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Digital Enhanced Cordless Telecommunications (DECT); DECT Packet Radio Service (DPRS) Test Case Library (TCL); Part 7: Test Suite Structure (TSS) and Test Purposes (TP) - Network (NWK) layer

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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 7 of a multi-part deliverable covering the Digital Enhanced Cordless Telecommunications (DECT); DECT Packet Radio Service (DPRS) Test Case Library (TCL), as identified below:

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

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

Part 3: "Abstract Test Suite (ATS) - 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 - Portable radio Termination (PT)";

Part 6: "Abstract Test Suite (ATS) - Data Link Control (DLC) layer - Fixed radio Termination (FT)";

Part 7: "Test Suite Structure (TSS) and Test Purposes (TP) - Network (NWK) layer";

Part 8: "Abstract Test Suite (ATS) - Network (NWK) layer - Portable radio Termination (PT)";

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

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1 Scope

The present document contains the Test Suite Structure (TSS) and Test Purposes (TP) to test the DECT Packet Radio Service (DPRS) Network (NWK) layer.

The objective of this test specification is to provide a basis for conformance tests for DECT equipment giving a high probability of air interface inter-operability between different manufacturers' DECT equipment.

The ISO standard for the methodology of conformance testing (ISO/IEC 9646-1 [9] and ISO/IEC 9646-2 [10]) as well as the ETSI rules for conformance testing (ETS 300 406 [8]) are used as a basis for the test methodology.

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] ETSI EN 300 175-3: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 3: Medium Access Control (MAC) layer".

[2] ETSI EN 300 175-5: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 5: Network (NWK) layer".

[3] ETSI EN 300 175-6: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 6: Identities and addressing".

[4] ETSI EN 300 175-7: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 7: Security features".

[5] ETSI EN 300 444: "Digital Enhanced Cordless Telecommunications (DECT); Generic Access Profile (GAP)".

[6] ETSI EN 301 649: "Digital Enhanced Cordless Telecommunications (DECT); DECT Packet Radio Services (DPRS)".

[7] ETSI EN 300 824: "Digital Enhanced Cordless Telecommunications (DECT); Cordless Terminal Mobility (CTM); CTM Access Profile (CAP)".

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

[9] ISO/IEC 9646-1: "Information technology - Open Systems InterConnection - Conformance testing methodology and framework - Part 1: General concepts". (See also ITU-T Recommendation X.290).

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

[11] ISO/IEC 9646-6: "Information technology - Open Systems InterConnection - Conformance testing methodology and framework - Part 6: Protocol profile test specification".

[12] 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 following terms and definitions apply:

a) the terms given in ISO/IEC 9646-7 [12]; and

b) the definitions given in EN 300 175-5 [2].

3.2 Abbreviations

For the purposes of the present document, the abbreviations defined in ISO/IEC 9646-1 [9], ISO/IEC 9646-6 [11], ISO/IEC 9646-7 [12] and EN 300 175-5 [2] apply. In particular, the following abbreviations apply:

AC	Authentication Code
AR	Access Rights
BI	Invalid Behaviour
BO	InOpportune Behaviour
BV	Valid Behaviour
CA	Capability tests
CC	Call Control
DLC	Data Link Control layer
FP	Fixed Part
FT	Fixed radio Termination
IPUI	International Portable User Identity
IUT	Implementation Under Test
LCE	Link Control Entity
LT	Lower Tester
MAC	Medium Access Control
ME	Management Entity
MM	Mobility Management
NWK	Network layer
PARK	Portable Access Rights Key
PDU	Protocol Data Unit
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation Extra Information for Testing
PP	Portable Part
PT	Portable radio termination
RFP	Radio Fixed Part
TP	Test Purposes
TSS	Test Suite Structure
UAK	User Authentication Key

4 Test suite structure

4.1 Overview

The Network (NWK) layer is layer 3 of the DECT protocol stack.

