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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 300 392-11-21. During the processing for Vote it was converted into an EN.

The present document is part 11, sub-part 21 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 300 392-11:   "Supplementary services stage 2";

    ETS 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)";

    ETS 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 (CH)";

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".

National transposition dates	
Date of adoption of this EN:	4 April 2003
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Date of withdrawal of any conflicting National Standard (dow):	31 January 2004

1   Scope

The present document defines the stage 2 specification of the Supplementary Service Ambience Listening (SS-AL) for the Terrestrial Trunked Radio (TETRA). Stage 2 identifies the functional entities involved in the supplementary service and the information flows between them. Aspects relating to all supplementary services are detailed in EN 300 392-9 [2].

NOTE: The stage 2 description is followed by the stage 3 description, which specifies the encoding rules for the information flows and process behaviour for the different entities in the SwMI and in the MS.

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

The SS-AL enables a served user to place a TETRA Mobile Station (MS) into a special type of voice call whereby the called MS transmits without any action from, or indication to, the affected user. The ambience listening call may include a second listening party.

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

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

[3]   ETSI EN 300 392-12-21: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 12: Supplementary services stage 3; Sub-part 21: Ambience Listening (AL)".

[4]   ETSI EN 300 392-10-21: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 10: Supplementary services stage 1; Sub-part 21: Ambience Listening (AL)".

3   Definitions and abbreviations

3.1   Definitions

For the purposes of the present document, the following terms and definitions apply:

Ambience Listening (AL) call: call in which ambience listening functionality is requested

NOTE: During the AL call, the affected user's MS transmits without any action from, or indication to, the affected user.

affected user: user whom the served user is listening to

served user: user who invokes this supplementary service and listens to the affected user

second listening party: TETRA individual or group which additionally listens the AL call

3.2 Abbreviations

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

AL	Ambience Listening
FE	Functional Entity
ISI	InterSystem Interface
ITSI	Individual TETRA Subscriber Identity
MS	Mobile Station
SS	Supplementary Service

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

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's service agent;

- FE2 ambience listening control entity;

- FE5 affected user's service agent;

- FE6 second listening party's service agent.

The following relationships shall exist between these FEs:

- ra between FE1 and FE2;

- rb between FE2 and FE5;

- rc between FE2s in different SwMIs;

- rd between FE2 and FE1 in a visited SwMI;

- re between FE2 in visited SwMI and FE5 in visited SwMI;

- rf between FE6 and FE2;

- rg between FE6 in visited SwMI and FE2 in a visited SwMI.

Figure 1 shows these FEs and their relationships.

NOTE: Served user FE1 and affected user FE5 can be present only once in each instance and figure 1 gives only a general view.
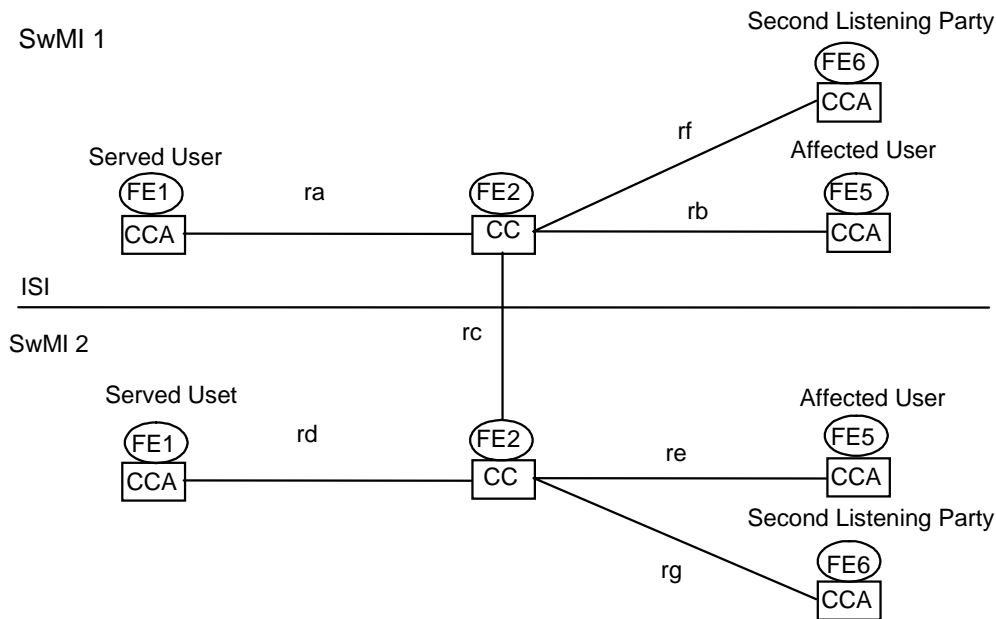
Figure 1: Operational and management functional model for SS-AL

4.2   Description of FEs

4.2.1   Served user's agent functional entity, FE1

The function entity FE1 shall:

-       receive interrogation and invocation information from the served user and information about the executed
        service request from FE2 in order to deliver it to the served user.

4.2.2   AL control functional entity in home SwMI, FE2

The functional entity FE2 shall:

-       perform checks and actions for the data received for interrogation and invocation;

-       provide the affected user's application with applicable SS-AL data by sending it to the affected user's service
        agent FE5 via visited system FE2 if the affected user is located in a different system;

-       provide the served user's agent functional entity with the acknowledgement or rejection of the requested
        service. This is sent via visited system SwMI FE2 if the served user is in visited system;

-       given that a second listening party is involved in the AL call, provide the second listening party's application
        with applicable SS-AL data by sending it to the second listening party's service agent FE6 via visited system
        SwMI FE2 if the second listening party is located in a different system;

-       if any exception conditions are noticed by SwMI, FE2 shall take appropriate action;

-       optionally clear down the AL call if a new incoming call is received for the affected user.

4.2.3 Affected user's agent functional entity, FE5

The functional entity FE5 shall:

- receive information of the new AL invocation;

- disable user notification of the call with which AL is invoked.

The functional entity FE5 should clear down the AL call if the affected user attempts to make a new call, normal call disconnection procedures shall apply to the AL call, as specified in EN 300 392-2 [1].

When the AL call ends FE5 reverts to normal operation.

In one SS-AL invocation there may only be one affected user.

