ETSI

EUROPEAN
TELECOMMUNICATION
STANDARD

Terrestrial Trunked Radio (TETRA);
Voice plus Data (V+D);
Part 11: Supplementary services stage 2;
Sub-part 23: Call Completion on No Reply (CCNR)

ETSI

Contents

Foreword

This final draft European Telecommunication Standard (ETS) has been produced by the ETSI Project Terrestrial Trunked Radio (TETRA), and is now submitted for the Voting phase of the ETSI standards approval procedure.

This ETS consists of 14 parts as follows:

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 8:   "Network management services";

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	
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
Date of withdrawal of any conflicting National Standard (dow):	6 months after doa

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1 Scope

This ETS specifies the stage 2 description of the Supplementary Service Call Completion on No Reply (SS-CCNR) for the Terrestrial Trunked Radio (TETRA).

SS-CCNR is a supplementary service which allows completion of a call to a no-reply subscriber.

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

Supplementary service specifications are produced in three stages according to the method defined in CCITT Recommendation I.130 [1]. The stage 2 description identifies the functional capabilities and the information flows needed to support the supplementary service as specified in its stage 1 description (see ETS 300 392-10-3 [6]). The stage 2 description is followed by the stage 3 description, which specifies the protocols at the air interface and at the various Inter-System Interfaces (ISI) to support the service.

This ETS is applicable to MS/LS and SwMIs involved in the operation of those supplementary services. Specifications of inter-working gateways to non-TETRA networks (mainly PSTN and ISDN) while affected by that ETS are outside the scope of this ETS.

The stage 2 description for the SS-CCNR are derived from ECMA-185 [5] taken as normative reference for the corresponding supplementary services for Private Integrated Services Networks (PISNs).

NOTE: The stage 2 description is followed by the stage 3 description, which specifies the encoding rules for the information flows and process behavior for the different entities in SwMI, MS and LS.

In order to avoid duplication of identical text, this ETS makes extensive use of references to the ETS stage 2 covering SS-CCBS ETS 300 392-11-13 [13].

2 Normative References

This ETS incorporates by dated and undated reference, provisions from other publications. These normative 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] CCITT Recommendation I.130 (1988): "Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".

[2] ECMA 185 (1997): "Specification, functional model and information flows; Call completion supplementary services".

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

[4] ETS 300 392-11-13 (1998): "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 11: Supplementary services stage 2; Sub-part 13: Call Completion to Busy Subscriber (CCBS)".

[5] ETS 300 392-12-23 (1998): "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 12: Supplementary services stage 3; Sub-part 23: Call Completion on No Reply (CCNR)".

[6] ETS 300 392-10-3 (1996): "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 10: Supplementary services stage 1; Sub-part 3: Talking Party Identification (TPI)".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of this ETS the following terms and definitions apply:

additional network feature: capability, over and above that of a basic service, provided by a SWMI, but not directly to a user.

bearer service: type of telecommunication service that provides the capability for the transmission of signals between user-network interfaces.

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.

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).

no reply: no reply condition is defined for this document as the no answer (of the called user B) time-out has expired. There is no formal definition found in ITU-T, ECMA or ETSI on the terms No Reply.

not reachable: MS is out of range or power off.

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

> NOTE 1: Path Reservation would not guarantee that user B be free when user A accepts the SS-CCNR Recall.

> NOTE 2: Path reservation is not the preferred way of operation in the TETRA environment.

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

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

SS-CCNR recall: indication informing user A that user B is no longer busy (in the case of SS-CCNR). Acceptance of this indication by user A will cause the call to be completed by the SWMI.

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

supplementary service: supplementary service modifies or supplements a bearer service or a teleservice. A supplementary service cannot be offered to a customer as a stand alone service. It should be offered in combination with a bearer service or a teleservice.

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.

teleservice: 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 call set up. Synonym is destination B.

3.2 Abbreviations

For the purposes of this ETS the following abbreviations apply:

3.2.1 General abbreviations

AI	Air Interface
CC	Call Control (functional entity)
CCBS	Completion of Calls (or call completion) to Busy Subscribers
CCNR	Call Completion (or Completion of Calls) on No Reply
CCNRI	CCNR Identifier
CR	Cancellation Reason
FE	Functional Entity
ISDN	Integrated Services Digital Network
ISI	Inter System Interface
LS	Line Station
MS	Mobile Station
PICS	Protocol Implementation Conformance Statement
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.

