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Foreword

This final draft European Telecommunication Standard (ETS) has been produced by the ETSI Project Terrestrial Trunked Radio (TETRA), and is now submitted for the Voting phase of the ETSI standards approval procedure.

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 8: "Network management services";

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".

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

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1 Scope

This European Telecommunication Standard (ETS) defines the stage 3 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. The SS-DGNA specification defines 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).

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 in a group call. Access priority and call priority can be specified and applied for groups using Supplementary Services Access Priority (SS-AP), Priority Call (SS-PC) and Pre-emptive Priority Call (SS-PPC). Thus, the definition procedure of these priorities is outside the scope of this ETS.

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

Supplementary service stage 3 specification is preceded by the stage 1 and the stage 2 specifications of the service. Stage 1 describes the functional capabilities from the user's point of view. Stage 2 defines the functional behaviour in terms of functional entities and information flows. Stage 3 gives the precise description of the supplementary service from the implementation point of view. It defines the protocols for the service and the encoding rules for the information flows. It defines the processes for the functional entities and their behaviour. The described protocols and their behaviour apply for the SwMI, for the MS and for the LS and can be applied over the Inter-System Interface (ISI) between TETRA systems.

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] ISO 8859-1: "Graphic character sets".

[2] ETS 300 392-11-22: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 11: Supplementary services stage 2; Sub-part 22: Dynamic Group Number Assignment (DGNA)".

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

[4] ETS 300 392-1: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 1: General network design".

[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 300 392-3-5: "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)".

[8] ETS 300 392-3-3: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 3: Interworking at the Inter-System Interface (ISI); Sub-part 3: Additional Network Feature Group Call (ANF-ISIGC)".

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 whom the group is assigned (added to) or deassigned (removed from). Affected user can also interrogate group information based on group numbers. Also SwMI can interrogate group information from affected user.

authorized user: user who is able to define, modify and delete a group and interrogate group information based on group numbers/affected user identities.

call related SS-DGNA: creation of a group whose members (affected users) are based on the participants of a referenced call and possibly also based on given affected user identities.

call unrelated SS-DGNA: creation of a group whose members (affected users) are solely based on given affected user identities.

3.2 Abbreviations

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

AP	Access Priority
CC	Call Control
CMCE	Circuit Mode Control Entity
FE	Functional entity
GTSI	Group TETRA Subscriber Identity
ISI	Inter System Interface
ITSI	Individual TETRA Subscriber Identity
PC	Protocol Control
SS	Supplementary Service
SSI	Short Subscriber Identity

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

SS-DGNA	Dynamic Group Number Assignment
SS-PC	Priority Call
SS-PPC	Pre-emptive Priority Call
SS-SNA	Short Number Addressing
SwMI	Switching and Management Infrastructure

4 Functional model

4.1 Functional entities

The functional model for SS-DGNA consists of Functional Entities FE1 to FE3 as defined in ETS 300 392-11-22 [2] subclause 4.1. Refer ETS 300 392-9 for Inter-System Interface model (ISI).

These functional entities can, for one action, be located in different TETRA SwMIs as defined in ETS 300 392-11-22 [2] clause 4.

4.2 Mapping of functional entities to Circuit Mode Control Entities (CMCE)

FEs, CCs and PCs correspond to sub-entities in the Circuit Mode Control Entity (CMCE) described in ETS 300 392-2 [3] according to the following definitions:

- FE1: Supplementary Service (SS) sub-entity in CMCE in affected user's MS/LS;
- FE2: SS sub-entity in CMCE in SwMI;
- FE3: SS sub-entity in CMCE in authorized user's MS/LS;
- CC: Call Control (CC) sub-entity in CMCE in SwMI or in MS/LS;
- PC: Protocol Control (PC) sub-entity in CMCE in MS/LS.

4.3 Protocol structure and protocol stack

The MS/LS protocol stack is defined in ETS 300 392-2 [3].

SS-DGNA PDUs shall be routed as specified in ETS 300 392-9 [6], at the air interface in U/D-FACILITY PDUs and using ANF-ISISS for conveying SS-DGNA PDUs over the ISI.

5 SS-DGNA service description

5.1 General

This subclause describes SS-DGNA specific services offered by the CMCE at the supplementary services service access point (TNSS-SAP) to application, or vice versa, of the TETRA Voice plus Data (V+D) layer 3 service boundary.

NOTE: As this document only deals with the SS-DGNA all the service primitives has been shown without a TNSS-DGNA-prefix e.g. the TNSS-DGNA-DEFINE request is shorten into a DEFINE request.

Refer ETS 300 392-9 [6] for general information on supplementary services.

In this protocol model the application is considered to manage group information in the MS/LS. The management mechanisms and a detailed information exchange between MS/LS protocol layers is outside the scope of this SS-DGNA standard.

5.2 SS-DGNA services offered over the TNSS-SAP

The service offered to users of SS-DGNA are defined as service primitives containing service parameters. The service primitives are defined in subclauses 5.3 and the parameter in the service primitives are defined in subclause 5.4.

In addition to the defined service primitives a SwMI/MS may response by a supplementary service not supported or an action not supported primitives as appropriate, refer ETS 300 392-9 and subclauses 6.2.18 and 6.2.19.

NOTE: As the man-machine interface or user application are outside the scope of this standard service primitives are used to define information exchange to and from the standardized part of the MS/LS. Those primitives may be only indirectly accessible.

5.3 SS-DGNA primitives

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) MODIFY request;
j) MODIFY indication;
k) INTERROGATE MS GROUPS request;
l) INTERROGATE MS GROUPS confirm.

The service primitives such as MODIFY request and MODIFY indication are related to each other by the group identity, if available. There can be more than one indication primitive related to a single request primitive.

5.3.1 ASSIGN indication

ASSIGN indication primitive shall be offered from FE1 to application over TNSS-SAP in order to assign group identities and/or parameters related to the group to the database in the affected user's MS/LS. The primitive shall contain the SS-DGNA parameters listed in table 1.

Table 1: ASSIGN indication contents

Parameter	Indication	Remark
Group identity/identities	M	
Acknowledgement requested	M	
Group identity attachment mode	O	
Class of usage	O	
Mnemonic group name	O	
Security related information	O	
Additional group information	O	

5.3.2 ASSIGN response

ASSIGN response primitive shall be offered from application to FE1 over TNSS-SAP. The primitive shall be used to acknowledge one or more group assignments made to affected user. The primitive shall contain the SS-DGNA parameters listed in table 2. The primitive shall be used only, if the acknowledgement was requested in an ASSIGN request.

The acknowledgement shall be valid for all given group identities in ASSIGN response and the application shall send independent responses for each result of assignment value.

Table 2: ASSIGN response contents

Parameter	Response	Remark
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.		

5.3.3 DEASSIGN indication

DEASSIGN indication primitive shall be offered from FE1 to application over TNSS-SAP. The primitive shall be used to remove group assignments from the affected user. The primitive shall contain the SS-DGNA parameters listed in table 3.

Table 3: DEASSIGN indication contents

Parameter	Indication	Remark
Group identity/identities	O	Note
Acknowledgement requested	O	
NOTE: All group identities of the MS is indicated by having no specific group identity in the indication primitive.		

5.3.4 DEASSIGN response

DEASSIGN response primitive shall be offered from application to FE1 over TNSS-SAP. The primitive shall contain the SS-DGNA parameters listed in table 4. The primitive shall be used to acknowledge requested group deassignments and it is used only, if the acknowledgement was requested in the DEASSIGN request.

The Acknowledgement parameter shall be valid for all deassigned group identities given in DEASSIGN response and the application shall send independent responses for each result of deassignment value.

Table 4: DEASSIGN response contents

Parameter	Response	Remark
Group identity/identities	O	Note 1
Result of deassignment	M	Note 2
NOTE 1: If MS deassigned all groups as a response to a "deassign all" then no group number will be present. NOTE 2: The result may be different for each group identity.		

5.3.5 DEFINE indication

DEFINE indication primitive shall be offered from FE3 to application over TNSS-SAP. The primitive shall be used to acknowledge a previously requested group definition. The primitive shall contain the SS-DGNA parameters listed in table 5.

The DEFINE indication shall refer to the corresponding DEFINE request in a call related definition by the call identifier. In the case of a call un-related definition the relationship is determined by the group identity, if used in the DEFINE request. If there were no group identity in the DEFINE request, then the relationship is based on the sequence of events, and the user should not request another definition without a group identity before receiving at least one DEFINE indication to the previous request.

Table 5: DEFINE indication contents

Parameter	Indication	Remark
Call related or call unrelated	M	
Call identifier	O	Note
Group identity	M	
Acknowledgement complete	M	
Result of definition	M	
Affected user identity/identities	O	
NOTE: Shall be present in case of call related DGNA definition.		

5.3.6 DEFINE request

DEFINE request primitive shall be offered from application to FE3 over TNSS-SAP. The primitive shall be used to define one group to SwMI. The primitive can be used to define group related parameters and to assign groups to affected users. The primitive shall contain the SS-DGNA parameters listed in table 6.

Table 6: DEFINE request contents

Parameter	Request	Remark
Call related or call unrelated	M	
Call identifier	C	Note 1
Group identity	O	Note 2
Set reference	O	
Mnemonic group name	O	
Security related information	O	
Additional group information	O	
Group identity attachment mode	O	See ETS 300 392-2 [3], clause 16
Class of usage	O	
Acknowledgement requested	O	
Affected user identity/identities	O	
NOTE 1: This parameter shall be present in case of call related DGNA definition. NOTE 2: As an option the defined group identity can be omitted in which case SwMI will allocate the group number.		

5.3.7 DELETE indication

DELETE indication primitive shall be offered from FE3 to application over TNSS-SAP. The primitive shall be used to acknowledge a previously sent deletion request. The primitive shall contain the SS-DGNA parameters listed in table 7.

Table 7: DELETE indication contents

Parameter	Indication	Remark
Group identity	M	
Result of deletion	M	

5.3.8 DELETE request

DELETE request primitive shall be offered from application to FE3 over TNSS-SAP. The primitive shall be used to delete defined groups from SwMI and to remove group assignments from affected users.

The primitive shall contain the SS-DGNA parameters listed in table 8.

When group is deleted, the assignment may not be removed from affected users. If the group assignment shall be removed from selected affected users, these users shall be listed, in which case other affected users shall not be affected. Listing of Affected users shall imply that deassignment shall have the value "deassignment from affected users".

Table 8: DELETE request contents

Parameter	Request	Remark
Group identity	M	
Group deassigned from affected users	M	
Affected user identity/identities	O	
Acknowledgement requested	O	

5.3.9 INTERROGATE GROUP request

INTERROGATE GROUP request primitive shall be offered from application to FE1 and FE3 over TNSS-SAP when the affected or authorized user interrogates group definitions. The INTERROGATE GROUP request primitive shall contain the SS-DGNA parameters listed in table 9.

Table 9: INTERROGATE GROUP request contents

Parameter	Request	Remark
Interrogation type for group	M	
Group identity	M	
Affected user identity	O	Note
NOTE: This parameter shall be present only when it is different to the ITSI of the requesting user.		

5.3.10 INTERROGATE GROUP indication

INTERROGATE GROUP indication primitive shall be offered from FE1 or FE3 to application over TNSS-SAP as a response to a previously sent interrogation request. INTERROGATE GROUP indication primitive shall contain the SS-DGNA parameters listed in table 10.

Table 10: INTERROGATE GROUP indication contents

Parameter	Indication	Remark
Interrogation type for group	M	
Group identity	M	
Result of interrogation	M	
Affected users identity	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	

5.3.11 INTERROGATE GROUP MEMBERS request

INTERROGATE GROUP MEMBERS request primitive shall be offered from application to FE3 over TNSS-SAP when authorized user interrogates members of a group definitions. The INTERROGATE GROUP MEMBERS request primitive shall contain the SS-DGNA parameters listed in table 11.