4.2.4 AL functional control entity in visited SwMI, FE2

The functional entity FE2 in visited SwMI shall:

- clear down the AL call if a new incoming call is received for the affected user;

- receive information flows from the ambience listening control functional entity, the served user's control functional entity and the affected user's control functional entity.

The information flows FE2 in visited SwMI shall be able to receive:

- acknowledgements sent by an affected user located in its system;

- requests and responses sent by ambience listening control entity in SS-AL home system;

- requests sent by a served user located in its system.

FE2 in visited SwMI shall send information flows to their recipient:

- the affected user that is currently in this system for SS-AL invocation;

- the SS-AL control entity for the responses sent by the affected user;

- the served user that is currently in this system for SS-AL interrogation and invocation;

- the second listening party that is currently in this system for SS-AL information.

4.2.5 Second listening party's agent functional entity, FE6

The functional entity FE6 shall: receive an information flow for the new AL call set-up.

5 Information flows

5.1 Definition of information flows

In the tables listing the element type indicates whether the information element is Mandatory (M) or optional (O).

5.1.1 AL-TX DEMAND

AL-TX DEMAND is an optional information flow for the routes ra, rc and rd from FE1 to FE2. The flow is sent to FE2 (group controlling SwMI) via FE2 in visited SwMI if FE1 is in a visited system. The flow is used to invoke AL-listening for a specified individual user during ongoing group call. Table 1 lists the elements within the AL-TX DEMAND information flow.

Table 1: Content of AL-TX DEMAND information flow

Element	Type
Affected user identity	M
TX demand priority	M
Encryption control	M

NOTE: Addition of other second listening parties, than those already in the ongoing call, is outside the scope of the present document.

5.1.2   AL-TX GRANTED

AL-TX GRANTED is an optional information flow for routes rb, rc and re from FE2 to FE5. The flow is sent to FE5 via FE2 in visited SwMI, if FE5 is in that visited system. The flow is used to invoke AL-transmission for the specified individual user during ongoing group call. Table 2 lists the elements within the AL-TX GRANTED information flow.

Table 2: Contents of AL-TX GRANTED information flow

Element	Type
Transmission grant	M, note
Encryption control	M
NOTE: Only value "Transmission granted" is applicable.	

5.1.3   AL-TX INFORM

AL-TX INFORM is an optional information flow for the routes rf, rc and rg from FE2 to FE6. The flow is sent via FE2 in visited SwMI, if FE6 is in the visited system. The AL-TX INFORM indicates that the current speech item is an AL-speech item. Table 3 lists the elements within the AL-TX INFORM information flow.

Table 3: Contents of AL-TX INFORM information flow

Element	Type
Affected user identity	M
Listening party identity	O

5.1.4   AL-TX INTERRUPT

AL-TX INTERRUPT is an optional information flow for the routes ra, rc and rd from FE1 to FE2. The flow is sent via FE2 in visited SwMI, if FE1 is in the visited system. The flow is used to stop AL-transmission for a specified individual during ongoing group call. Table 4 lists the elements within the AL-TX INTERRUPT information flow.

Table 4: Content of AL-TX INTERRUPT information flow

Element	Type
Affected user identity	M

5.1.5   AL-TX REJECT

AL-TX REJECT is an optional information flow for the routes ra, rc and rd from FE2 to FE1. The flow is sent to FE1 via FE2 in visited SwMI if FE1 is in a visited system. The flow is used to give reason why the AL-listening invocation for a specified individual user during ongoing group call failed. Table 5 lists the elements within the AL-TX REJECT information flow.

Table 5: Contents of AL-TX REJECT information flow

Element	Type	Remark
Rejection Cause	M	rejected for undefined reason; accepted; service not supported; user not authorized; affected user busy; unknown TETRA identity.

5.1.6   INFORMATION

INFORMATION is an optional information flow for the routes rc, rf and rg from FE2 to FE6. The flow is sent to FE6 via FE2 in visited SwMI if FE6 is in a visited system. The flow is used to inform a second listening party that the incoming call is an AL call. Table 6 lists the elements within the INFORMATION information flow.

Table 6: Content of INFORMATION information flow

Element	Type
Affected user identity	M

5.1.7   INTERROGATE

INTERROGATE is an optional information flow for the routes ra, rc and rd from FE1 to FE2. The flow is sent to FE2 via FE2 in visited SwMI if FE1 is in a visited system. The flow is used to interrogate the SS-AL for a specified individual, a list of individuals or a range of individuals. Table 7 lists the elements within the INTERROGATE information flow.

Table 7: Content of INTERROGATE information flow

Element	Type	Remarks
Interrogated subscribers identity(s)	M	This may be a single identity, a list or a range of identities.

5.1.8   INTERROGATE ACK

INTERROGATE ACK is an optional information flow for the routes ra, rc and rd from FE2 to FE1. The flow is sent to FE1 via FE2 in visited SwMI if FE1 is in a visited system. The flow is used to acknowledge an interrogation request for a specified individual, a list of individuals or a range of individuals. Table 8 lists the elements within the INTERROGATE ACK information flow.

If INTERROGATE is supported then support of the INTERROGATE ACK is mandatory.

Table 8: Content of INTERROGATE ACK information flow

Element	Type	Remarks
Interrogated subscribers identity(s)	M	This may be a single identity, a list or a range of identities
Result	M	rejected for undefined reason; SS-AL invoked for the TETRA identity, SS-AL not invoked for the TETRA identity; user not authorized; unknown TETRA identity; parameters not valid; or insufficient information.

5.1.9   INVOKE1

INVOKE1 s an optional information flow for the routes ra, rc and rd from FE1 to FE2. The flow is sent to FE2 via FE2 in visited SwMI if FE1 is in a visited system. The flow is used to request invocation of SS-AL for a specified individual. Table 9 lists the elements within the INVOKE1 information flow.

Table 9: Content of INVOKE1 information flow

Element	Type
Affected user identity	M

5.1.10   INVOKE2

INVOKE2 is an optional information flow for the routes ra, rc and rd from FE1 to FE2. The flow is sent to FE2 via FE2 in visited SwMI if FE1 is in a visited system. The flow is used to include a second listening party into an ongoing AL call. Table 10 lists the elements within the INVOKE2 information flow.

