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**Terrestrial Trunked Radio (TETRA);  
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## Foreword

This European Telecommunication Standard (ETS) has been produced by the Terrestrial Trunked Radio (TETRA) Project of the European Telecommunications Standards Institute (ETSI).

This ETS consists of 14 parts as follows:

- Part 1: "General network design";
- Part 2: "Air Interface (AI)";
- Part 3: "Interworking at the Inter-System Interface (ISI)";
- Part 4: "Gateways basic operation";
- Part 5: "Peripheral Equipment Interface (PEI)";
- Part 6: "Line connected Station (LS)";
- Part 7: "Security";
- Part 9: "General requirements for supplementary services";
- Part 10: "Supplementary services stage 1";
- Part 11: "Supplementary services stage 2";**
- Part 12: "Supplementary services stage 3";
- Part 13: "SDL model of the Air Interface (AI)";
- Part 14: "Protocol Implementation Conformance Statement (PICS) proforma specification".

Transposition dates	
Date of adoption of this ETS:	31 March 2000
Date of latest announcement of this ETS (doa):	30 June 2000
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## 1 Scope

This European Telecommunication Standard (ETS) defines the stage 2 specifications of the Supplementary Service Dynamic Group Number Assignment (SS-DGNA) for the Terrestrial Trunked Radio (TETRA).

The SS-DGNA enables a user to dynamically define group identities and group related parameters to the TETRA system and to the subscribers in the system. These definitions are used to enable group call invocations to dynamically defined groups. This ETS specifies the creation, modification, deletion and interrogation of group definitions in the Switching and Management Infrastructure (SwMI), in the Mobile Station (MS) and in the Line Station (LS). The operations can be made within one TETRA system or over the Inter System Interface (ISI).

This specification does not include the specification for access priority used for random access in uplink and call priority used by SwMI for resource allocation for a group. Access priority and call priority can be specified for groups using Supplementary Service Access Priority (SS-AP), Supplementary Service Priority Call (SS-PC) and Supplementary Service Pre-emptive Priority Call (SS-PPC).

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

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 SwMI, in the MS and in the LS. Stage 2 describes the information flows exchanged between these entities, and it also describes the flows sent over the 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.

## 2 Normative references

This ETS incorporates by dated and 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] ETS 300 392-2: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 2: Air Interface (AI)".
- [2] ETS 300 392-1: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 1: General network design".
- [3] ETS 300 392-12-22: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 12: Supplementary services stage 3; Sub-part 22: Dynamic Group Number Assignment (DGNA)".
- [4] ETS 300 392-10-22: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 10: Supplementary services stage 1; Sub-part 22: Dynamic group number assignment".
- [5] ETS 300 392-7: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 7: Security".
- [6] ETS 300 392-9: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 9: General requirements for supplementary services".
- [7] ETS 300 392-7: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 7: Security".

### 3 Definitions and abbreviations

#### 3.1 Definitions

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

**affected user:** identified MS or LS user to which the supplementary service operation assigns or deassigns the group number

NOTE: In some specific cases, the term affected users may apply to all the (assigned) users of an existing group.

**authorized user:** user who is authorized to define, modify, delete and interrogate SS-DGNA numbers

**call related DGNA:** creation of a group comprising the participants in a call

**call unrelated DGNA:** creation of a group based on identities

**DGNA number:** group number added, modified, deleted and/or interrogated with SS-DGNA

#### 3.2 Abbreviations

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

CC	Call Control
CCA	Call Control (functional entity Agent)
DGNA	Dynamic Group Number Assignment
FE	Functional Entity
GSSI	Group Short Subscriber Identity
GTSI	Group TETRA Subscriber Identity
ISI	Inter-System Interface
LS	Line Station
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):

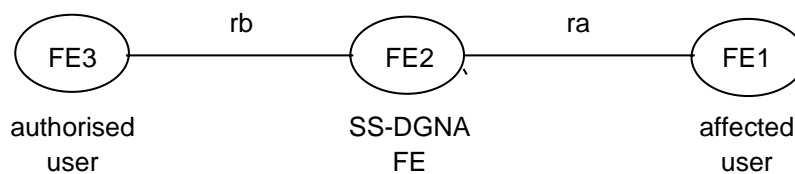
- FE1 Affected user functional entity;
- FE2 Dynamic Group Number Assignment (DGNA) functional entity in home SwMI and in visited SwMI;
- FE3 Authorized user functional entity.

The following relationships shall exist between these FEs:

- ra    between FE1 and FE2;
- rb    between FE2 and FE3.



Figure 1 shows these FEs and their relationships.



**Figure 1: Functional model for SS-DGNA**

## 4.2 Description of FEs

### 4.2.1 Affected user functional entity, FE1

The FE that serves the affected user for DGNA number assignment, deassignment and interrogations.

### 4.2.2 SS-DGNA functional entity, FE2

The FE within the network which ensures SS-DGNA operations: assignment, deassignment, definition, deletion, modification and interrogations in the home SwMI of the group for which SS-DGNA has been invoked. This FE also distributes assignment/de-assignment requests to FEs in visited SwMIs.

### 4.2.3 Authorized user functional entity, FE3

The FE that serves the authorized user for DGNA number call related and call un-related definitions, deletion, modification and interrogations. Some of the authorized user capabilities may be allocated to the affected user e.g. to interrogate his own groups.

### 4.2.4 Functional entity FE2 in visited SwMI

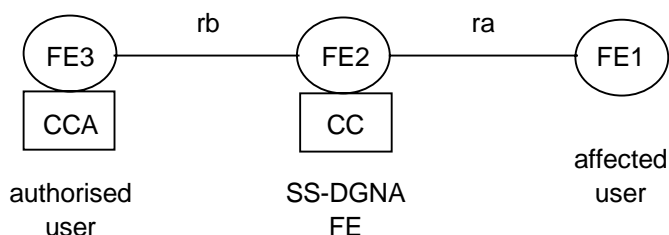
The FE within the network which ensures SS-DGNA operations: assignment, deassignment, definition, deletion, modification and interrogations in another than home SwMI of the group for which SS-DGNA has been invoked. This FE also distributes assignment/de-assignment requests to FEs in that SwMI.

## 4.3 Relationship to basic call functional model

In case of call related SS-DGNA FE3 shall be collocated with the authorized user CCA when this supplementary service is defined and then invoked.

NOTE: FE1 is not collocated with the affected user CCA because FE1 does not have any function during the definition and invocation of SS-DGNA and the assignment is independent of the call although a call related signalling may be utilized.

In case of call related SS-DGNA FE2 shall be collocated with a CC entity which will provide FE2 with the group composition.



**Figure 2: The relationships between the basic service and call related SS-DGNA FEs**

## 5 Information flows

### 5.1 General on information flows

The definitions of information flows define the informational contents exchanged between the different functional entities.

In the tables listing the elements in information flows, the column headed type indicates which of these elements are mandatory "M", conditional "C" or optional "O".

The response/confirmation information flows for confirmed information flows (e.g. definition or interrogation requests) have been named differently from the corresponding request/indication information flow so that the same names can be used for the corresponding (stage 3) PDU messages. However this difference consists only in the addition of the extension "ACK" after the name of the corresponding request/indication information flow.

The details of the element values are described in stage 3 as service primitive parameter values, refer to ETS 300 392-12-22 [3] subclause 5.4.

### 5.2 Definition of SS-DGNA number

Call related and call unrelated DGNA numbers shall be created using the DEFINE request/indication information flow.

For call unrelated -DGNA number definition, the participants in the group and the corresponding group parameters may be included in this information flow or modification information flow will be used later for completion of the definition.

For the creation of a call related DGNA group, the users currently participating in the group call (but not those nominally in the group and not participating in the call, e.g. because they were not powered on, or they had not attached to the group) shall be implicitly defined as affected users, and the corresponding group parameters shall be implicitly defined as being those of the group call. Thus there is no need to include these users or parameters in the corresponding DEFINE information flow. However, it shall be possible for the authorized user to add affected users to this group in defining their group parameters and/or to change some common group parameters (compared to those of the group call), in explicitly including these users and/or parameters in the DEFINE request/indication information flow used to define the call related DGNA number.

Call related DGNA number definition shall be ended after this single DEFINE request/indication information flow has been acknowledged, i.e. any additional modification shall be part of call unrelated SS-DGNA definition.

#### 5.2.1 DEFINE

DEFINE is a confirmed information flow across relationship rb from FE3 to FE2.

NOTE: The response/confirmation information flow corresponding to the DEFINE request/indication information flow is DEFINE ACK (see subclause 4.1).

The DEFINE request/indication information flow shall be used to define a call unrelated or call related DGNA number, with the possibility in the latter case to add affected users to the DGNA number being defined and/or to change some common group parameters (compared to those of the group call), at the same time. The parameters included in the definition request shall override the call parameters, if any. If a parameter is not given in the request, a default value shall be valid for the DGNA number.

