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Digital Enhanced Cordless Telecommunications (DECT); Radio in the Local Loop (RLL)
Access Profile (RAP); Part 1: Basic telephony services

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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 1 of a multi-part Telecommunications series covering the Radio in the Local Loop (RLL) Access Profile (RAP), as identified below:

Part 1: "Basic telephony services";

Part 2: "Advanced telephony services".

Every EN prepared by ETSI is a voluntary standard. The present document may contain text concerning conformance testing of the equipment to which it relates. This text should be considered as guidance only and does not make the present document mandatory.

The present document is based on EN 300 175, parts 1 [1] to 8 [8] and EN 300 444 [10]. The present document has been developed in accordance to the rules of documenting a profile specification as described in ISO/IEC 9646-6 [12].

National transposition dates

Date of adoption of this EN:	23 June 2000
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Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 March 2001
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1 Scope

The present document specifies that set of technical requirements for Digital Enhanced Cordless Telecommunications (DECT) Fixed Part (FP) and DECT Cordless Terminal Adapter (CTA) necessary for the support of the Radio in the Local Loop (RLL) Access Profile (RAP).

The objective of the present document is to ensure the air interface interoperability of DECT RAP CTAs and DECT RAP FPs and Wireless Relay Stations (WRS) if applied.

In addition, the present document defines the features, services, procedures etc. for the CTA and the FT, which are provision mandatory either in the CTA or in the FT, as well as some elements that are provision optional but still process mandatory.

Another objective is to use as much as possible from the existing GAP profile, but to exclude the not applicable GAP-features. Therefore most of the RAP features refer to GAP [10] features and the necessary additional features (for example Operation, Administration, and Maintenance (OA&M)) are listed and explained in the present document.

The present document (i.e. part 1), contains the so called "Plain Old Telephone Service (POTS)" services including leased lines and 64 kbit/s bearer service.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

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- 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 300 175-1: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 1: Overview".
- [2] ETSI EN 300 175-2: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 2: Physical Layer (PHL)".
- [3] ETSI EN 300 175-3: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 3: Medium Access Control (MAC) Layer".
- [4] ETSI EN 300 175-4: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 4: Data Link Control (DLC) Layer".
- [5] ETSI EN 300 175-5: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 5: Network (NWK) Layer".
- [6] ETSI EN 300 175-6: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 6: Identities and Addressing".
- [7] ETSI EN 300 175-7: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 7: Security Features".
- [8] ETSI EN 300 175-8: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 8: Speech Coding and Transmission".
- [9] ETSI EN 300 176: "Digital Enhanced Cordless Telecommunications (DECT); Approval Test Specification".

- [10] ETSI EN 300 444: "Digital Enhanced Cordless Telecommunications (DECT); Generic Access Profile (GAP)".
- [11] ETSI EN 300 700: "Digital Enhanced Cordless Telecommunications (DECT); Wireless Relay Station (WRS)".
- [12] ISO/IEC 9646-6: "Information Technology - Open system Interconnection - Conformance testing methodology and framework: Protocol profile test specification".
- [13] ISO/IEC 9646-7: "Information Technology - Open system Interconnection - Conformance testing methodology and framework: Implementation Conformance Statements".
- [14] ETSI TBR 6: "Digital Enhanced Cordless Telecommunications (DECT); General terminal attachment requirements".
- [15] ETSI TBR 10: "Digital Enhanced Cordless Telecommunications (DECT); General terminal attachment requirements; Telephony applications".
- [16] ETSI ETR 246: "Digital Enhanced Cordless Telecommunications (DECT); Application of DECT Wireless Relay Stations (WRS)".
- [17] ETSI ETR 308: "Digital Enhanced Cordless Telecommunications (DECT); Services, facilities and configurations for DECT in the local loop".
- [18] ITU-T Recommendation V.25: "Automatic answering equipment and general procedures for automatic calling equipment on the general switched telephone network including procedures for disabling of echo control devices for both manually and automatically established calls".
- [19] ITU-T Recommendation G.164: "Echo suppressors".
- [20] ITU-T Recommendation G.165: "Echo cancellers".
- [21] CEPT Recommendation T/R 22-02: "Frequency band to be designated for the European Digital Cordless Telecommunication system (DECT)".

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3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the following definitions apply:

Authentication: the process whereby a DECT subscriber is positively verified to be a legitimate user of a particular FP

NOTE 1: Authentication is generally performed at call set-up, but may also be done at any other time (e.g. during a call).

Bearer service: type of telecommunication service that provides a defined capability for the transmission of signals between user-network interfaces

NOTE 2: The DECT user-network interface corresponds to the top of the network layer (layer 3).

