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EUROPEAN STANDARD

**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**

Reference

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Foreword

This draft European Standard (EN) has been produced by ETSI Technical Committee TETRA and Critical Communications Evolution (TCCE), and is now submitted for the combined Public Enquiry and Vote phase of the ETSI standards EN Approval Procedure.

The present document is part 3, sub-part 9 of a multi-part deliverable covering the 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)":

    Sub-part 1:   "General design";

    Sub-part 2:   "Additional Network Feature Individual Call (ANF-ISIIC)";

    Sub-part 3:   "Additional Network Feature Group Call (ANF-ISIGC)";

    Sub-part 4:   "Additional Network Feature Short Data Service (ANF-ISISDS)";

    Sub-part 5:   "Additional Network Feature for Mobility Management (ANF-ISIMM)";

    Sub-part 6:   "Speech format implementation for circuit mode transmission";

    Sub-part 7:   "Speech Format Implementation for Packet Mode Transmission";

    Sub-part 8:   "Generic Speech Format Implementation";

    Sub-part 9:   "Transport layer independent, General design";

    Sub-part 10:   "General design, PSS1 over E.1";

    Sub-part 11:   "General design, SIP/IP";

    Sub-part 12:   "Transport layer independent Additional Network Feature Individual Call (ANF-ISIIC)";

    Sub-part 13:   "Transport layer independent Additional Network Feature Group Call (ANF-ISIGC)";

    Sub-part 14:   "Transport layer independent Additional Network Feature Short Data Service (ANF-ISISDS)";

Sub-part 15: Transport layer independent Additional Network Feature, Mobility Management (ANF-ISIMM)";

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";

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.

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.

The present document is based on ETSI EN 300 392-3-1 "Interworking at the Inter-System Interface (ISI); General Design" [i.6]. The main differences are:

- Any transport protocol (PSS1) information is removed as several different transport protocols can be used.

- Any reference to ROSE ([i.4] and [i.5]) is removed and the necessary description of the PDU identification has been added.

- The ASN.1 specification of the PDUs has been re-designed taking into account that the reference to ROSE is removed.

For all subparts in the TETRA specification ETSI EN 300 392-3 "Interworking at the Inter-System Interface (ISI)" [3], [4], [5], [6], [7], [8] and [9] the terms ISI and TETRA ISI are equivalent.

Proposed national transposition dates	
Date of latest announcement of this EN (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	6 months after doa

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).

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

1 Scope

The present document defines the general aspects of interworking at the Inter-System Interface (ISI) for Terrestrial Trunked Radio (TETRA) system supporting Voice plus Data (V+D). Those specify the general concepts which are the basis of the ISI operation between TETRA systems. It introduces the Additional Network Features (ANFs) used at the ISI, and specifies:

- the general protocol mechanism upon which the definition of each ANF is based; and

- the security related functions over the ISI.

The specification of the general transport layer independent protocol mechanism applies to any TETRA Switching and Management Infrastructure (SwMI) which supports the ISI. The security requirements for the ISI only apply to SwMIs which support authentication or end-to-end encryption over the ISI.

Besides the ISI general design, the present sub-part, interworking at the Inter-System Interface comprises the following other sub-parts:

- General design, PSS1 over E.1 [3];

- General design, SIP/IP [4];

- Transport layer independent Additional Network Feature Individual Call (ANF-ISIIC) [5];

- Transport layer independent Additional Network Feature Group Call (ANF-ISIGC) [6];

- Transport layer independent Additional Network Feature Short Data Service (ANF-ISISDS) [7];

- Transport layer independent Additional Network Feature, Mobility Management (ANF-ISIMM) [8]; and

- Generic Speech Format Implementation [9].

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.

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

NOTE 1: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

NOTE 2: Note that for the TETRA standards, the reference is always to a European Standard (ETSI EN 300 xxx) if such has been published, but the latest version of that standard can be either an EN or a Technical Specification (ETSI TS 100 xxx), even if this is not visible in the reference list.

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 EN 300 392-3-10: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 3: Interworking at the Inter-System Interface (ISI); Sub-part 10: General design, PSS1 over E.1".

[4]   ETSI EN 300 392-3-11: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 3: Interworking at the Inter-System Interface (ISI); Sub-part 11: General design, SIP/IP".

[5]   ETSI EN 300 392-3-12: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 3: Interworking at the Inter-System Interface (ISI); Sub-part 12: Transport Layer Independent Additional Network Feature Individual Call (ANF-ISIIC)".

[6]   ETSI EN 300 392-3-13: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 3: Interworking at the Inter-System Interface (ISI); Sub-part 13: Transport layer independent Additional Network Feature Group Call (ANF-ISIGC)".

[7]   ETSI EN 300 392-3-14: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 3: Interworking at the Inter-System Interface (ISI); Sub-part 14: Transport Layer Independent Additional Network Feature Short Data Service (ANF-ISISDS)".

[8]   ETSI EN 300 392-3-15: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 3: Interworking at the Inter-System Interface (ISI); Sub-part 15: Transport layer independent Additional Network Feature, Mobility Management (ANF-ISIMM)".

[9]   ETSI EN 300 392-3-8: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 3: Interworking at the Inter-System Interface (ISI); Sub-part 8: Generic Speech Format Implementation".

[10]   ETSI EN 302 109: "Terrestrial Trunked Radio (TETRA); Security; Synchronization mechanism for end-to-end encryption".

