DRAFT

EUROPEAN TELECOMMUNICATION STANDARD

pr **ETS 300 392-11-21**

September 1996

Source: ETSI TC-RES

Reference: DE/RES-06001-11-21

ICS: 33.060, 33.060.50

Key words: TETRA, V+D, SS, AL

Radio Equipment and Systems (RES); Trans-European Trunked Radio (TETRA); Voice plus Data (V+D); Part 11: Supplementary Services (SS) Stage 2; Part 11-21: Ambience Listening (AL)

ETSI

European Telecommunications Standards Institute

ETSI Secretariat

Postal address: F-06921 Sophia Antipolis CEDEX - FRANCE
Office address: 650 Route des Lucioles - Sophia Antipolis - Valbonne - FRANCE
X.400: c=fr, a=atlas, p=etsi, s=secretariat - **Internet:** secretariat@etsi.fr

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

Contents

Foreword

This draft European Telecommunication Standard (ETS) has been produced by the Radio Equipment and Systems (RES) Technical Committee of the European Telecommunications Standards Institute (ETSI), and is now submitted for the Public Enquiry phase of the ETSI standards approval procedure.

This ETS is a multi-part standard and will consist of the following parts:

Part 1: "General network design".

Part 2: "Air Interface (AI)".

Part 3: "Inter-working", (DE/RES-06001-3).

Part 4: "Gateways", (DE/RES-06001-4).

Part 5: "Terminal equipment interface", (DE/RES-06001-5).

Part 6: "Line connected stations", (DE/RES-06001-6).

Part 7: "Security".
Part 8: "Management services", (DE/RES-06001-8).

Part 9: "Performance objectives", (DE/RES-06001-9).

Part 10: "Supplementary Services (SS) Stage 1".

Part 11: "Supplementary Services (SS) Stage 2".

Part 12: "Supplementary Services (SS) Stage 3".

Part 13: "SDL Model of the Air Interface".

Part 14: "PICS Proforma", (DE/RES-06001-14).

Part 15: "Inter-working - Extended Operations", (DE/RES-06001-15).

Proposed transposition dates	
Date of latest announcement of this ETS (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	6 months after doa

Blank page

1 Scope

This European Telecommunication Standard (ETS) defines the stage 2 specification of the Supplementary Service Ambience Listening (SS-AL) for the Trans-European 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.

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

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

2 Normative references

This ETS incorporates, by dated or undated reference, provisions from other publications. These†normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to, or revisions of, any of these publications apply to this ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

[1] CCITT Recommendation I.130 (1988): "Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".

[2] ETS 300 392-2: "Radio Equipment and Systems (RES); Trans-European Trunked Radio (TETRA); Voice plus Data (V+D); Part 2: Air Interface (AI)".

[3] ETS 300 392-1: "Radio Equipment and Systems (RES); Trans-European Trunked Radio (TETRA); Voice plus Data (V+D); Part 1: General Network Design".

[4] ITU-T Recommendation Z.100 (1993): "Specification and Description Language (SDL)".

3 Definitions and abbreviations

3.1 Definitions

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

AL call: A call in which ambience listening functionality is requested. During the AL call, the affected user's MS (or LS) transmits without any action from, or indication to, the affected user.

affected user: The user who is subject to the operation.

served user: The user who is invoking this supplementary service.

second listening party: A TETRA individual or group which may listen into the AL call.

3.2 Abbreviations

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

AL	Ambience Listening
CC	Call Control
CCA	Call Control (functional entity Agent)
FE	Functional Entity
GTSI	Group TETRA Subscriber Identity
ISDN	Integrated Services Digital Network
ITSI	Individual TETRA Subscriber Identity
LS	Line Station
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.

SwMI	Switching and Management Infrastructure
TETRA	Trans-European Trunked Radio

4 Supplementary Service Ambience Listening (SS-AL) Stage 2 specification

4.1 Functional model

4.1.1 Functional model description

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

- FE1 served user's service agent;
- FE2 ambience listening control entity in the served user's home system;
- FE3 affected user's service agent;
- FE4 generic functional control entity in a visited system with respect to the served user;
- FE5 second listening party's service agent.

The following relationships shall exist between these FEs:

- ra between FE1 and FE2;
- rb between FE2 and FE3;
- rc between FE2 and FE4 in different systems;
- rd between FE4 and FE1;
- re between FE4 and FE3;
- rf between FE5 and FE2;
- rg between FE5 and FE4.

Figure 1 shows these FEs and their relationships.

