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Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Test Case Library (TCL); Part 3: Abstract Test Suite (ATS) for Medium Access Control (MAC) layer - Fixed radio Termination (FT)

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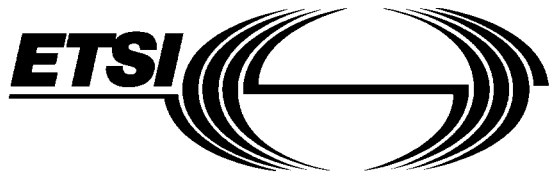
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Contents

Foreword

This European Telecommunication Standard (ETS) has been produced by the Radio Equipment and Systems (RES) Technical Committee of the European Telecommunications Standards Institute (ETSI).

The DECT Test Specification multipart ETS comprises nine parts, as follows:

Part 1:   "Part 1: Test Suite Structure (TSS) and Test Purposes (TP) for Medium Access Control (MAC) layer".

Part 2:   "Part 2: Abstract Test Suite (ATS) for Medium Access Control (MAC) layer - Portable radio Termination (PT)".

Part 3:   "Part 3: Abstract Test Suite (ATS) for Medium Access Control (MAC) layer - Fixed radio Termination (FT)".

Part 4:   "Part 4: Test Suite Structure (TSS) and Test Purposes (TP) - Data Link Control (DLC) layer".

Part 5:   "Part 5: Abstract Test Suite (ATS) - Data Link Control (DLC) layer".

Part 6:   "Part 6: Test Suite Structure (TSS) and Test Purposes (TP) - Network (NWK) layer - Portable radio Termination (PT)".

Part 7:   "Part 7: Abstract Test Suite (ATS) for Network (NWK) layer - Portable radio Termination (PT)".

Part 8:   "Part 8: Test Suite Structure (TSS) and Test Purposes (TP) - Network (NWK) layer - Fixed radio Termination (FT)".

Part 9:   "Part 9: Abstract Test Suite (ATS) for Network (NWK) layer - Fixed radio Termination (FT)".

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1 Scope

This European Telecommunication Standard (ETS) contains the Abstract Test Suite (ATS) to test the DECT FP 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 part contains the ATS specification for testing of the MAC layer at the FT.

The ISO standard for the methodology of conformance testing (ISO/IEC 9646 [21] to [27]) as well as the ETSI rules for conformance testing (ETS 300 406 [29]) are used as basis for the test methodology.

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

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 Normative references

This ETS incorporates, by dated or 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]   ETS 300 175-1 (1992): "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Common interface; Part 1: Overview".

[2]   ETS 300 175-2 (1992): "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Common interface; Part 2: Physical layer".

[3]   ETS 300 175-3 (1992): "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Common interface; Part 3: Medium access control layer".

[4]   ETS 300 175-4 (1992): "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Common interface; Part 4: Data link control layer".

[5]   ETS 300 175-5 (1992): "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Common interface; Part 5: Network layer".

[6]   ETS 300 175-6 (1992): "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Common interface; Part 6: Identities and addressing".

[7]   ETS 300 175-7 (1992): "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Common interface; Part 7: Security features".

[8]   ETS 300 175-8 (1992): "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Common interface; Part 8: Speech coding and transmission".

[9]   ETS 300 175-9 (1992): "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Common interface; Part 9: Public access profile".

[10]   ETS 300 444: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Generic Access Profile (GAP)".

[11]   ETS 300 370: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications/Global System for Mobile communications (DECT/GSM) inter-working profile; Access and mapping (Protocol/procedure description for 3,1 kHz speech service)".

[12]   ETS 300 434: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT) and Integrated Services Digital Network (ISDN) inter-working for end system configuration".

[13]   ETS 300 331: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); DECT Authentication Module (DAM)".

[14]   CCITT Recommendation G.726 (1991): "40, 32, 24, 16 kbit/s adaptive differential pulse code modulation (ADPCM)".

[15..20] Reserved values.

[21]   ISO/IEC 9646-1 (1991): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts". (See also CCITT Recommendation X.290 (1991)).

[22]   ISO/IEC 9646-2 (1991): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 2: Abstract test suite specification". (See also CCITT Recommendation X.291 (1991)).

[23]   ISO/IEC 9646-3 (1991): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 3: The tree and tabular combined notation". (See also CCITT Recommendation X.292 (1992)).

[24]   ISO/IEC 9646-4 (1991): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 4: Test realisation". (See also CCITT Recommendation X.292 (1992)).

[25]   ISO/IEC 9646-5 (1991): "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 CCITT Recommendation X.292 (1992)).

