDeactivate invoke component to network A. The value of this timer is 4 seconds.

Interrogation timer T-INTERROGATE

This timer is started by user A, after sending a CCNRInterrogate invoke component to network A. The value of this timer is 4 seconds.

14 Dynamic description (SDLs)²

The dynamic descriptions are shown in Figure 14-1 according to Recommendation Z.100 [10].

NOTE – In the SDLs "network A" is used as abbreviation for "originating network" and "network B" is used as abbreviation for "destination network".

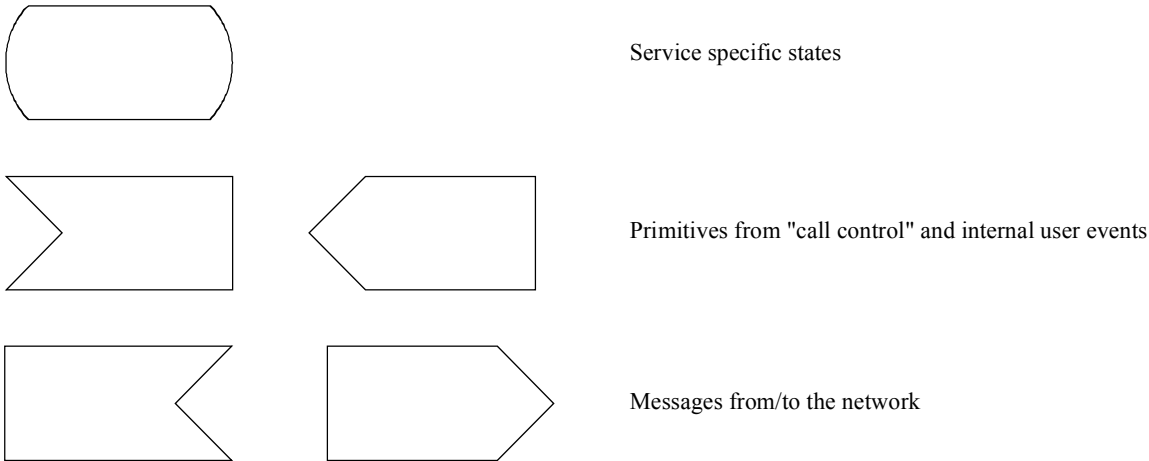
Figure 14-1/Q.953.5 contains the following 13 SDLs.

- 1 <Process CCNR_USER_A> <filename: ccnr_use.spr>
- 2 <Process CCNR_NETWORK_A> <filename: ccnr_n01.spr>
- 3 <Macro RELEASE_CCNR_ID > <filename: releas01.smc>
- 4 <Macro CHECK_STATUS_A> <filename: check_st.smc>
- 5 <Process CCNR_NETWORK_CALL_INFORMATION_RETENTION > <filename: ccnr_n02.spr>
- 6 <Process CCNR_NETWORK_B> <filename: ccnr_n04.spr>
- 7 <Macro CHECK_STATUS_B> <filename: check_01.smc>
- 8 <Process CCNR_ORIGINATING_PRIVATE_NETWORK> <filename: ccnr_ori.spr>
- 9 <Process CCNR_DESTINATION_PRIVATE_NETWORK> <filename: ccnr_des.spr>
- 10 <Process CCNR_PRIVATE_NETWORK> <filename: ccnr_pri.spr>

² The reprocessable SDT files are available on the electronic document.

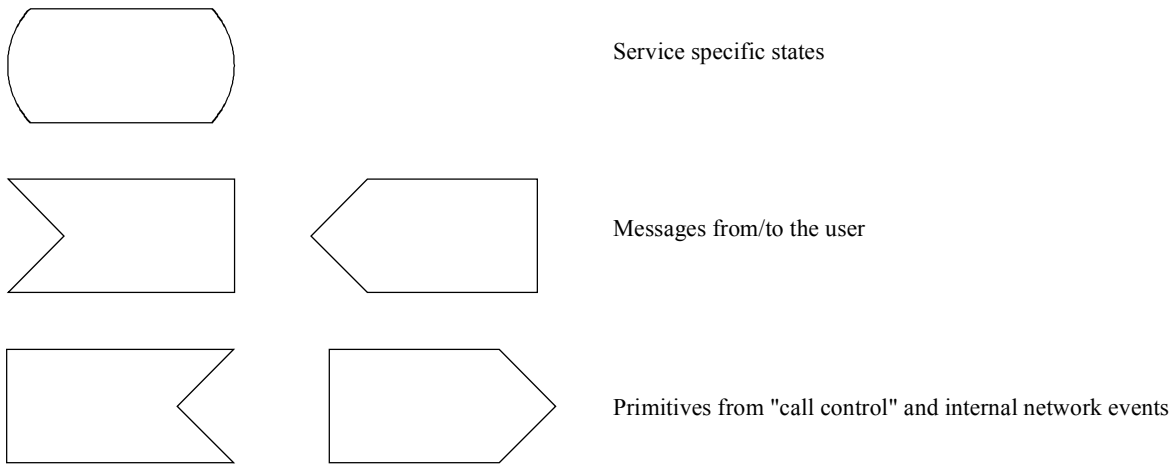
- 11 <Process CCNR_ORIGINATING_PUBLIC_NETWORK> <filename: ccnr_o01.spr>
- 12 <Process CCNR_DESTINATION_PUBLIC_NETWORK > <filename: ccnr_d01.spr>
- 13 <Process CCNR_PUBLIC_NETWORK > <filename: ccnr_pub.spr>

CCNR user side process SDL diagrams



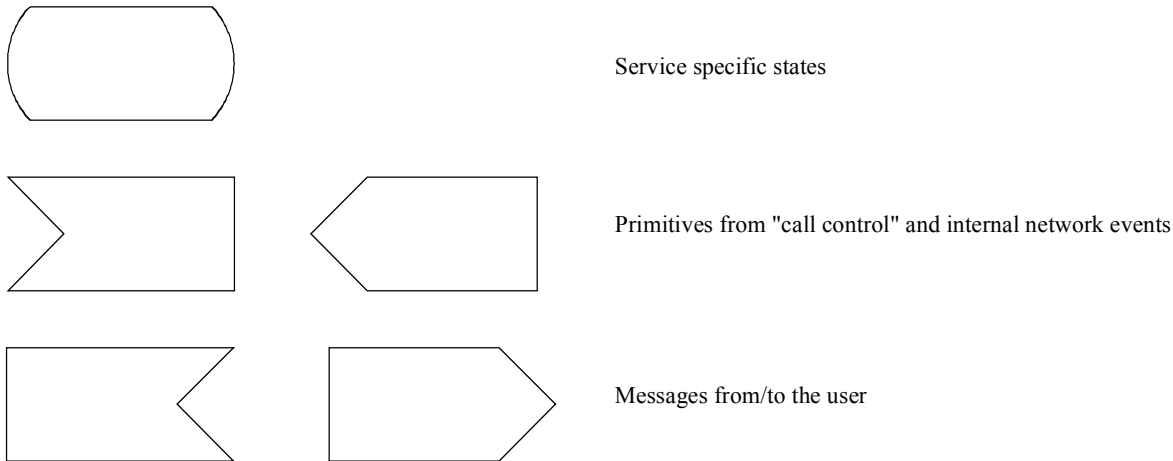
T11103350-99

CCNR originating network side process SDL diagrams

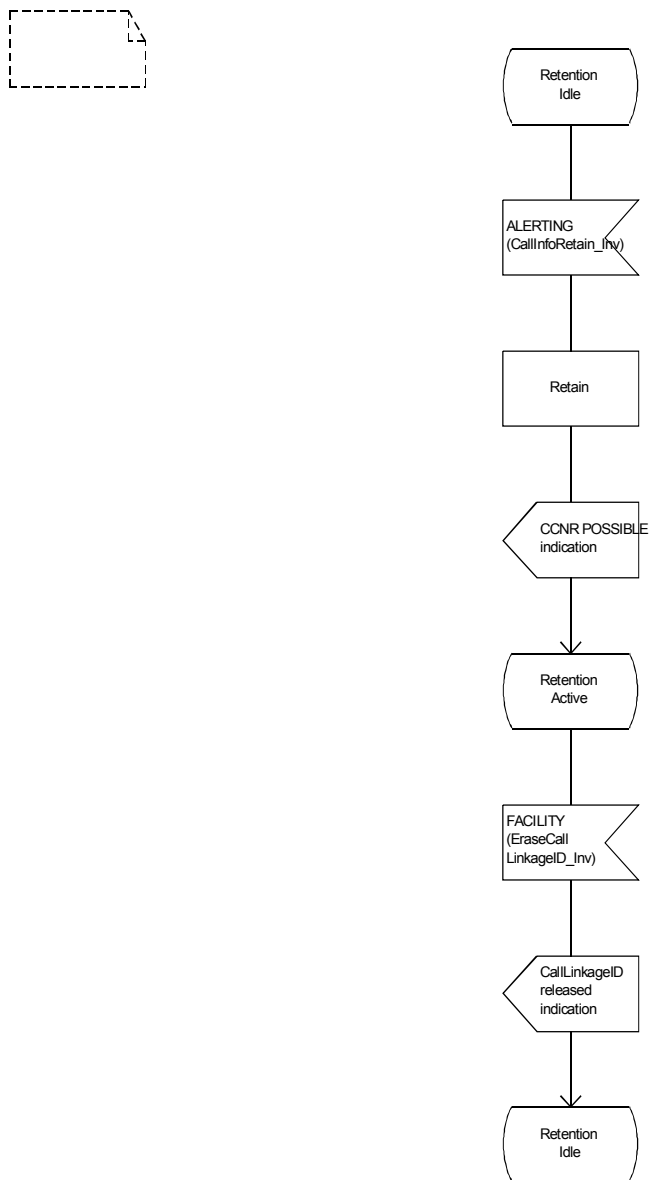


T11103360-99

CCNR destination network side process SDL diagrams



T11103370-99

**Figure 14-1/Q.953.5 – Dynamic description (SDLs)**

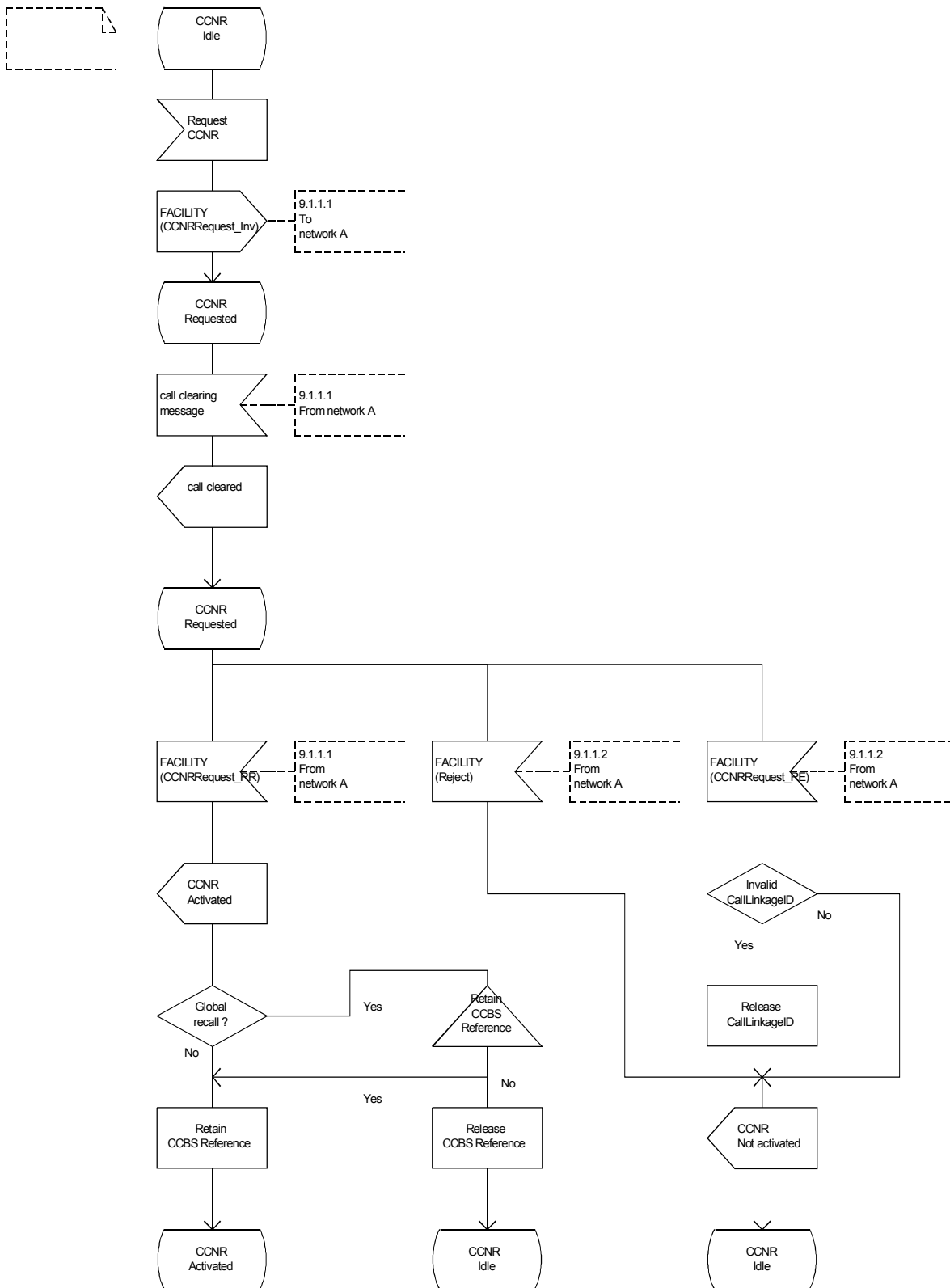


Figure 14-1/Q.953.5 – Dynamic description (SDLs) (continued)

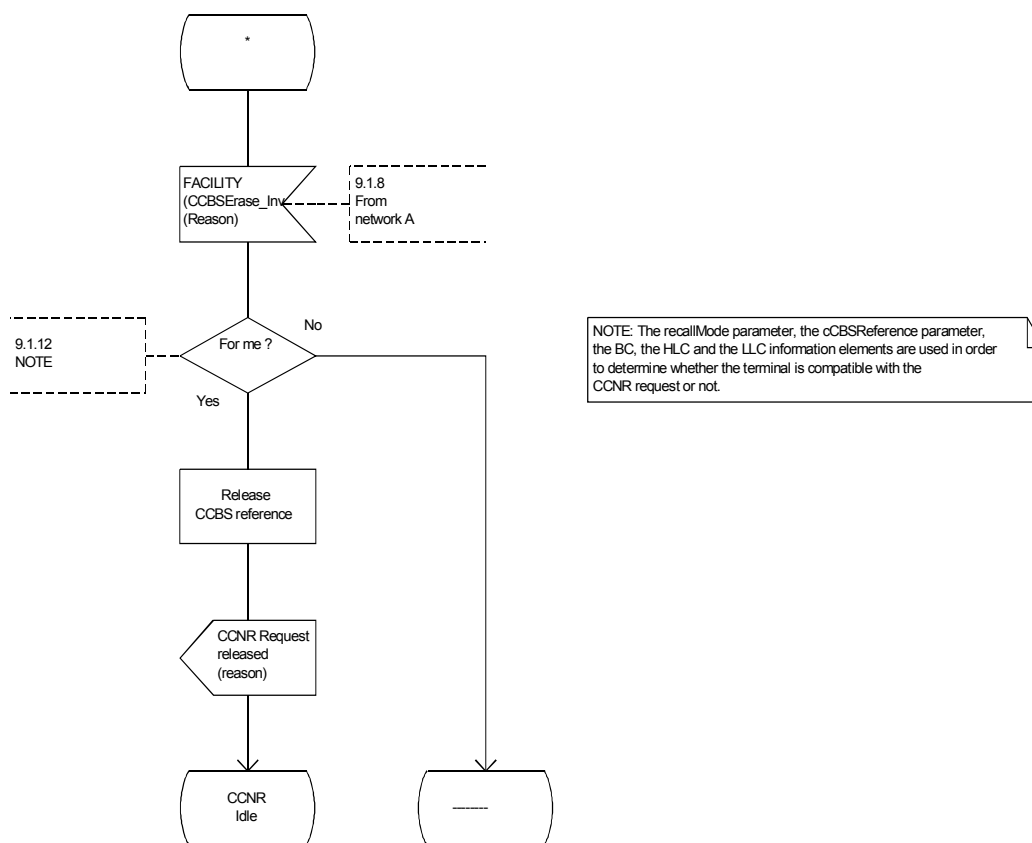


Figure 14-1/Q.953.5 – Dynamic description (SDLs) (continued)

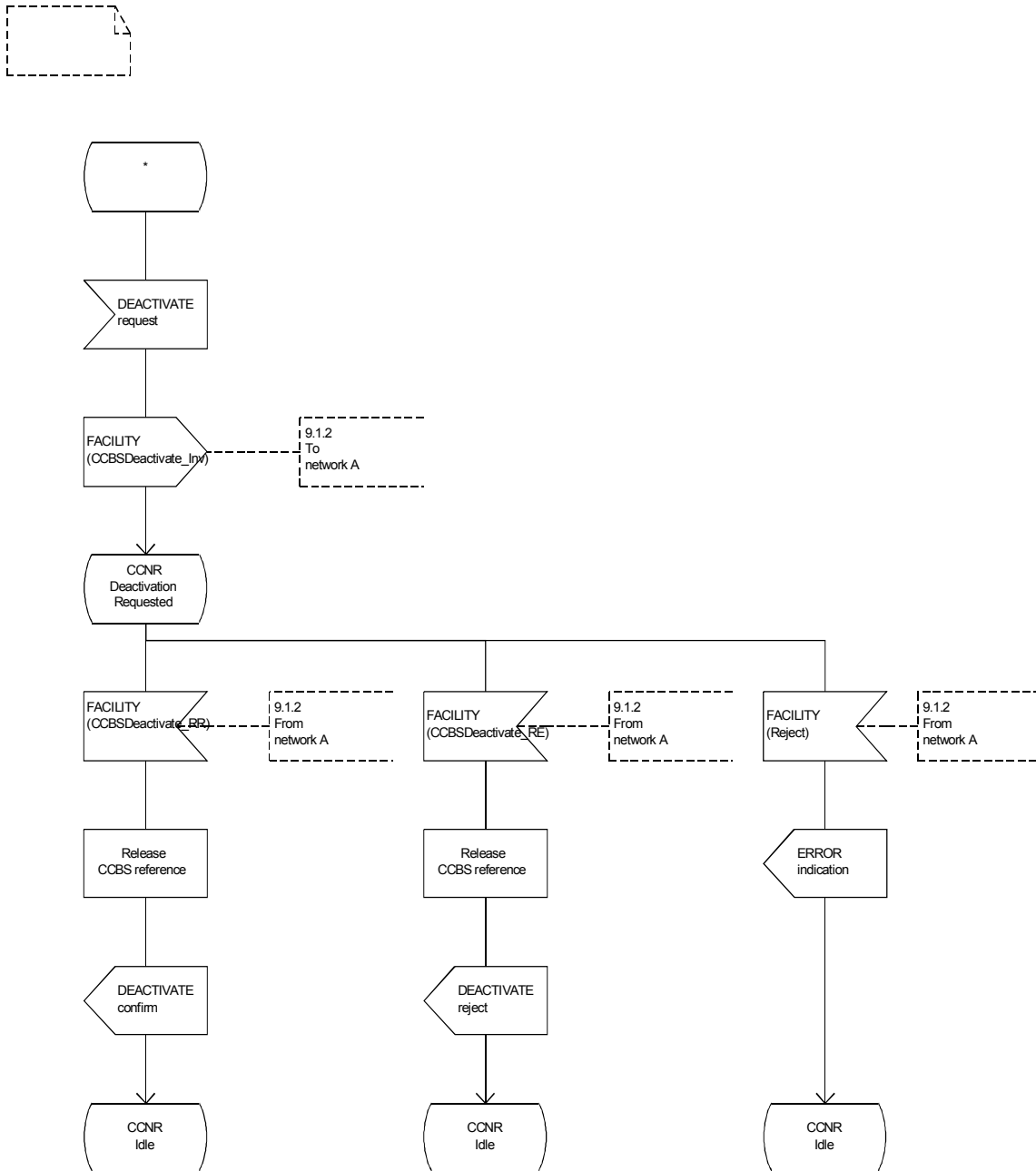


Figure 14-1/Q.953.5 – Dynamic description (SDLs) (continued)

