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**Terrestrial Trunked Radio (TETRA);
Voice plus Data (V+D);
Part 10: Supplementary services stage 1;
Sub-part 12: Call Hold (HOLD)**

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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Project Terrestrial Trunked Radio (TETRA).

The present document is part 10, sub-part 12 of a multi-part deliverable covering Voice plus Data (V+D), as identified below:

EN 300 392-1:   "General network design";

EN 300 392-2:   "Air Interface (AI)";

EN 300 392-3:   "Interworking at the Inter-System Interface (ISI)";

ETS 300 392-4:   "Gateways basic operation";

EN 300 392-5:   "Peripheral Equipment Interface (PEI)";

EN 300 392-7:   "Security";

EN 300 392-9:   "General requirements for supplementary services";

EN 300 392-10:   "Supplementary services stage 1";

  EN 300 392-10-1:   "Call Identification (CI)";

  ETS 300 392-10-2:   "Call report";

  ETS 300 392-10-3:   "Talking Party Identification (TPI)";

  EN 300 392-10-4:   "Call Forwarding (CF)";

  ETS 300 392-10-5:   "List Search Call (LSC)";

  EN 300 392-10-6:   "Call Authorized by Dispatcher (CAD)";

  ETS 300 392-10-7:   "Short number addressing";

  EN 300 392-10-8:   "Area Selection (AS)";

  ETS 300 392-10-9:   "Access priority";

  EN 300 392-10-10:   "Priority Call (PC)";

  EN 300 392-10-11:   "Call Waiting (CW)";

  EN 300 392-10-12:   "Call Hold (HOLD)";

  ETS 300 392-10-13:   "Call completion to busy subscriber";

  EN 300 392-10-14:   "Late Entry (LE)";

ETS 300 392-10-15:	"Transfer of control";

ETS 300 392-10-16:	"Pre-emptive priority call";

EN 300 392-10-17:	"Include Call (IC)";

EN 300 392-10-18:	"Barring of Outgoing Calls (BOC)";

EN 300 392-10-19:	"Barring of Incoming Calls (BIC)";

ETS 300 392-10-20:	"Discreet Listening (DL)";

EN 300 392-10-21:	"Ambience Listening (AL)";

EN 300 392-10-22:	"Dynamic Group Number Assignment (DGNA)";

ETS 300 392-10-23:	"Call completion on no reply";

ETS 300 392-10-24:	"Call Retention (CRT)";

EN 300 392-11:	"Supplementary services stage 2";

EN 300 392-12:	"Supplementary services stage 3";

ETS 300 392-13:	"SDL model of the Air Interface (AI)";

ETS 300 392-14:	"Protocol Implementation Conformance Statement (PICS) proforma specification";

TS 100 392-15:	"TETRA frequency bands, duplex spacings and channel numbering";

TS 100 392-16:	"Network Performance Metrics";

TS 100 392-17:	"TETRA V+D and DMO Release 1.1 specifications".

National transposition dates	
Date of adoption of this EN:	6 February 2004
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1 Scope

The present document defines the stage 1 description of the call hold supplementary service (SS-HOLD) for the Terrestrial Trunked RAdio (TETRA) as provided by European operators. The stage 1 description is an overall service description from the user point of view but does not deal with the details of the human interface itself (see ITU-T Recommendation I.130 [1]).

SS-HOLD enables a user to interrupt communication on an existing individual call and then subsequently, if desired, re-establish communication.

The present document specifies the service description of the supplementary service and the procedures to be expected with successful and unsuccessful outcomes. In addition the present document specifies the interactions with other TETRA supplementary services and Interworking considerations.

Charging principles are outside the scope of the present document.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

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

[2]   ITU-T Recommendation Z.100: "Specification and Description Language (SDL)".