Table 11: INTERROGATE GROUP MEMBERS request contents

Parameter	Request	Remark
Interrogation type for group members	M	
Group identity	M	

5.3.12 INTERROGATE GROUP MEMBERS indication

INTERROGATE GROUP MEMBERS indication primitive is offered from FE3 to application over TNSS-SAP as a response to a previously sent interrogation request. The INTERROGATE GROUP MEMBERS indication primitive shall contain the SS-DGNA parameters listed in table 12.

Table 12: INTERROGATE GROUP MEMBERS indication contents

Parameter	Indication	Remark
Interrogation type for group members	M	
Group identity	M	
Result of group interrogation	M	
Acknowledgement complete	M	
Affected user identity/identities	O	Note
NOTE: Shall be present if the group has any members and the result of group interrogation is positive.		

5.3.13 INTERROGATE MS GROUPS indication

INTERROGATE MS GROUPS indication primitive shall be offered from FE1 to application over TNSS-SAP when SwMI interrogates group definitions in the affected user MS/LS. The INTERROGATE MS GROUPS indication primitive shall contain the SS-DGNA parameters listed in table 13.

Table 13: INTERROGATE GROUP MEMBERS indication contents

Parameter	Indication	Remark
Interrogation type for MS groups	M	

5.3.14 INTERROGATE MS GROUPs response/confirm

INTERROGATE MS GROUPS response primitive shall be offered from application to FE1 over TNSS-SAP as a response to a previously received interrogation request. INTERROGATE MS GROUPS confirm primitive shall be offered by FE3 to application as a response to previously received INTERROGATE MS GROUPS request. The INTERROGATE MS GROUPS response/confirm primitive shall contain the SS-DGNA parameters listed in table 14.

Table 14: INTERROGATE MS GROUPS response contents

Parameter	Response/ confirm	Remark
Interrogation type for MS group	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 group information	O	Note
NOTE: Shall be present only if the result for interrogation has the value "Accepted". May be repeated as a set.		

5.3.15 INTERROGATE MS GROUPS request

INTERROGATE MS GROUPS request primitive shall be offered from application to FE3 over TNSS-SAP when authorized user interrogates group definitions of the affected user MS/LS. The INTERROGATE MS GROUPS request primitive shall contain the SS-DGNA parameters listed in table 15.

Table 15: INTERROGATE GROUP MEMBERS indication contents

Parameter	Indication	Remark
Interrogation type for MS groups	M	
Affected user identity	M	

5.6.16 MODIFY request

MODIFY request primitive shall be offered from application to FE3 over TNSS-SAP. The primitive shall be used to change one or more group definitions in SwMI. The primitive can be used to modify group related parameters and/or to assign groups to affected users. The primitive shall contain the SS-DGNA parameters listed in table 16.

NOTE: If the acknowledgements are different for different group identities FE3 will deliver several MODIFY indications to the application.

Table 16: MODIFY request contents

Parameter	Request	Remark
Group identity	M	
Set reference	O	
Mnemonic group name	O	
Security related information	O	
Additional group information	O	
Group identity attachment mode	O	Note
Class of usage	O	Note
Assigned affected user identity/identities	O	
Acknowledgement requested from the assigned affected users	O	
Deassigned affected user identity/identities	O	
Acknowledgement requested from the deassigned affected users	O	
NOTE: The parameter are applicable to the assigned affected users.		

5.6.17 MODIFY indication

MODIFY indication primitive shall be offered from FE3 to application over TNSS-SAP. The primitive shall be used to acknowledge a previously requested group modification. The primitive shall contain the SS-DGNA parameters listed in table 17.

NOTE: If application requested SS-DGNA definitions to be made to several affected user identities in one modification request, the application may receive multiple MODIFY indications as responses.

Table 17: MODIFY indication contents

Parameter	Indication	Remark
Group identity	M	
Result of modification	M	
Acknowledgement complete	O	
Affected user identity/identities	O	

5.4 Primitive parameter descriptions

Acknowledgement requested =

- Acknowledgement requested from affected users;
- No acknowledgement requested from affected users.

Additional group information =

- Additional non-security related group information.

Affected user identity/identities =

- A single, list or range, see ETS 300 392-9, of either:
  - Short Subscriber Identity; or
  - TETRA Subscriber Identity. See ETS 300 392-1 [4] clause 7.

Call identifier, see ETS 300 392-2 [3], clause 14.

Call related DGNA definition =

- Call releated;
- Call un-related.

Class of usage =

- Class 1;
- Class 2;
- Class 3;
- Class 4;
- Class 5;
- Class 6;
- Class 7;
- Class 8.

GCK exists =

- No GCK in MS;
- GCK in MS.

GCK usage =

- No GCK in use;
- GCK in use.

Group deassigned from affected users =

- Group deassigned;
- Group not deassigned.

Group identity/identities =

- A single, list or range, see ETS 300 392-9, of either:
  - Short Subscriber Identity; or
  - TETRA Subscriber Identity. See ETS 300 392-1 [4] clause 7.

Group identity attachment mode =

- Attached permanently, attachment not needed for next ITSI Attach or next location update;
- Attached, attachment for next ITSI Attach required;
- Attached, attachment not allowed for next ITSI-Attach;
- Attached, attachment for next location update required;
- Group is not attached; MS user is allowed to request an attachment.

Interogation response complete =

- Complete;
- Not complete, more information to follow.

Interrogation type by affected user =

- Mnemonic name;
- Group identity attachment mode and class of usage;
- Additional group information.

Interrogation type by authorized user =

- List of all group members;
- List of currently attached group members.

Interrogation type by SwMI =

- List of all groups;
- List of DGNA groups;
- List of pre-programmed groups.
- Group parameters for authorized user;
- Received acknowledgement from affected users;
- Group parameters for affected user.

Mnemonic group name =

- 1 to 15 characters using a defined character set such as ISO 8859-1 [1], which is also known as Latin-1.

Modification indication completed =

- Completed;
- Not completed, more information to follow.

Result of assignment =

- Assignment accepted;
- Assignment rejected for any reason;
- Assignment not accepted for security reasons;
- Assignment rejected, capacity exceeded.

Result of deassignment =

- Deassignment rejected for any reason;
- Group definition removed;
- Assignment not accepted for security reasons;
- Group definition cannot be removed, group permanently detached.

Result of definition =

- Request failed for any reason;
- Definition accepted by SwMI;
- Group already exists, no definition change;
- User not authorized;
- Not valid group identity;
- One or several affected users not valid or assignment not authorized, the failed affected users are indicated by the Affected user identity element, other definitions accepted by SwMI;
- Insufficient information..

Result of deletion

- Request failed for any reason;
- Deletion accepted by SwMI;
- User not authorized;
- Not valid group identity;
- Insufficient information.

Result of interrogation =

- Request failed for any reason;
- Accepted;
- Not valid group identity;
- User not authorized.

Result of modification =

- Request failed for any reason;
- Modification accepted by SwMI;
- User not authorized;
- Not valid group identity;
- One or several affected users not valid or assignment/deassignment not authorized, the nominated affected users are indicated by the Affected user identity element;
- Insufficient information.

Security related information =

- Security related information for the group, refer to ETS 300 392-7 [5].
  Set reference =

  - Set 1;
  - Set 2;
  - … etc.
  - Set 64.

6 Signalling protocol for support of SS-DGNA

6.1 Operational requirements

6.1.1 Affected user MS/LS

The affected user MS/LS shall comply with the requirements in clause 14 of ETS 300 392-2 [3] which apply to the call unrelated signalling. In addition, it shall comply with the relevant requirements in clauses 7 and 11 of ETS 300 392-9 [6].

6.1.2 Group home SwMI

If the affected/authorized user MS/LS is registered in the group home SwMI, that SwMI shall support this MS/LS complying with the requirements for call unrelated signalling set in clause 14 of ETS 300 392-2 [3] and with the requirements for call related signalling, when it supports call related SS-DGNA. This SwMI shall also comply with the relevant requirements in clauses 7 to 11 of ETS 300 392-9 [6].

If the affected/authorized user MS/LSs are not all registered in the group home SwMI, that SwMI shall comply with the ISI requirements necessary to support call unrelated signalling set and also call related signalling set in ETS 300 392-3-3 [8], when it supports call related SS-DGNA. It shall also comply with the relevant requirements in clauses 9 to 11 of ETS 300 392-9 [6] and relevant requirements in clauses 4 to 6 of ETS 300 392-11-22 [2].

6.1.3 Home SwMI of the affected user

If the home SwMI of the affected user is different from the group home SwMI, it shall also comply with the relevant requirements in clauses 9 to 11 of ETS 300 392-9 [6] and relevant requirements in clauses 4 to 6 of ETS 300 392-11-22 [2].

6.1.4 Affected user SwMI

The SwMI, where affected user is registered, shall support the affected user MS/LS complying with the requirements set in subclause 6.1.1.

When the affected user SwMI supports call related SS-DGNA it shall comply with the corresponding ISI requirements, set in ETS 300 392-3-3 [8] for group calls.

If the affected user SwMI is different from the group home SwMI or home SwMI of the affected user, it shall also comply with the relevant requirements in clauses 9 to 11 of ETS 300 392-9 [6] and relevant requirements in clauses 4 to 6 of ETS 300 392-11-22 [2].

6.1.5 Authorized user MS/LS

The authorized user MS/LS shall comply with the call related and call unrelated procedures defined in clause 14 of ETS 300 392-2 [3] and in clauses 7 and 11 of ETS 300 392-9 [6].

6.1.6 Authorized user SwMI

That SwMI shall support the authorized user MS/LS complying with subclause 6.1.4.

If the authorized user SwMI is different from the group home SwMI, it shall comply with the relevant call related and call unrelated requirements in clauses 9 to 11 of ETS 300 392-9 [6] and relevant requirements in clauses 4 to 6 of ETS 300 392-11-22 [2].

6.2 PDU descriptions

6.2.1 General on PDU descriptions

SS-DGNA PDUs are carried by a D-FACILITY or U-FACILITY except DEFINE PDU which can be carried by U-INFO or U-FACILITY if the definition is call related and DEFINE ACK which shall then be carried by D-INFO or D-FACILITY if the definition is call related. The element coding used is in accordance with the general rules specified in ETS 300 392-2 [3], annex E and ETS 300 392-9 [6], clauses 7 to 11.

The element coding for SS-DGNA PDUs is detailed in the following subclauses.

The value of the SS Type is defined in ETS 300 392-9 [6] subclause 8.1. The values of the SS-DGNA PDU type information elements are defined in subclause 6.3.31.

The information contained in the following SS-DGNA PDU description tables correspond to the following key:

- -Length: length of the sub-argument in bits;
- -Type: element type (1, 2 or 3) described in ETS 300 392-2 [3], clause 14;
- -C/O/M: conditional/optional/mandatory;
- -Remark: comment.

6.2.2 ASSIGN

The ASSIGN PDU shall be used by SwMI to add groups and group parameters to affected user(s).

Several groups can be assigned with one ASSIGN PDU.

The ASSIGN PDU shall contain information elements as defined in table 18.

Table 18: ASSIGN PDU contents

Information element	Length	Type	C/O/M	Value	Remark
SS Type	6	1	M		SS-DGNA
SS-DGNA PDU type	5	1	M		Assign
Number of groups	5	1	M		
Group Assignment	Varies	1	C		Repeatable, Note
Acknowledgement requested from affected user(s)	1	1	M		
NOTE: The Group Assignment element shall be present as many times as indicated by Number of groups element.					

6.2.3 ASSIGN ACK

The ASSIGN-ACK PDU shall be used to acknowledge an assign (add group) request, if the acknowledgement was requested in the ASSIGN PDU.

ASSIGN ACK PDU shall contain as many groups as was in the assign request.

The ASSIGN ACK PDU shall contain information elements as defined in table 19.

Table 19: ASSIGN ACK PDU contents

Information element	Length	Type	C/O/M	Value	Remark
SS Type	6	1	M		SS-DGNA
SS-DGNA PDU type	5	1	M		Assign ack
Number of groups	5	1	M		
Group assignment Ack	Varies	1	C		Repeatable, Note
NOTE: The Group Assignment ack element shall be present as many times as indicated by Number of groups element.					

