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Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 11: Supplementary services stage 2; Sub-part 12: Call Hold (CH)

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ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
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Foreword

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

The present document had been submitted to Public Enquiry as ETS 300 392-11-12. During the processing for Vote it was converted into an EN.

The present document 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".

National transposition dates	
Date of adoption of this EN:	19 January 2001
Date of latest announcement of this EN (doa):	30 April 2001
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1 Scope

The present document specifies the stage 2 description of the Supplementary Service Call Hold (SS-HOLD) for the Terrestrial Trunked Radio (TETRA).

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

Man-Machine Interface (MMI) and charging principles are outside of the scope of the present document.

Supplementary service specifications are produced in three stages according to the method defined in ITU-T 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 EN 300 392-10-12 [7]). 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.

The present document is applicable to TETRA Voice plus Data terminal equipment and networks.

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.

[1] ITU-T Recommendation I.130 (1993): "Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".

[2] ETSI EN 300 392-1: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 1: General network design".

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

[4] ETSI EN 300 392-3-2: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 3: Interworking at the Inter-System Interface (ISI); Sub-part 2: Additional Network Feature Individual Call (ANF-ISIIC)".

[5] ETSI ETS 300 392-3-5: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 3: Interworking at the Inter-System Interface (ISI); Sub-part 5: Additional Network Feature for Mobility Management (ANF-ISIMM)".

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

[7] ETSI ETS 300 392-10-12: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 10: Supplementary services stage 1; Sub-part 12: Call Hold (CH)".

[8] ETSI EN 300 392-12-12: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 12: Supplementary services stage 3; Sub-part 12: Call Hold (CH)".

[9] ISO/IEC 11574 (1994): "Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Circuit-mode 64 kbit/s bearer services - Service description, functional capabilities and information flows".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the definitions given in EN 300 392-9 [6] apply with the following modifications:

affected user: other party than the served user in an individual call

served user: user participating in an individual call who invokes the supplementary service

NOTE: When the served user has many calls on hold, he may be the calling party for some of them and the connected party for the others.

3.2 Abbreviations

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

ANF-ISIMM	Additional Network Feature - Inter-System Interface Mobility Management
CC	Basic Service Call Control functional entity
CCA	Basic Service Call Control functional entity agent

NOTE 1: CC and CCA are applied as defined in ISO/IEC 11574 [9].

FE	Functional Entity
HOLD	Call Hold
ISI	Inter-System Interface
ITSI	Individual TETRA Subscriber Identity
LS	Line Station
MS	Mobile Station
SDL	Specification an Description Language
SS	Supplementary Service

NOTE 2: The abbreviation SS is only used when referring to a specific supplementary service (e.g. SS-HOLD).

SwMI	Switching and Management Infrastructure

4 Functional model

4.1 Functional model description

The functional model shall comprise the following Functional Entities (FEs):

FE1	Served user functional entity
FE21	Served user SwMI FE
FE21'	Served user new SwMI FE
FE25	Affected user SwMI FE
FE5	Affected user FE

The following relationships shall exist:

ra	between FE1 and FE21
rb	between FE21 and FE5+
rc	between FE21 and FE25
rd	between FE21 and FE21'

Figure 1 shows these FEs and relationships for the basic operational part of SS-HOLD, when the served user does not change location after he has put a (individual) call on hold.

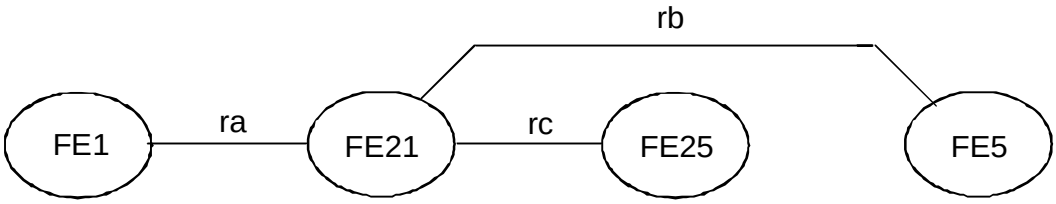


Figure 1: Functional model for the basic operational part of SS-HOLD

Figure 2 shows these FEs and relationships for the operational part of SS-HOLD, when the served user changes location after he has put a (individual) call on hold.