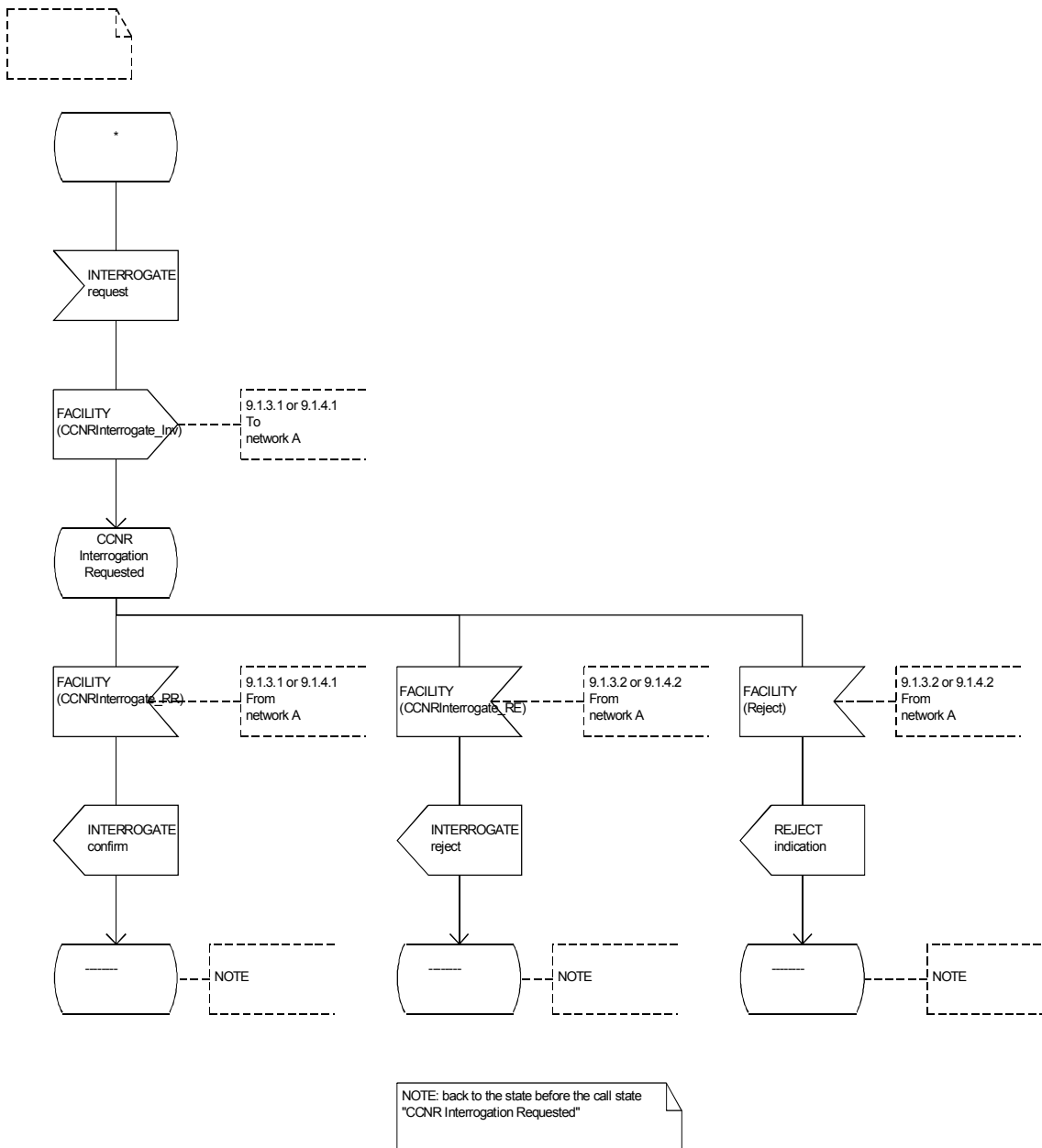


Figure 14-1/Q.953.5 – Dynamic description (SDLs) (continued)

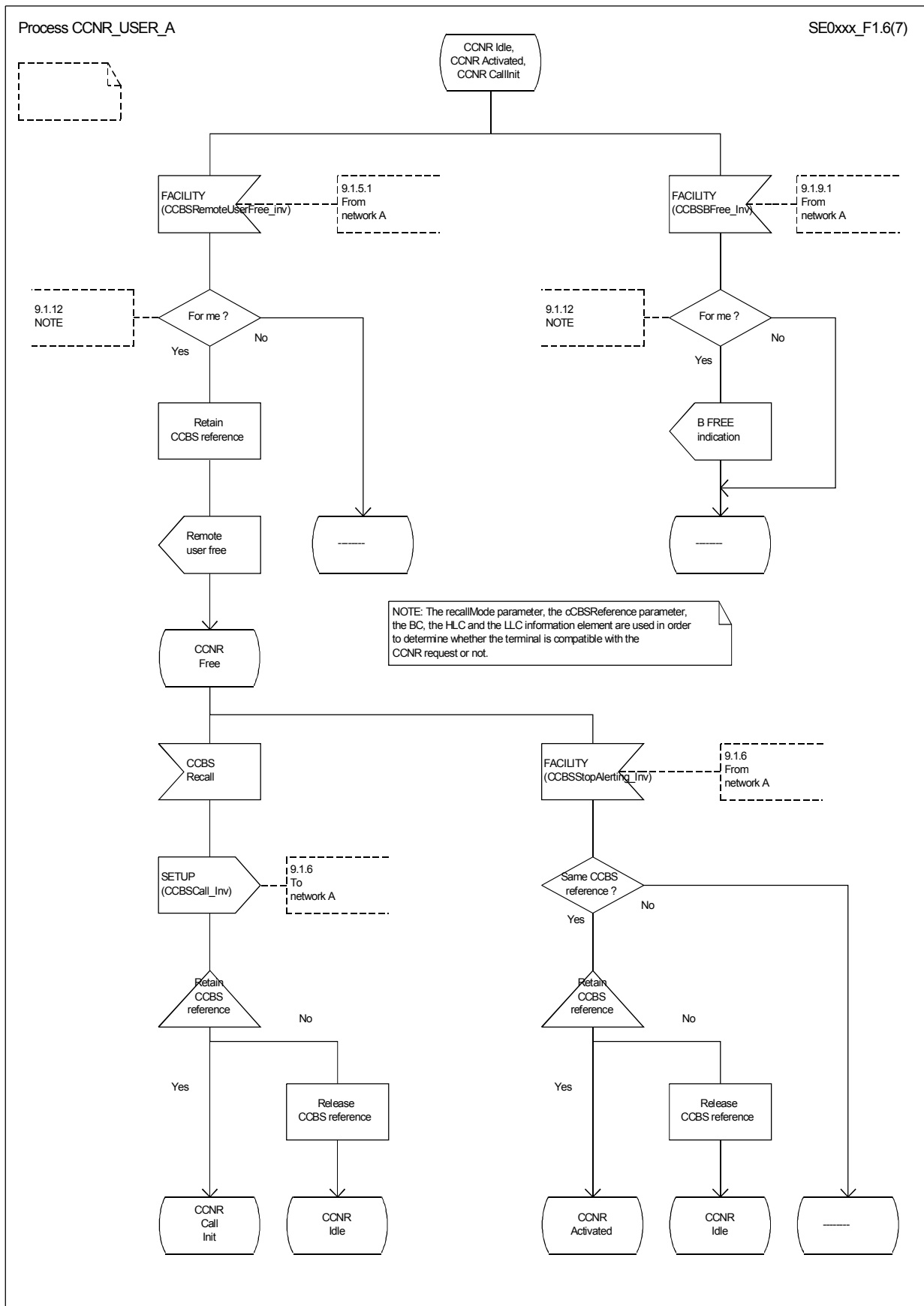


Figure 14-1/Q.953.5 – Dynamic description (SDLs) (continued)

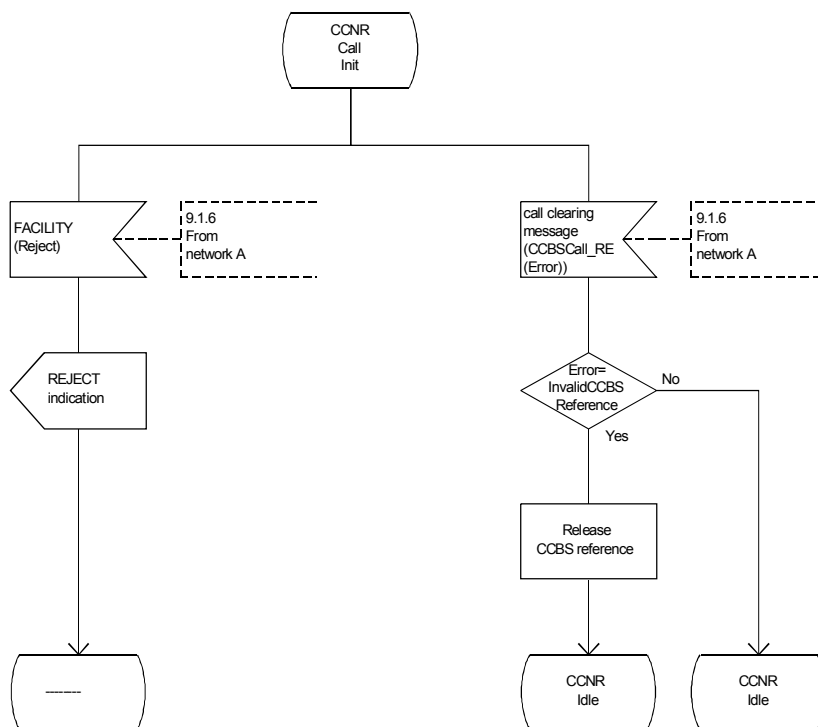
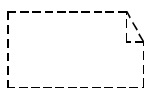


Figure 14-1/Q.953.5 – Dynamic description (SDLs) *(continued)*

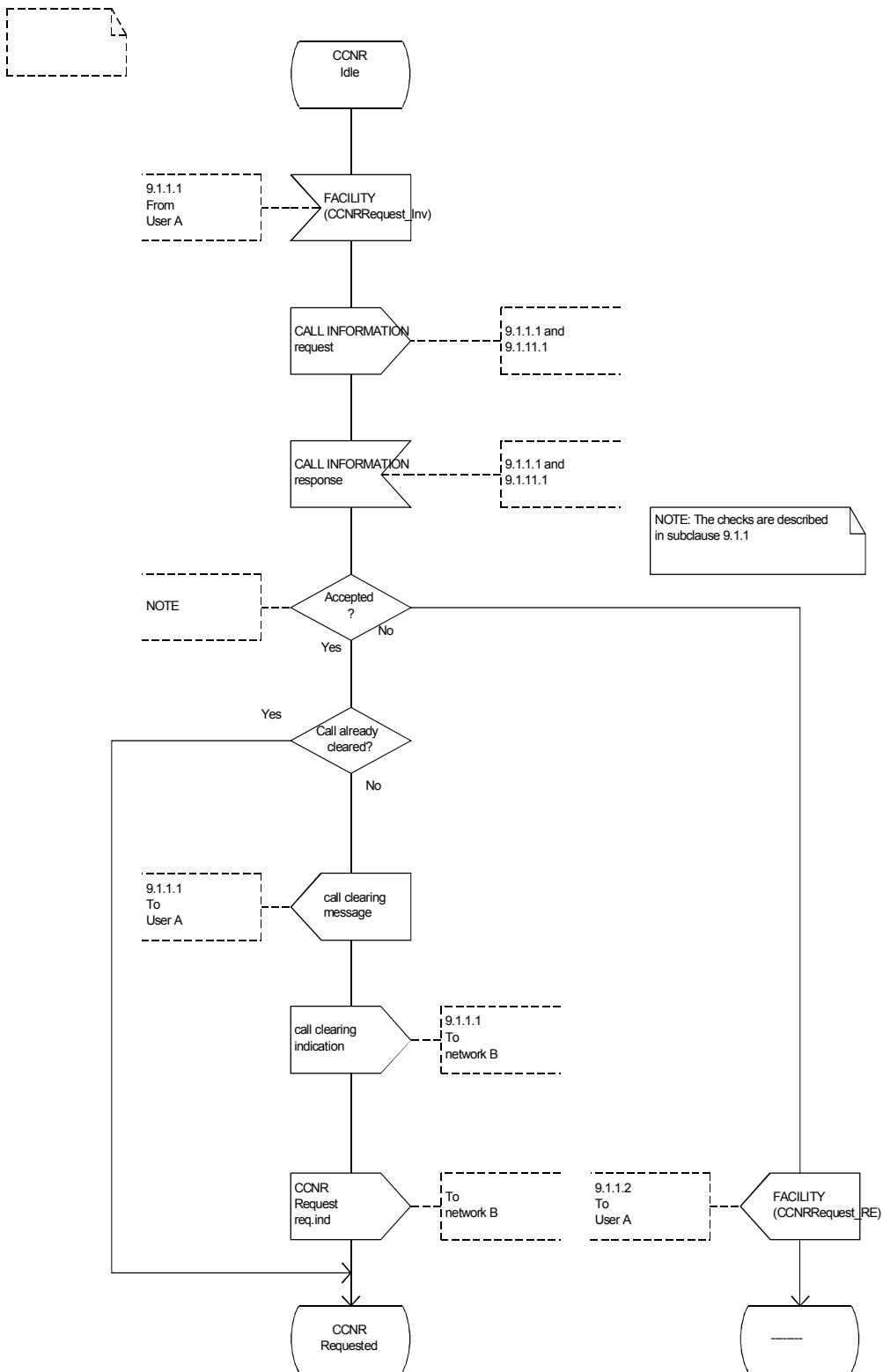
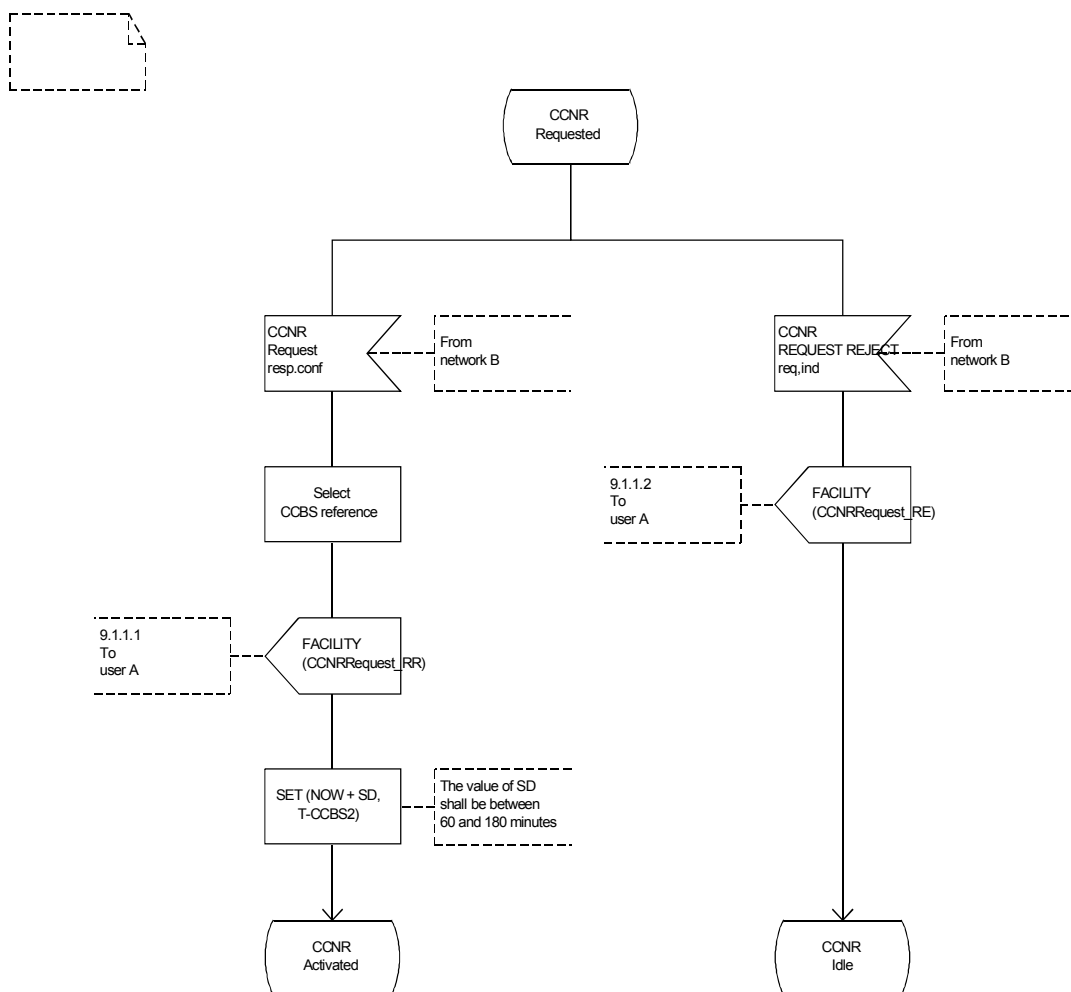


Figure 14-1/Q.953.5 – Dynamic description (SDLs) (continued)

Figure 14-1/Q.953.5 – Dynamic description (SDLs) (*continued*)

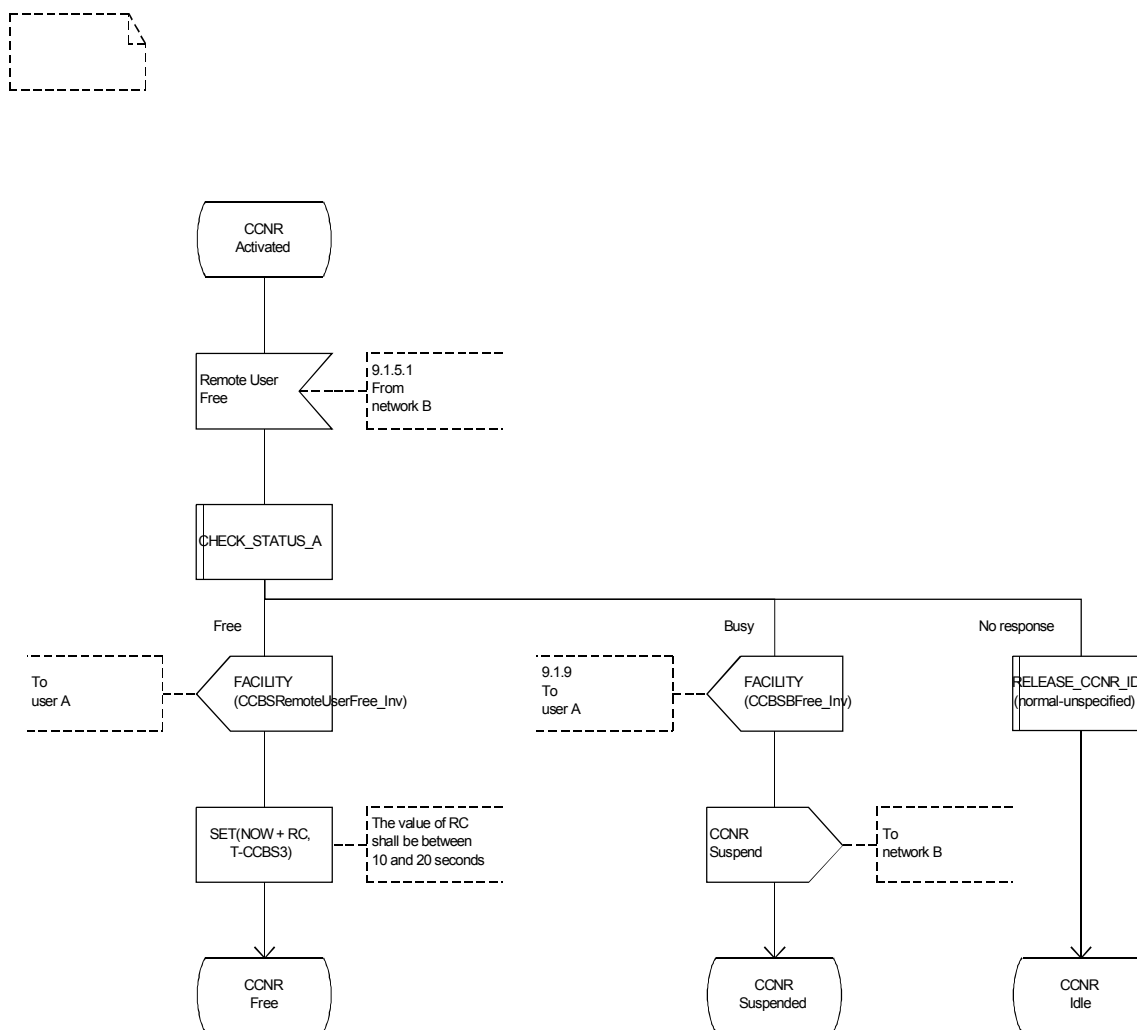


Figure 14-1/Q.953.5 – Dynamic description (SDLs) (continued)

