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Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 11: Supplementary services stage 2; Sub-part 6: Call Authorized by Dispatcher (CAD)

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**Terrestrial Trunked Radio (TETRA);
Voice plus Data (V+D);
Part 11: Supplementary services stage 2;
Sub-part 6: Call Authorized by Dispatcher (CAD)**

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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 11, sub-part 6 of a multi-part deliverable covering the Terrestrial Trunked Radio (TETRA); 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 300 392-11: "Supplementary services stage 2";**
 - EN 300 392-11-1: "Call Identification (CI)";
 - ETS 300 392-11-2: "Call Report (CR)";
 - ETS 300 392-11-3: "Talking Party Identification (TPI)";
 - EN 300 392-11-4: "Call Forwarding (CF)";
 - ETS 300 392-11-5: "List Search Call (LSC)";
 - EN 300 392-11-6: "Call Authorized by Dispatcher (CAD)";**
 - ETS 300 392-11-7: "Short Number Addressing (SNA)";
 - EN 300 392-11-8: "Area selection (AS)";
 - ETS 300 392-11-9: "Access Priority (AP)";
 - EN 300 392-11-10: "Priority Call (PC)";
 - ETS 300 392-11-11: "Call Waiting (CW)";
 - EN 300 392-11-12: "Call Hold (HOLD)";
 - ETS 300 392-11-13: "Call Completion to Busy Subscriber (CCBS)";

- EN 300 392-11-14: "Late Entry (LE)";
- ETS 300 392-11-16: "Pre-emptive Priority Call (PPC)";
- EN 300 392-11-17: "Include Call (IC)";
- EN 300 392-11-18: "Barring of Outgoing Calls (BOC)";
- EN 300 392-11-19: "Barring of Incoming Calls (BIC)";
- ETS 300 392-11-20: "Discreet Listening (DL)";
- EN 300 392-11-21: "Ambience Listening (AL)";
- ETS 300 392-11-22: "Dynamic Group Number Assignment (DGNA)";
- ETS 300 392-11-23: "Call Completion on No Reply (CCNR)";
- ETS 300 392-11-24: "Call Retention (CRT)";
- 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 spacing and channel numbering";
- TS 100 392-16: "Network Performance Metrics";
- TS 100 392-17: "TETRA V+D and DMO Release 1.1 specifications".

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1 Scope

The present document defines the stage 2 specifications of the Supplementary Service Call Authorized by Dispatcher (SS-CAD) for the Terrestrial Trunked Radio (TETRA) as provided by European operators. Stage 2 identifies the functional entities involved in the supplementary service and the information flows between them. Stage 2 is part of three stage definition where stage 1 (EN 300 392-10-6 [1]) specifies the service description and the procedures of the supplementary service and stage 3 specifies the service primitives, PDUs and protocols for functional entities.

NOTE: The stage 2 description is followed by the stage 3 description EN 300 392-12-6 [2], which specifies the encoding rules for the information flows and process behaviour for the different entities in the SwMI, in the MS and in the LS.

Aspects relating to all supplementary services are detailed in EN 300 392-9 [7].

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

The SS-CAD ensures that predefined TETRA calls do not proceed without first being authorized by a dispatcher.

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] ETSI EN 300 392-10-6: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 10: Supplementary services stage 1; Sub-part 6: Call Authorized by Dispatcher (CAD)".
- [2] ETSI EN 300 392-12-6: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 12: Supplementary services stage 3; Sub-part 6: Call Authorized by Dispatcher (CAD)".
- [3] ETSI EN 300 392-2: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 2: Air Interface (AI)".
- [4] ETSI EN 300 392-3-1: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 3: Interworking at the Inter-System Interface (ISI); Sub-part 1: General design".
- [5] 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)".
- [6] ETSI EN 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)".
- [7] 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 300 392-2 [3] and the following apply:

authorized user: user who can make service definition and can also activate/deactivate and interrogate the service

dispatcher: user to whom the request for authorization is directed

restricted user: user whose calls are forced to be authorized by a dispatcher before the call can proceed

NOTE: The restricted user can be either the calling user A or the called user B or both.

3.2 Abbreviations

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

CAD	Call Authorized by Dispatcher
CCA	Call Control Agent
FE	Functional Entity
ITSI	Individual TETRA Subscriber Identity
M	Mandatory
MMI	Man Machine Interface
O	Optional
PDU	Protocol Data Unit
SS	Supplementary Service

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

SwMI	Switching and Management Infrastructure
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4 Functional model

4.1 Functional model description

The functional model for SS-CAD shall, for each normal call set-up, consider the SS-CAD conditions defined in the subscriber data for both user A and user B respectively. Each of these users can have the SS-CAD authorization restriction which requires the dispatcher authorization at call set-up. The calling user A shall be informed when SS-CAD is invoked. There shall be no SS-CAD related indication to the called user.