[26]   ISO/IEC 9646-6 (1991): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 6: Protocol profile test specification".

[27]   ISO/IEC 9646-7 (1991): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 7: Implementation conformance statement".

[28]   ISO 7498: "Information Processing Systems - Open Systems Interconnection - Basic Reference model".

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

[30]   91/263/EEC: "Council Directive of 29 April 1991 on the approximation of the laws of the Member states concerning telecommunications terminal equipment, including the mutual recognition of their conformity. (Terminal Directive)".

[31..40]   Reserved values.

[41]   I-ETS 300 176: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Approval test specification".

[42]   TBR 6: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); General terminal attachment requirements".

[43]   TBR 10: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); General terminal attachment requirements: Telephony applications".

[44]   TBR 11 (1992): "Radio Equipment and Systems (RES); Attachment requirements for terminal equipment for Digital European Cordless Telecommunications (DECT) Public Access Profile (PAP) applications".

[45]   ETS 300 323 (1994): "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Public Access Profile (PAP) test specification".

[46]   ETS 300 476: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Protocol Implementation Conformance Statement (PICS) proforma".

[47]   ETS 300 497: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI) Test Case Library (TCL)".

[48]   ETS 300 474: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Generic Access Profile (GAP); Profile requirement list and profile specific Implementation Conformance Statement (ICS) proforma".

[49]   ETS 300 494: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Generic Access Profile (GAP); Profile Test Specification (PTS)".

[50]   TBR 22: "Radio Equipment and Systems (RES); Attachment requirements for terminal equipment for Digital Enhanced Cordless Telecommunications (DECT) Generic Access Profile (GAP) applications".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of this ETS, the definitions given in ISO/IEC 9646-1 [21] and ETS 300 175-1 [1] apply.

3.2 DECT abbreviations

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

AC	Authentication Code
CC	Call Control
CI	Common Interface
CLMS	Connectionless Message Services (CL)
CM	Co-ordination Message
COMS	Connection Oriented Message Services (CO)
CTS	Conformance Testing Services
DECT	Digital Enhanced Cordless Telecommunication
DLC	Data Link Control
DSAA	DECT Standard Authentication Algorithm
DSCA	DECT Standard Cipher Algorithm 1
ETS	European Telecommunication Standard
ISO	International Organisation for Standardisation
ETSI	European Telecommunications Standards Institute
FT	Fixed radio Termination
IPUI	International Portable User Identity
IPEI	International Portable Equipment Identity
IWU	InterWorking Unit
LC	Link Control entity
MAC	Medium Access Control
ME	Management Entity
MM	Mobility Management
NWK	Network
PAP	Public Access Profile
PARK	Portable Access Rights Key
PHL	Physical Layer
PT	Portable radio Termination
RPN	Radio Fixed Part Number
SAP	Service Access Point
SARI	Secondary access rights identity
SDU	Service data unit
UAK	User Authentication Key

3.3 ISO 9646 abbreviations

For the purposes of this ETS, the following ISO 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
CP	Co-ordination Point
IUT	Implementation Under Test
LT	Lower Tester
MTC	Main Test Component
PCO	Point of Control and Observation
PDU	Protocol Data Unit
PICS	Protocol Implementation Conformance Statements
PIXIT	Protocol Implementation eXtra Information for Testing
PTC	Parallel Test Component

