



EUROPEAN
TELECOMMUNICATION
STANDARD

FINAL DRAFT
pr **ETS 300 392-11-2**

June 2000

Source: TETRA

Reference: DE/TETRA-03001-11-02

ICS: 33.020

Key words: data, radio, speech, stage 2, supplementary service, TETRA, V+D

**Terrestrial Trunked Radio (TETRA);
Voice plus Data (V+D);
Part 11: Supplementary services stage 2;
Sub-part 2: Call Report (CR)**

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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 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	
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 European Telecommunication Standard (ETS) specifies the stage 2 description of the Supplementary Service Call Report (SS-CR) for the Terrestrial Trunked Radio (TETRA).

SS-CR is a supplementary service which allows the call originator of an individual call to leave his/her identity for the called party.

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 300 392-10-2 [3]). 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.

Use of SDS-TL for call report is outside the scope of this ETS.

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.

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 (Blue Book)".
- [2] ITU-T Recommendation Z.100: "CCITT Specification and description language (SDL)".
- [3] ETSI ETS 300 392-10-2: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 10: Supplementary services stage 1; Sub-part 2: Call report".
- [4] ETSI ETS 300 392-12-02: "TETRA; Voice+Data; Part 12: Supplementary Services stage 3; Part 12-3: Call Report".
- [5] ETSI ETS 300 392-2: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 2: Air Interface (AI)".
- [6] ITU-T Recommendation I.221 (1993): "Common specific characteristics of services".

3 Definitions, symbols and abbreviations

3.1 Definitions

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

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

busy: property of a user for whom either a network determined user busy or a user determined user busy condition applies (see ITU-T Recommendation I.221 [6]).

identity presentation: stored/displayed identification provided to the called party for subsequent call back.

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).

CC-SS retention timer: timer started by the infrastructure upon disconnection of the call, which allows the user to use the call Identification in order to invoke/activate/interrogate a supplementary service related to that call. After expiry of the timer, the user is no longer able to use the call Identification in order to carry out supplementary service procedures.

SS-CR message validity timer: timer controlled by the infrastructure but defined by the served user, which determines how long a message can be stored in the infrastructure. After expiry of the timer the message is deleted.

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.

user C: user who is the diverted-to user.

3.2 Symbols

There are no other symbols in this ETS besides those symbols used in SDL diagrams according to ITU-T Recommendation Z.100 [2].

3.3 Abbreviations

3.3.1 General abbreviations

For the purposes of this ETS, the following general abbreviations apply:

CC	Call Completion
GTSI	Group TETRA Subscriber Identity
ISDN	Integrated Services Digital Network
ITSI	Individual TETRA Subscriber Identity
MS	Mobile Station
NDUB	Network Determined User Busy
SDL	(Functional) 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
TETRA	Terrestrial Trunked Radio
UDUB	User Determined User Busy
V+D	Voice Plus Data

3.3.2 Supplementary service abbreviations

For the purposes of this ETS, the following Supplementary Service abbreviations apply:

BIC	Barring of Incoming Calls
CFB	Call Forwarding on Busy
CFNRy	Call Forwarding on No Reply
CFNRc	Call Forwarding on Not Reachable
CFU	Call Forwarding Unconditional
CR	Call Report

4 SS-CR Stage 2 Specifications

4.1 Functional model

4.1.1 Functional model description

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

- FE1 Originating SS-CR Served user FE;
- FE21 Originating SS-CR Controlling FE;
- FE25 Terminating SS-CR Controlling FE;
- FE25' New Terminating SS-CR Controlling FE;
- FE5 Terminating SS-CR Affected user FE.
-

NOTE 1: FE25' exists only in case of call restoration.

NOTE 2: FE25' has the same functions as FE25; it acts as the Terminating SS-CR Controlling FE in the case where FE5 has migrated to another location.

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

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

Figure 1 shows these FEs and relationships.