6.2.4 DEASSIGN

The DEASSIGN PDU shall be be used by SwMI to remove groups and group parameters from affected users.

The DEASSIGN PDU shall contain information elements as defined in table 20.

Table 20: DEASSIGN PDU contents

Information element	Length	Type	C/O/M	Value	Remark
SS Type	6	1	M		SS-DGNA
SS-DGNA PDU type	5	1	M		Deassign
Number of groups in deassign request	5	1	M		
Group deassignment	Varies	1	C		Repeatable, Note
Acknowledgement requested from affected user(s)	1	1	M		
NOTE: The Group deassignment element shall be present as many times as indicated by Number of groups in deassign request information element. If Number of groups in deassign request information element has value '0' then the element is not present.					

6.2.5 DEASSIGN ACK

The DEASSIGN ACK information flow shall be used to acknowledge a deassign (removal) request, if the acknowledgement was requested in the DEASSIGN PDU.

DEASSIGN ACK PDU shall contain as many groups as was in the DEASSIGN PDU if the PDU contained any group identities. If DEASSIGN PDU contained no groups (value of element Number of deassigned groups is 'all groups') then the DEASSIGN ACK PDU shall contain either those groups whose deassignment was rejected or no groups. In case deassignment of all groups was requested and the response is not sent in a single PDU, MS/LS shall set the value of Acknowledgement complete element accordingly and send one or several PDUs completing the response.

The DEASSIGN ACK PDU shall contain information elements as defined in table 21.

Table 21: DEASSIGN ACK PDU contents

Information element	Length	Type	C/O/M	Value	Remark
SS Type	6	1	M		SS-DGNA
SS-DGNA PDU type	5	1	M		Deassign Ack
Number of groups in deassign ack	5	1	M		
Group deassignment Ack	Varies	1	C		Repeatable, Note
Acknowledgement complete	1	1	M		
NOTE: The Group Deassignment Ack information element shall be present as many times as indicated by Number of groups in deassign ack information element. If Number of groups in deassign ack information element has value '0' then the element is not present.					

6.2.6 DEFINE

DEFINE PDU shall be used by authorized user to define one group and group parameters to SwMI and it may contain a request to assign the group to affected users.

The DEFINE request can be call related, i.e. MS/LS may request that the new group is assigned to the call participants in which case the call identifier must be provided by the requesting MS/LS.

The DEFINE PDU shall contain information elements as defined in table 22

Table 22: DEFINE PDU contents

Information element	Length	Type	C/O/M	Value	Remark
SS Type	6	1	M		SS-DGNA
SS-DGNA PDU type	5	1	M		Define
Call related DGNA creation	1	1	M		
Call identifier	14	1	C		Note 1
Group identity given	1	1	M	0	Not given
				1	Given
Group SSI	24	1	C		Note 2
Group extension present	1	1	C		Note 2
Group extension	24	1	C		Note 3
Set reference	6	2	O		
Mnemonic group name	varies	2	O		
Length of security related information element	6	2	O		
Security related information	varies	2	C		Note 4
Length of additional group information element	6	2	O		
Additional group information	varies	2	C		Note 5
Group identity attachment mode	3	2	O		
Class of usage	3	2	O		
Acknowledgement requested from affected user(s)	1	2	O		
Affected user identity range type	4	2	O		
Affected user identity	Varies	2	C		Repeatable, Note 6

NOTE 1: Shall be present in the PDU only when the value of the Call related DGNA creation information element is "Call related".

NOTE 2: Shall be present in the PDU only when the value of the Group identity given information element is "Given". The group identity can only be omitted in which case the SwMI shall allocate the group identity.

NOTE 3: The element shall be present only when the group extension present information element is present in the PDU and has value "group extension present".

NOTE 4: The length of Security related information information element shall be indicated by Length of Security related information element.

NOTE 5: The length of Additional group information information element shall be indicated by Length of additional group information element.

NOTE 6: Shall be present if the preceding Affected user identity range type element is present. Element shall be present as many times as indicated by the preceding Affected user identity range type element.

6.2.7 DEFINE ACK

The DEFINE- ACK PDU shall be used to acknowledge a group definition and possible assignment request sent by DEFINE PDU.

The acknowledgement may be positive or negative indicating the result of the attempt to define and assign the group identity to affected users. If the assignment fails for one or several affected users, the acknowledgement contains the identities of those users. In case the response is not sent in a single PDU, SwMI shall set the value of Acknowledgement complete element accordingly and send one or several PDUs completing the response.

The DEFINE ACK PDU shall contain information elements as defined in table 23

Table 23: DEFINE ACK PDU contents

Information element	Length	Type	C/O/M	Value	Remark
SS Type	6	1	M		SS-DGNA
SS-DGNA PDU type	5	1	M		Define Ack
Call related DGNA creation	1	1	M		
Call identifier	14	1	C		Note 1
Group SSI	24	1	M		
Group extension present	1	1	M		
Group extension	24	1	C		Note 2
Acknowledgement complete	1	1	M		
Result of definition	4	1	M		
Affected user identity range type	4	1	C		Note 3
Affected user identity	Varies	1	C		Repeatable, Note 4, Note 5.

NOTE 1: Shall be present in the PDU only when the value of the Call related DGNA creation information element is "Call related".
NOTE 2: The element shall be present if the group extension present information element has value "group extension present".
NOTE 3: The element is present if the Result of definition information element has value '0110_2'.
NOTE 4: This element shall be present, when the Affected user identity range type element is present.
NOTE 5: The element shall be present as many times as indicated by Affected user identity range type element.

6.2.8 DELETE

The DELETE PDU shall be used by authorized user to delete a group from the SwMI and it may contain a request to deassign (remove) group identities from all or specified affected users.

The DELETE PDU shall contain information elements as defined in table 24.

Table 24: DELETE PDU contents

Information element	Length	Type	C/O/M	Value	Remark
SS Type	6	1	M		SS-DGNA
SS-DGNA PDU type	5	1	M		Delete
Group SSI	24	1	M		
Group extension present	1	1	M		
Group extension	24	1	C		Note 1
Group deassignment from affected users	1	1	M	0	Not to be deassigned
				1	To be deassigned
Affected user identity range type	4	2	O		Note 2
Affected user identity	Varies	2	C		Repeatable, Note 3, Note 4
Acknowledgement requested from affected user(s)	1	2	O		

NOTE 1: The element shall be present only when the group extension present information has value "group extension present".
NOTE 2: If element not present and the Group to be deassigned from affected users element has value "To be deassigned", then group is to be deassigned from all affected users recorded into SwMI as group members".
NOTE 3: This element shall be present only, when the Affected user identity range type element is present.
NOTE 4: Element shall be present as many times as indicated by Affected user identity range type element.

6.2.9 DELETE ACK

The DELETE ACK PDU shall be used to acknowledge a deletion request sent with DELETE PDU. The acknowledgement may be positive or negative indicating the result of the attempt to delete the group identity.

The DELETE ACK PDU shall contain information elements as defined in table 25.

Table 25: DELETE ACK PDU contents

Information element	Length	Type	C/O/M	Value	Remark
SS Type	6	1	M		SS-DGNA
SS-DGNA PDU type	5	1	M		Delete Ack
Group SSI	24	1	M		
Group extension present	1	1	M		
Group extension	24	1	C		Note
Result of deletion	4	1	M		

NOTE: The element shall be present only when the group extension present information has value "group extension present".

6.2.10 INTERROGATE GROUP

The INTERROGATE GROUP PDU shall be used by authorized or affected user to interrogate the group parameters from the SwMI.

The INTERROGATE GROUP PDU shall contain information elements as defined in table 26.

Table 26: INTERROGATE GROUP PDU contents

Information element	Length	Type	C/O/M	Value	Remark
SS Type	6	1	M		SS-DGNA
SS-DGNA PDU type	5	1	M		Interrogate group
Interrogation type for group	3	1	M		
Group SSI	24	1	M		
Group extension present	1	1	M		
Group extension	24	1	C		Note 1
Affected user identity	varies	2	O		Note 2
NOTE 1: The element shall be present only when the group extension present information has value "group extension present". NOTE 2: This information element shall be present only if its value is different than the requesting user ITSI.					

6.2.11 INTERROGATE GROUP ACK

INTERROGATE GROUP ACK PDU sent by SwMI shall be used to give a response to an INTERROGATE GROUP PDU.

The INTERROGATE GROUP ACK PDU shall contain the requested information of the group as presented in table 27.

Table 27: INTERROGATE GROUP ACK PDU contents

Information element	Length	Type	C/O/M	Value	Remark
SS Type	6	1	M		SS-DGNA
SS-DGNA PDU type	5	1	M		Interrogate group ack
Interrogation type for group	3	1	M		
Group SSI	24	1	M		Assigned group SSI
Group extension present	1	1	M		
Group extension	24	1	C		Note 1
Result of interrogation	3	1	M		
Affected user identity	varies	2	O		Note 2
Set reference	6	2	O		
Mnemonic group name	varies	2	O		
Length of security related information element	6	2	O		
Security related information	varies	2	C		Note 3
Length of additional group information element	6	2	O		
Additional group information	varies	2	C		Note 4
Group identity attachment mode	3	2	O		
Class of usage	3	2	O		

NOTE 1: This information element be present only when the value of the group extension present information element is "group extension present".
NOTE 2: This information element shall be present only if its value is different than the receiving user ITSI.
NOTE 3: The length of Security related information information element shall be indicated by Length of Security related information element.
NOTE 4: The length of Additional group information information element shall be indicated by Length of additional group information element.

6.2.12 INTERROGATE GROUP MEMBERS

The INTERROGATE GROUP MEMBERS PDU shall be used by authorized user to interrogate the group members from the SwMI.

The INTERROGATE GROUP MEMBERS PDU shall contain information elements as defined in table 28.

Table 28: INTERROGATE GROUP MEMBERS PDU contents

Information element	Length	Type	C/O/M	Value	Remark
SS Type	6	1	M		SS-DGNA
SS-DGNA PDU type	5	1	M		Interrogate group members
Interrogation type for group members	3	1	M		
Group SSI	24	1	M		
Group extension present	1	1	M		
Group extension	24	1	C		Note

NOTE: The element shall be present only when the group extension present information has value "group extension present".

6.2.13 INTERROGATE GROUP MEMBERS ACK

INTERROGATE GROUP MEMBERS ACK PDU sent by SwMI shall be used to give a response to INTERROGATE GROUP MEMBERS PDU.

The interrogation response shall contain the list of specified type of group members recorded into SwMI, if any. In case the response does is not sent in a single PDU, SwMI shall set the value of Acknowledgement complete element accordingly and send one or several PDUs completing the response.

The INTERROGATE GROUP MEMBERS ACK PDU shall contain information elements as defined in table 29.

Table 29: INTERROGATE GROUP MEMBERS ACK PDU contents

Information element	Length	Type	C/O/M	Value	Remark
SS Type	6	1	M		SS-DGNA
SS-DGNA PDU type	5	1	M		Interrogate group members ack
Interrogation type for group members	3	1	M		
Group SSI	24	1	M		
Group extension present	1	1	M		
Group extension	24	1	C		Note 1
Result of interrogation	3	1	M		
Acknowledgement complete	1	1	M		
Number of affected user identities	5	1	M		
Affected user identity	Varies	1	C		Repeatable, Note 2
NOTE 1: The element shall be present only when the group extension present information has value "group extension present".					
NOTE 2: This element shall be present as many times as indicated by the Number of affected user identities element. If Number of affected user identities element has value '0' then the element is not present.					

6.2.14 INTERROGATE MS GROUPS

The INTERROGATE MS GROUPS PDU shall be used either by SwMI to interrogate the groups of the MS or by authorized user to interrogate groups of affected user.

The INTERROGATE MS GROUPS PDU shall contain information elements as defined in table 30.