In the case of creation of a SS-DGNA group, the authorized user shall determine the number which shall be included in the DEFINE request/indication information flow, unless as an option, FE2 can allocate it. If this option is supported, the number of the group being defined by SS-DGNA does not need to be included in the DEFINE request/indication information flow: if it has not been included, FE2 shall find a valid group number, make the definition for that number and return it to FE3 in the DEFINE ACK information flow.

If FE2 supports this option, it should check whether the DEFINE request/indication information would not result in creating a group with the same composition as an already existing one.

Table 1 lists the elements within the DEFINE request/indication information flow.

**Table 1: Contents of DEFINE information flow**

Element	Type
Call related or call unrelated	M
Call identifier	C (note 1)
Group identity	O (note 2)
Set reference	O
Group mnemonic name	O
Security related group information	O
Additional group information	O
Group identity attachment mode	O
Group identity attachment mode	O
Class of usage	O
Acknowledgement request from affected users	O
Affected user identity/identities	O (note 3)
NOTE 1:	This information element shall be present only when the definition is call related.
NOTE 2:	This element shall be included unless as an option, FE2 can allocate it: if this option is supported, this element does not need to be included.
NOTE 3:	This element may be included for the addition of affected users to the group being created by call related SS-DGNA. It shall also be included for call unrelated SS-DGNA definition of group members. As an option this element may be a group identity. It may be a group identity.

### 5.2.2 DEFINE ACK

DEFINE ACK is actually the response/confirmation information flow corresponding to the DEFINE request/indication information flow. It is thus across relationship rb from FE2 to FE3..

DEFINE ACK information flow shall be used to acknowledge a group definition. The acknowledgement shall indicate whether the result of the DEFINE information flow has been positive or negative. If the DEFINE information flow did not include a defined group identity and if the result is positive, the group number allocated by FE2 shall be included in the DEFINE ACK information flow.

NOTE: The definition of how a given DEFINE ACK information flow relates to the corresponding DEFINE information flow is outside the scope of the stage 2 description: it will be given in the stage 3 description, see subclause 4.1.

If the result of definition is different for different (set) of affected users, then there will be multiple DEFINE ACK information flows due to a single DEFINE information flow.

Table 2 lists the elements within the DEFINE ACK information flow.

**Table 2: Contents of DEFINE ACK information flow**

Element	Type
Call related or call unrelated	M
Call identifier	C (note 1)
Group identity	M
Acknowledgement complete	M
Result of definition	M
Affected user identity/identities	O (note 2)
NOTE 1: This information element shall be present only when the definition is call related.	
NOTE 2: This element is included to identify the affected users for which the result of definition is applicable.	

### 5.3 Modification of SS-DGNA number and/or addition and/or removal of affected users

#### 5.3.1 MODIFY

MODIFY is a confirmed information flow across relationship(s) rb from FE3 to FE2.

NOTE: The response/confirmation information flow corresponding to the MODIFY request/indication information flow is MODIFY ACK (see subclause 4.1).

The MODIFY information flow shall be used to add (assign) affected users to an existing group or remove (deassign) affected users from an existing group, whether this group has been created by SS-DGNA or by operator, and/or to change some group parameters either common to all assigned users or specific to some affected users. The parameters included in a modification request shall override the previously defined parameters. If a parameter is not given in the request, the previously defined parameter value shall be valid for the group or affected user identity.

Table 3 lists the elements within the MODIFY request/indication information flow.

**Table 3: Contents of MODIFY information flow**

Element	Type
Group identity	M
Set reference	O
Mnemonic group name	O
Security related information	O
Additional group information	O
Group identity attachment mode	O
Class of usage	O
Assigned affected user identity/identities	O (note 1)
Acknowledgement request from the assigned affected users	O
Deassigned affected user identities	O (note 2)
Acknowledgement request from deassigned affected users	O
NOTE 1: This element shall be included for the addition of affected users to an existing group or for change of class of usage and/or group identity attachment mode parameters of those affected users. As an option this element may be a group identity.	
NOTE 2: This element shall be included for the removal of affected users from an existing group. As an option this element may be a group identity.	

### 5.3.2 MODIFY ACK

MODIFY ACK is actually the response/confirmation information flow corresponding to the DEFINE request/indication information flow. It is thus across relationship(s) rb from FE2 to FE3.

MODIFY ACK information flow shall be used to acknowledge the addition of affected users and/or the modification of some group parameters and/or removal of affected users. The acknowledgement shall indicate whether the result of the MODIFY information flow has been positive or negative.

NOTE: The MODIFY ACK information flow relates to the corresponding MODIFY information flow by the group identity, see subclause 4.1.

Table 4 lists the elements within the MODIFY ACK information flow.

**Table 4: Contents of MODIFY ACK information flow**

Element	Type
Group identity	M
Result of modification	M
Acknowledgement complete	M
Affected user identity/identities	O

### 5.4 Deletion of SS-DGNA number

The authorized user shall use call unrelated SS-DGNA to delete the group definition from the SwMI and in addition may use it to remove (deassign) also the group from all or some affected users.

#### 5.4.1 DELETE

DELETE is a confirmed information flow across relationship rb from FE3 to FE2. It shall be used to delete a group from the system and optionally remove (deassign) the group from all or from some affected users.

NOTE: The DELETE ACK response/confirmation information flow relates to the corresponding DELETE request/indication information flow by the group identity, see subclause 4.1.

Table 5 lists the elements within the DELETE request/indication information flow.

**Table 5: Contents of DELETE information flow**

Element	Type
Group identity	M
Group deassignment from affected users	M
Affected users	O (notes 1 and 2)
Acknowledgement requested from affected users	O (note 1)
NOTE 1: This element may be present only when a deassignment from affected users is indicated.	
NOTE 2: As an option this element may be a group identity.	

#### 5.4.2 DELETE ACK

DELETE ACK is actually the response/confirmation information flow corresponding to the DELETE request/indication information flow. It is thus across relationship rb.

DELETE ACK information flow shall be used to acknowledge a group deletion and optional removal (deassignment) of the group from affected users. The acknowledgement shall indicate whether the result of the DELETE information flow has been positive or negative.

NOTE: The DELETE ACK information flow relates to the corresponding DELETE information flow by the group identity, see subclause 4.1.

Table 6 lists the elements within the DELETE ACK information flow.

**Table 6: Contents of DELETE ACK information flow**

Element	Type
Group identity	M
Result of deletion	M

**5.5 DGNA assignment to affected users**

Once the authorized user has created a SS-DGNA group or has added affected users to an existing group or modified group parameters, FE2 shall send the ASSIGN request/indication information flow to affected users to assign it to the group, together with its defined group parameters as indicated in the corresponding DEFINE or MODIFY information flow. The assignment operation shall be the same whether the SS-DGNA definition has been call related or call unrelated.

When the only modification changes made are group parameters changes the SwMI may inform the changes to the affected FE1s in an ASSIGN information flow as defined in the MODIFY information flow.

The affected user may or may not be requested to acknowledge the assignment request.

If FE2 does not succeed in delivering the assignment to the affected user, FE2 may, as an option, send the request to the affected user at a later time.

**5.5.1 ASSIGN**

ASSIGN is an information flow across relationship ra from FE2 to FE1. Depending on whether or not an acknowledgement is requested in the ASSIGN request/indication information flow, ASSIGN shall or shall not be a confirmed information flow.

NOTE: When ASSIGN is a confirmed information flow, the response/confirmation information flow ASSIGN ACK corresponds to the ASSIGN request/indication information flow by the group identity/identities, see subclause 4.1.

If the assignment is made to group members, FE2 may send this information flow to all group members using individual or group addressing.

The group parameters included in the ASSIGN request/indication information flow either shall be new or shall modify previously defined ones. If a parameter is not given in the request, the previously assigned or if no assigned value available a default parameter value shall be valid.

Table 7 lists the elements within the ASSIGN request/indication information flow.

**Table 7: Contents of ASSIGN information flow**

Element	Type
Added/modified group identity/identities	M
Acknowledgement requested from affected user	M
Group identity attachment mode	M (note 1)
Class of usage	O
Mnemonic group name	O
Security related information	O
Additional group information	O
Visited SwMI TETRA identity of the group, (V)GSSI	O (note 2)
NOTE 1: The details of that element is defined in stage 3.	
NOTE 2: This element shall be present if the affected user is in a visited SwMI on the group identity point of view and the group is attached as defined by Group identity attachment mode element.	

### 5.5.2 ASSIGN ACK

ASSIGN ACK is actually the response/confirmation information flow corresponding to the ASSIGN request/indication information flow when ASSIGN is a confirmed information flow. It is thus across relationship ra from FE1 to FE2.

The ASSIGN ACK information flow shall be used to acknowledge a group assignment to the affected user together with the corresponding group parameters sent to this user. It shall indicate whether the result of the ASSIGN information flow has been positive or negative.

