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Terrestrial Trunked Radio (TETRA);
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Part 10: Supplementary services stage 1;
Sub-part 24: Call Retention (CRT)

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Contents

Foreword

This European Telecommunication Standard (ETS) has been produced by the Terrestrial Trunked Radio (TETRA) Project of the European Telecommunications Standards Institute (ETSI).

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".

Transposition dates	
Date of adoption of this ETS:	14 April 2000
Date of latest announcement of this ETS (doa):	31 July 2000
Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	31 January 2001
Date of withdrawal of any conflicting National Standard (dow):	31 January 2001

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1   Scope

This ETS specifies the supplementary service Call Retention SS-CRT which is applicable to various basic services supported by TETRA SwMIs. Basic services are specified in ETS 300 392-2 [4].

SS-CRT is a supplementary service which applies either during call establishment or once call is established to protect a call from pre-emption by another call of lower priority.

Supplementary service specifications are produced in three stages, according to the method described in ITU-T Recommendation I.210 [2]. The present document contains the stage 1 specifications of SS-CRT. The stage 1 descriptions specify the supplementary services as seen by users of networks.

This ETS is applicable to circuit mode TETRA V+D tele-services and bearer services. This ETS is not applicable to TETRA Short Data Service (SDS).

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

This second edition of this ETS is based on the latest edition of ECMA-263 [1]. The first edition of this ETS was drafted at a time where no published text of ECMA-263 [1] existed. Additions to ECMA-263 [1] have been made to take into account particular TETRA specifics such as group calls and to include user requirements and situations not addressed in ECMA-263 [1].

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]   ECMA-263 (1997): "Private Integrated Services Network (PISN) -
            Specification, Functional Model and Information Flows -
            Call Priority Interruption and Call Priority Interruption Protection Supplementary
            Services (CPI(P)SD)".

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

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

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

[5]   ETSI ETS 300 392-10-24 (1996): "Terrestrial Trunked Radio (TETRA); Voice
            plus Data (V+D); Part 10: Supplementary services stage 1; Part 10-24: Call
            retention".

3   Definitions, symbols and abbreviations

3.1   Definitions

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

Call Priority Interruption Capability Level (CPICL): parameter indicating the priority of a call (ECMA-263); will be used in case of interworking

Call Priority Interruption Protection Level (CPIPL): parameter indicating a level of protection of a call against interruption from other calls (ECMA-263); will be used in case of interworking

Call Retention Value (CRV): value which defines the relative level of protection of established calls against pre-emption

established call: active call that is selected for interruption

impending priority interruption state: condition of an established call and a priority call after provision of an Impending priority interruption warning notification and before the release of the established call

impending priority interruption warning notification: notification provided before the release of the established call

non-priority call: call that has not been assigned any level of priority

> NOTE 1:   A non-priority call may be a protected call.

non-protected call: call that has not been assigned any level of protection

> NOTE 2:   A non-protected call may be a priority call.

priority call: call that has been assigned some level of priority (by a PC or PPC value)

> NOTE 3:   A priority call may also be a protected call.

protected call: call that has been assigned some level of protection (by a Call Retention Value)

> NOTE 4:   A protected call may also be a priority call.

served user: user who requests SS-CRT

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

time to priority interruption: duration of the impending priority interruption state

unprotected call: call which has not been assigned a CRV value or has a CRV value equal to zero

3.2   Symbols

For the purposes of this ETS, there are no additional symbols excepted the symbols used in the SDL representation (ITU-T Recommendation Z.100 [3]).

3.3   Abbreviations

3.3.1   General abbreviations

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

GTSI	Group TETRA Subscriber Identity
ISDN	Integrated Services Digital Network
ISI	Inter System Interface
ITSI	Individual TETRA Subscriber Identity
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

3.3.2 Supplementary service abbreviations

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

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
CFNRy	Call Forwarding on No Reply
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
CRV	Call Retention Value
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
SNA	Short Number Addressing
TC	Transfer of Control
TPI	Talking Party Identification

4 SS-CRT stage 1 specification

4.1 Description

4.1.1 General description

Call Retention (SS-CRT) is a supplementary service that allows the protection of calls against pre-emption. SS-CRT enables the user to define a relative level of call protection, once established, against the probability of having the network connection resources pre-empted.