Table 30: INTERROGATE MS GROUPS PDU contents

Information element	Length	Type	C/O/M	Value	Remark
SS Type	6	1	M		SS-DGNA
SS-DGNA PDU type	5	1	M		Interrogate MS groups
Interrogation type for MS groups	3	1	M		
Affected user identity	varies	2	O		Note
NOTE: This information element shall be present only if its value is different than the requesting/receiving user ITSI.					

6.2.15 INTERROGATE MS GROUPS ACK

INTERROGATE MS GROUPS ACK PDU shall give a response to an INTERROGATE MS GROUPS PDU.

The interrogation response shall contain a list of groups that are pre-programmed to MS and/or assigned to the MS by SS-DGNA ASSIGN PDU.

In case the response is not sent in a single PDU, MS/SwMI shall set the value of Acknowledgement complete element accordingly and send one or several further PDUs completing the response.

The INTERROGATE MS GROUPS ACK PDU shall contain information elements are described in table 31.

Table 31: INTERROGATE MS GROUPS ACK PDU contents

Information element	Length	Type	C/O/M	Value	Remark
SS Type	6	1	M		SS-DGNA
SS-DGNA PDU type	5	1	M		Interrogate MS groups ack
Interrogation type for MS groups	3	1	M		
Result of MS group interrogation	3	1	M		
Acknowledgement complete	1	1	M		
Affected user identity	varies	2	O		Note 1
Number of groups	5	2	O		
Group information	Varies	2	C		Repeatable, Note 2
NOTE 1: This information element shall be present only if its value is different than the requesting/receiving user ITSI.					
NOTE 2: This element shall be present only, when the Number of groups element is present. The element shall be present as many times as indicated by the Number of groups element.					

6.2.16 MODIFY

MODIFY PDU shall be used by authorized user to modify group parameters in SwMI and/or it may contain a request to assign the group to a set of affected users or deassign it from another set of affected users.

The MODIFY PDU shall contain information elements as defined in table 32.

Table 32: MODIFY PDU contents

Information element	Length	Type	C/O/M	Value	Remark
SS Type	6	1	M		SS-DGNA
SS-DGNA PDU type	5	1	M		Modify
Group SSI	24	1	M		
Group extension present	1	1	M		
Group extension	24	1	C		Note 1
Set reference	6	2	O		
Mnemonic group name	varies	2	O		
Length of security related information element	6	2	O		
Security related information	varies	2	C		Note 2
Length of additional group information element	6	2	O		
Additional group information	varies	2	C		Note 3
Group identity attachment mode	3	2	O		
Class of usage	3	2	O		
Assigned user identity range type	4	2	O		Group assignment to be done to these affected users
Affected user identity	Varies	2	C		Repeatable, Notes 4 and 5
Acknowledgement requested from affected user(s)	1	2	C		Note 4
Deassigned user identity range type	4	2	O		Group deassignment to be done to these affected users
Affected user identity	Varies	2	C		Repeatable, Notes 6 and 7
Acknowledgement requested from affected user(s)	1	2	C		Note 6

NOTE 1: The element shall be present only when the group extension present information element is in the PDU and has value "group extension present".
NOTE 2: The length of Security related information information element shall be indicated by Length of Security related information element.
NOTE 3: The length of Additional group information information element shall be indicated by Length of additional group information element.
NOTE 4: This element shall be present only, when the preceding Assigned user identity range type information element is present.
NOTE 5: The element shall be present as many times as indicated by the preceding Assigned user identity range type information element.
NOTE 6: This element shall be present only, when the preceding Deassigned user identity range type information element is present.
NOTE 7: The element shall be present as many times as indicated by the preceding Deassigned user identity range type information element.

6.2.17 MODIFY ACK

The MODIFY ACK PDU shall be used to acknowledge a group modification or assignment/deassignment request sent by MODIFY PDU.

The acknowledgement may be positive or negative indicating the result of the attempt to modify the group identity and possible assign and/or deassign it to affected user. In case SwMI does not accept one or several requested assignments/deassignments as indicated by result of modification information element, the MSs for whom assignment/deassignment was rejected are indicated in the Affected user identity element. In case the response is not sent in a single PDU, SwMI shall set the value of Acknowledgement complete element accordingly and send one or several further PDUs completing the response.

The MODIFY ACK PDU shall contain information elements as defined in table 33

Table 33: MODIFY ACK PDU contents

Information element	Length	Type	C/O/M	Value	Remark
SS Type	6	1	M		SS-DGNA
SS-DGNA PDU type	5	1	M		Modify Ack
Group SSI	24	1	M		
Group extension present	1	1	M		
Group extension	24	1	C		Note 1
Result of modification	4	1	M		
Acknowledgement complete	1	1	M		
Affected user identity range type	4	1	C		Note 2
Affected user identity	Varies	1	C		Repeatable, Note 3
NOTE 1: The element shall be present only when the group extension present value is "group extension present".					
NOTE 2: The element is present if the Result of modification information element has value '0110_2'.					
NOTE 3: This element shall be present only, when the Affected user identity range type information element is present. The element shall be present as many times as indicated by the Affected user identity range type information element.					

6.2.18 General DGNA not supported

In case MS/SwMI does not support SS-DGNA at all, it should give according to ETS 300 392-9 [6] an SS-PDU as presented in table 34 as a response to all SS-DGNA requests.

Table 34: SS-DGNA not supported PDU contents

Information element	Length	Type	C/O/M	Value	Remark
SS type	6	1	M		Same as in request (SS-DGNA).
SS PDU type	5	1	M	00000_2	Supplementary service not supported

6.2.19 Requested SS-DGNA action not supported

In case MS/SwMI does not support requested SS-DGNA action but supports some SS-DGNA actions, it should give according to ETS 300 392-9 [6] an SS-PDU as presented in table 35 as a response to the not supported SS-DGNA request.

Table 35: SS-DGNA action not supported PDU contents

Information element	Length	Type	C/O/M	Value	Remark
SS type	6	1	M		Same as in request (SS-DGNA)
SS PDU type	5	1	M	00001_2	Action not supported
Requested SS-DGNA PDU type	5	1	M		SS specific action type, Note
NOTE: The information element value shall be copied from the original request.					

6.3 Element coding

6.3.1 Acknowledgement complete

Acknowledgement complete information element shall indicate completion state of the acknowledgement. The information element shall have values as defined in table 36.

Table 36: Interrogation response complete information element contents

Information element	Length	Value	Remarks
Acknowledgement complete	1	0	Not complete, more PDUs to follow
		1	Complete

6.3.2 Acknowledgement requested from affected user(s)

Acknowledgement requested from affected user(s) information element shall indicate whether the affected user shall send an acknowledgement indicating the result of DGNA number assignment/deassignment. If the element is not present in the PDU it shall indicate, that the user shall not acknowledge the request. The information element shall have values as defined in table 37.

Table 37: Acknowledgement requested from affected user(s) information element contents

Information element	Length	Value	Remark
Acknowledgement requested from affected user(s)	1	0	Acknowledgement not requested
		1	Acknowledgement requested

6.3.3 Additional group information

Additional group information information element shall provide necessary non-security related information of the group. The information element contents shall be defined later.

6.3.4 Affected user extension

The Affected user extension information element shall indicate to the SwMI the MNI part of the TSI address of the affected user. The information element shall contain sub-elements as defined in ETS 300 392-1 [4] clause 7 and repeated in table 38.

Table 38: Affected user extension information element contents

Information element	Length	Value	Remark
Country Code	10		See ETS 300 392-1 [4] clause 7.
Network Code	14		See ETS 300 392-1 [4] clause 7.

6.3.5 Affected user identity

The Affected user identity information element shall indicate to the SwMI the SSI /TSI address of the affected user (individual or group). The information element shall contain sub-elements as defined in table 39.

Table 39: Affected user identity information element contents

Information element	Length	Type	C/O/M	Value	Remark
Affected user SSI	24	1	M		
Affected user extension present	1	1	M	0	Extension not present
				1	Extension present
Affected user extension	24	1	C		Note
NOTE: The element shall be present only when the value of Affected user extension present element is "extension present". Refer to ETS 300 392-9 [6] subclause 8.4.1.					

6.3.6 Affected user identity range type

Affected user identity range type information element shall indicate how many times the following "Affected user identity" information element shall be present or in the case of a range it shall appear twice. Affected user identity range type information element shall be constructed as defined in ETS 300 392-9 [6], subclause 8.3.1.

6.3.7 Affected user SSI

The purpose of the Affected user SSI information element shall indicate to the SwMI the SSI address of the affected user (individual or group). The information element shall be as defined in ETS 300 392-1 [4], clause 7 and repeated here in table 40.

Table 40: Affected User SSI element contents

Information element	Length	Value	Remark
Affected user SSI	24		See ETS 300 392-1 [4], clause 7.

6.3.8 Assigned user identity range type

Assigned user identity range type information element shall indicate how many times the following "Affected user identity" information element shall be present. The information element shall contain one element as defined in table 41.

Table 41: Assigned User SSI element contents

Information element	Length	Value	Remark
Affected user identity range type	4		See ETS 300 392-9 [6], subclause 8.3.1.

6.3.9 Call identifier

The purpose of the call identifier information element shall indicate to the SwMI the call whose participants are requested to be affected users. The information element shall be as defined in table 42.

Table 42: Call identifier element contents

Information element	Length	Value	Remark
Call identifier	14		See ETS 300 392-2 [3], clause 14.

6.3.10 Call related DGNA creation

The purpose of the call related DGNA creation information element shall indicate whether the participants of an existing call are requested to be affected users. The information element shall be as defined in table 43.

Table 43: Call related DGNA creation element contents

Information element	Length	Value	Remark
Call related DGNA creation	1	0	Not call related
		1	Call related

6.3.11 Class of usage

Class of usage information element shall indicate the importance of the group for the affected user.

The definitions for the different class of usage values shall be the same as in ETS 300 392-2 [3] subclause 16.10.6.

6.3.12 Deassigned user identity range type

'Deassigned user identity range type information element shall indicate how many times the following "Affected user identity" information element shall be present. The information element shall contain one element as defined in table 44.

Table 44: Deassigned User SSI element contents

Information element	Length	Value	Remark
Affected user identity range type	4		See ETS 300 392-9 [6], subclause 8.3.1.

6.3.13 Group assignment

The group assignment information element shall contain sub-elements as defined in table 45.

Table 45: Group assignment information element contents

Information element	Length	Type	C/O/M	Value	Remark
Group SSI	24	1	M		Assigned group SSI
Group extension present	1	1	M		
Group extension	24	1	C		Assigned group extension, Note 1
Group identity attachment mode	3	1	M		
Class of usage	3	2	O		Note 2
Mnemonic group name	varies	2	O		
Length of security related information element	6	2	O		
Security related information	varies	2	C		Note 3
Length of additional group information element	6	2	O		
Additional group information	varies	2	C		Note 4
(V)GSSI	24	2	O		

NOTE 1: The element shall be present only when the group extension present information element has value "group extension present". Refer to ETS 300 392-9 [6] subclause 8.4.1.
NOTE 2: The element shall be present if the Group Identity Attachment Mode has value 000_2-011_2. The element may be present also when other values are present in the Group Identity Attachment Mode information element.
NOTE 3: The length of Security related information information element shall be indicated by Length of Security related information element.
NOTE 4: The length of Additional group information information element shall be indicated by Length of additional group information element.

6.3.14 Group assignment ack

The group assignment ack information element shall contain sub-elements as defined in table 46.

Table 46: Group assignment ack information element contents

Information element	Length	Type	C/O/M	Value	Remark
Group SSI	24	1	M		Assigned group SSI
Group extension present	1	1	M		
Group extension	24	1	C		Note, Assigned group extension
Result of assignment	2	1	M		
Result of attachment	1	1	M		

NOTE: The element shall be present only when the group extension present has value "group extension present". Refer to ETS 300 392-9 [6] subclause 8.4.1.

6.3.15 Group deassignment

The group deassignment information element shall contain sub-elements as defined in table 47.