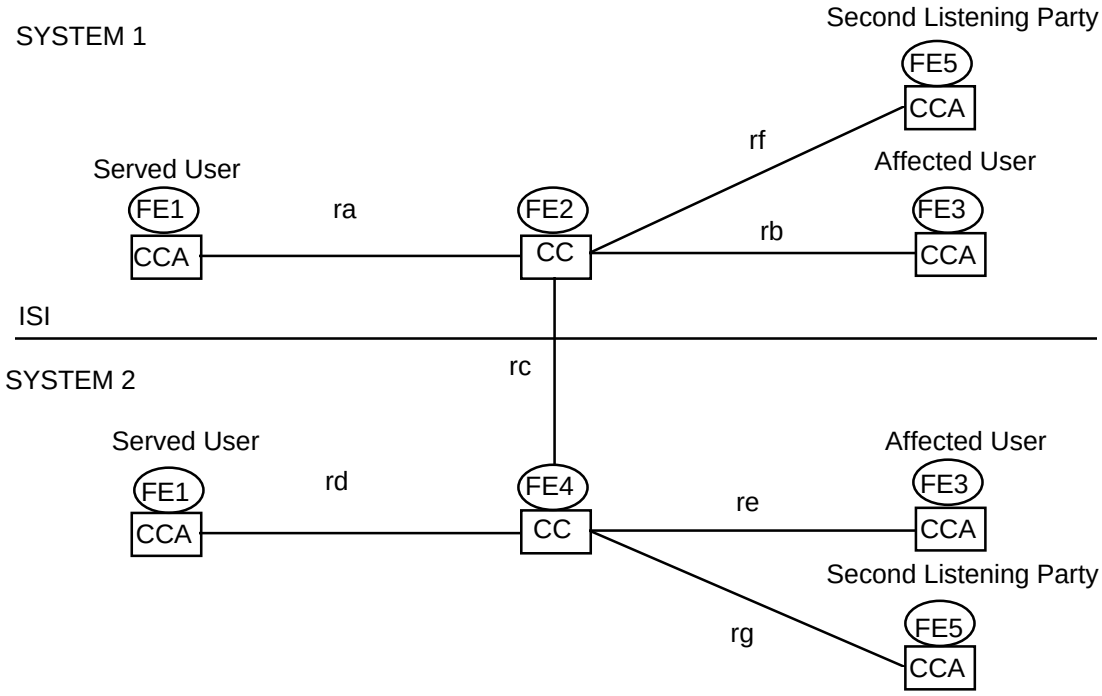


Figure 1: Operational and management functional model for SS-AL

4.1.2 Description of FEs

4.1.2.1 Served user's agent functional entity, FE1

The function entity FE1 shall: receive interrogation and invocation information from the served user and information (positive or negative acknowledgements) about the executed service request from FE2 in order to deliver it to the served user.

4.1.2.2 AL control functional entity, FE2

The functional entity FE2 shall:

- perform checks, give instructions and perform actions for the data received for interrogation and invocation;
- construct and deliver the PDUs;
- provide the affected user's application with applicable SS-AL data by sending it to the affected user's service agent FE3 via FE4 if the affected user is located in a different system;
- provide the served user's agent functional entity with the positive or negative acknowledgement of the requested service. This is sent to FE4 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 FE5 via FE4 if the second listening party is located in a different system;
- if any exception conditions are noticed by SwMI, FE2 stops the execution of the service request and the AL call will be cleared down;
- clear down the AL call if a new incoming call is received for the affected user.

4.1.2.3 Affected user's agent functional entity, FE3

The functional entity FE3 shall:

- receive information of the new AL invocation.;
- disable user notification of the call with which AL is invoked.

The functional entity FE3 may:

- 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 ETS 300 392-2 [2];
- when the AL call ends FE3 reverts to normal operation;
- in one SS-AL invocation there may only be one affected user.

4.1.2.4 Generic functional control entity, FE4

The functional entity FE4 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 FE4 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.

FE4 adds the applicable addressing information to the information flows and they are sent 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.

4.1.2.5 Second listening party's agent functional entity, FE5

The functional entity FE5 shall: receive an information flow for the new AL call set-up.

4.2 Information flows

4.2.1 Definition of information flows

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

4.2.1.1 Interrogation

4.2.1.1.1 INTERROGATE-REQUEST

This shall be an information flow for the routes ra, rc and rd from FE1 to FE2. The flow shall be sent to FE2 via FE4 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 1 lists the elements within the INTERROGATE-REQUEST information flow.

Table 1: Content of INTERROGATE-REQUEST

Element	Type	Value	Remarks
Interrogated Subscribers Identity(s)	M	This may be a single identity, a list or a range of identities	If range is given, the first and the last value is given

4.2.1.1.2 INTERROGATE-RESULT

This shall be an information flow for the routes ra, rc and rd from FE2 to FE1. The flow shall be sent to FE1 via FE4 if FE1 is in a visited system. The flow shall be used to acknowledge an interrogation request for a specified individual, a list of individuals or a range of individuals. Table 2 lists the elements within the INTERROGATE-RESULT information flow.

Table 2: Content of INTERROGATE-RESULT

Element	Type	Value	Remarks
Interrogated Subscribers Identity(s)	M	This may be a single identity, a list or a range of identities	If range is given, the first and the last value is given
Result	M	invoked, service not defined for the TETRA id., rejected for any reason, user not authorized, unknown TETRA identity, parameters not valid or insufficient information	Indicates if the interrogation was successful. This value applies to all identities given in the field 'Interrogated Subscriber Identity(s)' above

4.2.1.2 Invocation

4.2.1.2.1 INVOKE-REQUEST1

This is an information flow for the routes ra, rc and rd from FE1 to FE2. The flow is sent to FE2 via FE4 if FE1 is in a visited system. The flow is used to invoke SS-AL for a specified individual, with the option to include a second listening party. Table 3 lists the elements within the INVOKE-REQUEST1 information flow.

Table 3: Content of INVOKE-REQUEST1

Element	Type
Affected User Identity	M
Second Listening Party Address	O

4.2.1.2.2 INVOKE-REQUEST2

This is an information flow for the routes ra, rc and rd from FE1 to FE2. The flow is sent to FE2 via FE4 if FE1 is in a visited system. The flow is used to include a second listening party into an ongoing AL call. Table 4 lists the elements within the INVOKE-REQUEST2 information flow.

