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Prizemni snopovni radio (TETRA) - Specifikacija za preskušanje skladnosti - 4. del: Specifikacija za preskušanje protokola za neposredno obratovanje (DMO) ¬- 7. poddel: Zgradba preskušalnega niza in nameni preskušanja (TSS&TP) za radijski vmesnik (AI) med mobilno postajo in prehodom (MS-GW)

Terrestrial Trunked Radio (TETRA); Conformance testing specification; Part 4: Protocol testing specification for Direct Mode Operation (DMO); Sub-part 7: Test Suite Structure and Test Purposes (TSS&TP) for Mobile Station to GateWay (MS-GW) Air Interface (AI)

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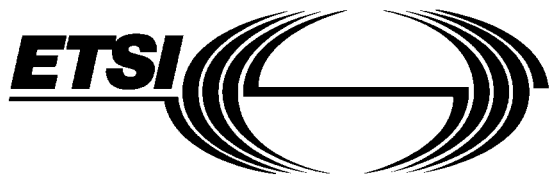
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Foreword

This European Telecommunication Standard (ETS) has been produced by the Terrestrial Trunked Radio (TETRA) Project of the European Telecommunications Standards Institute (ETSI).

This ETS consists of 4 parts as follows:

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".

Transposition dates	
Date of adoption of this ETS:	4 June 1999
Date of latest announcement of this ETS (doa):	30 September 1999
Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	31 March 2000
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1 Scope

This ETS contains the test specifications: Test Suite Structure and Test Purposes (TSS&TPs) and the Abstract Test Suites (ATSs) to test conformity of products to the TETRA Direct Mode Operation (DMO) protocols. This ETS is divided into several parts, each one dealing with one TSS&TP or one ATS for the test of a layer 2 or layer 3 protocol for DMO.

This present sub-part 7 deals with TSS&TP for a Mobile Station (MS) connected to a Gateway (MS-GW).

NOTE: Sub-part 8 deals with TSS&TP for the other part of the DMO Gateway, which is a GateWay (GW) connecting the MS-GW to the Switching and Management Infrastructure (SwMI) of a Voice plus Data (V+D) system.

Testing of security features is outside the scope of this ETS.

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 [5] and ISO/IEC 9646-2 [6], as well as the ETSI methodology for conformance testing, ETS 300 406 [7], are used as the basis for the test methodology.

2 References

This ETS incorporates by dated and undated reference, provisions from other publications. These normative 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 ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

[1]   Void.

[2]   ETS 300 396-5: "Terrestrial Trunked RAdio (TETRA); Technical requirements for Direct Mode Operation (DMO); Part 5: Gateways".

[3]   ETS 300 396-8-3: "Terrestrial Trunked RAdio (TETRA); Direct Mode Operation (DMO); Part 8: Protocol Implementation Conformance Statement (PICS) proforma specification; Sub-part 3: Gateway Air Interface (AI)".

[4]   ETS 300 394-4-1: "Terrestrial Trunked Radio (TETRA);Conformance testing specification; Part 4: Protocol testing specification for Direct Mode Operation (DMO); Sub-part 1: Test Suite Structure and Test Purposes (TSS&TP) for Mobile Station to Mobile Station (MS-MS) Air Interface (AI)".

[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]   ETS 300 406 (1995): "Methods for Testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".

3 Definitions and abbreviations

3.1 TETRA definitions

For the purposes of this ETS, the definitions given in ETS 300 396-5 [2] apply.

3.2 TETRA abbreviations

For the purposes of this ETS the following TETRA abbreviations apply:

CM	Circuit Mode
DMCC	Direct Mode Call Control
DMMM	Direct Mode Mobility Management
DMO	Direct Mode of Operation
FCS	Frame Check Sequence
GW	Gateway
MAC	Medium Access Control
MNI	Mobile Network Identity
MS	Mobile Station
NWK	Network. Layer 3 of the TETRA protocol stack
SDS	Short Data Services
SDU	Service Data Unit
TX	Transmit
RX	Receive

3.3 ISO 9646 definitions

For the purposes of this ETS the following ISO/IEC 9646-1 [5] definitions apply:

Implementation Conformance Statement (ICS)
Implementation Under Test (IUT)
Implementation eXtra Information for Testing (IXIT)
Protocol Implementation Conformance Statement (PICS)
Protocol Implementation eXtra Information for Testing (PIXIT)

3.4 ISO 9646 abbreviations

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

IUT	Implementation Under Test
PDU	Protocol Data Unit
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation eXtra Information for Testing
TP	Test Purpose
TSS	Test Suite Structure

4 Test Suite Structure (TSS)

This TSS contains several components, some are specific of the gateway functionality and are new, while others are derived or form a subset of other TETRA specifications. TPs are either included in this ETS, or are referenced from another document.