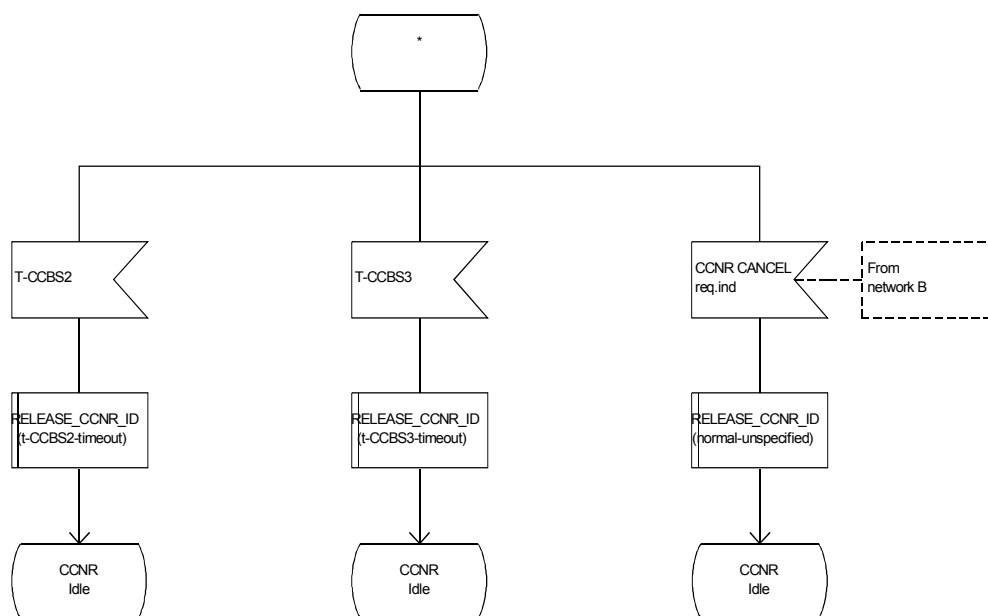


Figure 14-1/Q.953.5 – Dynamic description (SDLs) *(continued)*

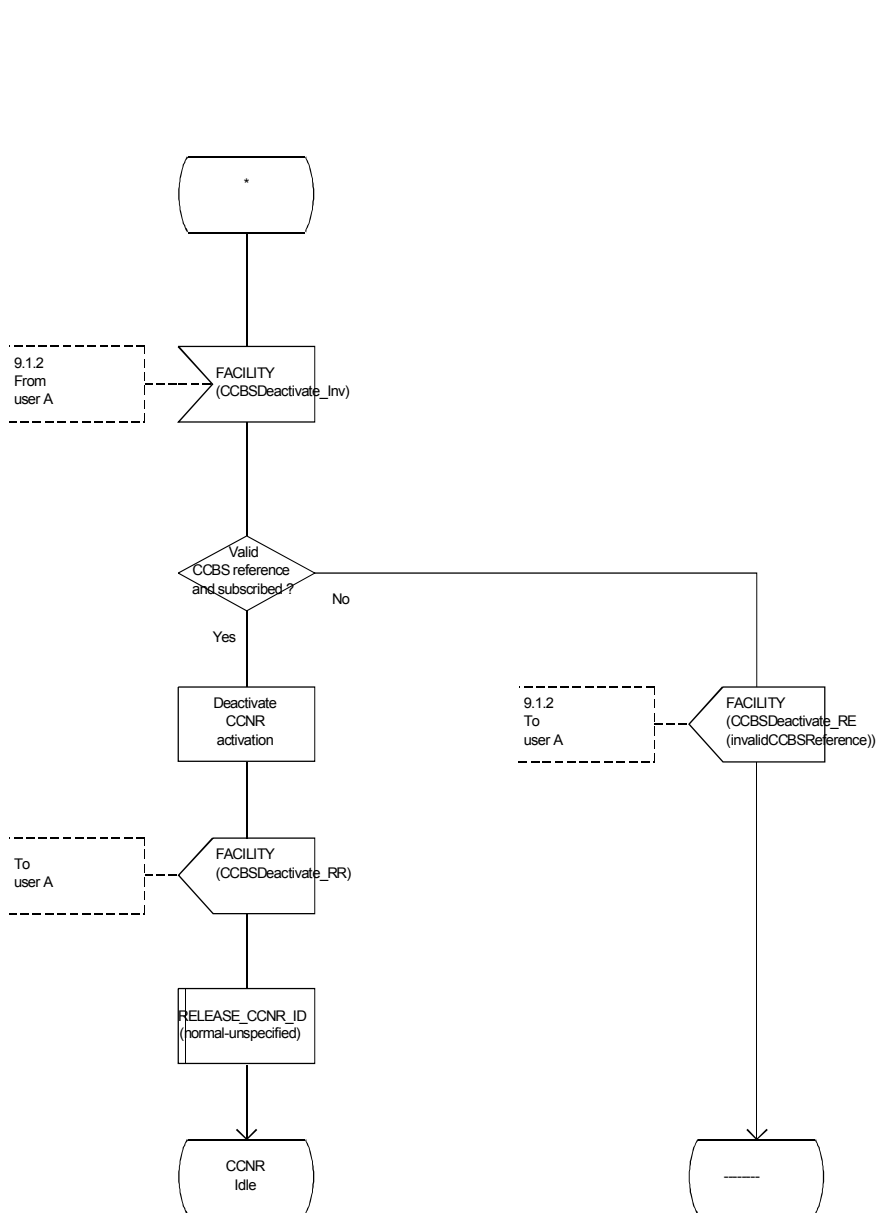


Figure 14-1/Q.953.5 – Dynamic description (SDLs) (continued)

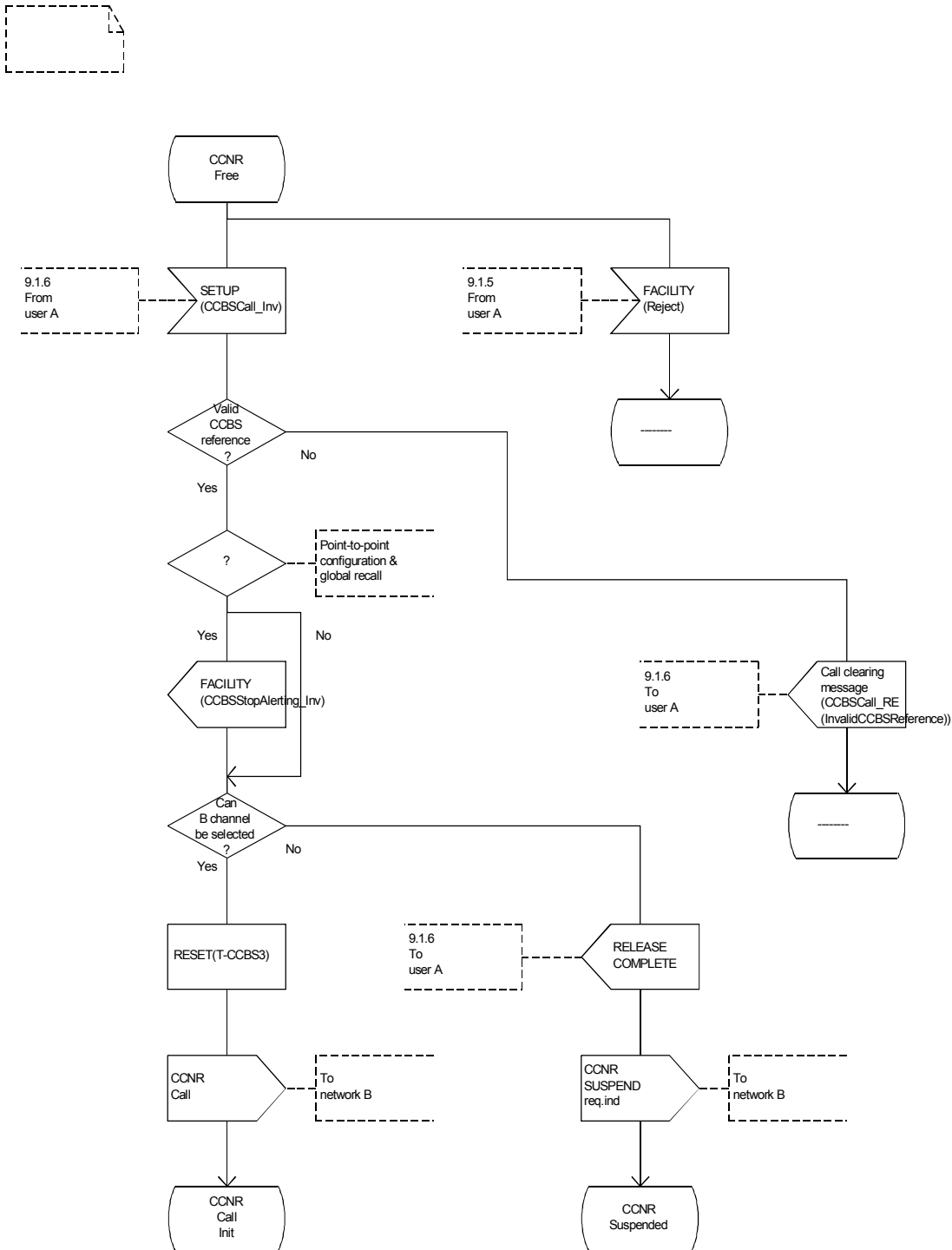


Figure 14-1/Q.953.5 – Dynamic description (SDLs) (continued)

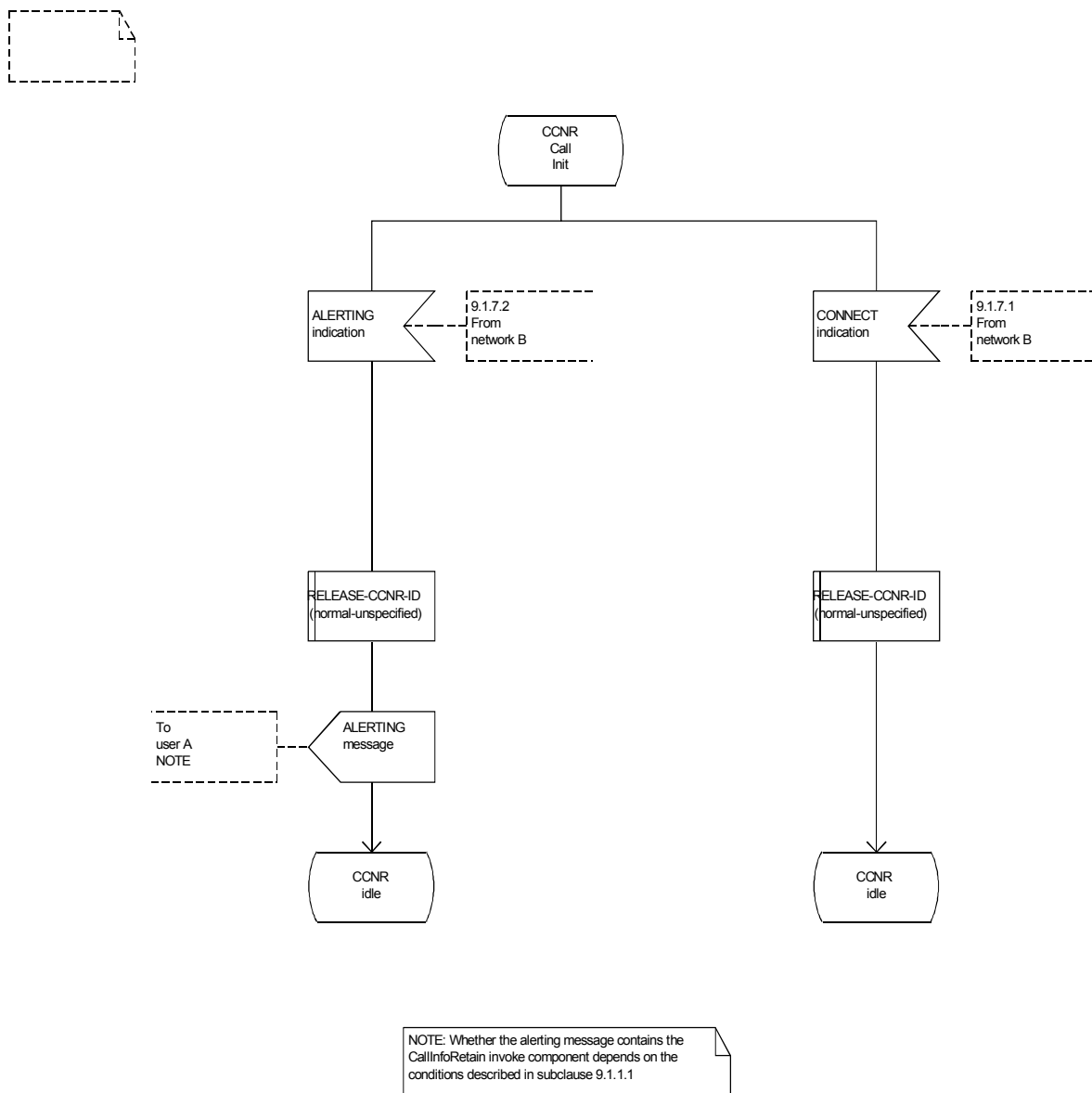


Figure 14-1/Q.953.5 – Dynamic description (SDLs) (continued)

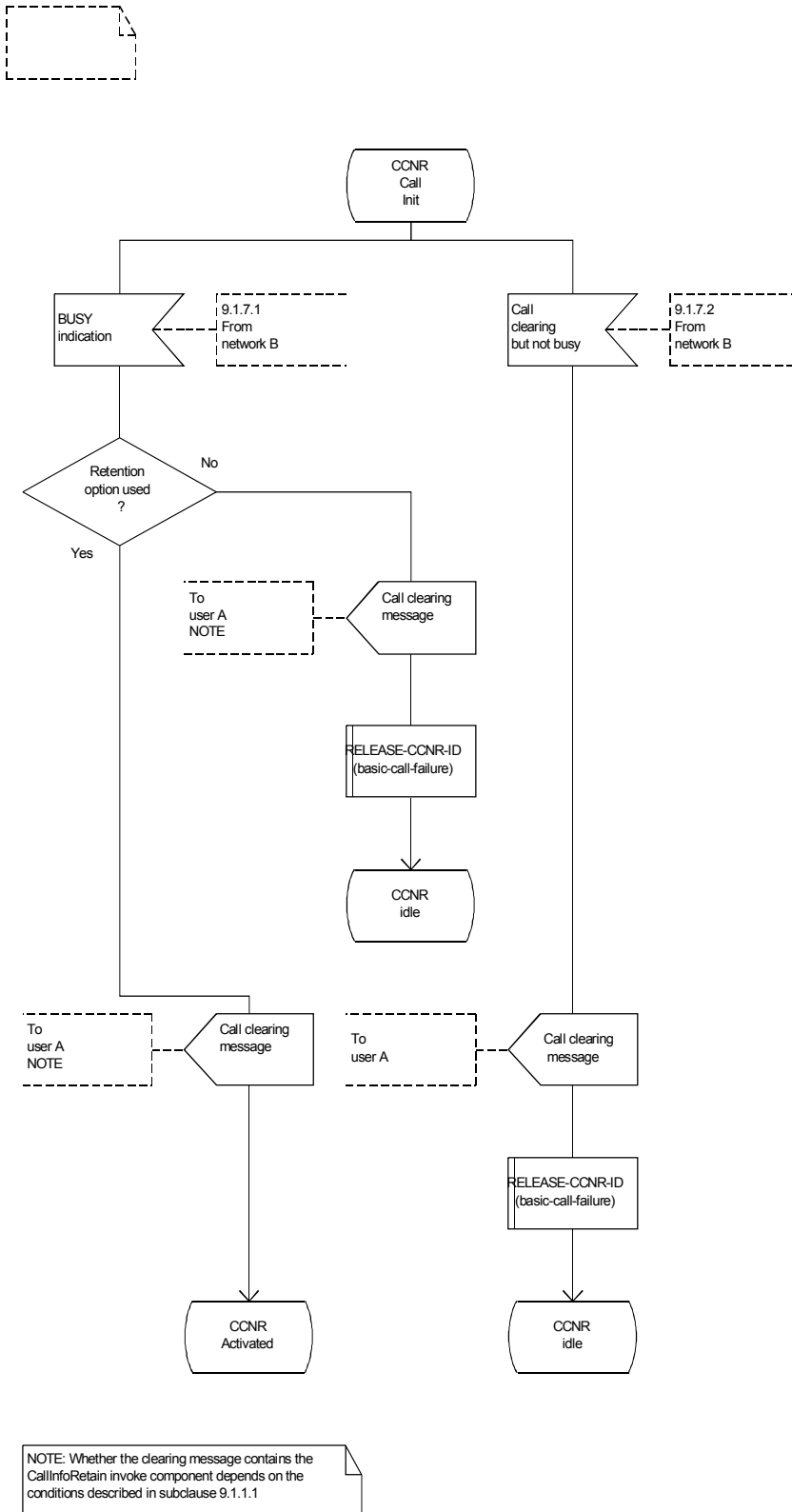


Figure 14-1/Q.953.5 – Dynamic description (SDLs) (continued)

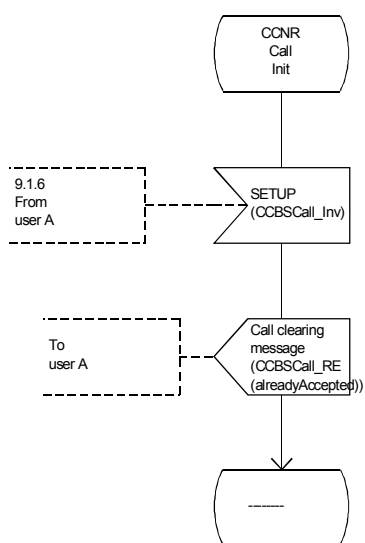


Figure 14-1/Q.953.5 – Dynamic description (SDLs) (*continued*)

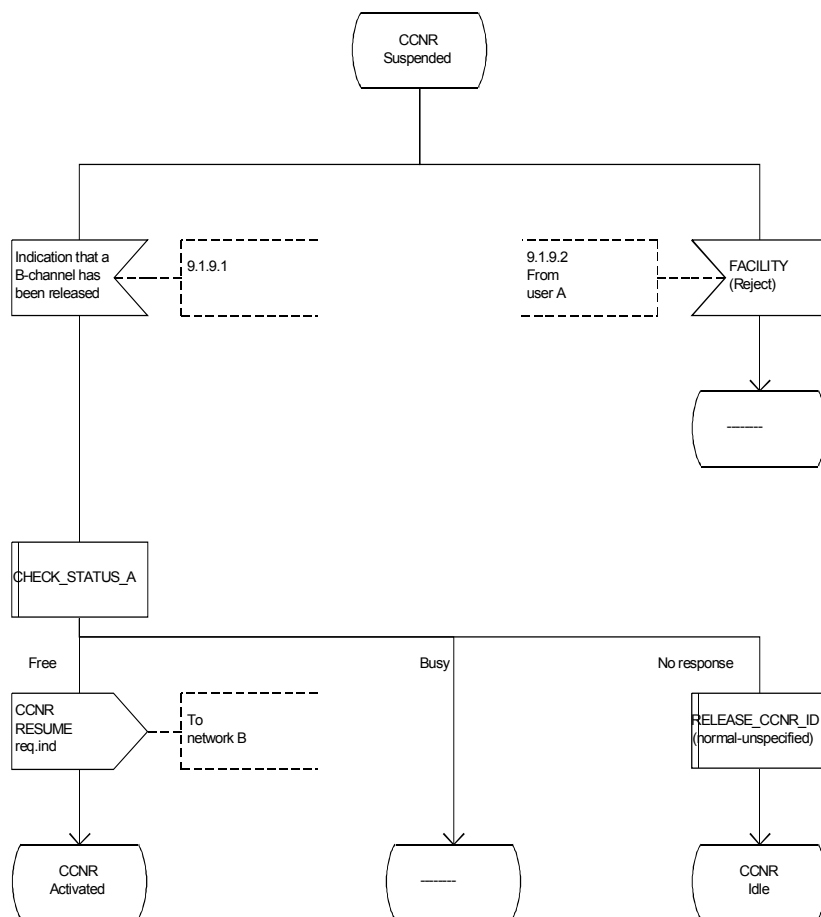
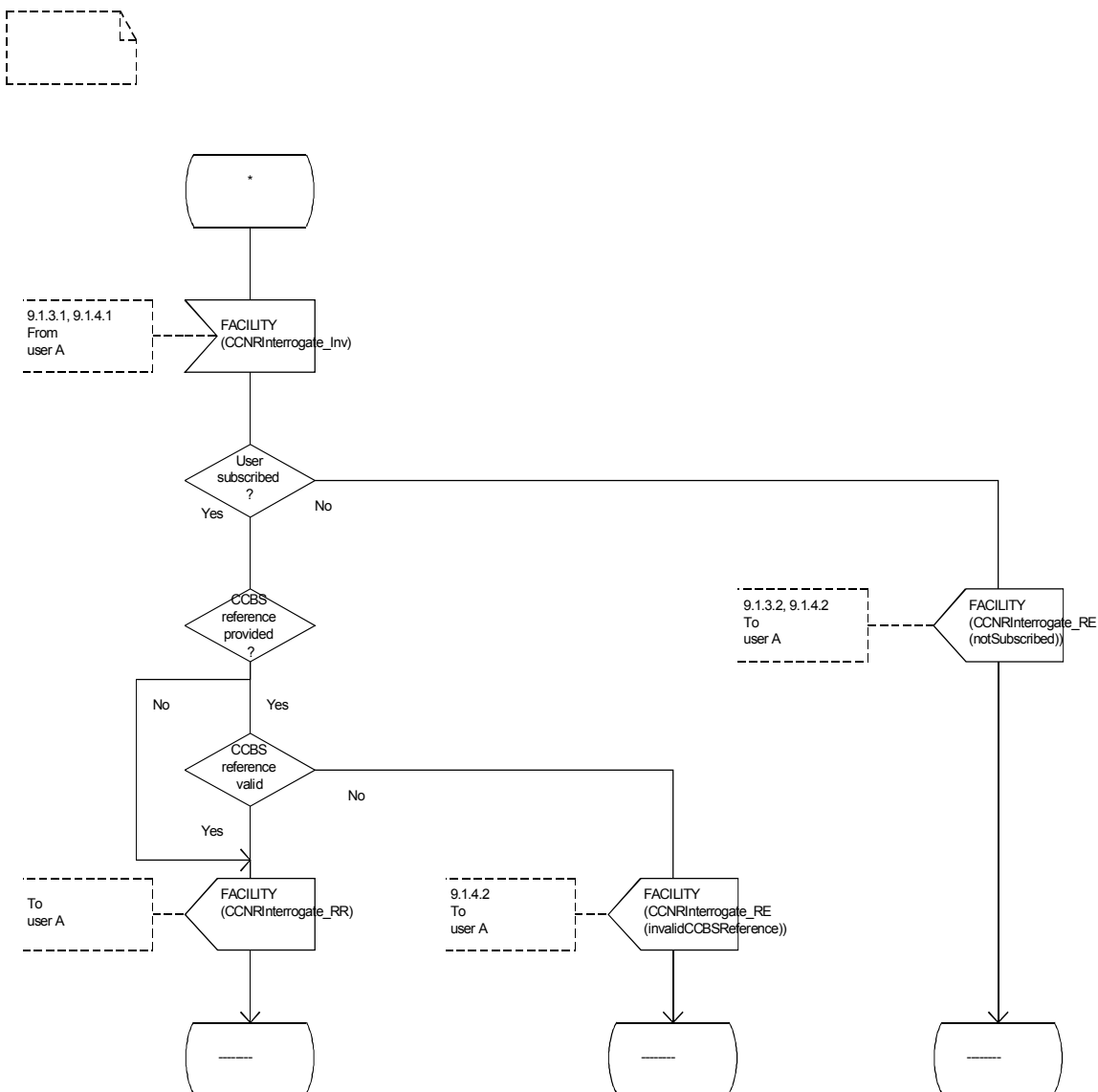


