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**Prizemni snopovni radio (TETRA) - Specifikacija za preskušanje skladnosti - 4. del:
Specifikacija za preskušanje protokola za neposredno obratovanje (DMO) -- 14.
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Terrestrial Trunked Radio (TETRA); Conformance testing specification; Part 4: Protocol testing specification for Direct Mode Operation (DMO); Sub-part 14: Abstract Test Suite (ATS) for Repeater type 2

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European Standard (Telecommunications series)

**Terrestrial Trunked Radio (TETRA);
Conformance testing specification;
Part 4: Protocol testing specification for
Direct Mode Operation (DMO);
Sub-part 14: Abstract Test Suite (ATS)
for Repeater type 2**

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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 300 394-4-14. 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".

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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 Suite (ATS) to test the TETRA Direct Mode Operation (DMO) Repeater type 2 (DM-REP2) protocol at layer 2, the Medium Access Control (MAC) protocol. The MAC protocol is specified in ETS 300 396-3 [10] and in EN 300 396-7 [1]. The Test Suite Structure (TSS) and Test Purposes (TPs) for this ATS are defined in ETS 300 394-4-12 [3].

The objective of this test specification is 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 [4], ISO/IEC 9646-2 [5], ISO/IEC 9646-3 [6] and ISO/IEC 9646-5 [7], as well as the ETSI rules for conformance testing, ETS 300 406 [8] and ETR 141 [9] are used as a basis for the test methodology.

Annex A provides the Tree and Tabular Combined Notation (TTCN) part of this ATS.

Annex B provides the partial Protocol Implementation eXtra Information for Testing (PIXIT) Proforma of this ATS.

Annex C provides the Protocol Conformance Test Report (PCTR) Proforma of this ATS.

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.

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- [1] ETSI EN 300 396-7: "Terrestrial Trunked Radio (TETRA); Technical requirements for Direct Mode Operation (DMO); Part 7: Type 2 repeater air interface".
- [2] 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)".
- [3] ETSI ETS 300 394-4-12: "Terrestrial Trunked Radio (TETRA); Conformance testing specification; Part 4: Protocol testing specification for Direct Mode Operation (DMO); Sub-part 12: Test Suite Structure and Test Purposes (TSS&TP) for Repeater type 2".
- [4] 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)).
- [5] 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)).
- [6] 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)).
- [7] 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)).
- [8] ETSI ETS 300 406: "Methods for Testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".

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

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 [1] apply.

3.2 TETRA abbreviations

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

DM-REP2	Direct Mode Repeater Type 2
MAC	Medium Access Control
MS	Mobile Station
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	SIST EN 300 394-4-14 V1.1.1:2003
TTCN.MP	https://standards.iteh.ai/catalog/standards/sist/83c7ff80-ff9d-4e0a-ab26-42bd58691337/sist-en-300-394-4-14-v1-1-1-2003
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 [4] 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
PCO	Point of Control and Observation
PCTR	Protocol Conformance Test Report
PDU	Protocol Data Unit
PICS	Protocol Implementation Conformance Statements
PIXIT	Protocol Implementation eXtra Information for Testing
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)

This clause describes the ATM used for testing the DM-REP2 MAC layer protocol. The selected method is the remote method, as defined in ISO/IEC 9646-2 [5], 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 DM-REP2 MAC protocol defines the operation of a DM-REP2 serving two air interfaces, the master and the slave link. To test the repeater operation in some cases both interfaces need to be controlled and observed simultaneously. This implies that two testing methods are used: the remote single-party test method (with one PCO) and the remote multiparty test method with two PCOs.

4.1 Single PCO testing

The remote Single Party test method with a single PCO is illustrated in figure 1.