Table 4: Content of INVOKE-REQUEST2

Element	Type
Call Identity	M
Second Listening Party Address	M

4.2.1.2.3 INVOKE

This is an information flow for the routes rb, rc and re from FE2 to FE3. The flow is sent to FE3 via FE4 if FE3 is in a visited system. The flow is used to invoke ambience listening in a specified individual. Table 5 lists the elements within the INVOKE information flow. This flow shall go to the application layer and not to the affected user.

Table 5: Content of INVOKE

Element	Type
Affected User Identity	M
Call Identifier	M

4.2.1.2.4 INVOKE-ACK

This is an information flow for the routes rb, rc and re from FE3 to FE2. The flow is sent to FE2 via FE4 if FE3 is in a visited system. The flow is used to respond to an invocation indication. Table 6 lists the elements within the INVOKE-ACK information flow.

Table 6: Content of INVOKE-ACK

Element	Type	Value
Affected User Identity	M	
Call Identifier	M	
Result	M	accepted, rejected for any reason, SS-AL not supported.

4.2.1.2.5 INVOKE-RESULT

This is an information flow for the routes ra, rc and rd from FE2 to FE1. The flow is sent to FE1 via FE4 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 7 lists the elements within the INVOKE-RESULT information flow.

Table 7: Content of INVOKE-RESULT

Element	Type	Value
Affected User Identity	M	
Result	M	accepted, rejected for any reason, user not authorized, SS-AL not activated, called party is busy, unknown TETRA Identity, parameters not valid
Call Identifier (note)	C	
NOTE: Shall be conditional on the value of Result: accepted; Call Identifier present, any other value; Call Identifier not present.		

4.2.1.3 Information

4.2.1.3.1 INFORMATION

This is an information flow for the routes rc, rf and rg from FE2 to FE5. The flow is sent to FE5 via FE4 if FE5 is in a visited system. The flow is used to inform a second listening party that the incoming call is an AL call . Table 8 lists the elements within the INFORMATION information flow.

Table 8: Content of INFORMATION

Element	Type
Affected User Identity	M
Call ID	M

4.2.2 Relationship of information flows to basic call information flows

Table 9 summarizes the typical relationship of the SS-AL information flows with those of the basic call.

Table 9: The relationship between SS-AL information flows and basic service information flows

Information flow	Independent of basic call flow	Basic call flow
INTERROGATE-REQUEST	yes	note
INTERROGATE-RESULT	yes	note
INVOKE-REQUEST1	no	U-SETUP
INVOKE-REQUEST2	yes	Note 1
INVOKE	no	D-SETUP (individual call only)
INVOKE-ACK	no	U-CONNECT(individual call only)
INVOKE-RESULT	no	D-CALLPROCEEDING, D-CONNECT
INFORMATION	no	D-SETUP
NOTE: This information flow may be added to any basic service information flows, if the basic service flow can contain the SS-FACILITY element.		

4.2.3 Information flow sequences

Signalling procedures shall be provided in support of the information flow sequences specified below. In†addition, signalling procedures should be provided to cover other sequences arising from error situations, interactions with the basic call, interactions with other supplementary services, different topologies etc.

In the figures, SS-AL information flows are represented by solid arrows and basic call 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 subclause 4.2.4.

No timers are used in the figures.