Table 10: Content of INVOKE2 information flow

Element	Type
Second listening party identity	M

5.1.11   INVOKE

INVOKE is a mandatory information flow for the routes rb, rc and re from FE2 to FE5. The flow is sent to FE5 via FE2 in visited SwMI if FE5 is in a visited system. The flow is used to invoke ambience listening in a specified individual. Table 11 lists the elements within the INVOKE information flow. This flow shall stop to the application layer and not to the affected user.

Table 11: Content of INVOKE information flow

Element	Type
Affected user identity	M

5.1.12   INVOKE ACK

INVOKE ACK is a mandatory information flow for the routes rb, rc and re from FE5 to FE2. The flow is sent to FE2 via FE2 in visited SwMI if FE5 is in a visited system. The flow is used to respond to an invocation indication. Table 12 lists the elements within the INVOKE ACK information flow.

Table 12: Content of INVOKE ACK information flow

Element	Type	Remarks
Result	M	rejected for undefined reason; user busy; accepted.

5.1.13   INVOKE1 ACK

INVOKE1 ACK is an optional information flow for the routes ra, rc and rd from FE2 to FE1. The flow is sent to FE1 via FE2 in visited SwMI if FE1 is in a visited system. The flow is used inform the served user of the success or failure of an invocation request. Table 13 lists the elements within the INVOKE1 ACK information flow.

If INVOKE1 is supported then support of the INVOKE1 ACK is mandatory.

Table 13: Content of INVOKE1 ACK information flow

Element	Type	Remarks
Affected user identity	M	
Result	M	rejected for undefined reason; accepted; affected user busy; user not authorized; unknown TETRA identity; parameters not valid; Insufficient information; service not supported, see note.
NOTE: This reason could be used, when the SwMI knows that the MS is not capable to support ambience listening.		

5.1.14   INVOKE2 ACK

INVOKE2 ACK is an optional information flow for the routes ra, rc and rd from FE2 to FE1. The flow is sent to FE1 via FE2 in visited SwMI if FE1 is in a visited system. The flow is used inform the served user of the success or failure of an addition of second listening party. Table 14 lists the elements within the INVOKE2 ACK information flow.

If INVOKE2 is supported then support of the INVOKE2 ACK is mandatory.

Table 14: Content of INVOKE2 ACK information flow

Element	Type	Remarks
Affected user identity	M	
Result	M	rejected for undefined reason; accepted; service not supported; user not authorized; second listening party not included; unknown TETRA identity; parameters not valid; insufficient information.

5.2 Relationship of information flows to basic call information flows

Table 15 summarizes the typical relationship of the SS-AL information flows with those of the basic call.

Table 15: The relationship between SS-AL information flows and basic service information flows

Information flow	Independent of basic call flow	Basic call flow
INTERROGATE	yes	U-FACILITY, ISI-FACILITY, see note 1
INTERROGATE ACK	yes	D-FACILITY, ISI-FACILITY, see note 1
INVOKE1	no	U-SETUP
INVOKE2	no	U-INFO
INVOKE	no	D-SETUP
INVOKE ACK	no	U-CONNECT, U-DISCONNECT, U-RELEASE
INVOKE1 ACK	no	D-CALL PROCEEDING, see note 2, D-CONNECT, D-DISCONNECT, D-RELEASE
INVOKE2 ACK	no	D-INFO
INFORMATION	no	D-SETUP, D-TX GRANTED
AL-TX DEMAND	no	U-INFO
AL-TX INTERRUPT	no	U-INFO
AL-TX GRANTED	no	D-INFO, see note 3
AL-TX REJECT	no	D-INFO or any other PDU within an ongoing call
AL-TX INFORM	no	D-TX GRANTED (transmission granted to another user)
NOTE 1: These information flows are listed, but are not basic call information flows.		
NOTE 2: D-CALL PROCEEDING PDU may be used only if the call is delayed due to ISI operation.		
NOTE 3: The AL-TX GRANTED PDU is sent with D-INFO PDU, not with D-TX GRANTED PDU to prevent MSs not supporting SS-AL to react to the D-TX GRANTED PDU (transmission granted).		

5.3 Service primitives

The SS-AL service primitives used to invoke or being a result of information flow sequences are defined in EN 300 392-12-21 [3] clauses 4.2 and 4.3 and the basic call service primitives are defined in EN 300 392-2 [1], clause 11.

5.4 Information flow sequences

5.4.1 General

Information flow sequences in clauses 5.4.2 to 5.4.14 present examples how SS-AL services to users as defined in stage 1 EN 300 392-10-21 [4] will be implemented. Signalling procedures are provided in stage 3 in support of the information flow sequences specified below, refer to EN 300 392-12-21 [3].

In the figures, SS-AL information flows are represented by solid arrows and basic call and general supplementary service information flows are represented by broken arrows. An ellipse embracing two information flows indicates that the two flows occur together. Within a column representing a functional entity, the numbers refer to functional entity actions listed in clause 5.5.

No timers are used to support information flows.

NOTE 1: The information flow sequences are examples and they may not cover all possible variations of the service.

NOTE 2: Some of the basic call features are not shown in the flow sequences such as call completion flow D-CONNECT ACK.

5.4.2   Interrogation

Figure 2 shows the information flow sequence of SS-AL interrogation when the served user is in the home system.
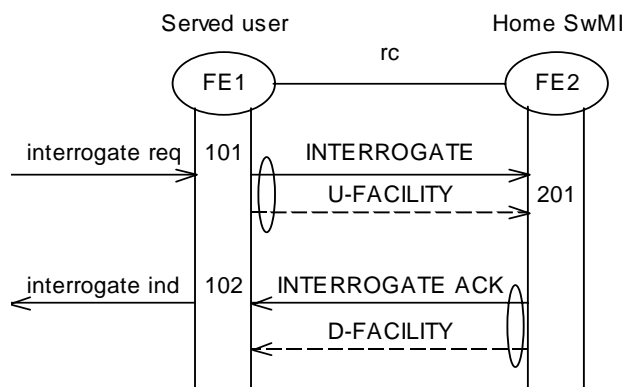
Figure 2: Interrogation of SS-AL