Table 8 lists the elements within the ASSIGN ACK information flow.

**Table 8: Contents of ASSIGN ACK information flow**

Element	Type
Assigned group identity/identities	M
Result of assignment	M (note)
Result of attachment	M (note)
NOTE: The result may be different to each assigned group identity.	

### 5.6 DGNA de-assignment of affected users

Once the authorized user has deleted SS-DGNA groups or has removed affected users from existing groups, FE2 shall send the DEASSIGN request/indication information flow to affected users as indicated in the corresponding MODIFY and DELETE information flows to de-assign those from the groups.

SwMI may request affected user to acknowledge the de-assignment request.

If FE2 does not succeed in delivering the de-assignment to the affected user, FE2 may, as an option, send the request to the affected user at a later time.

#### 5.6.1 DEASSIGN

DEASSIGN is an information flow across relationship ra from FE2 to FE1. It shall be used to de-assign groups and their parameters from an affected user. Depending on whether or not an acknowledgement is requested in the DEASSIGN request/indication information flow, it may or may not be a confirmed information flow.

NOTE: When DEASSIGN is a confirmed information flow, the response/confirmation information flow DEASSIGN ACK corresponds to the DEASSIGN request/indication information flow by the group identity/identities, see subclause 4.1.

Table 9 lists the elements within the DEASSIGN request/indication information flow.

**Table 9: Contents of DEASSIGN information flow**

Element	Type
De-assigned group identity/identities	M (note)
Acknowledgement requested from affected user	M
NOTE: When SwMI requests to deassign all group currently assigned to the affected user there shall no group identities in the information flow.	

### 5.6.2 DEASSIGN ACK

DEASSIGN ACK is actually the response/confirmation information flow corresponding to the DEASSIGN request/indication information flow when ASSIGN is a confirmed information flow. It is thus across relationship ra from FE1 to FE2. The DEASSIGN ACK information flow shall be used to acknowledge a de-assignment request. The acknowledgement shall indicate whether the result of the DEASSIGN information flow has been positive or negative.

Table 10 lists the elements within the DEASSIGN ACK information flow.

**Table 10: Contents of DEASSIGN ACK information flow**

Element	Type
De-assigned group identity/identities	M (note 1)
Result of de-assignment	M (note 2)
Acknowledgement complete	M
NOTE 1: When MS accepts detachment of all groups there shall no group identities in the information flow.	
NOTE 2: The result may be different to each group identity.	

### 5.7 Interrogation

As an option, FE2 may support the interrogation of definitions. If FE2 supports this option, the authorized user may interrogate the database where the definition of a SS-DGNA group is stored to know this definition. And the affected user may only interrogate this database about the SS-DGNA group parameters which are of concern to this user. This implies that this interrogation shall be limited to the groups of which this user is a member i.e. to which this user has been assigned.

The authorized user may interrogate the list of active (attached) or all group members of the group or some or all parameters of the group.

The affected user may interrogate a selection or all parameters of the group. If some parameter values stored in the MS/LS unit are different from the parameters received as the interrogation response, the MS/LS should update the parameters according to the received ones.

The SwMI may interrogate from MS the groups which are known by the MS. In the optional response the MS may either accept the interrogation and provide the requested information or MS may reject the request.

#### 5.7.1 INTERROGATE GROUP

INTERROGATE GROUP is a confirmed information flow across relationship rb from FE3/FE1 to FE2. It shall be used to interrogate FE2 about group definitions made to the system.

NOTE: The response/confirmation information flow INTERROGATE GROUP ACK corresponds to the INTERROGATE GROUP request/indication information flow by the group identity, see subclause 4.1.

The affected user and authorized user may use this information flow depending on the affected user interrogation authority.



Table 11 lists the elements within the INTERROGATE GROUP request/indication information flow.

**Table 11: Contents of INTERROGATE GROUP information flow**

Element	Type
Interrogation type for group	M
Interrogated group	M
Affected user identity	O (note)
NOTE:	This element shall be present only when it is different to the requesting user identity. It shall identify the user who's parameters are interrogated.

### 5.7.2 INTERROGATE GROUP ACK

INTERROGATE GROUP ACK is actually the response/confirmation information flow corresponding to the INTERROGATE GROUP request/indication information flow. It is thus across relationship rb from FE2 to FE3/FE1. It shall be used by FE2 to give a response to an interrogation about SS-DGNA definitions.

Table 12 lists the elements within the INTERROGATE GROUP ACK information flow.

**Table 12: Contents of INTERROGATE GROUP ACK information flow**

Element	Type
Interrogation type for group	M
Interrogated group identity	M
Result of interrogation	M
Affected user	O
Set reference	O
Mnemonic group name	O
Security related information	O
Additional group information	O
Group identity attachment mode	O
Class of usage	O

### 5.7.3 INTERROGATE GROUP MEMBERS

INTERROGATE GROUP MEMBERS is a confirmed information flow across relationship rb from FE3/FE1 to FE2. It shall be used to interrogate FE2 about the group members.

NOTE: The response/confirmation information flow INTERROGATE GROUP MEMBERS ACK corresponds to the INTERROGATE GROUP MEMBERS request/indication information flow by the group identity, see subclause 4.1.

The authorized user may use this information flow to interrogate:

- attached group members;
- group members having group assigned;
- group members who rejected the assignment; or
- all potential group members.

Table 13 lists the elements within the INTERROGATE GROUP MEMBERS request/indication information flow.

**Table 13: Contents of INTERROGATE GROUP MEMBERS information flow**

Element	Type
Interrogation type for group members	M
Group identity	M

**5.7.4 INTERROGATE GROUP MEMBERS ACK**

INTERROGATE GROUP MEMBERS ACK is actually the response/confirmation information flow corresponding to the INTERROGATE GROUP MEMBERS request/indication information flow. It is thus across relationship rb from FE2 to FE3/FE1. It shall be used by FE2 to give a response to an interrogation about SS-DGNA group members.

Table 14 lists the elements within the INTERROGATE GROUP MEMBERS ACK information flow.

**Table 14: Contents of INTERROGATE GROUP MEMBERS ACK information flow**

Element	Type
Interrogation type for group members	M
Group identity	M
Result of interrogation	M
Acknowledgement complete	M
Affected user identities	O

**5.7.5 INTERROGATE MS GROUPS**

INTERROGATE MS GROUPS is a confirmed information flow across relationship rb from FE3 to FE2 and/or from FE2 to FE1. It shall be used to interrogate SwMI or MS about the MS groups of an affected user.

NOTE: The response/confirmation information flow INTERROGATE MS GROUPS ACK corresponds to the INTERROGATE MS GROUPS request/indication information flow by the affected user identity when present otherwise by the network layer addressing, see subclause 4.1.

The authorized user may use this information flow to interrogate SS-DGNA groups or pre-programmed groups or all groups of the affected user MS.

Table 15 lists the elements within the INTERROGATE MS GROUPS request/indication information flow.

**Table 15: Contents of INTERROGATE MS GROUPS information flow**

Element	Type
Interrogation type for MS groups	M
Affected user identity	O (note)
NOTE: This element shall be used only when the affected user identity is not the same as the requesting/requested user identity.	

### 5.7.6 INTERROGATE MS GROUPS ACK

INTERROGATE MS GROUPS ACK is actually the response/confirmation information flow corresponding to the INTERROGATE MS GROUPS request/indication information flow. It is thus across relationship rb from FE2 to FE3 and/or from FE1 to FE2. It shall be used by FE2 and FE1 to give a response to an interrogation about MS groups.

Table 16 lists the elements within the INTERROGATE MS GROUPS ACK information flow.

**Table 16: Contents of INTERROGATE MS GROUPS ACK information flow**

Element	Type
Interrogation type for MS groups	M
Result of MS group interrogation	M
Acknowledgement complete	M
Affected user identity	O
Group identity	O (note)
Group status	O (note)
Security related information	O (note)
Additional information	O (note)
NOTE: These elements shall be repeated for each group identity.	

### 5.8 Relationship of SS-DGNA information flows to basic call information flows

The DEFINE request/indication information flow for call related SS-DGNA definition may or may not be sent across rb in conjunction with a basic call information flow, depending on whether the authorized user requests this definition at the same time as it is issuing a TNCC request primitive (see subclause 11.3 of ETS 300 392-2 [1] for the definition of these primitives).

### 5.9 Service primitives

This subclause lists SS-DGNA service primitives used to invoke or being a result of information flow sequences. The SS-DGNA service primitives are defined in ETS 300 392-12-22 [3] subclause 5.3 and the basic call service primitives are defined in ETS 300 392-2 [1] clause 11.

The SS-DGNA service primitives at the Affected user MS/LS (FE1) TNSS-SAP are:

- a) ASSIGN indication;
- b) ASSING response;
- c) DEASSIGN indication;
- d) DEASSING response;
- e) INTERROGATE GROUP request;
- f) INTERROGATE GROUP indication;
- g) INTERROGATE MS GROUPS indication;
- h) INTERROGATE MS GROUPS response.