SS-CCBS	Supplementary Service Completion of Calls to Busy Subscribers
SS-CCNR	Supplementary Service Completion of Calls on No Reply
SwMI	Switching and Management Infrastructure
TETRA	TErrestrial Trunked RAdio
V+D	Voice Plus Data

3.2.2 Supplementary service abbreviations

AL	Ambience 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
CCNR	Call Completion on No Reply
CFB	Call Forwarding on Busy
CFNRc	Call Forwarding on Not Reachable
CFNRy	Call Forwarding on No Reply
CFU	Call Forwarding Unconditional
CLIP	Calling Line Identification Presentation
CLIR	Calling/Connected Line Identification Restriction
COLP	COnnected Line Identification Presentation
COLR	COnnected Line Identification Restriction
CR	Call Report
CRT	Call Retention
CW	Call Waiting
DL	Discreet Listening
HOLD	Call Hold
IC	Include Call
LE	Late Entry
LSC	List Search Call
PC	Priority Call
PPC	Pre-emptive Priority Call
SNA	Short Number Addressing
TC	Transfer of Control

TPI   Talking Party Identification

4 SS-CCNR stage 2 specifications

4.1 Functional mode

4.1.1 Functional model description

The functional model shall comprise the following functional entities (FEs) for Individual Calls:

- FE1   Originating SS-CCNR Served user FE;
- FE21   Originating SS-CCNR Controlling FE;
- FE25   Terminating SS-CCNR Controlling FE;
- FE5   Terminating SS-CCNR Affected user FE.

The following functional relationships shall exist between these FEs for Individual Calls:

- ra   between FE1 and FE21;
- rb   between FE21 and FE25;
- rc   between FE25 and FE5.

Figure 1 shows these FEs and relationships.

Served User   Affected User
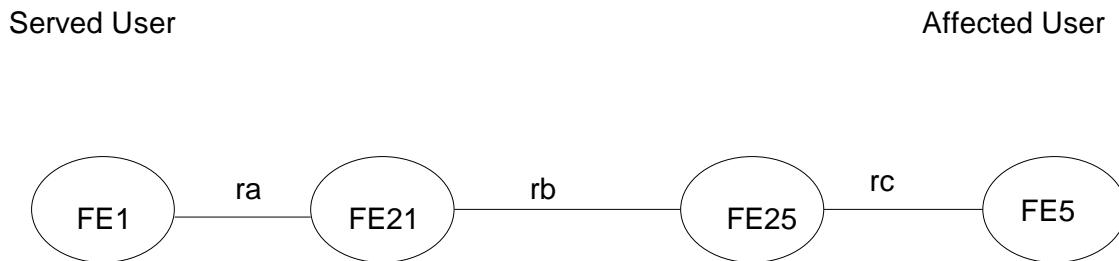
Figure 1: Functional model for SS-CCNR individual call

4.1.2 Description of the functional entities

4.1.2.1 Originating SS-CCNR served user FE, FE1

The FE that serves the served user that wishes to invoke the call completion to busy subscriber supplementary service (SS-CCNR).

4.1.2.2 Originating SS-CCNR controlling FE, FE21

The FE within the network which co-operates with its peer (FE25) to provide the SwMI call completion supplementary service as requested by FE1. It also interacts with FE5 to provide the monitoring information that is required for the successful operation of the call completion service.

4.1.2.3 Terminating SS-CCNR controlling FE, FE25

The FE within the network which co-operates with its peer (FE21) to provide the SwMI call completion supplementary service as requested by FE1. It also interacts with FE5 to provide the monitoring information that is required for the successful operation of the call completion service.

4.1.2.4 Terminating SS-CCNR FE, FE5

The FE that serves the monitored/affected user (B).

4.1.3 Relationship of functional model to basic call functional model

None.