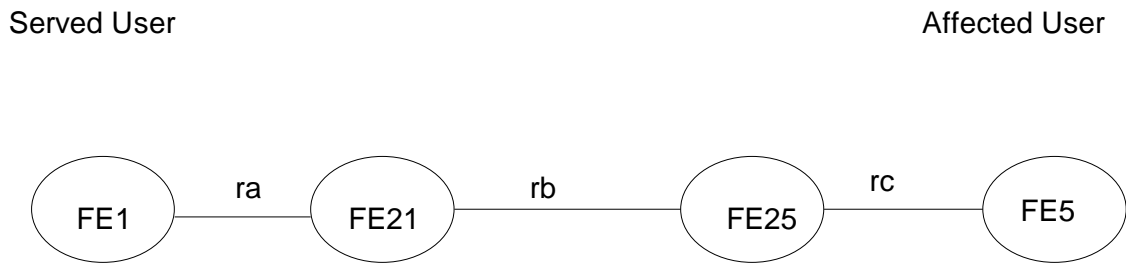


Figure 1: Functional model for SS-CR individual call

4.1.2 Description of the functional entities

4.1.2.1 Originating SS-CR served user FE, FE1

The FE that serves the served user (A) that invokes the call report to busy/no reply/not reachable subscriber supplementary service (SS-CR).

4.1.2.2 Originating SS-CR controlling FE, FE21

The FE within the network which co-operates with its peer FE25 for Individual Call to provide the SwMI call report supplementary service as requested by FE1. It also interacts with FE25 to obtain the monitoring information that is required for the successful operation of the call report service in the case of an individual call.

4.1.2.3 Terminating SS-CR controlling FE, FE25

The FE within the network which co-operates with its peer (FE21) to provide the SwMI call report 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 report service.

NOTE: The same description applies to FE25'.

4.1.2.4 Terminating SS-CR FE, FE5

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

4.1.3 Relationship of functional model to basic call functional model

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

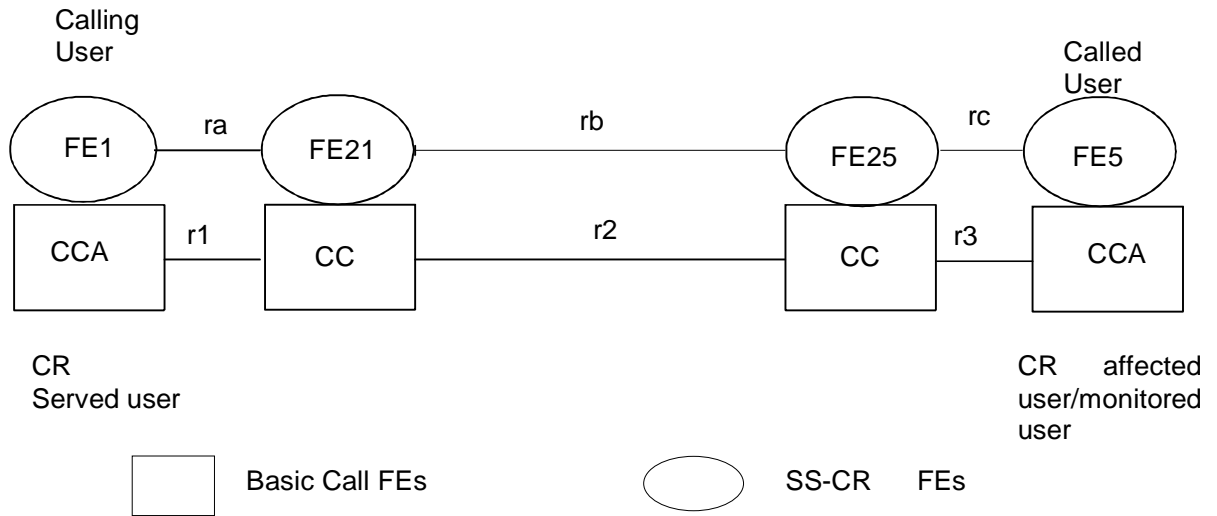


Figure 2: Example Relationship between model for SS-CR and Basic Individual Call

4.2 Service Primitives

This clause lists SS-CR service primitives used to invoke or being a result of information flow sequences. The SS-CR service primitives are defined in ETS 300 392-12-02 [4], subclause 4.2 and the basic call service primitives are defined in ETS 300 392-2 [5], clause 11.

