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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 300 392-11-14. During the processing for Vote it was converted into an EN.

The present document is part 11, sub-part 14 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";

Sub-part 1:   "Call Identification (CI)";

Sub-part 2:   "Call Report (CR)";

Sub-part 3:   "Talking Party Identification (TPI)";

Sub-part 4:   "Call Forwarding (CF)";

Sub-part 5:   "List Search Call (LSC)";

Sub-part 6:   "Call Authorized by Dispatcher (CAD)";

Sub-part 7:   "Short Number Addressing (SNA)";

Sub-part 8:   "Area Selection (AS)";

Sub-part 9:   "Access Priority (AP)";

Sub-part 10:   "Priority Call (PC)";

Sub-part 11:   "Call Waiting (CW)";

Sub-part 12: "Call Hold (CH)";

Sub-part 13: "Call Completion to Busy Subscriber (CCBS)";

Sub-part 14: "Late Entry (LE)";

Sub-part 16: "Pre-emptive Priority Call (PPC)";

Sub-part 17: "Include Call (IC)";

Sub-part 18: "Barring of Outgoing Calls (BOC)";

Sub-part 19: "Barring of Incoming Calls (BIC)";

Sub-part 20: "Discreet Listening (DL)";

Sub-part 21: "Ambience Listening (AL)";

Sub-part 22: "Dynamic Group Number Assignment (DGNA)";

Sub-part 23: "Call Completion on No Reply (CCNR)";

Sub-part 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 spacings and channel numbering";

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

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

National transposition dates	
Date of adoption of this EN:	12 July 2002
Date of latest announcement of this EN (doa):	31 October 2002
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Date of withdrawal of any conflicting National Standard (dow):	30 April 2003

1 Scope

The present document defines the stage 2 specifications of the Supplementary Service Late Entry (SS-LE) for the Trans-European Trunked Radio (TETRA).

The SS-LE allows radio users to be informed of and, if they are concerned, to join an already existing point-to-multipoint speech or data call.

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

Stage 2 describes the functional capabilities of the supplementary service introduced in stage 1 description. Stage 2 identifies the functional capabilities for the management of the service in the Switching and Management Infrastructure (SwMI), in the Mobile Station (MS) and in the Line Station (LS). Stage 2 also describes the information flows between these entities and also the flows sent over the Inter-System Interface (ISI).

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 SwMI, MS and LS of the service.

Aspects relating to all supplementary services are detailed in EN 300 392-9 [4].

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] ETSI ETS 300 392-11-16: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 11: Supplementary services stage 2; Sub-part 16: Pre-emptive Priority Call (PPC)".

[2] ETSI ETS 300 392-12-16: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 12: Supplementary services stage 3; Sub-part 16: Pre-emptive Priority Call (PPC)".

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

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

[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)".

3 Definitions and abbreviations

3.1 Definitions

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

authorized user: identified user who is able to define and interrogate the SS-LE parameters

forced LE: User is forced to join to the indicated call.

> NOTE: The user should join the ongoing multipoint call as soon as he receives a late entry indication. If the user is already engaged in another communication, the user has to join the highest priority call.

LE acknowledgement: indication sent in LE messages by a SwMI to inform a member who would like to join the call that he has to inform the SwMI of his entering the call

LE broadcast: indication sent by a SwMI to inform members of a multipoint call which are currently not already involved in this call that they can join directly an existing communication (a channel is already allocated in this cell)

LE paging: indication sent by a SwMI to inform members of a multipoint call which are currently not already involved in this call that they need to ask for a communication channel for that call if they wish to participate the call (a channel is not yet allocated in this cell)

user A: calling party in a call

user B: party that receives the SS-LE indications about an ongoing call

server user: party that receives the SS-LE indications about an ongoing call and joins the call

> NOTE: Also known as user B.

3.2 Abbreviations

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

FE	Functional Entity
ISI	Inter-System Interface
LE	Late Entry
SS	Supplementary Service

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

SwMI	Switching and Management Infrastructure
(V)GTSI	Visiting TETRA Subscriber Group Identity

4 Functional model

4.1 Functional model description

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

- FE1   user B's functional entity;

- FE2   SS-LE functional entity;

- FE3   authorized user's functional entity.

The following relationships shall exist between these FEs:

- ra between FE1 and FE2;

- rb between FE2s in different TETRA SwMIs;

- rc between FE2 and FE3.

Figure 1 shows these FEs and relationships for the operational part, and figure 2 for the management part. Refer to EN 300 392-9 [4] for further details on FE2 division into sub-entities.
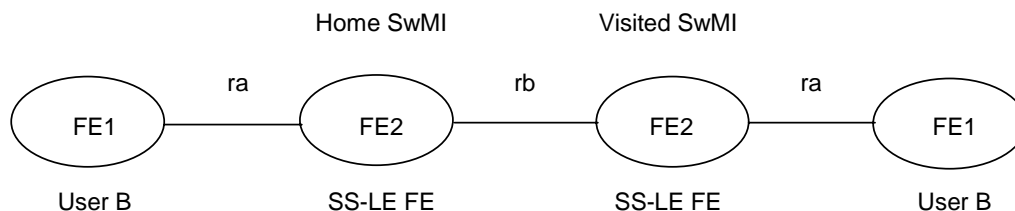
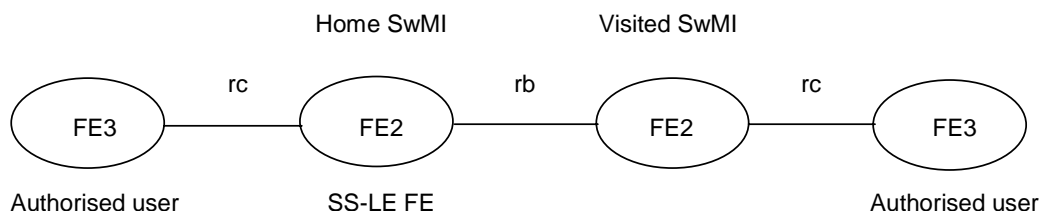**Figure 1: Functional model for the operational part of SS-LE**

