



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

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Reference

REN/TCCE-03280

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Foreword

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

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

- 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 7: "Security";

- Part 9: "General requirements for supplementary services";
- Part 10: "Supplementary services stage 1";
- Part 11: "Supplementary services stage 2";
- Part 12: "Supplementary services stage 3";
- Sub-part 1: "Call Identification (CI)";
 - Sub-part 2: "Call Report (CR)";
 - Sub-part 3: "Talking Party Identification (TPI)";
 - Sub-part 4: "Call Forwarding (CF)";
 - Sub-part 5: "List Search Call (LSC)";
 - Sub-part 6: "Call Authorized by Dispatcher (CAD)";
 - Sub-part 7: "Short Number Addressing (SNA)";
 - Sub-part 8: "Area Selection (AS)";
 - Sub-part 9: "Access Priority (AP)";
 - Sub-part 10: "Priority Call (PC)";
 - Sub-part 11: "Call Waiting (CW)";
 - Sub-part 12: "Call Hold (HOLD)";
 - Sub-part 13: "Call Completion to Busy Subscriber (CCBS)";
 - Sub-part 14: "Late Entry (LE)";
 - Sub-part 16: "Pre-emptive Priority Call (PPC)";
 - Sub-part 17: "Include Call (IC)";
 - Sub-part 18: "Barring of Outgoing Calls (BOC)";
 - Sub-part 19: "Barring of Incoming Calls (BIC)";
 - Sub-part 20: "Discreet Listening (DL)";
 - Sub-part 21: "Ambience Listening (AL)";
 - Sub-part 22: "Dynamic Group Number Assignment (DGNA)";**
 - Sub-part 23: "Call Completion on No Reply (CCNR)";
 - Sub-part 24: "Call Retention (CRT)";
- Part 13: "SDL model of the Air Interface (AI)";
- Part 14: "Protocol Implementation Conformance Statement (PICS) proforma specification";
- Part 15: "TETRA frequency bands, duplex spacings and channel numbering";
- Part 16: "Network Performance Metrics";
- Part 17: "TETRA V+D and DMO specifications";
- Part 18: "Air interface optimized applications";
- Part 19: "Interworking between TETRA and Broadband systems".

NOTE 1: Part 3, sub-parts 6 and 7 (Speech format implementation), part 4, sub-part 3 (Data networks gateway), 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.

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Modal verbs terminology

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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 referenced document (including any amendments) applies.

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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)".

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The following referenced documents may be useful in implementing an ETSI deliverable or add to the reader's understanding, but are not required for conformance to the present document.

Not applicable.

3 Definition of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the following terms 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 Symbols

Void.

3.3 Abbreviations

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

(V)GSSI Visiting Short Subscriber Group Identity or Visitor GSSI

(V)GTSI	Visiting TETRA Subscriber Group Identity or Visitor GTSI
ACK	ACKnowledgement
CC	Call Control
CMCE	Circuit Mode Control Entity
DGNA	Dynamic Group Number Assignment
DMO	Direct Mode Operation
FE	Functional Entities
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
SSI	Short Subscriber Identity
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.

SwMI	Switching and Management Infrastructure
TNSS-SAP	Supplementary Services Service Access Point
TSI	TETRA Subscriber Identity

4 Functional model

4.1 Functional entities

The functional model for SS-DGNA consists of Functional Entities FE1 to FE3 as defined in ETSI ETS 300 392-11-22 [2], clause 4.1. Refer to ETSI 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 ETSI ETS 300 392-11-22 [2], clause 4.

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

FES, CCs and PCs correspond to sub-entities in the Circuit Mode Control Entity (CMCE) described in ETSI EN 300 392-2-2 [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 ETSI EN 300 392-2 [3].

SS-DGNA PDUs shall be routed as specified in ETSI 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 to ETSI 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 ETSI EN 300 392-9 [6] and clauses 6.2.18 and 6.2.19 of the present document.

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

5.3.0 Introduction

This clause lists the SS-DGNA primitives, which are then described in the following clauses.

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

- a) ASSIGN indication.
- b) ASSIGN response.
- c) DEASSIGN indication.
- d) DEASSIGN 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.		

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	See note 1
Group identity	O	See note 2
Set reference	O	
Mnemonic group name	O	
Security related information	O	
Additional group information	O	
Group identity attachment mode	O	See ETSI EN 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	