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

- CALL-REPORT indication;
- CALL-REPORT request.

The SS-CR service primitive at the affected user (called user) MS/LS TNSS-SAP shall be:

- CALL-REPORTING indication.

4.3 Information flows

4.3.1 Definition of information flows

In the tables listing the service elements in information flows, the column headed "Type" for indicates which of these service elements are mandatory (M) and which are optional (O) in an information flow.

NOTE: Information flows are shown for users A and B having not migrated.

4.3.1.1 CALL-REPORT indication

CALL-REPORT indication is an unconfirmed information flow across either ra from FE21 to FE1 or rb from FE25 to FE21 which indicates user A that his request for CALL-REPORT has not been accepted.

Table 1 lists the service elements within the CALL-REPORT indication information flow.

Table 1: Information content of CALL-REPORT indication

Service Element	Type
CALL-REPORT Identifier	M
Reject cause	M

NOTE: The use of positive CALL-REPORT indication is outside the scope of this ETS.

4.3.1.2 CALL-REPORT request

CALL-REPORT request is an unconfirmed information flow across ra from FE1 to FE21 which gives to FE21 the request to report the call just not completed.

Table 2 lists the service elements within the CALL-REPORT request information flow.

Table 2: Information content of CALL-REPORT request

Service Element	Type
CALL-REPORT Identifier	M (note 3)
TETRA Call Identifier	M (notes 1 and 2)
Message Validity Timer	O
NOTE 1: As provided in the call retention parameters.	
NOTE 2: Local significance.	
NOTE 3: Basic service does not need to be included in this information flow since it is contained in the TETRA call identified by the TETRA Call Identifier.	

4.3.1.3 CALL-REPORTING indication

CALL-REPORTING indication is an unconfirmed information flow across rc from FE25 to FE5 which gives to user B the information that a call has been attempted and that this call has for origin user A identity.

Table 3 lists the service elements within the CALL-REPORTING indication information flow.

NOTE: CALL-REPORTING indication may also be presented to FE5 by FE25' when FE5 has migrated to a new SwMI and has operated call restoration.

Table 3: Information content of CALL-REPORTING indication

Service Element (note)	Type
Basic Service	M
Calling User Identity	M
Time Stamp	O
Call Priority	O
NOTE:	TETRA Call identifier is not available at the called user when the busy condition is due to NDUB.

4.3.1.4 CALL-REPORT-CRI

CALL-REPORT-CRI is an unconfirmed information flow across rb from FE21 to FE25 which associates a TETRA call set-up and one invocation of SS-CR.

Table 4 lists the service elements within the CALL-REPORT-CRI information flow.

Table 4: Information content of CALL-REPORT-CRI

Service Element	Type
Call Report Identifier (CRI)	M
Calling User Identity	M

4.3.1.5 ISI-SS-CR

ISI-SS-CR is an unconfirmed information flow across rb from FE25 to FE21 which indicates that SS-CR may be invoked for that unsuccessful call.

Table 5 lists the service elements within the ISI-SS-CR information flow.

Table 5: Information content of ISI-SS-CR

Service Element	Type
SS-CR Invocation Possible	M

4.3.2 Relationship of information flows to basic individual call information flows

The CALL-REPORT request information flow, the CALL-REPORT indication information flow, the CALL-REPORTING indication information flow and the CALL-REPORT CRI information flow are independent of basic call.

Table 6 summarizes the relationship of the SS-CR information flows to those of basic call.