Here is the list of the TSS components for the part dealing with an MS connected to a GateWay (DMO MS-GW):

at layer 3 also named NWK layer:
　　Direct Mode Call Control (DMCC):
　　　　Circuit Mode (CM): new component;
　　　　Short Data Service (SDS): derived from DMO MS-MS TPs in ETS 300 394-4-1 [4].
　　Direct Mode Mobility Management (DMMM): new component.
at layer 2:
　　MAC layer: derived from DMO MS-MS TPs in ETS 300 394-4-1 [4].

4.1 NWK layer or Layer 3 test groups

The first level separates the NWK layer (or layer 3) in different protocols (Circuit mode, Short Data Service). Next level splits protocol testing into functional test groups according to the type of testing: Capability test (CA), Valid Behaviour (BV) and Timer tests (TI). Further level classifies the possible operations in each protocol condition or state.

The following list defines the NWK layer test group names and identifiers used for those:

MS connected to a gateway GW (DMO_MSGW_NWK):
    Direct Mode Call Control (DMCC):
        Circuit mode (CM):
            Capability tests (CA);
            Valid Behaviour tests (BV):
                from Idle state(ID);
                from Idle state, channel busy (IB);
                from TX occupation State (TXO);
                from RX occupation State (RO);
                from TX Reservation (TR);
                from RX Reservation State (RR).
            Timer Tests (TI).
        Short Data Service (SDS):
            Capability tests (CA);
            Valid Behaviour tests (BV):
                from Idle state(ID);
                from Idle state, channel busy (IB);
                from RX Occupation State (RO);
                from TX Reservation State (TR);
                from RX Reservation State (RR).
            Timer Tests (TI).
    Direct Mode Mobility Management (DMMM).

4.2 Layer 2 test groups

The first level of the Layer 2 test groups separates the test suite in functional test groups: CA, BV and TI. The second level of the test subgroups is used to form a division of protocol requirements.

In the case of an MS connected to a gateway, layer 2 contains the MAC only and is structured as follows:

MS connected to a gateway MAC layer (DMO_DMO_MSGW_MAC):
    Capability tests (CA);
    Valid behaviour tests (BV):
        Channel usage (CU);
        Signalling messages (SM);
        Traffic mode (TM).
    Timer tests (TI).

4.3 Test group description

Capability (CA) tests provide limited testing that the observable capabilities of the IUT are in accordance with the conformance requirements and the additional capabilities claimed in the PICS/PIXIT.

The Valid Behaviour (BV) group tests an IUT in response to valid behaviour of the test system. "Valid" means that a test event is syntactically and contextually correct. All test cases in the valid behaviour group are intended to verify as thoroughly as possible the various functions of the protocol.

Different timers are defined to supervise the various state transitions. The Timer (TI) test group is intended to verify that the IUT is reacting properly to an expiry of one of the timers or to a counter mismatch.

5 Introduction to Test Purposes (TPs)

The test purposes for each test suite are defined in clause 6 of this ETS for NWK layer and MAC layer.

5.1 Test purpose definition conventions

5.1.1 Text and MSCs

Each TP is described in a table that contains the following information:

Table 0

TP-Name The TP name is a unique identifier, specified according to the TP naming conventions defined in the subclause below. (it is also the name of the corresponding test case)	**Reference**: reference to the paragraph number of specification ETS 300 396-5 [2] stating this conformance requirement. For example: ETS 300 396-5 [2], 6.2.5.1
Purpose	purpose of the test itself, indicating for example the test performed against a requirement of the protocol, described by this test purpose. Example: test of changeover initiated from RX reservation state.
Test description	body of the test
Pass criteria	visible action to be observed at PCO to declare that the IUT passes the test and conforms to the specifications
Selection	expression based on ETS 300 396-8-3 [3] PICS statements, used to select or deselect the corresponding test case according to the options of the implementation.
Preamble	"None" or name of the preamble procedure bringing the IUT from idle state to the state required to run the test. For example: idle_to_RX_reservation.
Postamble	"None" or name of the postamble to bring the IUT back to idle state, for example: RX_occupation_to_idle.

The preambles and postambles are described using MSCs and are shown in the following paragraphs.

5.1.2 Preamble descriptions

Preambles are used to bring the IUT from the idle state to the state where the test takes place. As the protocol has different options, as for instance the use of presence check or the absence of presence check, there are several ways to reach a given state. The preamble has to be chosen according to the IUT capabilities and the implemented options.

5.1.2.1 Preamble registration

Without registration invitation

MSC Registration_uninvited_supp

| IUT | Tester |

```
/*
PREAMBLE:
Bring the IUT from Not Registered state to
Registration Accepted state  when
un–invited registration is supported
*/
```

NOT REGISTERED

< IMP!DM_REGISTER_REQUEST>

DM_GREGISTER_REQUEST

DM_GREGISTER ACCEPT

REGISTRATION ACCEPTED