5.4.3   Interrogation of AL when FE1 in visited system

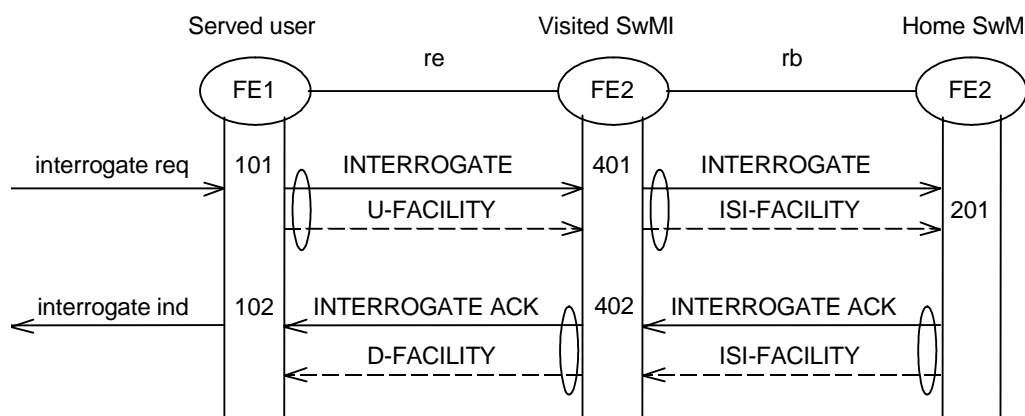Figure 3 shows the information flow sequence of SS-AL interrogation when the served user is in a visited system.

Figure 3: Interrogation of SS-AL when FE1 is in a visited system

5.4.4   Invocation with served user and affected user in home system

Figure 4 shows the information flow sequence of SS-AL invocation when the served user and affected user are in the home system.
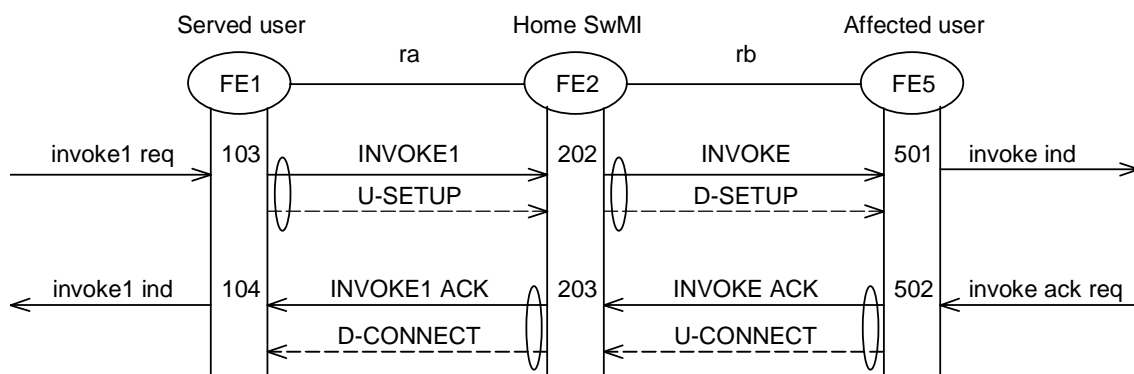
Figure 4: Invocation with served user and affected user in home system

5.4.5 Invocation with served user, affected user and second listening party in home system

Figure 5 shows the information flow sequence of SS-AL invocation when the served user, affected user and a second listening party are in the home system.

NOTE 1: Although the INVOKE ACK request is provided in the model by the application, the application generates the response without any user action via a man machine interface.

NOTE 2: Only those basic call flows are shown that carry SS-AL PDUs or are otherwise relevant to the actions.
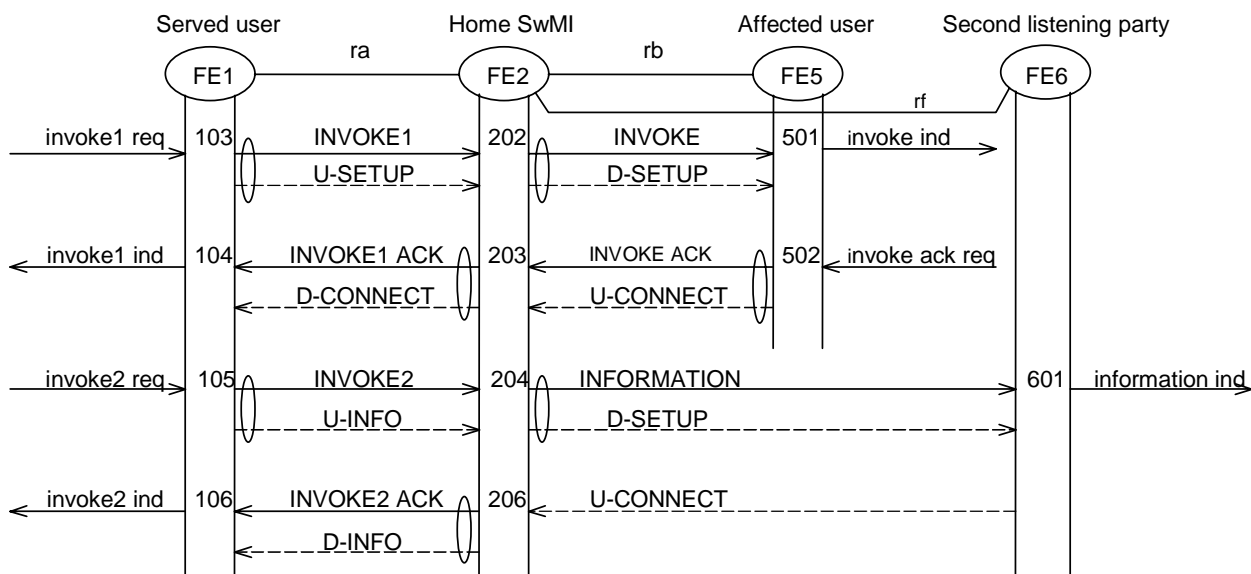
NOTE: The call made to the second listening party can be either a group or an individual call. The basic service type for the continuation of the call is outside the scope of the present document.

