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# Terrestrial Trunked Radio (TETRA);
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# Sub-part 23: Call completion on no reply

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# Contents

## Foreword

This European Telecommunication Standard (ETS) has been produced by the Terrestrial Trunked Radio (TETRA) Technical Committee of the European Telecommunications Standards Institute (ETSI), and is now submitted for the One-step Approval Procedure phase of the ETSI standards approval procedure.

This ETS is a multi-part standard and will consist of the following parts:

Part 1:             "General network design";

Part 2:             "Air Interface (AI)";

Part 3:             "Interworking at the Inter-System Interface (ISI)";

Part 4:             "Gateways basic operation";

Part 5:             "Peripheral Equipment Interface (PEI)";

Part 6:             "Line connected Station (LS)";

Part 7:             "Security";

Part 9:             "General requirements for supplementary services";

**Part 10:             "Supplementary services stage 1";**

Part 11:             "Supplementary services stage 2";

Part 12:             "Supplementary services stage 3";

Part 13:             "SDL model of the Air Interface (AI)";

Part 14:             "Protocol Implementation Conformance Statement (PICS) proforma specification".

| Proposed transposition dates | |
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| Date of latest announcement of this ETS (doa): | 3 months after ETSI publication |
| Date of latest publication of new National Standard or endorsement of this ETS (dop/e): | 6 months after doa |
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# 1 Scope

This ETS specifies the Call Completion on No Reply (SS-CCNR) supplementary service which is applicable to various basic services supported by TETRA Switching and Management Infrastructures (SwMIs). TETRA basic services are specified in ETS 300 392-2 [8].

SS-CCNR allows completion of a call to a subscriber that was unsuccessful because of a no reply condition. SS-CCNR enables a calling user A, encountering a destination user B, that, though alerted, does not answer, to have the call completed when user B is available, without having to make a new call attempt.

Supplementary service specifications are produced in three stages, according to the method described in ITU-T Recommendation I.210 [4]. This ETS contains the stage 1 specifications of SS-CCNR.
The stage 1 descriptions specify the supplementary services as seen by users of networks.

This ETS is applicable to circuit mode TETRA tele-services and bearer services only. This ETS does not describe the case where the MS is not reachable.

Man Machine Interfaces and charging principles are outside the scope of this ETS.

The first edition of this ETS was presented as a delta document to the first edition of ECMA-185 [2]. This version has been redrafted based on the latest published text of ECMA-185 [2] as a self contained document so as to be more readable. Additions to ECMA-185 [2] have been made to take into account particular TETRA specifics and to include user requirements and situations not addressed in ECMA-185 [2].

> NOTE: Contrary to PISN SS-CCBS and SS-CCNR which are both specified in ECMA-185 [2], TETRA SS-CCBS and TETRA SS-CCNR are specified in two separate ETSs.

# 2 References

This ETS incorporates by dated and undated reference, provisions from other publications. These references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

[1]         Void.

[2]         Standard ECMA-185 (1997): "Specification, Functional Model and Information Flows, Call Completion 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 I.221 (1993): "Common specific characteristics of services".

[6]         ITU-T Recommendation Z.100 (1993): "CCITT specification and description language (SDL)".

[7]         Void.

[8]         ETS 300 392-2 (1995): "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 2: Air Interface (AI)".

[9]                     ETS 300 392-9 (1997): "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 9: General requirements for supplementary services".

[10]                    ITU-T Recommendation Q.9 (1988): "Vocabulary of switching and signalling terms".

# 3       Definitions, symbols and abbreviations

## 3.1      Definitions

For the purposes of this ETS, the following definitions apply:

**activity:** Answering an incoming call or originating an outgoing call. Applies in particular to user B.

**Additional Network Feature (ANF):** Capability, over and above that of a basic service, provided by a SwMI, but not directly to a user.

**basic (…) service:** Any stand alone bearer service or tele-service (derived from ITU-T Recommendation I.210 [4]).

**bearer service:** Type of telecommunication service that provides the capability for the transmission of signals between user-network interfaces (as defined in ITU-T Recommendation I.112 [3]).

**busy:** Property of a user for whom either a "network determined user busy" or "user determined user busy" condition (see clause 3.1 of ITU-T Recommendation I.221 [5]) exists.

**call, basic call:** Instance of the use of a basic service.

**call completion:** Successful presentation of a previously unsuccessful Call to a destination user (user B) which occurs when the call has entered an alerting phase or has been answered.

**CCNR busy:** Any one of the following conditions will cause user A to be considered as CCNR busy:

-        maximum number of calls queued at user A;
-        CCNR recall pending on user A;
-        no resource available at user A.

        NOTE 1:    It is assumed that SS-CCNR busy is independent from SS-CCBS busy; one could consider merging the two conditions in an SS-CC busy which would combine the total numbers of CCBS and CCNR requests.

**compatible MS/LS:** MS/LS presenting the same basic TETRA class of service as the TETRA class of service requested by the calling user MS/LS. By analogy to ISDN "compatible terminal".

**free:** Property of a user who can accept any attempt by the SwMI to present a call to that user (i.e. allow the call to reach the alerting or answered state).