4.1.4 Relationship to basic individual call functional model

An example of a relationship between the FEs for SS-CCNR and FEs for the basic individual call is shown in figure 2.
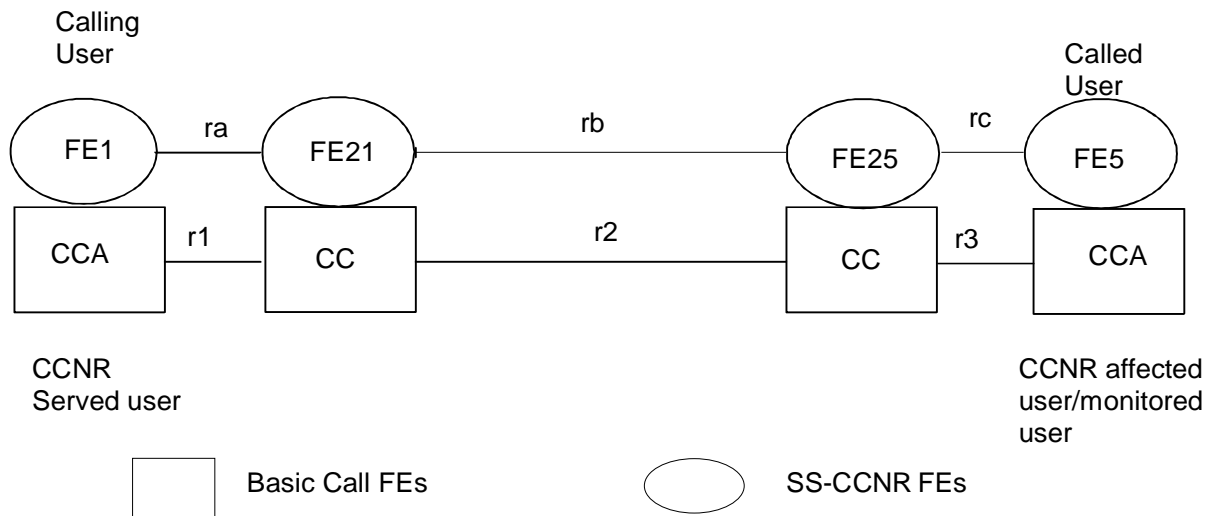

Figure 2: Example Relationship between model for SS-CCNR and Basic Individual Call

4.2 Service Primitives

This subclause lists SS-CCNR service primitives used to invoke or being a result of information flow sequences. The SS-CCNR service primitives are defined in ETS 300 392-12-23 [5], subclause 4.2 and the basic call service primitives are defined in ETS 300 392-2 [3], clause 11.

The SS-CCNR service primitives for the served user at the MS/LS TNSS-SAP shall be:

- CALL-INFORMATION-RELEASE indication;
- CALL-INFORMATION-RETENTION indication;
- CANCEL request/confirmation;
- CANCELLED indication;
- FAILED indication;
- LIST-CCNR request/confirmation;
- RECALL request;
- RECALL-ACCEPTED request;
- REQUEST request/confirmation;
- USER-B-FREE AFTER ACTIVITY indication.

   NOTE: Cancellation by the network does not correspond to a primitive seen by the user application. Information flows.

4.2.1 Definition of information flows for individual call.

In the tables listing the service elements in information flows, the column headed "Req./Ind." For "Request/Indication" indicates which of these service elements are mandatory (M) and which are optional (O) in a request/indication information flow, and the column headed "Resp./Cfm." for "Response/Confirm" indicates which of these service elements are mandatory (M) and which are optional (O) in a response/confirmation information flow.

4.2.1.1 CCNR CALL-INFORMATION-RELEASE

Same text as subclause 4.3.1.1 of ETS 300 392-11-13 [4] replacing CCBS by CCNR.

4.2.1.2 CCNR CALL-INFORMATION-RETENTION

Same text as subclause 4.3.1.2 of ETS 300 392-11-13 [4] replacing CCBS by CCNR.

4.2.1.3 CCNR-CANCEL

Same text as subclause 4.3.1.3 of ETS 300 392-11-13 [4] replacing CCBS by CCNR.

4.2.1.4 CCNR-CANCEL-ACK

Same text as subclause 4.3.1.4 of ETS 300 392-11-13 [4] replacing CCBS by CCNR.

4.2.1.5 CCNR-CANCELLATION (STOP-MONITOR)

CCNR-CANCELLATION (STOP-MONITOR) is an unconfirmed information flow across rb either from FE21 to FE25 or from FE25 to FE21 which cancels the SS-CCNR service.

Table 1 lists the service elements within the CCNR-CANCELLATION information flow.

