



**Terrestrial Trunked Radio (TETRA);
Voice plus Data (V+D);
Part 9: General requirements for supplementary services**

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee TETRA and Critical Communications Evolution (TCCE).

The present document is part 9 of a multi-part deliverable covering the Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D) and Direct Mode Operation (DMO), 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";
- 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".

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.

NOTE 2: Some parts are also published as Technical Specifications such as ETSI TS 100 392-2 and those may be the latest version of the document.

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**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).

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1 Scope

The present document is applicable to any TETRA terminal equipment (Mobile Station (MS)) and to any TETRA network (Switching and Management Infrastructure (SwMI)) which support at least one TETRA Supplementary Service (SS). In addition, its routing requirements of supplementary service information are applicable to any TETRA network with a Voice plus Data (V+D) Inter-System Interface (ISI) to another TETRA network which supports at least one TETRA SS.

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.

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

- [1] ETSI EN 300 392-1: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 1: General network design".
- [2] ETSI EN 300 392-2: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 2: Air Interface (AI)".
- [3] ETSI TS 100 392-3-9: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 3: Interworking at the Inter-System Interface (ISI); Sub-part 9: Transport layer independent, General design".
- [4] Void.
- [5] Void.
- [6] ETSI EN 300 392-7: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 7: Security".
- [7] ETSI EN 300 392-10-6: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 10: Supplementary services stage 1; Sub-part 6: Call Authorized by Dispatcher (CAD)".
- [8] ETSI EN/ETSI TS 300 392-11 (all parts): "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 11: Supplementary services stage 2".
- [9] ETSI EN/ETSI TS 300 392-12 (all parts): "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 12: Supplementary services stage 3".
- [10] ISO/IEC 11571 (1998): "Information technology -- Telecommunications and information exchange between systems -- Private Integrated Services Networks -- Addressing".
- [11] Void.
- [12] Void.
- [13] Recommendation ITU-T I.130 (1988): "Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".
- [14] Recommendation ITU-T E.164: "The international public telecommunication numbering plan".

- [15] Recommendation ITU-T X.121: "International numbering plan for public data networks".
- [16] Void.
- [17] Void.
- [18] Void.
- [19] Void.
- [20] ETSI ETS 300 392-12-7: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 12: Supplementary services stage 3; Sub-part 7: Short Number Addressing (SNA)".
- [21] ISO/IEC 10646: "Information technology - Universal Coded Character Set (UCS)".
- [22] ETSI TS 100 392-18-3: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D) and Direct Mode Operation (DMO); Part 18: Air interface optimized applications; Sub-part 3: Direct mode Over The Air Management protocol (DOTAM)".
- [23] ETSI TS 100 392-3-10: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 3: Interworking at the Inter-System Interface (ISI); Sub-part 10: General design, PSS1 as transport layer".
- [24] ETSI TS 100 392-3-11: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 3: Interworking at the Inter-System Interface (ISI); Sub-part 11: Transport layer dependent specification; General design, SIP/IP".

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 referenced document (including any amendments) applies.

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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.

- [i.1] ETSI TR 102 300-5: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Designers' guide; Part 5: Guidance on Numbering and addressing".

3 Definitions, abbreviations and Functional Entities (FE)

3.1 Definitions

For the purposes of the present document, the terms and definitions given in ETSI EN 300 392-2 [2] and the following apply:

affected user: user who is subject to the operation

affected user SwMI: SwMI where the affected user is currently registered

authorized user: user who is responsible for the definition, activation and deactivation of the service

NOTE: The authorized user may also interrogate the service. Affected user and served user may also be authorized user as defined in each supplementary service.

authorized user SwMI: SwMI where the authorized user is currently registered

call related service: service requested from call set-up initiation until call disconnection and related to that call

NOTE: The call-related service can also be valid a certain short time after disconnection but before next call set-up is initiated.

call unrelated service: service either requested outside a call or inside a call but not referring to that call

ISI Mediation Function: Entity which provides the services that are not supported by the transport layer protocol to different ANF-ISI entities.

served user: user for whom the supplementary service is invoked

served user SwMI: SwMI where the served user is currently registered

user: entity using the services of a telecommunications network via an externally accessible service access point

NOTE: A user may be a person or an application process.

user application: application process which acts as a user

NOTE: See definition of **user**.