**Line Station (LS):** Physical grouping that contains all the fixed equipment that is used to obtain TETRA services through a line.

**Mobile Station (MS):** Physical grouping that contains all of the mobile equipment that is used to obtain TETRA services. By definition, a mobile station contains at least one Mobile Radio Stack (MRS).

**no reply:** No reply condition is defined for this ETS as no answer from the called user; the no-answer time-out has expired. There is no formal definition found in ITU-T, ECMA or ETSI on the terms No Reply.

**not reachable:** Different case of no reply; the MS may be out of range or non fed.

**path reservation:** Reservation of resources just prior to SS-CCNR Recall in order that a connection path through the network is available when user A accepts the SS-CCNR Recall.

NOTE 2: Path Reservation would not guarantee that user B will be free when user A accepts the SS-CCBS Recall.

NOTE 3: Path Reservation is not the preferred mode of operation in the TERA environment due to mobility considerations.

**recall timer:** Timer specifies the length of time the network shall wait for a response from user A to a CCNR Recall.

**retention timer:** Timer specifies the period of time the network retains the originating call information after a valid call attempt is released.

**SS-CCNR call:** Call generated by the network from user A to user B resulting from user A's acceptance of a SS-CCNR recall.

**SS-CCNR recall:** Indication informing user A that user B is now non busy (after a period of no reply, user B shows some activity and then becomes non-busy). Acceptance of this indication by user A will cause the call to be completed by the SwMI.

**SS-CCNR request:** Instance of an activation of SS-CCNR held in a queue pending the correct conditions for the SS-CCNR to be completed.

**SS-CCNR service duration timer:** Timer specifies the length of time that the service shall be active within the network.

**supplementary service:** Any service provided by a network in addition to its basic service or services (defined in ITU-T Recommendation Q.9 [10]). A supplementary service modifies or supplements a basic telecommunication service. Consequently, it cannot be offered to a customer as a stand alone service. It must be offered together with or in association with a basic telecommunication service (excerpt from ITU-T Recommendation I.210 [4]).

**suspended CCNR request:** CCNR request that cannot be served even if destination B is not busy, because user A is busy or CCNR busy.

**Switching and Management Infrastructure (SwMI):** All of the TETRA equipment for a Voice plus Data (V+D) network except for subscriber terminals. The SwMI enables subscriber terminals to communicate with each other via the SwMI.

**tele-service:** Type of telecommunications service that provides the complete capability, including terminal equipment functions, for communication between users according to agreed protocols.

**User A:** Specific user that originated the call and requested the supplementary service.

**User B:** User that was initially addressed in the original individual call set up.

**user B idle guard timer:** Time the SwMI will wait after user B has become not busy, after having initiated an activity before informing user A.

## 3.2 Symbols

For the purposes of this ETS, there are no special symbols besides the symbols used in SDL diagrams and defined in ITU-T Recommendation Z.100 [6].

### 3.3 Abbreviations

For the purposes of this ETS the following abbreviations apply:

### 3.3.1 General abbreviations

| | |
|---|---|
| AI | Air Interface |
| ANF | Additional Network Feature |
| CC | Call Control (functional entity) |
| CC | Call Completion (generic term common to both CCBS and CCNR) |
| ISDN | Integrated Services Digital Network |
| ISI | Interworking at the Inter-System Interface |
| LS | Line Station |
| MS | Mobile Station |
| NRc | Not Reachable |
| PEI | Peripheral Equipment Interface |
| PISN | Private Integrated Services Network |
| SDL | Specification and Description Language |
| SS | Supplementary Service |

NOTE: The abbreviation SS is only used when referring to a specific supplementary service.

| | |
|---|---|
| SwMI | Switching and Management Infrastructure |
| V+D | Voice Plus Data |

### 3.3.2 Supplementary service abbreviations

| | |
|---|---|
| AL | Ambiance Listening |
| AoC | Advice of Charge |
| AP | Access Priority |
| AS | Area Selection |
| BIC | Barring of Incoming Calls |
| BOC | Barring of Outgoing Calls |
| CAD | Call Authorized by Dispatcher |
| CCBS | Call Completion to Busy Subscriber (TETRA) or Completion of Calls to Busy Subscriber (ECMA) |
| CCNR | Call Completion on No Reply (TETRA) or Completion of Calls to Busy Subscriber (ECMA) |
| CFB | Call Forwarding on Busy |
| CFNRc | Call Forwarding on Not Reachable |
| CFU | Call Forwarding Unconditional |
| CLIP | Calling Line Identification Presentation |
| CLIR | Calling/Connected Line Identification Restriction |
| COLP | COnnected Line identification Presentation |
| CR | Call Report |
| CRT | Call ReTention |
| CW | Call Waiting |
| DGNA | Dynamic Group Number Assignment |
| DL | Discreet Listening |
| HOLD | Call Hold |
| IC | Include Call |
| LE | Late Entry |
| LSC | List Search Call |
| PC | Priority Call |
| PPC | Pre-emptive Priority Call |
| PTN | Private Telecommunication Network |
| SNA | Short Number Addressing |
| TC | Transfer of Control |
| TPI | Talking Party Identification |

# 4 SS-CCNR Stage 1 Specification

## 4.1 Description

### 4.1.1 General description

SS-CCNR is offered to a calling user A. On encountering a called user B which, though alerted does not answer, it allows user A to request that the network monitors user B and notifies user A when user B becomes free after a subsequent period of activity. On response by user A to that notification, the network shall attempt to complete the call to user B.