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

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

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in EN 300 392-9 [4], except for those of affected user and served user, which are given below:

affected user: after SS-HOLD has been invoked by one of the two parties in an individual call, the other party in that call

NOTE: If both parties in an individual call invoke SS-HOLD, both will be affected user for SS-HOLD invocation by the other party.

served user: user who may invoke the supplementary service (i.e. request that a call be put on hold)

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

HOLD   Call Hold
ISDN   Integrated Services Digital Network
MS   Mobile Station
SDL   (Functional) Specification and Description Language
SS   Supplementary Service

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

4 SS-HOLD stage 1 specification

4.1 Description

4.1.1 General description

The call hold supplementary service (SS-HOLD) enables a user to interrupt an existing individual call and then subsequently retrieve that call (in re-establishing communication), unless it has been cleared.

4.1.2 Qualifications on applicability to telecommunication services

This supplementary service shall be applicable to all TETRA circuit mode individual teleservices and bearer services.

4.2 Procedures

4.2.1 Provision/withdrawal

The provision of SS-HOLD shall be either general for all (TETRA) individual subscribers or on a per individual subscriber basis.

The supplementary service shall be withdrawn by the service provider:

- for administrative purposes; or

- at the request of the served user, if individually provided.

No specific information shall then be given to the subscribers by the network.

4.2.2 Normal procedures

4.2.2.1 Activation/deactivation, interrogation

4.2.2.1.1 Activation/deactivation

The service shall be activated upon provision and deactivated upon withdrawal.

4.2.2.1.2 Interrogation

The network and the served user may support the interrogation procedure, initiated by the served user to inform him about:

- the number of calls put on hold by that user;

- the calls presently on hold.

4.2.2.2 Invocation and operation

4.2.2.2.1 Hold request

When the served user invokes SS-HOLD during an individual call, after it has been established, and the network accepts that invocation, the call shall be interrupted. The network shall inform the served user about the success of that invocation. It shall also notify the affected user about it.

If the served user uses a radio access to the network (i.e. he is equipped with mobile terminal equipment), the corresponding air interface resource used for the call traffic may be released. If the affected user uses a radio access to the network, it is an implementation matter whether the network releases or not the corresponding air interface resource used for the call traffic (on the affected user side).

The served user may be either of the two users participating in the individual call. If the supplementary service is provided to both users, each one can put the call on hold independently of the other.

The served user may be able to invoke SS-HOLD for more than one individual call. However, the maximum number of held calls at any one time per subscriber shall be a network option.

4.2.2.2.2 Follow-up

When the served user has successfully invoked SS-HOLD he shall still be considered by the network as being in the basic call state: call active. The same shall apply for the affected user.

NOTE 1: More generally, except if the network releases the air interface resource used for the call traffic on the affected user side, no change happens in the basic (individual) call for the affected user when it is put on hold for the served user.

After he has successfully invoked SS-HOLD, the served user shall be able to make another request to the network in order to:

- retrieve that call from hold or any other call which is on hold;

- originate a new call;

- establish connection to an incoming call, e.g. a waiting call.

If the network can satisfy the request (i.e., in the case of mobile terminal equipment, air interface and other necessary resources are available), it shall re-establish the call and acknowledge that request in indicating that the call has been (successfully) retrieved; if it cannot, it shall reject the request and inform the served user whether or not the call on hold is retrievable, i.e. whether or not a new retrieval request sent later may be successful. If the call on hold is retrievable but cannot be retrieved, e.g. because resources are not available at this time, such reject may be delayed for some pre-defined time. The served user may then subsequently ask for another retrieve request for the call on hold.

NOTE 2: Unless the call has been cleared in the meantime or congestion (e.g. at the air interface) occurs, one might expect that the network will able to fulfil the retrieval request if:

- the served user has not changed location since he has put that call on hold; or if

- the served user has changed location since he has put that call on hold and both his terminal equipment and the network support the optional SS-HOLD location change procedure.

See clause 4.2.3.2.4 for the case where the network cannot satisfy the request because the served user has changed location since he has invoked SS-HOLD for the call and the network does not support the SS-HOLD location change procedure.

NOTE 3: If the affected user changes location while the call is on hold, the call restoration procedure for basic call may apply.

If there are multiple calls on hold, the served user shall be able to select the call he wants to retrieve.

If the retrieve request for a call on hold (i.e. an individual on hold) is successful, the network shall notify the affected user about it.