Table 6: Relationship of SS-CCBS information flows to Basic Call

Information flow	Independent of basic call ?	With basic call flow ?	Basic call flows:
CALL-REPORT-CRI	yes	-	
CALL-REPORT request	yes	-	
CALL-REPORT indication	yes	-	
CALL-REPORTING indication	yes	-	
ISI-SS-CR	-	Yes	ISI-DISCONNECT; ISI-ALERTING

4.3.3 Examples of information flow sequences

A stage 3 ETS for SS-CR shall provide signalling procedures in support of the information flow sequences specified below. In addition, signalling procedures should be provided to cover other sequences arising from error situations, interactions with basic call, interactions with other supplementary services, different topologies, etc...

In the figures, SS-CR information flows are represented by solid arrows and basic call information flows are represented by broken arrows. An ellipse embracing two information flows indicates that the two information flows occur simultaneously. Within a column representing an SS-CR functional entity, the numbers refer to functional entity actions listed below. The following abbreviations are used.

4.3.3.1 Successful invocation of SS-CR in case of user B busy (UDUB)

Figure 3 shows the information flow sequence for successful invocation of SS-CR in the case of user B busy, user determined user busy (UDUB).

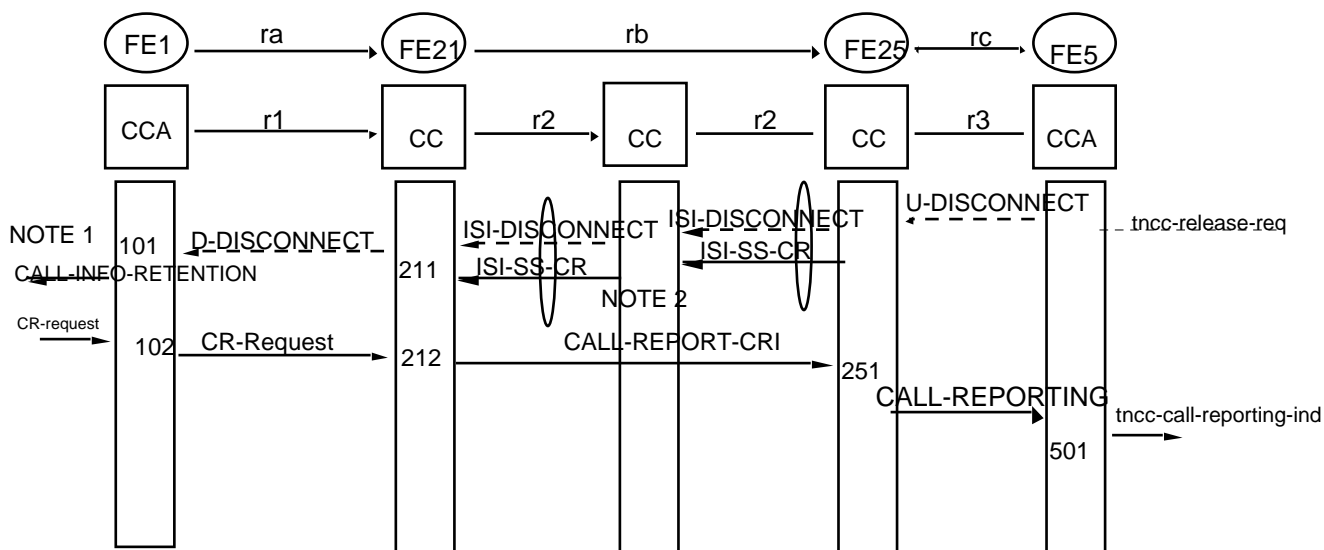
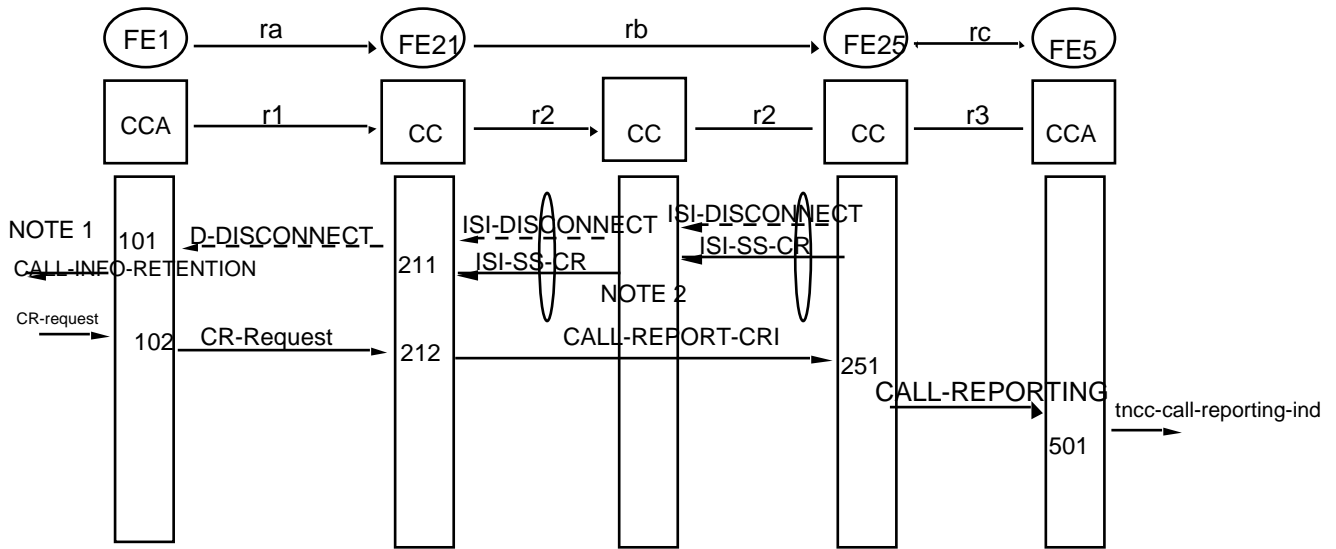