> NOTE: User activities that constitute a subsequent period of activity are implementation specific and beyond the scope of this ETS.

SS-CCNR does not cover the case where the user B's MS is not reachable.

### 4.1.2 Qualifications on applicability to telecommunication services

This supplementary service is applicable to all basic individual circuit mode TETRA V+D services. SS-CCNR is not applicable to group calls and is not applicable to SDS.

## 4.2 Procedures

### 4.2.1 Provision/Withdrawal

SS-CCNR may be provided after pre-arrangement with the service provider (to selected users), or may be available generally to all users. SS-CCNR may be withdrawn on request of the user or for administrative reasons.

No subscription options shall be offered by the SwMI.

> NOTE 1: Contrary to ECMA-185 [2] which offers two selection options for recall mode, SS-CCNR recall shall be offered only to the MS/LS which has invoked SS-CCNR.

> NOTE 2: As a guidance to stage 3 ETS, the following main options in relation to ECMA 185 [2] are selected for TETRA SS-CCNR:

- Path reservation is not provided in a TETRA network.

> NOTE 3: In the TETRA network environment, path reservation is deemed not to be necessary due to mobility considerations; a path reserved between two SwMIs could become not available when one of the user migrates.

- Signaling connection is retained for the duration of the SS-CCNR request.

- Retention of the SS-CCNR service until expiration of the service duration timer (if user A and/or user B is found busy after the recall).

### 4.2.2 Normal Procedures

#### 4.2.2.1 Activation/deactivation/registration/interrogation

SS-CCNR shall be permanently activated upon provision and shall be deactivated upon withdrawal.

Called user B needs not be provided with SS-CCNR for calling user A invocation of SS-CCNR to operate properly.

Restriction of SS-CCNR for called user B is outside the scope of this ETS.

NOTE: A mechanism provided to user B which causes rejects of CCNR requests is outside the scope of this ETS.

Interrogation will not be used to interrogate activation/deactivation status; however, a process similar to interrogation may be implemented; see invocation clause below.

### 4.2.2.2 Invocation and operation

When a call from user A fails because the destination user, user B, does not answer, the network shall retain the call information provided by user A, for a period governed by the retention timer. User A shall be able to request SS-CCNR during that period. User A shall also be able to request SS-CCNR whilst user B is alerting.

NOTE 1: User A recognizes that user B does not answer by expiration of the call set-up timer which is presented to user A in a disconnect with cause expiration of basic call timer.

NOTE 2: User B may not answer the call or may be non reachable.

NOTE 3: Alerting received at user A indicates that user B is reachable.

On receipt of a request for SS-CCNR, the network shall check whether it is possible to initiate the service, and if so shall send an acknowledgment to user A, start monitoring user B and start the SS-CCNR Service Duration Timer. The acknowledgment means that user A shall expect to receive a SS-CCNR Recall if user B becomes not busy, after a subsequent period of activity, within the period of the SS-CCNR Service Duration Timer.

NOTE 1: The fact that user B is already being monitored, as a result of a call completion request from another user, shall not cause rejection of the request from user A. The handling of multiple requests against the same user B is an implementation matter, typically involving some sort of queue arranged in chronological and/or priority order.

NOTE 2: The fact that user A has already invoked call completion against another user need not cause rejection of any further requests for call completion from user A. The handling of multiple requests by the same user A is an implementation matter.

NOTE 3: SS-CCBS requests and SS-CCNR may be dealt with either in a combined manner or in independent manners; this is an implementation matter.

NOTE 4: Only users for which SS-CCNR has been activated by subscription are allowed to invoke SS-CCNR for a particular no reply subscriber; users for which SS-CCNR has not been activated and invoking SS-CCNR will receive a negative response to their request.

After the SS-CCNR request has been acknowledged, user A shall be able to receive and initiate other calls.

A network may provide user A with the ability to request a list of outstanding SS-CCNR requests that user A has invoked. Only details of requests made by user A (and user A only) from that MS/LS should be provided. The list will be empty if there are no outstanding SS-CCNR requests.

When the monitoring of user B indicates that user B has become free after a period of activity (related to the same basic service as the original call to user B), and if user A is also free, the network shall provide SS-CCNR Recall to user A, and start the SS-CCNR Recall timer. The priority of the recall signaling process shall be equal to the priority of the original call.

If user A accepts the SS-CCNR Recall, the network shall attempt to complete the call between user A and user B. User A shall not be able to modify the call parameters in the CCNR Call; this holds true for the basic call setup (such as basic service, priority and area selection) as well as for the supplementary services invoked for the initial call. If the call is successfully presented to user B and enters an alerting phase or is answered, SS-CCNR shall be regarded as complete.

In the case where several invocations of SS-CCNR are in the queue, the calls shall be handled in the order they occurred unless their priority levels are different in which case the higher priority call shall be handled first.

To properly operate, SS-CCNR shall be supported by the originating SwMI as well as the terminating SwMI.