The SS-DGNA service primitives at the authorized user MS/LS (FE3) TNSS-SAP are:

- a) DEFINE request;
- b) DEFINE indication;
- c) DELETE request;
- d) DELETE indication;
- e) INTERROGATE GROUP request;
- f) INTERROGATE GROUP indication;
- g) INTERROGATE GROUP MEMBERS request;
- h) INTERROGATE GROUP MEMBERS indication;
- i) INTERROGATE MS GROUPS request;
- j) INTERROGATE MS GROUPS indication.
- k) MODIFY request;
- l) MODIFY indication.

## 6 Information flow sequences

### 6.1 Information flow sequences of call unrelated DGNA definition

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

No timers are used in the figures.

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

#### 6.1.1 Successful definition/modification and group assignment when the authorized user is registered in the group home system

Figure 3 shows the information flow sequence for successful SS-DGNA definition and the corresponding assignment. In the case of modification the DEFINE and DEFINE ACK information flows are replaced by the MODIFY and MODIFY ACK information flows. In the scenario below the authorized user is registered in the home SwMI of the SS-DGNA group to be created or modified. Affected users are registered in the home and visited SwMIs and the assignment is extended to visited SwMIs.

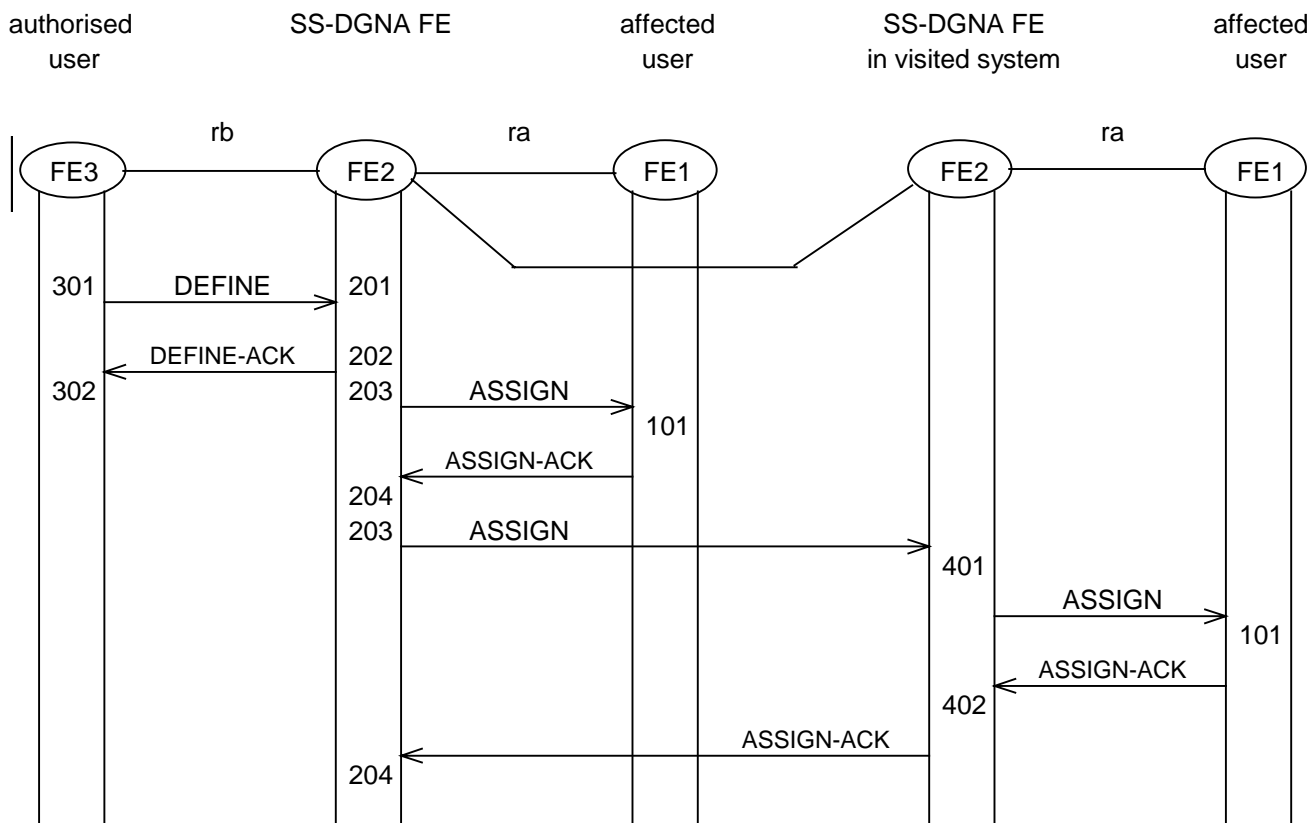
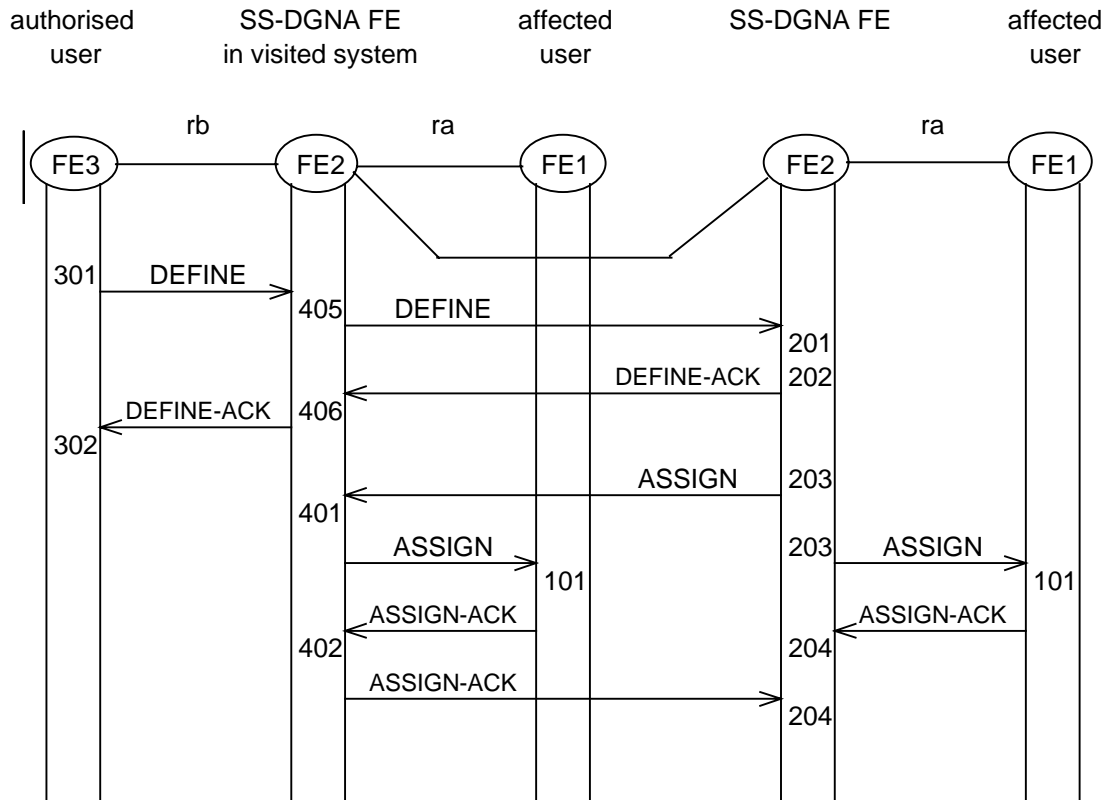


Figure 3: Successful definition and operation of call unrelated SS-DGNA

**6.1.2 Successful definition/modification and group assignment when the authorized user is registered in another than the group home system**

Figure 4 shows the information flow sequence for successful SS-DGNA definition and the corresponding assignment. In the case of modification the DEFINE and DEFINE ACK information flows are replaced by the MODIFY and MODIFY ACK information flows. In the scenario below the authorized user is registered in another than the home SwMI of the SS-DGNA group to be created or modified. Affected users are registered in the home and visited SwMIs and the assignment is extended to visited SwMIs.



**Figure 4: Successful definition and operation of call unrelated SS-DGNA**

6.1.3 Successful deletion and deassignment when authorized user in the group home system

Figure 5 shows the information flow sequence for successful group deletion and the corresponding operation. In the scenario below the authorized user is registered in the home SwMI of the group. another affected user is registered in a visited SwMI.