Every call in a Switching and Management Infrastructure (SwMI) shall be assigned a Call Retention Value (CRV), and, in the event that resources are required, the call with the lowest CRV, using the required resources, shall be pre-empted. Pre-emption of resources may be necessary because the resources are required by pre-emptive priority calls. In the event where all calls have the same CRV, another mechanism may be used to determine which resource to take e.g. oldest, type of call, user.

> NOTE: The network operator may have to provide a correspondence between priority values and CRVs. This correspondence and the means to establish it are outside the scope of this ETS.

The served user may be either the calling user, the called user or both in the case of an individual call.

In the case of a group call, the called group may be assigned a CRV prior to call set-up; this value called group CRV will not be changed during the duration of the call; only the calling user outside the group may be able to change CRV for the call during that call.

SS-CRT is a service which defines the relative level of protection of the established call against the probability of having the resources pre-empted. In the event of a pre-emption of resources the call with the lowest CRV should be taken. On networks which do not implement SS-CRT, it is assumed that all calls have the same CRV.

4.1.2 Qualifications on applicability to telecommunication services

SS-CRT is applicable to all circuit mode basic bearer and tele-services defined in ETS 300 392-2 [4].

4.2 Procedure

4.2.1 Provision/withdrawal

Provision and withdrawal of SS-CRT shall be by pre-arrangement with the service provider or shall be generally available.

The provision of the service shall be on a per Individual TETRA Subscriber Identity (ITSI)/ Group TETRA Subscriber Identity (GTSI) basis. For each ITSI/GTSI, the supplementary service may be subscribed to for every basic service subscribed to at that ITSI/Group TETRA Subscriber Identity (GTSI) or for only some of the basic services subscribed to at that ITSI.

One or more Call Retention Values (CRV) shall be allocated to the served user. CRVs may be allocated to gateways to other networks for use on behalf of users outside the TETRA Network. Where no CRV is allocated a default value of zero (no protection) shall be assumed. The procedure by which CRV is allocated is outside the scope of this standard.

CRV shall take at least two values: 0 (no protection) and 3 (total protection). Intermediate values between no protection and total protection may be provided.

4.2.2 Normal procedures

4.2.2.1 Activation/deactivation/registration/interrogation

SS-CRT shall be activated by the service provider upon provision and deactivated upon withdrawal.

If the supplementary service is made generally available, then the served user shall be able to activate and invoke the service within the call set-up message.

Registration procedure shall not apply.

4.2.2.1.1 Void

4.2.2.1.2 Definition

As an implementation option, authorized users may dynamically define the CRV or CRV range for each registered ITSI/GTSI.

> NOTE: This process supplements the provision process, where the ITSIs are allocated a CRV range upon provision, and facilitates the "on line" change of CRV ranges.

4.2.2.1.3 Registration

N.A.

4.2.2.1.4 Interrogation

The infrastructure may provide interrogation, which can be local, remote or both.

If interrogation is provided, a SwMI shall support interrogation on a per ITSI/GTSI basis for:

- provided/not provided;

- default CRV;

- SS-CRT value range;

- applicable basic service.

4.2.2.1.5   Cancellation

Cancellation shall not be applicable to SS-CRT.

4.2.2.2   Invocation and operation

SS-CRT may be invoked by a calling user or by a called user to assign a protection level (CRV) to a call in the initial call set up message. As an implementation option, the network may invoke SS-CRT automatically on behalf of the served user. Unless otherwise instructed, the CRV shall correspond to the default CRV of the basic service, pre-assigned upon provision. CRVs may be different for each basic service.

In the case where the calling user initiates a group call, he uses one of the values associated against his ITSI. The group controlling SwMI checks and chooses the highest requested value for the whole call.

> NOTE 1:   For a group call, the group controlling SwMI may select a CRV for each participating SwMI; this capability is outside the scope of this ETS.

All users may be assigned the same CRV default value.

If the service has been made generally available then the served user, shall be able to activate and invoke SS-CRT as part of the initial call set up, and shall send the required CRV value for the call.

The user shall be able to change the CRV once the call has been set-up. SS-CRT may also be provided on a GTSI basis.

> NOTE 2:   As an example, this assignment may be based on a class of service.

> NOTE 3:   A group call member may request change of CRV during the call; the group controlling SwMI will decide which new value to assign to the group call in progress.

Where both the calling user and the called user invoke SS-CRT for the same call, the CRV of the call shall be assigned the higher of the values requested.

The CRV shall be stored by the network for the lifetime of the call.

If the calling user has invoked SS-PPC and SS-CRT at the same time there shall be no interaction.

A user shall use the same CRV range independently of whether he is the calling user or the called user.