Figure 5: Invocation of SS-AL in a home system with second listening party

5.4.6 Invocation with second Listening Party, served user in visited system

Figure 6 shows the information flow sequence of SS-AL invocation when the served user in a visited system for a AL call with a second listening party. The affected party and the second listening party are in the home system. Some member of the second listening party could be in a visited system and then the ISI-SETUP contains the INFORMATION flow.
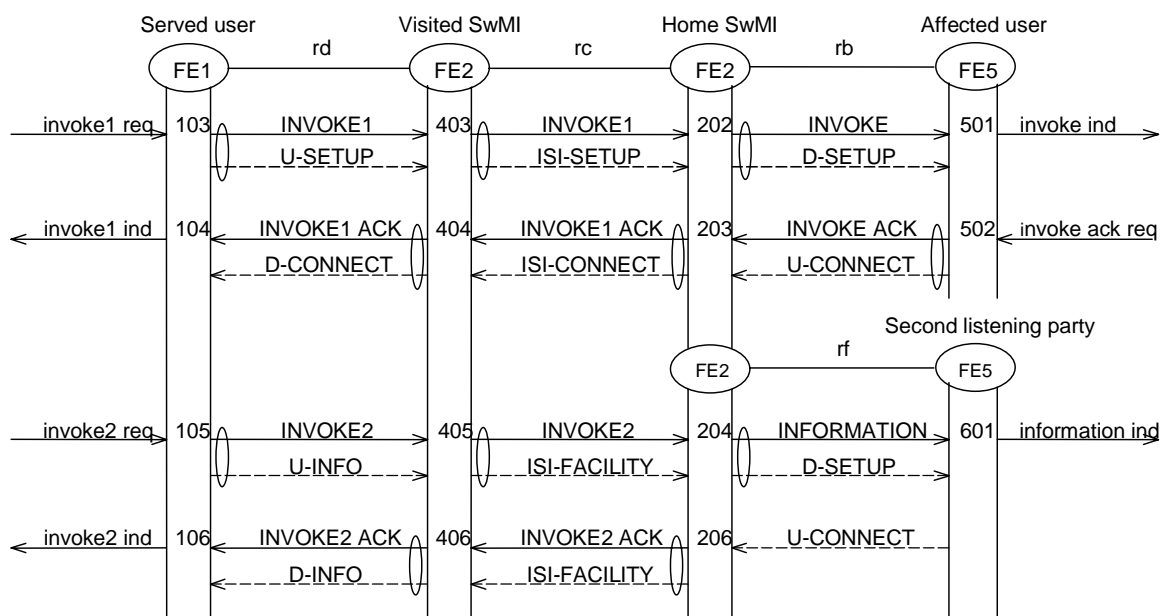

Figure 6: Invocation of SS-AL with second listening party, served user in a visited system

5.4.7 Invocation with served user in visited system, without second listening party

Figure 7 shows also the information flow sequence of SS-AL invocation when the served user in a visited system for an AL call without second listening party.
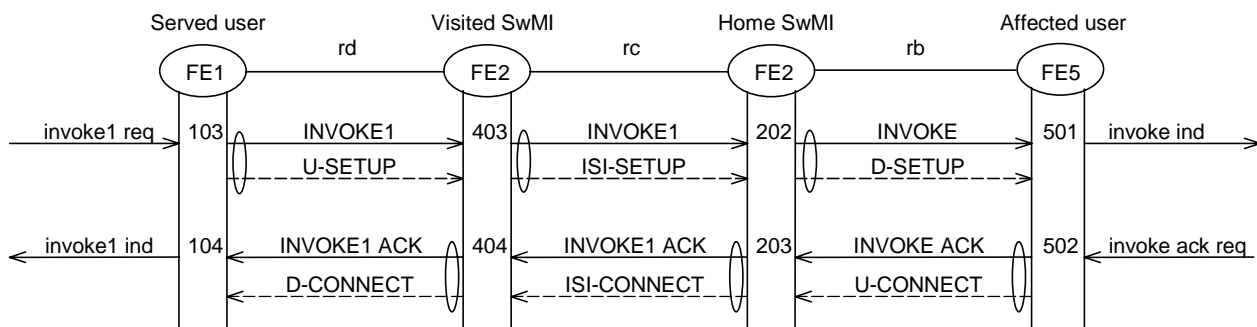

Figure 7: Invocation of SS-AL, served user in a visited system, no second listening party

5.4.8   Invocation with affected user in visited system, without second listening party

Figure 8 shows also the information flow sequence of SS-AL invocation when the affected user is in a visited system without second listening party.
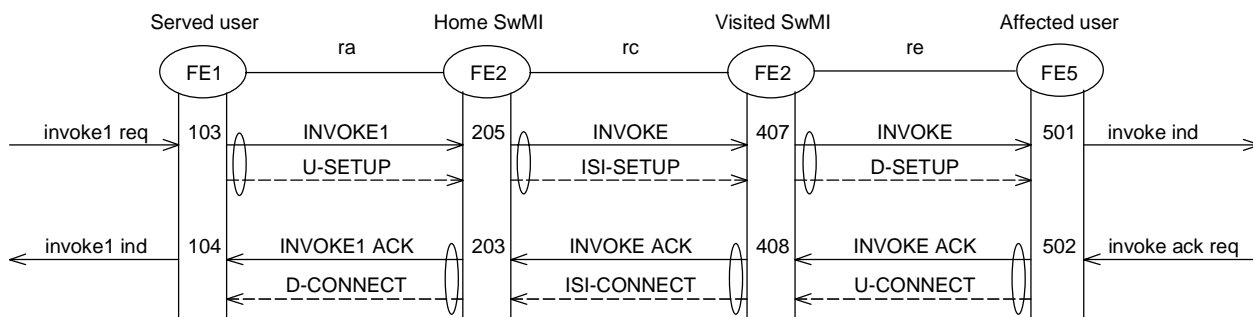

Figure 8: Affected user in a visited system without second listening party

5.4.9   Invocation with affected user in visited system, with second listening party

Figure 9 shows the information flow sequence of SS-AL invocation when the affected user is in a visited system with second listening party. The setup of the information flow assumes that the visited SwMI FE2 supports SS-AL and is controlling SwMI FE2 for the resulting group call. If the home SwMI FE2 is the controlling SwMI the INVOKE2 from home SwMI FE2 to visited SwMI FE2 is replace by INFORMATION information flow and there is no INVOKE2 ACK information flow from the visited SwMI FE2 to the home SwMI FE2.