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

4.2 FE description

4.2.1 User B's functional entity, FE1

FE1 shall receive notifications of SS-LE from FE2 when SS-LE is invoked for a call. In case of LE acknowledgement, FE1 shall send the acknowledgement when it participates in an ongoing call. In case of LE paging, FE1 shall send the paging response when it aims to participate in an ongoing call. If FE1 is in visited SwMI FE1 shall send the messages to FE2 in visited SwMI.

4.2.2 SS-LE functional entity, FE2

At the reception of call invocation request from a calling user A, FE2 shall determine if the SS-LE is invoked. If so, FE1 shall determine the applied SS-LE type and shall start operation of the SS-LE. During operation FE2 shall send the notifications of SS-LE to FE1s.

FE2 shall receive SS-LE definition requests from FE3s. FE2 shall analyse the requests and if they are found authorized and correct, FE2 shall make the definitions to the system and shall acknowledge to FE3. If not, FE2 shall reject the request and send a negative acknowledgement to FE3.

FE2 shall also receive SS-LE interrogation requests from FE3 about availability or state of a SS-LE service. FE2 shall fetch the response for the interrogation and if FE2 finds the request authorized it shall send the response to FE3.

If the basic service to which SS-LE is defined, extends to another TETRA system (visited SwMI), FE2 shall send a SS-LE information flow to visited SwMI FE2 to indicate if SS-LE should or should not be invoked in visited SwMI.

4.2.3 Authorized user's functional entity, FE3

At the receipt of a request from service user, FE3 shall send SS-LE definition and interrogation requests to FE2. At the reception of the responses, FE3 shall indicate the result to the service user.

4.2.4 LE functional entity FE2 in visited SwMI

Refer EN 300 392-9 [4] for message routing services in a visited SwMI.

If a basic service extends to visited SwMI, FE2 should receive a SS-LE information flow which indicates if it should or should not invoke SS-LE for the call in visited SwMI. If SS-LE is invoked in visited SwMI for the call, the visited SwMI FE2 shall determine the SS-LE type for the call in visited SwMI. When the SS-LE type is acknowledgement, then the visited SwMI FE 2 shall pass acknowledgement from FE1 to the home SwMI FE2.

The group number shall be known in the visited SwMI either by migration or group linking, refer ETS 300 392-3-5 [5], when the SS-LE service in invoked in the visited SwMI, FE2.

4.3 Relationship with basic services

Figure 3 shows the relationship of SS-LE with basic service.

Figure 3: The relationships with a basic service

5 Information flows

5.1 Definition of information flows

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

5.1.1 Definition

Only authorized user (FE3) shall make SS-LE definitions. The definition can be to one group identity or a list or range of group identities. FE2 shall acknowledge the definition request. FE2 shall save the SS-LE definitions in the home SwMI for the defined group identity/identities, if the definition request was accepted.

The authorized user may define the LE type to be can be defined. If the LE type is omitted in the definition, it is outside the scope of the present document, which LE type shall be applied and the decision can be made e.g. depending on the congestion in the system.

SS-LE can be defined to be invoked over ISI to extend to several TETRA systems or the SS-LE can be defined not to extend over ISI.

5.1.1.1 DEFINE

DEFINE shall be an information flow from FE3 to FE2 for the relationship rc and rb. The flow shall be used to define SS-LE for one group and may be used to define SS-LE for a list or range of groups. Table 1 lists the elements within the DEFINE information flow.

Table 1: Contents of DEFINE

Element	Type
Defined group identity/identities	M
LE Type	O
LE used over ISI	O
Basic service type(s)	O
Repetition rate	O

5.1.1.2 DEFINE ACK

DEFINE ACK shall be an information flow from FE2 to FE3 for the relationship rc and rb. The flow shall be used in order to acknowledge a definition request made for one group or a list or range of groups. Table 2 lists the elements within the DEFINE ACK information flow.

Table 2: Contents of DEFINE ACK

Element	Type
Defined group identity/identities	M
Result for definition	M

5.1.2 Operation

A SwMI may be four different SS-LE types. These four types are LE broadcast, LE acknowledgement, LE paging and forced LE and they have the following characteristics:

LE broadcast shall be used for unacknowledged group calls and it may be used for acknowledged group calls. It shall be used to inform users about an ongoing group call. The users may join the call immediately after the reception of LE broadcast information flow. If the user joins the call, it shall move to the traffic channel, if any allocated at that time.

LE acknowledgement shall be used for acknowledged group calls. It shall be used to inform users about an ongoing group call and to request an acknowledgement from a user that joins the call. The users may join the call immediately after the reception of LE acknowledgement information flow. If the user joins the call, it shall move to the allocated traffic channel, if any, and it shall send the acknowledgement after moving to the traffic channel. If the traffic channel is not at that moment allocated for the indicated call, the user shall send the acknowledgement on the control channel.