### 4.2.2.3 Cancellation

The network shall provide user A with the ability to request cancellation of at least one of the following:

- all outstanding SS-CCNR requests for which a SS-CCNR Recall is still expected;
- the most recent SS-CCNR request for which a SS-CCNR Recall is still expected; and
- a specific SS-CCNR request for which a SS-CCNR Recall is still expected.

User A shall be able to cancel its own request(s) and shall not be able to cancel requests from other users.

User A shall be informed of successful cancellation.

### 4.2.2.4 Timers

This paragraph regroups all values of timers as seen by the user so as to provide a range of values for timers in further stages of this CCNR.

- Idle guard timer: the value of this optional timer is a network option and shall be in the range from 0 to 15 seconds. The value 0 corresponds to no guard at all.

- Retention timer: shall be at least 15 seconds.

- List request timer: shall be between 20 and 60 seconds.

- SS-CCNR service duration timer should be from 15 to 45 minutes.

- Recall timer shall have a minimum value of 10 seconds and a maximum value of 30 seconds.

- Request/cancel timer shall have a value in the range 10 to 30 seconds.

### 4.2.3 Exceptional procedures

### 4.2.3.1 Activation/deactivation/registration and Interrogation

Not applicable.

### 4.2.3.2 Invocation and operation

In the case where the originating SwMI does not support SS-CCNR, the CCNR call request shall be rejected as in any SS-reject described in ETS 300 392-2 [8] and ETS 300 392-9 [9].

### 4.2.3.2.1 Rejection of SS-CCNR service request

If user A is not permitted to request SS-CCNR, the network shall reject the SS-CCNR request with an indication of whether denial is short or long term.

Short term denial shall be used for temporary conditions where a later request for SS-CCNR might be successful. Examples of conditions that may result in a short term denial are:

- limit of requests by user A already reached;
- no call information retained;
- limit of requests against user B already reached.

> NOTE: Contrary to ECMA 185, duplicate requests following a new call attempt is not a cause for rejection; see subclause 4.2.3.2.6.

Long term denial shall be used when later requests will also be rejected. Examples of conditions that may result in a long term denial are:

- SS-CCNR not provided to user A; or
- inter-working with a network which does not support SS-CCNR;
- SS-CCNR not allowed against user B.

> NOTE: Duplicate requests is not a cause for rejection; it may be used by user A to reset its timers.

### 4.2.3.2.2 User A is busy on SS-CCNR recall

#### 4.2.3.2.2.1 Case of user A busy

If user A is found to be busy when user B becomes free, the network shall wait for both users to become free before providing SS-CCNR Recall and starting the SS-CCNR Recall timer. As an option, the network may notify user A that the network is attempting to complete a call. On receipt of such a notification, user A may either:

- ignore the notification, thereby causing the SS-CCNR Recall to be delayed;
- cancel the SS-CCNR request; or
- free resources by disposing of an existing call, thereby allowing the SS-CCNR Recall to proceed.

#### 4.2.3.2.2.2 Case of SS-CCNR busy

If user A is found to be SS-CCNR busy, the network shall wait for user A to become SS-CCNR non busy before providing SS-CCNR Recall and starting the SS-CCNR Recall timer.

### 4.2.3.2.3 Network congestion

Since the network does not use path reservation, or inter-works with a network which does not allow path reservation, the call completion attempt can fail after user A has accepted the SS-CCNR Recall because of network congestion. In this case, user A shall be informed of the failure, the SS-CCNR request shall be maintained by the SwMI and a further SS-CCNR Recall can be expected.

In case of network congestion, the SS-CCBS calls shall be queued as in the case of a normal call set-up.

### 4.2.3.2.4 User B becomes busy after successful SS-CCNR recall

If user B is busy for the call resulting from an accepted SS-CCNR Recall of user A, the SwMI shall automatically invoke SS-CCNR monitoring of user B, indicating the reason for the failure to user A and that SS-CCNR has been invoked. In such a case, user A may, as a user option, request cancellation of the SS-CCNR request, if call completion to user B is no longer required.

As a network option, if user B makes an outgoing call after SS-CCNR Recall has been started, but before user A has accepted the SS-CCNR Recall, then user B may be notified that the network is attempting to complete a call. This gives user B the opportunity to abandon call initiation in order to allow the SS-CCNR call to complete.

### 4.2.3.2.5 Duplicate SS-CCNR requests

If user A has already requested SS-CCNR on user B for a particular Basic service, and is awaiting recall, any subsequent request from user A to invoke SS-CCNR on user B, for the same Basic service, shall cause the network to accept the request as valid. In this case, and for TETRA, user A shall receive only one SS-CCNR Recall.

#### 4.2.3.2.6 Other situations

A user can be both, a "user A" and a "destination B" simultaneously, i.e. that user can have activated the CCBS or CCNR supplementary service and have CCBS or CCNR requests outstanding while at the same time that user can be the destination of CCNR or CCBS requests from other users.

If a user receives a CCBS or CCNR recall while that user's destination B CCNR or CCBS queue is being processed, then the CCBS or CCNR recall shall take priority over the handling of the destination B CCNR or CCBS queue. The handling of CCBS or CCNR requests activated by this user shall have priority over the handling of CCNR or CCBS requests activated by other users on this user.