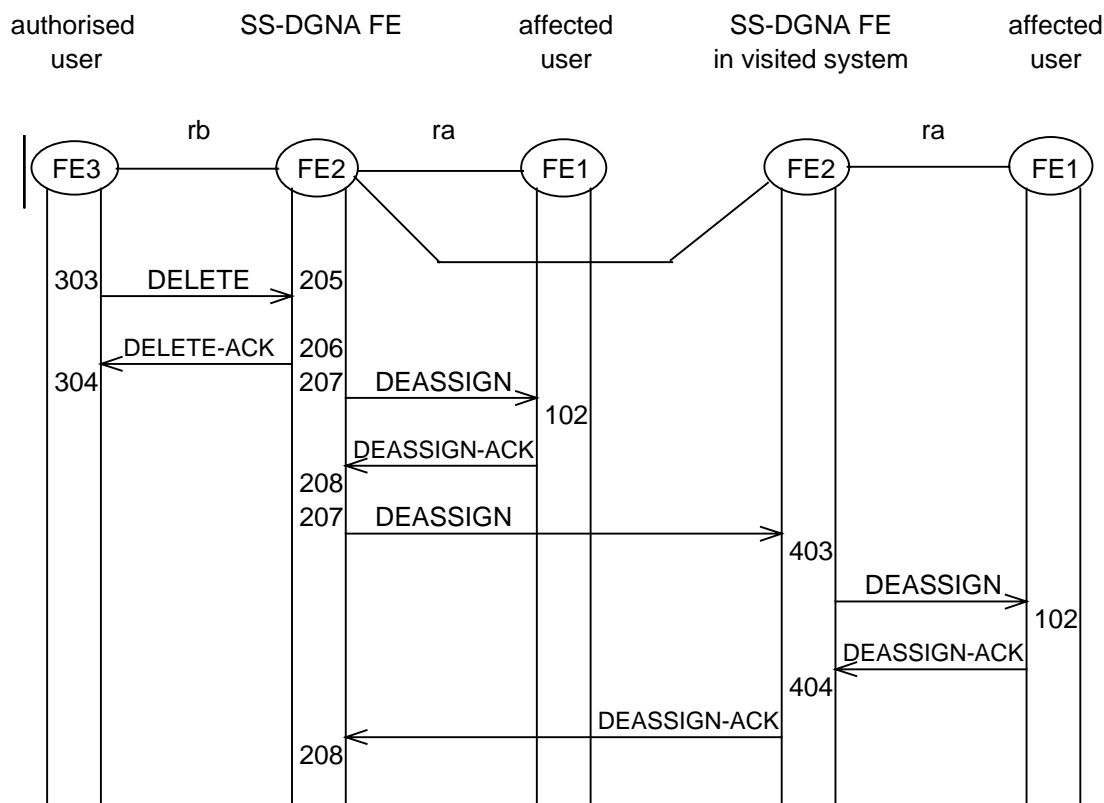
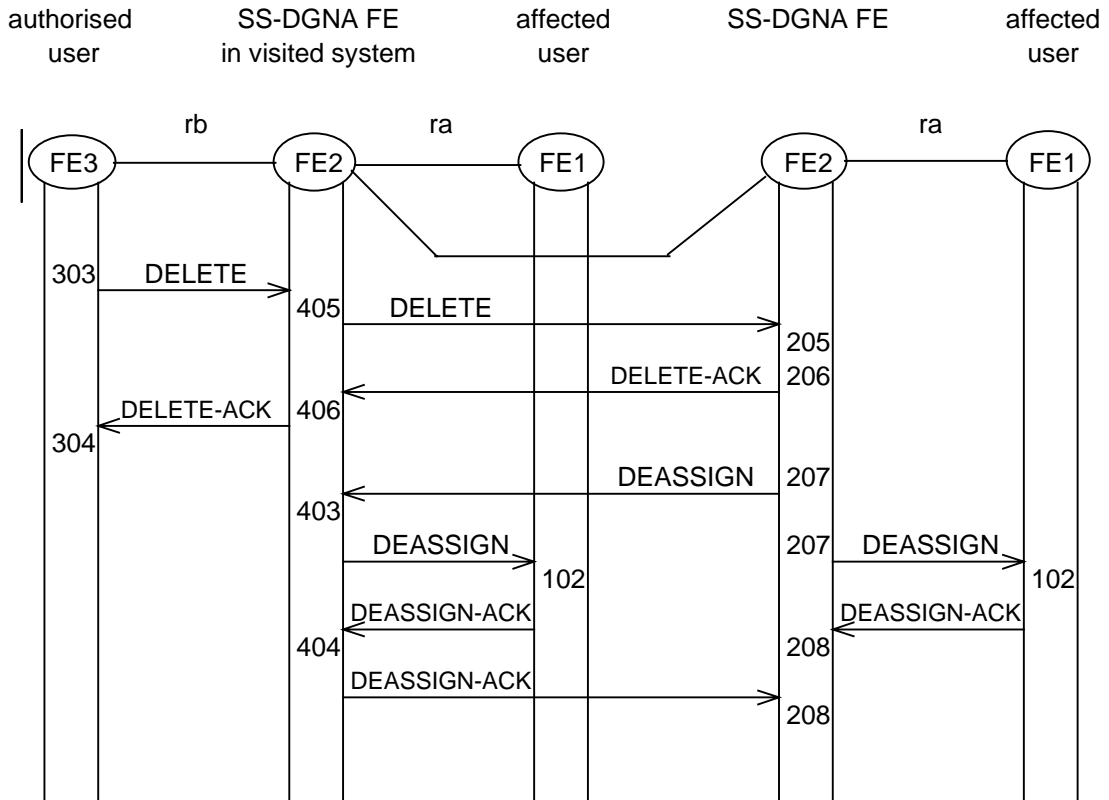


Figure 5: Successful deletion and deassignment operation of a group when authorized user is in the group home system

**6.1.4 Successful deletion and deassignment when authorized user in another than the group home SwMI**

Figure 6 shows the information flow sequence for successful group deletion and the corresponding operation. In the scenario below the authorized user and an affected user are registered in the home SwMI of the group. Affected users are registered in the home and visited SwMIs and the deassignment is extended to visited SwMIs.



**Figure 6: Successful deletion and deassignment operation of a group when authorized user is in another than the group home system**

**6.2 FE actions of call unrelated DGNA definition and operation**

**6.2.1 FE actions of FE1**

101 The FE1 receives the SS-DGNA assignment for affected user. FE1 shall verify the parameter values for each group identity and if FE1 finds them suitable it shall add/modify the definition data to MS database and FE1 shall send acknowledgements to FE2, if requested. Otherwise, FE1 sends negative acknowledgements to FE2.

NOTE 1: Before creating FE1, the affected user should authenticate the infrastructure, using the procedure defined in subclause 4.1.3 of ETS 300 392-7 [5].

102 The FE1 receives the group number deassignment. FE1 shall verify each group identity and if FE1 finds them applicable it shall either remove the definition data from MS database or mark the group deassigned in this SwMI and FE1 shall send the deassignment result of each group to FE2, if requested.

NOTE 2: If the MS accepts the deassignment only as a detachment in the current SwMI and the group identity is not removed, there is no need to perform a network authentication procedure before accepting the detachment part of the deassignment.

### 6.2.2 FE actions of FE2

NOTE: Before accepting any group definition, modification or deletion from FE3, FE2 should make sure the physical entity to which FE3 is allocated has been authenticated. The procedure to be used when FE3 is allocated to the authorized user MS/LS is defined in subclause 4.1.2 of ETS 300 392 7 [7].

- 201 At the reception of the DEFINE/MOFIDY request FE2 shall detect the user request for adding/modifying a group definition. FE2 verifies the given group identity and the parameters in the request. If these checks are successful, FE2 adds the group to the database in the SwMI or modifies the parameters of the group according to the request.
- 202 When FE2 has accepted or rejected the definition/deletion request it shall send the acknowledgement to FE3.
- 203 If the definition request included any affected users that the group is to be assigned, the FE2 prepares the data to be sent to FE1. FE2 locates and delivers the data to the FE1s.
- 204 At the reception of acknowledgement FE2 notifies if the assignment to FE1 was successful or unsuccessful. If FE2 is unable to contact FE1, as an option FE2 may buffer the data for affected user and deliver it later to FE1. If the attachment was successful FE2 shall also mark the group attached to that FE1.
- 205 At the reception of deletion request FE2 shall detect the user request for deleting a group definition. FE2 verifies the given group identity and the parameters in the request. If these checks are successful, FE2 removes the group from the database in the SwMI.
- 206 When FE2 has accepted or rejected the definition/deletion request it shall send the acknowledgement to FE3.
- 207 If the deletion request included any affected users that the group is to be removed from, the FE2 prepares a de-assignment to be sent to FE1. FE2 locates and delivers the de-assignment to the FE1s.
- 208 At the reception of acknowledgement FE2 notifies the de-assignment and/or detachment from FE1 and shall mark the group detached from that FE1. If FE2 is unable to contact FE1, as an operational option FE2 may buffer the data for affected user and deliver it later to FE1.