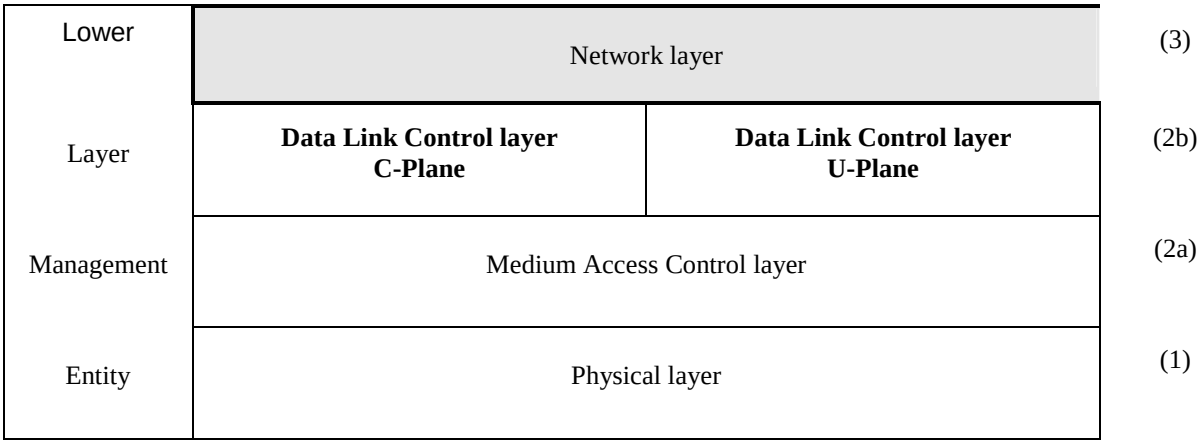

Figure 1: DECT protocol stack

Figure 2 shows the NWK (TSS) including its subgroups and defined for the conformance testing.

