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Prizemni snopovni radio (TETRA) - Specifikacija za preskušanje skladnosti - 4. del: Specifikacija za preskušanje protokola za neposredno obratovanje (DMO) ¬- 13. poddel: Abstraktni preskušalni niz (ATS) za ponavljalnik (repetitor) tipa 2 mobilne postaje

Terrestrial Trunked Radio (TETRA); Conformance testing specification; Part 4: Protocol testing specification for Direct Mode Operation (DMO); Sub-part 13: Abstract Test Suite (ATS) for Mobile station Repeater type 2

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Terrestrial Trunked Radio (TETRA); Conformance testing specification; Part 4: Protocol testing specification for Direct Mode Operation (DMO); Sub-part 13: Abstract Test Suite (ATS) for Mobile station Repeater type 2

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ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

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

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Project Terrestrial Trunked Radio (TETRA).

The present document had been submitted to Public Enquiry as ETS 300 394-4-13. During the processing for Vote it was converted into an EN.

The present document consists of the following parts:

Part 1: "Radio";

Part 2: "Protocol testing specification for Voice plus Data (V+D)";

Part 4: "Protocol testing specification for Direct Mode Operation (DMO)";

Part 5: "Security".

National transposition dates	
Date of adoption of this EN:	5 January 2001
Date of latest announcement of this EN (doa):	30 April 2001
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 October 2001
Date of withdrawal of any conflicting National Standard (dow):	31 October 2001

1 Scope

The present document contains the Abstract Test Suites (ATS) to test the TETRA Direct Mode Operation (DMO) MS Repeater Type 2 (MS-REP2) protocol at layer 3, called Direct Mode Call Control (DMCC) and the MS-Repeater type 2 protocol at layer 2, the Medium Access Control (MAC) protocol. The DMCC and MAC protocols are specified in ETS 300 396-3 [1] and in EN 300 396-7 [2]. The Test Suite Structure (TSS) and Test Purposes (TPs) for these ATSs are defined in EN 300 394-4-11 [4].

The objective of these test specifications are to provide a basis for approval tests for TETRA equipment giving a high probability of air interface inter-operability between different manufacturer's TETRA equipment.

The ISO standard for the methodology of conformance testing, ISO/IEC 9646-1 [5], ISO/IEC 9646-2 [6], ISO/IEC 9646-3 [7] and ISO/IEC 9646-5 [8], as well as the ETSI rules for conformance testing, ETS 300 406 [9] and ETR 141 [10] are used as a basis for the test methodology.

Annex A provides the Tree and Tabular Combined Notation (TTCN) part of these two ATSs.

Annex B provides the Partial Protocol Implementation eXtra Information for Testing (PIXIT) Proforma of these ATSs.

Annex C provides the Protocol Conformance Test Report (PCTR) Proforma of these ATSs.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

[1] ETSI ETS 300 396-3: "Terrestrial Trunked Radio (TETRA); Technical requirements for Direct Mode Operation (DMO); Part 3: Mobile Station to Mobile Station (MS-MS) Air Interface (AI) protocol".

[2] ETSI EN 300 396-7: "Terrestrial Trunked Radio (TETRA); Technical requirements for Direct Mode Operation (DMO); Part 7: Type 2 repeater air interface".

[3] ETSI EN 300 396-8-4: "Terrestrial Trunked Radio (TETRA); Technical requirements for Direct Mode Operation (DMO); Part 8: Protocol Implementation Conformance Statement (PICS) proforma specification; Sub-part 4: Type 2 repeater Air Interface (AI)".

[4] ETSI EN 300 394-4-11: "Terrestrial Trunked Radio (TETRA); Conformance testing specification; Part 4: Protocol testing specification for Direct Mode Operation (DMO); Sub-part 11: Test Suite Structure and Test Purposes (TSS&TP) for Mobile Station Repeater type 2".

[5] ISO/IEC 9646-1 (1994): "Information technology - Open Systems Interconnection - Conformance Testing Methodology and Framework - Part 1: General Concepts". (See also ITU-T Recommendation X.290 (1991)).

[6] ISO/IEC 9646-2 (1994): "Information technology - Open Systems Interconnection - Conformance Testing Methodology and Framework - Part 2: Abstract Test Suite Specification". (See also ITU-T Recommendation X.291 (1991)).

[7] ISO/IEC 9646-3 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 3: The tree and tabular combined notation". (See also ITU-T Recommendation X.292 (1992)).

[8] ISO/IEC 9646-5 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 5: Requirements on test laboratories and clients for the conformance assessment process". (See also ITU-T Recommendation X.292 (1992)).

[9] ETSI ETS 300 406: "Methods for Testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".

[10] ETSI ETR 141: "Methods for Testing and Specification (MTS); Protocol and profile conformance testing specifications; The Tree and Tabular Combined Notation (TTCN) style guide".

3 Definitions and abbreviations

3.1 TETRA definitions

For the purposes of the present document, the terms and definitions given in EN 300 396-7 [2] apply.

