ETSI EN 300 392-12-22 V1.4.1 (2015-02)

Terrestrial Trunked Radio (TETRA);
Voice plus Data (V+D);
Part 12: Supplementary services stage 3;
Sub-part 22: Dynamic Group Number Assignment (DGNA)

Reference
REN/TETRA-03225

Keywords
data, radio, speech, stage 3, supplementary service, TETRA, V+D

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Foreword

This European Standard (EN) has been produced by ETSI Technical Committee TETRA and Critical Communications Evolution (TCCE).

The present document is part 12, sub-part 22 of a multi-part deliverable covering the Voice plus Data (V+D), as identified below:

EN 300 392-1: "General network design";

EN 300 392-2: "Air Interface (AI)";

EN 300 392-3: "Interworking at the Inter-System Interface (ISI)";

ETS 300 392-4: "Gateways basic operation";

EN 300 392-5: "Peripheral Equipment Interface (PEI)";

EN 300 392-7: "Security";

EN 300 392-9: "General requirements for supplementary services";

EN 300 392-10: "Supplementary services stage 1";

EN 300 392-11: "Supplementary services stage 2";

EN 300 392-12: "Supplementary services stage 3";

- EN 300 392-12-1: "Call Identification (CI)";
- ETS 300 392-12-2: "Call Report (CR)";
- EN 300 392-12-3: "Talking Party Identification (TPI)";
- EN 300 392-12-4: "Call Forwarding (CF)";
- ETS 300 392-12-5: "List Search Call (LSC)";
- EN 300 392-12-6: "Call Authorized by Dispatcher (CAD)";
- ETS 300 392-12-7: "Short Number Addressing (SNA)";
- EN 300 392-12-8: "Area Selection (AS)";
- ETS 300 392-12-9: "Access Priority (AP)";
- EN 300 392-12-10: "Priority Call (PC)";
- ETS 300 392-12-11: "Call Waiting (CW)";
- EN 300 392-12-12: "Call Hold (HOLD)";

EN 300 392-12-13: "Call Completion to Busy Subscriber (CCBS)";

EN 300 392-12-14: "Late Entry (LE)";

EN 300 392-12-16: "Pre-emptive Priority Call (PPC)";

EN 300 392-12-17: "Include Call (IC)";

EN 300 392-12-18: "Barring of Outgoing Calls (BOC)";

EN 300 392-12-19: "Barring of Incoming Calls (BIC)";

EN 300 392-12-20: "Discreet Listening (DL)";

EN 300 392-12-21: "Ambience Listening (AL)";

EN 300 392-12-22: "Dynamic Group Number Assignment (DGNA)";

EN 300 392-12-23: "Call Completion on No Reply (CCNR)";

ETS 300 392-12-24: "Call Retention (CRT)";

ETS 300 392-13: "SDL model of the Air Interface (AI)";

ETS 300 392-14: "Protocol Implementation Conformance Statement (PICS) proforma specification";

TS 100 392-15: "TETRA frequency bands, duplex spacings and channel numbering";

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

TR 100 392-17: "TETRA V+D and DMO specifications".

TS 100 392-18: "Air interface optimized applications".

NOTE: Part 10, sub-part 15 (Transfer of control), part 13 (SDL) and part 14 (PICS) of this multi-part deliverable are in status "historical" and are not maintained.

National transposition dates	
Date of adoption of this EN:	27 January 2015
Date of latest announcement of this EN (doa):	30 April 2015
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 October 2015
Date of withdrawal of any conflicting National Standard (dow):	31 October 2015

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**may not**", "**need**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

1 Scope

The present document 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).

The present document 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 the present document.

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

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 and for the MS and can be applied over the Inter-System Interface (ISI) between TETRA systems.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are necessary for the application of the present document.

[1] ISO/IEC 8859-1: "Information technology -- 8-bit single-byte coded graphic character sets -- Part 1: Latin alphabet No. 1".

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

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

[5] ETSI EN 300 392-7: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 7: Security".

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

[7] ETSI EN 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] ETSI EN 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)".

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

Not applicable.

3 Definitions and abbreviations

3.1 Definitions

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

affected user: identified MS user to whom the group is assigned (added to) or deassigned (removed from)

NOTE: 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 the present document, the following abbreviations apply:

ACK	Acknowledgement
CC	Call Control
CMCE	Circuit Mode Control Entity
DGNA	Dynamic Group Number Assignment
DMO	Direct Mode Operation
FE	Functional Entity
GCK	Group Cipher Key
GSSI	Group Short Subscriber Identity
GTSI	Group TETRA Subscriber Identity
ISI	Inter System Interface
ITSI	Individual TETRA Subscriber Identity
MLE	Mobile Link Entity
MMI	Man Machine Interface

MNI	Mobile Network Identity
MS	Mobile Station
PC	Protocol Control
PDU	Protocol Data Unit
PICS	Protocol Implementation Conformance Statement
SDL	Specification and Description Language
SS	Supplementary Services
SS-AP	Access Priority
SS-DGNA	Dynamic Group Number Assignment
SS-PC	Priority Call
SS-PDU	Protocol Data Unit
SS-PPC	Pre-emptive Priority Call

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

SSI	Short Subscriber Identity
SwMI	Switching and Management Infrastructure
TSI	TETRA Subscriber Identity
(V)GSSI	Visiting Short Subscriber Group Identity or Visitor GSSI
(V)GTSI	Visiting TETRA Subscriber Group Identity or Visitor GTSI

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], clause 4.1. Refer to EN 300 392-9 [6] 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 EN 300 392-2 [3] according to the following definitions:

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

4.3 Protocol structure and protocol stack

The MS protocol stack is defined in EN 300 392-2 [3].

SS-DGNA PDUs shall be routed as specified in EN 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

Clauses 5.2 to 5.4 describe 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 the present 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 shortened into a DEFINE request.

Refer EN 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. The management mechanisms and a detailed information exchange between MS protocol layers are outside the scope of the present document.

5.2 SS-DGNA services offered over the TNSS-SAP

The services offered to users of SS-DGNA are defined as service primitives containing service parameters. The service primitives are defined in clause 5.3 and the parameter in the service primitives are defined in clause 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 EN 300 392-9 [6] and clauses 6.2.18 and 6.2.19.

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

5.3 SS-DGNA primitives

The SS-DGNA service primitives at the Affected user MS (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 (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. 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	See note
Result of attachment	M	See 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	See note
Acknowledgement requested	O	
NOTE: All group identities of the MS are 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	See note 1
Result of deassignment	M	See 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	See 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.		