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

4.2.3.1 Interrogation

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

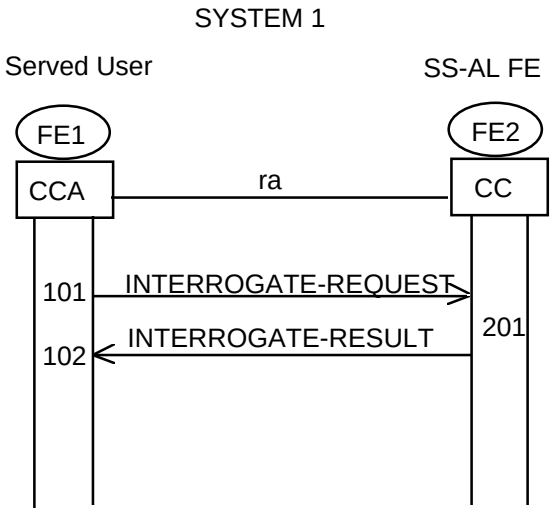


Figure 2: Interrogation of SS-AL

4.2.3.2 Normal Interrogation of AL when FE1 in visited system

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

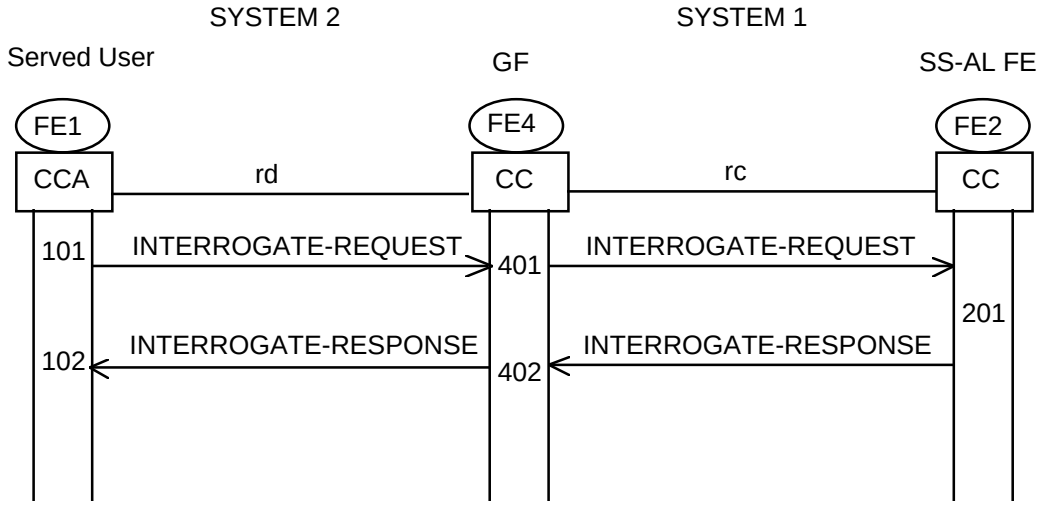
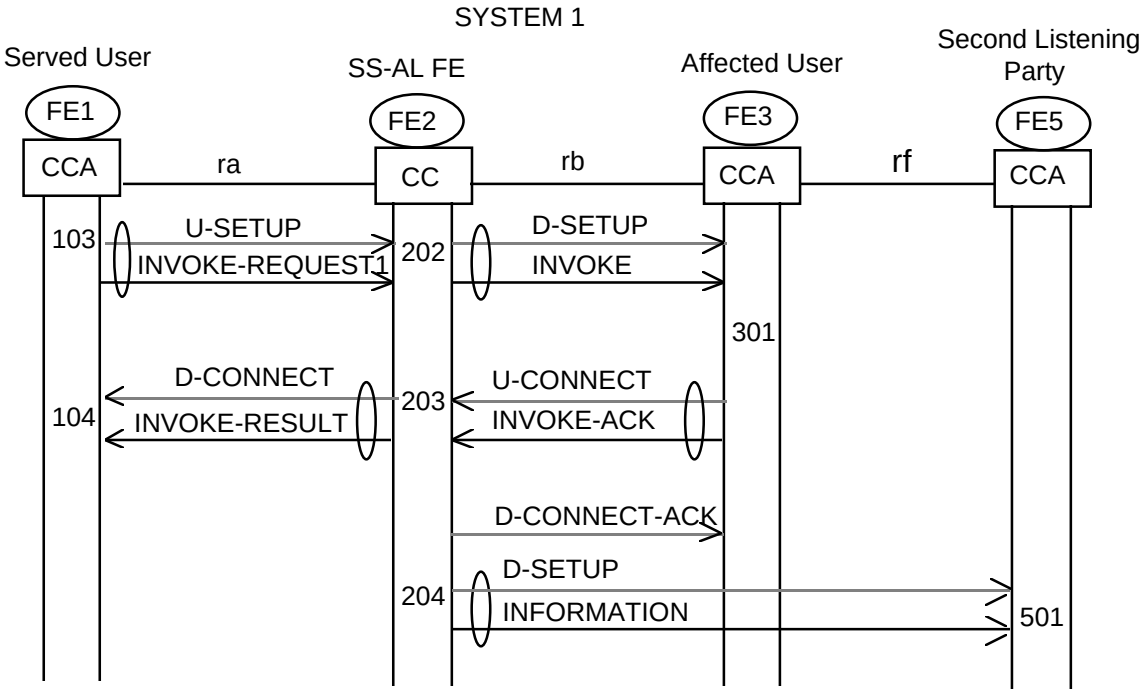


Figure 3: Interrogation of SS-AL when FE1 is in a visited system

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

Figure 4 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: 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 this ETS.

Figure 4: Invocation of SS-AL in a home system with second listening party

4.2.3.4 Invocation with served and affected user in home system

Figure 5 shows the information flow sequence of SS-AL invocation when both served user and affected user are in the Home system and no second listening party is involved.