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

[12]   Recommendation ITU-T X.690: "Information technology - ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER)".

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

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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NOTE 2: Note that for the TETRA standards, the reference is always to a European Standard (ETSI EN 300 xxx) if such has been published, but the latest version of that standard can be either an EN or a Technical Specification (ETSI TS 100 xxx), even if this is not visible in the reference list.

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 EN 300 395-1: "Terrestrial Trunked Radio (TETRA); Speech CODEC for full-rate traffic channel; Part 1: General description of speech functions".

[i.2]   Recommendation ITU-T I.130: "Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".

[i.3]   Recommendation ITU-T Z.100: "Specification and description language (SDL)".

[i.4]   Recommendation ITU-T X.219: "Remote Operations: Model, notation and service definition".

[i.5]   Recommendation ITU-T X.229: "Remote Operations: Protocol specification".

[i.6]   ETSI EN 300 392-3-1: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 3: Interworking at the Inter-System Interface (ISI); Sub-part 1: General design".

3   Definition of terms, symbols and abbreviations

3.1   Terms

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

call independent: property of information which is conveyed between SwMI on a signalling connection which is not related to an audio call

call independent signalling connection: signalling connection established between ANF-ISI entities located in different Switching and Management Infrastructures that is not related to audio calls

destination SwMI: Switching and Management Infrastructure where the receiving ANF-ISI entity is located (in the context of a single one-way exchange of information between two ANF-ISI entities located in different Switching and Management Infrastructures)

Group TETRA Subscriber Identity (GTSI): TETRA Subscriber Identity assigned to a group

home SwMI: home of the MS's ITSI, i.e. the SwMI where the network code (MNC) is equal to that of the individual subscriber (ITSI)

invocation: action taken by the user or by the service provider to execute a specific service function within real time

ISI mediation function: entity which provides to different ANF-ISI entities the services that are not supported by the transport layer protocol

Location Area (LA): area within radio coverage of a base station or group of base stations within which a Mobile Station (MS) is allowed to operate

Mobile Network Identity (MNI): identity that identify the SwMI

   NOTE: It consists of the Mobile Country Code (MCC) and the Mobile Network Code (MNC).

Mobile Station (MS): physical grouping that contains all of the mobile equipment that is used to obtain TETRA services

   NOTE: By definition, a mobile station contains at least one Mobile Radio Stack (MRS).

originating SwMI: in the context of a TETRA call, Switching and Management Infrastructure where the calling user is registered (which implies that this user is located in that SwMI) or Switching and Management Infrastructure which originates a Call independent signalling connection

segmentation: act of generating two or more transport layer PDUs derived from one initial ISI PSU

service user: abstract representation of the totality of those entities in a single system that makes use of a service through a single access point

Short Subscriber Identity (SSI): network specific portion of a TSI

   NOTE: A SSI is only unique within one TETRA sub-domain (one TETRA network).

source SwMI: Switching and Management Infrastructure where the sending ANF-ISI entity is located (in the context of a single one-way exchange of information between two ANF-ISI entities located in different Switching and Management Infrastructures)

subscriber: user of a telecommunication service, based on a contract with the provider of the service

   NOTE 1: The subscriber may be an individual or a group: in the first case it is identified by an ITSI, in the second, by a GTSI.

NOTE 2: The individual subscriber is able to access an SwMI either through a MS or Line Station.

supplementary service: service which modifies or supplements a basic bearer service or a basic teleservice

NOTE: A supplementary service cannot be offered to a customer as a stand-alone service. It should be offered in combination with a bearer service or a teleservice.

Switching and Management Infrastructure (SwMI): all of the TETRA equipment for a Voice plus Data (V+D) network

terminating SwMI: in the context of a TETRA call, Switching and Management Infrastructure where the called user is registered (which implies that this user is located in that SwMI) or Switching and Management Infrastructure which terminates a Call independent signalling connection

TETRA Subscriber Identity (TSI): global TETRA network address that is to identify an individual or a group subscriber within the domain of all TETRA networks

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

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

visited SwMI: TETRA network which MNI is not equal to the user's MNI

3.2 Symbols

Void.

3.3 Abbreviations

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

(V)ASSI	Visiting Alias Short Subscriber Identity
(V)GSSI	Visiting Group Short Subscriber Identity
AC	Authentication Centre
AI	Air Interface
ANF	Additional Network Feature
ANF-ISI	all Additional Network Features of the Inter-System Interface
APDU	Application Protocol Data Unit
ASN.1	Abstract Syntax Notation One
ASSI	Alias Short Subscriber Identity
BER	Basic Encoding Rules
BS	Base Station
C	Conditional
CAD	Call Authorized by Dispatcher
CCK	Common Cipher Key
C-LDB	Controlling Linking DataBase
CLIR	Calling Line Identification Restriction
DCK	Derived Cipher Key
DMO	Direct Mode Operation
GCK	Group Cipher Key
GFP	Generic Functional Protocol
G-HDB	Group Home DataBase
GSSI	Group Short Subscriber Identity
GTSI	Group TETRA Subscriber Identity
G-VDB	Group Visited DataBase
HAC	Home Authentication Centre
HDB	Home DataBase
I-HDB	Individual Home DataBase
IP	Internet Protocol
ISI	Inter-System Interface
ISIGC	Inter-System Interface Group Call
ISIIC	Inter-System Interface Individual Call