SLOVENSKI STANDARD
PSIST ETR 292:2000

01-julij-2000

Prizemni snopovni radio (TETRA) - Govor in podatki (V+D) - Specifikacija tehniļnih zahtev - Upravljanje omreģja

Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Technical requirements specification; Network management

Ta slovenski standard je istoveten z: **ETR 292 Edition 1**

ICS:

33.070.10	Prizemni snopovni radio (TETRA)	Terrestrial Trunked Radio (TETRA)

PSIST ETR 292:2000 **en**

ETSI TECHNICAL REPORT

ETR 292

July 1997

Source: EP-TETRA

Reference: DTR/TETRA-01015

ICS: 33.020

Key words: TETRA, network management

Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Technical requirements specification; Network management

ETSI

European Telecommunications Standards Institute

ETSI Secretariat

Postal address: F-06921 Sophia Antipolis CEDEX - FRANCE
Office address: 650 Route des Lucioles - Sophia Antipolis - Valbonne - FRANCE
X.400: c=fr, a=atlas, p=etsi, s=secretariat - **Internet:** secretariat@etsi.fr

Tel.: +33 4 92 94 42 00 - Fax: +33 4 93 65 47 16

Contents

Blank page

Foreword

This ETSI Technical Report (ETR) has been produced by the Terrestrial Trunked Radio (TETRA) Project of the European Telecommunications Standards Institute (ETSI).

ETRs are informative documents resulting from ETSI studies which are not appropriate for European Telecommunication Standard (ETS) or Interim European Telecommunication Standard (I-ETS) status. An ETR may be used to publish material which is either of an informative nature, relating to the use or the application of ETSs or I-ETSs, or which is immature and not yet suitable for formal adoption as an ETS or an I-ETS.

Blank page

1 Scope

This ETSI Technical Report (ETR) provides an overview of the network management requirements in a Terrestrial Trunked Radio (TETRA) Voice plus Data (V+D) mobile radio system. The primary motivation of this ETR is to provide a starting point to facilitate central network management of TETRA systems from different manufacturers. After an overview of network management in TETRA, this ETR outlines the approach to the work, followed by the specification of the management services and information flows. Finally a standardization strategy for network management for TETRA is given.

The guiding principle in the examination of central Telecommunications Management Network (TMN) management services has been that the Central Network Management (CNM) facility will generally fulfil a monitoring role rather than a controlling role, although performing some limited controlling functions such as temporarily disabling and enabling individual subscribers.

With this constraint, an examination of the necessary central network management functions indicates that only a subset need to be standardized in order to support a high degree of inter-operability between different manufacturers' TMN management services. It appears that the following network management functionalities require access from the CNM facility (or, in the case of items d) and (g), require standardization in support of that access):

a) management of subscribers (for temporary actions only);

b) subscriber activity log and subscriber diagnostics;

c) access to system performance measurement data;

d) access to network management facilities;

e) fault and maintenance data;

f) testing and recovery of network support links, in particular the Local to Central Network Management link (LNM-CNM link);

g) accounting management.

It is clear that remote access to the LNM facilities from the centre will need to be supported by appropriate authentication and authorization procedures optionally including encryption over the LNM-CNM link.

In this ETR all of the local and central telecommunications management functions are examined and those that require to be standardized to allow remote CNM operation, as defined above, are identified. The local/central/local network management information flows required to support the CNM functions are studied and recommendations are made for defining TMN standard protocols and procedures.

2 References

This ETR incorporates by dated and undated reference, provisions from other publications. These references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this ETR only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

[1] ITU-T Recommendation M.3020: "TMN Interface specification methodology".

[2] ITU-T Recommendation M.3200: "TMN management services: Overview".

[3] ITU-T Recommendation M.3400: "TMN management functions".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of this ETR, the following definitions apply:

Base Station (BS): A physical grouping of equipment which provides the fixed portion of the air interface. One base station transmits and receives radio signals to and from a single location area (a single region of geographical coverage). A BS contains at least one Base Radio Stack (BRS).

cell: The smallest geographical area where TETRA services may be obtained, using a certain set of radio frequencies.

Cipher Key (CK): A value that is used to determine the transformation of plain text to cipher text in a cryptographic algorithm.

cipher text: The data produced through the use of encipherment. The semantic content of the resulting data is not available (ISO 7498-2).

decipherment: The reversal of a corresponding reversible encipherment (ISO 7498-2).

encipherment/encryption: The cryptographic transformation of data to produce cipher text. (ISO 7498-2).

entity: A point at which a packet is manipulated (e.g. sourced, sunk, routed or switched).

gateway: A device which will enable the interconnecting of two networks which inherently use different and incompatible protocols.

historical data: Record of a past event or series of events. Historical data from triggered events may start at some point in the past up to the present.

home location register: A database in the Mobile Station (MS) home system which keeps track of the position of the MS. The home location register is used to indicate where the MS should be paged.

key: A sequence of symbols that controls the operations of encipherment and decipherment.

key management: The generation, selection, storage, distribution, deletion, archiving and application of keys in accordance with a security policy.

network: A collection of subscriber terminals interconnected through telecommunications devices.

plain text: The unencrypted source data. The semantic content is available.

real time: Refers to the generation of network management information in a timeframe comparative to the real life process that it is controlling or monitoring.

signalling: The exchange of Information specifically concerned with the establishment and control of connections, and with management, in a telecommunication network.

site: Physical location within the network.

subscriber activity log: A system record which contains information on attach/detach ITSI; enable/disable terminal; registrations; location updates vs. time; call re-establishment; authentications; call start time, call end time, and called party; type of call; Supplementary Services invoked; whether uplink BER or MER are below an operator pre-determined threshold; plus any other relevant activity record.

subscriber data: A system record which contains information on the individual subscriber ITSI, GTSIs, Supplementary Services allowed, privileges allowed and other system accesses allowed.

subscriber management: The system functionality for dealing with subscribers to the system.

subscriber terminal: An equipment which an internal user can use to communicate with another user. Mobile Stations (MS) and Line Stations (LS) are the only types of subscriber terminal.