> NOTE 4:   It is not precluded that CRV values can be variable, e.g., a user may have the possibility to change the value with a user procedure. The details of such capabilities are outside the scope of this Standard.

In the case where the calling user has invoked SS-PPC for a new call, the called user is engaged on a call and SS-CRT has been invoked for that call then the CRV shall be checked before the call can be pre-empted under normal procedures of the supplementary services. If the CRV is sufficiently high, the pre-emptive priority call may not be able to pre-empt the ongoing call.

4.2.2.2.1   Invocation by a calling user

The calling user shall be able to request SS-CRT as part of the initial call set-up.

Following the receipt of a call retention request, the SwMI shall pass on the received CRV unchanged towards the call destination. Upon completion of the call the originating SwMI shall receive the called user CRV and shall set the CRV value for that call to the highest value (calling user CRV compared to called user CRV).

At any point during the call, the calling user shall be able to invoke SS-CRT with a change of value in the CRV on the calling user side.

4.2.2.2.2 Invocation by a called user

The called user (individual or group) shall be able to request SS-CRT for protection when confirming a call set-up request, to indicate a higher protection level than that associated with the incoming call. This request may be made regardless of whether, or not, the calling user invoked SS-CRT.

Following the receipt of a CRV of a higher value by the called user than the CRV requested by the called user, the called SwMI shall set the CRV to the highest value for that call and pass towards the origin SwMI the called user requested CRV.

At any point during the call, the called user shall be able to invoke SS-CRT with a change of value in the CRV on the called user side.

> NOTE: In the case of a called group user, the process to change the CRV during the call is outside the scope of this ETS.

4.2.3 Exceptional procedures

4.2.3.1 Activation/deactivation/registration/interrogation

4.2.3.1.1 Void

4.2.3.1.2 Interrogation

If the SwMI cannot accept an interrogation request, the interrogating user shall receive a notification that SS-CRT interrogation was unsuccessful. Possible causes for rejection can be e.g.:

- supplementary service not subscribed to;

- insufficient information;

- basic service to which relevance is requested is not subscribed to;

- unauthorized user.

4.2.3.2 Invocation and operation

If the SS-CRT request cannot be accepted the request shall be ignored and the default value of CRV shall be used. SS-CRT shall be rejected by the TETRA SwMI if the served user does not have the appropriate subscription parameters to use the service. If the user attempts to make a call and establish a CRV which is outside normal range, the infrastructure shall automatically adjust the CRV to the maximum nearest value as appropriate for the served user and proceed with the call. A notification may be returned to the served user.

If the user asks for a CRV which is less than his allowed range of values, the user gets what he is asking for.

In the case where SS-CRT is not invoked or where SS-CRT is invoked without a CRV, a default value of CRV shall be used. If the infrastructure cannot invoke the service, the call shall be allowed to proceed.

4.3 Interaction with other supplementary services and ANFs

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

4.3.1 Access Priority (SS-AP)

SS-CRT shall not have any interaction with SS-AP.

4.3.2 Advice of Charge (SS-AOC)

No interaction.

4.3.3 Ambience Listening (SS-AL)

SS-CRT shall not have any interaction with SS-AL.

4.3.4 Area Selection (SS-AS)

SS-CRT shall not have any interaction with SS-AS.

4.3.5 Barring of Incoming Calls (SS-BIC)

SS-CRT shall not have any interaction with SS-BIC.

4.3.6 Barring of Outgoing Calls (SS-BOC)

SS-CRT shall not have any interaction with SS-BOC.

4.3.7 Call Authorized by Dispatcher (SS-CAD)

SS-CRT shall not have any interaction with SS-CAD.

NOTE : The dispatcher is not able to change the CRV of an intercepted call.

4.3.8 Call Completion on No Reply (SS-CCNR)

SS-CRT may apply to a call resulting from the use of SS-CCNR; the same CRV shall apply to the completed call resulting from SS-CCNR as the original call.

4.3.9 Call Completion to Busy Subscriber (SS-CCBS)

SS-CRT may apply to a call resulting from the use of SS-CCBS; the same CRV value shall apply to the completed call resulting from SS-CCBS as the original call.

4.3.10 Call Forwarding Busy (SS-CFB)

SS-CRT may be invoked when establishing the forwarded call. The forwarded-to user may indicate that a higher protection level is required on the resulting call.

4.3.11 Call Forwarding No Reply (SS-CFNRy)

SS-CRT may be invoked when establishing the forwarded call. The forwarded-to user may indicate that a higher protection level is required on the resulting call.