Figure 3: Successful invocation of SS-CR in case of busy user B (UDUB)

4.3.3.2 Successful invocation of SS-CR in case of user B busy (NDUB)

Figure 4 shows the information flow sequence for successful invocation of SS-CR in the case of user B busy, network determined user busy (NDUB).



NOTE 1: The CALL-INFO-RETENTION generated by FE1 gives the call information parameters which shall be retained/stored in the MS/LS as part of the support of SS-CR. This information is also kept within the originating SwMI during the duration of timer call retention; if this timer expires, this information is released by the originating SwMI.

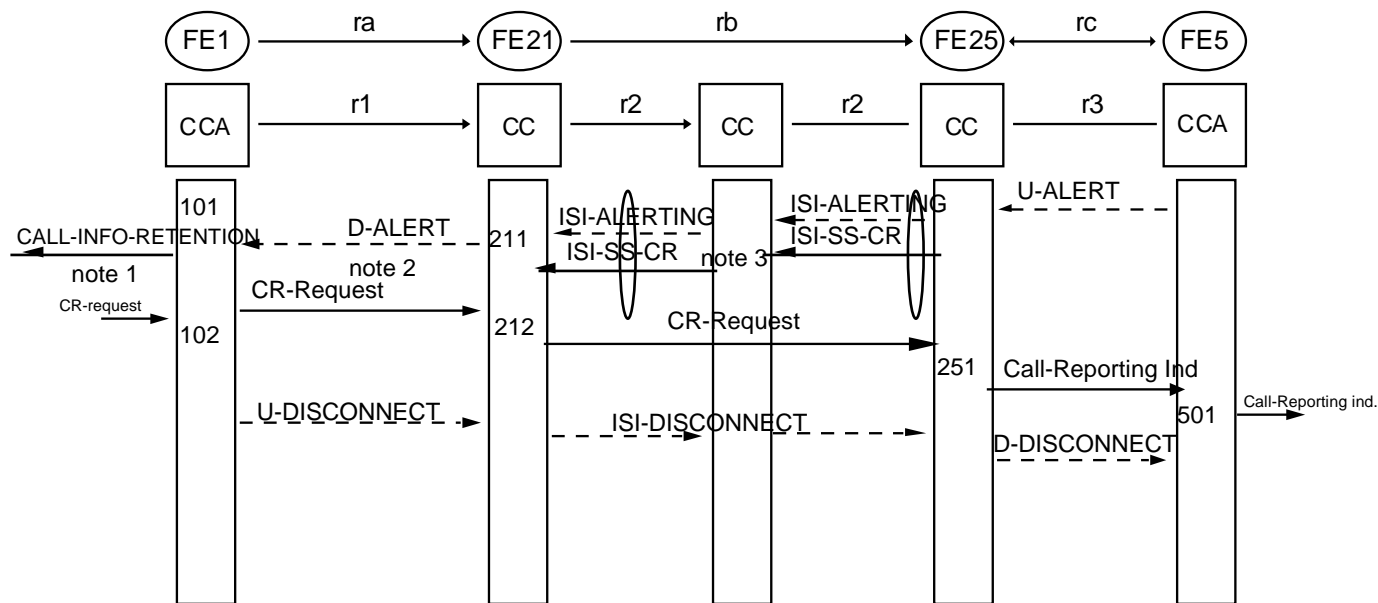
NOTE 2: The ISI-SS-CR carries the information that SS-CR can be invoked as a result of the failure of the call set-up.