If one of the user's CCBS or CCNR requests can be processed as a result, then the user shall be given a CCBS or CCNR recall or notification as described in clause 3. The served user's destination B idle guard timer, if running, shall be canceled.

The CCBS requests shall be processed before the completion of CCNR requests.

If user A has a completion of calls on no reply recall pending on arrival of the CCBS recall, this should be treated in the same way as in the case where user A is CCBS busy.

#### 4.2.3.2.7 Other failure situations

A particular request for the service shall be automatically canceled by the network, and user A shall be notified if:

- user B has still had no period of activity before the SS-CCNR Service Duration Timer expires;

- user B and/or user A are still busy (after a period of activity by user B) when the SS-CCNR Service Duration Timer expires;

- user A does not accept the SS-CCNR Recall before the SS-CCNR Recall timer expires;

- user B invokes or activates a service that conflicts with the existing SS-CCNR invocation e.g. BIC;

- for any reason, the network is unable to continue with SS-CCNR invocation.

A particular request for the service shall be automatically canceled by the network if user A does not accept the SS-CCNR Recall before the SS-CCNR Recall timer expires.

#### 4.2.3.3 Cancellation

A cancellation request shall be rejected if there are no SS-CCNR requests for user A or if the request is to cancel a specific SS-CCNR request which does not exist.

### 4.3 Interactions with other supplementary services

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

#### 4.3.1 Calling Line Identification Presentation (SS-CLIP)

No possible interaction.

#### 4.3.2 Connected Line Identification Presentation (SS-COLP)

No possible interaction.

#### 4.3.3 Calling/Connected Line Identification Restriction (SS-CLIR)

If user A requests presentation restriction for a call (does not use the default value for a call), and the call encounters a busy user B, the request to restrict presentation of the calling line identification shall be retained by the network and shall apply to a call resulting from the use of SS-CCNR.

### 4.3.4 Completion of Calls on Busy Subscriber (SS-CCBS)

A user can be both a "user A" and a "destination B" simultaneously, i.e. that user can have activated the CCNR or completion of calls to busy subscriber supplementary service and have CCNR or completion of calls to busy subscriber requests outstanding whilst at the same time that user can be the destination of CCNR or completion of calls to busy subscriber requests from other users.

If a user receives a CCNR or completion of calls to busy subscriber recall while that user's destination B CCNR or completion of calls to busy subscriber queue is being processed, then the CCNR or completion of calls to busy subscriber recall shall take priority over the handling of the destination B CCNR or completion of calls to busy subscriber queue. The handling of CCNR/completion of calls to busy subscriber requests activated by this user shall have priority over the handling of CCNR or completion of calls to busy subscriber requests activated by other users on this user.

If one of the user's CCNR or completion of calls to busy subscriber requests can be processed as a result, then the user shall be given a CCNR or completion of calls to busy subscriber recall. The served user's destination B idle guard timer, if running, shall be canceled.

The completion of calls to busy subscriber requests shall be processed before the CCNR requests.

If user A has a completion of calls to busy subscriber recall pending on arrival of the CCNR recall, this should be treated in the same way as in the case where user A is CCNR busy.

### 4.3.5 Call Forwarding Unconditional (SS-CFU)

#### 4.3.5.1 SS-CFU activated by user B before user A requests SS-CCNR

If the call to User B is diverted to User C by SS-CFU and User C does not answer, then a SS-CCNR request from User A shall be applied to the diverted-to User C.

#### 4.3.5.2 SS-CFU activated by user B after user A requests SS-CCNR

If User B activates SS-CFU after User A has requested SS-CCNR and whilst the SS-CC Recall has not yet been accepted by User A, the SS-CCNR request shall either continue to be applied to User B or be canceled.

#### 4.3.5.3 SS-CFU activation by user A

If User A invokes SS-CCNR whilst SS-CFU is activated, or User A invokes SS-CCNR and subsequently activates SS-CFU, SS-CC Recall shall still be given to User A.

### 4.3.6 Call Forwarding Busy (SS-CFB)

#### 4.3.6.1 SS-CFB activated by user B before user A requests SS-CCNR

If the call from User A to User B is diverted to User C by SS-CFB and C does not answer, then a SS-CCNR request made shall be applied to the diverted-to User C.

#### 4.3.6.2 SS-CFB activated by user B after user A requests SS-CCNR

If User B activates SS-CFB after User A has requested SS-CCNR and whilst the SS-CC Recall has not yet been accepted by User A, the SS-CCNR request shall continue to be applied to User B.

#### 4.3.6.3 SS-CFB activation by user A

If User A invokes SS-CCNR whilst SS-CFB is invoked, or User A invokes SS-CCNR and subsequently invokes SS-CFB, this shall not affect the provision of the SS-CC Recall to User A.

In all case, a SS-CCNR recall shall not be forwarded.

### 4.3.7    Call Forwarding on No Reply (SS-CFNR)

There shall be no interaction. The recall shall be presented to user A regardless of the invocation of SS-CCNR or CFNR.