4.3.12 Call Forwarding Not Reachable (SS-CFNRc)

SS-CRT may be invoked when establishing the forwarded call. The forwarded-to user may indicate that a higher protection level is required on the resulting call.

4.3.13 Call Forwarding Unconditional (SS-CFU)

SS-CRT may be invoked when establishing the diverted call. The forwarded-to user may indicate that a higher protection level is required on the resulting call.

4.3.14 Call Hold (SS-HOLD)

SS-CRT shall not have any interaction with SS-HOLD.

4.3.15 Call Report (SS-CR)

SS-CRT shall not have any interaction with SS-CR.

4.3.16 Call Waiting (SS-CW)

SS-CRT shall not have any interaction with SS-CW.

4.3.17 Calling Line Identification Presentation (SS-CLIP)

SS-CRT shall not have any interaction with SS-CLIP.

4.3.18 Calling/Connected Line identification Restriction (SS-CLIR)

SS-CRT shall not have any interaction with SS-CLIR.

4.3.19 Connected Line identification Presentation (SS-COLP)

SS-CRT shall not have any interaction with SS-COLP.

4.3.20 Discreet Listening (SS-DL)

SS-CRT shall not have any interaction with SS-DL.

> NOTE: The way the operation of the discreet listening supplementary service has been standardized, the establishment of the connection which allows the discreet listening of a monitored user's call (i.e. so that the monitoring user can monitor that call) cannot be considered as a call to that monitored user. Otherwise, it would have been necessary to recall here that in no event will such call ever be offered to the monitored user.

4.3.21 Dynamic Group Number Assignment (SS-DGNA)

SS-CRT shall not have any interaction with SS-DGNA.

> NOTE: If the served user has dynamically assigned a new group, then the CRV from the served user shall be part of the new group set-up. This CRV is known by subscription.

4.3.22 Include Call (SS-IC)

SS-CRT shall not have any interaction with SS-IC.

4.3.23 Late Entry (SS-LE)

SS-CRT shall not have any interaction with SS-LE.

4.3.24 List Search Call (SS-LSC)

SS-CRT shall not have any interaction with SS-LSC.

4.3.25 Pre-emptive Priority Call (SS-PPC)

SS-CRT shall not have any interaction with SS-PPC.

> NOTE 1: It is assumed that SS-PPC invocation cannot lead to a change of CRV of a call.

> NOTE 2: The normal procedure of comparing PPC level and CRV is not considered to be an interaction.

NOTE 3: In the case where SS-CRT is not invoked or where SS-CRT is invoked without a CRV, a default value of CRV shall be used.

4.3.26 Priority Call (SS-PC)

SS-CRT shall not have any interaction with SS-PC.

NOTE: SS-CRT applies only to PPC calls.

4.3.27 Short Number Addressing (SS-SNA)

SS-CRT shall not have any interaction with SS-SNA.

4.3.28 Talking Party Identification (SS-TPI)

SS-CRT shall not have any interaction with SS-TPI.

4.3.29 Transfer of Control (SS-TC)

SS-CRT shall not have any interaction with SS-TC.

4.3.30 Transit Counter (ANF-TC)

No interaction.

4.3.31 ANF-ISI-IC

Each ISI Individual Call shall be assigned a call retention value; this value shall be the highest value of the value affected by the originating SwMI (corresponding to the calling user selected CRV) and the value affected by the terminating SwMI (corresponding to the called user selected CRV); in the case where no CRV is indicated a default value shall be used. In case of limited ISI resource, ANF-ISI-IC shall pre-empt ISI-ICs starting with the ISI existing individual calls with the lowest CRV values.

NOTE: SS-CRT shall interact with the ANF-ISIIC in having the Call Retention Value (CRV) of the call for which both have been invoked assigned to the inter-TETRA connection(s) over which this call will have been routed. The ANF-ISI-IC signalling connection shall use the same CRV as the basic call.

4.3.32 ANF-ISI-GC

See ANF-ISI-IC.

4.3.33 ANF-ISI-MM

ANF-ISI-MM shall insure that the CRV range of the calling user is provided to the new visited SwMI in case of migration of the calling user; ANF-MM shall insure that the CRV range of the called user is provided to the new visited SwMI in case of migration of the called user.

NOTE: SwMIs that support SS-PPC may also support SS-CRT and vice-versa.