Table 47: Group deassignment information element contents

Information element	Length	Type	C/O/M	Value	Value
Group SSI	24	1	M		Deassigned group SSI
Group extension present	1	1	M		Note
Group extension	24	1	C		Deassigned group extension
NOTE: The element shall be present only when the group extension present has value "group extension present". Refer to ETS 300 392-9 [6] subclause 8.4.1.					

6.3.16 Group deassignment ack

The group deassignment ack information element shall contain sub-elements as defined in table 48.

Table 48: Group deassignment ack information element contents

Information element	Length	Type	C/O/M	Value	Value
Group SSI	24	1	M		
Group extension present	1	1	M		
Group extension	24	1	C		Note
Result of deassignment	2	1	M		
NOTE: The element shall be present only when the group extension present has value "group extension present". Refer to ETS 300 392-9 [6] subclause 8.4.1.					

6.3.17 Group extension

The Group extension information element shall indicate to the SwMI the MNI part of the TSI address of the group. The information element shall contain sub-elements as defined in table 49.

Table 49: Group extension information element contents

Information element	Length	Value	Remark
Country Code	10		See ETS 300 392-1 [4] clause 7.
Network Code	14		See ETS 300 392-1 [4] clause 7.

6.3.18 Group extension present

The Group extension present information element shall indicate whether the MNI part of the TSI address of the group is present in the PDU. The information element shall be as defined in table 50.

Table 50: Group extension information element contents

Information element	Length	Value	Remark
Group extension present	1	0	No group extension present
		1	Group extension present

6.3.19 Group identity attachment mode

The group identity attachment mode information element shall define attachment mode as defined in table 51.

Table 51: Group identity attachment mode information element contents

Information element	Length	Value	Remark
Group identity attachment mode	3	000_2	Attached permanently, attachment not needed for next ITSI Attach or next location update, Note
		001_2	Attached, attachment for next ITSI Attach required, Note
		010_2	Attached, attachment not allowed for next ITSI-Attach, Note
		011_2	Attached, attachment for next location update required, Note
		100_2	Group is not attached; MS user is allowed to request an attachment
		101_2	Group is not attached; MS user is not allowed to request an attachment
		110_2	Reserved
		111_2	Reserved
NOTE: Meaning of the values are same as for "Group identity attachment lifetime" element defined in ETS 300 392-2 [3], subclause 16.10.16.			

6.3.20 Group information

Group information information element shall contain sub-elements as defined in table 52.

Table 52: Group information information element contents

Information element	Length	Type	C/O/M	Value	Remark
Group SSI	24	1	M		
Group extension present	1	1	M		
Group extension	24	1	C		Note 1
Group status	3	1	M		
Length of security related information element	6	2	O		
Security related information	varies	2	C		Note 2
Length of additional group information element	6	2	O		
Additional group information	varies	2	C		Note 3
NOTE 1: The element shall be present only when the group extension present information element value is "group extension present". Refer to ETS 300 392-9 [6] subclause 8.4.1.					
NOTE 2: The length of Security related information information element shall be indicated by Length of Security related information element.					
NOTE 3: The length of Additional group information information element shall be indicated by Length of additional group information element.					

6.3.21 Group SSI

The Group SSI information element shall indicate the SSI address of the group. The information element shall be as described in ETS 300 392-1 [4], clause 7 and repeated here in table 53.

Table 53: Group SSI element contents

Information element	Length	Value	Remark
Group SSI	24		See ETS 300 392-1 [4], clause 7.

6.3.22 Group status

The group status information element shall indicate validity of the group identity as defined in table 54.

Table 54: Group status information element contents

Information element	Length	Value	Remark
Group status	3	000_2	Group active (is used as Layer 2 address)
		001_2	Group temporarily deactivated, deactivated with reason temporary 1
		010_2	Group permanently deactivated, deactivated with reason temporary 2
		011_2	Group permanently deactivated
		110_2	Reserved
		… etc.	… etc.
		111_2	Reserved

6.3.23 Interrogation type for group

Interrogation type for group information element shall indicate the type of the interrogation. The information element shall have values as defined in table 55.

Table 55: Interrogation type for group information element contents

Information element	Length	Value	Remarks
Interrogation type for group	3	000_2	Mnemonic name
		001_2	Group identity attachment mode and class of usage
		010_2	Additional group information
		011_2	Set reference
		100_2	Security related information
		101_2	Reserved
		110_2	Reserved
		111_2	All available information

6.3.24 Interrogation type for group members

Interrogation type for group members information element shall indicate the type of the interrogation, when authorized user interrogates group information from SwMI. The information element values shall be as defined in table 56.

Table 56: Interrogation type for group members information element contents

Information element	Length	Value	Remarks
Interrogation type for group members	3	000_2	List of all potential group members
		001_2	List of currently attached group members
		010_2	List of all members having group definition
		011_2	List of group members who rejected assignment
		100_2	Reserved
		101_2	Reserved
		110_2	Reserved
		111_2	Reserved

6.3.25 Interrogation type for MS groups

Interrogation type for MS groups information element shall indicate the type of the interrogation, when SwMI interrogates group information from MS/LS or authorized user interrogates group information from affected user. The information element values shall be as defined in table 57.

Table 57: Interrogation type for MS groups information element contents

Information element	Length	Value	Remarks
Interrogation type for MS groups	3	000_2	List of all groups
		001_2	List of DGNA groups
		010_2	List of pre-programmed groups
		011_2	Reserved
		100_2	Reserved
		101_2	Reserved
		110_2	Reserved
		111_2	Reserved

6.3.26 Length of additional group information element

Length of additional group information element shall indicate how many bits the following Additional group information element contains. The information element contents shall be as defined in table 58.

Table 58: Length of additional group information element contents

Information element	Length	Value	Remarks
Length of additional group information	6	000000_2	1 bit
		000001_2	2 bits
		000010_2	3 bits
		... etc.	... etc.
		111111_2	63 bits

6.3.27 Length of security related information element

Length of security related information element shall indicate how many bits the following Additional group information element contains. The information element contents shall be as defined in table 59.

Table 59: Length of additional group information element contents

Information element	Length	Value	Remarks
Length of security related information	6	000000_2	1 bit
		000001_2	2 bits
		000010_2	3 bits
		... etc.	... etc.
		111111_2	63 bits

Table 60: Void

6.3.28 Mnemonic group name

The mnemonic group name shall be encoded as defined in ETS 300 392-9 [6] clause in table 16. The maximum number of characters shall be 15 independently of the character length or language.

6.3.29 Number of affected user identities

Number of affected user identities information element shall indicate either how many times the following information element is present, i.e. how many group members (affected user identities) the PDU contains, or that no group members are present in the PDU. The information element contents shall be as defined in table 61.

Table 61: Number of affected user identities information element contents

Information element	Length	Value	Remarks
Number of affected user identities	5	00000_2	No members present in the PDU
		00001_2	1 user identity
		00010_2	2 user identities
		... etc.	... etc.
		11111_2	31 user identities

6.3.30 Number of groups

Number of groups information element shall indicate how many times the following information element is present, i.e. how many groups the PDU contains. The information element contents shall be as defined in table 62.

Table 62: Number of groups information element contents

Information element	Length	Value	Remarks
Number of groups	5	00000_2	Reserved
		00001_2	1 group
		00010_2	2 groups
		... etc.	... etc.
		11111_2	31 groups

6.3.31 Number of groups in deassign ack

Number of groups in deassign ack information element shall indicate either that deassignment of all groups was accepted or it shall indicate how many times the following group deassignment ack element is present, i.e. how many groups the PDU contains. The information element contents shall be as defined in table 63.

Table 63: Number of groups in deassign ack information element contents

Information element	Length	Value	Remarks
Number of groups in deassign ack	5	00000_2	All groups permanently detached in this SwMI, group deassignment ack information element is not present
		00001_2	1 group
		00010_2	2 groups
		... etc.	... etc.
		11111_2	31 groups

6.3.32 Number of groups in deassign request

Number of groups in deassign request information element shall indicate either that all groups are to be deassigned or it shall indicate how many times the following group deassignment element is present, i.e. how many groups the PDU contains. The information element contents shall be as defined in table 64.

Table 64: Number of groups in deassign request information element contents

Information element	Length	Value	Remarks
Number of groups in deassign request	5	00000_2	All groups to be deassigned, group deassignment element is not present
		00001_2	1 group
		00010_2	2 groups
		... etc.	... etc.
		11111_2	31 groups

6.3.33 Result of assignment

Result for assignment information element shall indicate the result of group identity assignment request. The information element shall values shall be as defined in table 65.

Table 65: Result of assignment information element contents

Information element	Length	Value	Remark
Result of assignment	2	00_2	Assignment rejected for any reason
		01_2	Assignment accepted
		10_2	Assignment not accepted for security reasons
		11_2	Assignment rejected, capacity exceeded

6.3.34 Result of attachment

Result for attachment information element shall indicate the result of group identity attachment request. The information element shall values shall be as defined in table 66.

Table 66: Result of attachment information element contents

Information element	Length	Value	Remark
Result of attachment	1	0_2	Group is not attached
		1_2	Group is attached

6.3.35 Result of deassignment

Result of deassignment information element shall indicate the result of group identity deassignment request. The information element shall values shall be as defined in table 67.

Table 67: Result of deassignment information element contents

Information element	Length	Value	Remark
Result of deassignment	2	00_2	Group permanently detached in this SwMI. Note.
		01_2	Group definition removed
		10_2	Reserved
		11_2	Reserved
NOTE: MS behaves as it had received a SwMI initiated group detachment with reason 'permanent detachment'. See ETS 300 392-2 [3] for detachment procedure.			

6.3.36 Result of definition

Result of definition information element shall indicate whether the previously made definition request was successful or unsuccessful. Result for definition information element shall have values as defined in table 68.

Table 68: Result of definition information element contents

Information element	Length	Value	Remark
Result of definition	4	0000_2	Request failed for any reason
		0001_2	Definition accepted by SwMI
		0010_2	Group already exists, no changes done
		0011_2	User not authorized
		0100_2	Not valid Group identity
		0101_2	Reserved
		0110_2	One or several affected users not valid or assignment not authorized, the failed affected users are indicated by the Affected user identity element, other definitions accepted by SwMI
		0111_2	Insufficient information
		1000_2	Allocation of group ids only by SwMI supported
		1001_2	Definition accepted by SwMI, security and additional group information not supported
		1011_2	Reserved
		…etc.	…etc.
		1111_2	Reserved

6.3.37 Result of deletion

Result of deletion information element shall indicate whether the deletion request was successful or unsuccessful. Result for deletion information element shall have values as defined in table 69.

Table 69: Result of deletion information element contents

Information element	Length	Value	Remark
Result of deletion/deassignment	4	0000_2	Request failed for any reason
		0001_2	Deletion accepted by SwMI
		0010_2	Reserved
		0011_2	User not authorized
		0100_2	Not valid group identity
		0101_2	Reserved
		0110_2	Reserved
		0111_{22}	Reserved

6.3.38 Result of interrogation

Result of interrogation information element shall indicate the result for interrogation request. The information element shall have values as defined in table 70.

Table 70: Result of interrogation request information element contents

Information element	Length	Value	Remark
Result of interrogation	3	000_2	Request failed for any reason
		001_2	Accepted
		010_2	Not valid group identity
		011_2	User not authorized
		100_2	Not valid user identity
		101_2	Rejected for security reasons
		110_2	Requested interrogation type not supported.
		111_2	Reserved

6.3.39 Result of modification

Result of modification information element shall indicate whether the previously made modify and/or assignment/deassignment request was successful or unsuccessful. Result of modification information element shall have values as defined in table 71.

