

**Terrestrial Trunked Radio (TETRA);
User Requirement Specification TETRA Release 2;
Part 6: Subscriber Identity Module (SIM)**



Reference

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Foreword

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

The present document is part 6 of a multi-part deliverable covering the User Requirement Specification 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, see [7] and [8]. 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 the enhancements of the TETRA Subscriber Identity Module (SIM).

The URS is required by Working Group 7 (WG7) of EPT in the development and evolution of the ETSI standard defining the features and functions of a Subscriber Identity Module meeting the administrative and operational requirements of TETRA Release 2.

1 Scope

The present document contains the user requirements which 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 defines the user requirements for the Subscriber Identity Module (SIM).

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

2 References

For the purposes of this Technical Report (TR), 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 102 021-2: "Terrestrial Trunked Radio (TETRA); User Requirement Specification TETRA Release 2; Part 2: High Speed Data".
- [3] ETSI TR 102 021-3: "Terrestrial Trunked Radio (TETRA); User Requirement Specification TETRA Release 2; Part 3: Codec".
- [4] ETSI TR 102 021-4: "Terrestrial Trunked Radio (TETRA); User Requirement Specification TETRA Release 2; Part 4: Air Interface Enhancements".
- [5] ETSI TR 102 021-5: "Terrestrial Trunked Radio (TETRA); User Requirement Specification TETRA Release 2; Part 5: Interworking and Roaming".
- [6] ETSI TR 102 021-7: "Terrestrial Trunked Radio (TETRA); User Requirement Specification TETRA Release 2; Part 7: Security".
- [7] ETSI B28(00)12: "Extension of EPT Terms of Reference to Enable TETRA "Release 2"".
- [8] ETSI B28(00)24 Rev 2: "Summary minutes, decisions and actions from 28th ETSI Board Meeting", Sophia Antipolis, 5-6 September 2000.

3 Definitions and abbreviations

3.1 Definitions

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

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

NOTE: See bibliography.

Network Access Application (NAA): software application permitting access to a particular type of network, e.g. GSM, 3G, TETRA, etc.

UICC: removable IC card containing one or more Network Access Applications (NAA)

3.2 Abbreviations

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

API	Application Programming Interface
DMO	Direct Mode Operation
EPT	ETSI Project TETRA
ITSI	International TETRA Subscriber Identity
ME	Mobile Equipment
MMI	Man-Machine Interface
MoU	Memorandum of Understanding
MS	Mobile Station (ME and SIM)
NAA	Network Access Application
OTAR	Over The Air Re-keying
PAMR	Public Access Mobile Radio
PMR	Private Mobile Radio
PSTN	Public Switched Telephone Network
SIM	Subscriber Identity Module
TMO	Trunked Mode Operation
ToR	Terms of Reference
URS	User Requirement Specification
WAP	Wireless Application Protocol
WG	EPT Working Group

4 User Requirement Specification

4.1 Introduction

TETRA networks require a considerable quantity of personalization data to be entered into an MS before the MS can be used in service. In general, the programming APIs for the MS differ between manufacturers. The use of SIMs simplifies the logistics process of operators supporting the use of MSs from several different manufacturers because only one physical interface and API is necessary.

By including all variable data in a SIM, an alternative terminal may be personalized to the end-users' requirements simply by the insertion of the end-users' existing SIM. This simplifies and improves the service that can be offered by the network operator to the customer and end-user. If a network operator elects to use SIMs in the range of MSs that it supports, then the cost of supply and personalization of the SIM should be as economic as possible. The standardization process for the TETRA SIM should ensure the solution adopted is commercially competitive and offers interoperability between both TETRA networks and radio technologies.

With the addition of applications supporting access to other radio technologies to the SIM, the SIM should support inter-standard roaming when placed in an appropriate ME. A sub-set of the features and functions should support TETRA Release 2 only.

In addition, the SIM should permit the development and implementation of additional services in a timely manner, probably through SIM (or card) application toolkit functionality, suitably adopted for TETRA networks.

Current SIM designs are targeted at a single user utilizing a dedicated ME operating on a single radio standard. The evolving SIM standard should consider, in conjunction with Working Groups studying the ME and the MMI, at least 2 other operational scenarios:

- a standardized method of sharing one ME with several end-users. This means that the ability to change or update the appropriate personalization data by simple exchange of the SIM or by other means as appropriate is of importance;
- the use of dual- and multi-standard terminals using different radio technologies. Some of these technologies (e.g. GSM or 3GPP) involve the mandatory use of a SIM.

It must be emphasized that the SIM, apart from its active function in the authentication procedures, is mainly intended to act as a removable, non-volatile and secure data store. The data storage requirements for features and functions which are being defined for TETRA Release 2 must be indicated to WG7 for the necessary files to be incorporated in that version of the SIM standard which supports the TETRA Release 2.

4.2 General requirements for SIM

The TETRA market has changed significantly over the last five years. Previously, it was expressed that for PMR/PAMR type operations, SIM was not strictly necessary. This view has changed significantly. An analysis of the results to the Questionnaire shows that less than 2 % of the market respondents expressed the view that SIM was not applicable for TETRA.