4.4 Inter-working considerations

When inter-working with another network which supports an equivalent feature, it may be possible to operate with the other network to provide SS-CRT. As of today, it appears that inter-working in those assumptions can occur only between two TETRA networks or between one TETRA network and a Private ISDN network since Public ISDN and GSM do not support SS-CRT.

4.5 Overall SDL

Figure 1 contains the dynamic description of SS-CRT using the Specification Description Language (SDL) defined in ITU-T Recommendation Z.100 [3]. The SDL process represents the behavior of the network in providing SS-CRT to a served user.

Input symbols from the left represent primitives from the served user.

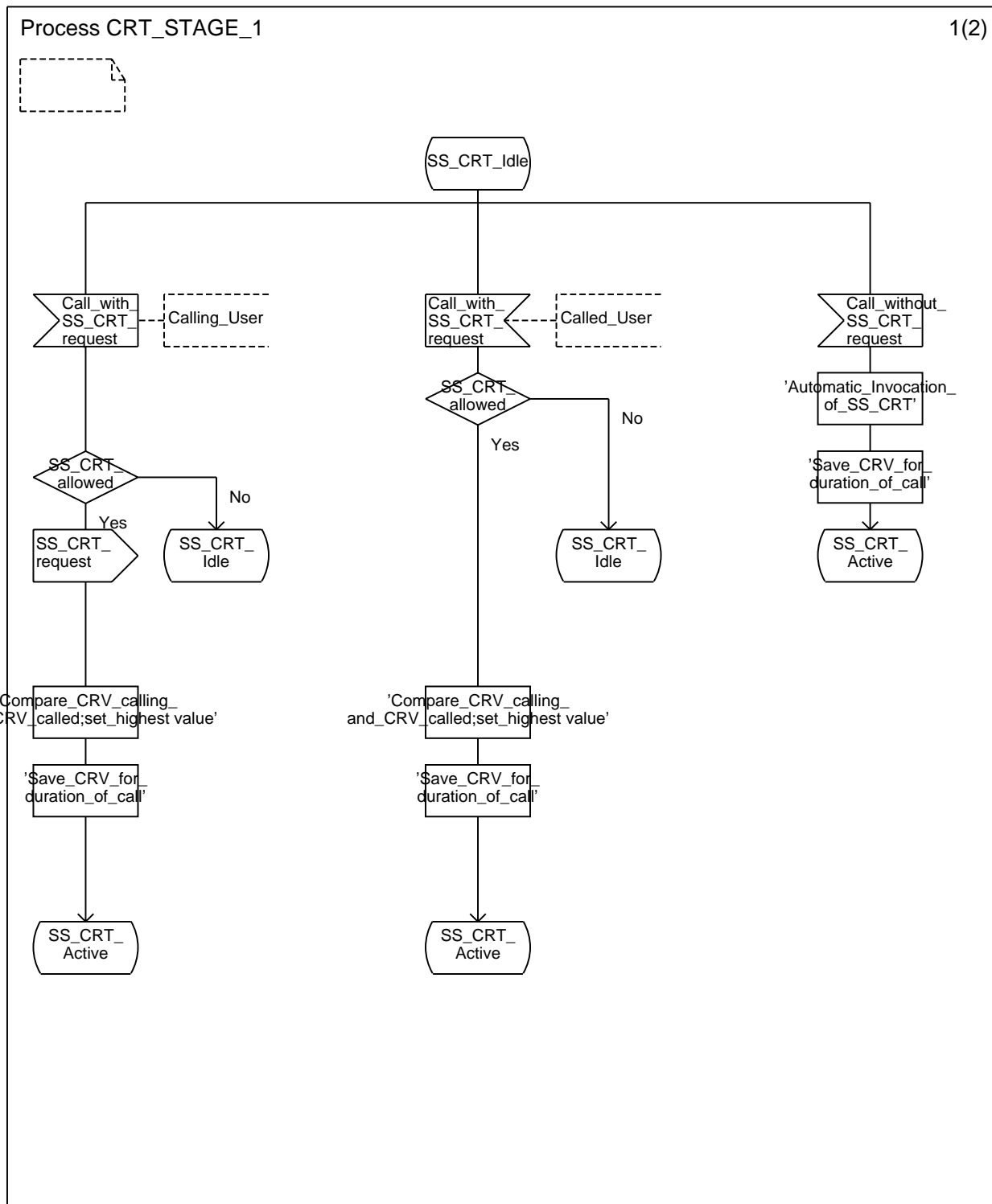Output symbols to the right represent primitives to the basic call process.