4.2.3 Exceptional procedures

4.2.3.1 Activation/deactivation, interrogation

4.2.3.1.1 Activation/deactivation

No exceptional procedures identified.

4.2.3.1.2 Interrogation

If the network cannot accept an interrogation request, the interrogating user shall be informed about the interrogation failure. The possible failure causes are:

- SS-HOLD interrogation not supported;

- SS-HOLD not subscribed for the interrogating user.

4.2.3.2 Invocation

SS-HOLD invocation by a user in a call shall fail when:

- the supplementary service has not been subscribed for that user; or

- the maximum number of calls on hold at any time for that user has already been reached.

The network shall then inform that user about the corresponding reason.

4.2.3.3 Operation

4.2.3.3.1 Call on hold cleared by the served user

The served user shall be able to clear a call on hold using the basic call procedures. Such clearing shall be independent of that of any other call in which the served user participates.

If the served user has put on hold more than one call, he shall be able to selectively clear any of them, without the need to retrieve them.

4.2.3.3.2 Call cleared by the network

The network shall be able to clear any call on hold. It shall then inform the served user using the basic call procedures.

If the served user requests to retrieve a previously held call which has been cleared or is in the process of being cleared, he shall be informed of the reason for failure.

4.2.3.3.3 Call on hold cleared by the affected user

The affected user shall be able to clear the call while it is on hold, according to the basic call procedures. The served user shall be informed about the call clearing according to those basic call procedures.

4.2.3.3.4 Location change

If the network cannot support the SS-HOLD location procedure, it shall indicate it to the MS of the served user when that user sends his first request to retrieve one of the (individual) calls which he has put on hold previously after having changed location. The served user MS shall then send the call control primitive TNCC-RELEASE indication (see clause 11 of EN 300 392-2 [3]) to the served user application in giving the corresponding cause: restoration of call (on hold) not supported. The network should then clear the call on hold in giving the same cause to the affected user.

4.3 Interactions with other supplementary services

The interactions with other TETRA supplementary services are specified in the present clause.

4.3.1 Calling line identification presentation

SS-HOLD shall not have any interaction with the calling line identification presentation supplementary service.

4.3.2 Connected line identification presentation

SS-HOLD shall not have any interaction with the connected line identification presentation supplementary service.

4.3.3 Calling/connected line identification restriction

SS-HOLD shall not have any interaction with the calling/connected line identification restriction supplementary service.

4.3.4 Call report

SS-HOLD shall not have any interaction with the call report supplementary service.

4.3.5 Talking party identification

If invoked for a call for the served user, the talking party identification supplementary service shall stop operating for that user while the call is on hold.

NOTE: Normally the above requirement would be irrelevant for individual calls.

4.3.6 Call forwarding unconditional

SS-HOLD shall not have any interaction with the call forwarding unconditional supplementary service.

4.3.7 Call forwarding on busy

SS-HOLD shall not have any interaction with the call forwarding on busy supplementary service.

NOTE 1: If activated for the SS-HOLD served user, the supplementary service call forwarding on busy will be invoked for a new call to that user while he has a call on hold, since he is then considered as busy (see clause 4.2.2.2.2).

NOTE 2: The same applies for the affected user, since he is also busy (see clause 4.2.2.2.2).

4.3.8 Call forwarding on no reply

SS-HOLD shall not have any interaction with the call forwarding on no reply supplementary service. Both the served and affected users are considered to be busy, see notes in clause 4.3.7.

4.3.9   Call forwarding on not reachable

SS-HOLD shall not have any interaction with the call forwarding on no reply supplementary service.

NOTE 1: If the user is not reachable, then SS-HOLD cannot be invoked and the SS-CFNRc can be invoked.

NOTE 2: If the user comes not reachable during an invoked hold then on the SS-CFNRc can be invoked once that situation is identified in the system, before that the user is considered to be busy, see clause 4.3.7.

4.3.10   List search call

SS-HOLD shall not have any interaction with the list search call supplementary service.

4.3.11   Call authorized by dispatcher

Not applicable when the call authorized by dispatcher supplementary service is operated with no diversion of the call to the dispatcher.