3.2 TETRA abbreviations

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

DMCC	Direct Mode Call Control
MAC	Medium Access Control
MS	Mobile Station
MS-REP2	Mobile Station Repeater Type 2
SDS	Short Data Service
SDU	Service Data Unit

3.3 ISO 9646 definitions

For the purposes of the present document the following ISO/IEC 9646 definitions apply:

TTCN.GR	
TTCN.MP	
PCTR	Protocol Conformance Test Report (PCTR proforma)

3.4 ISO 9646 abbreviations

For the purposes of the present document the following ISO/IEC 9646-1 [5] abbreviations apply:

ASP	Abstract Service Primitive
ATM	Abstract Test Method
ATS	Abstract Test Suite
ICS	Implementation Conformance Statement
IUT	Implementation Under Test
IXIT	Implementation eXtra Information for Testing
LT	Lower Tester
MTC	Main Test Component
PCO	Point of Control and Observation
PCTR	Protocol Conformance Test Report
PDU	Protocol Data Unit
PICS	Protocol Implementation Conformance Statement (PICS proforma)
PIXIT	Protocol Implementation eXtra Information for Testing (PIXIT proforma)
PTC	Parallel Test Component
SAP	Service Access Point
SPyT	Single Party Testing
SUT	System Under Test
TC	Test Case

TP	Test Purpose
TSS	Test Suite Structure
TTCN	Tree and Tabular Combined Notation
UT	Upper Tester

4 Abstract Test Method (ATM)

4.1 ATM for the MS-REP2 MAC ATS

This subclause describes the ATM used for testing the MS-REP2 MAC layer protocol of a Mobile Station Repeater Type 2 (MS-REP2). It is the embedded variant of the remote test method used in Single Party Testing (SPyT) context, as defined in ISO/IEC 9646-2 [6], clause 11. This test method has been selected, because:

- this test method implies no specific requirements from the Implementation Under Test (IUT);
- the upper Service Access Point (SAP) of the IUT cannot be directly observed;
- the variety of the possible TETRA implementations is a serious technical obstacle for the adoption of a different ATM;
- this test method places minimum limitations in the realization of conformance testing.

The selected test method is illustrated in figure 1.

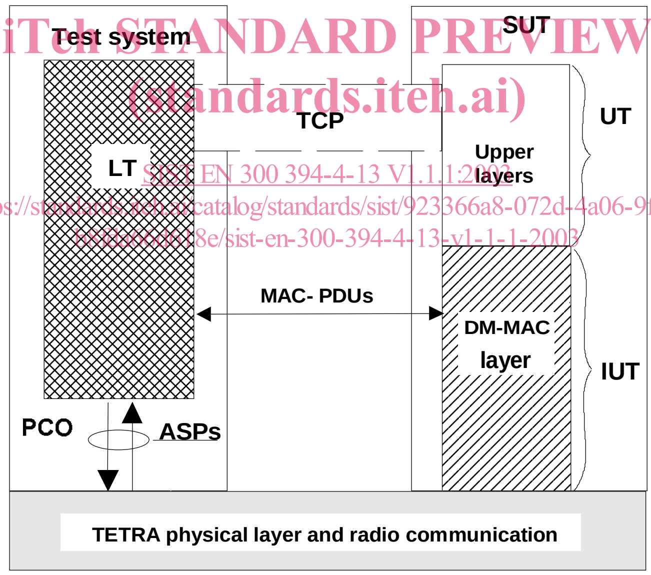

Figure 1: Remote SPyT test method for TETRA DMO MS-REP2 MAC layer

4.1.1 Lower Tester (LT)

A LT is located in a remote TETRA test system. It controls and observes the behaviour of the IUT.

4.1.2 Upper Tester (UT)

There is no explicit UT in the remote test method, but the layers above inside the System Under Test (SUT) are used implicitly for testing the MS-REP2 MAC layer.

4.1.3 Test Coordination Procedures (TCP)

The implicit send events defined by the provider of an implementation in annex B serve the purpose of the TCP. They are used as an input to the IUT communicating with the UT to initiate test events at the MS-REP2 MAC layer.

4.1.4 Point of Control and Observation (PCO)

All test events at the PCO carrying service user data are specified in terms of MAC layer PDUs. Only few Abstract Service Primitives (ASPs) are defined for control or observation purposes. The mapping of the MAC PDUs into the physical layer frame structure is left to the test implementation.

4.2 ATM for the MS-REP2 DMCC ATS

This clause describes the ATM used for testing the DMCC protocol of a MS-REP2. The selected method is the embedded variant of the remote test method used in Single Party Testing (SPyT) context, as defined in ISO/IEC 9646-2 [6], clause 11. This test method has been selected, because:

- this test method implies no specific requirements from the Implementation Under Test (IUT);
- the upper Service Access Point (SAP) of the IUT cannot be directly observed;
- the variety of the possible TETRA implementations is a serious technical obstacle for the adoption of a different ATM;
- this test method places minimum limitations in the realization of conformance testing.