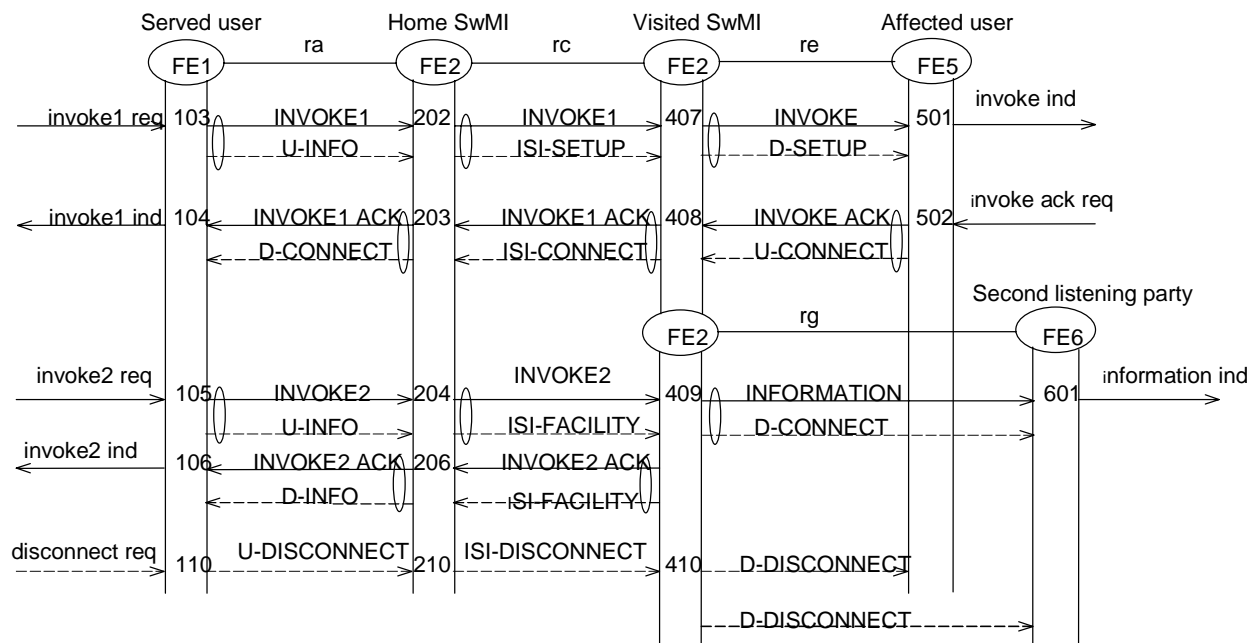

Figure 9: Invocation of SS-AL, affected user in a visited system, with second listening party

Figure 9 also shows how AL call is disconnected by the basic call signalling without any SS-AL specific information flow.

5.4.10   AL call cleardown, with affected user in home system, due to the affected user invoking a new call

Figure 10 shows the information flow sequence of an SS-AL call cleardown when the affected user invokes a new call. There is no SS-AL specific information flows for the AL call disconnection.
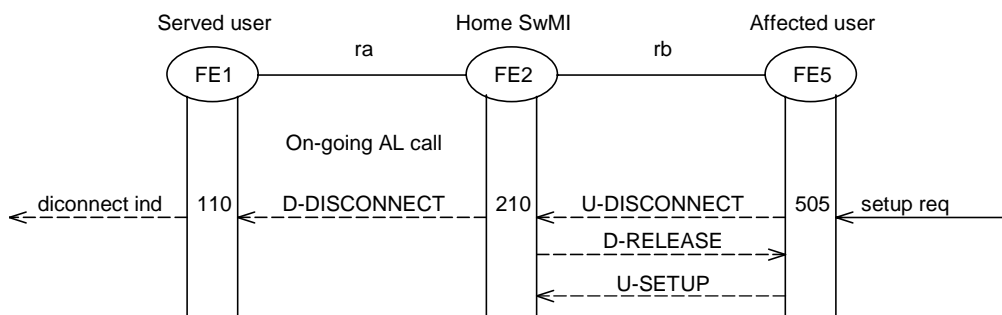
Figure 10: Affected user invokes a new call

5.4.11   AL call cleardown, with affected user in visited system, due to a new outgoing call

Figure 11 shows the information flow sequence of an SS-AL call cleardown when the affected user is in a visited system and affected user invokes a new call. Note that there is no SS-AL spesific information flows for AL call disconnection.

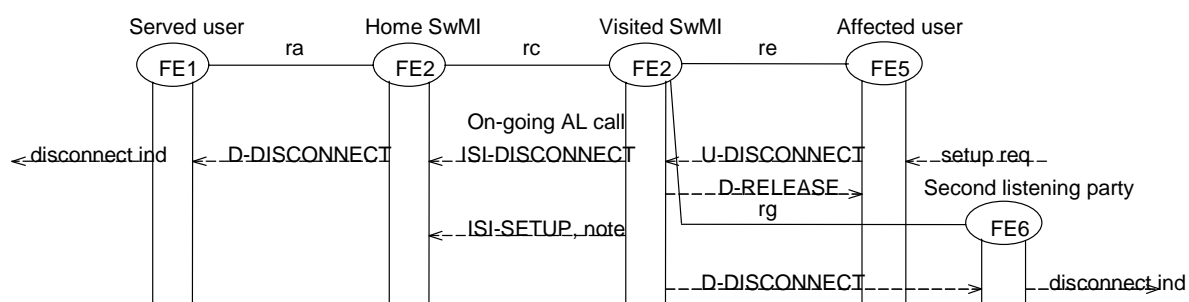**Figure 11: Cleardown of SS-AL, with affected user in a visited system and making a new call**

5.4.12   AL call cleardown, with affected user in visited system, due to a new incoming call

Figure 12 shows the information flow sequence of an SS-AL call cleardown when the affected user is in a visited system and affected user receives a new call. Home SwMI FE2 call control entity should use the call priority values of the AL call and the new call set-up to determine if the AL call should be cleared to allow the new call set-up to proceed. When the AL call should be cleared, the normal call disconnection procedures shall be applied as specified in EN 300 392-2 [1].
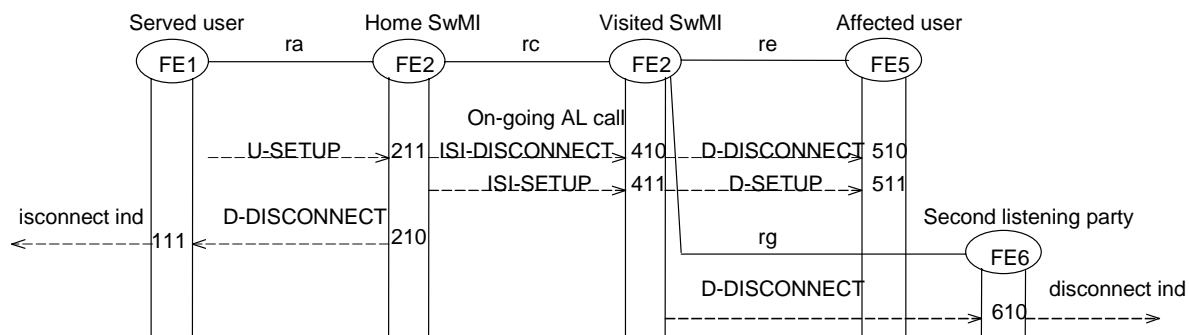
Figure 12: AL call cleardown due to a new call to the affected user