Table 1: Information content of CCNR-CANCELLATION (STOP-MONITOR)

Service Element	Type
CCNR Identifier (CCNRI)	M
Cancellation Reason (CR)	M

4.2.1.6 CCNR-CANCELLED

Same text as subclause 4.3.1.6 of ETS 300 392-11-13 [4] replacing CCBS by CCNR.

4.2.1.7 CCNR-CCNRI

Same text as subclause 4.3.1.7 of ETS 300 392-11-13 [4] replacing CCBS by CCNR.

4.2.1.8 CCNR-FAILED

Same text as subclause 4.3.1.8 of ETS 300 392-11-13 [4] replacing CCBS by CCNR.

4.2.1.9 CCNR-FREE-NOTIFICATION

CCNR-FREE-NOTIFICATION is an unconfirmed information flow across rb from FE25 to FE21 informing FE21 that user B is now free after a period of activity.

The service elements shall be identical to the service elements of the CCNR-RECALL request.

4.2.1.10 CCNR-LIST

Same text as subclause 4.3.1.10 of ETS 300 392-11-13 [4] replacing CCBS by CCNR.

4.2.1.11 CCNR-LIST-ACK

Same text as subclause 4.3.1.11 of ETS 300 392-11-13 [4] replacing CCBS by CCNR.

4.2.1.12 CCNR-MONITOR

CCNR-MONITOR is a confirmed information flow, across rb from FE21 to FE25, which either initiates monitoring at FE25 or re-initiates monitoring in the case where a SS-CCNR call has failed (e.g. user B busy again or no reply again) and the SwMI provides automatic re-registration of the SS-CCNR service.

Table 2 lists the service elements within the CCNR-MONITOR information flow.

Table 2: Information content of CCNR-MONITOR

Service Element	Type (note)
CCNRI	M
Call Priority	M
Area Selection	M
Full Calling User Identity	M
Basic Service Information	M
Full Called User Identity	M
NOTE: This service element shall indicate Monitor for free user B after activity.	

4.2.1.13 CCNR-MONITOR-ACK

CCNR-MONITOR is a confirmed information flow, across rb from FE21 to FE25, which indicates whether or not FE25 has successfully initiated monitoring of user B for free after activity.

Table 3 lists the service elements within the CCNR-MONITOR-ACK information flow.

Table 3: Information content of CCNR-MONITOR

Service Element	Type (note)
CCNRI	M
Call Priority	M
Area Selection	M
Full Calling User Identity	M
Basic Service Information	M
Full Called User Identity	M
NOTE: This service element shall indicate Monitor for free user B after activity.	

4.2.1.14 CCNR-RECALL

Same text as subclause 4.3.1.14 of ETS 300 *392*-11-13 [4] replacing CCBS by CCNR.

4.2.1.15 CCNR-RECALL-ACCEPTED

Same text as subclause 4.3.1.15 of ETS 300 *392*-11-13 [4] replacing CCBS by CCNR.

4.2.1.16 CCNR-REQUEST

Same text as subclause 4.3.1.16 of ETS 300 *392*-11-13 [4] replacing CCBS by CCNR.

4.2.1.17 CCNR-REQUEST-ACK

Same text as subclause 4.3.1.17 of ETS 300 *392*-11-13 [4] replacing CCBS by CCNR.

4.2.1.18   CCNR-RESUME-COMPLETION

CCNR-RESUME-COMPLETION is an unconfirmed information flow across rb from FE21 to FE25 which informs FE25 that user A is no longer busy and that FE25 should re-instate monitoring of user B, in the case that path reservation is not to be performed.

Table 4 lists the service elements within the CCNR-RESUME-COMPLETION information flow.

Table 4: Information content of CCNR-RESUME-COMPLETION

Service Element	Indication
CCNR Identifier (CCNRI)	M

4.2.1.19   CCNR-SUSPEND-COMPLETION

CCNR-SUSPEND-COMPLETION is an unconfirmed information flow across rb from FE21 to FE25 which informs FE25 that user A is temporarily busy in the case that path reservation is not to be performed.

Table 5 lists the service elements within the CCNR-SUSPEND-COMPLETION information flow.