NOTE 3: In the case where SwMI A indicates SwMI A NDUB such as due to network congestion, invocation of SS-CR fails.

Figure 4: Successful invocation of SS-CR in case of busy user B (NDUB)

4.3.3.3 Successful invocation of SS-CR in case of no reply

Figure 5 shows the information flow sequence for successful invocation of SS-CR.



NOTE 1: This example shows invocation of SS-CR before releasing the original call. If SS-CR is invoked after releasing the original call, CR req/ind will occur later than the U_DISCONNECT and the SwMI has to keep the information relating to the call just released within the call retention timer duration. The CALL-INFO-RETENTION, generated locally, contains the call parameters that allow user application to invoke SS-CR.

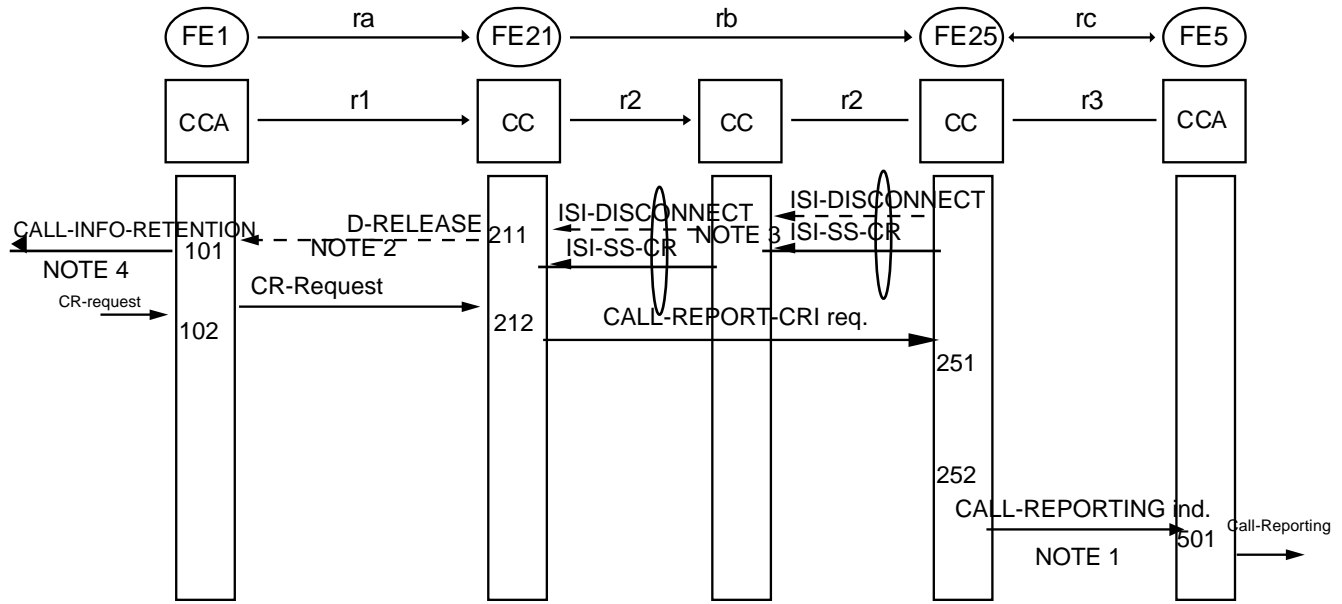
NOTE 2: At originating side, there is no way to distinguish between user B is being alerted and is busy (Call Waiting) or user B is not replying, non busy.