### 6.2.3 FE actions of FE3

- 301 FE3 shall detect the user request for adding (DEFINE) or modifying (MODIFY) a group definition. The request shall be sent to FE2.
- 302 At the receipt of acknowledgement the FE3 shall inform the user of the result.
- 303 FE3 shall detect the user request for deleting (DELETE) a group definition. The request shall be sent to FE2.
- 304 At the receipt of acknowledgement the FE3 shall inform the user of the result.

### 6.2.4 FE actions of FE2 in visited SwMI

- 401 Upon the reception of the assignment message to FE1 in this system FE2 sends the assignment to FE1. If also attachment is requested the FE2 in the visited SwMI shall also add the Visited system GSSI (V)(GSSI) in addition to the GTSI into the assignment information flow.
- 402 At the reception of acknowledgement from FE1, FE2 in the visited SwMI sends the acknowledgement of the assignment to FE2. Each FE2 shall also mark the group attached to that FE1.
- 403 Upon the reception of the de-assignment message to FE1 in this system FE2 sends the de-assignment to FE1. FE2 in visited system shall mark the group detached from that FE1.



- 404 At the reception of acknowledgement from FE1 FE2 in the visited SwMI sends the acknowledgement of the de-assignment to FE2. FE2 shall also mark the group detached from that FE1.
- 405 Upon reception of the definition/modification/deletion message from FE3 the FE2 in visited system shall pass it to the FE2 managing the group.
- 406 Upon reception of the acknowledgement message from FE2 the FE2 in visited system shall pass it to the FE3.

### 6.3 Information flow sequences of call related DGNA definition and assignment

#### 6.3.1 Definition and operation when authorized user in the group home system

Figure 7 shows the information flow sequence for successful call related SS-DGNA definition and the corresponding operation. In the scenario below the authorized user is registered in the group home SwMI. Affected user are registered in the group home and in other SwMIs. The call related SS-DGNA definition is optional.

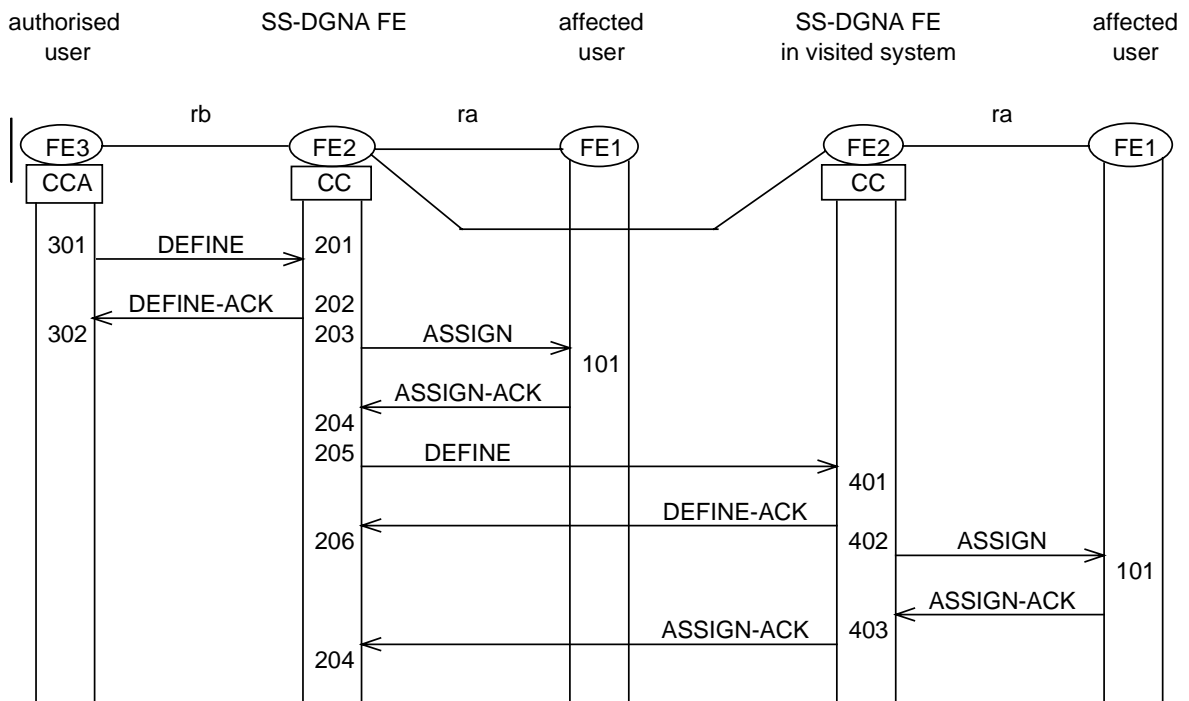


Figure 7: Successful definition and operation of call related SS-DGNA

6.3.2 Definition and operation when authorized user in another than the group home system

Figure 8 shows the information flow sequence for successful call related SS-DGNA definition and the corresponding operation. In the scenario below the authorized user is registered in another than the group home SwMI. Affected users are registered in the group home and in other SwMIs. The call related SS-DGNA definition is optional.

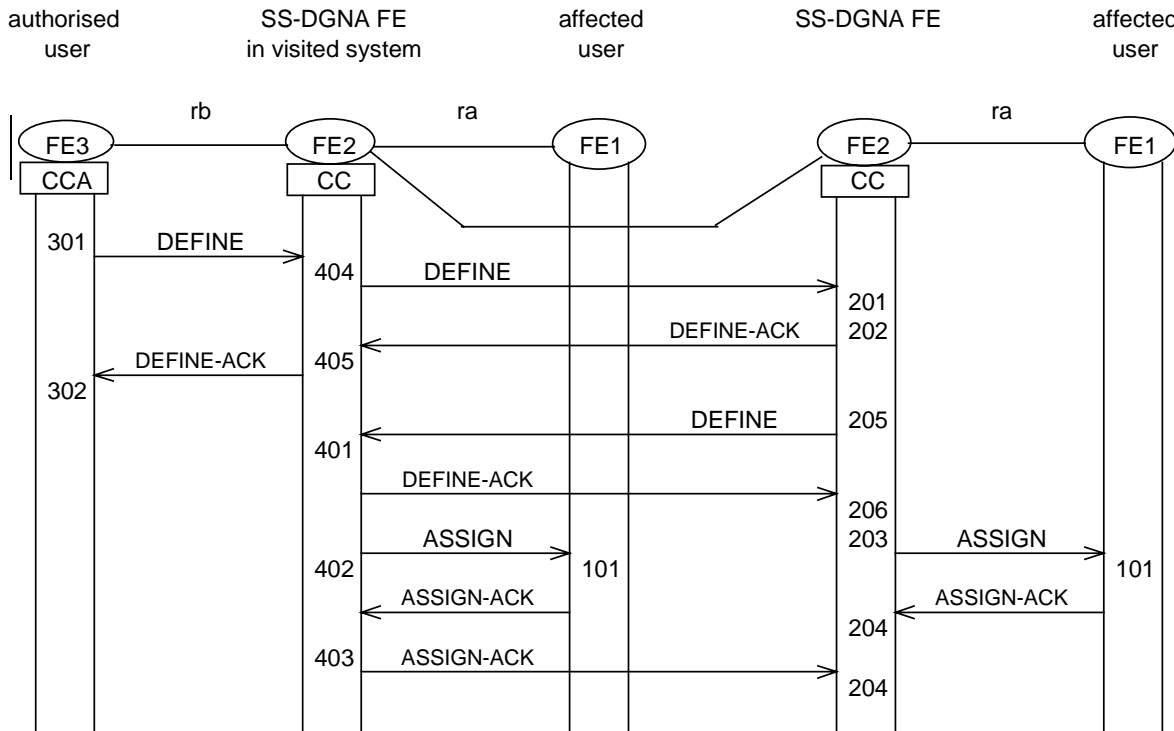


Figure 8: Successful definition and operation of call related SS-DGNA

6.4 FE actions of call related DGNA definition and operation

6.4.1 FE actions of FE1

101 The FE1 receives the group number assignment. The data parameters and their values shall be verified and if they are found suitable the definition data shall be saved and the acknowledgement shall be sent to FE2, if requested. If the parameters or their values are found unsuitable, this shall be indicated in the acknowledgement to the FE2.

6.4.2 FE actions of FE2

NOTE: Before accepting any DGNA number definition from FE3, FE2 should make sure the physical entity to which FE3 is allocated has been authenticated. The authentication procedure is defined in subclause 4.1.2 of ETS 300 392-7 [5].

201 FE2 shall detect the user request for defining a SS-DGNA definition. It performs authorization checks and verifies the given SS-DGNA identity, if any, and the call identifier. The call identifier shall be used to identify the related call. If these are valid FE2 verifies the other parameters, if any in the request. The parameters that are not given in the request command FE2 fetches from the related call in the system and optionally allocates the group identity, if not provided in the request. If the parameter values are valid the FE2 saves the definition to the system.

