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**TETRA and Critical Communications Evolution (TCCE);
Part 17: TETRA V+D, DMO and associated specifications;
Sub-part 6: Release 2.2**

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Foreword

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

The present document is part 17, sub-part 6 of a multi-part deliverable covering Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D), as identified below:

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

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

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

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

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

ETSI EN 300 392-7: "Security";

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

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

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

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

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

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

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

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

ETSI TR 100 392-17: "TETRA V+D, DMO and associated specifications":

Sub-part 1: "Release 1.1";

Sub-part 2: "Release 1.2";

Sub-part 3: "Release 1.3";

Sub-part 4: "Release 2.0";

Sub-part 5: "Release 2.1";

Sub-part 6: "Release 2.2";

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

ETSI TS 100 392-19: "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.

Related specifications and reports outside of TETRA V+D and DMO release 2.2 are also included in the present document. These include Harmonised ENs covering EMC standards and specifications regarding Lawful Interception, QOS and mission-critical broadband. Technical reports are included as they provide very useful information on TETRA and critical communications.

Modal verbs terminology

In the present document "**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.

Introduction

The TETRA standard was developed to meet the needs of Professional Mobile Radio (PMR) user organizations for secure, reliable and robust critical communications. In particular, the following important services have been specified:

- Wide area fast call set-up "all informed net" group calls.
- Direct Mode Operation (DMO) allowing "back to back" communications between radio terminals independent of the network.
- High level voice encryption to meet the security needs of public safety organizations.
- An Emergency Call facility that gets through even if the system is busy.
- Full duplex voice for PABX and PSTN telephony communications.
- In addition to the needs of traditional PMR users, TETRA has been developed to meet the needs of Public Access Mobile Radio (PAMR)operators.

To meet the ever-changing user requirements and utilize the latest in technology developments, TETRA continues to be evolved and enhanced with the development of new standards including:

- TETRA Release 2, which incorporates the TETRA Enhanced Data Service (TEDS) that provides wideband high-speed data communication services.

- The interfacing between TETRA systems and mission-critical broadband services in order to allow interworking.
- TETRA Releases 2.x are defined in the Terms of Reference of ETSI technical committee and are continuously maintained.
- Work has been ongoing since 2010 in developing specifications and reports related to the evolution to broadband critical communications and these are listed as they are either directly relevant to TETRA r2.2. e.g. interworking between TETRA and broadband systems or indirectly e.g. aspects of security for critical communications broadband systems.

1 Scope

The present document identifies ETSI specifications and reports for TETRA V+D and DMO Release 2.2. It also includes ETSI specifications and reports relating to Critical Communications evolution undertaken by TC TCCE as well as relevant specifications produced by other ETSI technical committees. The present document is a revision of ETSI TR 100 392-17-6 V1.1.1 published in 2018 and contains the specifications and reports that have been produced since then.

ENs relating to TETRA specifications are often updated by first introducing an ETSI Technical Specification (TS) which will contain new features and change requests. Therefore, in these cases, the latest specification is shown along with the previous version, if one is an EN and the other a TS. In the same way, EN versions of the same specification will also be updated, replacing a TS in some cases. Release 2.2 specifications were functionally frozen after the 52nd TC TCCE meeting in October 2018.

Release 2.2 specifications contain corrections and enhancements to Release 2.1 including a major development of the Inter System Interface specifications to develop separate specifications for IP and PSS1 over E.1 transport layers as well as transport layer independent parts.

NOTE 1: Functionally frozen means that no further functionality/features may be incorporated into the set of specifications, and that only corrective Change Requests (CRs) are to be accepted and agreed.

NOTE 2: It can be expected that corrective CRs will be introduced into the Release 2.2 specifications.

NOTE 3: Some of the CRs that will be produced will be for the next Release as they add new functionalities/features.

2 References

2.1 Normative references

Normative references are not applicable in the present document.

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.

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.

[i.1] Directive 2014/53/EU of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC.

3 Definition of terms, symbols and abbreviations

3.1 Terms

Void.

3.2 Symbols

Void.