When the call authorized by dispatcher supplementary service is operated with diversion of the call to the dispatcher, SS-HOLD shall not have any interaction with the call authorized by dispatcher supplementary service regarding that diverted call with the dispatcher, i.e.:

- either the calling user or the dispatcher shall be able to put that call on hold if the service has been subscribed for them; and

- the dispatcher shall be able to authorize the call to continue while the call is on hold (whether it has been put on hold by him or by the calling user).

Once the dispatcher has authorized the call to continue while the calling user has put that call on hold, the calling user MS/LS should retrieve it at the latest when the called party has answered the call.

NOTE: Since when the dispatcher authorized the call to continue, the branch of that call on the dispatcher side is cleared, it does not matter whether or not the dispatcher had put it on hold.

4.3.12   Short number addressing

SS-HOLD shall not have any interaction with the short number addressing supplementary service.

4.3.13   Area selection

SS-HOLD shall not have any interaction with the area selection supplementary service.

NOTE: For individual calls the SS-AS is completed before SS-HOLD can be invoked and SS-HOLD is not applicable to group calls.

4.3.14   Access priority call

SS-HOLD shall not have any interaction with the access priority supplementary service.

4.3.15   Priority call

SS-HOLD shall not have any interaction with the priority call supplementary service.

4.3.16   Call waiting

SS-HOLD shall not have any interaction with the call waiting supplementary service, except for the recommendation that if the SS-CW served user is engaged in an individual call with an additional call in the call waiting state and if he wants to be connected to the waiting call without clearing the first call, he should put it on hold before accepting the waiting call.

NOTE 1: If subscribed for the SS-HOLD served user, the call waiting supplementary service may be invoked for a new call by that user while he has a call on hold, since he is then considered as busy (see clause 4.2.2.2.2).

NOTE 2: The same applies for the affected user, since he is also busy (see clause 4.2.2.2.2).

4.3.17 Call completion to busy subscriber

SS-HOLD shall not have any interaction with the call completion to busy subscriber supplementary service.

NOTE: The call completion to busy subscriber supplementary service may be invoked for a failed call attempt to the SS-HOLD served user, since he is then considered as busy (see clause 4.2.2.2.2).

4.3.18 Late entry

SS-HOLD shall not have any interaction with the late entry supplementary service, notably if the SS-HOLD served user has put a call on hold, he shall be able to receive late entry messages. The same shall apply to the affected user.

4.3.19 Void

4.3.20 Pre-emptive priority call

SS-HOLD shall not have any interaction with the pre-emptive priority call supplementary service, i.e.:

- the served user may be pre-empted while he has calls on hold;

- if the affected user or a connection element used by the call on hold is pre-empted, the call on hold shall be cleared.

4.3.21 Include call

The served user of both SS-HOLD and the include call supplementary service shall be able to invoke the include call supplementary service for any of his calls on hold. The on hold situation for that call shall then be removed by the operation of the include call supplementary service.

NOTE: The requirement that the on hold situation is removed (i.e. the call is automatically retrieved) is all the more logical because the call resulting from the operation of the include call supplementary service is group call - for which SS-HOLD does not apply.

4.3.22 Void

4.3.23 Barring of outgoing calls

SS-HOLD shall not have any interaction with the barring of outgoing calls supplementary service.

4.3.24 Barring of incoming calls

SS-HOLD shall not have any interaction with the barring of incoming calls supplementary service.

4.3.25   Discreet listening

SS-HOLD shall not have any interaction with the discreet listening supplementary service (SS-DL), notably:

- the (SS-DL) monitoring user may invoke SS-HOLD for a discreet listening call, if SS-HOLD has been subscribed for him (see notes 1 and 2);

- the (SS-DL) monitored user may invoke SS-HOLD during a monitored individual call, if SS-HOLD has been subscribed for him. The (SS-DL) monitoring user shall be informed about it and about the subsequent operations (e.g. retrieval or clearing of call on hold). If the (SS-DL) monitored user establishes a new call following his SS-HOLD invocation, the (SS-DL) monitoring user shall be informed about it and shall be able to listen to it.

NOTE 1:   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 the monitored user ever be able to put such call on hold.