Figure 14-1/Q.953.5 – Dynamic description (SDLs) *(continued)*

Figure 14-1/Q.953.5 – Dynamic description (SDLs) *(continued)*

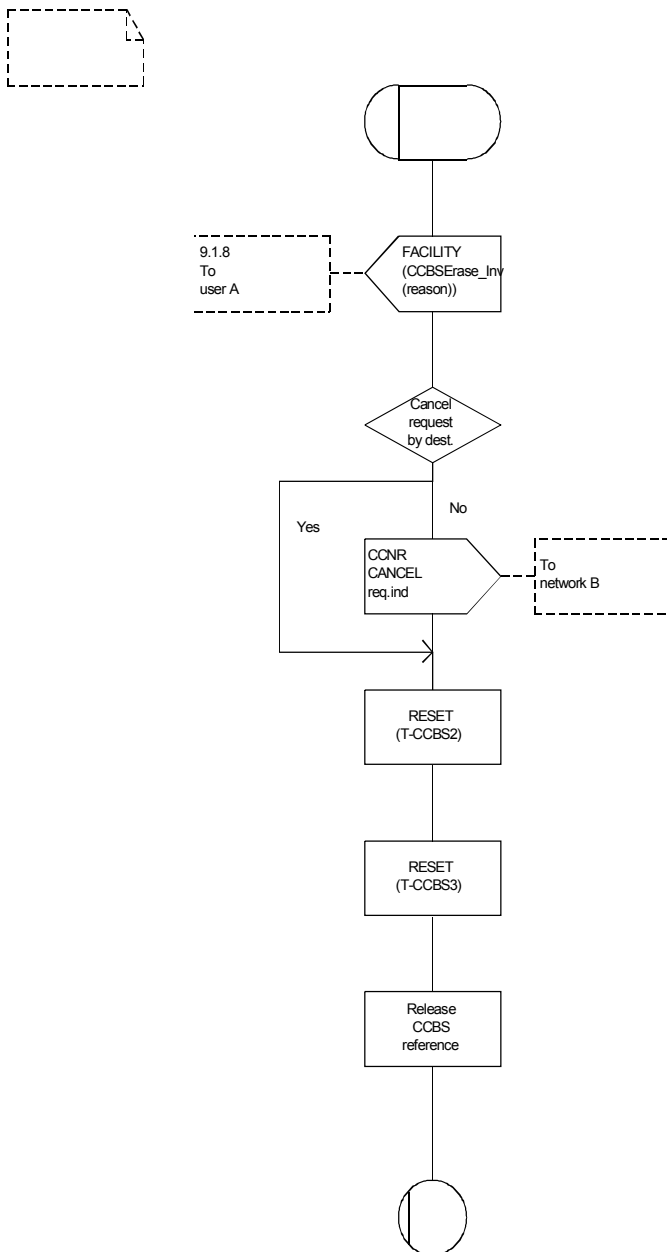


Figure 14-1/Q.953.5 – Dynamic description (SDLs) (*continued*)

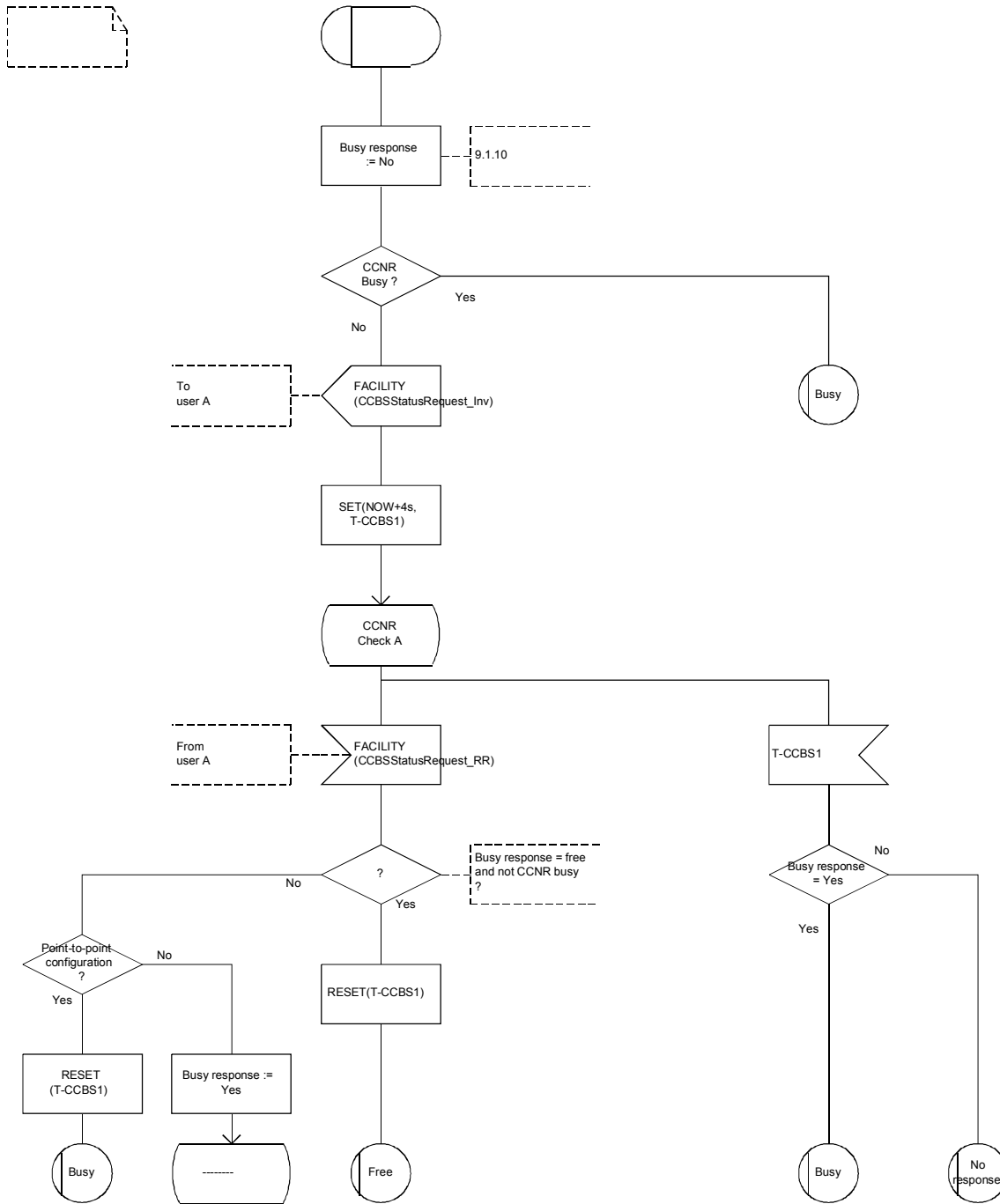


Figure 14-1/Q.953.5 – Dynamic description (SDLs) (continued)

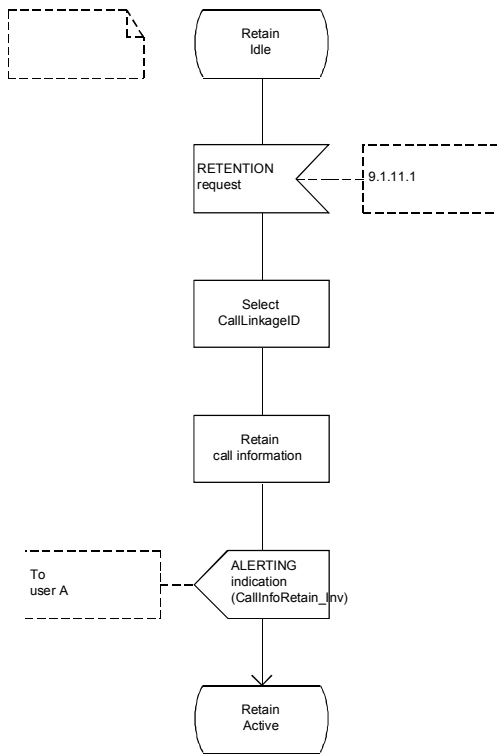


Figure 14-1/Q.953.5 – Dynamic description (SDLs) (*continued*)

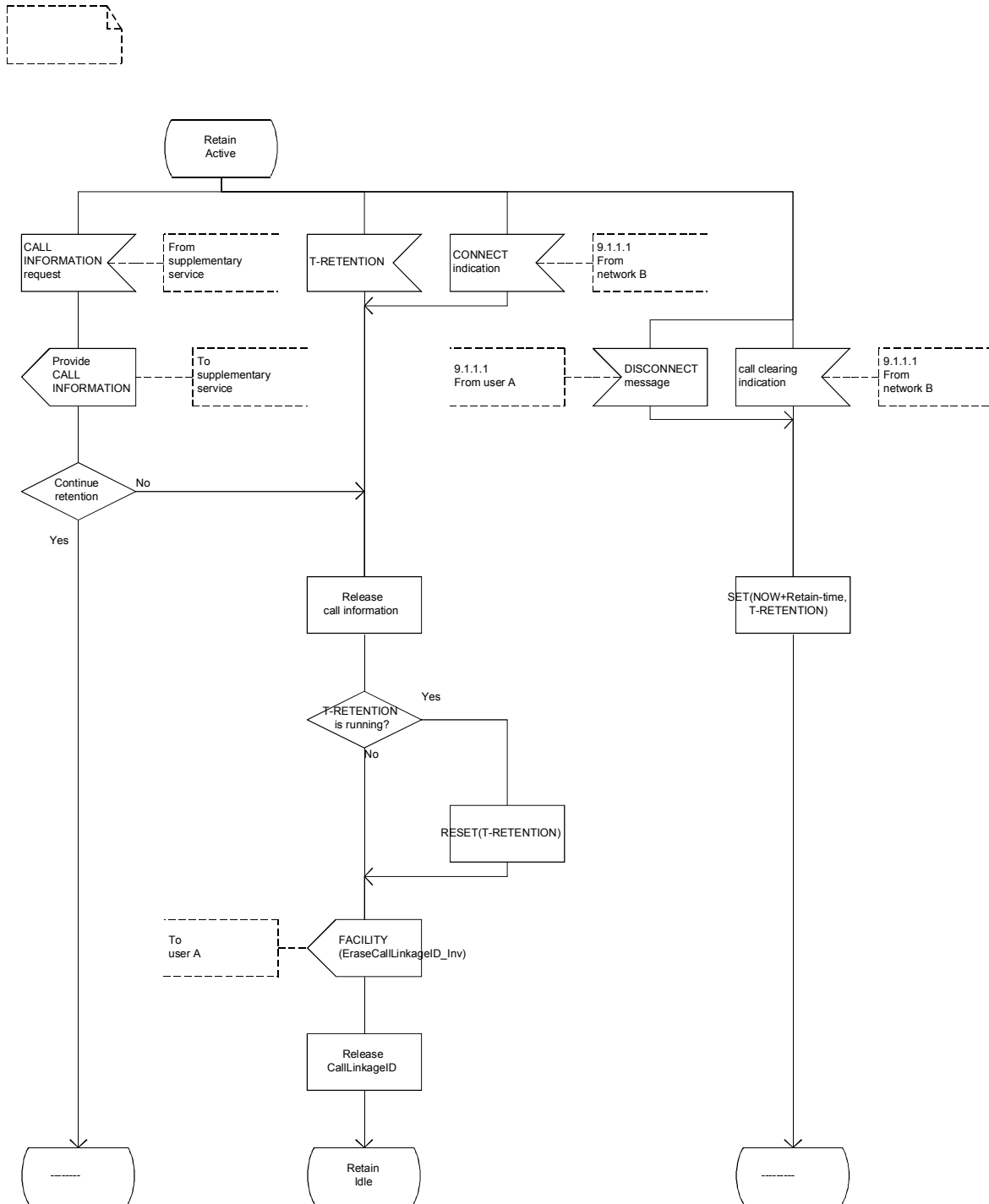


Figure 14-1/Q.953.5 – Dynamic description (SDLs) (continued)

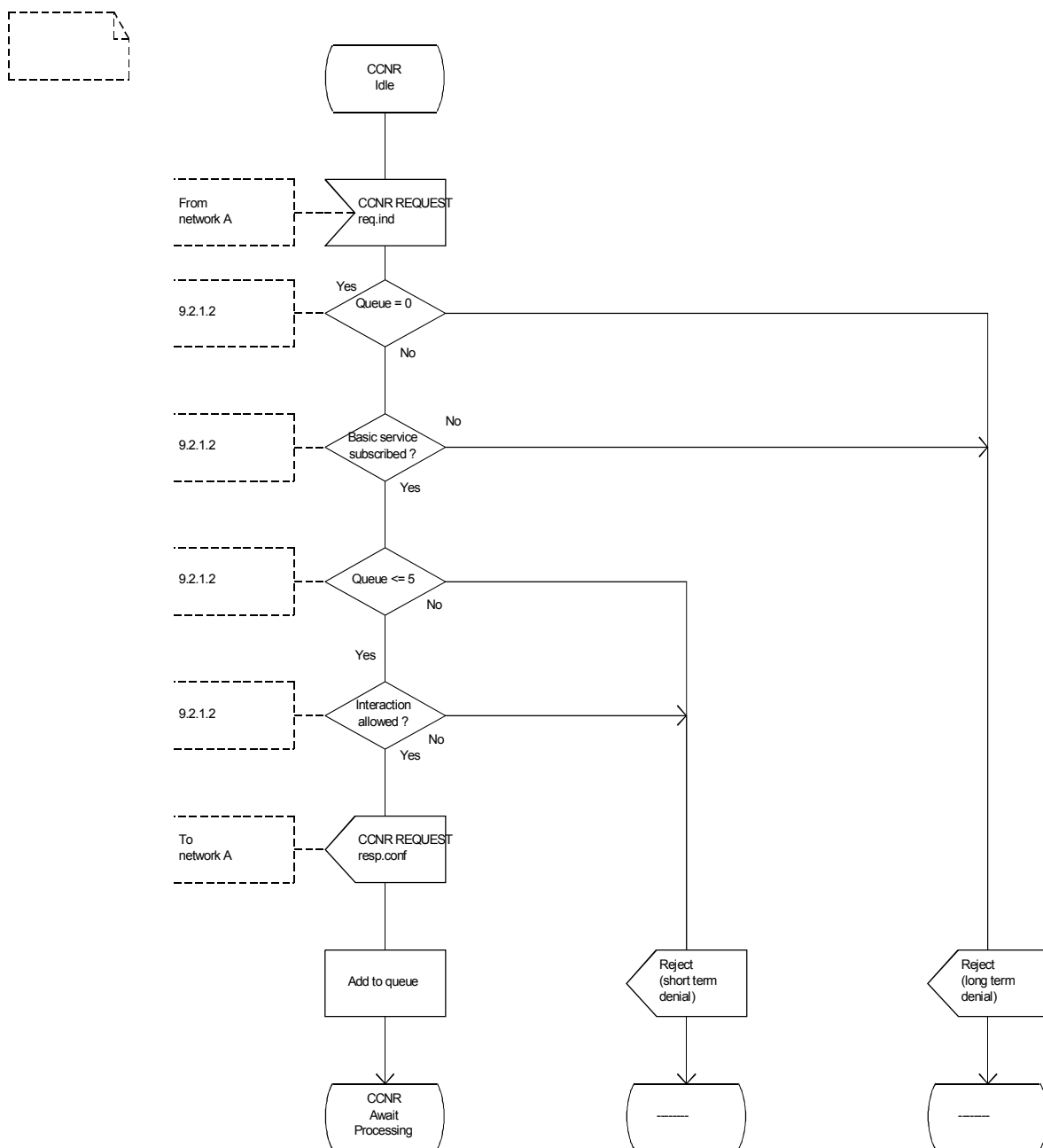


Figure 14-1/Q.953.5 – Dynamic description (SDLs) (continued)

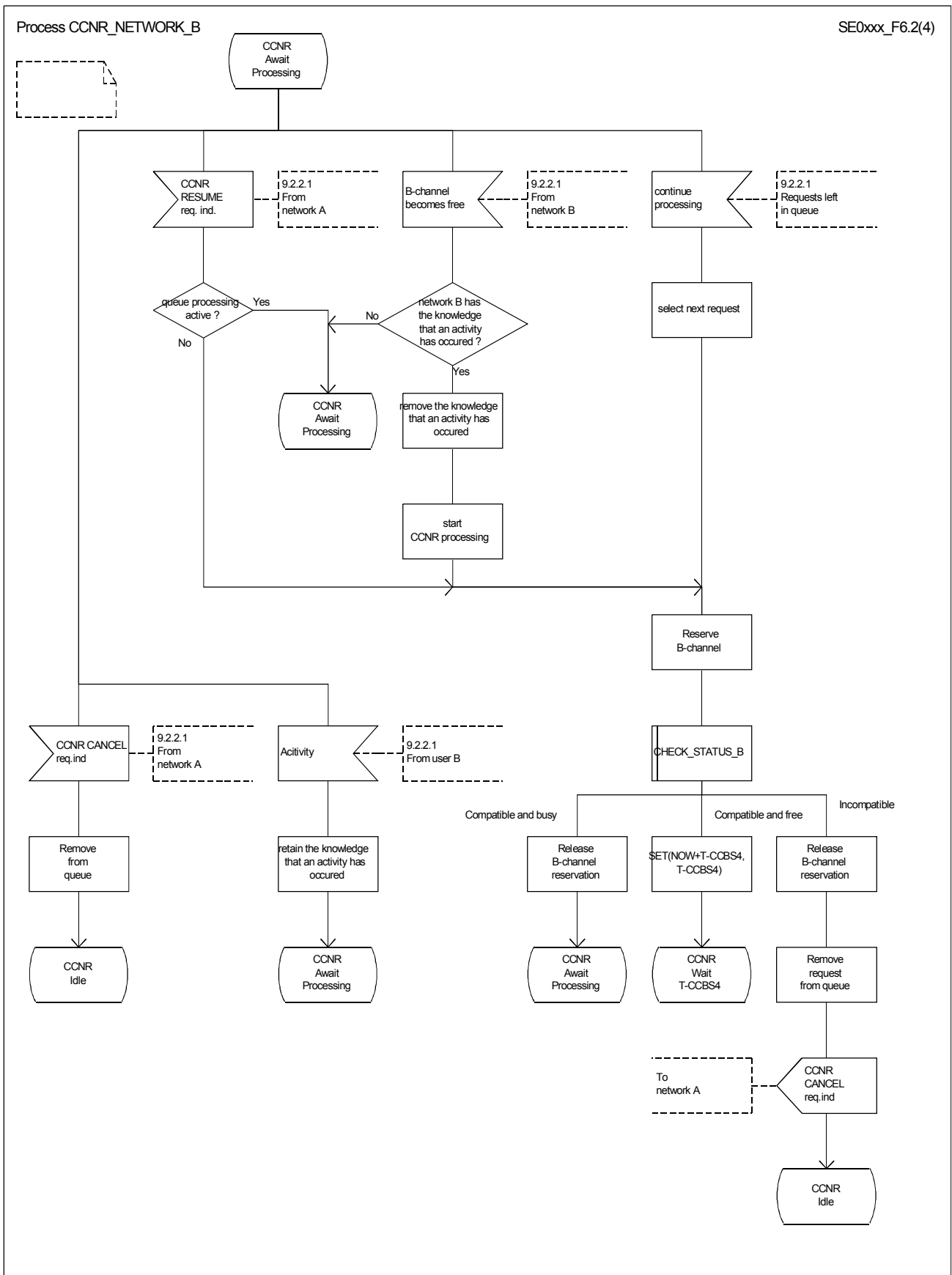
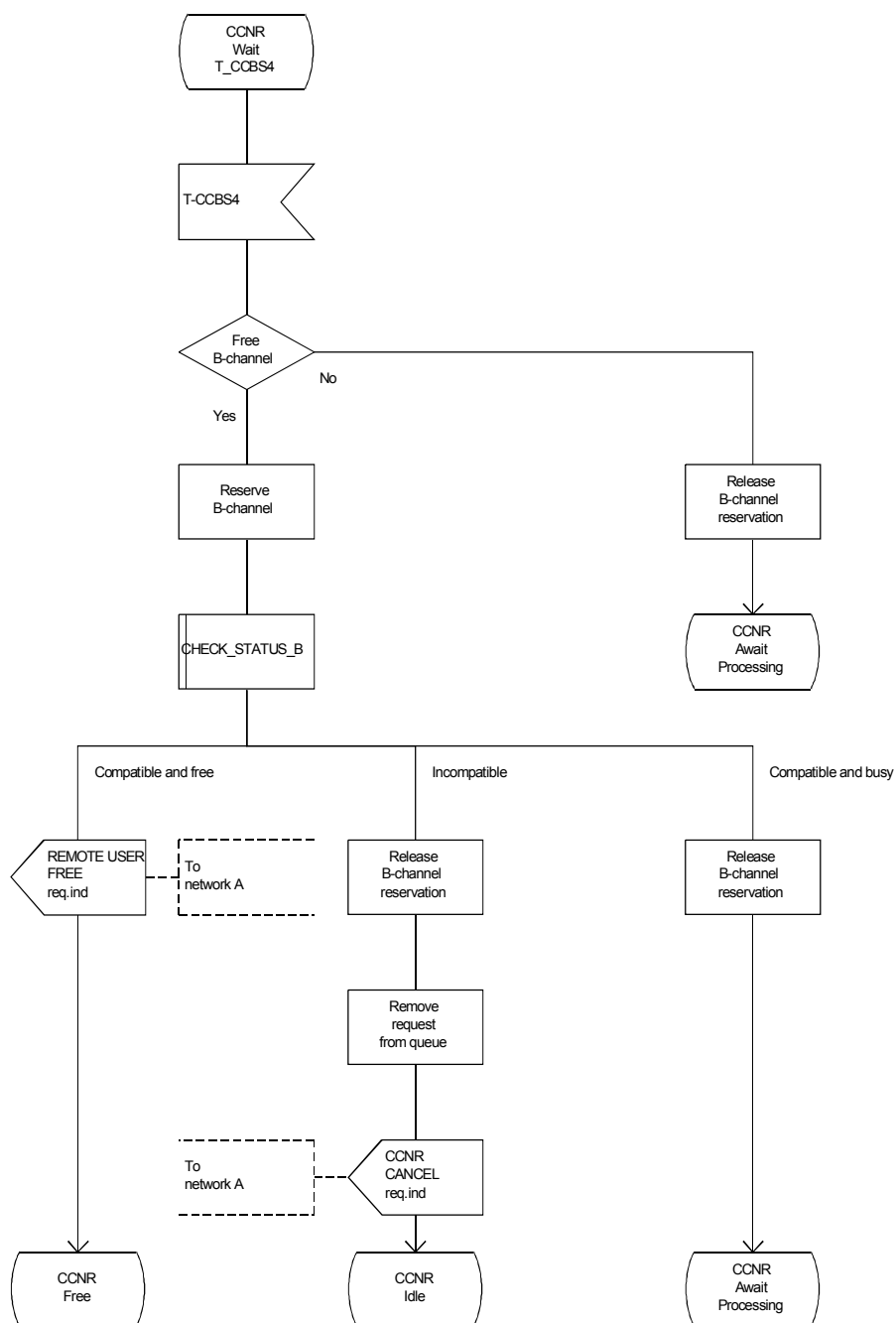


