

Terrestrial Trunked Radio (TETRA); User Requirement Specification TETRA Release 2; Part 5: Interworking and Roaming



Reference

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Contents

Intellectual Property Rights	4
Foreword.....	4
Introduction	4
1 Scope	5
2 References	5
3 Definitions and abbreviations.....	5
3.1 Definitions	5
3.2 Abbreviations	5
4 User requirement specification.....	6
4.1 Introduction	6
4.2 Interworking	7
4.2.1 Voice interworking requirements	7
4.2.2 Data interworking requirements	7
4.3 Roaming	7
4.4 Implementing technical requirements	8
4.5 Timeline	8
Annex A: Bibliography	9
History	10

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Foreword

This Technical Report (TR) has been produced by ETSI Project Terrestrial Trunked Radio (TETRA).

The present document is part 5 of a multi-part deliverable covering the User Requirement Specifications (URSs) for TETRA Release 2, as identified below:

- Part 1: "General Overview";
- Part 2: "High Speed Data";
- Part 3: "Codec";
- Part 4: "Air Interface Enhancements";
- Part 5: "Interworking and Roaming";**
- Part 6: "Subscriber Identity Module (SIM)";
- Part 7: "Security".

Introduction

The TETRA Release 2 suite of standards was mandated in the new Terms of Reference (ToR) for ETSI Project TETRA approved at ETSI Board meeting number 28 (Board 28) on 6th September 2000. Its aim was to enhance the services and facilities of TETRA in order to meet the emerging user requirements, utilize new technologies and, by maintaining the competitiveness with other wireless technologies, increase the future proofness of TETRA as the standard for PMR and PAMR world-wide.

The approved programme for TETRA Release 2 covers five work areas, namely:

- High speed data;
- Speech coding;
- Air interface enhancements;
- Interworking and roaming;
- SIM.

The present document provides the User Requirement Specification (URS) for interworking and roaming.

The URS is required by Working Group 3 (WG3) of EPT to provide improved interworking and roaming between TETRA and public mobile networks such as GSM, GPRS and UMTS.

1 Scope

The user requirements contained in this URS are described in non-technical terms and are based on an analysis of the results for air interface enhancements from the TETRA Release 2 Market Questionnaire (see Bibliography), described in TR 102 021-1 [1], clauses 4.2 and 4.3. The present document provides the user requirements for TETRA interworking and roaming.

The present document is applicable to the specification of TETRA Release 2 equipment.

2 References

For the purposes of this Technical Report, the following references apply:

- [1] ETSI TR 102 021-1: "Terrestrial Trunked Radio (TETRA); User Requirement Specification TETRA Release 2; Part 1: General Overview".
- [2] ETSI TR 102 021-6: "Terrestrial Trunked Radio (TETRA); User Requirement Specification TETRA Release 2; Part 6: Subscriber Identity Module (SIM)".

3 Definitions and abbreviations

3.1 Definitions

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

interworking: where TETRA users on one system can communicate with mobile users on another system (which could be TETRA or different), as long as they operate within their home TETRA network, i.e. they cannot roam into another system

roaming: utilization of a mobile terminal in a network other than the one where the mobile is subscribed but on which the mobile can still be located and operated by agreement between the respective network operators

NOTE: In the present document the term roaming is used maybe different from the definition of roaming used in other TETRA documents.

TETRA Release 2: work programme with new terms of reference within ETSI Project TETRA to enhance the services and facilities of TETRA in order to meet new user requirements, utilize new technology and increase the longevity of TETRA within the traditional market domains of PMR and PAMR

3.2 Abbreviations

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

APN	Access Point Name
BS	Base Station
EPT	ETSI Project TETRA
ETSI	European Telecommunications Standards Institute
GSM	Global System for Mobile communications
GPRS	General Packet Radio Service
IOP	InterOPerability
IP	Internet Protocol
MoU	Memorandum of Understanding
PAMR	Public Access Mobile Radio
PMR	Private Mobile Radio
PSTN	Public Switched Telephone Network
PTT	Press to Talk
QoS	Quality of Service

RF	Radio Frequency
RX	Receive(r)
SDS	Short Data Service
SMS	Short Message Service
SSI	Short Subscriber Identity
STF	Special Task Force
SwMI	Switching and Management Infrastructure
TDMA	Time Division Multiple Access
TETRA	TERrestrial Trunked RAdio
TIP	Tetra Interoperability Profile
TMO	Trunked Mode Operation
TR	Technical Report
UMTS	Universal Mobile Telecommunications System
URS	User Requirement Specification
V+D	Voice plus Data
WAP	Wireless Application Protocol

4 User requirement specification

4.1 Introduction

TETRA networks will rarely exist in isolation. These networks are built to enable communication between users of TETRA networks and to/from other networks and network users. The present document describes the need to interface to existing and future networks mobile and fixed in order to enable interoperability of services and roaming between networks.

There are two main classes of requirements:

- The interworking requirements are concerned with the ability to interface different networks so that higher level services and application are enabled when at least one of the parties is on a different network.
- The roaming requirements give users of a network the ability to access services when outside the area covered by their subscribed network.

There are roaming requirements for both voice services and data services.

There are interworking requirements for both voice services and data services.