3.3 Abbreviations

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

AGA	Air-Ground-Air
AI	Air Interface
AL	Ambience Listening
AMR	Adaptive Multi-Rate
ANF	Additional Network Feature
ANF-ISIGC	Additional Network Feature - Inter-System Interface Group Call
ANF-ISIIC	Additional Network Feature - Inter-System Interface Individual Call
ANF-ISIMM	Additional Network Feature - Inter-System Interface Mobility Management
ANF-ISISDS	Additional Network Feature - Inter-System Interface Short Data Service
AP	Access Priority
AS	Area Selection
BIC	Barring of Incoming Calls
BOC	Barring of Outgoing Calls
CAD	Call Authorized by Dispatcher
CCBS	Call Completion to Busy Subscriber
CCNR	Call Completion on No Reply
CF	Call Forwarding
CI	Call Identification
CR	Change Request
CRT	Call Retention
CW	Call Waiting
DG	Designer's Guide
DGNA	Dynamic Group Number Assignment
DL	Discreet Listening
DMO	Direct Mode Operation
DOTAM	Direct mode Over The Air Management
EMC	Electromagnetic Compatibility
EU	European Union
HOLD	Call Hold
HSD	High Speed Data
IC	Include Call
IC	Integrated Circuit
IP	Internet Protocol
IPI	Internet Protocol Interworking
ISDN	Integrated Services Digital Network
ISI	Inter-System Interface
LE	Late Entry
LI	Lawful Interception
LIP	Location Information Protocol
LSC	List Search Call
MCPTT	Mission Critical Press To Talk
MS-MS	Mobile Station to Mobile Station
NAP	Net Assist Protocol
PABX	Private Automatic Base eXchange
PAMR	Public Access Mobile Radio
PC	Priority Call
PEI	Peripheral Equipment Interface
PICS	Protocol Implementation Conformance Statement
PMR	Private/Professional Mobile Radio
PPC	Pre-emptive Priority Call
PSS	Public Security and Safety
PSTN	Public Switched Telephone Network
QAM	Quadrature Amplitude Modulation

QOS	Quality Of Service
R&TTE	Radio and Terminal Telecommunications Equipment
RF	Radio Frequency
SC	Smart Card
SDL	Specification and Description Language
SIM	Subscriber Identity Module
SIM-ME	Subscriber Identity Module to Mobile Equipment
SNA	Short Number Addressing
SPAN	Service and Protocols for Advanced Networks
SSD	Service Specific Details
STQ	Speech and multi-media Transmission Quality
TEDS	TETRA Enhanced Data Service
TMO	Trunked Mode Operation
TPI	Talking Party Identification
TR	Technical Report
TSIM	TETRA SIM
UHF	Ultra High Frequency
UICC	Universal Integrated Circuit Card
V+D	Voice plus Data

4 Specifications of TETRA Release 2.2 plus related specifications and reports

4.0 General

The following clauses contain ETSI deliverables included in TETRA V+D and DMO Release 2.2.

NOTE: After the list of TETRA V+D and DMO specifications, there are listed specifications and reports applicable to TETRA including evolution to critical communications broadband.

4.1 Voice plus Data (V+D)

4.1.1 General Network Design

ETSI EN 300 392-1 V1.6.1 (2020-04): "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 1: General network design".

ETSI TS 100 392-1 V1.5.1 (2018-04): "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 1: General network design".

4.1.2 Air Interface

ETSI TS 100 392-2 V3.9.2 (2020-06): "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 2: Air Interface (AI)".

NOTE: An update is in preparation (Improvements to Group Addressed Packet Data).

ETSI EN 300 392-2 V3.8.1 (2016-08): "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 2: Air Interface (AI)".

4.1.3 Inter-system interface

NOTE: The ISI specifications have been completely changed with the introduction of separate specifications for IP bearers, circuit mode bearers and common aspects. The new ENs and TSs that now comprise the current ISI specification are listed. The original EN specifications have now been withdrawn.

ETSI EN 300 392-3-8 V1.4.1 (2020-04): "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".

ETSI TS 100 392-3-8 V1.3.1 (2018-05): "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".

ETSI EN 300 392-3-9 V1.2.1 (2020-04): "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".

ETSI TS 100 392-3-9 V1.1.1 (2018-05): "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".

ETSI EN 300 392-3-10 V1.2.1 (2020-04): "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".

ETSI TS 100 392-3-10 V1.2.1 (2018-05): "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".

ETSI EN 300 392-3-11 V1.2.1 (2020-04): "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".