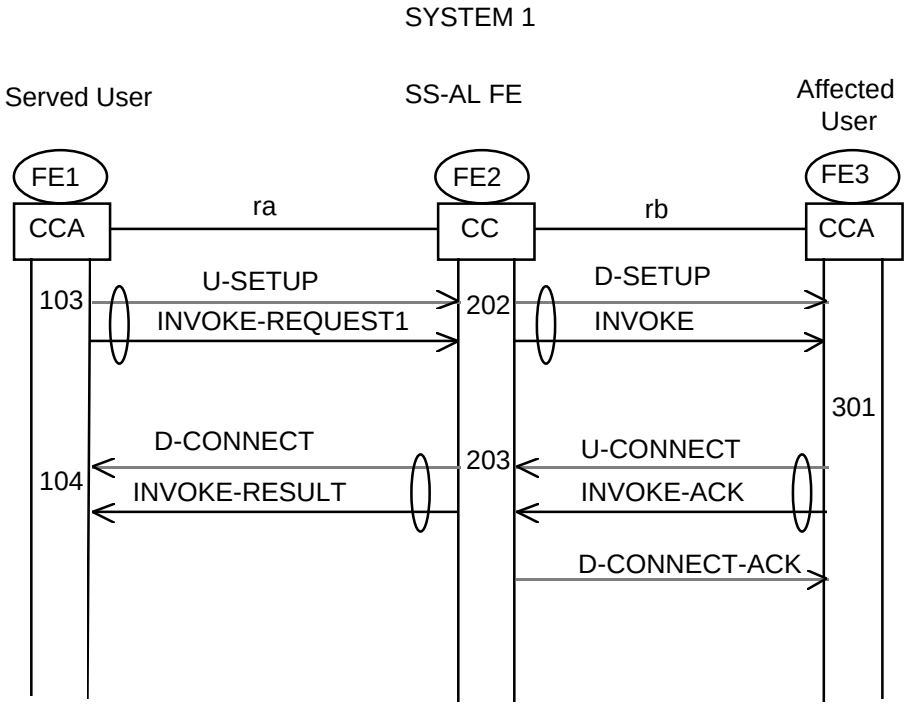
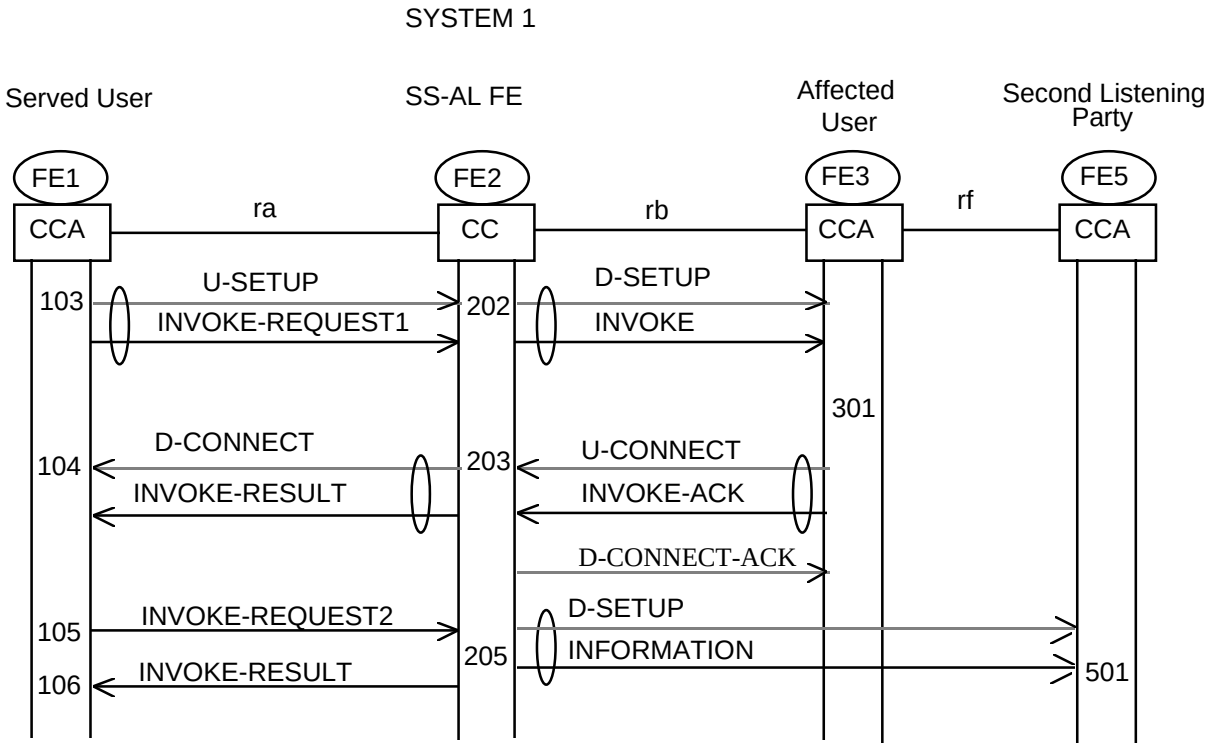


Figure 5: Invocation of SS-AL in a home system without second listening party

4.2.3.5 Invocation with served and affected user in home system with a 2nd listening party

Figure 6 shows the information flow sequence of SS-AL invocation when both served user and affected user are in the Home system and a second listening party is included into the call after the initial AL call set-up.



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 this ETS.

Figure 6: Invocation of SS-AL in a home system with a second listening party included

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

Figure 7 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.