C-plane: the control plane of the DECT protocol stacks, which contains all of the internal DECT protocol control, but may also include some external user information

NOTE 3: The C-plane stack always contains protocol entities up to and including the network layer.

Call: all of the NWK layer processes involved in one network layer peer-to-peer association

NOTE 4: Call may sometimes be used to refer to processes of all layers, since lower layer processes are implicitly required.

Cordless Terminal Adapter (CTA): physical grouping that contains a DECT portable termination and a line interface

DECT network: network that uses the DECT air interface to interconnect a local network to one or more portable applications. The logical boundaries of the DECT network are defined to be at the top of the DECT network layer

NOTE 5: A DECT network is a logical grouping that contains one or more fixed radio terminations plus their associated portable radio termination. The boundaries of the DECT network are not physical boundaries.

Fixed Part (DECT Fixed Part) (FP): physical grouping that contains all of the elements in the DECT network between the local network and the DECT air interface

NOTE 6: A DECT FP contains the logical elements of at least one FT, plus additional implementation specific elements.

Fixed Radio Termination (FT): logical group of functions that contains all of the DECT processes and procedures on the fixed side of the DECT air interface

NOTE 7: A FT only includes elements that are defined in the DECT CI standard. This includes radio transmission elements together with a selection of layer 2 and layer 3 elements.

NOTE 8: A FT can also be the FT side of a WRS.

Handover: the process of switching a call in progress from one physical channel to another physical channel

NOTE 9: There are two physical forms of handover, intra-cell handover and inter-cell handover.

Incoming call: call received at a CTA

Inter-cell handover: the switching of a call in progress from one cell to another cell

Internal handover: handover processes that are completely internal to one FT. Internal handover reconnects the call at the lower layers, while maintaining the call at the NWK layer.

NOTE 10: The lower layer reconnection can either be at the DLC layer (connection handover) or at the MAC layer (bearer handover).

Interoperability: the capability of FPs and CTAs, that enable a CTA to obtain access to teleservices in more than one location area and/or from more than one operator (more than one service provider)

Intra-cell handover: the switching of a call in progress from one physical channel of one cell to another physical channel of the same cell

Local Exchange: local switch connecting the end-user to the public network

Local Network (LNW): telecommunication network capable of offering local telecommunication services

NOTE 11: The term does not include legal or regulatory aspects, nor does it indicate if the network is a public network or a private network.

location area: the domain in which a PP may receive (and/or make) calls as a result of a single location registration

location registration: the process whereby the position of a DECT PT is determined to the level of one location area, and this position is updated in one or more databases

NOTE 12: These databases are not included within a DECT FT.

MAC Connection (CONNECTION): an association between one source MAC Multi-Bearer Control (MBC) entity and one destination MAC MBC entity. This provides a set of related MAC services (a set of logical channels), and it can involve one or more underlying MAC bearers

Outgoing call: call originating from a PP

Portable Application (PA): logical grouping that contains all the elements that lie beyond the DECT network boundary on the portable side

NOTE 13: The functions contained in the PA may be physically distributed, but any such distribution is invisible to the DECT network.

Portable Part (DECT Portable Part) (PP): physical grouping that contains all elements between the user and the DECT air interface. PP is a generic term that may describe one or several physical pieces

NOTE 14: A DECT PP is logically divided into one PT plus one or more PAs.

Portable Radio Termination (PT): logical group of functions that contains all of the DECT processes and procedures on the portable side of the DECT air interface

NOTE 15: A PT only includes elements that are defined in the DECT CI standard. This includes radio transmission elements (layer 1) together with a selection of layer 2 and layer 3 elements.

NOTE 16: A PT can also be the PT side of a WRS or the PT side of a CTA.

Radio Fixed Part (RFP): one physical sub-group of a FP that contains all the radio end points (one or more) that are connected to a single system of antennas

Registration: an ambiguous term, that should always be qualified. See either location registration or subscription registration

Subscription registration: the infrequent process whereby a subscriber obtains access rights to one or more FPs

NOTE 17: Subscription registration is usually required before a user can make or receive calls.

Wireless Relay Station (WRS): physical grouping that combines elements of both PTs and FTs to relay information on a physical channel from one DECT termination to a physical channel to another DECT termination

NOTE 18: The DECT termination can be a PT or an FT or another WRS.

3.2 Symbols **iTeh STANDARD PREVIEW**

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For the purposes of the present document, the following symbols apply if not explicitly otherwise stated:

M	for mandatory to support (provision mandatory, process mandatory);
O	for optional to support (provision optional, process mandatory);
I	for out-of-scope (provision optional, process optional) not subject for testing;
C	for conditional to support (process mandatory);
N/A	for not-applicable (in the given context the specification makes it impossible to use this capability).