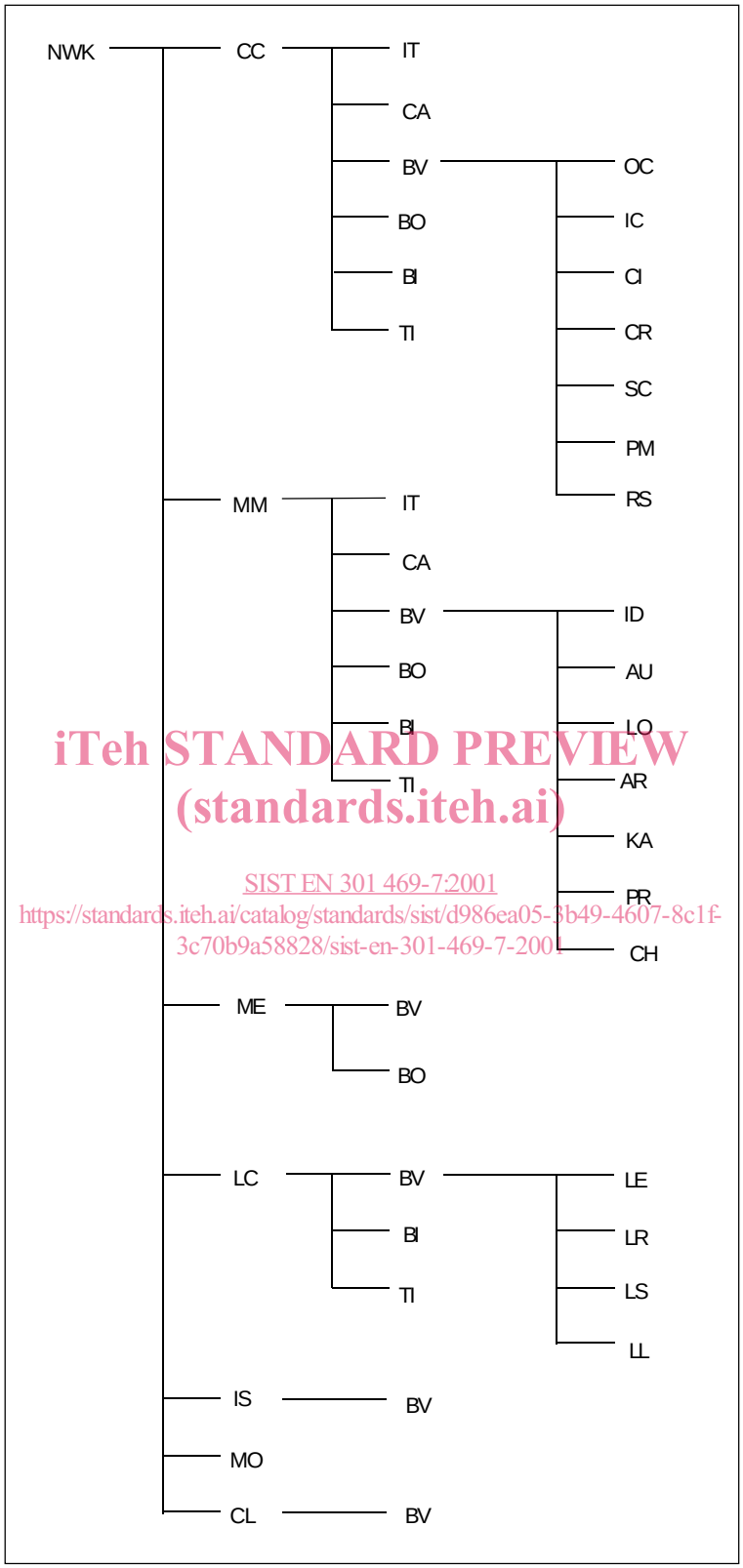

Figure 2: NWK (TSS)

4.2 Test suite structure (TSS)

The test suite is structured as a tree with a first level defined as NWK representing the protocol group "NWK for Portable Part (PP) and Fixed Part (FP)".

4.3 Test groups

The test groups are organized in multiple levels. The first level creates seven protocol groups representing the network entities. The last level contains the standard ISO subgroups IT, CA, BV, BO, BI, and TI.

4.3.1 Protocol groups

4.3.1.1 Call Control (CC)

Refer to EN 300 175-5 [2], subclause 5.2 and clause 9.

4.3.1.2 Mobility Management (MM)

Refer to EN 300 175-5 [2], subclause 5.6 and clause 13.

4.3.1.3 Lower Layer Management Entity (LLME)

Refer to EN 300 175-5 [2], clause 15.

4.3.1.4 Link Control (LC)

Refer to EN 300 175-5 [2], subclause 5.7 and clause 14.

4.3.1.5 Call Independent Supplementary Services (CISS)

Refer to EN 300 175-5 [2], subclauses 5.3 and 10.4.2.2.

4.3.1.6 Connection Oriented Message Services (COMS)

Refer to EN 300 175-5 [2], subclause 5.4 and clause 11.

4.3.1.7 ConnectionLess Message Services (CLMS)

Refer to EN 300 175-5 [2], subclause 5.5 and clause 12.

4.3.2 Main test groups

4.3.2.1 Basic InTerConnection tests (IT)

IT tests provide limited testing of an Implementation Under Test (IUT) in order to establish that there is sufficient conformance for possible interconnection without trying to perform thorough testing. In particular, only those test cases will be executed which will assure the sufficient interconnection between the IUT of the NWK layer and the test system exists, so that the rest of the test cases can then be put into execution.

4.3.2.2 CApability tests (CA)

CA tests provide limited testing that the observable capabilities of the IUT are in accordance with the static conformance requirements and the additional capabilities claimed in the Protocol Implementation Conformance Statement/Protocol Implementation Extra Information for Testing (PICS/PIXIT). In particular, this test group can be regarded as a set of spot checks for all the capabilities of the IUT stated in the PICS/PIXIT. The scope of the test group is the observable capabilities of the IUT with respect to NWK layer connection, call control, and the mobility management.

4.3.2.3 Valid Behaviour tests (BV)

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.

4.3.2.4 Invalid Behaviour tests (BI)

BI group is intended to verify that the IUT is able to react properly in case an invalid protocol data unit (message) occurring. Invalid Protocol Data Unit (PDU) here means syntactically or semantically invalid test events generated by the test system. A syntactically or semantically invalid test event regardless of the current state is not allowed.

4.3.2.5 InOpportune Behaviour tests (BO)

BO test group is intended to verify that the IUT is able to react properly in case an inopportune test event occurring. Such an event is syntactically correct, but occurs when it is not allowed.

4.3.2.6 TImer expiry and counter mismatch tests (TI)

Different timers and counters are defined to supervise the various state transitions. This test subgroup is intended to verify that the IUT is reacting properly to an expiry of one of the timers or counters mismatch.

5 Test Purposes

5.1 Introduction

5.1.1 TP definition conventions

The TPs are defined following particular rules as shown in table 1.