The majority of TETRA users want to utilize SIM to gain access to other technologies, such as GSM and UMTS.

A number of users also require SIM to provide a similar feature set for TETRA that is currently being offered to cellular phone users.

A quarter of the users expect to operate within a TETRA environment only. However, it is clear that this group also want to make use of SIM.

4.3 SIM personalization features

The expectations to the functionalities of the SIM are broadly divided into two categories. One being "Access rights" and the other "Additional feature and functions".

4.3.1 Access rights

This area covers a number of different functionalities. These are over-the-air SIM administration, permitted network access, storage of radio frequency raster/channels and permitted service (call types, DMO, data) and security.

4.3.1.1 Over-the-Air SIM administration

The users view over-the-air SIM administration as one of the more important functions of the SIM; this is not a surprise, because of the relatively young technology TETRA represents. However, it is a clear message that TETRA, unlike ordinary cellular phones, is expected to form an integral part of an organization's operational needs and thus must be adaptable in a dynamic way.

4.3.1.2 Permitted Network Access

Access to the network is a clear requirement. This is connected to the general requirement for roaming to other networks. These networks can be other TETRA networks, but there is certainly a very strong requirement for roaming to GSM and UMTS. In this area, the users may require access to the PSTN, Internet and WAP servers.

4.3.1.3 Storage of radio frequency raster/channels and permitted service (call types, DMO, data)

This is a key area because it provides the terminals with the essential technical data they need to operate within one or more networks. It is clear that this type of personalization data is required on the SIM. This area defines the basic user profile, which provides access to different call types (simplex, group, duplex, DMO, data). The area covers DMO, whether it is selected by the individual user or set by the network. At a TETRA MoU workshop on DMO (Brussels, June 2001), the users expressed a very clear requirement for the DMO operation to be transparent in all respects of the operation of TMO. This means that the number the user dials must be the same, that channels are pre-set, groups are the same, etc. The link to over-the-air SIM administration is very clear.

4.3.1.4 Security

The system should be able to support a mechanism whereby information held on a removable personalization module (e.g. SIM) is protected from unauthorized access. A SIM should be able to contain the ITSI/K pair and the authentication algorithms.

NOTE: There is no known method for providing an OTAR mechanism based on K in the current TETRA Security standard that makes the use of SIM to store updateable keys viable, *because of the lack of an encryption mechanism over the SIM-ME interface. In addition post-personalization file storage structures do not lend themselves to secure storage of key material.* In cases where OTAR is essential the K/ITSI pair and algorithm set (TAA1) can be stored on the ME and the SIM used to store other (non-key related) personalization data.

4.3.2 Additional features and functions

This is the other main category into which the user requirements fall. This category includes flexible contact management/phone book facility, call lists (dynamic, user programmable, access), storage of card application toolkit applications, financial and other secure transactions and storage of operator/network logos and graphics.

It is recognized that there is an overlap between the two main categories in some requirements. However, from a user perspective these are the functions that are required.

4.3.2.1 Flexible contact management/phonebook facility, call lists (dynamic, user programmable, access, etc.)

Some of the functions in this area could also be designated as "Access Rights". The requirement is to support a TETRA system that operates as an integrated part of an organization, as well as serving the individual user with a set of features that will make communication easier.

4.3.2.2 Card application toolkit

There is a clear need for this facility. PMR users have, for many years, had bespoke system solutions built into their radio systems. The toolkit provides an excellent opportunity to have these special applications, whilst simultaneously enjoying the features of TETRA.

4.3.2.3 Financial and other types of secure transactions

The users have clearly expressed an interest in these features because of the success of GSM and the financial sectors drive towards more secure credit/charge card transactions.

4.3.2.4 Storage of operator/network logotypes and graphics

A number of users have expressed an interest in displaying logos and other graphics. This is an area where the individual network as well as virtual networks will have an interest.

4.4 Commercial aspects

This is a fundamental element in all of the clauses of the present document, which is largely driven by the features and services the users are familiar with in GSM. There is also an accumulated requirement, as the existing TETRA SIM has never materialized in the market place. Furthermore, there is the expectation that the volume of handsets used by GSM and later UMTS will make the SIM financially viable and provide a continuous development from which TETRA can benefit.

4.5 Timescales

The results of the questionnaire indicated a variance in timescales for the expected delivery date of SIM between different industry sectors.

The PAMR environment requires SIM to be available in 2002. The utilities clause envisages a requirement for SIM in 2005. The military do not see a requirement for SIM until after 2005.

The public safety sector requirement for SIM availability is split between 2002-2004. Some of the public safety fraternity does not see a requirement for SIM until after 2005.

As the public safety and PAMR sectors hold the market share within the TETRA environment and they both have a strong requirement for SIM availability in 2002, this date should be aimed for. All other requirements for SIM availability in future years from other sectors will then also be satisfied.

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".

History

Document history		
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