5.4.13   Affected user engaged in a call

If a user is engaged in a call but is not transmitting, an ambience listening transmission may be invoked on him. The served user may request the affected user to start SS-AL transmission using the AL-TX DEMAND PDU. After having received a AL-TX GRANTED PDU, the terminal of the affected user begins to transmit without any indication to the user, refer to figure 13.

The served user may be engaged in the call or monitoring it as a discreet listening party. The interaction between SS-AL and SS-DL is outside the scope of the present document. The second listening party, if there are any, is notified that ambience listening transmission has been granted to another user. The served user terminates the ambience listening transmission using the AL-TX INTERRUPT PDU. The SwMI sends normal D-TX INTERRUPT PDUs to all call parties and the basic call can continue.
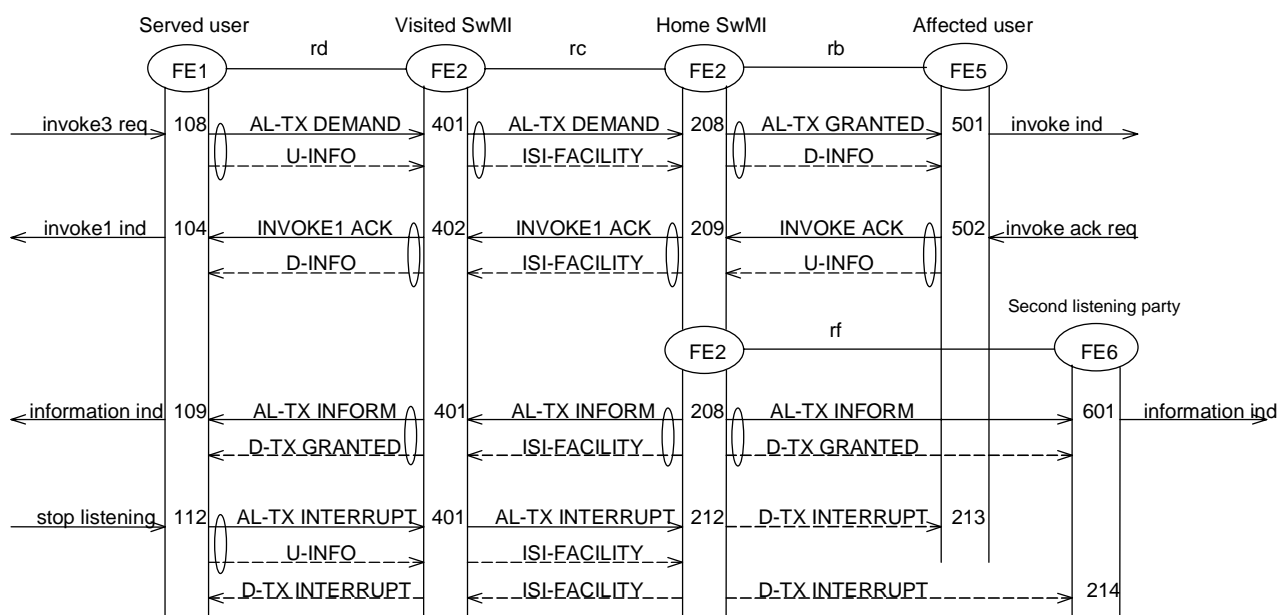
Figure 13: Ambience listening invocation in an ongoing call

During an ambience listening transmission, the affected user may normally demand transmission. The ambience listening transmission will then be terminated and a normal permission to transmit will be granted. It is an implementation matter, whether ambience listening transmission is interrupted by the MS or by the SwMI.

5.4.14 Rejection of an ambience listening transmission demand

If the served user is not authorized to request SS-AL transmission, the SwMI sends him an AL-TX REJECT PDU, refer to figure 14.
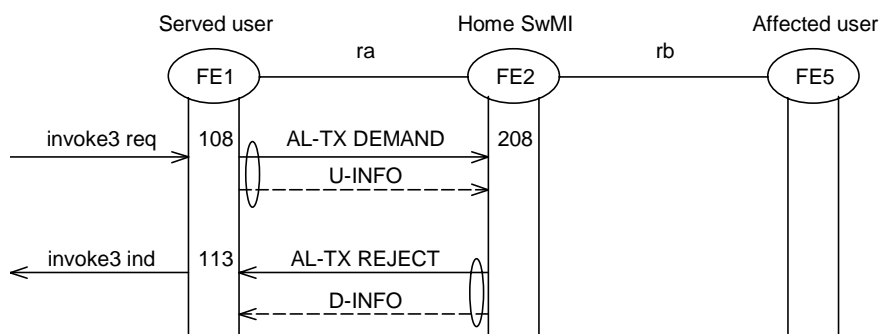
Figure 14: Rejection of an ambience listening transmission demand

5.5 FE Actions

5.5.1 Functional entity actions of FE1

101 Upon user's request for SS-AL interrogation FE1 shall pass the interrogation request to FE2.

102 On reception of the interrogation result, FE1 shall present the information to the served user application.

103 Upon user's request for SS-AL invocation FE1 shall pass the invocation request to FE2.

104 On reception of the invocation result, FE1 shall present the information to the served user application.

105 Upon user's request to include a second listening party FE1 shall pass the invocation request to FE2.

106 On reception of the second listening party addition result, FE1 shall present it to the served user application.

107 On reception of the AL call release, FE1 may present the reason for disconnection to the served user application.

108 Upon user's INVOKE3 request for SS-AL speech item invocation FE1 shall pass the invocation request to FE2.

109 On reception of AL-TX INFORM information flow FE1 may inform user.

110 Upon reception of disconnection request FE1 performs basic call disconnection.

111 Upon reception of basic call disconnection on the AL call FE1 disconnects it.

112 On reception of stop listening request FE1 shall send AL-TX INTERRUPT information flow to FE2.

113 On reception of AL-TX REJECT FE1 shall inform user.

5.5.2   Functional entity actions of FE2

201   On reception of the INTERROGATE information flow, FE2 shall verify the authorization for the request and the ITSIs presented in the interrogation. If FE2 finds the request valid, it fetches the SS-AL data and sends the result to FE1. If the request is not valid or authorized, FE2 returns an error indication to FE1.