NOTE 3: The ISI-ALERTING is accompanied by the indication ISI-SS-CR which indicates that SS-CR invocation is possible.

Figure 5: Successful invocation of SS-CR in case of No reply

4.3.3.4 Successful invocation of SS-CR in case of Not Reachable

Figure 6 shows the information flow sequence for successful invocation of SS-CR.

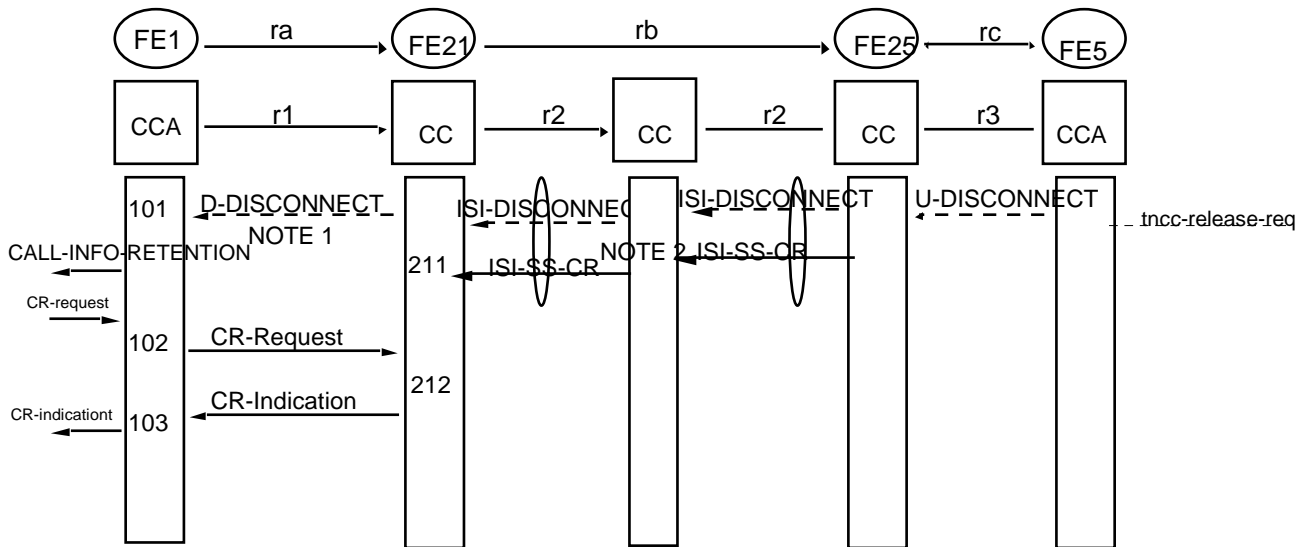


- NOTE 1: This example shows invocation of SS-CR after releasing the original call. Home SwMI is informed when FE5 becomes reachable and informs FE25/FE25' which presents CALL-REPORTING to FE5 which has become reachable.
- NOTE 2: The D-RELEASE gives the call information parameters. This information is kept within the originating SwMI during the duration of timer call retention; if this timer expires, this information is released by the originating SwMI.
- NOTE 3: The ISI-IC-DISCONNECT carries the information that SS-CR can be invoked as a result of the failure of the call set-up.