Table 5: Information content of CCNR-SUSPEND-COMPLETION

Service Element	Indication
CCNR Identifier (CCNRI)	M

4.2.1.20   CCNR-USER-B-FREE

CCNR-USER-B-FREE is an unconfirmed information flow across ra from FE21 to FE1 in order to inform user A, when user A is known to be busy, that user B is now free after a period of activity.

The service elements within the CCNR-USER-B-FREE information flow shall be the same as the service elements in the CCNR-RECALL request.

4.2.2   Relationship of information flows to basic individual call information flows

Same text as subclause 4.3.2. of ETS 300 392-11-13 [4] replacing CCBS by CCNR.

4.2.3 Examples of information flow sequences

Same text as subclause 4.3.4 of ETS 300 392-11-13 [4] replacing CCBS by CCNR.

The following information flow sequences assume the signalling connection to be established and to be retained during the whole duration of SS-CCNR.

4.2.3.1 Successful invocation of SS-CCNR

Figure 3 shows the information flow sequence for successful invocation of SS-CCNR when the SS-CCNR service is requested.
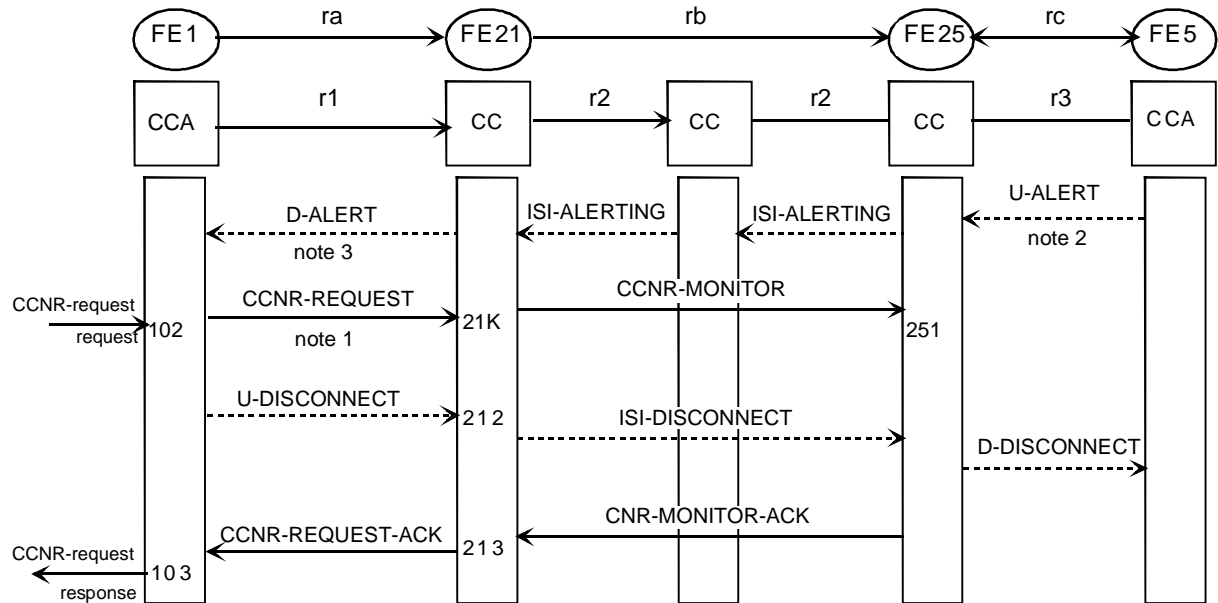
NOTE 1: This example shows invocation of SS-CCNR before releasing the original call. If SS-CCNR is invoked after releasing the original call, CCNR req/ind will occur later than the U_DISCONNECT and the network will have to keep the information relating to the call just disconnected.

NOTE 2: At originating side, there is no way to distinguish between user B is being alerted and is busy (Call Waiting) or user B is not replying, non busy.

NOTE 3: The alerting is accompanied by the indication CCNR-possible and CALL-RETENTION parameters.

Figure 3: Successful invocation of SS-CCNR

#### 4.2.3.2 Cancellation of previously invoked SS-CCNR request by User A

Same text and same figure as in subclause 4.3.4.1.2 of ETS 300 392-11-13 [4] only replacing CCBS by CCNR.

4.2.3.3 List of SS-CCNR request

Same text and same figure as in subclause 4.3.4.1.3 of ETS 300 392-11-13 [4] only replacing CCBS by CCNR.