202   On reception of INVOKE1 information flow, FE2 shall verify the authorization for the request and the affected user identity presented in the invocation. If FE2 finds the request valid, it shall send an INVOKE to FE5. If the request is not valid or authorized, FE2 returns an error indication to FE1.

203   On reception of the INVOKE ACK information flow, FE2 shall check the result code. If the result code is negative FE2 shall clear down the AL call. If the result code is "success" it shall allow the AL call to continue. FE2 shall send INVOKE1 ACK to FE1.

204   On reception of the INVOKE2 information flow, FE2 shall verify the authorization for the request, the second listening party presented in the invocation and the call identifier. If FE2 finds the request valid and the call identifier applies to an ongoing AL call, FE2 shall include the second listening party in the call. FE2 shall send an INFORMATION flow to FE6 informing FE6 that the call is an AL call.

205   On reception of the INVOKE1 information flow, FE2 shall verify the authorization for the request and the affected user identity presented in the invocation. If FE2 finds the request valid, it shall send an INVOKE to the visited SwMI FE2. If the request is not valid or authorized, FE2 returns an error indication to FE1.

206   On reception of basic call acceptance FE2 shall send INVOKE2 ACK to the served user FE1. If the request is not valid or authorized, FE2 returns an error indication to FE1.

207   FE2 shall receive the AL call release from FE2 and shall forward the release to FE1.

208   On reception of AL-TX DEMAND information flow, FE2 shall verify the authorization for the request and the affected user identity presented in the invocation. If FE2 finds the request valid, it shall send a AL-TX GRANTED information flow to FE5 and INFORMATION to the FE1 and FE6. If the request is not valid or authorized, FE2 returns an error indication to FE1 using AL-TX REJECT information flow.

209   On reception of INVOKE ACK information flow, FE2 shall check the result code. If the result code is negative FE2 shall continue the basic call. If the result code is "accepted" it shall allow the AL speech item to continue and send INVOKE1 ACK to FE1.

210   FE2 performs basic call disconnection on the AL call.

211   FE2 decides that the priority of the new call is higher than the AL call and disconnects the AL call using basic call disconnection. After disconnection FE2 sets up the new call.

212   On reception of AL-TX INTERRUPT information flow FE2 shall send basic call D-TX INTERRUPT to FE5 to stop its transmission and to other participants to inform transmission end.

213   Basic call transmission stop action.

214   Basic call information on transmission end.

5.5.3   Functional entity actions of visited SwMI FE2

401   FE2 in the visited SwMI shall pass the message to the home FE2.

402   On reception of the response for the request, FE2 in the visited SwMI shall deliver it to FE1.

NOTE 1:   Actions 401 and 402 are not actually SS-AL actions, although presented here for convenience, but part of generic transport function.

403   FE2 in visited SwMI sets up the SS-AL call to FE5 including the INVOKE1 information flow.

404   FE2 in the visited SwMI shall pass the INVOKE1 ACK information flow to the home FE2 as a part of the call set-up.

405   On reception INVOKE2 information flow FE2 in the visited SwMI passes it to home SwMI.

406   On reception of INVOKE2 ACK FE2 in visited SwMI shall pass it to FE1.

NOTE 2:   Actions 405 and 406 are not actually SS-AL actions, although presented here for convenience, but part of generic transport function.

407   FE2 in visited SwMI sets up the SS-AL call to FE5 including the INVOKE information flow.

408   FE2 in the visited SwMI shall pass the INVOKE ACK information flow to the home FE2 as a part of the call set-up.

409   On reception of INVOKE2 FE2 in visited SwMI includes second listening party to the AL call and sends INFORMATION information flow to FE5 and INVOKE2 ACK to FE2.

410   FE2 in visited SwMI performs basic call disconnection on the AL call.

411   Basic call set-up.

5.5.4   Functional entity actions of FE5

501   On reception of the INVOKE information flow FE5 may authenticate the entity from which the invocation was received. The AL call invocation, or any subsequent signalling related to the AL call, shall not be presented to the user.

502   FE5 shall respond to the invocation by sending an INVOKE ACK to FE2.

503   On reception of the AL call release, FE5 shall disconnect the AL call.

NOTE: The AL call may be closed also by an affected user action such as the affected user makes a call.

504   On reception of the INVOKE3 information flow within a call FE5 shall start SS-AL speech item without any indication to the user.

505   On reception of a new call setup FE5 disconnects the AL call using basic call procedures and proceed with the new call.

510   FE5 receives basic call disconnection for the AL call and disconnects it.

511   Basic call set-up for the new call.

5.5.5   Functional entity actions of FE6

601   On reception of the INFORMATION information flow, FE6 shall indicate to its user that the incoming call is an AL call.

602   On reception of AL-TX GRANTED information flow, FE6 shall indicate to its user that the speech item is an AL speech item.

610   FE6 receives basic call disconnection for the AL call and disconnects it.

6   Allocation of FEs to physical equipment

Table 16 defines allocation of functional entities to physical entities. Allocation of FE1 and FE6 to other physical entities that indicated in the table 16 is outside the scope of the present document.

Table 16: Allocation of functional entities to physical entities

FE/PE	SwMI		MS
FE1	-		+
FE2	+		-
FE5	-		+
FE6	+		+
KEY: + = applicable			
- = not applicable			

7 Interworking considerations

The SS-AL may extend to several TETRA networks. In order to support the inter-system SS-AL feature the TETRA SwMI1 (which initially invokes the service) and the TETRA SwMI2 (the additional network where the service extends to) need to support in addition to the basic call generic supplementary service related information transport and carry out some SS-AL specific tasks. The list below consists of all the SS-AL specific features that are needed to support the SS-AL to extend to several TETRA systems:

- the invocation of SS-AL to the affected user;

- optionally invoke call to the second listening party.

History

Document history			
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