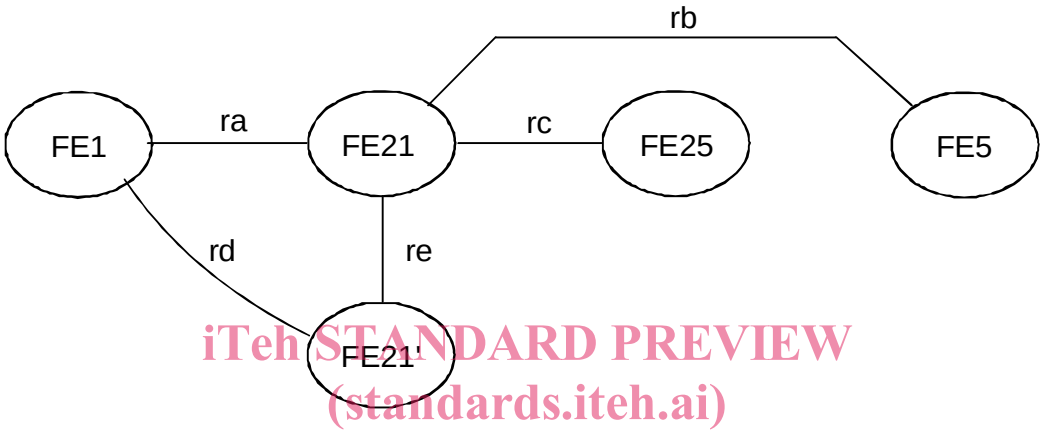


Figure 2: Functional model for the operational part of SS-HOLD with location change of the served user

NOTE: Both figures 1 and 2 apply only in the case of individual call since SS-HOLD does not apply to group call.

4.2 Description of functional entities

4.2.1 Served user functional entity, FE1

FE1 is the functional entity that serves the calling user for the invocation of SS-HOLD.

If the served user changes location with one or more individual call still on hold, FE1 may be informed by FE21' about possible changes for those calls. It will process that information according to its contents; notably if it indicates a call reference change for some calls on hold, it will update accordingly its call references for those calls.

FE1 may also relay the interrogation requests received from the served user to FE21, and the corresponding responses from FE21 to the served user (as indication primitives).

4.2.2 Served user SwMI functional entity, FE21

When it receives a SS-HOLD invocation from FE1, FE21 checks whether SS-HOLD has been activated (i.e. subscribed) and, if so, puts the call on hold, in informing FE5 and FE25.

If the served user changes location with an individual call still on hold, FE21 may attempt to create FE21'. If that attempt is successful, FE21 passes the data about that call to FE21'. If not, it informs the collocated individual call control entity about the situation.

4.2.3 Served user new SwMI functional entity, FE21'

If the served user changes location with a call still on hold, FE21' may be created.

FE21' then receives the data about that call, informs FE1 about the calls on hold for which one of the two following changes has occurred due to the location change: call reference changed or call lost. After that FE21' replaces FE21.

4.2.4 Affected user SwMI functional entity, FE25

FE25 receives from FE21 the information that SS-HOLD has been invoked (by the served user) for the call and passes it to the collocated individual call control entity.

4.2.5 Affected user functional entity, FE5

FE5 is the functional entity that serves the affected user to inform him when the call has been put on hold and then, when it is retrieved.

4.3 Relationship of functional model to basic call functional model

Although no formal models have been defined for basic individual call nor for basic group call, those models can be readily derived from the PISN model for basic call, in ISO/IEC 11574 [9].

FE1 shall be collocated with the CCA of the calling user or of the called user in an individual call.