Provision mandatory, process mandatory means that the indicated feature, service or procedure shall be implemented as described in the present document, and may be subject to testing.

Provision optional, process mandatory means that the indicated feature, service or procedure may be implemented, and if implemented, the feature, service or procedure shall be implemented as described in the present document, and may be subject to testing.

NOTE: The used notation is based on the notation proposed in ISO/IEC 9646-7 [13].

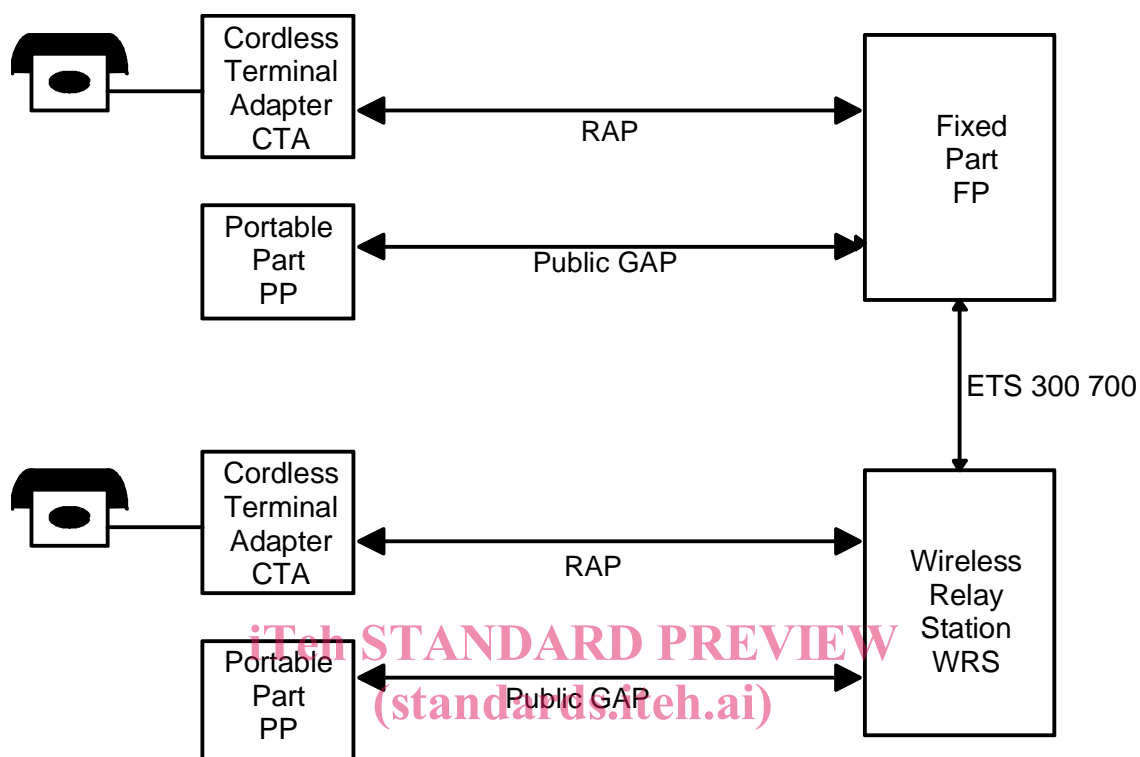
3.3 Abbreviations

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

AC	Authentication Code
ARI	Access Rights Identity
CC	Call Control
CI	Common Interface
CLIP	Calling Line ID Presentation
CPE	Customer Premises Equipment
CTA	Cordless Terminal Adapter
DCK	Derived Cipher Key
DECT	Digital Enhanced Cordless Telecommunications
DLC	Data Link Control, Layer 2b of the DECT protocol stack
DTMF	Dual Tone Multi-Frequency
FP	Fixed Part, (see definitions)
FT	Fixed radio Termination
GPS	Global Position System
GSM	Global System for Mobile communications
IE	Information Element
IEC	International Electrotechnical Commission
IPUI	International Portable User Identity
ISDN	Integrated Services Digital Network
ISO	International Organisation for Standardization
LLME	Lower Layer Management Entity
LNW	Local Network
MAC	Medium Access Control, Layer 2a of the DECT protocol stack
MM	Mobility Management, a NWK layer functional grouping
NWK	Network, Layer 3 of the DECT protocol stack
OA&M	Operation, Administration, and Maintenance
P	Public (environment)
PARK	Portable Access Rights Key
PHL	PHysical Layer
PLI	Park Length Indicator
POT	Plain Old Telephone
POTS	Plain Old Telephone Service
PP	Portable Part
PT	Portable radio Termination. See definition
RFP	Radio Fixed Part (see definitions)
RFPI	Radio Fixed Part Identity
RS	Reed Solomon code
SARI	Secondary Access Rights Identity
TE	Terminal Equipment
TI	Transaction Identifier
UAK	User Authentication Key
WRS	Wireless Relay Station