As an option, the SwMI may keep call related data a certain time after the call has been cleared for call related SS-DGNA purposes. During this time the authorized user shall be able to invoke call related SS-DGNA definition and the system shall be able to offer the call related data for the definition. This time shall be determined by SS call retention value.

FE2 defines the affected users. As an option, the FE2 may regard as the affected users for the definition either the parties that are within the call, e.g. acknowledged subscribers in case of ack. group call, or the parties that upon the knowledge of FE2 shall be parties of the call.

202 When FE2 has accepted or rejected the definition request it shall send the acknowledgement to FE3.

203 The FE2 prepares assignment data to be sent to FE1. FE2 locates and delivers the data to the FE1s.

NOTE: FE1 may itself correspond to a group (see end of note 3 in table 1).

204 On the reception of acknowledgement FE2 notifies if the definition to FE1 was successful or unsuccessful. If FE2 is unable to contact FE1, as an operational option FE2 may buffer the data for affected user and deliver it later to FE1.

205 If the FE2 accepts the definition it sends it to all other systems which participates this call.

206 FE2 notes that the call participating SwMI FE2 accepts the definition.

#### **6.4.3 FE actions of FE3**

301 FE3 shall detect the user request for defining a SS-DGNA definition. FE3 adds the call identifier to the definition request and sends it to FE2.

302 At the receipt of definition acknowledgement the FE3 shall inform the user of the result. The result may be successful or unsuccessful definition. In case of successful definition with minor problems or unsuccessful definition the reason indicating the result shall be sent from FE2 to FE3. FE3 shall display the result for the user.

#### **6.4.4 FE actions of FE2 in visited SwMI**

401 FE2 in the visited SwMI accepts or rejects the definition and shall send acknowledgement to FE2.

402 After the accepting the definition the FE2 in the visited SwMI prepares assignment message and delivers it to FE1. FE2 in the visited SwMI also adds the Visited system GSSI (V)(GSSI) to the information flow.

403 At the reception of acknowledgement from FE1, FE2 in the visited SwMI shall send the assignment acknowledgement to FE2 and if the FE1 accepted the attachment mark the FE1 attached.

404 Upon reception of the definition message from FE3 the FE2 in visited system shall pass it to the FE2 managing the group.

405 Upon reception of the acknowledgement message from FE2 the FE2 in visited system shall pass it to the FE3.

6.5 Information flow sequences of interrogation

6.5.1 Interrogation of group when authorized user in group home system

Figure 9 shows the information flow sequence for interrogation of group when authorized user in the home system of the group. The affected user may also interrogate parameters of its own group.

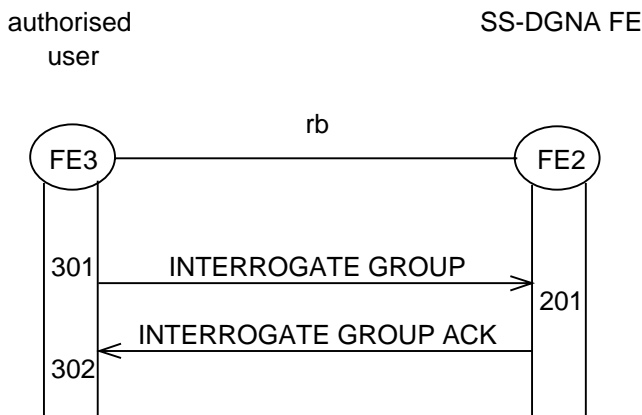


Figure 9: SS-DGNA interrogation of group when authorized user in the group home system

The same information flow applies to successful interrogation and to an interrogation that is rejected by the SS-DGNA control entity.

6.5.2 Interrogation of group when authorized user in another than group home system

Figure 10 shows the information flow sequence for interrogation of group when authorized user is in another than the home of the group system. The affected user may also interrogate parameters of its own group.

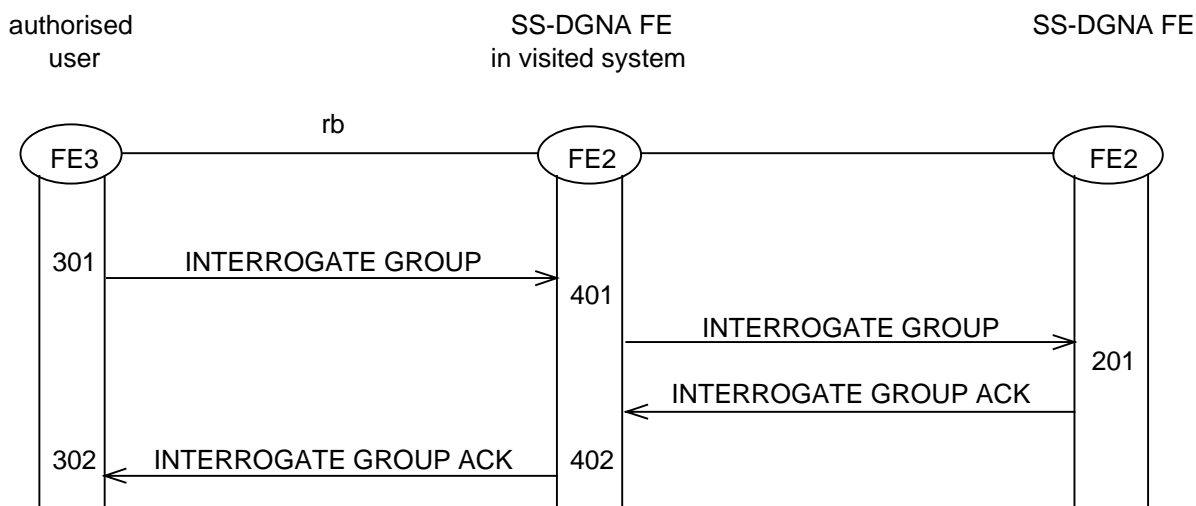
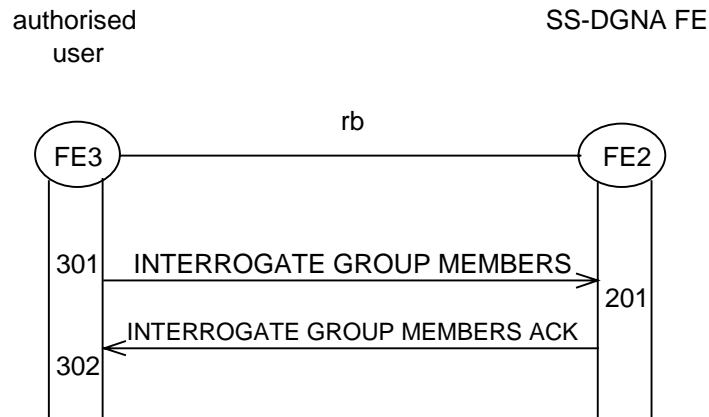


Figure 10: Interrogation of group when authorized user in another than group home system

The same information flow applies to successful interrogation and to an interrogation that is rejected by the SS-DGNA control entity.

**6.5.3 Interrogation of group members when authorized user in group home system**

Figure 11 shows the information flow sequence for interrogation of group members when authorized user in the home system of the group.

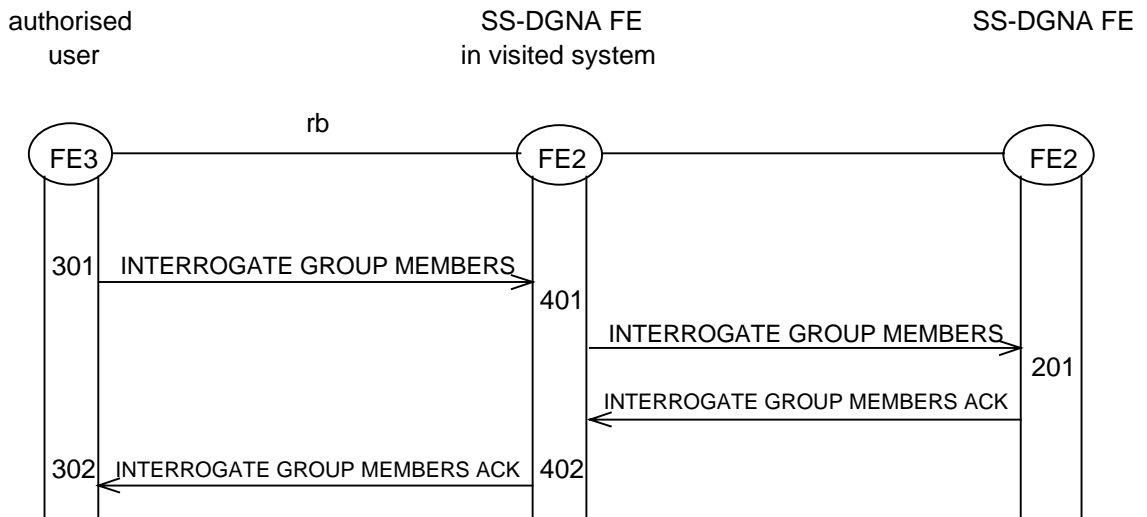


**Figure 11: SS-DGNA interrogation of group members when authorized user in the group home system**

The same information flow applies to successful interrogation and to an interrogation that is rejected by the SS-DGNA control entity.