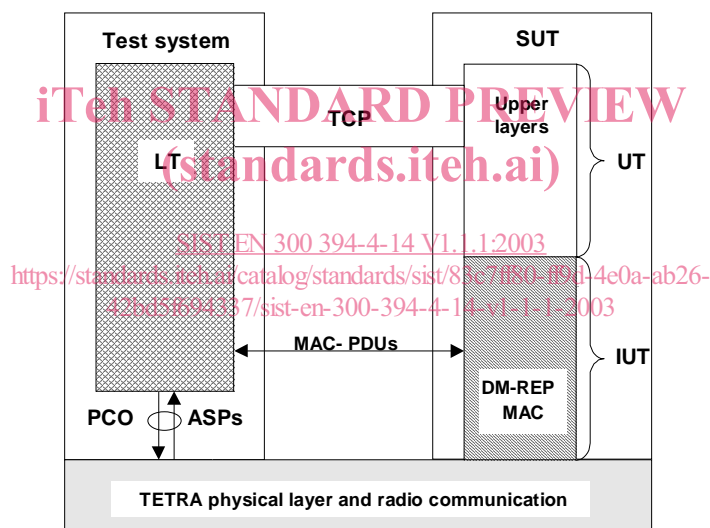


Figure 1: Remote SPyT test method for TETRA DM-REP2 MAC layer

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 DM-REP2 MAC layer and the layers above inside the System Under Test (SUT) are used implicitly for testing the 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 DMO 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 Multiple PCO testing

The selected test method is illustrated in figure 2.

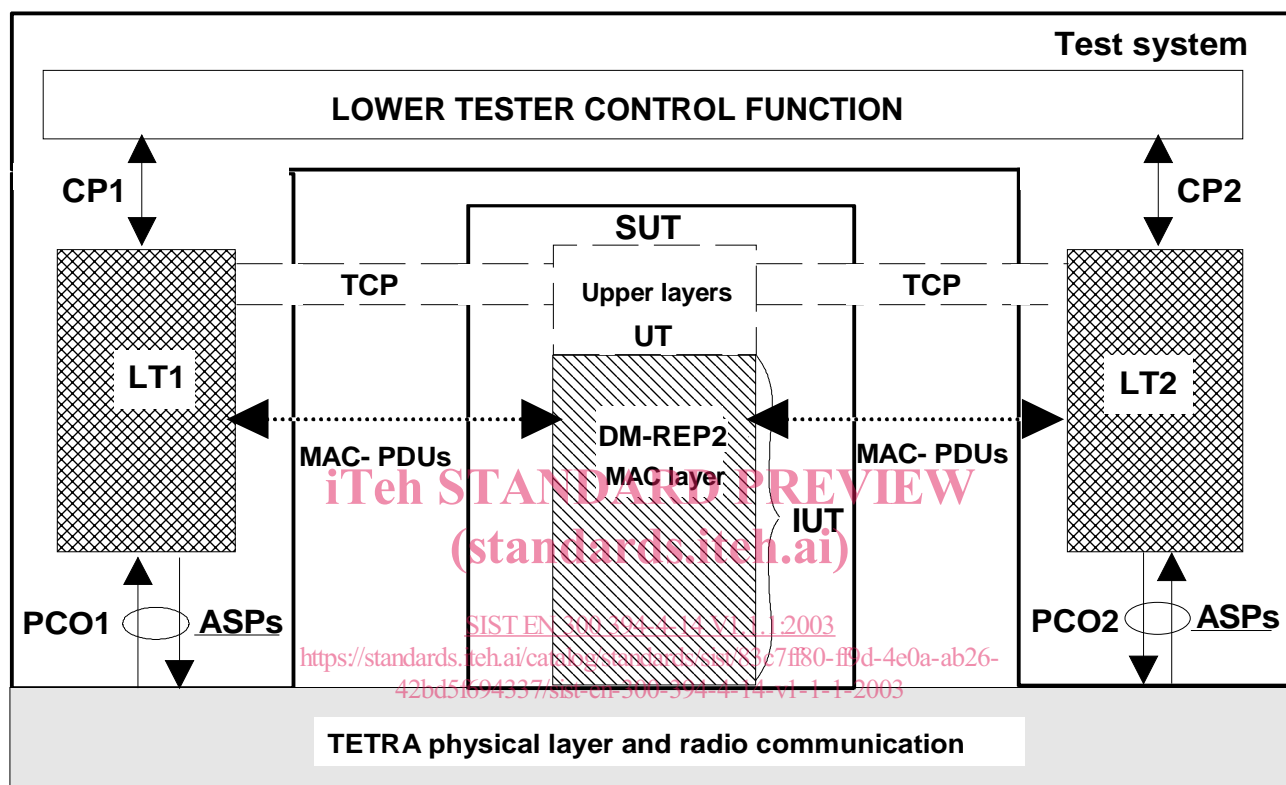


Figure 2: Remote multi party test method for TETRA DM-REP2 MAC protocol

4.2.1 Lower Testers (LT)

Two LTs: LT1 and LT2 are located in a remote TETRA test system. They observe the behaviour of the IUT. They are controlled and synchronized by the lower tester control function.

4.2.2 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 DM-REP2 MAC 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 MAC protocol layer.