4.2.3.4 Successful completion of SS-CCNR

Figure 4 shows the information flow sequence where the SS-CCNR request is successfully completed without prior reservation of a network path.
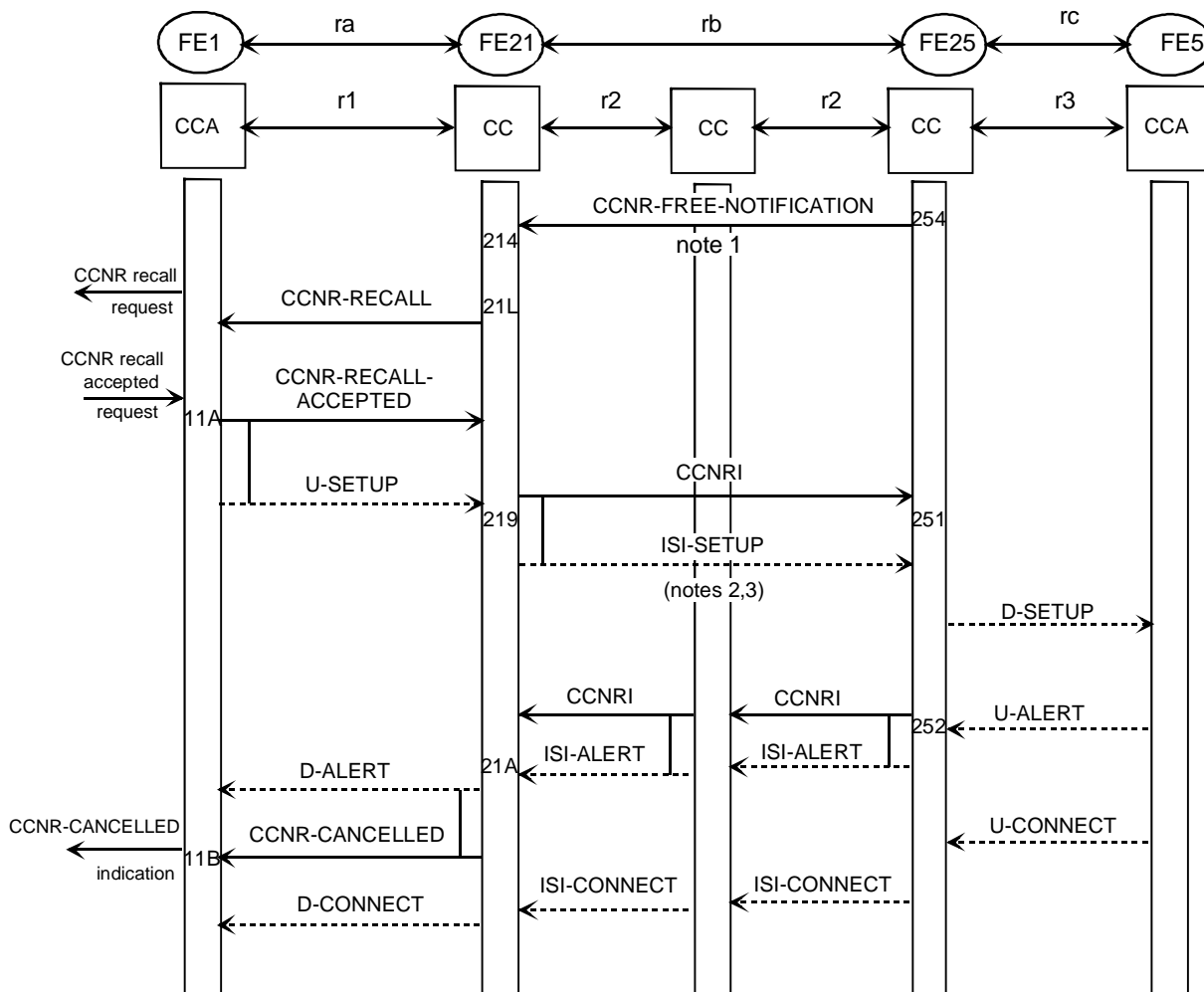
NOTE 1: The process to reach the free status is not shown; the FREE_NOTIFICATION is sent once the user B has shown some activity such as accepting an incoming call or initiating an outgoing call and then has gone to non busy status; FREE_NOTIFICATION is not sent at the first free occurrence of user B and this constitutes a significant difference with CCBS.