3.2 Abbreviations

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

ACK	ACKnowledgement
AI	Air Interface
ANF-ISIGC	Additional Network Feature - Inter-System Interface Group Call
ANF-ISIMM	Additional Network Feature - Inter-System Interface Mobility Management
ANF-ISISS	Additional Network Feature - Inter-System Interface Supplementary Service
APDU	Application Packet Data Unit
APP	APPROved
CC PDU	Call Control Protocol Data Unit
DMO	Direct Mode Operation
DOTAM	Direct mode Over The Air Management protocol
EPT	ETSI Project TETRA
FE	Functional Entity
GFT	Generic Functional Transport
GSSI	Group Short Subscriber Identity
GTSI	Group TETRA Subscriber Identity
ISI	Inter-System Interface
ISSS	Inter-System Interface Supplementary Service
ISSI	Individual Short Subscriber Identity
ITSI	Individual TETRA Subscriber Identity
ITU	International Telecommunication Union
MAC	Media Access Control
MCC	Mobile Country Code
MLE	Mobile Link Entity
MNC	Mobile Network Code
MNI	Mobile Network Identity
MS	Mobile Station
MS-ISDN	Mobile Station ISDN number
NFE	Network Facility Extension
PDU	Protocol Data Unit
PICS	Protocol Implementation Conformance Statement
PINX	Private Integrated Services Network Exchange
PISN	Private Integrated Services Network
PN	Private Network
PSS1	Private Signalling System no. 1
PSTN	Public Services Telephone Network
SAP	Service Access Point
SDL	(Functional) Specification and Description Language

SIP	Session Initiation Protocol
SS	Supplementary Service

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

SSE	Segmentation Service Element
SSI	Short Subscriber Identity
SS PDU	Supplementary Service Protocol Data Unit
SS-XXX	generic Supplementary Service PDU name
SwMI	Switching and Management Infrastructure
TNCC-SAP	TETRA Network layer Call Control - Service Access Point
TNSS	TETRA Network layer Supplementary Service
TNSS-SAP	TETRA Network layer Supplementary Service - Service Access Point
TSI	TETRA Subscriber Identity
UCS	Universal Multiple-Octet Coded Character Set, also known as Universal Character Set
UCS-2	Universal Character Set coded in 2 octets
UTF-16BE	Unicode Transformation Format serialized as two bytes in Big-Endian format
V+D	Voice plus Data
WG3	TC TETRA Working Group 3
XX	generic name of an information element

Supplementary Service abbreviations

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

NOTE 1: Supplementary service abbreviations are also used without "SS-" preamble e.g. "SS-AL" and "AL" are used as appropriate.

NOTE 2: The supplementary services list contains also abbreviations that are not used in the present document.

SS-AL	Ambience Listening
SS-AP	Access Priority
SS-AS	Area Selection
SS-BIC	Barring of Incoming Calls
SS-BOC	Barring of Outgoing Calls
SS-CAD	Call Authorized by Dispatcher
SS-CCBS	Call Completion on Busy Subscriber
SS-CCNR	Call Completion on No Reply
SS-CF	Call Forwarding
SS-CFB	Call Forwarding on Busy
SS-CFNR	Call Forwarding on No Reply (generic for both CFNRy and CFNRc)
SS-CFNRC	Call Forwarding on Mobile Subscriber Not Reachable
SS-CFNRY	Call Forwarding on No Reply
SS-CFU	Call Forwarding Unconditional
SS-CI	Call Identification
SS-CLIP	Calling Line Identification Presentation
SS-CLIR	Calling Line Identification Restriction
SS-COLP	COnnected Line identification Presentation
SS-COLR	COnnected Line identification Restriction
SS-CR	Call Report
SS-CRT	Call Retention
SS-CW	Call Waiting
SS-DGNA	Dynamic Group Number Assignment
SS-DL	Discreet Listening
SS-HOLD	call HOLD
SS-IC	Include Call
SS-LE	Late Entry
SS-LSC	List Search Call
SS-PC	Priority Call
SS-PPC	Pre-emptive Priority Call
SS-SNA	Short Number Addressing
SS-TPI	Talking Party Identification

3.3 Functional Entities (FE)

The functional model for each supplementary service is comprised of a number of FEs. The FEs below should always have the following definitions:

- FE1 served user's service agent;
- FE2 SwMI service control functional entity;
- FE3 authorized user's service agent;
- FE5 service agent of the user affected by service operation;
- FE6 service agent of second listening party;
- FE7 service agent of dispatcher (in the case of SS-CAD) or of monitoring user (in the case of SS-DL);
- FE8 service agent of user removed from a call during a pre-emptive priority call;
- FE9 service agent of user informed that another user has been removed from a call during a pre-emptive priority call;
- FE10 service agent of user affected by management functions.