Figure 14-1/Q.953.5 – Dynamic description (SDLs) (continued)

Figure 14-1/Q.953.5 – Dynamic description (SDLs) *(continued)*

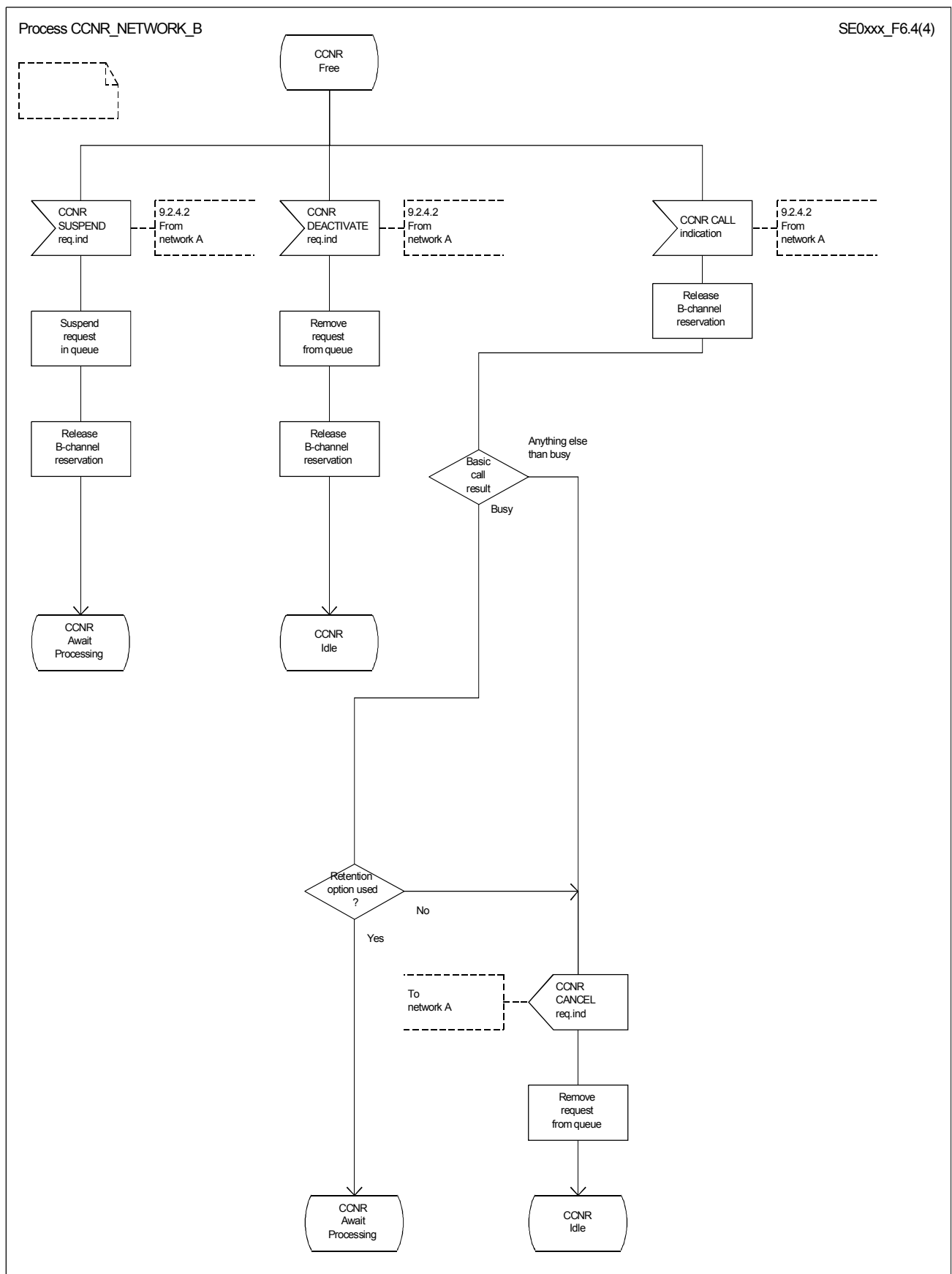
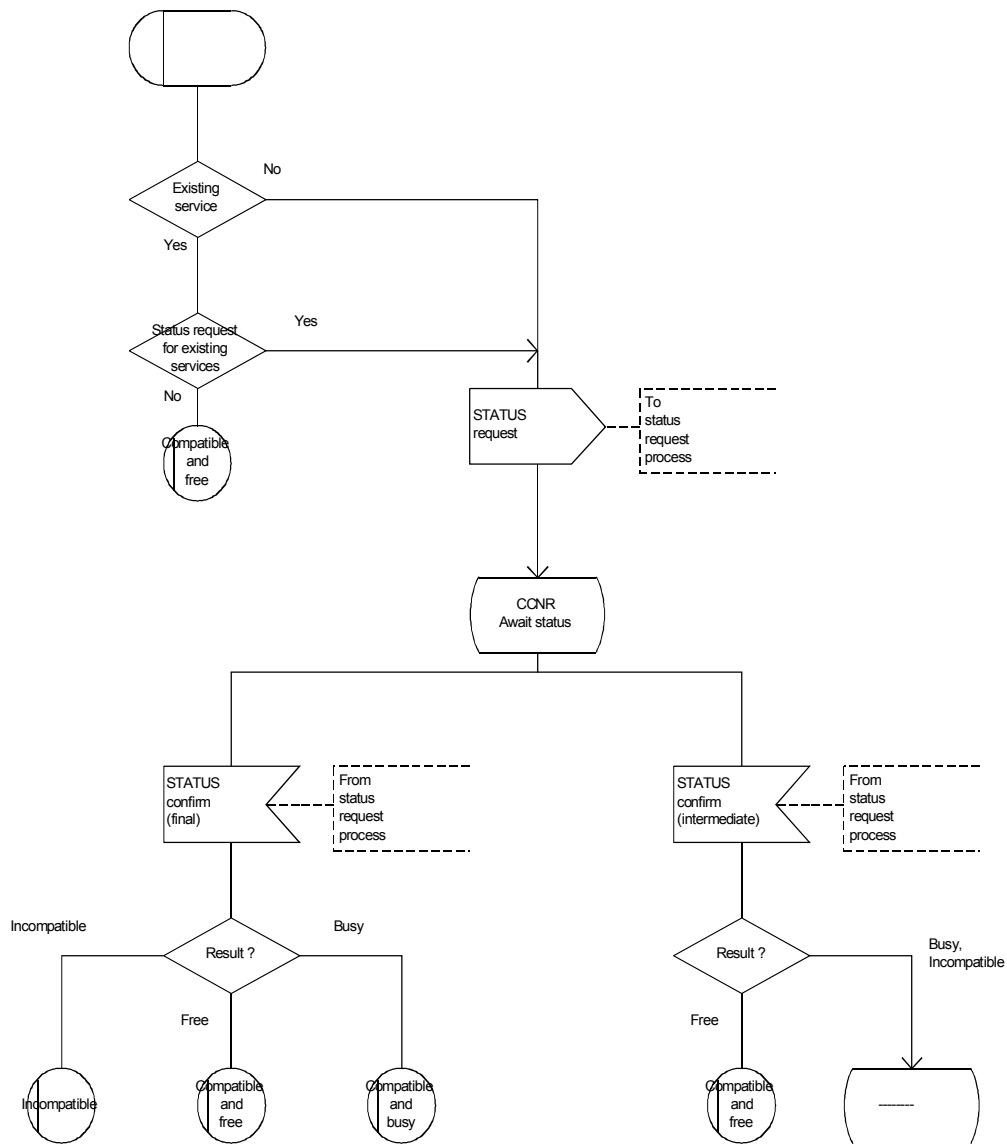


Figure 14-1/Q.953.5 – Dynamic description (SDLs) *(continued)*

Figure 14-1/Q.953.5 – Dynamic description (SDLs) (*continued*)

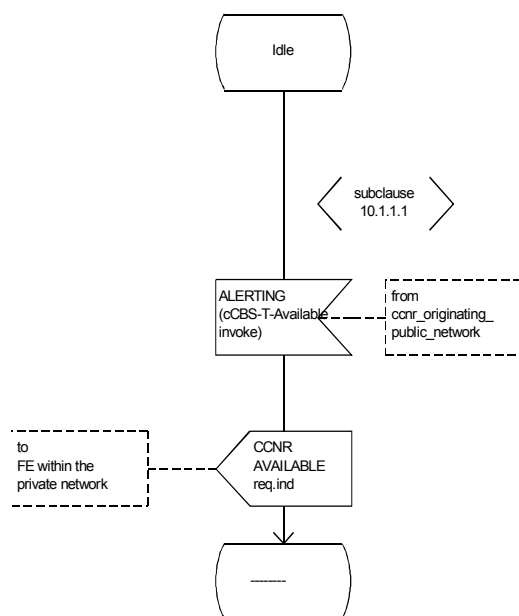


Figure 14-1/Q.953.5 – Dynamic description (SDLs) (continued)

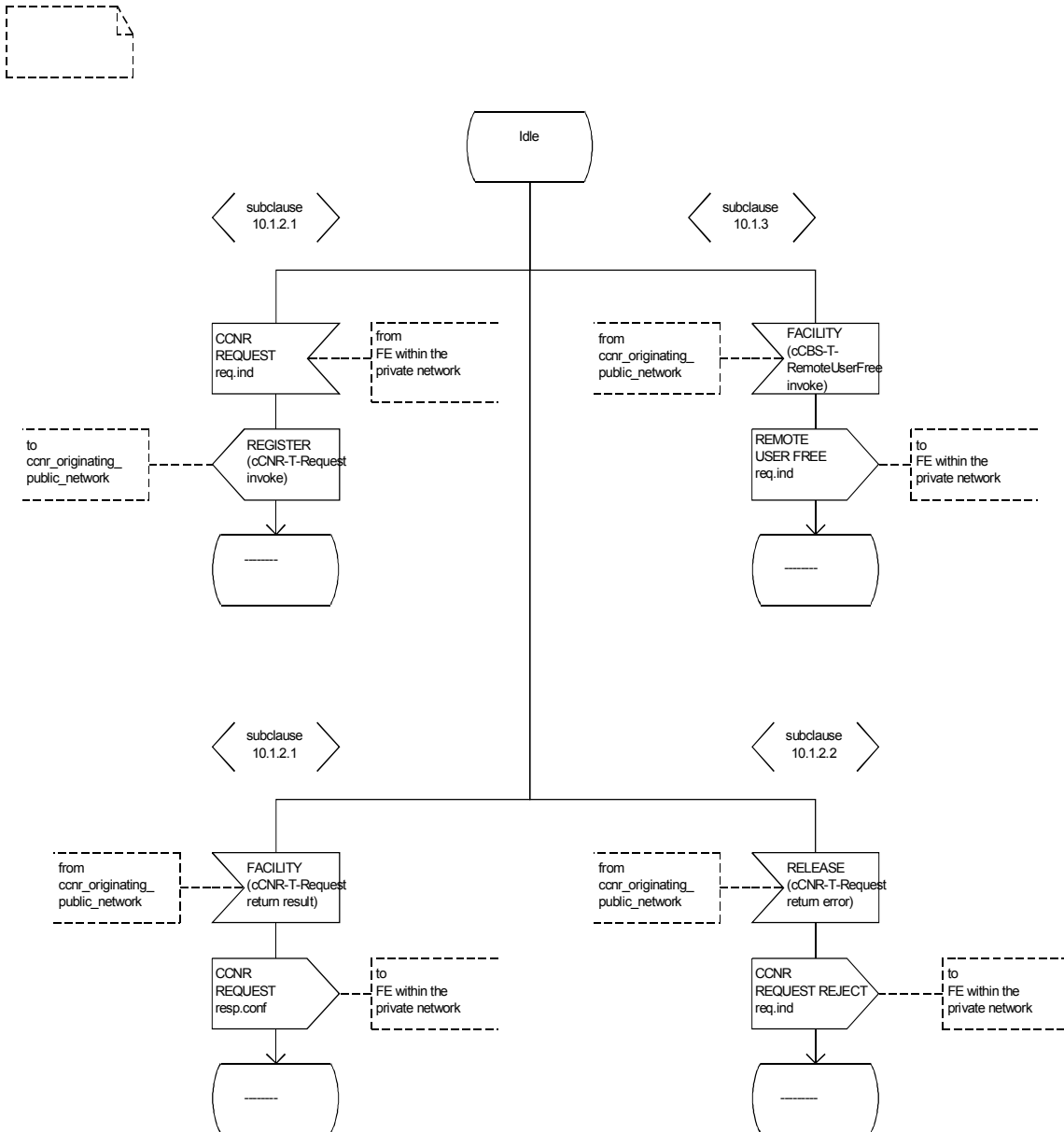


Figure 14-1/Q.953.5 – Dynamic description (SDLs) (continued)

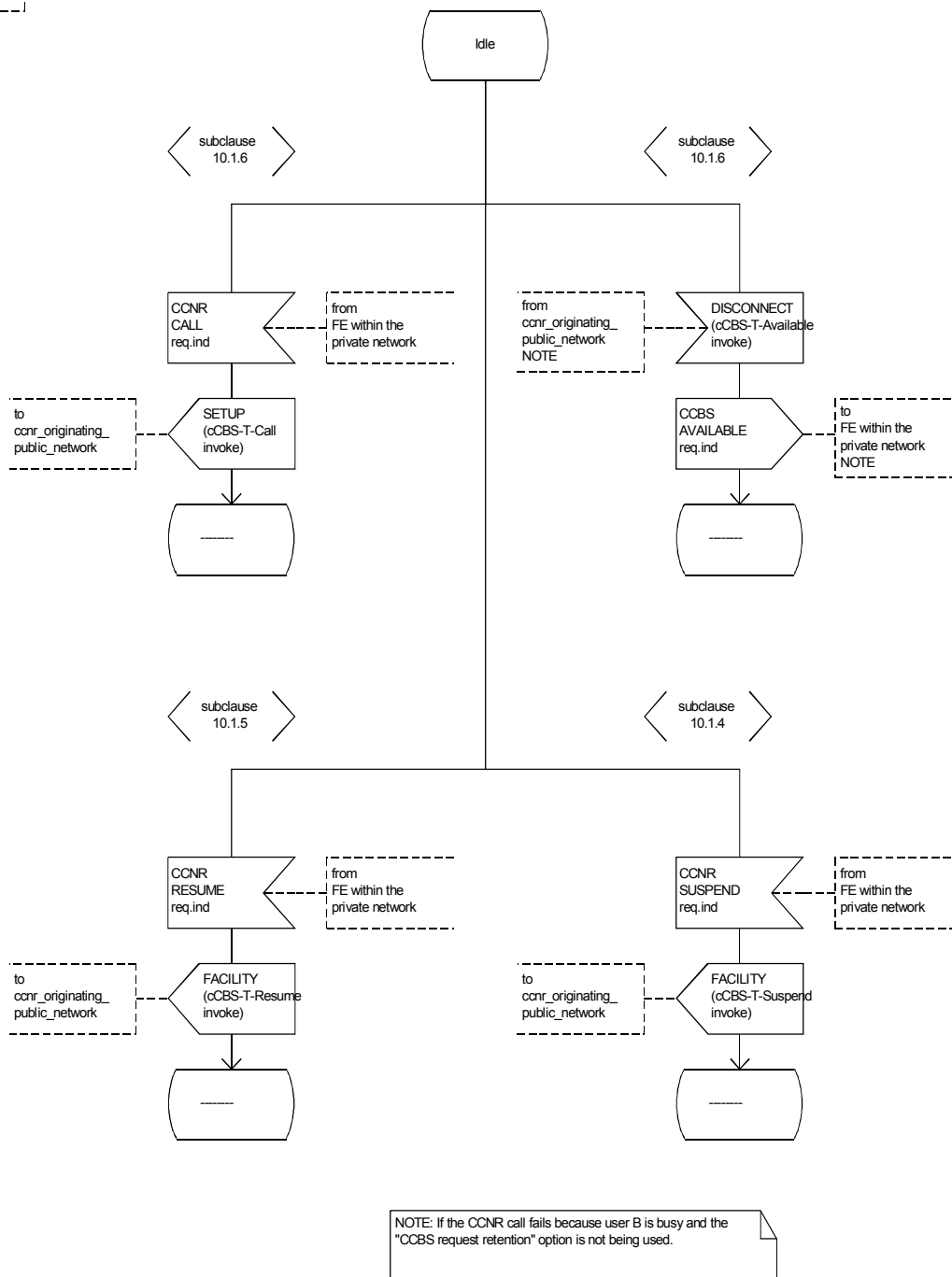


Figure 14-1/Q.953.5 – Dynamic description (SDLs) (continued)

