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Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Test Case Library (TCL); Part 2: Abstract Test Suite (ATS) for Medium Access Control (MAC) layer - Portable radio Termination (PT)

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**Digital Enhanced Cordless Telecommunications (DECT);
Common Interface (CI); Test Case Library (TCL);
Part 2: Abstract Test Suite (ATS) for Medium Access Control
(MAC) layer - Portable radio Termination (PT)**

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ETSI

Postal address

F-06921 Sophia Antipolis Cedex - FRANCE

Office address

650 Route des Lucioles - Sophia Antipolis
Valbonne - FRANCE

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

Siret N° 348 623 562 00017 - NAF 742 C

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Internet

secretariat@etsi.fr

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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Project Digital Enhanced Cordless Telecommunications (DECT).

The present document is part 2 of a multi-part EN covering the Common Interface (CI) Test Case Library (TCL), as identified below:

- Part 1: "Test Suite Structure (TSS) and Test Purposes (TP) for Medium Access Control (MAC) layer";
- Part 2: "Abstract Test Suite (ATS) for Medium Access Control (MAC) layer - Portable radio Termination (PT)";**
- Part 3: "Abstract Test Suite (ATS) for Medium Access Control (MAC) layer - Fixed radio Termination (FT)";
- Part 4: "Test Suite Structure (TSS) and Test Purposes (TP) - Data Link Control (DLC) layer";
- Part 5: "Abstract Test Suite (ATS) - Data Link Control (DLC) layer";
- Part 6: "Test Suite Structure (TSS) and Test Purposes (TP) - Network (NWK) layer - Portable radio Termination (PT)";
- Part 7: "Abstract Test Suite (ATS) for Network (NWK) layer - Portable radio Termination (PT)";
- Part 8: "Test Suite Structure (TSS) and Test Purposes (TP) - Network (NWK) layer - Fixed radio Termination (FT)";
- Part 9: "Abstract Test Suite (ATS) for Network (NWK) layer - Fixed radio Termination (FT)".

National transposition dates

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1 Scope

The present document contains the Abstract Test Suite (ATS) to test the DECT Portable Part (PP) Medium Access Control (MAC) layer.

The objective of this test specification is to provide a basis for approval tests for DECT equipment giving a high probability of air interface inter-operability between different manufacturer's DECT equipment. This test specification contains the ATS specification for testing of the MAC layer at the Portable radio Termination (PT).

The ISO standard for the methodology of conformance testing (ISO/IEC 9646, parts 1 to 7 [13] to [19]) as well as the ETSI rules for conformance testing in ETS 300 406 [8] are used as the basis for the test methodology.

Test specifications for the Physical Layer (PHL) are provided in other DECT ENs.

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

Annex B provides the specification of the parallel test component LT_MAC.

Annex C provides the Partial Protocol Implementation Extra Information for Testing (PIXIT) Proforma of this ATS.

Annex D 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.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

- [1] EN 300 175-1: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 1: Overview".
- [2] EN 300 175-2: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 2: Physical Layer (PHL)".
- [3] EN 300 175-3: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 3: Medium Access Control (MAC) layer".
- [4] EN 300 175-4: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 4: Data Link Control (DLC) layer".
- [5] EN 300 175-6: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 6: Identities and addressing".
- [6] EN 300 175-7: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 7: Security features".
- [7] EN 300 175-8: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 8: Speech coding and transmission".
- [8] ETS 300 406: "Methods for Testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".

- [9] ETS 300 474 Parts 1 and 2: "Digital Enhanced Cordless Telecommunications (DECT); Generic Access Profile (GAP); Profile requirement list and profile specific Implementation Conformance Statement (ICS) proforma".
- [10] EN 300 497-1: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI) Test Case Library (TCL); Part 1: Test Suite Structure (TSS) and Test Purposes (TP) for Medium Access Control (MAC) layer".
- [11] EN 300 497-5: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI) Test Case Library (TCL); Part 5: Abstract Test Suite (ATS) - Data Link Control (DLC) layer".
- [12] ETR 141: "Methods for Testing and Specification (MTS); Protocol and profile conformance testing specifications; The Tree and Tabular Combined Notation (TTCN) style guide".
- [13] ISO/IEC 9646-1: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts".
- [14] ISO/IEC 9646-2: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 2: Abstract Test Suite Specification".
- [15] ISO/IEC 9646-3: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 3: The Tree and Tabular Combined Notation (TTCN)".
- [16] ISO/IEC 9646-4: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 4: Test realization".
- [17] ISO/IEC 9646-5: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 5: Requirements on test laboratories and clients for the Conformance Assessment process".
- [18] ISO/IEC 9646-6: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 6: Protocol Profile Test Specification".
- [19] ISO/IEC 9646-7: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 7: Implementation Conformance statement".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the definitions given in ISO/IEC 9646-1 [13] and EN 300 175-1 [1] apply.