Supplementary Service: A Supplementary Service modifies or supplements a bearer service or a teleservice. 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 except for subscriber terminals. The SwMI enables subscriber terminals to communicate with each other via the SwMI.

transaction (packet transaction): All the processes and procedures associated with the transmission of one packet of information between peer network layer protocol entities on opposite sides of the air interface.

transaction (voice transaction): Part of a voice call comprising the transmissions of each talking party. The total of all transactions make up the call.

transferred account procedure: Name given to the central accounting procedure defined in the GSM standards. The transferred account procedure is used to allocate costs to roamed mobiles.

3.2 Abbreviations

For the purposes of this ETR, the following abbreviations apply:

ACL	Access Control List
ACSE	Associated Control Service Element
ASN	Abstract Syntax Notation
BER	Bit Error Rate
BIC	Barring Incoming Calls
BOC	Barring Outgoing Calls
BRS	Base Radio Stack
BS	Base Station
CK	Cipher Key
CMIP	Common Management Information Protocol
CMIS	Common Management Information Service
CMOT	CMIP Over TCP/IP
CNM	Central Network Management
CS	Control Supervisor
CUG	Closed User Group
DES	Data Encryption System
DGNA	Dynamic Group Number Assignment
EFD	Event Forwarding Discriminator
GDMO	Guidelines for the Definition of Managed Objects
GOS	Grade OF Service
GSM	Global System for Mobile communications
GTSI	Group TETRA Subscriber Identity
HLR	Home Location Register
I5	Interface between central and local network management systems
ISDN	Integrated Services Digital Network
ISI	Inter System Interface
ITSI	Individual TETRA Subscriber Identity
ITU	International Telecommunication Union
LA	Location Area
LNM	Local Network Management
LS	Line Station
MER	Message Erasure Rate
MFA	Management Functional Areas
MIB	Management Information Base
MS	Mobile Station
NMC	Network Management Controller
NMS	Network Management System
OSI	Open Systems Interconnection

PDN	Public Data Network
PDU	Protocol Data Unit
PSTN	Public Switched Telephone Network
PTN	Private Telephone Network
RFC	Request For Comments
ROS	Remote Operations Service
ROSE	Remote Operation Service Element
RSSI	Received Signal Strength Information
SDH	Synchronous Digital Hierarchy
SM	Subscriber Management
SMI	Structure of Management Information
SNMP	Simple Network Management Protocol
SS	Supplementary Service
SwMI	Switching and Management Infrastructure
TAP	Transferred Account Procedure
TCP/IP	Transmission Control Protocol/Internet Protocol
TEI	TETRA Equipment Identity
TETRA	TErrestrial Trunked RAdio
TIB	Task Information Base
TMN	Telecommunications Management Network
TNM	Telecommunications Network Management
UDP	User Datagram Protocol (TCP/IP-DoD)
V+D	Voice plus Data

4 Objectives and approach

4.1 Objectives

The purpose of this ETR is to examine the following:

a) the network management services that need to be standardized to achieve the required level of central management; and

b) the level to which the inter-system network management functions should be standardized.

4.2 Approach adopted

The issues of Inter-System Interface (ISI) functions (supporting normal operation of the network to provide service to subscribers), subscriber management and network management have been separated. An accepted framework for the standardization process is the ITU TMN methodology, ITU-T Recommendation M.3020 [1].

The first task was to identify the services required, rather than the functions (services are implemented by functions). Service descriptions have to identify who benefits from the service, e.g. network manager, dispatcher or subscriber. It was decided to define all network management services (local and central) and then extract the central ones needed to support interworking between management systems.

Once the services have been defined the aims stated in subclauses 4.1 a) and b) can be addressed.

4.3 Problems with the definition of management services using ITU methodology

A Telecommunication Management Network (TMN) is intended to support a wide variety of management functions which cover planning, operations, administration, maintenance and provisioning of telecommunication networks and services, ITU-T Recommendation M.3400 [3], paragraph 1.2.

A TMN management service is seen as an area of management activity which provides for support of an aspect of Operations, Administration and Maintenance (OAM) of the network being managed, described from the user perception of the OAM requirements, ITU-T Recommendation M.3200 [2], paragraph 1.

It was found that using the ITU methodology led to much overlap between categories of service definition, with duplication between the heading of the management service and the Management Functional Areas (MFAs) e.g. performance, fault, configuration etc.). The amount of detailed categorization required did not give a clear picture to guide network management development in TETRA, where the current objective

was to standardize a limited degree of interworking between network management systems of different TETRA systems at an early date.

4.4 Simplified methodology

Because of the problems associated with use of the full ITU methodology, a simpler, alternative approach was employed, using parts of the ITU methodology to provide a clearer way to identify the standardization task. This alternative approach is detailed in clause 6.