Table 1: TP definition rules

TP Id according to the TP naming conventions	Reference. Initial condition. Stimulus. Expected behaviour.
TP Id **Reference** **Condition** **Stimulus** **Expected behaviour**	The TP Id is a unique identifier it shall be specified according to the TP naming conventions defined in the subclause below. The reference should contain the references of the subject to be validated by the actual TP (specification reference, clause, paragraph). The condition defines in which initial state the IUT has to be to apply the actual TP. The stimulus defines the test event to which the TP is related. Definition of the events that are expected from the IUT to conform to the base specification.

5.1.2 TP naming conventions

The identifier of the TP is built according to table 2.

Table 2: TP naming convention

Identifier:	**TP/<fm>/<x>/<s>/<nn>**			
	<fm> =	functional module	CC	Call Control
			MM	Mobility Management
			LC	Link Control Entity
			IS	Call Independent Supplementary Services
			CL	Connectionless Message Service
	x =	Type of testing	CA	CApability Tests
			BV	Valid Behaviour Tests
			BO	Inopportune Behaviour Tests
			TI	Timer expiry and counter mismatch tests
	s =	Test subgroup	OC	Outgoing Call establishment
			CI	Call Information
			CR	Call Release
			SC	Service Change
			RS	Call Related Supplementary services
			SN	Service Negotiation
			MP	Multi-purposes tests
			HP	Handover procedures
			SR	Suspend and Resume procedures
			ID	Identification
			AU	Authentication
			LO	Location
			AR	Access Rights
			KA	Key Allocation
			CH	Ciphering
			LE	Connection oriented Link Establishment
			LR	Connection oriented Link Release
	<nn> =	sequential number	(01-99)	Test Purpose Number

5.1.3 Sources of TP definitions

All TPs are specified according to EN 300 175-5 [2] with respect to the requirements expressed in EN 301 649 [6].

5.2 Test purposes for FT part

5.2.1 TP presentation

Test purposes are presented by a logical grouping related to NWK features. The naming is in line with the test suite structure. Test purposes which do not already exist in the CI test case library are highlighted by prefixing the word data to their test purpose number.

5.2.2 Dynamic parameters allocation and NWK layer management

DPRS-N.38, Dynamic parameters allocation		
	Dynamic parameters allocation	EN 301 649 [6]: 12.11
DPRS-N.41, NWK layer management		
	Management of MM procedures	EN 301 649 [6]: 12.22
	Location registration initiation management	EN 300 444 [5]: 13.2
	Assigned individual TPUI management	EN 300 444 [5]: 13.4
	PMID management	EN 300 444 [5]: 13.5
	DCK management	EN 300 444 [5]: 13.6
	Broadcast attributes management	EN 301 649 [6]: 12.20
	Storage of subscription related data management	EN 301 649 [6]: 12.xx-
	U-plane handling	EN 301 649 [6]: 12.21

These two features are implicitly covered by the test purposes defined for all other NWK features.

5.2.3 SARI support

DPRS M.15 SARI support		
	Downlink broadcast.	EN 300 175-3 [1]: 7.2.3.6.

TP/FT/CC/BV/OC-06	M.15 SARI support. EN 300 175-3 [1]: 11.3.2, EN 300 175-6 [3]: 5.6. Initial state: F-00. Verify that the IUT can correctly establish a following outgoing call from the LT when the LT has use SARI as the means to lock to the IUT.

5.2.4 Outgoing call

DPRS-N.1, Outgoing call		
	Outgoing call request	EN 301 649 [6]: 12.1
	Overlap sending	EN 300 444 [5]: 8.3
	Outgoing call proceeding	EN 300 444 [5]: 8.4
	Outgoing call confirmation	EN 300 444 [5]: 8.5
	Outgoing call connection	EN 300 444 [5]: 8.6
	Sending keypad information	EN 300 444 [5]: 8.10
DPRS-N.2, Off Hook		
	Outgoing call request	EN 300 444 [5]: 8.2
DPRS-N.3, On Hook (full release)		
	Normal call release	EN 300 444 [5]: 8.7
	Abnormal call release	EN 300 444 [5]: 8.8
DPRS-N.21, Partial release		
	Partial release	EN 300 444 [5]: 8.9