NOTE 1:    If the call to User B is diverted to User C by SS-CFNR and User C does not answer, then a SS-CCNR request from User A shall be applied to either User B or to User C.

NOTE 2:    If User B activates SS-CFNR after User A has requested SS-CCNR and whilst the SS-CC Recall has not yet been accepted by User A, the SS-CCNR request is not affected.

NOTE 3:    If User A invokes SS-CCNR whilst SS-CFNR is activated, or User A invokes SS-CCNR and subsequently activates SS-CFNR, this shall not affect the provision of the SS-CC Recall to User A.

### 4.3.8    Call Report (SS-CR)

Call completion on no reply shall not have any interaction with call report.

### 4.3.9    Talking Party Identification (SS-TPI)

Call completion on no reply shall not have any interaction with talking party identification.

### 4.3.10    Call Forwarding on Not Reachable (SS-CFNRc)

If the call from user A to user B is diverted to user C by SS-CFNRc and user C does not answer, then a SS-CCNR request made by user A shall be applied either to the diverted-to user C or to the originally called user B whichever becomes reachable first.

If user A invokes SS-CCNR whilst SS-CFNRc is activated against user A, or user A invokes SS-CCNR and subsequently activates SS-CFNRc, and then becomes not reachable, the network shall wait until user A has become reachable before the provision of the SS-CCNR Recall to user A.

### 4.3.11    List Search Call (SS-LSC)

User A shall be able to invoke SS-CCNR if the original call has failed due to all attendants in the list search call not answering the call.

### 4.3.12    Call Authorized by Dispatcher (SS-CAD)

If the original call placed by user A was given authorization by a dispatcher for completion, then subsequent invocation of SS-CCNR by user A to the authorized destination, shall not require further authorization by a dispatcher. In the CCNR Call set-up, an indication that the call set-up belongs to a CCNR Call shall be needed; this indication will insure that dispatcher is by-passed in the subsequent CCNR call.

### 4.3.13    Short Number Addressing (SS-SNA)

Call completion on no reply shall not have any interaction with short number addressing.

### 4.3.14    Area Selection (SS-AS)

If user B is originally outside the area selected and in a No Reply state, it shall not be possible for user A to invoke SS-CCNR.

If user A has invoked SS-CCNR against user B who was in a No Reply state and within the selected area, when user B becomes free after a period of activity, the area in which user B happens to be at the time user B becomes free will be checked and compared to the area requested in the initial call; if user B is free but is outside the selected area, RECALL is not sent to user A; call failure shall be notified to user A as in a normal Area Selection call failure; SS-CCNR request shall be canceled and user A shall be notified accordingly; if user B is free after a period of activity and is within the selected area, user B free

notification shall be sent to user A SwMI and recall will be presented to user A. Monitoring of when user B is back in the selected area is outside the scope of this ETS.

The same Area Selection shall be used for the initial call set-up and the CCNR Call.

### 4.3.15 Access Priority (SS-AP)

Call completion on no reply shall not have any interaction with access priority.

### 4.3.16 Priority Call (SS-PC)

Call completion on no reply shall not have any interaction with priority call. If the priority call leads to invocation of SS-CCNR, (not finding user B), the CCNR call shall use the same priority as the original call.

> NOTE: The recall is not a call in itself and does not have any priority assigned to it.

### 4.3.17 Call Waiting (SS-CW)

Call completion on no reply shall not have any interaction with call waiting.

### 4.3.18 Call Hold (SS-HOLD)

Call completion on no reply shall not have any interaction with call hold.

### 4.3.19 Late Entry (SS-LE)

Call completion on no reply shall not have any interaction with late entry.

### 4.3.20 Transfer of Control (SS-TC)

Call completion on no reply shall not have any interaction with transfer of control.

### 4.3.21 Pre-emptive Priority Call (SS-PPC)

Call completion on no reply shall not have any interaction with pre-emptive priority call.

### 4.3.22 Include Call (SS-IC)

Call completion on no reply shall not have any interaction with include call.

### 4.3.23 Advice of Charge (SS-AoC)

Call completion on no reply shall not have any interaction with advice of charge.

### 4.3.24 Barring of Outgoing Calls (SS-BOC)

Not applicable. (If user A is unable to make outgoing calls because SS-BOC has been activated against user A, then it should be unlikely that user A shall be able to invoke SS-CCNR). If SS-BOC is invoked after SS-CCNR, the CCNR Call may be barred (implementation dependent).

### 4.3.25 Barring of Incoming Calls (SS-BIC)

Call completion on no reply shall not have any interaction with barring of incoming calls. If user A also has SS-BIC activated it shall not prevent the receipt of the SS-CCNR Recall from the infrastructure in order to start the call completion process. If SS-BIC is invoked after SS-CCNR, the CCNR Call may be barred (implementation dependent).

### 4.2.26 Discreet Listening (SS-DL)

Call completion on no reply shall not have any interaction with discreet listening.

### 4.2.27 Ambiance Listening (SS-AL)

Call completion on no reply shall not have any interaction with ambiance listening.

### 4.2.28 Dynamic Group Number Assignment (SS-DGNA)

Call completion on no reply shall not have any interaction with dynamic group number assignment (Call Completion on No Reply shall not be invoked for group calls).