SUT   System Under Test
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 to test the DECT MAC layer protocol at the Fixed radio Termination (FT).
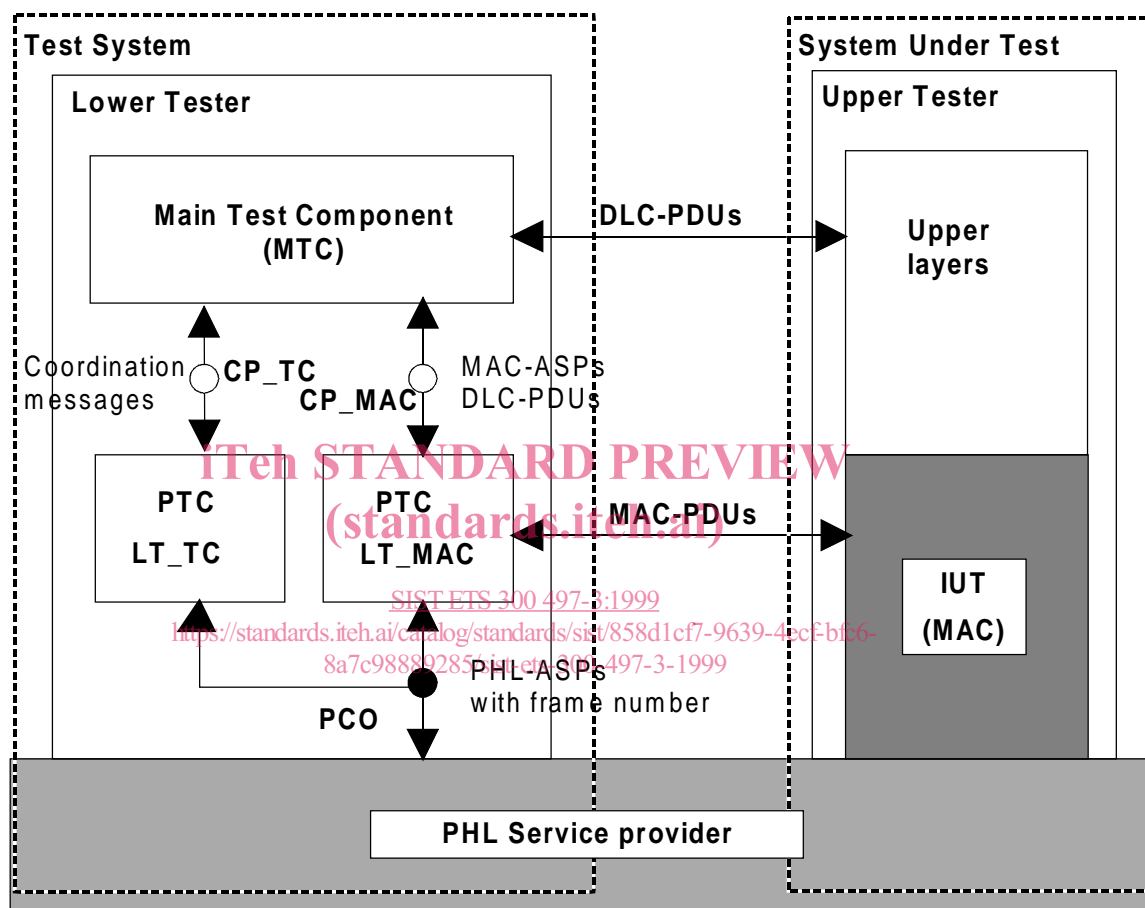
4.1   Description of ATM

Figure 1: Remote test method, embedded variant

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

PCO: the PCO for MAC Layer testing is located at the D-SAP between the MAC layer and the Physical layer. All test events at the PCO are specified in terms of PHL-ASPs (frame number parameter added).

CP_TC: co-ordination Point Test Case (CP_TC) is located between the MTC and 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 DLC layer testing in part 6 of this ETS. All co-ordination messages at this CP are specified in terms of MAC-ASPs and 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 9646-2 [22] 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 IUT during test execution, via the underlying service-provider. It does not assign any verdicts.

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 SUT (upper layers) needs to carry out some UT functions to achieve some effects of test co-ordination procedures.

The primitives used at the PCO (physical SAP - DSAP) are defined according to ETS 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 ETS 300 175-3 [3], clause 8 and associated subclauses. Two abstract primitives for starting and stopping the synchronisation 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 ETS 300 175-4 [4], clause 7 and associated subclauses. The frames (DLC U-plane frames) are defined according to ETS 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 9646-3 [23]. The parallel test components PTC_TC and PTC_MAC is, however, seen as two independent entities. This means that there is no communication or synchronisation between the two PTCs during the test.

PTC_TC is specified in TTCN (annex A). Since PTC_TC is only observing at the PCO, this ATS does not contain any send statements. Once the test purpose (TP) is fulfilled, the PTC_TC terminates, i.e. there are no postambles, 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 (annex B) are specified using ETS 300 474 [48].

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 (TPs)

This clause gives a list of TPs which are not implemented in the ATS for PTC LT_TC (annex A) due to the chosen abstract test method or other restrictions.

Table 1: Untestable TPs

Test purpose	Reason
TP/PG/BV-00	No procedure can be defined to verify that the FT manages correctly the paging Extended Flag when it transmit pages.

6   ATS Conventions (only applicable for PTC LT_TC)

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 [29] and ETR 141 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 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.

All declarations in the test suite are listed in alphabetical order. A different order of listing should be used for only maintenance reason.

6.1.1.2   Test suite operations definition

The test suite operation identifiers are composed of substrings in lowercase letters, except for standard prefix "TSO_". Each substring is separated by an underscore character ("_").

EXAMPLE: TSO_substring.