Different dispatchers can be requested to authorize the call if SS-CAD is activated for either user A or user B. The following rules shall apply:

- if user A and user B are present in the same SwMI and both have SS-CAD invoked towards the same dispatcher, only one authorization shall be requested;
- if user A and user B are present in the same SwMI and both have SS-CAD invoked towards different dispatchers, then it is outside the scope of the present document if more than one dispatcher authorizes the call;
- if user A and user B are in different SwMIs, both SwMIs shall analyse if SS-CAD may be invoked. If invoked for both for both users, both the user A and the user B dispatcher shall be requested to authorize the call in sequence;
- if user A migrates to another SwMI outside its own home SwMI, the SS-CAD subscriber data shall follow it to the visited SwMI if SS-CAD shall be invoked there. It is optional for the visited SwMI to support invocation of SS-CAD;

- if user B migrates to another SwMI outside its own home SwMI, SS-CAD against incoming calls is normally operated in the home SwMI, but the SS-CAD subscriber data shall follow user B to the visited SwMI if SS-CAD shall be invoked against incoming calls originating from that visited SwMI (intra-SwMI calls). It is optional for the visited SwMI to support invocation of SS-CAD;
- if user B has migrated to another SwMI outside its own home SwMI and that SwMI coincides with the originating SwMI and the originating SwMI has first routed a call to user B to user B home SwMI (instead of applying an intra-SwMI call), then that SwMI should not operate SS-CAD against that incoming call to user B as the call at that moment is already authorized in the home SwMI of user B.

If a subscriber is migrating, the authorization shall, by default, be carried out by the subscribers' home dispatcher. Upon agreement between the network operators, the SS-CAD authorization migrated user A and/or user B may be carried out by the dispatcher of the visited SwMI.

Additional CAD restrictions can then be applied by the visiting SwMI to a migrating subscriber.

The functional model for SS-CAD shall comprise the following Functional Entities (FEs):

- FE1 calling user A's agent;
- FE2 CAD control entity in the SwMI where SS-CAD is invoked and a generic transport function, see EN 300 392-9 [7];
- FE3 authorized user's agent;
- FE7 dispatcher agent.

The following relationships shall exist between these FEs:

- ra between FE1 and FE2;
- rb between FE2 and FE7 in different SwMIs;
- rc between FE2 and FE2; [SIST EN 300 392-11-6 V1.2.1:2006](https://standards.iteh.ai/catalog/standards/sist/86092397-f5cf-4e55-9c10-a558dc2d968d/sist-en-300-392-11-6-v1-2-1-2006)
- rd between FE3 and FE2; <https://standards.iteh.ai/catalog/standards/sist/86092397-f5cf-4e55-9c10-a558dc2d968d/sist-en-300-392-11-6-v1-2-1-2006>

Figure 1 and 2 show the FEs and their relationships.