The DGNA number needs to be valid during the duration of the CCNR duration timer. If the DGNA number is no longer valid and/or the DGNA timer has expired, the CCNR Request shall be canceled.

### 4.2.29 Call Retention (SS-CRT)

Call completion on no reply shall not have any interaction with call retention.

### 4.2.30 Interaction with ANFs

### 4.2.30.1 Mobility

Migration related descriptions can be split into several cases.

### 4.2.30.1.1 Migration of user B while SS-CCNR is active for a given call

Mobility management shall insure that SS-CCNR invocation of user B is kept during the migration by insuring that the call parameters and timers are passed to the user B visited SwMI.

### 4.2.30.1.2 Migration of user A while SS-CCNR is active

Mobility management shall insure that SS-CCNR invocation from user A is kept during the migration by insuring that the call parameters and timers are passed to the visited SwMI.

### 4.2.30.1.3 Migration of either user A or user B to a SwMI not supporting SS-CCNR

In either case the whole SS-CCNR shall be canceled and user A shall be notified (long term denial).

### 4.2.31 Inter-working considerations

Where users A and B are on a different network, the availability of SS-CCNR to user A will be limited by the capabilities of the other network and the inter-working functions between the SwMI and the other network.

If user B is connected to a public ISDN and the public ISDN version of the SS-CCNR service is available at the network inter-working point, user A may be able to request SS-CCNR on public ISDN user B. In addition, a user A served by the Public ISDN may be able to request SS-CCNR on a TETRA user B.

> NOTE: This assumes peer co-operation between ISDN and TETRA in provision of the SS-CCNR service.

## 4.3 SS-CCNR Overall SDL

Figure 1 contains the dynamic description of SS-CCNR using the Specification and Description Language (SDL) defined in ITU-T Recommendation Z.100 [6]. The SDL process represents the behavior of the network in providing SS-CCNR. The relationship of this process to the basic call process is indicated in the annotations.

Input signals from the left and output signals to the left represent primitives from and to user A. Input signals from the right represent internal stimuli.
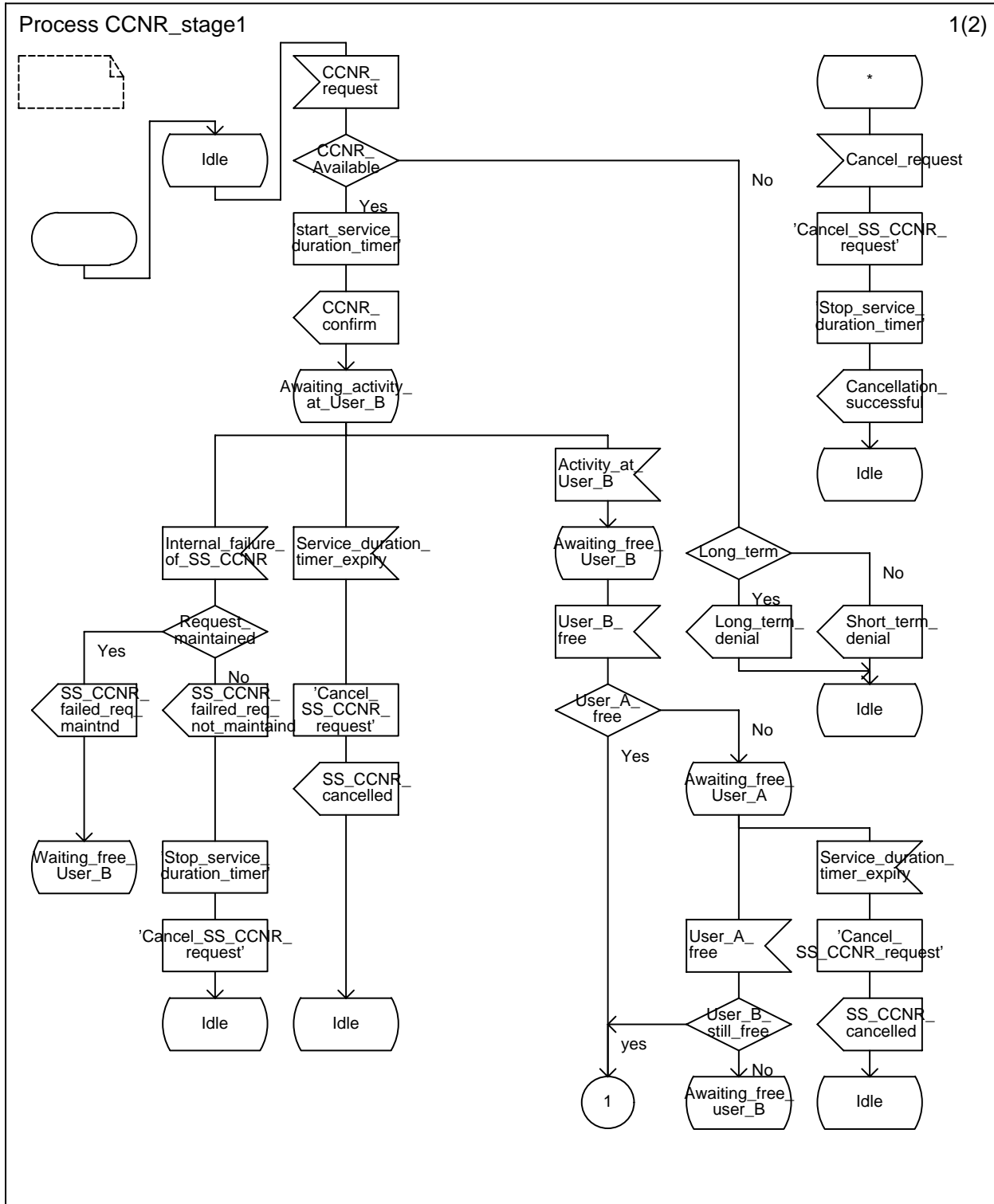