LE paging shall be used to inform users about an ongoing group call. LE paging should be used when the traffic channel is not yet allocated for the call in a cell. So, LE paging should be used to request a paging response from users that wish to join the call, so that the SwMI can allocate the traffic channels after at least one user has indicated the need. FE2 shall start LE paging by sending the paging indication, to which FE1 shall send a response, if it wishes to join the call. When FE2 receives the paging response from FE1, FE2 shall send LE broadcast information flow to FE1. Or, if the applied LE type shall be LE acknowledgement, FE2 shall send LE acknowledgement information flow to FE1. The LE broadcast/LE acknowledgement information flow shall be sent in order to allow FE1 to participate the call. The paging response is considered also as an acknowledgement and the requesting FE1 need not response to the LE acknowledgement information flow to FE1 after sending the PE paging response.

Forced LE may be used to force the user to join an ongoing multipoint call even if the user is engaged to another (lower priority) call. Forced LE is implemented by using the pre-emptive values of "Call priority" element within basic service information flow as described in ETS 300 392-11-16 [1] and ETS 300 392-12-16 [2].

If a call for which SS-LE has been defined extends to visited SwMI, FE2 in home SwMI shall indicate to FE2 in visited SwMI whether SS-LE should or should not be applied in visited SwMI. FE2 in visited SwMI should invoke the LE Broadcast or LE Acknowledgement depending on the call type. Whether FE2 in visited SwMI applies LE Paging first is up to visited SwMI and is outside the scope of the present document.

5.1.2.1   INFORM1 for LE broadcast

INFORM1 shall be an information flow from FE2 to FE1 for LE broadcast over the relationship ra and the flow shall be sent by FE2 in visited SwMI if the user B is in visited SwMI. The flow shall inform the user B about an ongoing group call.

INFORM1 shall be used in case of LE broadcast; INFORM1 shall also be used when a user has responded to LE paging and when FE2 has changed the LE type to LE broadcast and FE2 informs FE1 about the allocated traffic channel and thus FE2 shall allow FE1 to participate the call. Table 3 lists the elements within the INFORM1 information flow.

Table 3: Contents of INFORM1

Element	Type
LE broadcast indication	M

5.1.2.2   INFORM2 for LE acknowledgement

INFORM2 shall be an information flow and from FE2 to FE1 for LE acknowledgement over the relationship ra. The flow shall be sent from FE2 in visited SwMI to FE1 if the user B is in visited SwMI. It shall inform the user B about an ongoing group call and request an acknowledgement response, if the user B decides to join the call.

INFORM2 shall be used in case of LE acknowledgement; INFORM2 shall also be used when a user has responded to LE paging and when FE2 has consequently changed the LE type to LE acknowledgement and FE2 informs FE1 about the allocated traffic channel and thus FE2 invites FE1 to participate the call.

   NOTE: If LE type is changed from LE paging to LE acknowledgement, the traffic channel should be given in
             INFORM2 information flow.

Table 4 lists the elements within the INFORM2 information flow.

Table 4: Contents of INFORM2

Element	Type
LE acknowledgement indication	M

5.1.2.3   INFORM2 ACK for LE acknowledgement

INFORM2 ACK shall be an information flow from FE1 to FE2 for LE acknowledgement over the relationships ra and rb. The flow shall be sent from FE1 to FE2 via FE2 in visited SwMI if the user B is in visited SwMI. The flow shall inform the system about a user B that participates the call. If a user does not participate the call, the user shall not send LE acknowledgement message.

FE1 should only send one LE acknowledgement response per one call (one call item).

FE1 shall send the acknowledgement in INFORM2 information flow.

Table 5 lists the elements within the INFORM2 ACK information flow.

Table 5: Contents of INFORM2 ACK

Element	Type
Call identifier	M

5.1.2.4   INFORM3 for LE paging

INFORM3 shall be an information flow from FE2 to FE1 for LE paging over the relationship ra. The flow shall be sent from FE2 in visited SwMI to FE1 if the user B is in visited SwMI. The flow shall inform the user B about a group call and request a response, if the user B wishes to participate the call. As LE paging is used when the traffic channel has not been allocated for the call in the cell, there shall be no indication of an allocated traffic channel in INFORM3.

Table 6 lists the elements within the INFORM3 information flow.

Table 6: Contents of INFORM3

Element	Type
LE paging indication	M

5.1.2.5   INFORM3 ACK for LE paging

INFORM3 ACK shall be an information flow from FE1 to FE2 for LE paging over the relationship ra. The flow shall be sent to FE2 in visited SwMI if the user B is in visited SwMI. It shall inform the system about a user B that wishes to join the call.

The user B shall send this response only when he wishes to participate the call.

The LE paging shall end when FE2 receives the paging acknowledgement from FE1 and the SS-LE type is changed to LE broadcast.

Table 7 lists the elements within the INFORM3 ACK information flow.

Table 7: Contents of INFORM3 ACK

Element	Type
Call identifier (a part of the basic call information flow)	M

5.1.2.6   INFORM4

LE used over ISI shall be an information flow over the relationship rb between FE2 in home SwMI and FE2 in visited SwMI. The flow shall be used when SS-LE should be invoked for the call in two or more TETRA systems. Table 8 lists the information elements within the LE for ISI information flow.

If the basic service type is acknowledged multipoint call, the acknowledgement received from FE1 should be routed to FE2 in home SwMI.

Table 8: INFORM4 information flow

Element	Type
LE applied/not applied over ISI	M

5.1.3   Interrogation

FE3 can interrogate SS-LE definitions from FE2. The interrogation can be made to one group identity or a list or range of group identities. A member of a group is authorized to interrogate the SS-LE of the group.