**6.5.4 Interrogation of group members when authorized user in another than group home system**

Figure 12 shows the information flow sequence for interrogation of group members when authorized user is in another than the home of the group system. The affected user may also interrogate parameters of its own group.



**Figure 12: SS-DGNA interrogation of group members when authorized user in the group home system**

The same information flow applies to successful interrogation and to an interrogation that is rejected by the SS-DGNA control entity.

### 6.5.5 SwMI Interrogation of MS groups

Figure 13 shows the information flow sequence for SwMI interrogation of MS groups. If the MS is in another SwMI than its home SwMI the flows will pass the intervening SwMI without any action in the functional entity, refer figure 10.

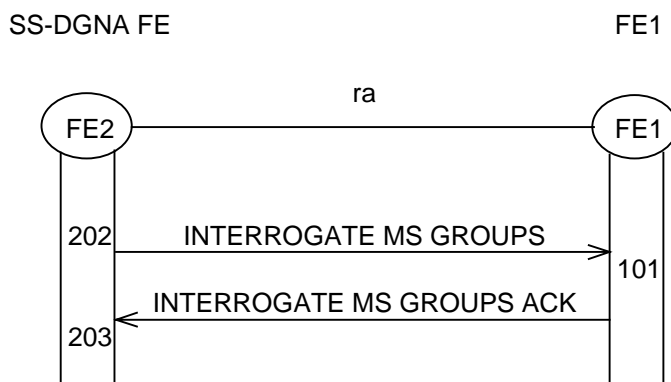


Figure 13: SS-DGNA SwMI interrogation of MS groups

The same information flow applies to successful interrogation and to an interrogation that is rejected by the SS-DGNA control entity.

### 6.5.6 Interrogation of MS groups when authorized user in group home system

Figure 14 shows the information flow sequence for interrogation of MS groups when authorized user in the home system of the FE1. Before sending response to the authorized user the FE2 may perform interrogation of the MS and presented in subclause 6.5.5.

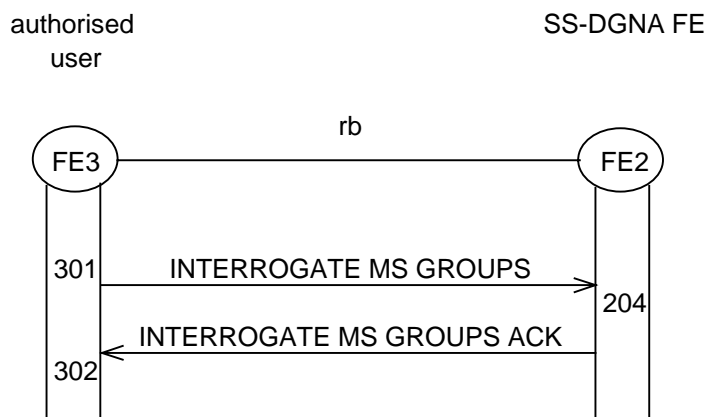
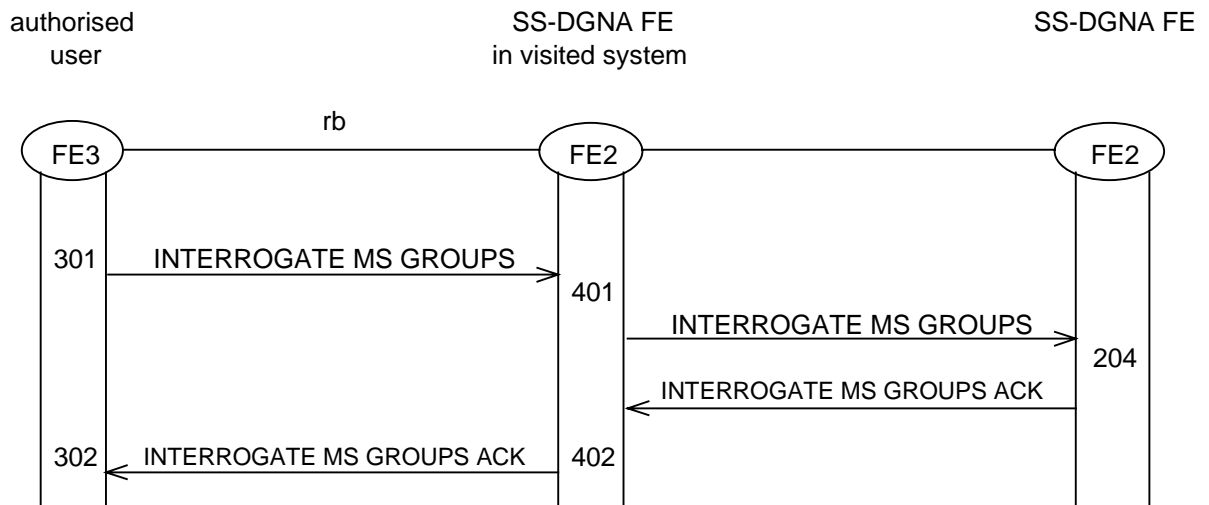


Figure 14: SS-DGNA interrogation of MS group when authorized user in the group home system

The same information flow applies to successful interrogation and to an interrogation that is rejected by the SS-DGNA control entity.

### 6.5.7 Interrogation of MS groups when authorized user in group home system

Figure 15 shows the information flow sequence for interrogation of MS groups when authorized user in another system than the home system of the FE1. Before sending response to the authorized user the FE2 may perform interrogation of the MS and presented in subclause 6.5.5.



**Figure 15: SS-DGNA interrogation of MS group when authorized user in another system than the group home system**

The same information flow applies to successful interrogation and to an interrogation that is rejected by the SS-DGNA control entity.

## 6.6 FE actions of interrogation

### 6.6.1 FE actions of FE1

101 FE1 receives the interrogation and prepares the acknowledgement and send it to FE2.

NOTE: Before accepting any SS-DGNA interrogation from FE2, FE1 should make sure the physical entity to which FE2 is allocated has been authenticated. The authentication procedure is defined in subclause 4.1.2 of ETS 300 392-7 [5].

### 6.6.2 FE actions of FE2

NOTE: Before accepting any SS-DGNA interrogation from FE3, FE2 should make sure the physical entity to which FE3 is allocated has been authenticated. The authentication procedure is defined in subclause 4.1.2 of ETS 300 392-7 [5].

201 FE2 shall verify that the request is authorized and if so, fetch the group data on the basis of the parameters in the request. If the requested data is found, it shall be sent to FE3. If the request fails, the valid error code shall be returned.

202 FE2 sends interrogation to FE1.

203 FE2 receives interrogation result from FE1.

204 FE2 shall verify that the request is authorized and if so, fetch the group data on the basis of the parameters in the request. If the requested data is found, it shall be sent to FE3. If the request fails, the valid error code shall be returned. Before sending response to the authorized user the FE2 may perform interrogation of the MS groups from the FE1. If the FE1 and FE3 are co-located the FE2 shall not request the information from FE1.

### 6.6.3 FE actions of FE3

301 FE3 shall detect the users request for interrogation. The interrogation request shall be sent to FE2. The request shall include the group number and the interrogation parameter.

302 On the receipt of the interrogation response, FE3 shall give the information for the requesting user.

### 6.6.4 FE actions of FE in visited SwMI

401 FE2 in visited SwMI shall pass the message to FE2 managing the indicated group identity.

402 At the reception of the response FE2 in the visited SwMI shall deliver it to FE3.

## 7 Allocation of FEs to physical equipment

Table 17 shows the allocation of FEs to physical equipment. Any proprietary management means for definition, deletion and interrogation are outside the scope of this standard.

**Table 17: Allocation of FE to physical equipment**

<b>Equipment/Function</b>	<b>Definition/modification Deletion</b>	<b>Assignment/ De-assignment</b>	<b>Interrogation</b>
SwMI	FE2 (Optional)	FE2 (Mandatory)	FE2 (Optional)
MS	FE3 (Optional)	FE1 (Mandatory)	FE1, FE3 (Optional)
LS	FE3 (Optional)	FE1 (Mandatory)	FE1, FE3 (Optional)

## 8 Inter-working considerations

The usage of SS-DGNA may extend to several TETRA networks. In order to support the inter-system SS-DGNA feature the SwMI 1 (which initially invokes the service) and the SwMI 2 (the additional system where the service extends to) need to be able to deliver SS-DGNA specific information over the Inter-System Interface (ISI). Refer ETS 300 392-9 [6] for further details.



## History

Document history	
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