NOTE 2:   Even though the SS-DL monitoring user may invoke SS-HOLD for a discreet listening call, his operational instructions may restrict him to do it. Such instructions are outside the scope of standardization.

4.3.26   Ambience listening

If a user has invoked the ambience listening supplementary service, he shall be able to invoke SS-HOLD for ambience listening if SS-HOLD has been subscribed for him. No SS-HOLD notification (when the call is put on hold and when it is retrieved) shall then be sent to the user whose ambience is being listened to.

NOTE 1:   Even though the user who is monitoring the ambience around a user may invoke SS-HOLD for the corresponding ambience listening supplementary service, his operational instructions may restrict him to do it. Such instructions are outside the scope of standardization.

NOTE 2:   According to its specification, the ambience listening supplementary service is operated only when the user being listened to does not participate in an individual call. Hence by definition, this user cannot invoke SS-HOLD while he is subject to the operation of the ambience listening supplementary service.

4.3.27   Dynamic group number assignment

SS-HOLD shall not have any interaction with the dynamic group number assignment supplementary service as SS-HOLD is not applicable to group calls.

4.3.28   Call completion on no reply

SS-HOLD shall not have any interaction with the call completion on no reply supplementary service.

4.3.29   Call retention

SS-HOLD shall not have any interaction with the call retention supplementary service.

4.4   Interworking considerations

4.4.1   Interworking between different TETRA networks

When the affected user is located in another network than the served user, that other network shall pass to the affected user:

- the notification that SS-HOLD has been invoked for the call (see clause 4.2.2.2.1);

- the notification that the call on hold has been retrieved (see clause 4.2.2.2.2).

When the served user has invoked SS-HOLD in a network, called the old network, and migrates in another network and that new network or the old network do not support the optional SS-HOLD migration procedure, the old network shall clear each individual call he has still on hold, in sending the corresponding disconnect cause: "restoration of call (on hold) not supported" to the affected users.

The new network shall apply the (generic) procedure mentioned in clause 4.2.3.2.4 (for the case of failure due to location change in the same network) to inform the served user about the clearing of his calls on hold.

The same shall apply for both the old and the new networks when the served user migrates in another network than that where his subscription is recorded (the called is called his home network) and that other network does not support SS-HOLD.

NOTE: In addition, obviously, that other network will ignore any new SS- HOLD invocation.

4.4.2   Interworking with external networks

SS-HOLD operation shall be independent of whether the distant party is another TETRA user or an external user. The corresponding notifications to the distant party in the external network shall be sent to the TETRA gateway. Even if the call hold supplementary service is available in the external network (e.g. public ISDN), the TETRA gateway shall not invoke it when it receives the notification that the current call has been put on hold.

If the call hold supplementary service is available in the external network, the TETRA gateway shall operate as follows when it receives the notifications that the call has been put on hold or that it has been retrieved in the external network:

- if the call is an individual call, that gateway shall relay those notifications to the TETRA user whose call has been put on hold;

- if the call is a TETRA group call, that gateway shall ignore that notification.