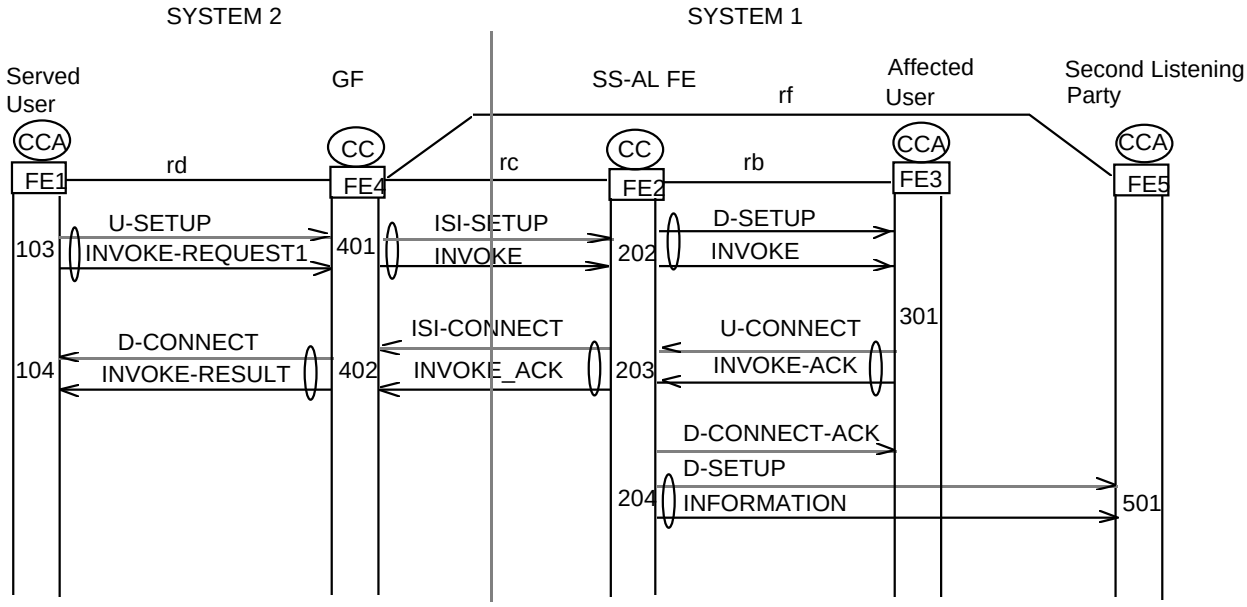


Figure 7: Invocation of SS-AL with second listening party, served user in a visited system

4.2.3.7 Invocation with served user in visited system, no second listening party

Figure 8 shows the information flow sequence of SS-AL invocation when the served user in a visited system for an AL call with no second listening party.

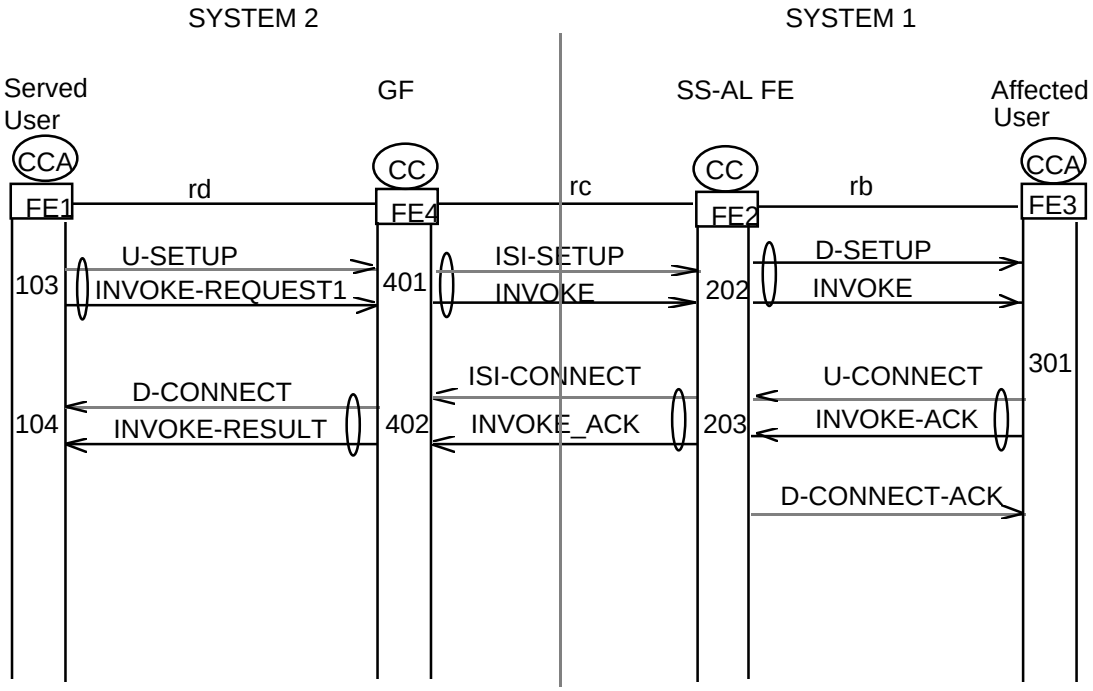


Figure 8: Invocation of SS-AL, served user in a visited system, no second listening party

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

Figure 9 shows the information flow sequence of SS-AL invocation with the affected user in a visited system and a second listening party involved in the AL call.