5.1.3.1   INTERROGATE

INTERROGATE shall be an information flow from FE3 to FE2 over the relationships rc and rb, and the flow shall be used in order to interrogate the SS-LE for one group or a list or range of groups.

Table 9 lists the elements within the INTERROGATE information flow.

Table 9: Contents of INTERROGATE

Element	Type
Interrogated group identity/identities	M

5.1.3.2   INTERROGATE ACK

INTERROGATE ACK shall be an information flow from FE2 to FE3 over the relationships rc and rb. It shall be used in order to respond to the LE interrogation request for one group or a list or range of groups. Table 10 lists the elements within the INTERROGATE ACK information flow. Acknowledgement shall be sent for each requested TETRA identity.

Table 10: Contents of INTERROGATE ACK

Element	Type
Interrogated group identity/identities	M
Result of interrogation	M
LE Type	O (see note)
LE used over ISI	O (see note)
Basic service type(s)	O (see note)
Repetition rate	O (see note)
NOTE: The parameters shall be returned, if defined.	

5.2   Relationship of information flows to basic call information flows

Table 11 summarizes the relationship of the SS-LE information flows with those of the basic call as defined in EN 300 392-2 [3].

Table 11: The relationship between SS-LE information flows and basic service information flows

Information flow	Dependent of basic call flow	Basic call or supplementary service flow
DEFINE	no	U-FACILITY
DEFINE ACK	no	D-FACILITY
INTERROGATE	no	U-FACILITY
INTERROGATE ACK	no	D-FACILITY
INFORM1	yes	D-SETUP
INFORM2	yes	D-SETUP
INFORM2 ACK	yes	U-INFO, ISI-FACILITY
INFORM3	yes	D-SETUP
INFORM3 ACK	yes	U-INFO
INFORM4	yes	ISI-SETUP

5.3   SS-LE service primitives

The SS-LE service primitives at the authorized user MS/LS (FE3) shall be:

   a) DEFINE request;

   b) DEFINE indication;

   c) INTERROGATE request;

   d) INTERROGATE indication.

The SS-LE service primitives at the served user MS/LS (FE1) shall be:

   a) BROADCAST LE indication;

   b) ACKNOWLEDGE LE indication;

   c) ACKNOWLEDGE LE response;

   d) PAGING LE indication;

   e) PAGING LE response.

Refer to EN 300 392-9 [4], clause 5.

5.4   Information flow sequences

5.4.1   General

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 service specific error situations, interactions with basic call, interactions with other supplementary services, different topologies, etc.

In figures, SS-LE information flows are represented by solid arrows and basic call or generic supplementary service information flows are represented by broken arrows. An ellipse embracing two information flows indicates that the two information flows occur together. Within a column representing an SS-LE FE, the numbers refer to FE actions listed in clause 4.2.3.

No timers are used in figures.

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

   NOTE 2: The call set-up sequences are partial and only information flows relevant to SS-LE are shown.

5.4.2   Definition

Figure 4 shows the information flow sequence of SS-LE definition when authorized user is in home SwMI.
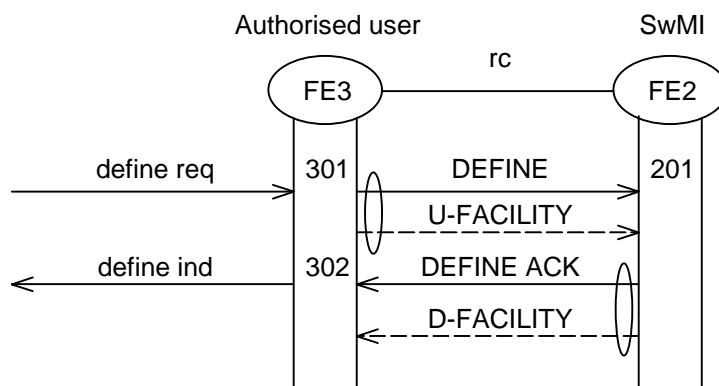
Figure 4: Definition of SS-LE

5.4.3   Definition of LE when FE3 in visited SwMI

Figure 5 shows the information flow sequence of SS-LE definition when authorized user is in visited SwMI. The information about SS-LE is store into the group home SwMI.
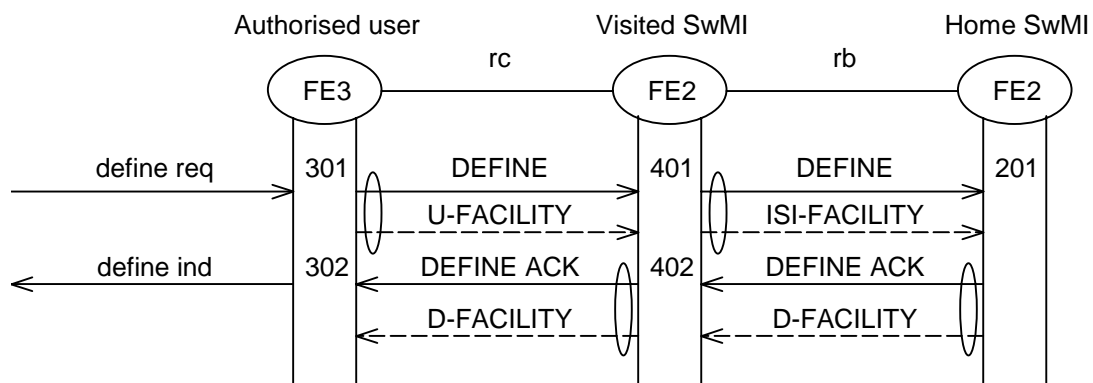
Figure 5: Definition of SS-LE when FE3 is in visited SwMI