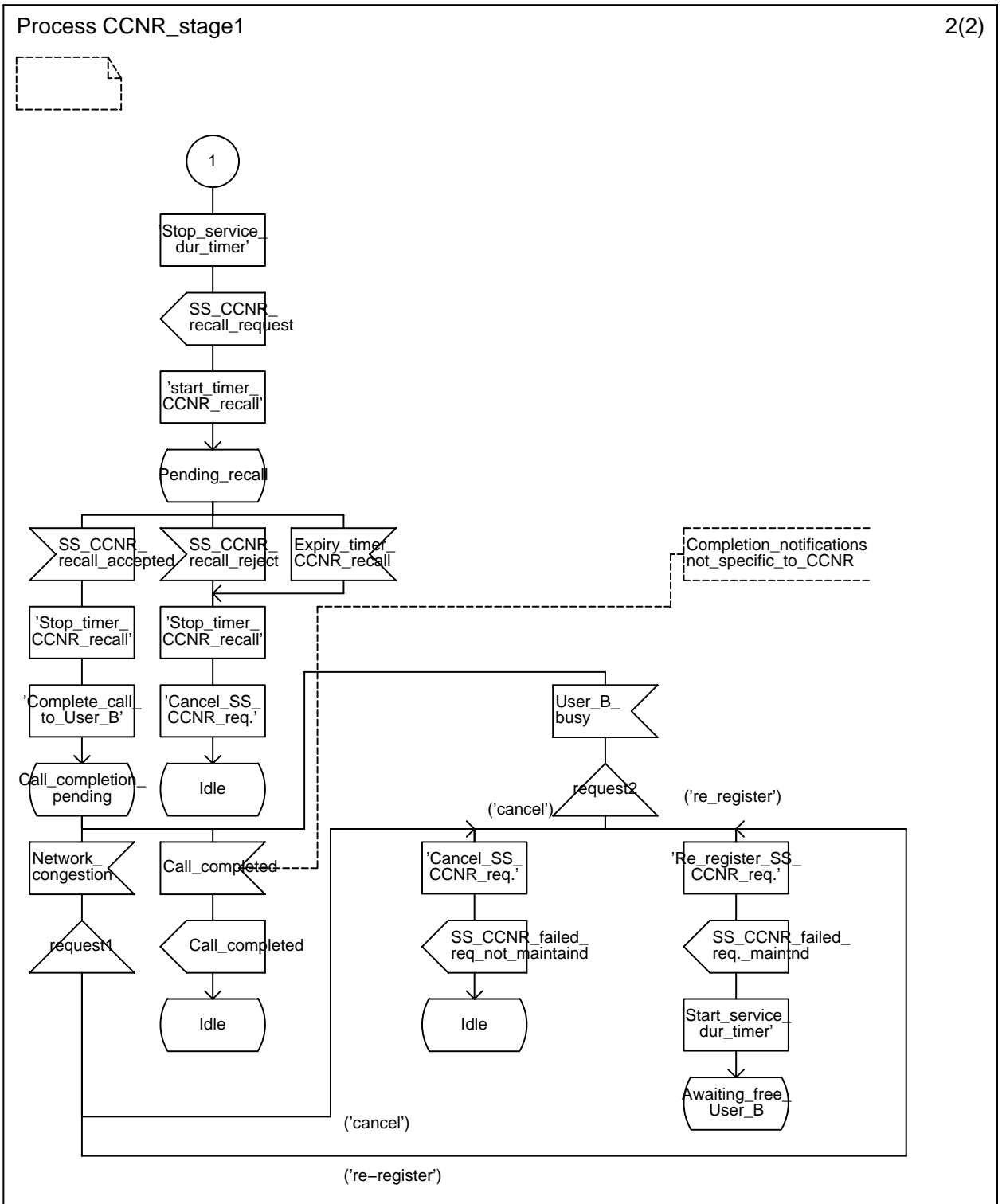**Figure 1: Overall SDL for SS-CCNR (1 of 2)**

Process CCNR_stage1                                                    2(2)



**Figure 1: Overall SDL for SS-CCNR (2 of 2)**

# Annex A (informative): Bibliography

The following material, though not specifically referenced in the body of the present document (or not publicly available), gives supporting information.

- ITU-T Recommendation I.130: "Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".

- ETS 300 171 (1992): "Private Telecommunication Network (PTN); Specification, functional models and information flows; Control aspects of circuit mode basic services".

## History

| Document history | |
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| April 1996 | First Edition |
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