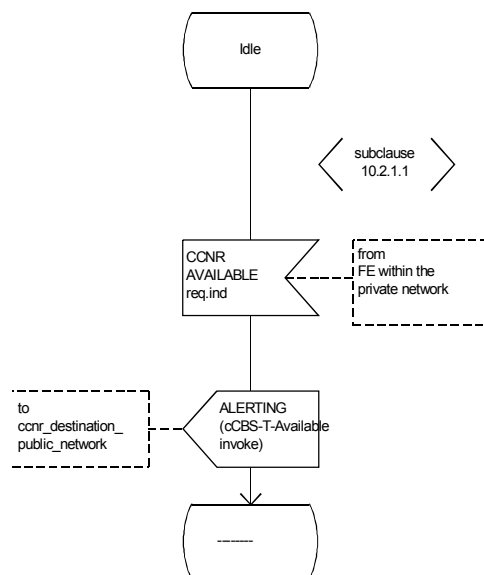
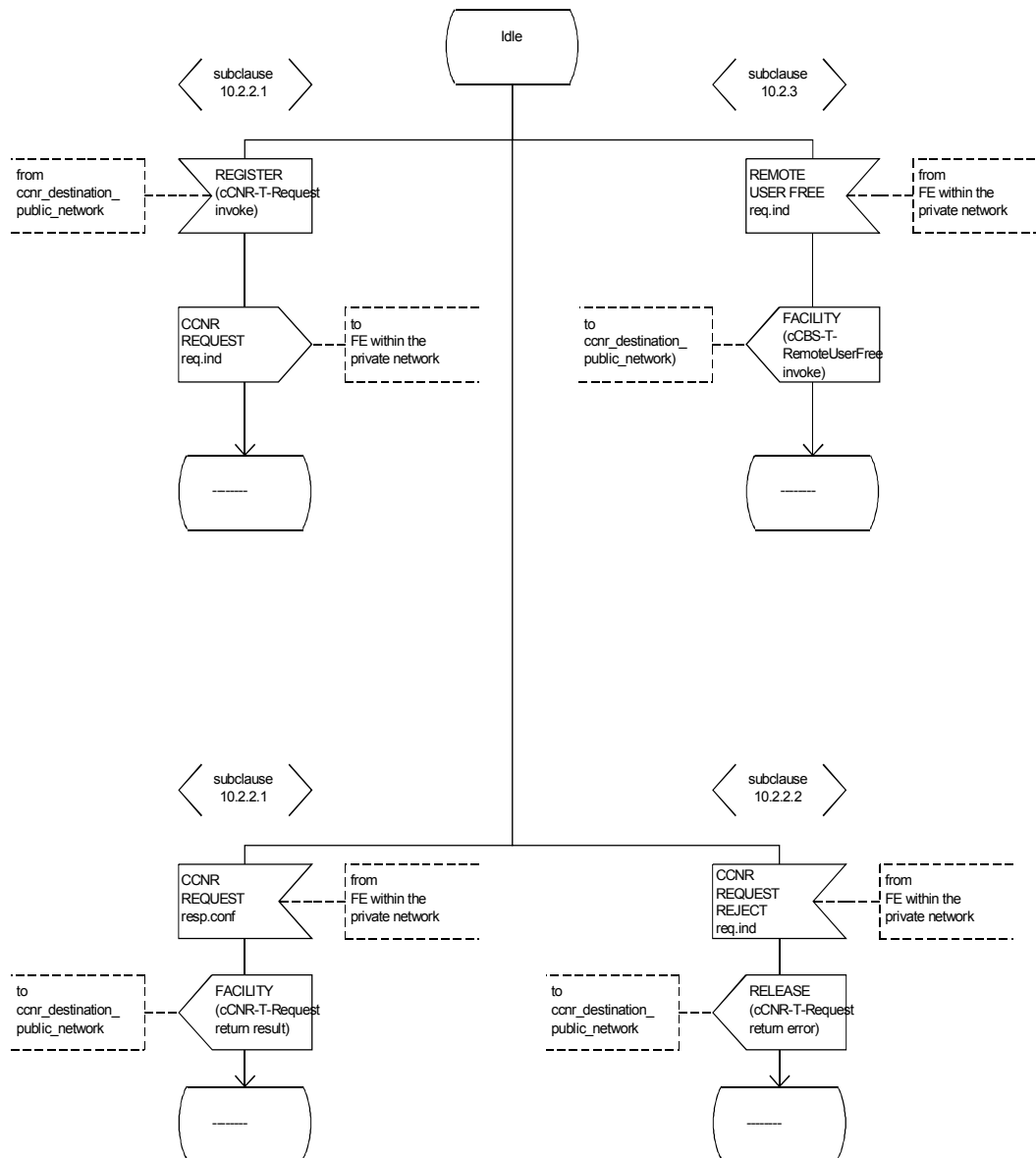
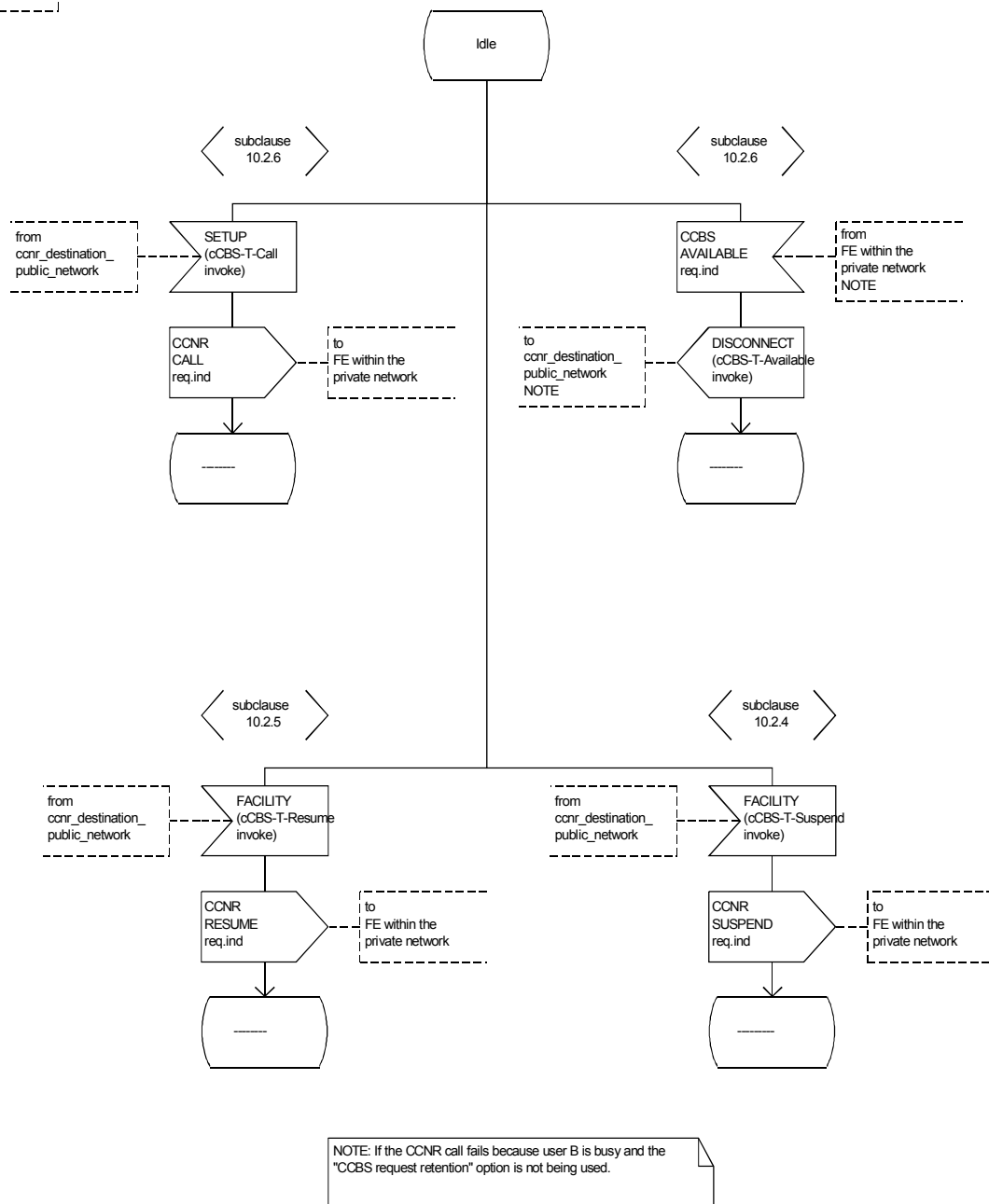
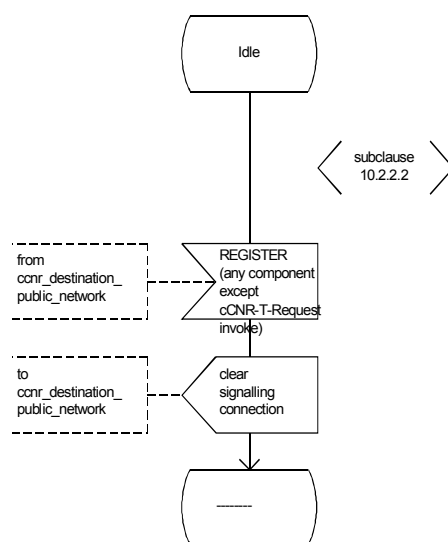


Figure 14-1/Q.953.5 – Dynamic description (SDLs) (*continued*)

Figure 14-1/Q.953.5 – Dynamic description (SDLs) (*continued*)

Figure 14-1/Q.953.5 – Dynamic description (SDLs) (*continued*)

Figure 14-1/Q.953.5 – Dynamic description (SDLs) (*continued*)

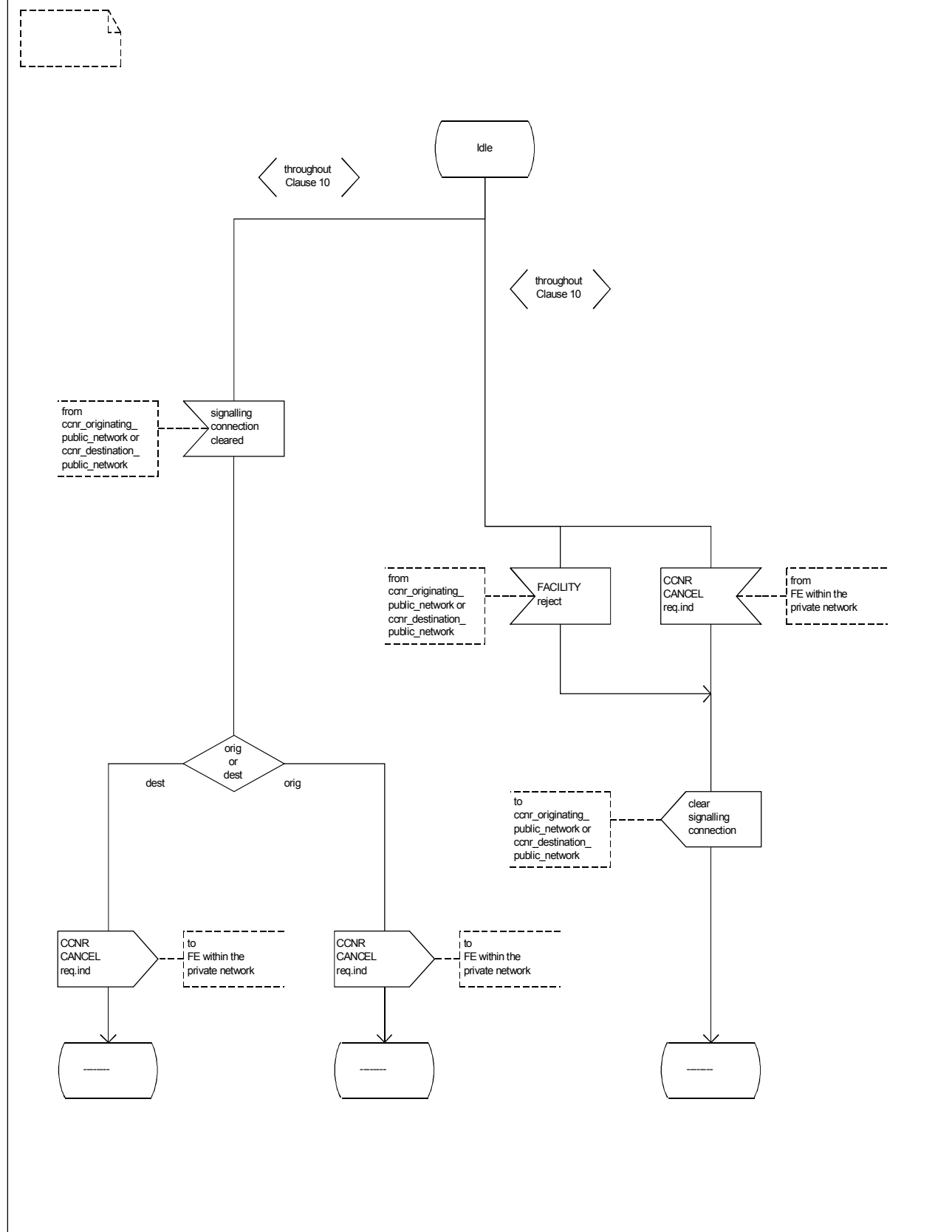


Figure 14-1/Q.953.5 – Dynamic description (SDLs) (continued)

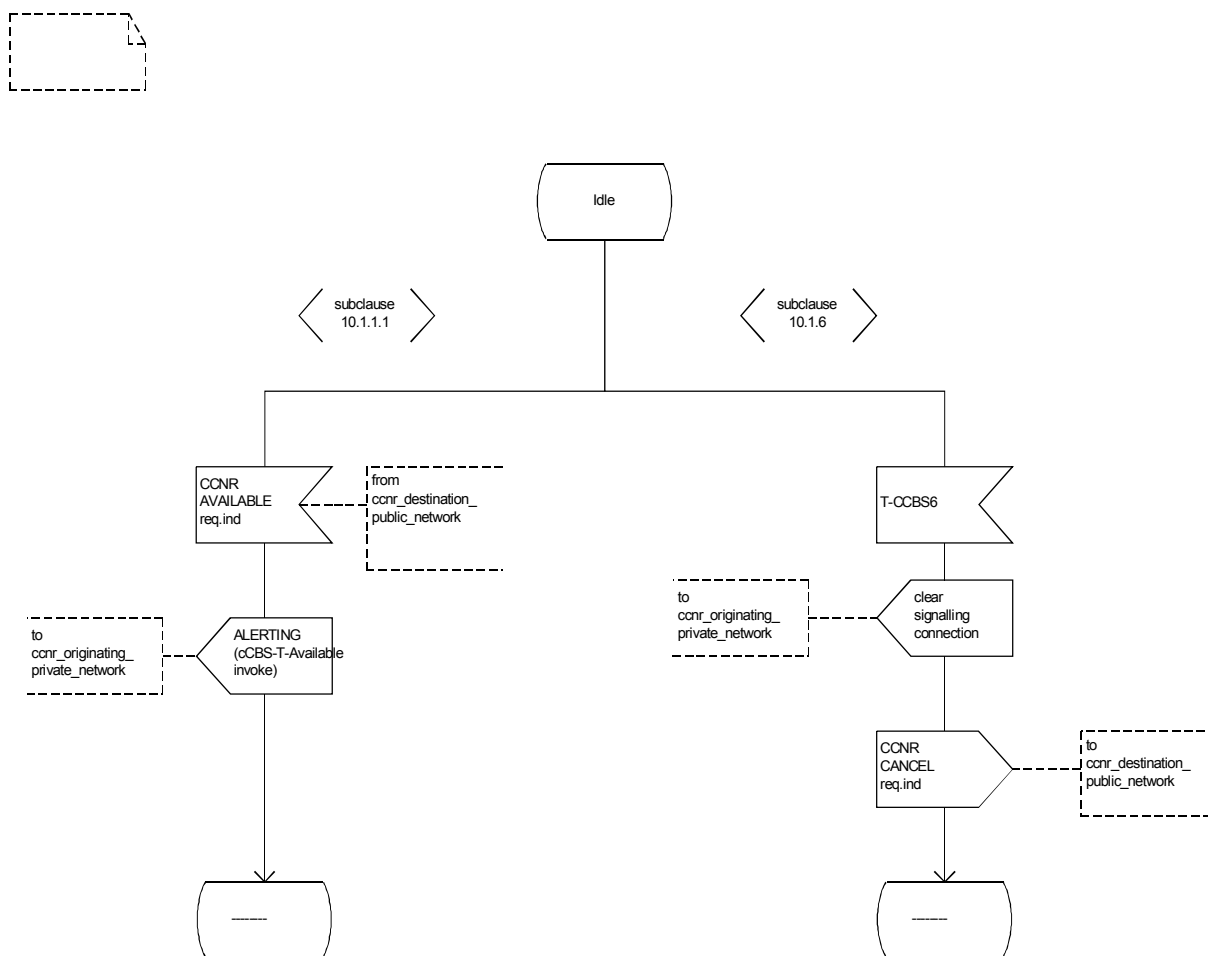


Figure 14-1/Q.953.5 – Dynamic description (SDLs) (continued)

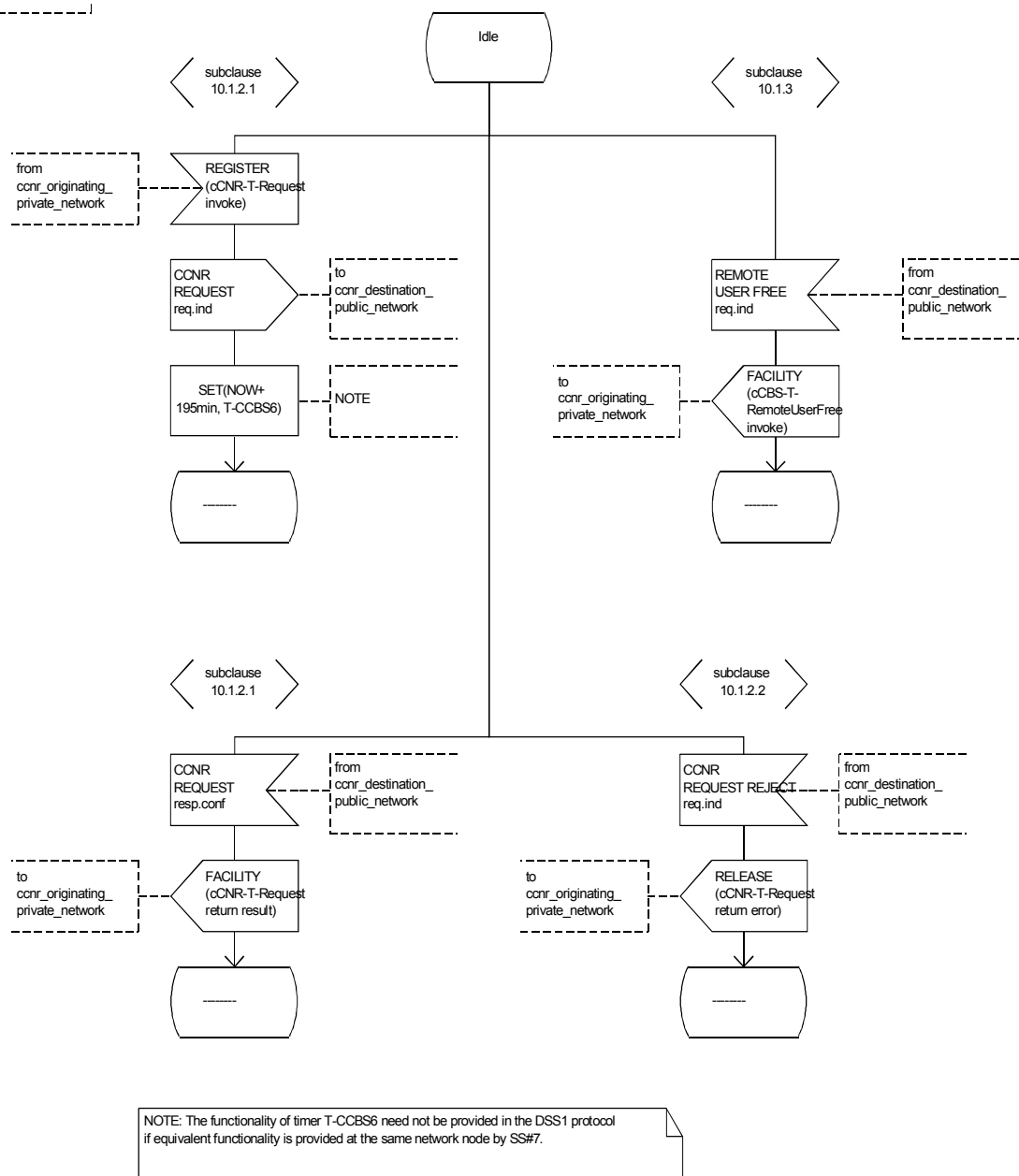


Figure 14-1/Q.953.5 – Dynamic description (SDLs) (continued)

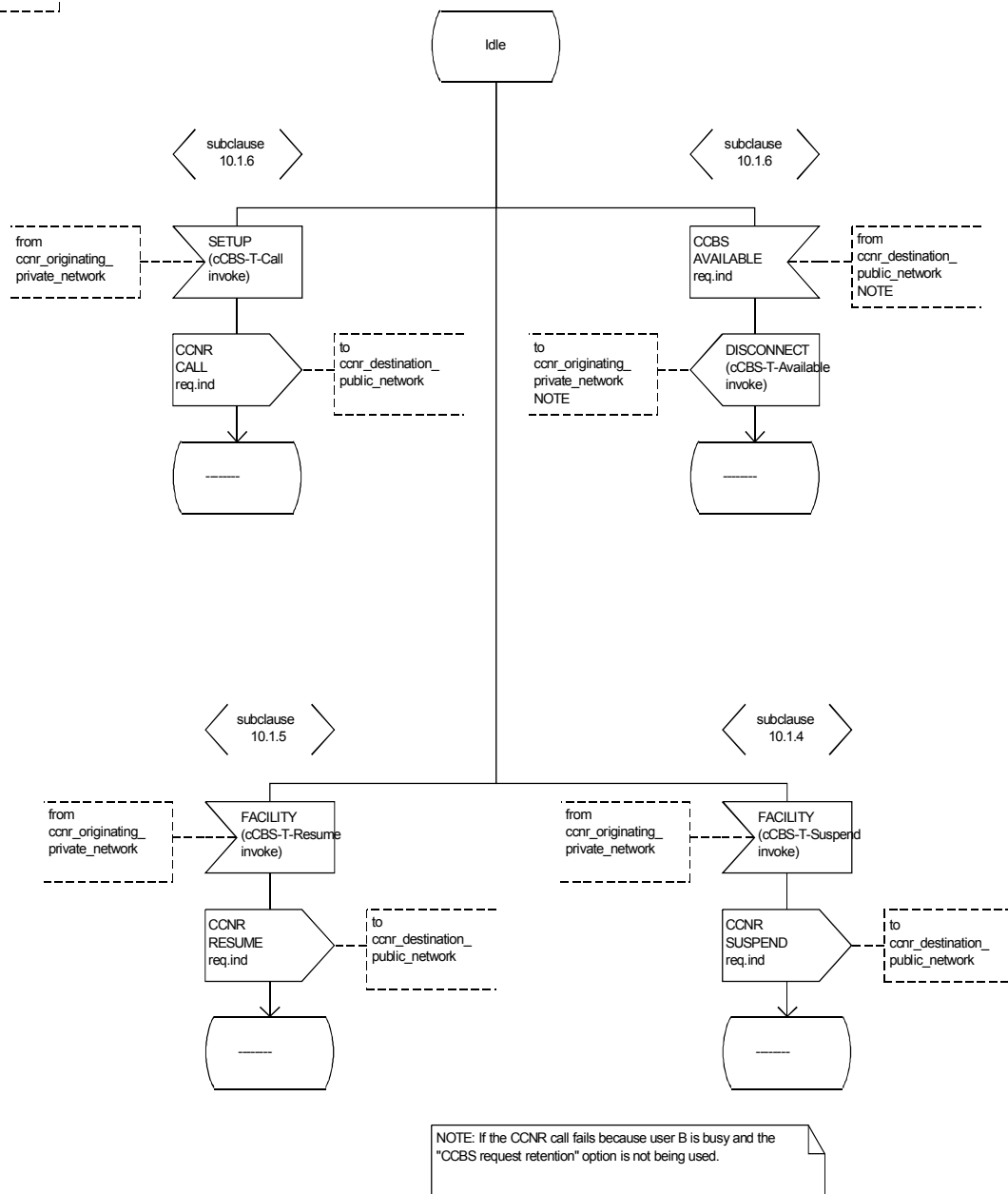


Figure 14-1/Q.953.5 – Dynamic description (SDLs) (continued)