Table 71: Result of modification information element contents

Information element	Length	Value	Remark
Result of modification	4	0000_2	Request failed for any reason
		0001_2	Modification accepted by SwMI
		0010_2	Reserved
		0011_2	User not authorized
		0100_2	Not valid group identity
		0101_2	Reserved
		0110_2	One or several affected users not valid or assignment/deassignment not authorized, the nominated affected users are indicated by the Affected user identity element, group modification accepted by SwMI
		0111_2	Insufficient information
		1000_2	Reserved
		1001_2	Modification accepted by SwMI, security and additional group information not supported
		1011_2	
		…etc.	
		1111_2	Reserved

6.3.40 Result of MS group interrogation

Result of MS group interrogation information element shall indicate the result for interrogation request. The information element shall have values as defined in table 72.

Table 72: Result of MS group interrogation information element contents

Information element	Length	Value	Remark
Result of MS group interrogation	3	000_2	Request failed for any reason
		001_2	Accepted
		010_2	Reserved
		011_2	User not authorized
		100_2	Not valid user identity
		101_2	Rejected for security reasons
		110_2	Reserved
		111_2	Reserved

6.3.41 Security related information

Security related information element shall provide necessary security related information of the group. The information element contents shall be as defined in ETS 300 392-7 [5].

6.3.42 Set reference

Set reference information element is a reference to a pre-defined parameter set, which may be recognized by group home SwMI. The information element shall have values as defined in table 73.

Table 73: Set reference information element contents

Information element	Length	Value	Remarks
Set reference	6	000000_2	Set 1
		000001_2	Set 2
		etc.	etc.
		111111_2	Set 64

6.3.43 SS-DGNA PDU type

SS-DGNA PDU type information element shall indicate the type of the action as described in table 741.

Table 74: SS-DGNA PDU type information element contents

Information element	Length	Value	Remark
SS-DGNA PDU type	5	00000_2	Defined in ETS 300 392-9 [6]
		00001_2	Defined in ETS 300 392-9 [6]
		00010_2	Defined in ETS 300 392-9 [6]
		00011_2	Defined in ETS 300 392-9 [6]
		00100_2	Defined in ETS 300 392-9 [6]
		00101_2	DEFINE
		00110_2	DEFINE ACK
		00111_2	ASSIGN
		01000_2	ASSIGN ACK
		01001_2	DEASSIGN
		01010_2	DEASSIGN ACK
		01011_2	INTERROGATE GROUP MEMBERS
		01100_2	INTERROGATE GROUP MEMBERS ACK
		01101_2	DELETE
		01110_2	DELETE ACK
		01111_2	MODIFY
		10000_2	MODIFY ACK
		10001_2	INTERROGATE MS GROUPS
		10010_2	INTERROGATE MS GROUPS ACK
		10011_2	INTERROGATE GROUP
		10100_2	INTERROGATE GROUP ACK
		10101_2	Reserved
		...	etc.
		11111_2	Reserved

6.3.44 Visitor Group Short Subscriber Identity (V)GSSI

The visitor Group Short Subscriber Identity (V)GSSI information element shall indicate the (V)GSSI applicable as Layer 2 address in the visited SwMI.

The information element shall be as defined in ETS 300 392-1 [4], clause 7 and repeated in table 75.

Table 75: (V)GSSI element contents

Information element	Length	Value	Remark
(V)GSSI	24		See ETS 300 392-1 [4], clause 7.

6.4 SS-DGNA protocol states

6.4.1 Protocol states of FE1

IDLE is the only state of FE1.

6.4.2 Protocol states of FE2

IDLE is the only state of FE2.

6.4.3 Protocol states of FE3

IDLE is the only state of FE3.

6.4.4 Protocol states of FE2 in visited SwMI

IDLE is the only state of FE2 in visited SwMI.

6.5 SS-DGNA signalling procedures

6.5.1 PDU addressing

If an entity uses SSI form identities then the receiving entity shall expand it into a full TSI as defined in ETS 300 392-9 [6] subclause 8.4.1. Refer also to interworking requirements in subclause 6.7.1.1.

6.5.2 Signalling procedures of FE1 (affected user)

6.5.2.1 Assignment

Upon reception of an ASSIGN PDU FE1 shall send an ASSIGN indication to the application. The ASSIGN indication may contain assign request of one or several groups.

Application may initiate the network authentication procedure before accepting the assignments. FE1 should not accept the assignments, if the authentication fails. The network authentication procedure is described in ETS 300 392-7 [5].

If the application does not accept the assignment of a group because the MS is located in other network than the home network of the MS, the application shall set "Assignment not accepted for security reasons" as the result of assignment for the group to the ASSIGN response. In case there is no room in the group database of MS/LS, the application shall indicate 'Assignment rejected, capacity exceeded' as the result of assignment for the group to the ASSIGN response. Other reject reasons are indicated with 'Assignment rejected for any reason' as the result of assignment. If the application does not accept the assignment it shall set 'Group was not attached' as the result of attachment to the ASSIGN response.

If the application accepts the assignment of a group it shall update the group database of MS/LS and set 'Assignment accepted' as the result of assignment for the group to the ASSIGN response. If the ASSIGN indication contains also an attachment request for the group and application accepts the attachment, the application shall set 'Group was attached' as the result of attachment to the ASSIGN response and send IDENTITIES request containing the attached GSSIs (GSSI and possible V-GSSI) to PC which shall send MLE-IDENTITIES request to MLE. If the ASSIGN indication does not contain an attachment request for the group or if the ASSIGN indication contains an attachment request for the group and application rejects the attachment, the application shall set 'Group was not attached' as the result of attachment to the ASSIGN response.

The class of usage indicates how the affected user should handle the group address. The class of usage value may be changed by group attachment procedures as defined in ETS 300 392-2 [3], clause 16. The group identity attachment mode indicates the validity of the group identity as a layer 2 address in MS/LS. The validity of the group identity as a layer 2 address may be changed by group attachment/detachment procedures as defined in ETS 300 392-2 [3], clause 16.

The application shall send an ASSIGN response to FE1, which shall send an ASSIGN ACK PDU to FE2 only if an acknowledgement was requested in the ASSIGN PDU. The ASSIGN response shall contain separate result of assignment and result of attachment for each group that was requested to be assigned in the ASSIGN indication. The result of attachment information elements in the ASSIGN ACK PDU shall indicate if the group is used as valid layer 2 address by the MS (LS).

To comply with this standard the assignment process is mandatory to MS/LS.

6.5.2.2 Deassignment

Upon reception of a DEASSIGN PDU FE1 shall send a DEASSIGN indication to the application. The DEASSIGN indication may contain deassign request of one or several or all groups of the MS/LS.

Application may initiate the network authentication procedure before accepting the deassignment. FE1 should not accept the deassignment, if the authentication fails. The network authentication procedure is described in ETS 300 392-7 [5].

If the application does not accept the deassignment of a group, the application shall set "Deassignment not accepted for any reason, group permanently detached in this SwMI" as the result of deassignment for the group to the DEASSIGN response. However if the DEASSIGN indication contains request to deassign all groups of MS then the application whether or not to include a separate negative result of deassignment for the group to the DEASSIGN response. If the application accepts the deassignment of a group it shall remove the group definition from the database of MS/LS and set 'Group definition removed' as the result of deassignment to the DEASSIGN response. However if the DEASSIGN indication contains request to deassign all groups of MS then the application shall not include a separate positive result of deassignment for the group to the DEASSIGN response.

In case the DEASSIGN indication contains request to deassign all groups of MS and the application either accepts the deassignment of all the groups or does not want to indicate the rejected groups in the response, the application shall set the result of deassignment to 'all groups detached, group deassignment ack element not present'..

If the application accepts or rejects the deassign request, it shall send IDENTITIES request containing the GSSIs requested to be detached to PC which shall send MLE-IDENTITIES request to MLE. The group numbers indicated to be detached in the DEASSIGN PDU shall not be used as valid layer 2 addresses in the current network from the moment the deassignment request is received in MS/LS.

The application shall send a DEASSIGN response back to FE1, which shall send a DEASSIGN ACK PDU to FE2 if an acknowledgement was requested in the DEASSIGN PDU. The DEASSIGN response shall contain separate result of deassignment for each group that was requested to be deassigned in the DEASSIGN indication. If DEASSIGN PDU contained request to deassign all groups then the DEASSIGN ACK PDU shall contain either those groups whose deassignment was rejected or no groups. In case deassignment of all groups was requested and the response is not sent in a single PDU, FE1 shall set the value of Acknowledgement complete element accordingly and send one or several PDUs completing the response. FE2 shall set the acknowledgement complete information element to value "complete" in the last DEFINE ACK PDU and to value 'not complete' in the preceding PDUs.

To comply with this standard the deassignment process is mandatory to MS/LS.

6.5.2.3 Interrogation of group parameters

Upon reception of an INTERROGATE GROUP request from user application FE1 shall construct an INTERROGATE GROUP PDU according to the user's request and send it to the SwMI. The INTERROGATE GROUP PDU shall not contain an Affected user identity information element. The affected user can interrogate the group parameters for the groups he is member of. However, FE1 should not bar any interrogation requests, if it does not have any knowledge of the user's membership to a group.

The affected user can interrogate the defined group identity for one group identity at the time. At the reception of the INTERROGATE GROUP ACK PDU from SwMI FE1 shall send an INTERROGATE GROUP indication to the user application. If the SwMI provides the group information, the affected user application may update the parameters in the database of the MS/LS unit according to the received response, if it accepts the information element values. Thus, the interrogation response can be interpreted as a potential modification. If the user application does not accept one or more of the information element values in the received INTERROGATE GROUP ACK PDU, it may initiate group attachment/detachment procedure as defined in ETS 300 392-2 [3] subclause 16.4.2.

There can be group parameters that are defined for the group and for the subscriber independently, in this case the subscriber specific parameters shall override the parameters defined for the group, e.g. the members of the group can have different values for the class of usage of one group. If this is the case, FE2 should provide the affected user the parameters that are defined for him, and not the values defined for the group.

To comply with this standard the interrogation group process is optional to MS/LS.

6.5.2.4 Interrogation of MS groups by SwMI

Upon reception of an INTERROGATE MS GROUPS PDU from FE2, FE1 shall send an INTERROGATE MS GROUPS indication to the application.

Application may initiate the network authentication procedure before accepting the interrogation. FE1 should not accept the interrogation, if the authentication fails. The network authentication procedure is described in ETS 300 392-7 [5].

If the application does not accept the interrogation of groups because the MS is located in other network than the home network of the MS, the application shall set "Interrogation rejected for security reasons' as the result of interrogation to the interrogate MS groups response. If the application does not support the requested interrogation type of MS groups, the application shall set "Interrogation type not supported' as the result of interrogation to the interrogate MS groups response. Other reject reasons are indicated by value 'Request failed by any reason'.

If application accepts the Interogation it shall return an INTERROGATE MS GROUPS response to FE1 and FE1 shall send an INTERROGATE MS GROUPS ACK PDU containing group information to the requesting SwMI. If not all the reported groups cannot be sent in one INTERROGATE MS GROUPS ACK PDU, FE1 shall set value 'not complete' to acknowledgement complete information element and send one or several INTERROGATE MS GROUPS ACK PDUs to complete the acknowledgement. FE1 shall set the acknowledgement complete information element to value "complete" in the last INTERROGATE MS GROUPS ACK PDU and to value 'not complete' in the preceding PDUs. In case the FE1 has no groups, FE2 shall set value 'complete' to information element acknowledgement complete and the optional information element Number of groups shall not be present.

To comply with this standard the interrogation MS groups process is optional to MS/LS.

6.5.3 Signalling procedures of FE2 (SwMI)

6.5.3.1 General on procedures for FE2

In FE2 procedures it is assumed that SwMI accepts the service request from the MS/LS based on subscription and possible authentication at registration or during SS-DGNA service operation, refer to ETS 300 392-7 [5] for authentication protocol.

6.5.3.2 Definition

An authorized user requests by the definition process that the SwMI defines a new group and may also request to assign it to affected users. Refer to modification process for changing group parameters and group members.

Before accepting the definition FE2 can authenticate the authorized user that has sent a DGNA definition request. The authentication procedure is described in ETS 300 392-7 [5].