3.2 Abbreviations

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

ASP	Abstract Service Primitive
ATM	Abstract Test Method
ATS	Abstract Test Suite
BI	Invalid Behaviour
BO	Inopportune Behaviour
BV	Valid Behaviour
CA	Capability tests
CM	Co-ordination Message
CP	Co-ordination Point
DECT	Digital Enhanced Cordless Telecommunication
DLC	Data Link Control
FT	Fixed radio Termination
IUT	Implementation Under Test

LT	Lower Tester
MAC	Medium Access Control
MTC	Main Test Component
PCO	Point of Control and Observation
PDU	Protocol Data Unit
PHL	Physical Layer
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation Extra Information for Testing
PT	Portable radio Termination
PTC	Parallel Test Component
SAP	Service Access Point
SUT	System Under Test
TP	Test Purposes
TSS	Test Suite Structure
TTCN	Tree and Tabular Combined Notation
UT	Upper Tester

4 Abstract Test Method (ATM)

This clause describes the ATM used to test the DECT MAC layer protocol at the Portable radio Termination (PT).

4.1 Description of ATM

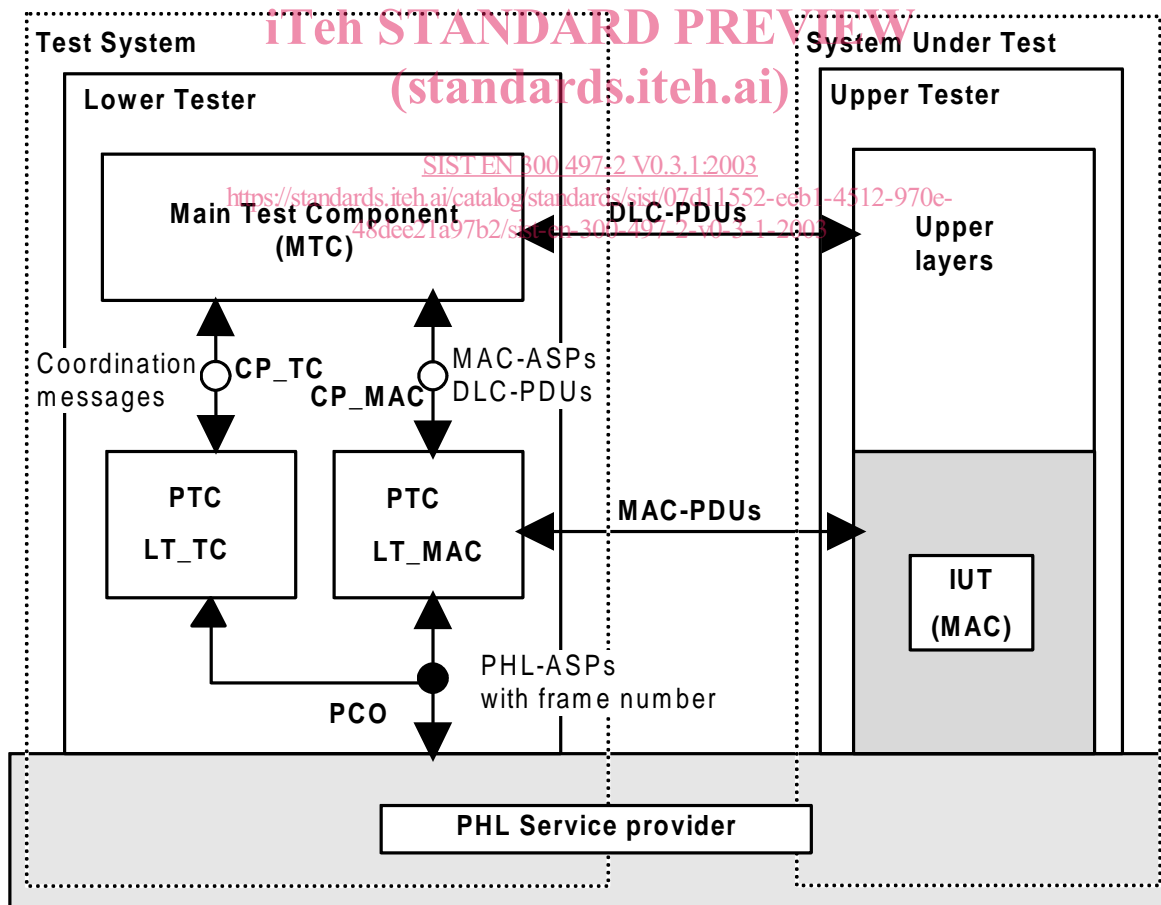


Figure 1: Remote test method, embedded variant

A single-party testing concept is used, which consists of the following abstract testing functions:

- PCO:** the Point of Control and Observation (PCO) for MAC Layer testing is located at the D-Service Access Point (D-SAP) between the MAC layer and the Physical layer. All test events at the PCO are specified in terms of Physical Layer - Abstract Service Primitives (PHL-ASPs) (frame number parameter added);
- CP_TC:** Co-ordination Point Test Case (CP_TC) is located between the Main Test Component (MTC) and Parallel Test Component (PTC) LT_TC in the test system. It is used for passing co-ordination messages between these two testing functions;
- CP_MAC:** Co-ordination Point MAC (CP_MAC) is located between the MTC and PTC LT_MAC in the test system. It is equivalent to the PCO used for Data Link Control (DLC) layer testing in part 6 of the present document. All co-ordination messages at this CP are specified in terms of MAC-ASPs and DLC Protocol Data Units (DLC-PDUs);
- PTC LT_TC:** the Lower Tester Parallel Test Component LT_TC (PTC LT_TC) is located in the test system. It makes restricted use of the PCO by only observing the test events in both directions. It assigns preliminary verdicts (the MTC assigns the final verdict);

NOTE: This restricted use of the PCO is a non-ISO/IEC 9646-2 [14] application of the PCO.