4.5   Overall SDL

Figure 1 contains the dynamic description of SS-HOLD using the Specification Description Language (SDL) defined in ITU-T Recommendation Z.100 [2]. The SDL process in figure 1 represents the behaviour of the network in SS-HOLD invocation and operation procedures; that in figure 2, the behaviour of the network in SS-HOLD interrogation procedure.
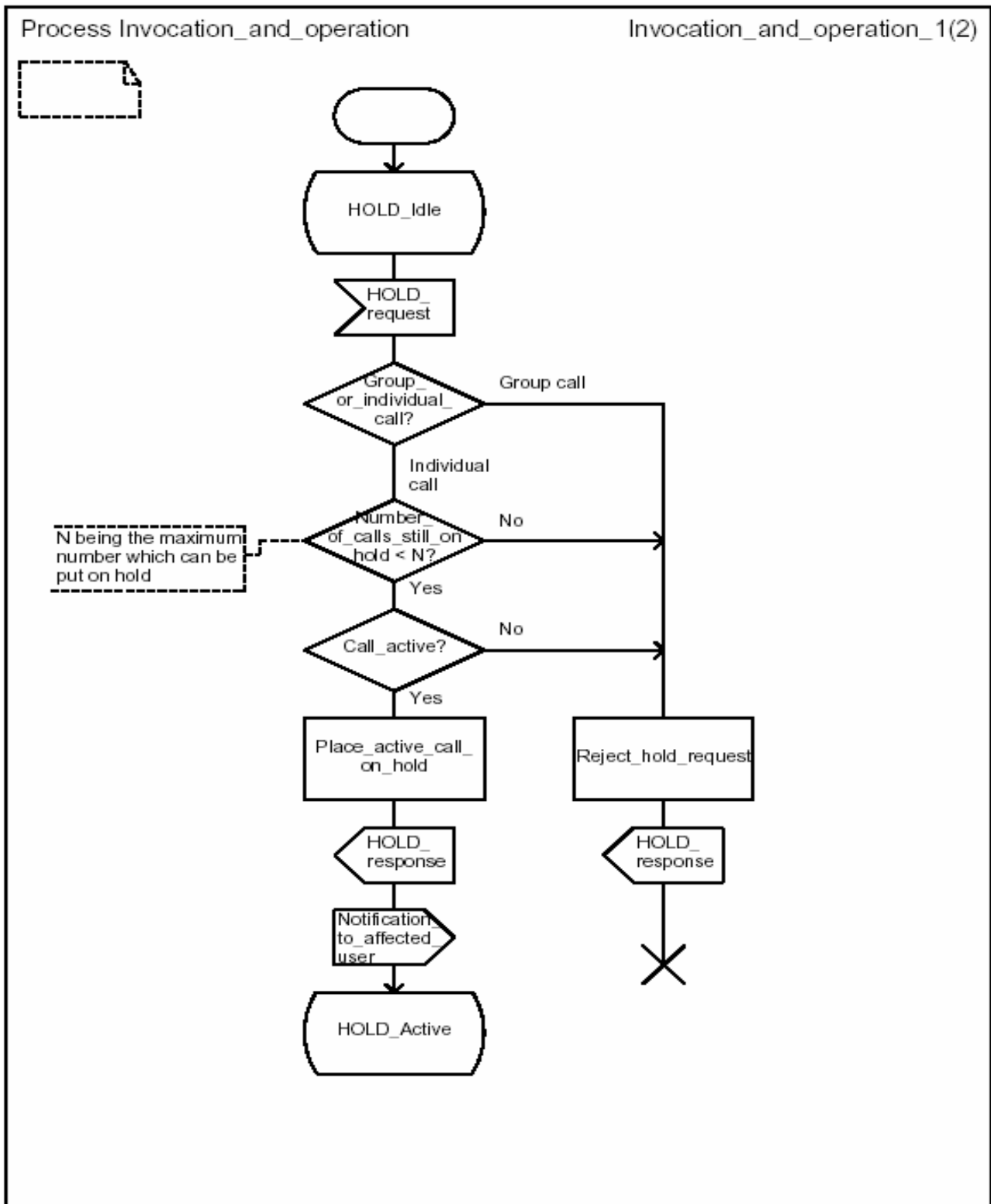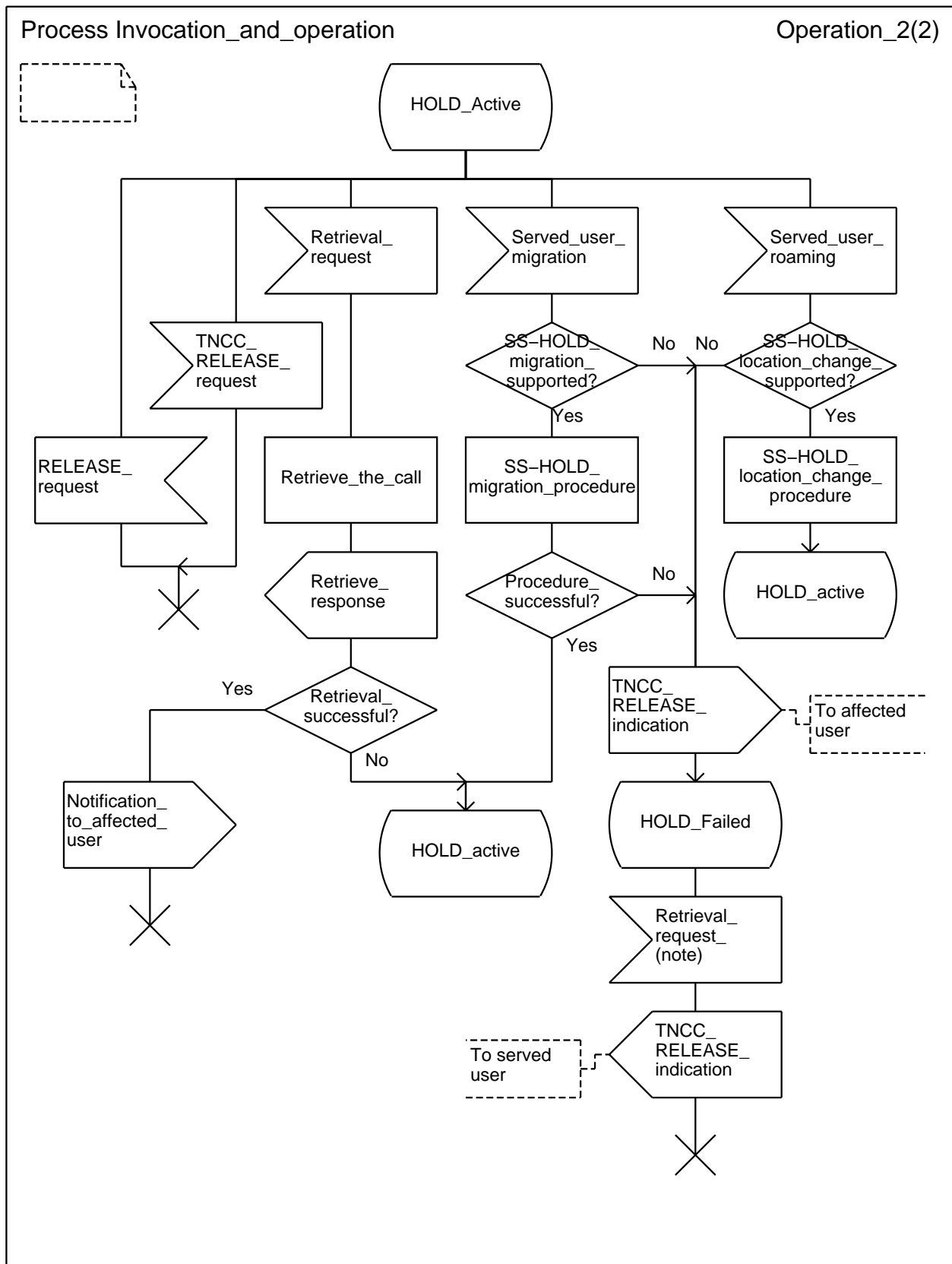
Figure 1 (sheet 1 of 2): SS-HOLD, overall SDL for invocation and operation