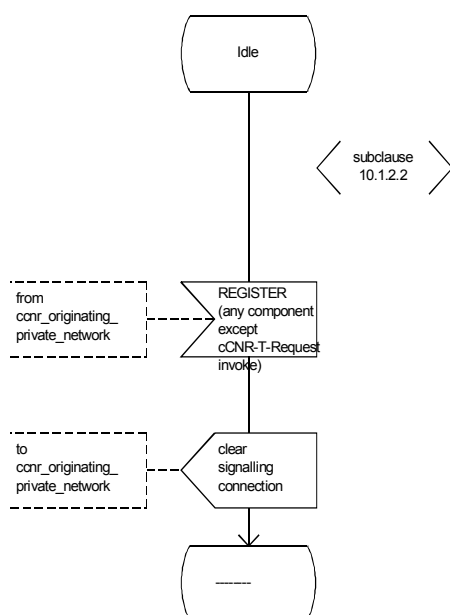
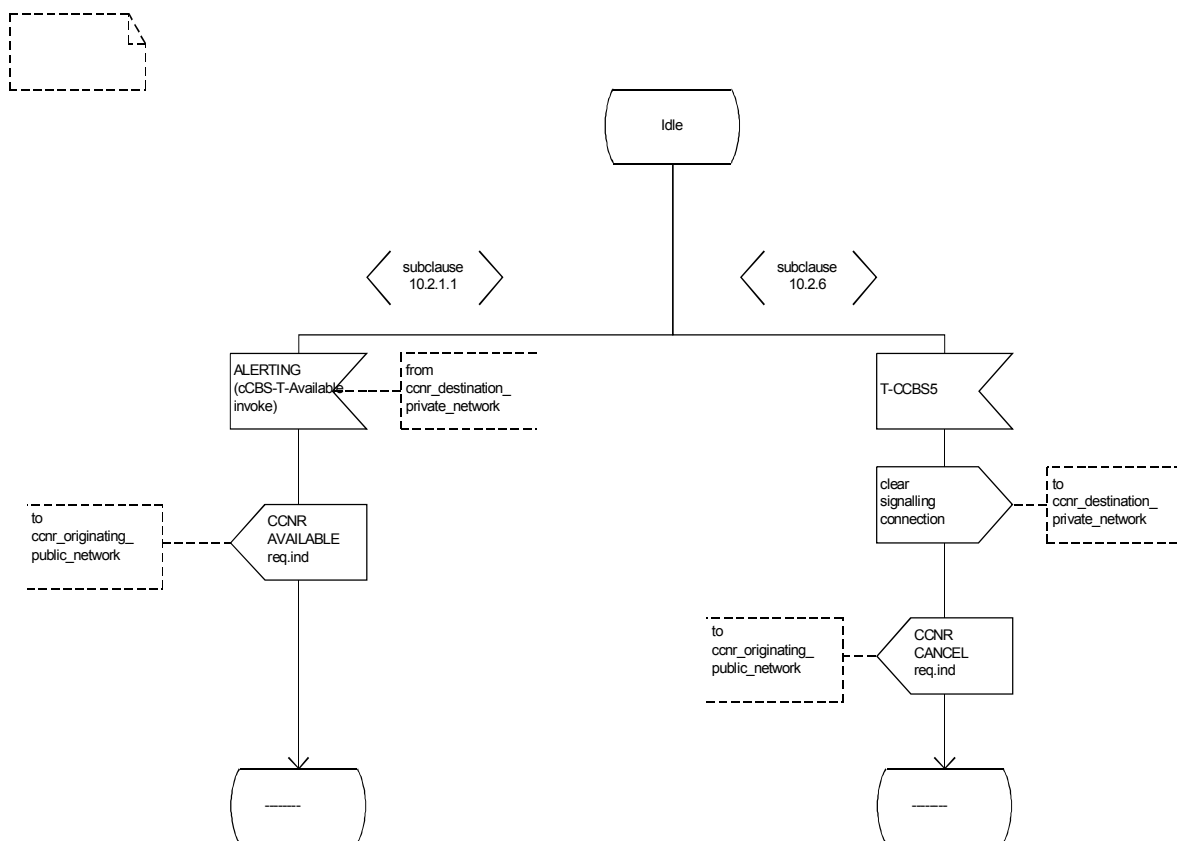


Figure 14-1/Q.953.5 – Dynamic description (SDLs) (*continued*)

Figure 14-1/Q.953.5 – Dynamic description (SDLs) (*continued*)

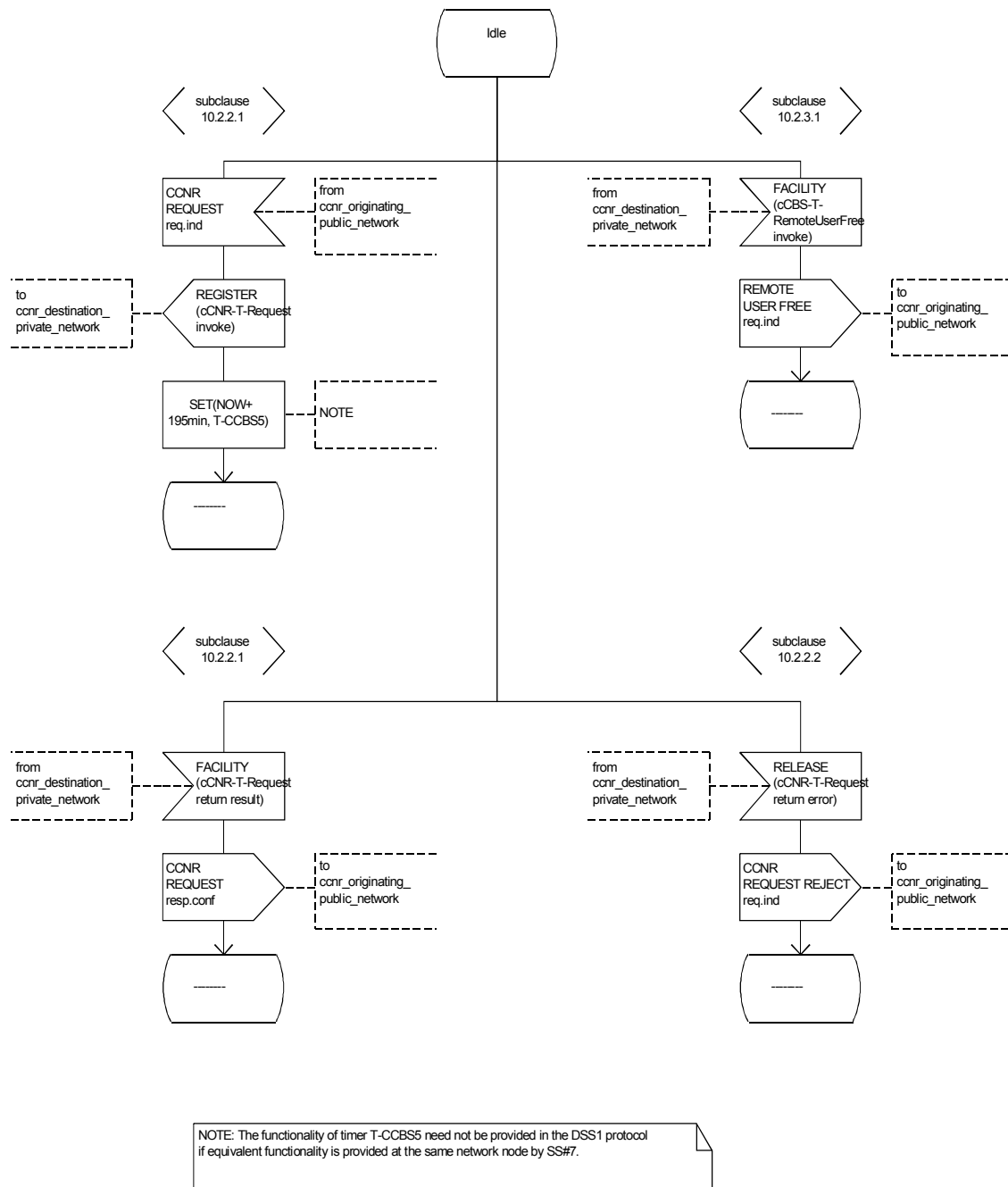


Figure 14-1/Q.953.5 – Dynamic description (SDLs) (continued)

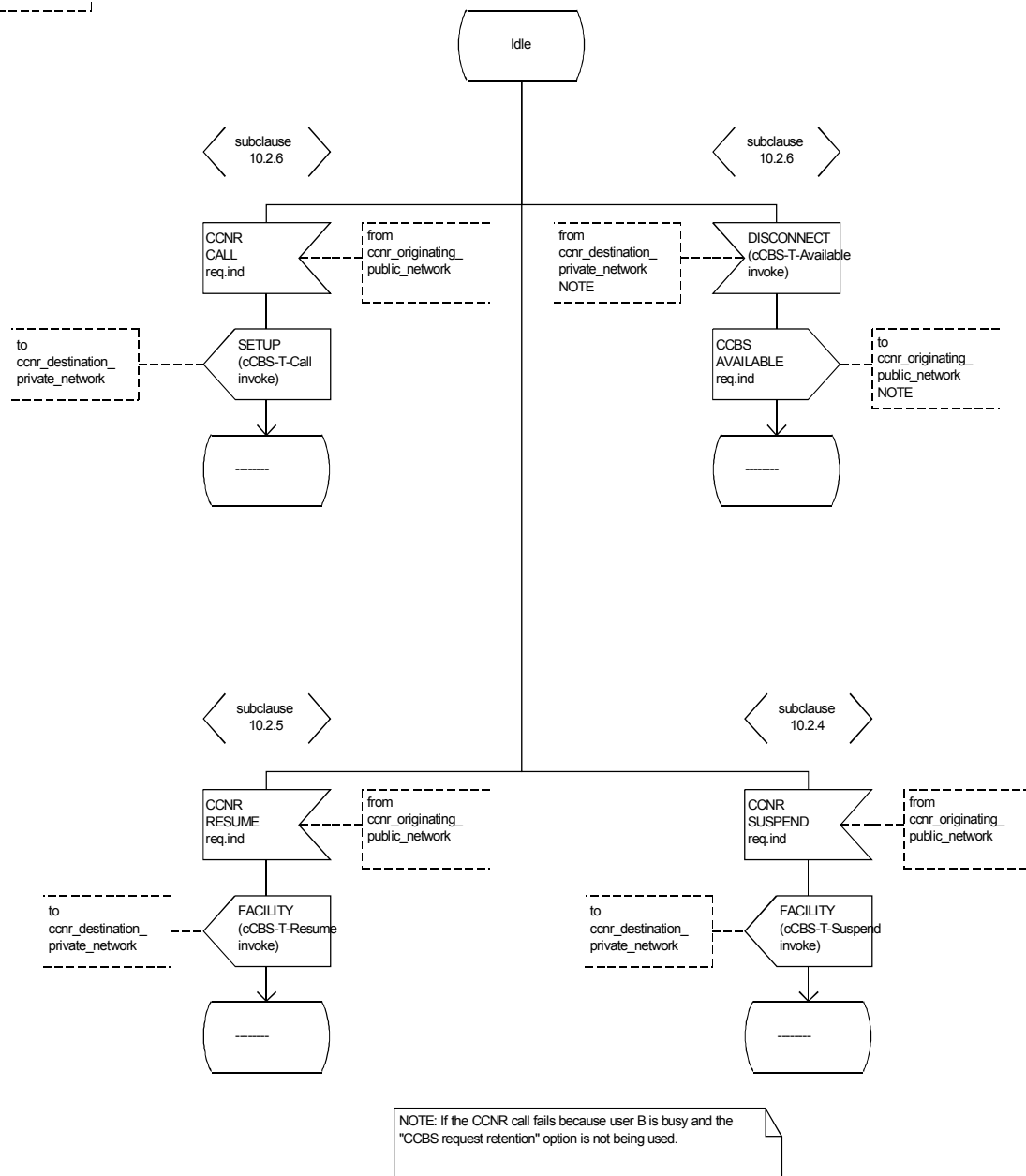


Figure 14-1/Q.953.5 – Dynamic description (SDLs) (continued)

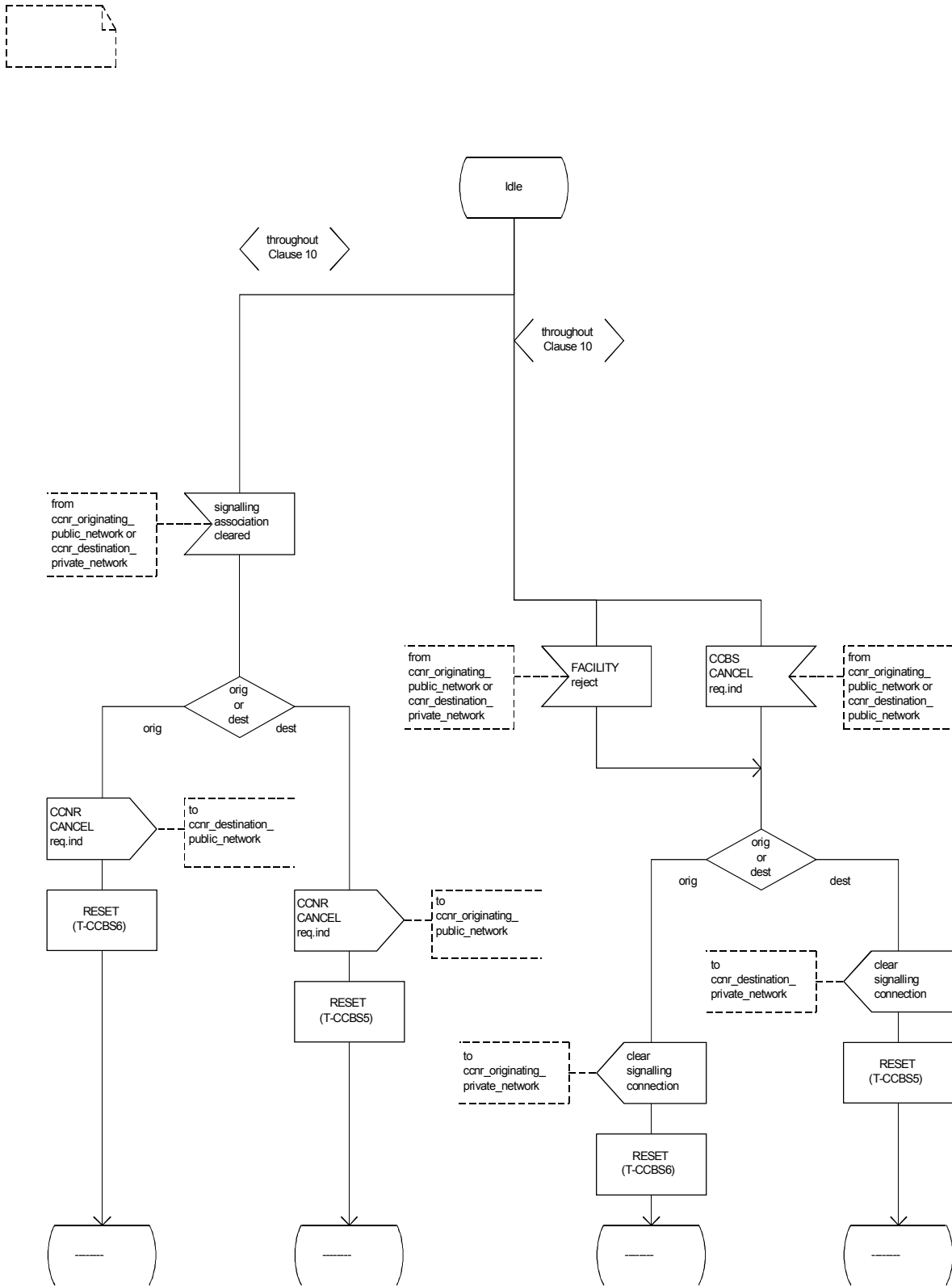


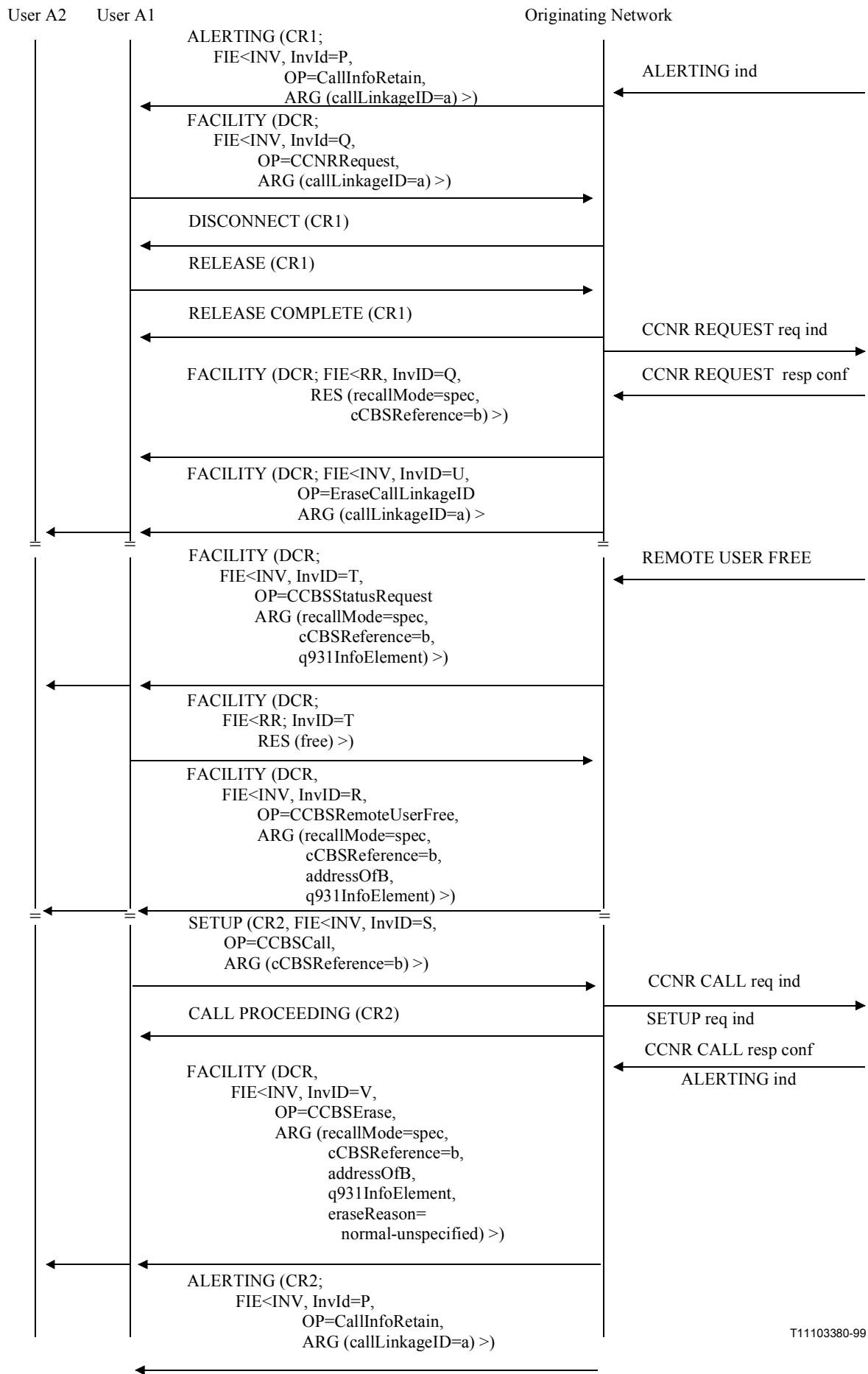
Figure 14-1/Q.953.5 – Dynamic description (SDLs) (concluded)

APPENDIX I

Signalling flows

This section contains the signalling flows for the different cases of the CCNR supplementary service:

- Figure I.1: Normal operation, CCNR request during the alerting phase, "CCBS request retention" option is set to "no", specific recall, user A free.
- Figure I.2: Specific recall, CCNR request during the alerting phase, user A busy.
- Figure I.3: Normal operation, CCNR request during the alerting phase, "CCBS request retention" option is set to "no", global recall, at least one user A free.
- Figure I.4: Global recall, CCNR request during the alerting phase, user A busy.
- Figure I.5: CCNR deactivation by user A.
- Figure I.6: CCNR deactivation by the network.
- Figure I.7: Normal operation, originating private ISDN.
- Figure I.8: User A busy, originating private ISDN.