Figure 6: Successful invocation of SS-CR in case of Not Reachable

4.3.3.5 Unsuccessful invocation of SS-CR

Figure 7 shows the information flow sequence for successful invocation of SS-CR.



NOTE 1: The D-DISCONNECT gives the call information parameters. This information is retained/stored in the MS/LS as part of the support of SS-CR. This information is also kept within the originating SwMI during the duration of timer call retention; if this timer expires, this information is released by the originating SwMI. Unsuccessful invocation of SS-CR is shown in the case of disconnect cause "busy"; seen from the originating FE21, the information flow is the same for other causes of call releases.

NOTE 2: ISI-SS-CR indicates that invocation of SS-CR is possible for that unsuccessful call.

Figure 7: Unsuccessful local invocation of SS-CR

4.4 Functional entity actions

4.4.1 Functional entity actions of FE1

- 101 Store information related to failed TETRA basic call and present it to user A application in a CALL-INFO-RETENTION to enable User A to request SS-CR.
- 102 Receives CALL-REPORT-request from user application and send CALL-REPORT-request to FE21.
- 103 Receives CALL-REPORT-indication from FE21 and presents the result of CALL-REPORT request with a reject cause.

NOTE: Reject causes only are presented; successful completion of SS-CR does not lead to a SS-CR positive indication.

4.4.2 Functional entity actions of FE21

- 211 Store details of failed TETRA basic call and starts call retention timer.

NOTE: Action 211 could also be initiated by receipt of a busy indication as part of another Supplementary Service, rather than via the release of the TETRA basic call.

- 212 If SS-CR is activated and requested before the expiration of the call retention timer, send CALL-REPORT-CRI req. to FE25; CRI associates the Calling User Identity and the SS-CR request.

If SS-CR is invoked after expiration of call retention timer, remove all call references/parameters.

If SS-CR is not invoked, do nothing and erases the previous call information.

4.4.3 Functional entity actions of FE25

- 251 Receives CALL-REPORT-CRI and if SS-CR is possible:
- store request against User B; and
 - if User B is reachable (either busy or no reply), send CALL-REPORTING indication to FE5
 - if User B is not reachable, continue to monitor User B's status to determine when User B becomes reachable; when user B becomes reachable prior to expiration of message validation timer, send CALL-REPORTING indication to FE5;
 - If SS-CR is not possible (either permanently or due to expiration of message validation timer, and as an implementation option return CALL-REPORT indication to FE21 indicating reason for rejection.

4.4.4 Functional entity actions of FE5

501 Receives CALL-REPORTING indication and presents the Call Report to the user application.

4.5 Allocation of functional entities to physical equipment

The allocations of FEs to physical equipment shown in table 7 shall apply.

Table 7: Scenarios for the allocation of FEs to physical equipment in case of individual call

Scenario	Functional Entities			
	User A		User B	
	FE1	FE21	FE25	FE5
1 Users A and B in same SwMI	MS/LS	SwMI	SwMI	MS/LS
2 User A in SwMI, User B in other SwMI	MS/LS	SwMI A	SwMI B	MS/LS
NOTE: The case of inter working with another network is not considered in this ETS.				

4.6 Inter-working considerations

N/A.

NOTE: There is no external network supporting SS-CR; ISDN and GSM support message waiting (which indicates voice message waiting); PISN does not support Call Report.

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.112 (1993): "Vocabulary of terms for ISDNs".
- ITU-T Recommendation I.210 (1993): "Principles of telecommunication services supported by an ISDN and the means to describe them".

History

Document history	
February 2000	Public Enquiry PE 200022: 2000-02-02 to 2000-06-02
June 2000	Vote V 20000825: 2000-06-26 to 2000-08-25