FE2, the SwMI functional entity, may be split into secondary FEs when needed for a given supplementary service. These FEs are called FE2x in the corresponding stage 2 description (in the related EN/ETS 300 392-11 [8]).

4 Supplementary service concepts

4.1 Stage 1, 2 and 3 descriptions

4.1.0 General Description

Supplementary service descriptions are covered in 3 stages according to the method described in Recommendation ITU-T I.130 [13], each stage in a separate document. The contents of each stage description are described in the following clauses.

4.1.1 Stage 1 description

This stage is the overall service description from the user viewpoint and also details the interaction of the service with other supplementary services.

4.1.2 Stage 2 description

Stage 2 identifies the functional capabilities and the information flows needed to support the supplementary service as specified in its stage 1 description. It defines the FEs, the information flow between these entities, the FE actions and the allocation of FEs to physical locations.

4.1.3 Stage 3 description

The stage 3 description specifies the signalling protocols needed to implement the service. The present document addresses the encoding of the service Protocol Data Units (PDU) and of the related information elements, the protocol procedures and the corresponding SDL diagrams.

NOTE: According to Recommendation ITU-T I.130 [13], the stage 3 description of any telecommunication service addresses the network implementation aspects. Consequently it comprises two steps, the specifications of all protocols at the various reference points involved in any of the service procedures (notably the service operation) are the first step of the stage 3 description, and the specifications of the functions of the corresponding network entities are its second step. The latter have not been provided since they can be derived from the specification of the FE actions in the stage 2 description.

Service management procedures specified in the above stages (e.g. activation or interrogation) are optional unless otherwise stated in the specific supplementary service stage documents.

4.2 Concepts associated with supplementary services

The terms used to define the procedures associated with supplementary services are given in ETSI EN 300 392-1 [1], clause 14.3.1.

5 Service primitives

5.1 Service primitive general description

Primitives are specified for each supplementary service at the TNSS Service Access Point (TNSS-SAP), in a specific clause of the corresponding stage 3 description in EN/ETS 300 392-12 [9].

Primitive names shall take the form of TNSS-*service-name type* where:

- *service* - supplementary service identifier;
- *name* - indicates the type of function this primitive is performing (e.g. DEFINE);
- *type* - indicates whether the primitive is a request, confirm, indication or response.

For example, an INTERROGATE request primitive for the supplementary service Ambience Listening (SS-AL) would be specified as TNSS-AL-INTERROGATE request, when primitives of more than one supplementary service are used in the same document. When a document refers only to one supplementary service the short form such as INTERROGATE request may be used.

Parameters are listed with mandatory and conditional parameters first, followed by optional parameters. Repeatable parameters are identified by a comment in the remarks column in the table specifying the primitive's parameters.

Following the specifications of a service's primitives, there is a parameter description section listing alphabetically all primitive parameters used in this service and the values allowed.

Among those parameters, special mention is to be made of the parameter access priority. This parameter has to be included in every service primitive request or response, since the priority defined for the corresponding air interface (uplink) PDUs is set according to the its value (i.e. low, high or emergency priority as seen by the user application of "0" to "7" as defined in the lower layer service primitives).

NOTE: For call related services the TNSS-SAP and TNCC-SAP logically form a combined SAP defining access to the total service. Some of the supplementary service parameters are actually defined as TNCC-SAP parameters.

5.2 Notification service primitive

Many of the air interface PDUs can carry supplementary service-related information in special information element notification. The notification information element values are used by many supplementary services to carry information to the equipment not supporting the specific supplementary service. The information in the notification information element may be displayed to the user in some format, e.g. in natural language or as a number code.