5.4.4   Operation of LE broadcast

Figure 6 shows the information flow sequence of LE broadcast operation when user A (calling party) and one user B is in home SwMI and another user B is in visited SwMI. The users have not reacted to the basic call set-ups; potentially those were not received by the MS of the user B in first place although shown in figure 6.
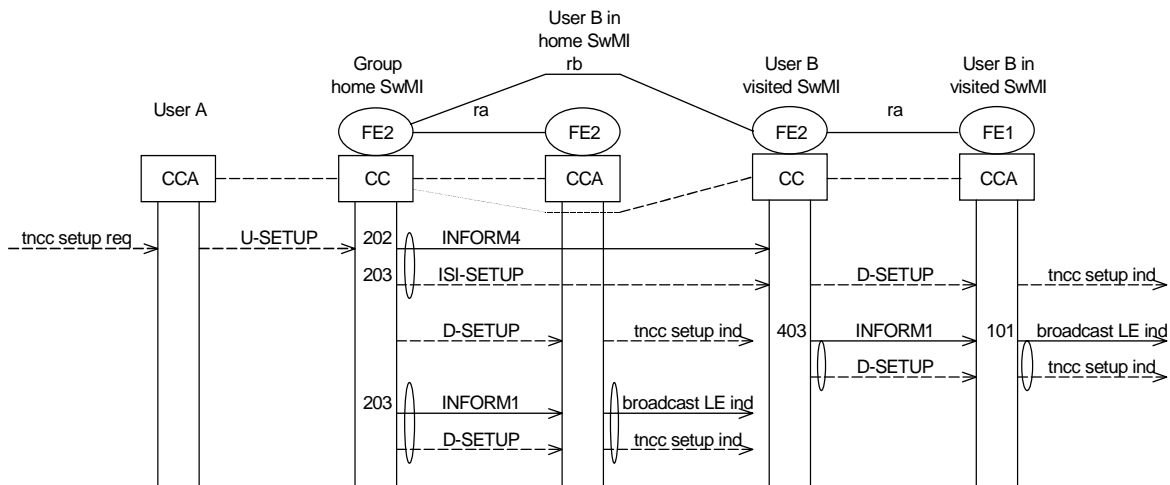

Figure 6: Operation of LE broadcast

FE2 shall start the sending of LE broadcast messages after the basic call setup as defined in EN 300 392-2 [3]. Only the first sent LE messages after the basic call setup are shown in figure 6.

5.4.5   Operation of LE broadcast when user A (calling party) is in visited SwMI

Figure 7 shows the information flow sequence of LE broadcast operation when user A (calling party) in visited SwMI and two user Bs are in home SwMI. In this scenario there is no other participant than user A of the group call in the visited SwMI. Figure 7 shows only the SS-LE operation and the basic call is not presented, refer to figure 6.
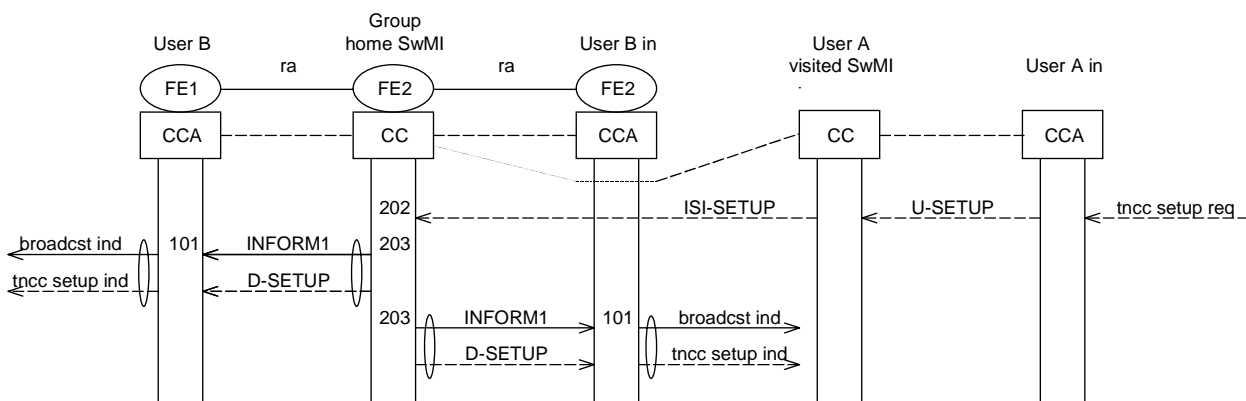

Figure 7: Operation of LE broadcast

FE2 shall start the sending of SS-LE broadcast messages after the basic call setup as defined in EN 300 392-2 [3]. Only the first sent LE messages are shown in figure 7. The call setup messages sent to the calling user A are not shown in figure 7 as those are not affected by SS-LE.