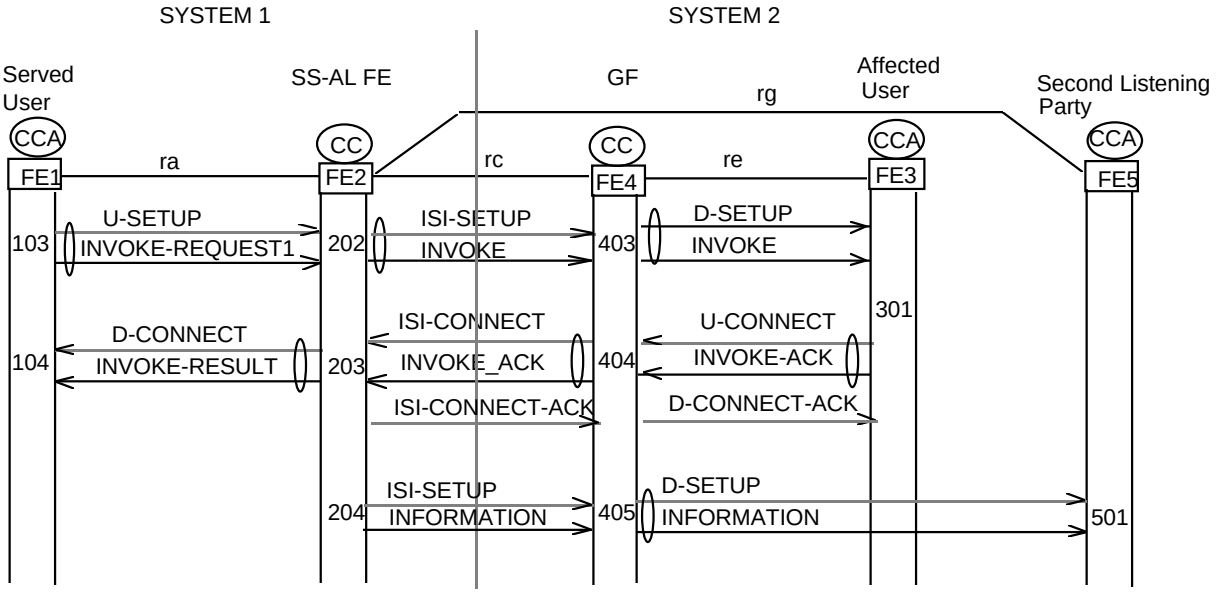


Figure 9: Invocation of SS-AL, affected user in a visited system, with second listening party

4.2.3.9 Invocation with affected user in visited system, no second listening party

Figure 10 shows the information flow sequence of SS-AL invocation with the affected user in a visited and no second listening party.

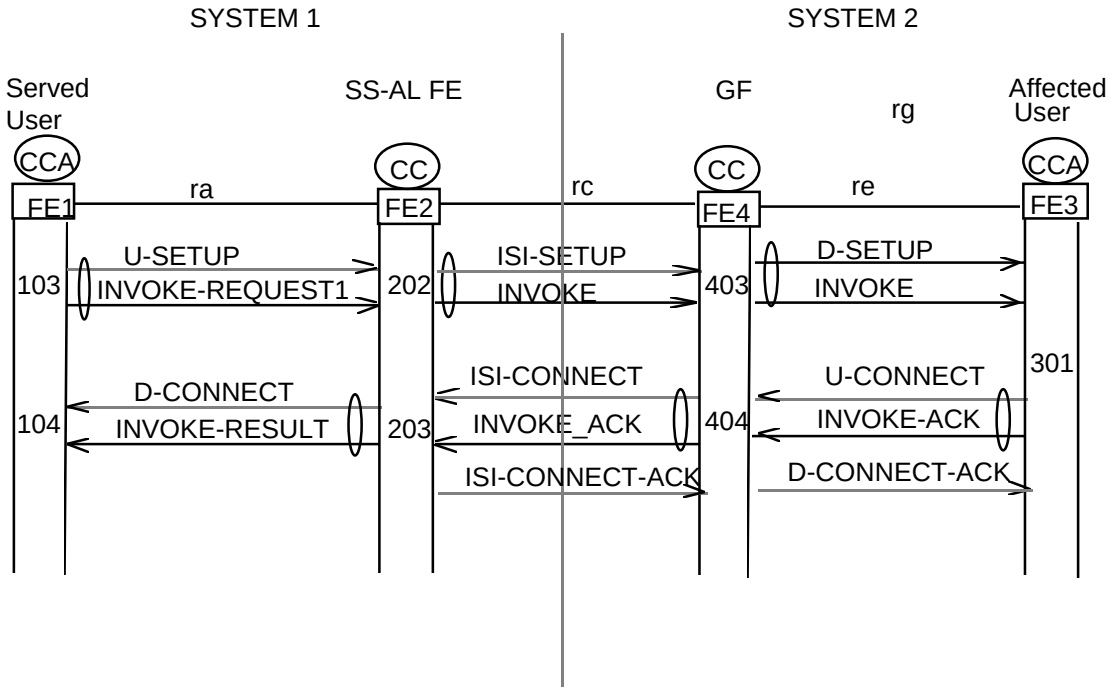
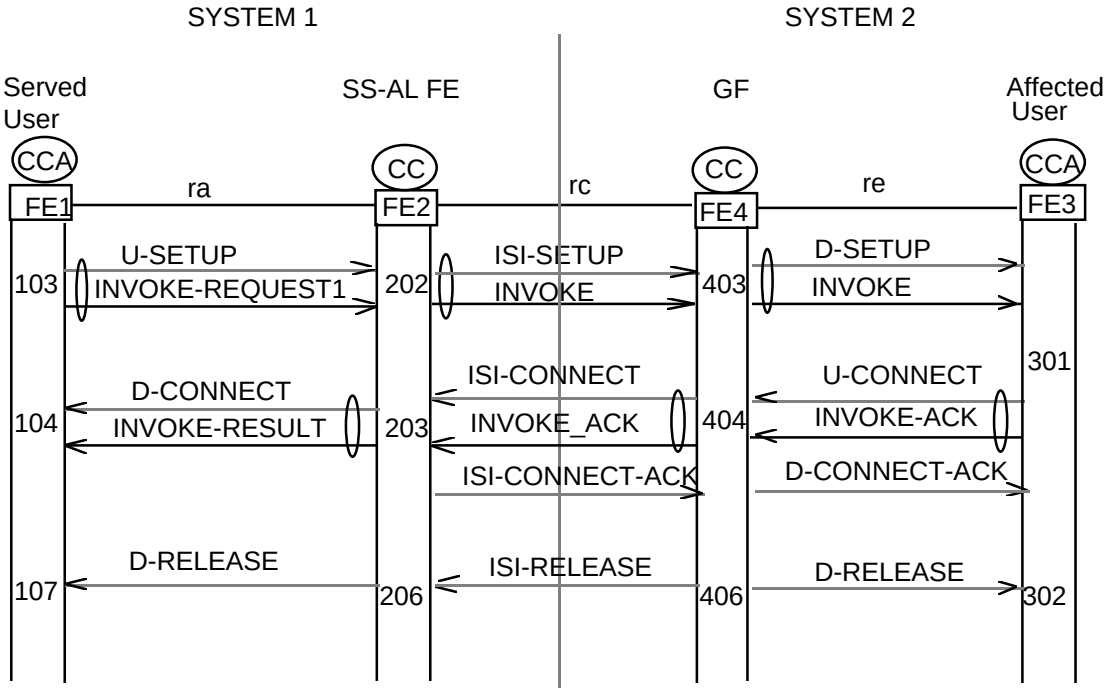