Upon reception of an acceptable DEFINE PDU FE2 shall save the group definition into the database in SwMI. If the group identity was omitted in the DEFINE PDU, FE2 shall allocated a group identity. SwMI may define further details of the group definition as indicated by the set reference information element. The meaning of the set reference values are outside the scope of this SS-DGNA standard.

If SwMI does not allow an authorized user to define the group identity it shall reject the definition attempt with reason ' Allocation of group ids only by SwMI supported'.

In case of call related DGNA definition, FE2 shall retrieve the call membership data as indicated by the call identifier and use the call membership data to select the affected user to whom the assignment is to be done. The DEFINE PDU may also contain identities of affected users. For each affected user FE2 shall check whether the assignment is allowed and in case SwMI permits the assignment it shall invoke deassignment process to the affected user as defined in subclause 6.5.3.5.

In case of call related SS-DGNA definition the DEFINE ACK PDU shall contain the call identifier of the call. The protocol assumes that the authorized user knows from the basic call functions the proper call identifier of the call even after a possible change of the call identifier due to roaming in the SwMI or migrating to another SwMI. In case FE2 accepts the group definition and all requested assignments (if any), it shall set the value "Definition accepted by SwMI" in the result of definition information element. In that case there shall be no affected user identities in the DEFINE ACK PDU.

In case FE2 accepts the definition but does not accept one or several requested assignments, it shall set the value "One or several affected users not valid or assignment not authorized, the failed affected users are indicated by the Affected user identity element, other definitions accepted by SwMI" in the result of definition information element and the affected users for whom assignment were rejected shall be indicated in the Affected user identity/identities information element in the DEFINE ACK PDU. If all of the affected users for whom assignment were rejected cannot be sent in one DEFINE ACK PDU, FE2 shall set value 'Acknowledgement not complete' to acknowledgement complete information element and send one or several DEFINE ACK PDUs to complete the response. FE2 shall set the acknowledgement complete information element to value "complete" in the last DEFINE ACK PDU and to value 'not complete' in the preceding PDUs.

In case FE2 does not accept the group definition it shall send a DEFINE ACK PDU with applicable reason in the result of definition information element, refer to subclause 6.3.33 for reasons. In that case there shall be no affected user identity in the DEFINE ACK PDU. If group identity was not given in the DEFINE PDU, FE2 shall set a dummy identifier '0' to Group SSI element in DEFINE ACK PDU.

To comply with this standard both the call related and the call un-related definition processes are optional to SwMI.

6.5.3.3 Deletion

An authorized user requests by the deletion process that the SwMI deletes an existing group and may also request to deassign it from all or specified affected users. Before accepting the deletion FE2 may authenticate the authorized user that has sent the SS-DGNA deletion request. The authentication procedure is described in ETS 300 392-7 [5].

In case SwMI does not accept the deletion it shall send a DELETE ACK PDU with applicable reason in the result of deletion information element, refer to subclause 6.3.34 for reasons.

Upon reception of an acceptable DELETE PDU FE2 shall remove the definition of the group from the database in SwMI and acknowledge the deletion request by sending a DELETE ACK PDU with result of deletion value "Deletion accepted by SwMI" to the requesting FE3.

If the authorized user requested the group to be deassigned from affected users, FE2 shall check whether the deassignment is valid for each affected user specified in the DELETE PDU. If the authorized user requested the group to be removed from affected users and there is no affected user identities present in the DELETE PDU, then SwMI shall regard this as a request to deassign the group from all members of the group. In case SwMI permits the deassignment for the affected user it shall invoke deassignment process as defined in subclause 6.5.3.6.

To comply with this standard the deletion process is optional to SwMI.

6.5.3.4 Modification

An authorized user requests by the modification process that the SwMI makes changes to an existing group and may also request to assign the group to specified affected users or deassign it from specified affected users. Before accepting the modification FE2 may authenticate the authorized user that has sent the SS-DGNA modification request. The authentication procedure is described in ETS 300 392-7 [5].

Upon reception of an acceptable MODIFY PDU FE2 shall save the possible group parameter modification into the database in SwMI. SwMI may modify further details of the group definition using the set reference information element. The meaning of the set reference values are outside the scope of this SS-DGNA standard.

If the DEFINE PDU contains request to assign the group to specified affected users, FE2 shall check for whether the assignment is allowed for each affected user specified. In case SwMI permits the assignment to the affected user it shall invoke a assignment process as defined in subclause 6.5.3.5.

If the DEFINE PDU contains request to deassign the group from specified affected users, FE2 shall check whether the deassignment is valid for each affected user specified. In case SwMI permits the deassignment for the affected user it shall invoke a deassignment process as defined in subclause 6.5.3.6.

If FE2 accepts the group modification and all assignments and deassignments (if any requested), FE3 shall acknowledge the modification request by sending a MODIFY ACK PDU to FE2 with the value "Modification accepted by SwMI" in the result of modification information element. In that case there shall be no affected user identities in the PDU.

In case FE2 does not accept one or several requested assignments/deassignments as indicated by the value "One or several affected users not valid or assignment not authorized, the failed affected users are indicated by the Affected user identity element, group modification accepted by SwMI" in the result of modification information element and the MSs for whom assignment/deassignments were rejected shall be indicated in the Affected user identity/identities information element in the MODIFY ACK PDU. If the MSs for whom assignment/deassignments were rejected cannot be sent in one MODIFY ACK PDU, FE2 shall set value 'not complete' to acknowledgement complete information element and send one or several MODIFY ACK PDUs to complete the acknowledgement. FE2 shall set the acknowledgement complete information element to value "complete" in the last MODIFY ACK PDU and to value 'not complete' in the preceding PDUs.

In case FE2 does not accept the group modification it shall not accept any assign/deassign requests either. FE2 shall send a MODIFY ACK PDU with applicable reason in the result of modification information element, refer to subclause 6.3.35 for reasons. In that case there shall be no affected user identities in the MODIFY ACK PDU.

To comply with this standard the modification processes is optional to SwMI.

6.5.3.5 Assignment

SwMI requests by the assignment process to assigns and maybe also attach one or more group identities to the MS/LS.

If an accepted definition or modification request received from FE3 contains also acceptable assign requests, FE2 shall produce corresponding ASSIGN PDUs and send them to specified FE1s. SwMI may combine multiple requests (assignment of multiple groups) together into one ASSIGN PDU, when sending it to MS/LS. If the assign request contains also an attachment request then the ASSIGN PDU shall contain optional elements Class of usage and Group identity attachment mode. If the assign request contains an attachment request and FE2 is not the group home SwMI, then FE2 shall allocate a V(GSSI) for the group (to be used as valid Layer 2 address).

At the reception of the ASSIGN ACK PDU, if acknowledgement requested, FE2 may save information about the FE1's assignment and attachment status into the database of SwMI. If the affected user (FE1) is not reached when the assignment is made, FE2 may send the ASSIGN PDU to the FE1 later, in order to complete the assignment process. This standard sets no time requirements on the assignment process completion.

To comply with this standard the assignment process is mandatory to SwMI.

6.5.3.6 Deassignment

SwMI requests by the deassignment process to remove or permanently detach one or more group identities from the MS/LS (affected user).

If an accepted deletion or modification request received from FE3 contained acceptable deassignment request(s), FE2 shall produce corresponding DEASSIGN PDU and send them to specified FE1s. SwMI may combine multiple requests (deassignment of multiple groups) together into one DEASSIGN PDU, when sending it to MS/LS.

At the reception of the DEASSIGN ACK PDU, if acknowledgement requested, FE2 may save information about the FE1's deassignment status. If affected user is not reached when the deassignment is made, FE2 may send the DEASSIGN PDUs to FE1 later, in order to complete the deassignment process. This standard sets no time requirements on the deassignment process completion.

To comply with this standard the deassignment process is mandatory to SwMI.

6.5.3.7 Interrogation of group information

An affected (FE1) or authorized (FE3) user requests information about an existing group by sending INTERROGATE GROUP PDU to SwMI. Before accepting the interrogation request FE2 may authenticate the affected or authorized user that has sent the interrogation request. The authentication procedure is described in ETS 300 392-7 [5].

If the SwMI rejects the interrogation it shall send an INTERROGATE GROUP ACK PDU with the appropriate result of interrogation value, refer to subclause 6.3.35 for reasons. If the FE2 does not support the requested interrogation type of group, it shall set "Interrogation type not supported' as the result of interrogation to the interrogate group response. If FE2 accepts the interrogation, FE2 shall send an INTERROGATE ACK GROUP PDU to the requesting entity with the requested information and the result of interrogation information element set to "Accepted". If the INTERROGATE GROUP PDU is sent by authorized user and it contains an affected user identity or if the PDU is sent by affected user, then the FE2 shall include the affected user specific parameters to the INTERROGATE ACK GROUP PDU. FE2 may acquire the affected user specific parameters by attachment/detachment procedures and/or by group reporting procedures defined in ETS 300 392-2 [3], clause 16. If the INTERROGATE GROUP PDU is sent by authorized user and it does not contain an affected user identity, then the FE2 shall include the group specific parameters to the INTERROGATE ACK GROUP PDU.

To comply with this standard the interrogation group process is optional to SwMI.

6.5.3.8 Interrogation of group members

An authorized user requests information about members of an existing group by sending INTERROGATE GROUP MEMBERS PDU. Before accepting the interrogation request FE2 can authenticate the authorized user that has sent the interrogation request. The authentication procedure is described in ETS 300 392-7 [5].

If FE2 accepts the interrogation, FE2 shall send an INTERROGATE GROUP MEMBERS ACK PDU to the requesting entity containing the specified type of group members as defined in the request. If all of the group members do not fit into one INTERROGATE GROUP MEMBERS ACK PDU SwMI shall set the information element acknowledgement complete to value "not complete, more PDUs to follow" and send one or several more PDUs to complete the acknowledgement. FE2 shall set the acknowledgement complete information element to value "complete" in the last INTERROGATE GROUP MEMBERS ACK PDU and to value 'not complete' in the preceding PDUs. In case the group contains no members, FE2 shall set value 'complete' to information element acknowledgement complete and value 'No members present in the PDU' to the information element Number of affected users identities.

If the SwMI rejects the interrogation it shall send an INTERROGATE ACK GROUP PDU with the appropriate result of interrogation value, refer to subclause 6.3.27 for reasons. If the FE2 does not support the requested interrogation type of group members, it shall set "Interrogation type not supported' as the result of interrogation.

To comply with this standard the interrogation of group members process is optional to SwMI supporting FE2.

6.5.3.9 Interrogation of MS groups from affected user

FE2 may interrogate groups of an affected user (FE1) by sending an INTERROGATE MS GROUPS PDU. The FE2 may send the interrogation by its own initiative or invoked by a request from an authorized user (FE3) as described in subclause 6.5.3.10. The interrogation may contain a request to report all groups, only pre-programmed groups or only dynamically allocated groups of the affected user.

At the reception of one or several INTERROGATE MS GROUPS ACK PDU, FE2 may save information about the FE1's group status into group database of SwMI. The acknowledgement completed information element indicates when the last INTERROGATE MS GROUPS ACK PDU is received for the request.

If the request was invoked by authorized user FE2 shall forward the MS groups information to requesting authorized user as described in subclause 6.5.3.10.

To comply with this standard the interrogation of MS groups is optional to SwMI supporting FE2.

6.5.3.10 Interrogation of MS groups request from authorized user

An authorized user (FE3) requests information about groups of an affected user by sending INTERROGATE MS GROUPS PDU to FE2. Before accepting the interrogation request FE2 may authenticate the authorized user that has sent the interrogation request. The authentication procedure is described in ETS 300 392-7 [5].

If the SwMI rejects the interrogation it shall send an INTERROGATE MS GROUPS ACK PDU with the appropriate result of interrogation value, refer to subclause 6.3.27 for reasons. If the FE2 does not support the requested interrogation type of MS groups, it shall set "Interrogation type not supported' as the result of interrogation to the interrogate MS groups response.