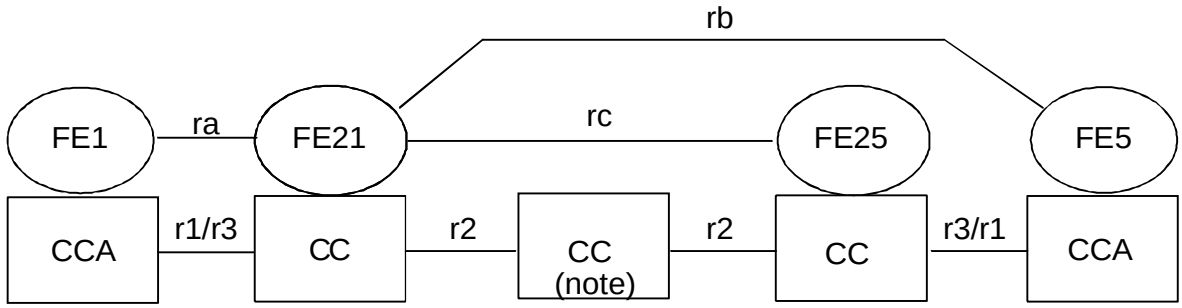
FE21 shall be collocated with the CC functional entity in the served user SwMI in an individual call.

Depending on whether the served user has roamed or migrated (with one or more individual calls on hold), FE21' shall be collocated with the CC functional entity either:

- in the same served user SwMI if the served user has roamed;
- in the served user new SwMI if the served user has migrated.

FE5 shall be collocated with the CCA of the remote party in an individual call.

Figure 3 shows the relationship between the models for SS-HOLD and for the basic individual call.



NOTE: It is possible that no intermediate CC be present (i.e. when the called user (whether he is the served user or the/an affected user) is registered in his home SwMI and when no transit Private Integrated (services) Network Exchanges -PINXs- are present).

Figure 3: Relationship between models for SS-HOLD and basic individual call

5 Information flows

5.1 Definition of information flows

In the tables listing the information elements in information flows, the column headed "Type" indicates which of these elements are Mandatory (M), which are Optional (O) and which are Conditional (C).

5.1.1 INFORM 1

INFORM 1 is an unconfirmed information flow:

- across relationship rb from FE21 to FE5 to inform the affected user about the successful result of SS-HOLD invocation;
- across relationship rc from FE21 to FE25 to inform the affected user SwMI about the successful result of SS-HOLD invocation.

There are no elements in that information flow.

5.1.2 INFORM 2

INFORM 2 is an unconfirmed information flow:

- across relationship rb from FE21 to FE5 to inform the affected user about the successful retrieval of the call (previously on hold);
- across relationship rc from FE21 to FE25 to inform the affected user SwMI about the successful the successful retrieval of the call (previously on hold).

There are no elements in that information flow.

5.1.3 INFORM 3

INFORM 3 is an unconfirmed information flow across relationship rb from FE21 to FE5 to inform the affected user that the call on hold is being cleared because the served user has changed location and either the FE21' functional entity cannot be created (e.g. case of migration into a new SwMI that does not support SS-HOLD) or it cannot take over FE21 role to support a later request from the served user (after the change location procedure has been completed) to retrieve the call on hold.

There are no elements in that information flow.

5.1.4 INTERROGATE

INTERROGATE is an unconfirmed information flow across relationship ra from FE1 to FE21 which is used to interrogate the served user SwMI about the calls currently still on hold for the served user.

NOTE: The response/confirmation information flow corresponding to the INTERROGATE request/indication information flow is INTERROGATE ACK (see clause 5.1.5).

There are no elements in that information flow.

5.1.5 INTERROGATE ACK

INTERROGATE ACK is actually the response/confirmation information flow corresponding to the INTERROGATE request/indication information flow. It is thus across relationship ra from FE21 to FE1. It is used to respond to the corresponding interrogation request.