ETSI TS 100 392-3-11 V1.1.1 (2018-05): "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".

ETSI EN 300 392-3-12 V1.2.1 (2020-04): "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)".

ETSI TS 100 392-3-12 V1.3.1 (2021-09): "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 Features Individual Call (ANF-ISIIC)".

ETSI EN 300 392-3-13 V1.2.1 (2020-04): "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)".

ETSI TS 100 392-3-13 V1.1.1 (2018-05): "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 features, Group Call (ANF- ISIGC)".

ETSI EN 300 392-3-14 V1.2.1 (2020-04): "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)".

ETSI TS 100 392-3-14 V1.1.1 (2018-05): "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 features, Short Data Service (ANF-ISISDS)".

ETSI EN 300 392-3-15 V1.2.1 (2020-04): "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)":

ETSI TS 100 392-3-15 V1.3.1 (2021-10): "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 features, Mobility Management (ANF-ISIMM)".

4.1.4 Voice + Data Gateways

ETSI ETS 300 392-4-1 Ed.1 (1999-01): "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 4: Gateways basic operation; Sub-part 1: Public Switched Telephone Network (PSTN)".

ETSI ETS 300 392-4-2 Ed.1 (2000-09): "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 4: Gateways basic operation; Sub-part 2: Integrated Services Digital Network (ISDN) gateway".

4.1.5 Peripheral Equipment Interface

ETSI EN 300 392-5 V2.7.1 (2020-04): "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D) and Direct Mode Operation (DMO); Part 5: Peripheral Equipment Interface (PEI)".

ETSI TS 100 392-5 V2.6.1 (2018-06): "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D) and Direct Mode Operation (DMO); Part 5: Peripheral Equipment Interface (PEI)".

4.1.6 Security

ETSI EN 300 392-7 V3.5.1 (20197-07): "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 7: Security".

NOTE: An update is in preparation (Additional algorithms).

4.1.7 General requirements for Supplementary Services

ETSI EN 300 392-9 V1.7.1 (2020-04): "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 9: General requirements for supplementary services".

ETSI TS 100 392-9 V1.6.1 (2018-05): "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 9: General requirements for supplementary services".

4.1.8 V+D Supplementary Services Stage 1

ETSI EN 300 392-10-1 V1.3.1 (2004-01): "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 10: Supplementary services stage 1; Sub-part 1: Call Identification (CI)".

ETSI ETS 300 392-10-2 Ed.2 (2000-08): "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 10: Supplementary services stage 1; Sub-part 2: Call report".

ETSI ETS 300 392-10-3 Ed.2 (1999-07): "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 10: Supplementary services stage 1; Sub-part 3: Talking Party Identification (TPI)".

ETSI EN 300 392-10-4 V1.3.1 (2003-09): "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 10: Supplementary services stage 1; Sub-part 4: Call Forwarding (CF)".

ETSI ETS 300 392-10-5 Ed.2 (2000-08): "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 10: Supplementary services stage 1; Sub-part 5: List Search Call (LSC)".

ETSI EN 300 392-10-6 V1.4.1 (2006-08): "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 10: Supplementary services stage 1; Sub-part 6: Call Authorized by Dispatcher (CAD)".

ETSI ETS 300 392-10-7 Ed.2 (1999-09): "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 10: Supplementary services stage 1; Sub-part 7: Short number addressing".

ETSI EN 300 392-10-8 V1.2.1 (2004-02): "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 10: Supplementary services stage 1; Sub-part 8: Area Selection (AS)".

ETSI ETS 300 392-10-9 Ed.2 (1998-12): "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 10: Supplementary services stage 1; Sub-part 9: Access priority".

ETSI EN 300 392-10-10 V1.2.1 (2002-05): "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 10: Supplementary services stage 1; Sub-Part 10: Priority Call (PC)".

ETSI EN 300 392-10-11 V1.3.1 (2004-01): "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 10: Supplementary services stage 1; Sub-Part 11: Call Waiting (CW)".

ETSI EN 300 392-10-12 V1.3.1 (2004-02): "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 10: Supplementary services stage 1; Sub-Part 12: Call Hold (HOLD)".

ETSI ETS 300 392-10-13 Ed.2 (1999-09): "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 10: Supplementary services stage 1; Sub-part 13: Call completion to busy subscriber".