If FE2 accepts the interrogation, FE2 shall send an INTERROGATE MS GROUPS ACK PDU to the requesting entity with the requested information and the result of interrogation information element set to "Accepted". FE2 may acquire the requested information by invoking the interrogation of MS groups as defined in subclause 6.5.3.9. If not all the reported groups cannot be sent in one INTERROGATE MS GROUPS ACK PDU, FE2 shall set value 'not complete' to acknowledgement complete information element and send one or several INTERROGATE MS GROUPS ACK PDUs to complete the acknowledgement. FE2 shall set the acknowledgement complete information element to value "complete" in the last INTERROGATE MS GROUPS ACK PDU and to value 'not complete' in the preceding PDUs. In case the MS has no groups, FE2 shall set value 'complete' to information element acknowledgement complete and the information element Number of groups shall not be present in the INTERROGATE MS GROUPS ACK PDU.

To comply with this standard the interrogation of MS groups requested by authorized user process is optional to SwMI supporting FE2.

6.5.4 Signalling procedures of FE3

6.5.4.1 Definition

Upon reception of a DEFINE request from application FE3 shall construct the DEFINE PDU according to the user's request.

The call identifier, if given, shall indicate the call who's participants are requested to be affected users of the new group. In addition other affected user may be included to the request. If a call identifier or affected users are given, the define request contains also an assign request for the affected users.

The group identity information element in the DEFINE PDU can be omitted in which case the SwMI will allocate the group identity and return it in the DEFINE ACK PDU.

The optional set reference is known by the group home SwMI and may be used in order to define certain group parameters not given in the DEFINE PDU. The optional mnemonic name and optional additional group information give more information to the affected user about the defined group.

The optional acknowledgement requested from affected user(s) indicates whether the affected user/users are requested to acknowledge the group assignment. If the acknowledgement requested from affected user(s) element is not present it indicates that acknowledgement is not requested.

The optional class of usage indicates how the affected user's MS/LS should handle the group address. The affected user specific class of usage value may be changed by group attachment procedures as defined in ETS 300 392-2 [3], clause 16.

The optional group identity attachment mode indicates the validity of the group identity as a layer 2 address in MS/LS. The affected user specific validity of the group identity as a layer 2 address may be changed by group attachment/detachment procedures as defined in ETS 300 392-2 [3], clause 16.

Upon reception of one or more DEFINE ACK PDUs FE3 shall indicate the result of definition to the application by one or more DEFINE indication primitives. The acknowledgement completed information element indicates when the last DEFINE ACK PDU is received for the request.

To comply with this standard the definition process is optional to MS supporting FE3.

6.5.4.2 Modification

Upon reception of a MODIFY request from application FE3 shall construct the MODIFY PDU according to the user's request.

The group identity information element in the MODIFY PDU is mandatory as the process is applicable only for modification of an existing group.

The optional set reference, the optional mnemonic name, the optional additional group information, the optional class of usage and the optional group identity attachment mode information elements have the same meaning as in the definition process, refer to subclause 6.5.4.1.

The first optional set of affected user identity/identities indicate users to whom the group identity is requested to be assigned and to whom the first optional acknowledgement requested from affected user(s) element is applicable.

The second optional set of affected user identity/identities indicate users from whom the group identity is requested to be deassigned and whom the second optional acknowledgement requested from affected user(s) information elements is applicable.

Upon reception of one or more MODIFY ACK PDUs FE3 shall indicate the result of modification to the application by one or more MODIFY indication primitives. The acknowledgement completed information element indicates when the last MODIFY ACK PDU is received for the request.

To comply with this standard the modification process is optional to MS supporting FE3.

6.5.4.3 Deletion

Upon reception of an DELETE request from application FE3 shall construct an DELETE PDU according to the user's request and send it to the FE2. The DELETE request may also contain a request to deassign the group from all or specified affected users.

At the reception of the DELETE ACK PDU from FE2, FE1 shall send an DELETE indication to the user application.

To comply with this standard the deletion process is optional to MS supporting FE3.

6.5.4.4 Interrogation of group members

Upon reception of an INTERROGATE GROUP MEMBERS request from application FE3 shall construct an INTERROGATE GROUP MEMBERS PDU according to the user's request and sent it to the SwMI. The interrogation shall contain a request to report all or currently active group members.

Upon reception of one or more INTERROGATE GROUP MEMBERS ACK PDUs FE3 shall indicate the result of interrogation to the application by one or more INTERROGATE GROUP MEMBERS indication primitives. The acknowledgement completed information element indicates when the last INTERROGATE GROUP MEMBERS ACK PDU is received for the request.

To comply with this standard the interrogation group members process is optional to MS supporting FE3.

6.5.4.5 Interrogation of MS groups

Upon reception of an INTERROGATE MS GROUPS request from application FE3 shall construct an INTERROGATE MS GROUPS PDU according to the user's request and send it to the FE2.

Upon reception of one or more INTERROGATE MS GROUPS ACK PDUs FE3 shall indicate the result of interrogation to the application by one or more INTERROGATE MS GROUPS indication primitives. The acknowledgement completed information element indicates when the last INTERROGATE MS GROUPS ACK PDU is received for the request.

To comply with this standard the interrogation of MS groups process is optional to MS supporting FE3.

6.5.4.6 Interrogation of group information

Upon reception of an INTERROGATE GROUP request from application FE3 shall construct an INTERROGATE GROUP PDU according to the user's request and send it to the FE2. Application may request the affected user specific parameters by including the affected user identity to the INTERROGATE GROUP request. If the affected user identity is not present in the INTERROGATE ACK GROUP request, then the application requests for group specific parameters.

At the reception of the INTERROGATE GROUP ACK PDU from FE2, FE1 shall send an INTERROGATE GROUP indication to the application. If the SwMI provides the group information, the application may update the parameters in the database of his MS/LS.

To comply with this standard the interrogation of group information process is optional to MS supporting FE3.

6.5.5 Signalling procedures of FE2 in a visited SwMI

FE2 shall act as a control entity in an other TETRA system, if the SS-DGNA service requests are sent over the Inter System Interface. The visited SwMI FE2 shall deliver SS-DGNA service requests from home SwMI FE2 to FE1 or FE3, or from FE1 or FE3 to home SwMI FE2, refer ETS 300 392-9 [6]. The visited SwMI FE2 shall also add the (V)GSSIs to ASSIGN messages if needed, refer ETS 300 392-2 [3].

6.6 Protocol timers

For purposed of the SS-DGNA protocol no timers have been defined. However it is recommended that the requesting party waits for the acknowledgement at least for 5 seconds if the operation involves only the current (location) SwMI and at least for 10 seconds if the operation involves several SwMIs.

6.7 Inter-working considerations

6.7.1 Inter system interface

6.7.1.1 Basic requirements to ISI support

In order to enable the SS-DGNA to extend to several TETRA systems over the ISI, the FE2s in different TETRA systems shall be able to send and receive call related and call unrelated Supplementary Service information flows over the ISI as defined in ETS 300 392-9 [6] and exchange supplementary service profile information as defined in ETS 300 392-3-5 [7].

Entities which are sending information which will flow via TETRA inter system interface (ISI) shall use full TSI as defined in ETS 300 392-9 [6]. Notably that is valid for an MS which sends messages to another SwMI where it is currently registered.

6.7.1.2 Assignment

FE2 of the home SwMI of the affected user may receive a assign request from (FE2 of) the group home SwMI. If FE2 of the home SwMI of the affected user accepts the assignment, it may forward the request to the visiting SwMI where the MS currently is located or wait until the MS is registered to the home SwMI of the MS and then assign the group. The home SwMI of the MS may also reject the assignment and acknowledge the request by one of the reject reasons.

FE2 of the visited SwMI of the affected user may receive a assign request from (FE2 of) the group home SwMI in case of call related definition. If FE2 of the visited SwMI of the affected user accepts the assignment, it shall assign the group to the MS. The visited SwMI of the MS may also reject the assignment and acknowledge the request by one of the reject reasons.

If the assignment is done in other network than the home network of the group, the FE2 of the visited network shall allocate a (V)GSSI in the ASSIGN PDUs, if the group identity is attached with the ASSIGN PDU as indicated by the group identity attachment mode information element. Upon accepted attachment the FE2 shall store the group attachment of the assigned MS into its database as if it had performed group attachment to the MS as defined in ETS 300 392-2 [3], clause 16 and inform FE2 of the home network of the group. The FE2 shall store information of the attachment of the group into its database and perform group migration, when needed as defined in ETS 300 392-3-5 [7].

6.7.1.3 Deassignment

FE2 of the home SwMI of the affected user may receive a deassign request from (FE2 of) the group home SwMI. If FE2 of the home SwMI of the affected user accepts the deassignment, it may forward the request to the visiting SwMI where the MS currently is located or wait until the MS is registered to the home SwMI of the MS. The home SwMI of the MS may also reject the deassignment and acknowledge the request by one of the reject reasons.

Upon performing deassignment the visited SwMI shall send DEASSIGN PDUs to one or more visited MSs and shall remove the group attachment of the deassigned MS and shall store the possible information of the deattachment of the group into its database as if it had performed group detachment from those MSs as defined in ETS 300 392-2 [3], clause 16. The visited SwMI shall perform group migration removal, when needed as defined in ETS 300 392-3-5 [7].

6.7.1.4 Definition, deletion, modification

The authorized user shall address the definition, modification and deletion requests to the home SwMI of the group by using the proper values in the 'Routeing' information element of the U-FACILITY PDU. These processes are transparent to the visited SwMI which shall forward PDUs between FE3 and group home SwMI FE2 as defined in ETS 300 392-9 [6]. The home SwMI of the group may also reject the request..

6.7.1.5 Interrogation

The authorized user shall address the interrogation requests related to an affected user (groups of MS or affected user based group information) to the home SwMI of the MS by using the proper values in the 'Routeing' information element of the U-FACILITY PDU. These processes are transparent to the visited SwMI which shall forward PDUs between FE3 and home SwMI of the MS as defined in ETS 300 392-9 [6].

The authorized user shall address the interrogation requests related to the group information (group based group information or interrogation of group members) to the group home SwMI MS by using the proper values in the 'Routeing' information element of the U-FACILITY PDU. These processes are transparent to the visited SwMI which shall forward PDUs between FE3 and group home SwMI as defined in ETS 300 392-9 [6].

The affected user shall address the interrogation requests of group information the group home SwMI by using the proper values in the 'Routeing' information element of the U-FACILITY PDU. These processes are transparent to the visited SwMI which shall forward PDUs between FE1 and group home SwMI as defined in ETS 300 392-9 [6].

The affected user may also address the interrogation requests of group information to the current visited SwMI in case the SwMI has allocated a V(GSSI) for the group. The GTSI used in the interrogation request shall then be the VGTSI, i.e. (V)GSSI + MNI of the current network. By that process the affected user gains the parameter values (e.g. group identity attachment mode and security related information) used in the visited SwMI for the group.

FE2 of the home SwMI of the affected user may receive an interrogation request related to an affected user (groups of MS or affected user based group information) from FE2 of the visited SwMI of the authorized user or from FE2 of group home SwMI. If FE2 of the home SwMI of the affected user accepts the interrogation, it may forward the request to the visiting SwMI where the MS currently is located or provide the information from its own database (if available). The home SwMI of the MS may also reject the interrogation and acknowledge the request by one of the reject reasons.

FE2 of the group home SwMI may receive an interrogation request related to group information (group based group information or interrogation of group members) from FE2 of the visited SwMI of the authorized/affected user. If FE2 of the group home SwMI accepts the interrogation, it may or provide the information from its own database (if available) or forward the request (interrogation of members of the group) to the visiting SwMIs where the MSs belonging to groups currently are located. The group home SwMI may also reject the interrogation and acknowledge the request by one of the reject reasons.

6.7.2 Gateways

SS-DGNA processes are not applicable via gateways.

Annex A (informative): Bibliography

The following material, though not specifically referenced in the body of the present document (or not publicly available), gives supporting information.

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

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

History

Document history			
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