PTC LT_MAC: the Lower Tester Parallel Test Component LT_MAC (PTC LT_MAC) is located in the test system. It provides indirect control and observation of the Implementation Under Test (IUT) during test execution, via the underlying service-provider. It does not assign any verdict;

MTC: the Main Test Component (MTC) is located in the test system. It is responsible for creating and terminating the PTCs, managing the co-ordination points CP_TC and CP_MAC, and computation of the final test case verdict;

Upper layers: no explicit Upper Tester (UT) exists in the test system. However, the System Under Test (SUT) (upper layers) needs to carry out some functions to achieve some effects of test co-ordination procedures.

The primitives used at the PCO (physical SAP) are defined according to EN 300 175-2 [2] clause 7 and associated subclauses.

The co-ordination messages used at CP_MAC co-ordination point are abstract primitives including protocol data units and frames. The abstract primitives (MAC ASPs) are defined according to EN 300 175-3 [3] clause 8 and associated subclauses. Two abstract primitives for starting and stopping the synchronization between the main test component and the parallel test component LT_MAC are added for the needs of the tester. The protocol data units (DLC C-plane PDUs) are defined according to EN 300 175-4 [4] clause 7 and associated subclauses. The frames (DLC U-plane frames) are defined according to EN 300 175-4 [4] clause 12 and associated subclauses.

4.2 Test strategy

The ATM defined in subclause 4.1 requires the use of concurrent TTCN, which is specified in Amendment 1 of ISO/IEC 9646-3 [15]. The parallel test components PTC_TC and PTC_MAC are, however, seen as two independent entities. This means that there is no communication or synchronization between the two PTCs during the test.

PTC_TC is specified in TTCN (see annex A). Since PTC_TC is only observing at the PCO, this ATS does not contain any send statements. Once the Test Purposes (TP) are fulfilled, the PTC_TC terminates, i.e. there are no post ambles, unless required by the TP. No explicit co-ordination messages is exchanged at CP_TC. To simplify the TTCN test cases, the underlying service provider has been assigned the task of frame numbering. Consequently, a frame parameter has been added to some of the PHL-ASPs.

The requirements for PTC_MAC (see annex B) are specified using ETS 300 474 [9].

The Main Test Component (MTC) creates the two PTCs (using CREATE operation), stimulates the PTC_MAC (using MAC ASPs at CP_MAC) and then waits for the two PTCs to terminate (using the DONE event). The final verdict is computed as follows:

- a PASS is assigned if PTC_TC returns a PASS verdict and the expected event is received from PTC_MAC at CP_MAC;
- a FAIL verdict is assigned if PTC_TC returns a FAIL verdict independently of what is received from PTC_MAC at CP_MAC;
- an INCONC verdict is assigned if: PTC_TC returns an INCONC verdict and the expected event is received from PTC_MAC at CP_MAC, or returns a PASS verdict and an unexpected event is received from PTC_MAC at CP_MAC.

5 Untestable Test Purposes (TP)

This clause gives a list of TP which are not implemented in the ATS for PTC LT_TC (see annex A) due to the chosen ATM or other restrictions.

Table 1: Untestable TP

Test purpose	Reason
TP/DB/BV-00	It is not possible to distinguish, without confusion, if the PT is unlocked or crashed.
TP/PG/BV-00	No procedure can be defined to verify that the Fixed radio Termination (FT) manages correctly the paging Extended Flag when it transmit pages.

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6 ATS conventions (only applicable for PTC LT_TC)

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The ATS conventions are intended to give a better understanding of the ATS but they also describe the conventions made for the development of the ATS. These conventions shall be considered during any later maintenance or further development of the ATS.

The ATS conventions contain two clauses, the naming conventions and the implementation conventions. The naming conventions describe the structure of the naming of all ATS elements. The implementation conventions describe the functional structure of the ATS.

To define the ATS, the guidelines of the documents ETS 300 406 [8] and ETR 141 [12] were considered.

6.1 Naming conventions

6.1.1 Declarations part

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

6.1.1.1 General

The following general rules apply for the name giving in the declarations part. All type definitions (simple type definitions, structured type definitions, ASP type definitions and PDU type definitions) shall be written in uppercase.

All element names (structured type definition), parameter names (ASP type definition) and field names (PDU type definition) shall be written in lowercase.

Predefined types (e.g. BITSTRING [8]) are never used in structured type definitions, ASP type definitions or PDU type definitions. Simple types are used instead.