5.4.6   Operation of LE acknowledgement

Figure 8 shows the information flow sequence of LE acknowledgement operation when user A (calling party) and one user B is in home SwMI and another user B is in visited SwMI. D-INFO message can be used to inform the calling user A about acknowledgements that FE2 has received from FE1s, see EN 300 392-2 [3], clause 14. Figure 8 shows only the SS-LE operation and the basic call is not presented, refer to figure 6.
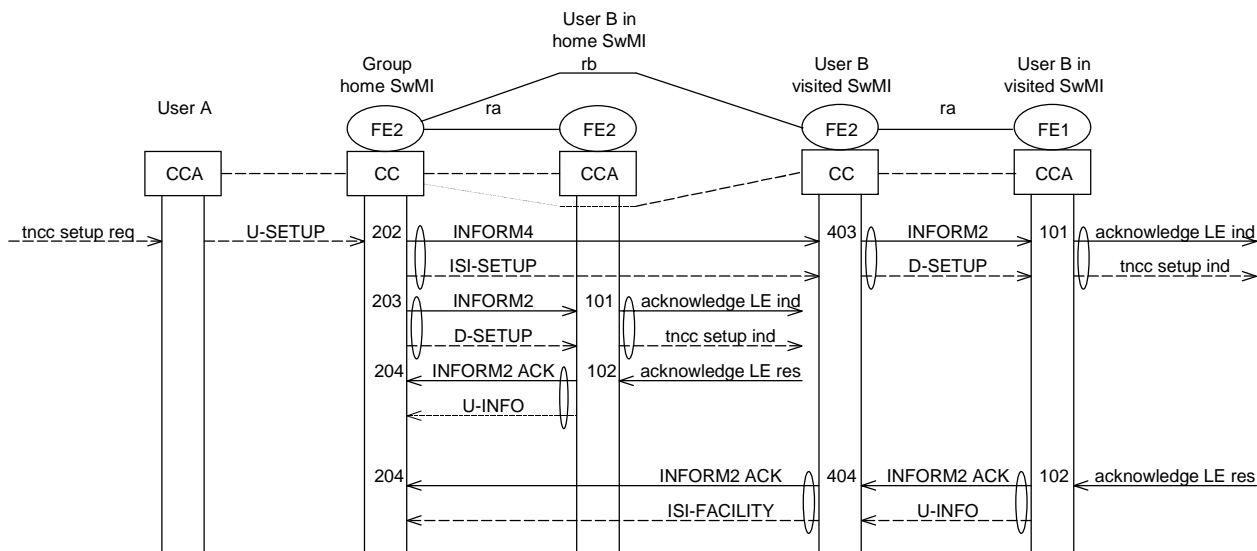

Figure 8: Operation of LE acknowledgement

FE2 shall start the sending of LE acknowledgement messages after the basic call setup as defined in EN 300 392-2 [3]. Only the first sent LE messages are shown in figure 8.

5.4.7   Operation of LE paging

Figure 9 shows the information flow sequence of LE paging operation when user A (calling party) and one user B is in home SwMI and another user B is in visited SwMI. In this scenario the SS-LE type changes into LE broadcast.
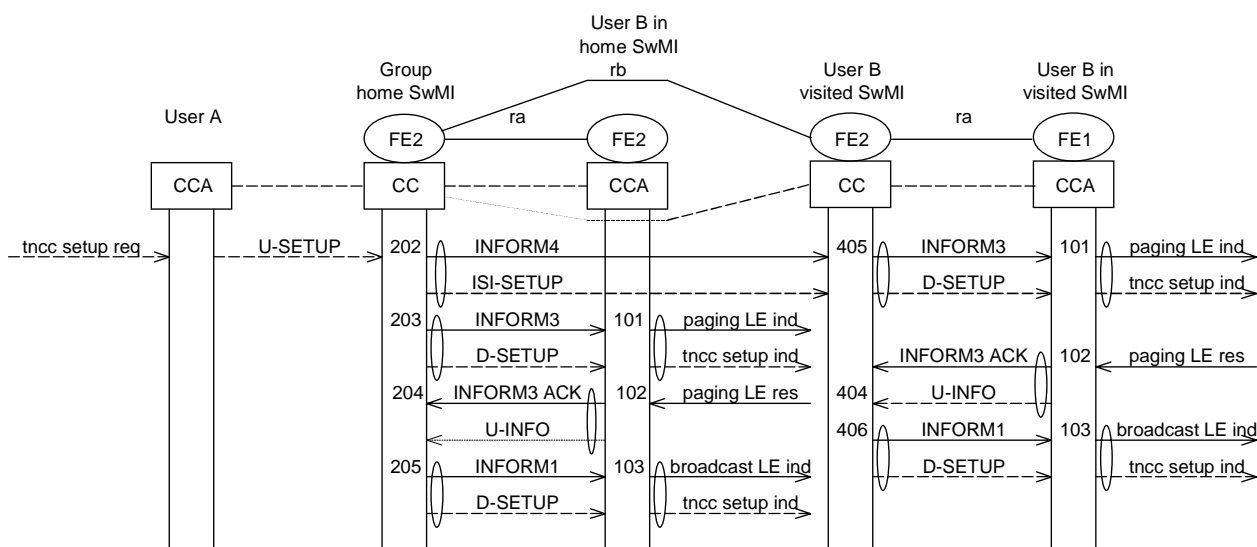

Figure 9: Operation of LE paging in normal group call

FE2 shall start the sending of LE paging messages after the basic call setup as defined in EN 300 392-2 [3]. At the reception of a LE paging response, FE2 shall allocate the traffic channel for the call and should change LE paging to LE broadcast.