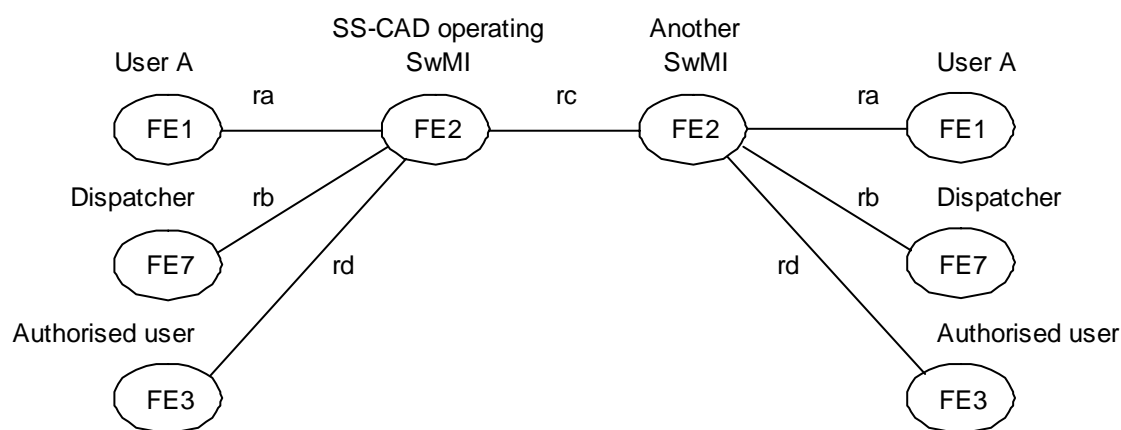


Figure 1: Functional model for the operational part of SS-CAD

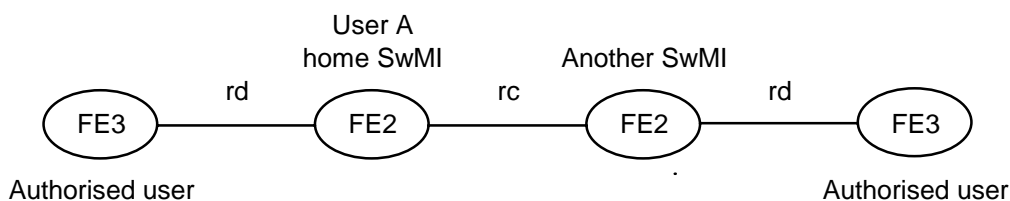


Figure 2: Functional model for the management part of SS-CAD

4.2 Description of FEs

4.2.1 Calling/restricted user A's functional entity, FE1

At the reception of notifications of the CAD interception from FE2, FE1 may deliver them to the calling user A.

4.2.2 CAD control functional entity, FE2

This functional entity:

- shall, for each new call establishment from user A, determine if the SS-CAD is activated and shall be invoked due to any of the following optional conditions related to either user A or user B:
 - 1) restricted basic service request;
 - 2) restricted destination or source address;
 - 3) restricted area.

NOTE: In addition there may be network dependent restriction reasons which are outside the scope of the present document.

- shall invoke call interception by sending information to the dispatcher functional entity FE7, if any of the interception conditions are met;
- shall initiate disconnection of the call if call rejection is received from FE7;
- shall generate and relay to FE1 the call interception notifications addressed to user A;
- shall receive instructions and perform actions for activation/deactivation and interrogation of SS-CAD from FE7;
- shall receive instructions and perform actions for acceptance, rejection and diversion from FE7;
- shall receive instructions and perform actions for definition, activation, deactivation and interrogation of SS-CAD from FE3;
- shall return responses to FE3 regarding requests for definition, activation, deactivation and interrogation of SS-CAD.

For general inter system inter-working this functional entity:

- shall deliver call interception notifications to the user A agent FE1 received from FE2 in another SwMI where SS-CAD has been invoked;
- shall deliver call interception notifications to the dispatcher agent FE7 received from FE2 in another SwMI where SS-CAD has been invoked;
- shall receive responses from the dispatcher agent FE7 which are sent back to FE2 in the other SwMI;
- shall relay information to and from the authorized user functional entity FE3 when the authorized user addresses FE2 of another SwMI.

Refer to EN 300 392-9 [7] for further details on FE2 subdivision.

4.2.3 Authorized user's functional entity, FE3

This functional entity shall:

- receive requests from the authorized user regarding activation, deactivation, and interrogation and pass these on to FE2;
- receive corresponding responses and information from FE2 and deliver them to the authorized user.

4.2.4 Dispatcher user's functional entity, FE7

This FE shall deliver call interception notifications received from FE2 to the dispatcher. It shall also receive responses from the dispatcher which are sent back to FE2.

When indication is received that CAD is invoked, the dispatcher shall either request immediate continuation of the original call or redirect the call to the dispatcher for further authorization or rejection or, if the authorization request is not accepted, immediately request disconnection of the initial call.

4.2.5 Relationship of functional model to basic call functional model

Functional entity FE1 shall be co-located with the calling user A's Call Control Agent (CCA) in a home or in a visited SwMI.

Functional entity FE2 shall be co-located with the Call Control entity within that TETRA Switching and Management Infrastructure (SwMI) where the SS-CAD is invoked.

Functional entity FE7 shall be co-located with the intercepted to dispatcher's CCA in the SwMI where the dispatcher is located.

Functional entity FE2 shall be located within that TETRA SwMI where the SS-CAD is not invoked but where the user A or the dispatcher is located.

Functional entity FE3 shall be co-located with the authorized user's CCA.

Called user B's CCA is not co-located with any FE for SS-CAD.

Examples of a relationship between the FEs for SS-CAD and the FEs for the basic call are shown in figures 3 to 14.

5 Information flows

This clause defines information flow names and contents in general terms. The information flows will be transformed into real PDUs in stage 3, refer EN 300 392-12-6 [2]. In some cases an information flow defined in the present document will be an element or a value of an element of a CC PDU, refer EN 300 392-2 [3], clauses 14.7 and 14.8, and EN 300 392-9 [7].

5.1 Definition of information flows

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

5.1.1 ACCEPT

ACCEPT is an unconfirmed information flow across rd and rc from FE7 to FE2 which indicates to FE2 that the dispatcher has authorized the call and that the call set-up to user B can continue. Table 1 lists the elements within the ACCEPT information flow.

This information flow shall be mandatory to FEs which support authorization.