NOTE 2: Signals preceded by ISI such as ISI-SETUP indicate that they carry ISI significance (such as mobility) on top of their PSS1 definition. Signals not shown associated to a basic call set-up are carried by the TETRA signalling connection.

NOTE 3: This is in that case a true path set-up both for PSS1 and ISI since the path has NOT already been set-up by path reservation. CCNRI indication flow replaces the ECMA 185 [2] CCNR-CALL information flow.

Figure 4: Successful completion of SS-CCNR

4.2.3.5 Local rejection of SS-CCNR by SwMI

Same text and same figure as in subclause 4.3.4.1.5 of ETS 300 392-11-13 [4] only replacing CCBS by CCNR.

4.2.3.6 Remote rejection of SS-CCNR by SwMI

Same text and same figure as in subclause 4.3.4.1.6 of ETS 300 392-11-13 [4] only replacing CCBS by CCNR.

4.2.3.7 User A busy when User B becomes not busy after activity (request suspended)

Same text and same figure as in subclause 4.3.4.1.7 of ETS 300 392-11-13 [4] replacing CCBS by CCNR and adding the following note under the figure.

NOTE: The process to reach the free status is not shown; the FREE_NOTIFICATION is sent once the user B has shown some activity such as accepting an incoming call or initiating an outgoing call and then has gone to non busy status; FREE_NOTIFICATION is not sent at the first free occurrence of user B and this constitutes a significant difference with CCBS.

4.2.3.8 No response by User A to SS-CCNR Recall

Same text and same figure as in subclause 4.3.4.1.13 of ETS 300 392-11-13 [4] replacing CCBS by CCNR and adding the following note under the figure.

NOTE: The process to reach the free status is not shown; the FREE_NOTIFICATION is sent once the user B has shown some activity such as accepting an incoming call or initiating an outgoing call and then has gone to non busy status; FREE_NOTIFICATION is not sent at the first free occurrence of user B and this constitutes a significant difference with CCBS.

4.2.3.9 Successful SS-CCNR recall, User B busy

Same text and same figure as in subclause 4.3.4.1.9 of ETS 300 392-11-13 [4] replacing CCBS by CCNR.

4.2.3.10 Successful SS-CCNR recall, no path to User B

Same text and same figure as in subclause 4.3.4.1.10 of ETS 300 392-11-13 [4] replacing CCBS by CCNR.

4.3 Functional entity actions

4.3.1 Functional entity actions of FE1

Same text as in subclause 4.3.1. of ETS 300 392-11-13 [4] replacing CCBS by CCNR.

4.3.2 Functional entity actions of FE21

Same text as in subclause 4.3.2 of ETS 300 392-11-13 [4] replacing CCBS by CCNR.

4.3.3 Functional Entity Actions of FE25

Same text as in subclause 4.3.3 of ETS 300 392-11-13 [4] replacing CCBS by CCNR.

4.3.4 Functional entity actions of FE5

None.

4.4 Allocation of functional entities to physical equipment in case of individual call

The allocations of FEs to physical equipment shown in table 18 in ETS 300 392-11-13 [4] shall apply.

4.5 Inter-working considerations

Same text as in subclause 4.6 of ETS 300 392-11-13 [4] replacing CCBS by CCNR except the last sentence which does not apply.

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.

- CCITT Recommendation I.112 (1993): "Vocabulary of terms for ISDNs".

- CCITT Recommendation I.210 (1988): "Principles of telecommunication services supported by an ISDN and the means to describe them".

- CCITT Recommendation Z.100 (1993): "CCITT Specification and description language (SDL)".

- ITU-T Recommendation I.221 (1993): "Common specific characteristics of services".

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

- ETS 300 392-3-1 (1997): "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 3: Interworking at the Inter-System Interface (ISI); Sub-part 1: General design".

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

- ETS 300 392-10-23 (1998): "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 10: Supplementary services stage 1; Sub-part 23: Call completion on no reply".

- ETS 300 392-1 (1995): "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 1: General network design".

History

Document history			
May 1999	Public Enquiry	PE 9940:	1999-05-05 to 1999-10-01
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