4 Introduction

4.1 Reference model



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Figure 1: Reference model

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4.2 Services & facilities

The present document provides a minimum service level, i.e. the so-called "POTS" services, and optional extensions including 64 kbit/s bearer service and leased lines. A Fixed Part that supports RAP may additionally support GAP and can in this way support both CTAs and GAP PPs as well as the respective RAP and GAP WRSs, and also CTAs with embedded GAP WRS functionality (see EN 300 700 [11]).

Another part of the RAP is expected to describe ISDN services, non-voiceband data services and support of digital leased lines.

5 Feature definitions

For the purposes of the present document the feature definitions in the following subclauses apply.

The number given in square brackets after the name of a feature is the item number used in the tables of the present document.

5.1 Network (NWK) features (only differences from GAP)

On-Hook (CONDITIONAL Release) [N.100]: The ability of the CTA to indicate the action of going on-hook (e.g. to terminate a call) to the DECT FP. On reception of the "on hook" indication, the DECT FP may terminate the call, and release the radio resource.

Calling Line Identity Presentation, inband (CLIP, inband) [N.101]: The ability to provide the calling party number to the POTS CTA by transmitting DTMF or modem tones to the CTA within the speech channel before off hook during incoming call.

Incoming maintenance transaction [N.102]: The ability of the CTA to receive, and the FP to send OA&M messages.

Outgoing maintenance transaction [N.103]: The ability of the CTA to send, and the FP to receive OA&M messages.

Maintenance during call [N.104]: The ability of the CTA and FT to exchange OA&M messages during an active call.

Metering pulses [N.105]: The ability of the CTA to generate metering pulses on reception of a corresponding RAP-CC message.

Analogue Leased Line [N.106]: The ability to provide an analogue leased line.

Physical resources fault [N.107]: The ability of the CTA to corresponding OA&M messages to indicate the location of faults in the Physical resources to the network management

Remote Test [N.108]: The ability of the FP to request the CTA to run specific tests.

Alarms [N.109]: The ability of the CTA to indicate to the FP that a significant system event occurs or is about to occur which may seriously affect the systems ability to function.

On-air modification of user parameters[N.110]: The ability of the CTA to accept FP initiated changes of subscription data.

Switch from voice to data service FT initiated [N.111]: The ability of the FT of detecting the 2.1 kHz tone in the Audio-Channel and of switching an existing speech call in a data call sending a RAP-CC message to the CTA and the ability of the CTA to process this message.

Switch from voice to data service CTA initiated [N.112]: The ability of the CTA of detecting the 2.1 kHz tone in the Audio-Channel and of switching an existing speech call in a data call sending a RAP-CC message to the FT and the ability of the FT to process this message.

Coin collection [N.113]: The ability to transmit the result of coin collection via RAP-CC message.

Ground start [N.114]: The ability to transmit the ground start signal via a RAP-CC message.

Remote configuration [N.115]: The ability to configure the parameters of the CTA via OA&M messages.

64 kbit/s bearer service using DLC LU7 service [N.116]: The ability to offer the DLC LU7 service suitable for a 64 kbit/s bearer service and transparent ISDN services using double slots at the physical layer.

Line parked [N.117]: The ability of the FP to indicate to the CTA that the Local Exchange has parked the line.

Line polarity reversal [N.118]: The ability to transmit the line polarity reversal signal via a RAP-CC message.

Incoming WRS maintenance transaction [N.119]: The ability of the WRS to receive OA&M messages from the FP.

Outgoing WRS maintenance transaction [N.120]: The ability of the WRS to send OA&M messages to the FP.

Advanced file transfer [N.121]: The ability to transfer file to the CTA.

Maintenance during WRS MM operation [N.122]: The ability of the WRS to exchange OA&M messages with the FP during an ongoing MM operation.

5.2 Application features (only differences from GAP)

Manual entry of the PARK and AC to a CTA [A.100]: The ability of the CTA to accept a manual entry of the PARK for ensuring attachment to the right FP in a physical area covered by many providers and a manual entry of the AC via the keypad of a connected CPE.