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Figure I.1/Q.953.5 – Normal operation, CCNR request during the alerting phase, "CCBS request retention" option is set to "no", specific recall, user A free

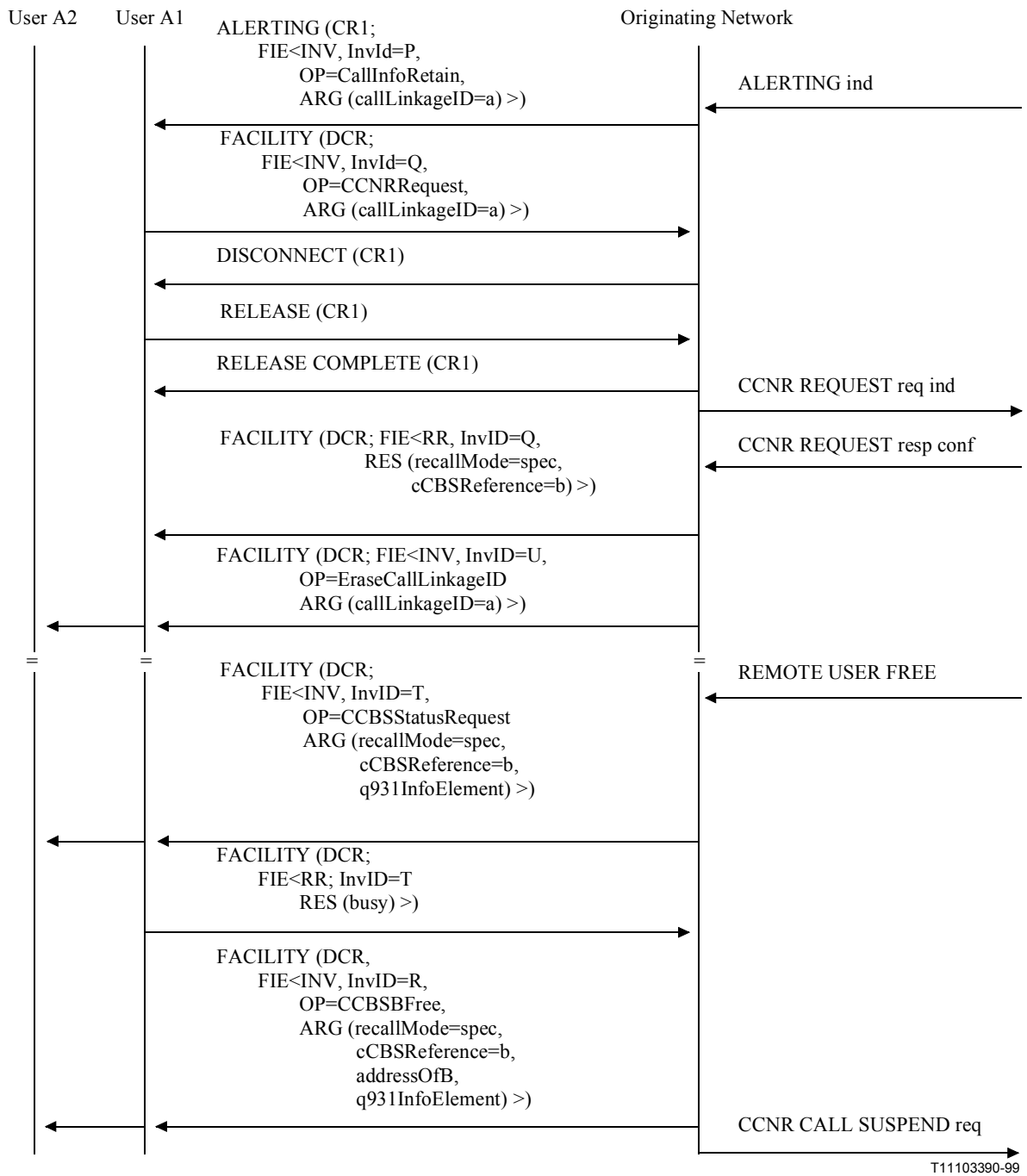


Figure I.2/Q.953.5 – Specific recall, CCNR request during the alerting phase, user A busy

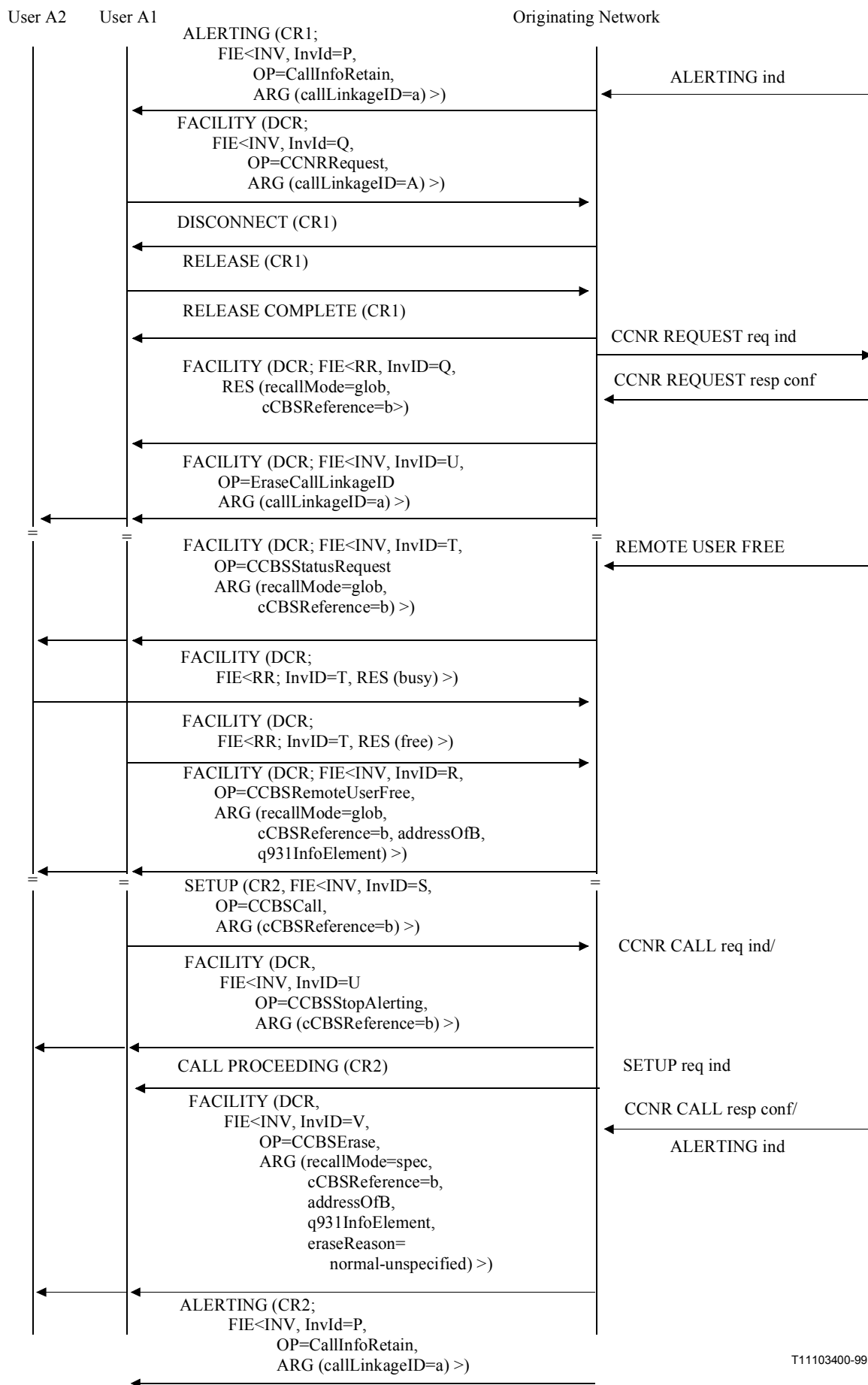
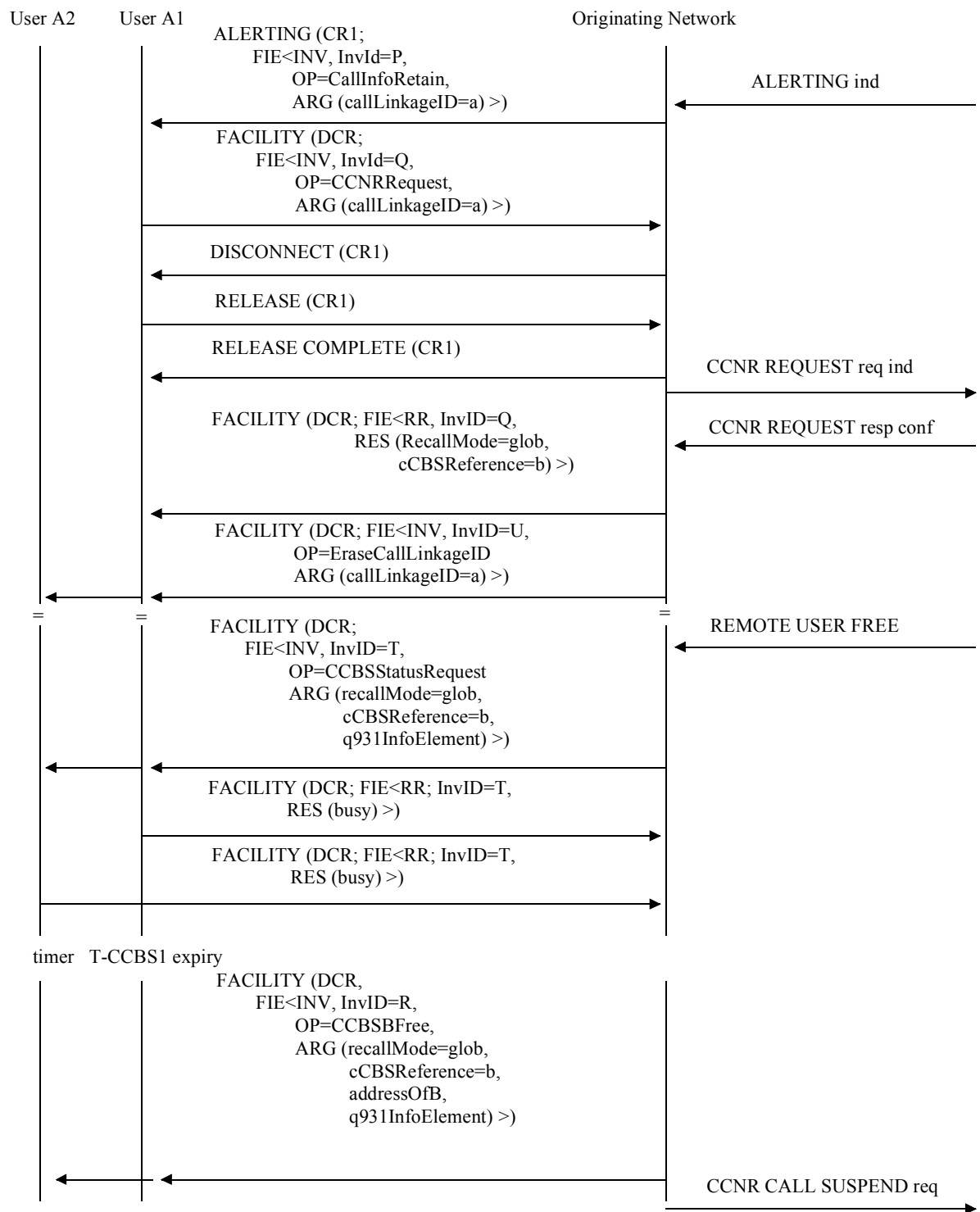


Figure I.3/Q.953.5 – Normal operation, CCNR request during the alerting phase, "CCBS request retention" option is set to "no", global recall, at least one user A free



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Figure I.4/Q.953.5 – Global recall, CCNR request during the alerting phase, user A busy

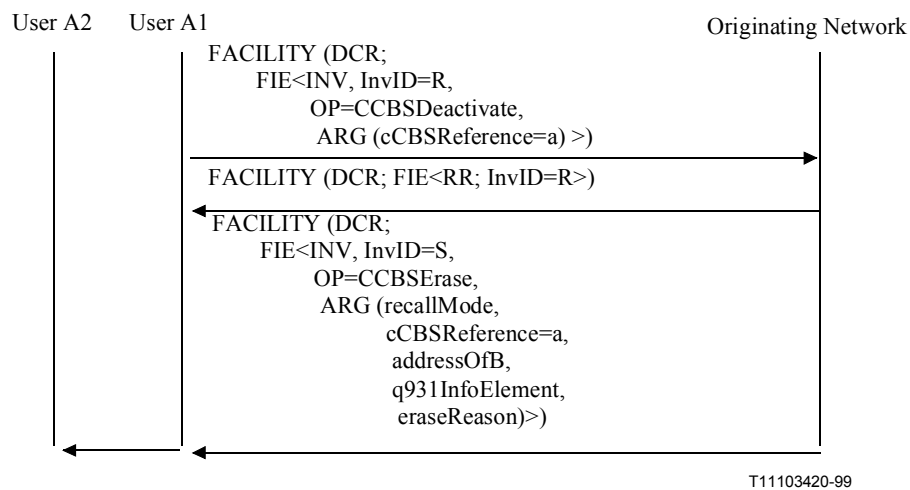


Figure I.5/Q.953.5 – CCNR deactivation by user A

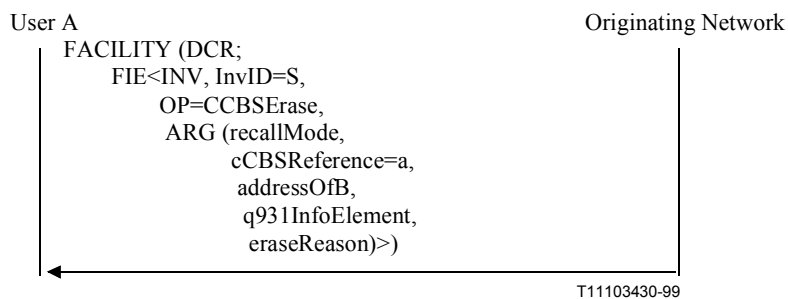


Figure I.6/Q.953.5 – CCNR deactivation by the network

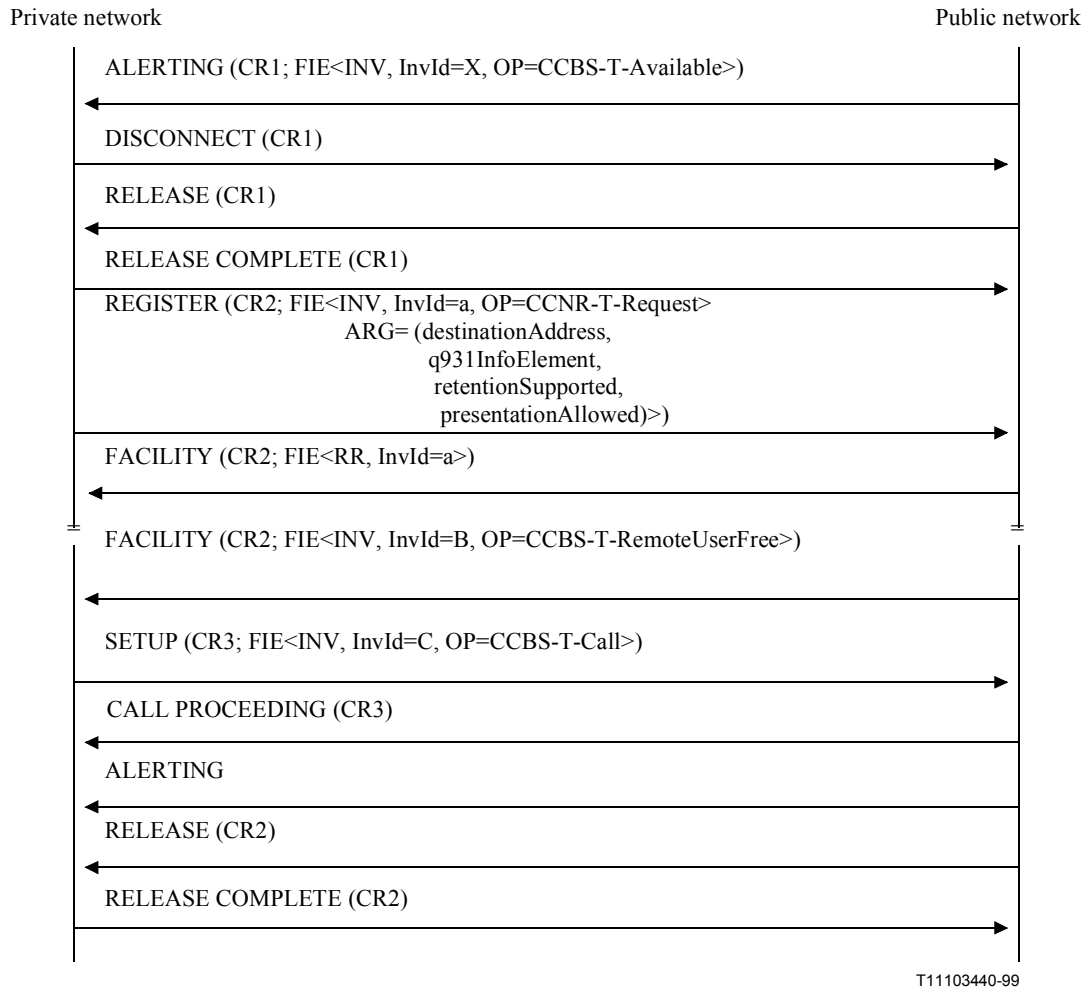


Figure I.7/Q.953.5 – Originating private ISDN (normal operation)

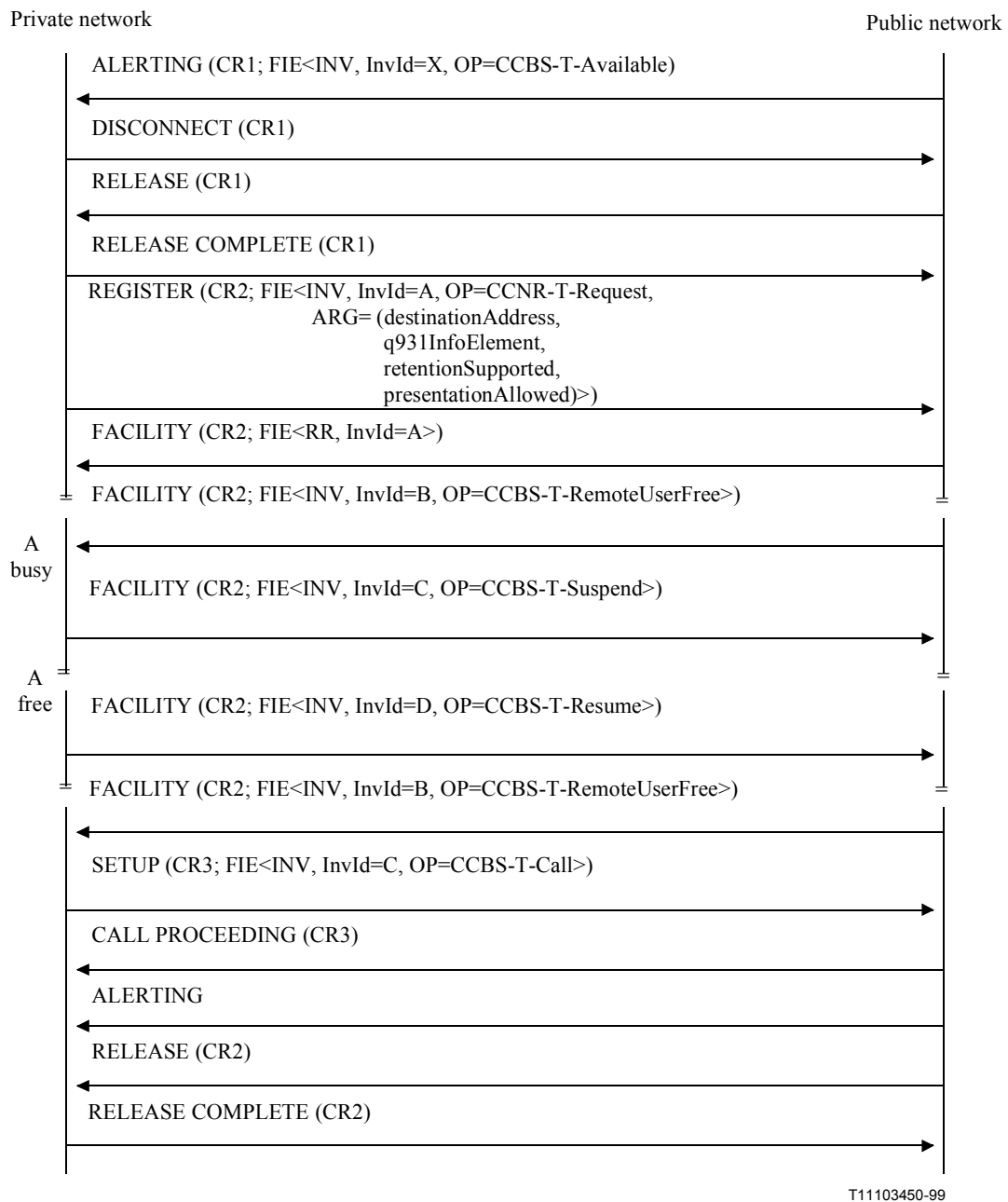


Figure I.8/Q.953.5 – Originating private ISDN (user A busy)

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