Figure 10: Invocation of SS-AL, affected user in a visited system, no second listening party

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

Figure 11 shows the information flow sequence of an SS-AL call cleardown when the affected user is in a visited system and FE4 call control entity receives a new call set-up for the affected user. FE4 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. For the case illustrated in figure 11, the new incoming call set-up is deemed to have a higher call priority than the AL call. When the AL call should be cleared, the normal call disconnection procedures shall be applied as specified in ETS 300 392-2 [2]. The†figure does not contain any information relating to the new call set-up to the affected user in the visited system.



NOTE: The call retention value of the AL call should be high and the call priority value of the AL call should be low. FE2 should provide a call priority to the visited system associated with the AL call. The visited system SwMI call control entity should use the AL call priority value to determine if the AL call should be cleared due to a new incoming call set-up in the visited system.

Figure 11: Cleardown of SS-AL, with affected user in a visited system, due to new incoming call in visited system (without second listening party)

4.2.4 FE Actions

4.2.4.1 Functional entity actions of FE1

101 FE1 shall detect the users request for SS-AL interrogation. Local checks on the suitability of the interrogation may be made and the request rejected on the basis of such checks. If these checks do not fail, an interrogation request shall be sent to FE2.

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

103 FE1 shall detect the users request for SS-AL invocation. Local checks on the suitability of the invocation may be made and the request rejected on the basis of such checks. If these checks do not fail, an invocation request shall be sent to FE2.

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

105 FE1 shall detect the users request to include a second listening party. Local checks on the suitability of the invocation may be made and the request rejected on the basis of such checks. If†these checks do not fail, an invocation request shall be sent to FE2.

106 On reception of the invocation result, FE1 shall present the information to the requesting user.

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

4.2.4.2 Functional entity actions of FE2

201 On reception of the SS-AL INTERROGATE-REQUEST 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 the SS-AL INVOKE-REQUEST1 information flow, FE2 shall verify the authorization for the request and the ITSI presented in the invocation. If FE2 finds the request valid, it shall send an INVOKE to FE3. If the request is not valid or authorized, FE2 returns an error indication to FE1.

203 On reception of the SS-AL 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.

204 On sending call set-up indications to FE5, FE2 shall send an SS-AL INFORMATION flow to FE5.

205 On reception of the SS-AL INVOKE-REQUEST2 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. The mechanism for inclusion of FE5 in the AL call is outside the scope of this ETS, but FE2 shall send an INFORMATION flow to FE5 informing FE5 that the call is an AL call. If the request is not valid or authorized, FE2 returns an error indication to FE1.

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

4.2.4.3 Functional entity actions of FE3

301 On reception of the SS-AL INVOKE information flow, FE3 shall validate the invocation. FE3 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. FE3 shall respond to the invocation by sending an INVOKE-ACK to FE2.

302 On reception of the AL call release, FE3 shall disconnect the AL call.

4.2.4.4 Functional entity actions of FE4

401 FE4 shall add the routing address of FE2 to the message. FE4 may also bar the service request, e.g. on the basis of authority checks.

402 On reception of the response for the request, FE4 shall deliver it to FE1. If FE4 barred the request, this is indicated in the response.

403 FE4 determines the subscriber's location site, changes the ITSI to the (V)SSI and sends the SS-AL message to FE3.

404 FE4 shall add the routing address of FE2 to the message.

405 On reception of SS-AL INFORMATION information flow, determines the sites where the group is present, changes the GTSI to the V(GSSI) and broadcasts the SS-AL message to FE5.

406 On reception of a call set-up (not shown) for the affected user, FE4 may initiate cleardown of the AL call based on the respective priorities of the two calls. If the AL call is to be cleared, FE4 shall send a D-RELEASE to the FE3 and FE2 for transfer to FE1. FE4 shall indicate the reason for disconnection in the disconnect cause element of the D-RELEASE PDU. As an implementation example, the disconnect cause values of "pre-emptive use of resource" or "SwMI requested disconnection" may be used.

4.2.4.5 Functional entity actions of FE5

501 On reception of the SS-AL INFORMATION information flow, FE5 shall indicate to its user that the incoming call is an AL call.

4.3 Allocation of FEs to physical equipment

FE/PE	SwMI	LS	MS
FE1	-	+	+
FE2	+	-	-
FE3	-	+	+
FE4	+	-	-
FE5	-	+	+
KEY:	+ = applicable - = not applicable		

4.4 Inter-working considerations

The SS-AL may extend to several TETRA networks. In order to support the inter-system SS-AL feature the TETRA system 1 (which initially invokes the service) and the TETRA system 2 (the additional service where the service extends to) need to 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 activation, deactivation, interrogation and invocation of SS-AL;
- to address and route messages between TETRA systems;
- to allocate visited subscriber identities is needed in TETRA system 2.

History

Document history			
September 1996	Public Enquiry	PE 114:	1996-09-23 to 1997-01-17