Figure 1 (sheet 1 of 2): SS-CRT overall SDL

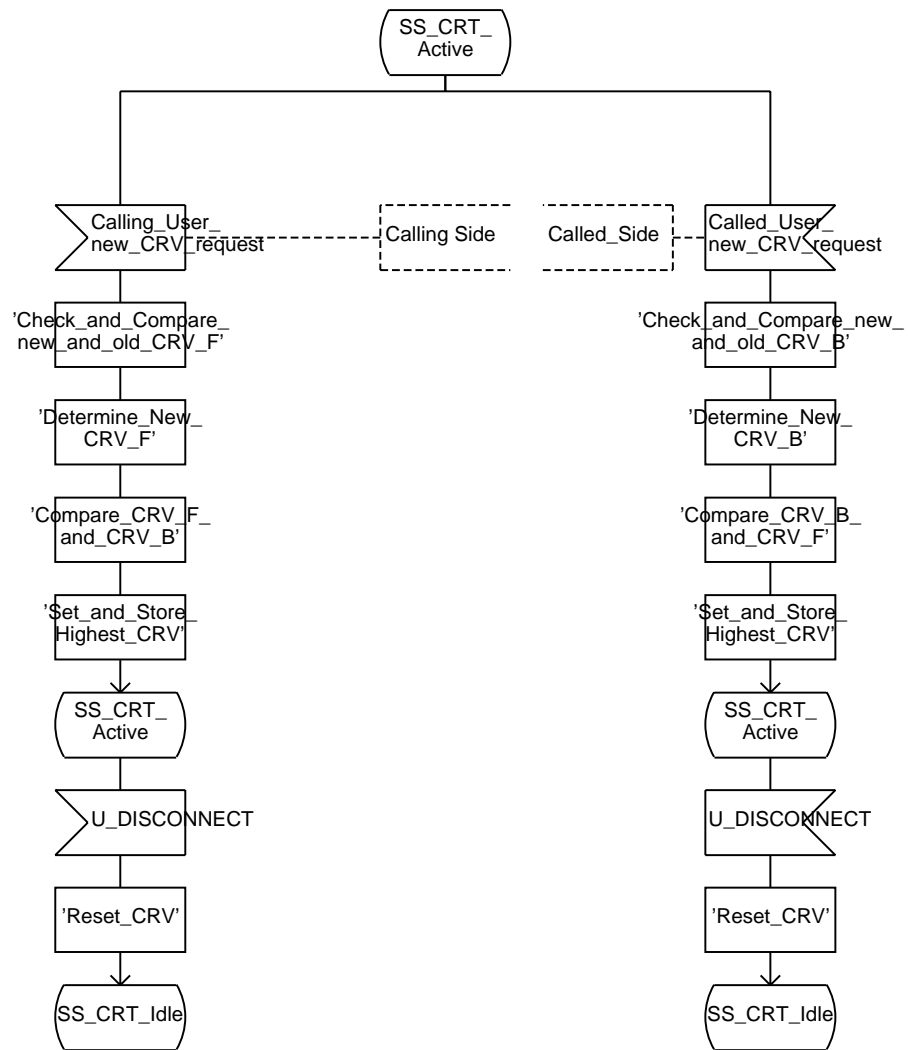Process CRT_STAGE_1   2(2)

SS_CRT_
Active

| Calling_User_ new_CRV_request | ···· | Calling Side | Called_Side | ···· | Called_User_ new_CRV_request |

'Check_and_Compare_ new_and_old_CRV_F'

'Determine_New_ CRV_F'

'Compare_CRV_F_ and_CRV_B'

'Set_and_Store_ Highest_CRV'

SS_CRT_ Active

U_DISCONNECT

'Reset_CRV'

SS_CRT_Idle

'Check_and_Compare_new_ and_old_CRV_B'

'Determine_New_ CRV_B'

'Compare_CRV_B_ and_CRV_F'

'Set_and_Store_ Highest_CRV'

SS_CRT_ Active

U_DISCONNECT

'Reset_CRV'

SS_CRT_Idle

Figure 1 (sheet 2 of 2): SS-CRT overall SDL

Annex A (informative):   Bibliography

- ITU-T Recommendation I.255.3: "Multi-level precedence and preemption service (MLPP)".

- ITU-T Recommendation I.255.4: "Priority Service".

- ITU-T Recommendation Q.85.3: "Multi-level precedence and preemption (MLPP)".

History

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