A specific TETRA network may need to interface with the following networks (not a complete list):

- Another TETRA network (of the same or different release).
- A GSM network.
- A GPRS network.
- A UMTS network.
- A Tetrapol network.
- Another mobile network.
- A fixed network (e.g. the PSTN).
- A private network.
- An IP network.
- The Internet.
- Other data networks.

The basic requirement to enable interworking and roaming are the interconnections between networks. TETRA networks will need to support the common interfaces to connect to GSM, PSTN and IP networks for voice, data and signalling.

4.2 Interworking

Interworking is the ability of multiple networks to co-operate and together render a service. It is an essential feature when parties involved in communication services are not connected to the same network. Those parties would typically be end-users in a voice communication. They could also be a client and a server in an automated transaction.

Users needs for voice interworking are expressed differently than user needs for data interworking. We will discuss each of them separately.

4.2.1 Voice interworking requirements

Voice interworking is required between TETRA and other voice networks listed in clause 4.1.

It is expected that most TETRA voice communications will be combination of simplex PTT group calls and simplex and/or duplex "one to one" calls within the same network or across TETRA networks.

However, the interworking of duplex calls to PSTN and GSM users, where most of the installed base of voice terminals are connected, is an essential requirement. This requirement is expected to remain important even as new networks are deployed and gain market share (e.g. more of existing networks like TETRA, new networks such as UMTS).

The Public Safety community has also expressed a specific requirement of interworking with a Tetrapol network.

4.2.2 Data interworking requirements

Data interworking requirements are of two main sorts:

- TETRA users wanting access to other servers and data network from their subscribed TETRA network; and
- TETRA users wanting access to their TETRA profile and applications from another network.

There are requirements for both. However, the possibility to access the outside world from the TETRA network stands out as being the most important for all user segments.

TETRA users will need access to the networks where the applications and other users are. Today this translates into: SMS, SDS, GPRS, APNs, WAP servers, intranets, the Internet. In the future, the list will include 3G networks and other TETRA networks.

The TETRA community considers security and confidentiality as important requirements. It is important that interworking requirement do not have a negative impact on those, so the following should be considered:

- proper mechanisms such as firewalls need to be put in place in particular to control access from IP networks;
- flexible authorization mechanisms are needed, in particular the concept of call barring for data calls is required.

4.3 Roaming

Roaming has implications on the terminal as well as on the SwMI. Here we consider the user requirements for the roaming service and therefore we do not make explicit distinction whether the implications are at the terminal level or at the SwMI level.

European-wide roaming is a very appealing promise of TETRA. Users feel that roaming between different TETRA networks is essential and by far the most important requirement. This includes roaming between TETRA networks of the same release as well as roaming between TETRA networks of different releases. This requirement also includes roaming between networks providing the same RF coverage for reasons of back up communications and for inter-communication needs between different organizations during national disaster scenarios.

In all forms of roaming, users want full access to all services: voice-only roaming is important, data-only roaming is important, but voice and data roaming is the essential requirement.

The capability to use a TETRA terminal (and the corresponding subscription) on another mobile network (in particular GSM today and UMTS in the future) is also seen as an important requirement by most users. This requirement is important for TETRA users travelling to a different country where they may not find TETRA coverage. A similar but not quite as compelling feature is the possibility of using a TETRA SIM card in a GSM terminal. Related requirements are discussed in the SIM URS [2].

A similar requirement is the capability to roam to other mobile networks when out of TETRA coverage within the same country.

Some users also have specific roaming requirements: even though the possibilities for interworking between TETRA Release 1 and Tetrapol are well recognized by the public safety community, it is important to explore how roaming (and additional interworking solutions) could be provided by the introduction of TETRA Release 2.

When roaming it is desirable that the user perceives as little difference as possible in the service offering and the profile. However, it is recognized that when roaming to a network of a different technology the users will certainly perceive a difference in the service.

4.4 Implementing technical requirements

Implementations of interworking and roaming should pay particular attention to the following aspects:

- Minimum impact on operational costs.
- Maximum transparency to the end-user.
- Minimum impact on network requirement.
- Co-ordination of numbering across technologies.
- Co-ordination of user identities across technologies.
- Minimum impact on Lawful Interception.
- Minimum impact on billing systems.

4.5 Timeline

Interworking and roaming between different TETRA networks is an immediate requirement of users.

Interworking between TETRA networks and GSM/UMTS or PSTN and IP networks is an immediate requirement of users.

Requirement for roaming between TETRA networks and GSM/UMTS networks varies between user organization. Users of the PAMR market have a requirement as early as 2002. Some users in the Public Safety market also have a requirement in 2002. A more significant portion of this market has requirements for 2003.

Annex A: Bibliography

- ETSI EPT/WG1(01)046v9 ETSI Project TETRA (EPT) TETRA Release 2 Questionnaire.
- ETSI EPT13(00)17r1 TETRA Release 2 Work Programme.
- TETRA 2 ETSI/B28(00)12: "Extension of EPT Terms of Reference to Enable TETRA" Release 2".
- ETSI B28 (00)24 Rev 2: "Summary minutes, decisions and actions from 28th ETSI Board Meeting, Sophia Antipolis, 5-6 September 2000".

History

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