The selected test method is illustrated in figure 2.

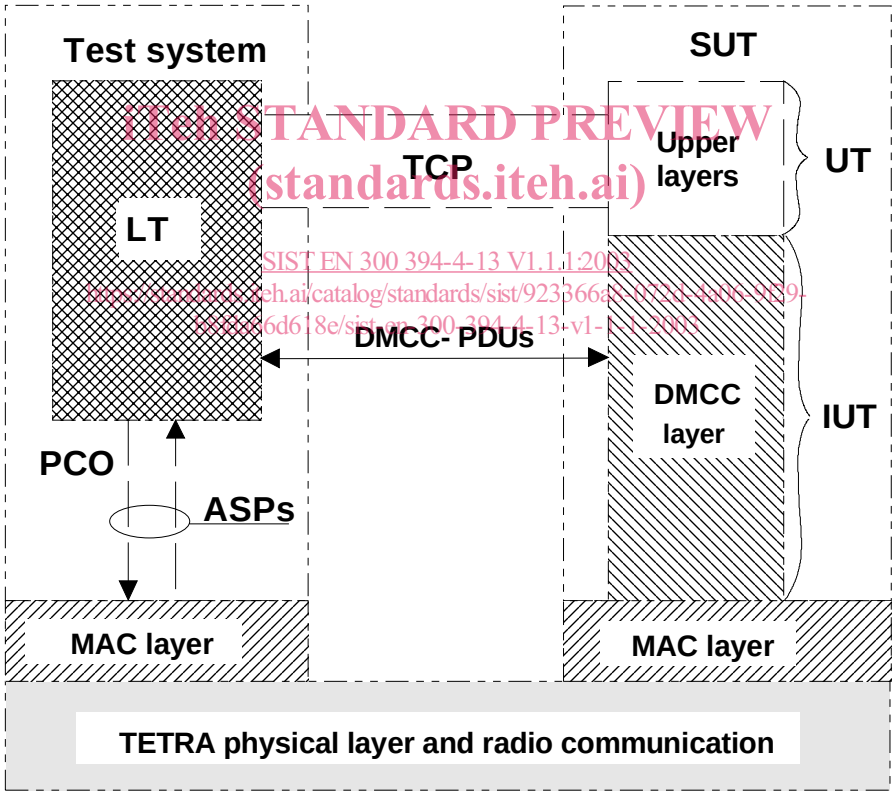

Figure 2: Remote single party test method for TETRA MS-REP2 DMCC protocol

4.2.1 Lower Tester (LT)

A LT is located in a remote TETRA test system. It controls and observes the behaviour of the IUT.

4.2.2 Upper Tester (UT)

There is no explicit UT in the remote test method, but the TETRA MS-REP2 DMCC and the layers above inside the System Under Test (SUT) are used implicitly for testing the DMCC layer.

4.2.3 Test Coordination Procedures (TCP)

The implicit send events defined by the provider of an implementation in annex B serve the purpose of the TCP. They are used as an input to the IUT communicating with the UT to initiate test events at the DMCC protocol layer.

4.2.4 Point of Control and Observation (PCO)

The PCO is located inside the protocol.

All test events at the PCO carrying service user data is specified in terms of PDUs. The mapping of the PDUs to possible Medium Access Control (MAC) layer service primitives is left to the test implementation.

5 ATS conventions

This clause describes the conventions applied to define the two ATSs and gives the naming conventions chosen for the different elements of the ATSs.

The ATS conventions are intended to give a better understanding of the ATS but they describe also the conventions made for the development of the ATS, thus for any later maintenance purposes or further development of the ATS, the conventions described in this clause shall be considered.

5.1 Naming conventions

5.1.1 Declarations part

This subclause describes the naming conventions chosen for the elements of the ATS declarations part.

5.1.1.1 Test suite type and structured type definitions

The test suite type and test suite structured type identifiers describe the information elements, and each whole word included in the name is written in lowercase starting by an uppercase letter:

EXAMPLE: Priority_Level_Type: simple type;

SSI_Type: simple type;

ITSI_Type: structured type.

In the case an abbreviation is included in the declaration name, there is an underscore ("_") before and/or after it, separating it from the rest of the identifier. This rule with abbreviations apply to all the naming conventions in the whole test suite.

5.1.1.2 Test suite operations definitions

The test suite operation identifiers are composed of strings in uppercase letters starting by the uppercase string "TSO_". The different strings in the definition are separated with underscores.

EXAMPLE: TSO_ACTIVE_IND_CALL_OCCUPATION_REP2_MS.

5.1.1.3 Test suite parameter declarations

The test suite parameter identifiers are composed of strings in uppercase letters starting by the uppercase string "PIC_" or "PIX_" and separated by underscores.

If the test suite parameter references a PICS item, the prefix "PIC_" is used.

EXAMPLE 1: PIC_CIRCUIT_MODE_CALL.

If the test suite parameter references a PIXIT item, the prefix "PIX_" is used.