In case of acknowledged group call, the LE type should be changed to LE acknowledgement as shown in figure 10 when the user B in the visited system responses to the LE paging. At this stage the group home SwMI still operates LE paging.
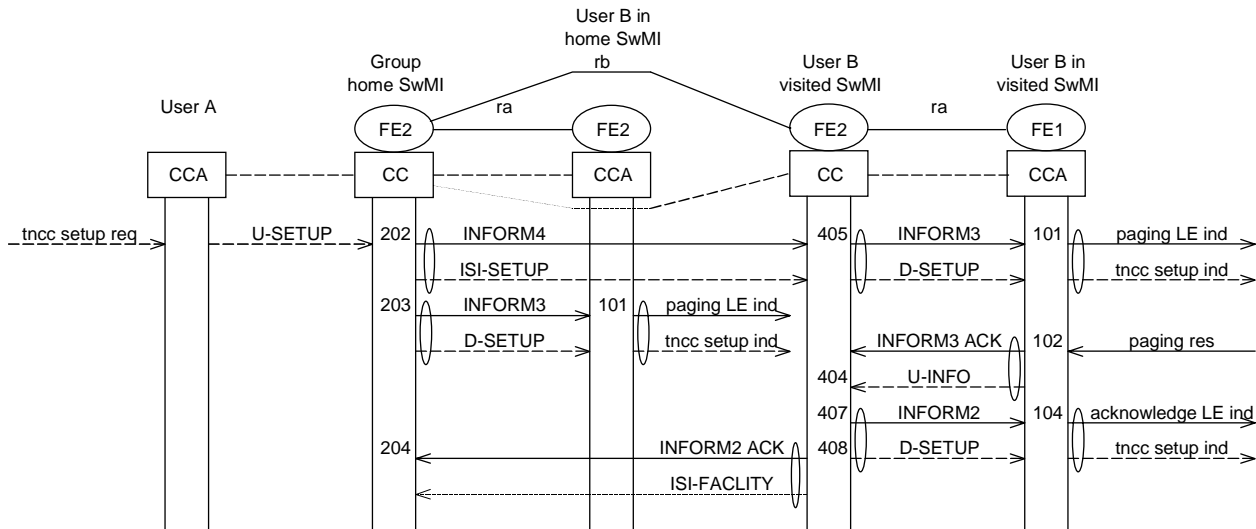
Figure 10: Operation of LE paging in an acknowledged group call

5.4.8 Interrogation of SS-LE

Figure 11 shows the information flow sequence for normal operation of SS-LE interrogation when authorized user is in home SwMI.
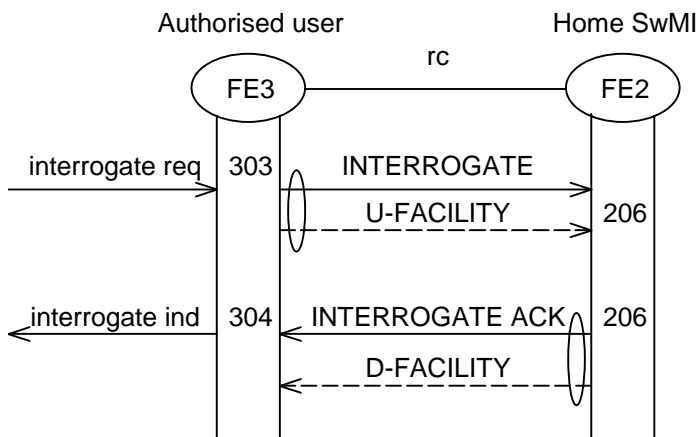
Figure 11: Interrogation of SS-LE

5.4.9   Interrogation of SS-LE when authorized user is in visited SwMI

Figure 12 shows the information flow sequence for normal operation of SS-LE interrogation when authorized user is in visited SwMI.
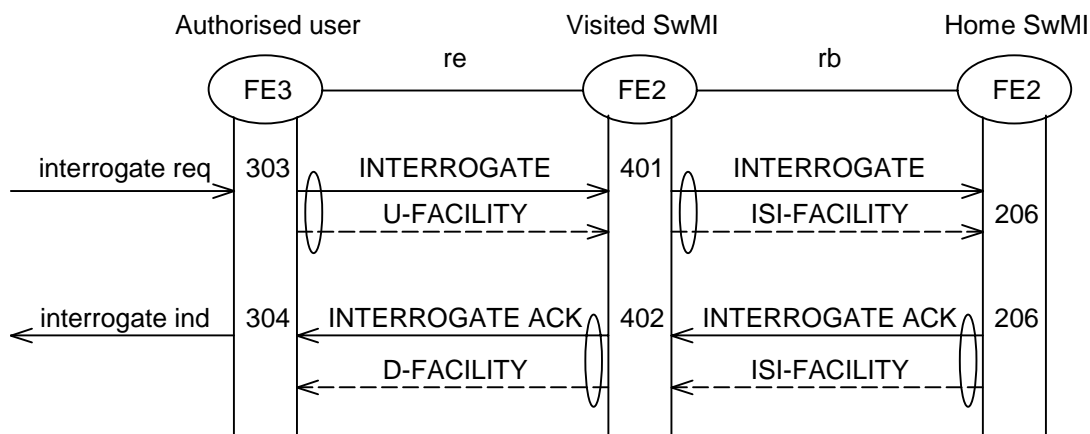

Figure 12: Interrogation of LE when FE3 in visited SwMI

5.4.10   FE actions

5.4.10.1   FE actions of FE1

101   At the reception of the SS-LE information flows:

- INFORM1 with SETUP;

- INFORM2 with SETUP;

- INFORM3;

- FE1 collocated to CCA shall inform user with the corresponding service primitive about the SS-LE related to a call.

102   When an acknowledgement is requested the user should response with the corresponding service primitive and FE1 shall acknowledge to SwMI if the MS joins the call and FE1 shall send:

- INFORM2 ACK as a response to INFORM2;

- INFORM3 ACK as a response to INFORM3.