NOTE: If more than one call is on hold for the served user, the retrieval request from the served user shown on the figure should be understood as being the first one sent by that user (for any of them).

Figure 1 (sheet 2 of 2): SS-HOLD, overall SDL for invocation and operation

Process Interrogation   1(1)

Idle

TNSS_HOLD_
INTERROGATE_
request

Idle

TNSS_HOLD_
indication ──── From SS database

TNSS_HOLD_
INTERROGATE_
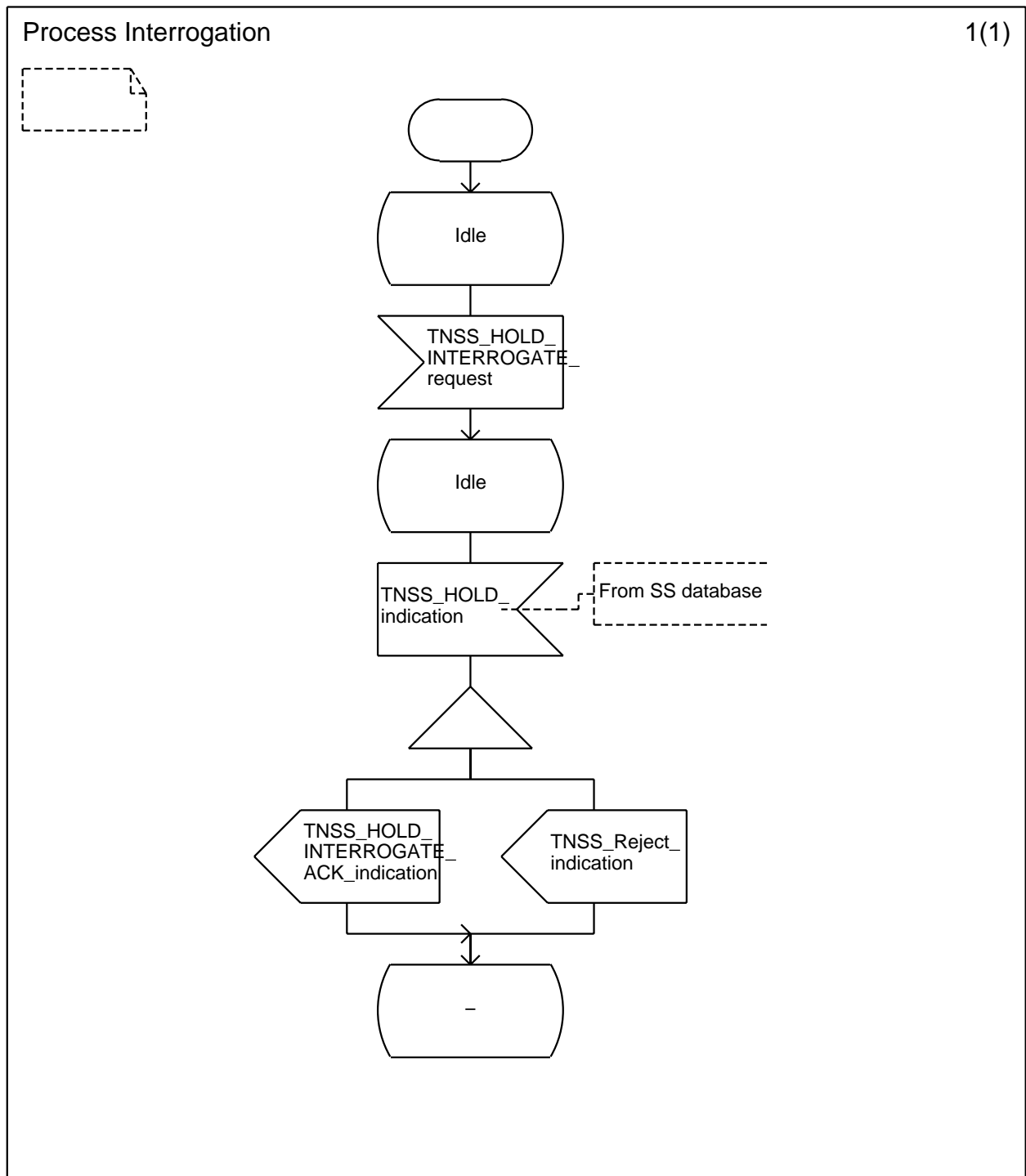ACK_indication

TNSS_Reject_
indication

–

Figure 2: SS-HOLD, overall SDL for interrogation

Annex A (informative):
Bibliography

ETSI ETS 300 392-4-2: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 4: Gateways basic operation; Sub-part 2: Integrated Services Digital Network (ISDN) gateway".

Annex B (informative):
Change Requests

The present document contains Change Requests as described in table B.1.

Table B.1: Change Requests

No	CR vers.	Standard Version	Clauses affected	Title	CR Status
001	01	Ed. 2	Forword, 4.2.2.1, 4.2.3.1, 4.3.8, 4.3.9, 4.3.13, 4.3.19, 4.3.22, 4.3.27	Interactions with other supplementary services clarified and editorial changes	Proposal

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V1.3.1	February 2004	Publication