103   Upon reception of the INFORM1 information flow FE1 shall inform CC and user.

104   Upon reception of the INFORM2 information FE1 shall inform CC and user without invoking any further response to FE2.

5.4.10.2   FE actions of FE2

201   At the reception of DEFINE information flow, FE2 shall detect the user request for defining the SS-LE definition. FE2 shall verify the given SS-LE group identity, teleservice/bearer service type and the authorization for the request. If these checks do not fail, FE2 shall make the SS-LE definition to the system. FE2 shall return DEFINE ACK as an acknowledgement for the service request to FE3.

202   At the reception of the call set up, FE2 checks if the SS-LE is activated for the group identity. If SS-LE is activated FE2 shall determine the SS-LE type and parameters. The call is set-up as defined in EN 300 392-2 [3].

203   FE2 shall send the SS-LE operation information flows to FE1s.

204   FE2 shall record the acknowledgement received from FE1 for acknowledged group call usage.

205   FE2 shall send the call invocation message with channel information to FE1.

206 At the reception of SS-LE interrogation, FE2 shall verify that the request is allowed and its parameters valid. If FE2 finds the request valid, it shall fetch the SS-LE data and send the requested response to FE3. If the request is not valid or authorized, FE2 shall return an error indication to FE3.

5.4.10.3 FE actions of FE3

301 Upon a user request for a SS-LE definition in a DEFINE request FE3 shall send corresponding DEFINE information flow to FE2.

302 At the receipt of definition acknowledgement in a DEFINE ACK information flow, FE3 shall inform the user of the result by corresponding DEFINE indication primitive. The result may be successful or unsuccessful definition.

303 Upon the user request for interrogation in an INTERROGATE request service primitive FE3 shall send corresponding INTERROGATE information flow to FE2.

304 Upon the receipt of the interrogation response in INTERROGATE ACK information flow FE3 shall give the information to the requesting user in corresponding INTERROGATE indication service primitive.

5.4.10.4 FE ISI actions of FE2 in visited SwMI

401 FE2 shall forward information flow to home SwMI FE2.

402 At the reception of the information flow, FE2 shall deliver it to FE3.

403 FE2 shall determine the subscriber's location site, shall determine the applied SS-LE type, allocate the traffic channel for the call, if needed, and change the group identity to the corresponding visited SwMI group identity (V)GSSI. After normal basic call set-up FE2 shall send the SS-LE messages to FE1.

404 FE2 shall receive the acknowledgement sent by FE1 and forward it to the group home SwMI.

405 FE2 shall determine the subscriber's location site, shall determine the applied SS-LE type and change the group identity to the visited SwMI group identity (V)GSSI. After basic call set-up FE2 shall send the SS-LE messages to FE1.

406 FE2 shall change the LE operation into LE broadcast in an unacknowledged group call.

407 FE2 shall change the LE operation into LE acknowledgement in an acknowledged group call.

408 FE2 shall forward the FE1 response as an acknowledgement to the group home SwMI.

6 Allocation of FEs to physical equipment

Table 12 shows the allocation of FE to physical equipment. Other means how authorized user may be connected to SwMI and use management functions are outside the scope of the present document.

Table 12: Allocation of FE to physical equipment

Equipment/Function	SS-LE Management	SS-LE Operation
SwMI	FE2 (Optional)	FE2 (Mandatory)
MS	FE3 (Optional)	FE1 (Mandatory)
LS	FE3 (Optional)	FE1 (Optional)

7 Interworking considerations

The SS-LE may extend to several TETRA networks. If supported, the TETRA group home SwMI (which initially invokes the service) and the TETRA visited SwMI (the additional system to which the service extends) shall deliver the SS-LE specific information over the Inter System Interface (ISI) and they shall operate SS-LE.

In order to support the SS-LE to extend to several TETRA systems over the ISI, home SwMI and visited SwMI shall be able to perform the general supplementary service related sending and reception tasks of call unrelated data, refer to refer EN 300 392-9 [4].

The attachment profile of a group identity may contain SS-LE part as defined in tables 13 and 14, refer to EN 300 392-9 [4]. A profile update may be exchanged also after the original attachment due to a new definition.

Table 13 lists the elements within the PROFILE information flow.

Table 13: PROFILE

Element	Type
LE types, see note	O
Repetition rate	O
NOTE: List of types, which may be used upon invocation.	

Table 14 lists the elements within the PROFILE ACK information flow.

Table 14: PROFILE ACK

Element	Type
Supported LE types	O
Repetition rate	O

Figure 13 shows SS-LE information exchange during group attachment.
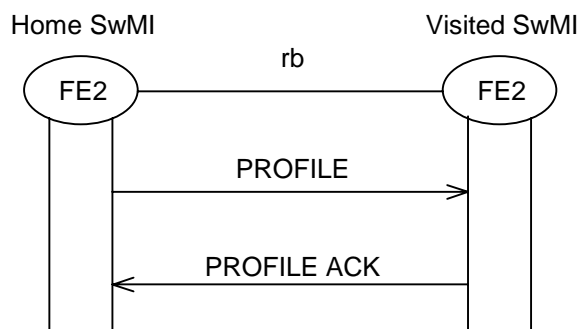

Figure 13: SS-AP profile exchange between SwMIs

Annex A (informative):
Bibliography

ETSI ETS 300 392-10-14: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 10: Supplementary services stage 1; Sub-part 14: Late entry".

ETSI EN 300 392-12-14: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 12: Supplementary services stage 3; Sub-part 14: Late Entry (LE)".

History

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