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**Digital Enhanced Cordless Telecommunications (DECT);  
A high level guide to the DECT standardization**

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## Foreword

This ETSI Technical Report (ETR) has been produced by the Digital Enhanced Cordless Telecommunications (DECT) Project of the European Telecommunications Standards Institute (ETSI).

The information in this ETR is believed to be correct at the time of publication. However, DECT standardization is a rapidly changing area, and it is possible that some of the information contained in this ETR may become outdated or incomplete within relatively short time-scales.

## Introduction

The aim of this ETR is to give the reader a basic understanding of the DECT applications and features and how the ETSI standards for DECT interrelate to the different applications.

In this ETR, clause 4 outlines the services and applications that the DECT standards address and the concept of DECT being a general radio access technology.

Clause 5 provides a brief overview to the ETSI standardization and introduces some of the other bodies involved in the development of DECT.

Clause 6 provides details of the basic DECT documents, on which all applications of DECT are built. The aspects covered by each document are briefly described.

Most of the DECT standards published by ETSI are written within the committee RES-03 (Radio Equipment and Systems - 03 -Cordless Telecommunications)/DECT Project. There is also some other work related to cordless telephony in other ETSI committees. Details are provided in clause 7.

Clause 8 describes existing ETSI defined profiles and how they relate to particular applications.

Clauses 9, 10 and 11, cover issues of conformance testing and regulation. Clause 9 explains the distinction between these two closely related topics. Clause 10 describes how conformance to DECT standards is verified. Clause 11 gives information on the regulatory regime for DECT products.

In addition to DECT standards, RES-03/DECT Project has produced several informative documents on DECT. These are published as ETSI technical Reports (ETRs). Clause 12 provides a summary of these documents.

Clause 13 describes the flexibility for evolutionary developments of the DECT standard.

Annex A provides information on the DECT documents in a summary format.

Annex B provides a short introduction to the special way, DECT utilizes the radio frequency spectrum. Though not essential background for this document, it explains very briefly the Dynamic Channel Selection technique, that makes DECT fundamentally different from traditional cellular systems.

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## 1 Scope

This ETSI Technical Report (ETR) provides a high level description of the various components of the Digital Enhanced Cordless Telecommunications (DECT) standardization. It is directed at a wide audience, regulators, operators, manufacturers and others, and attempts to provide a basic overview of the DECT standards, without requiring detailed technical knowledge of DECT as a prerequisite.

The ETR describes the services and applications for which DECT may be used, and which ETSI publications relate to the different applications. The documents relating to conformance testing and regulation of DECT products are also described

## 2 References

For the purposes of this ETR, the following references apply.

- [1] ETS 300 052-1: "Integrated Services Digital Network (ISDN); Multiple Subscriber Number (MSN) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".
- [2] ETS 300 052-2: "Integrated Services Digital Network (ISDN); Multiple Subscriber Number (MSN) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 2: Protocol Implementation Conformance Statement (PICS) proforma specification".
- [3] ETS 300 052-3: "Integrated Services Digital Network (ISDN); Multiple Subscriber Number (MSN) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 3: Test Suite Structure and Test Purposes (TSS&TP) specification for the user".
- [4] ETS 300 052-4: "Integrated Services Digital Network (ISDN); Multiple Subscriber Number (MSN) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 4: Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for the user".
- [5] ETS 300 052-5: "Integrated Services Digital Network (ISDN); Multiple Subscriber Number (MSN) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 5: TSS&TP specification for the network".
- [6] ETS 300 052-6: "Integrated Services Digital Network (ISDN); Multiple Subscriber Number (MSN) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 6: ATS and partial PIXIT proforma specification for the network".
- [7] ETS 300 175-1: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Common Interface (CI); Part 1: Overview".
- [8] ETS 300 175-2: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Common Interface (CI); Part 2: Physical Layer".
- [9] ETS 300 175-3: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Common Interface (CI); Part 3: Medium Access Control (MAC) layer".
- [10] ETS 300 175-4: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Common Interface (CI); Part 4: Data Link Control (DLC) layer".

- [11] ETS 300 175-5: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Common Interface (CI); Part 5: Network (NWK) layer".
- [12] ETS 300 175-6: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Common Interface (CI); Part 6: Identities and addressing".
- [13] ETS 300 175-7: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Common Interface (CI); Part 7: Security features".
- [14] ETS 300 175-8: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Common Interface (CI); Part 8: Speech coding and transmission".
- [15] ETS 300 175-9: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Common Interface (CI); Part 9: Public Access Profile (PAP)".
- [16] ETS 300 176-1: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Approval test specification; Part 1: Radio".
- [17] I-ETS 300 176: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Approval test specification".
- [18] ETS 300 176-2: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Approval test specification; Part 2: Speech".
- [19] ETS 300 323-1: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT) Public Access Profile (PAP) test specification Part 1: Overview".
- [20] ETS 300 323-2: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT) Public Access Profile (PAP) test specification Part 2: Portable radio Termination (PT) Abstract Test Suite (ATS)".
- [21] ETS 300 323-3: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT) Public Access Profile (PAP) test specification Part 3: Portable radio Termination (PT) Protocol Implementation Conformance Statement (PICS) proforma".
- [22] ETS 300 323-4: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT) Public Access Profile (PAP) test specification Part 4: Portable radio Termination (PT) Protocol Implementation eXtra Information for Testing (PIXIT) proforma".
- [23] ETS 300 323-5: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT) Public Access Profile (PAP) test specification Part 5: Fixed radio Termination (FT) Abstract Test Suite (ATS)".
- [24] ETS 300 323-6: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT) Public Access Profile (PAP) test specification Part 6: Fixed radio Termination (FT) Protocol Implementation Conformance Statement (PICS) proforma".
- [25] ETS 300 323-7: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT) Public Access Profile (PAP) test specification Part 7: Fixed radio Termination (FT) Protocol Implementation eXtra Information for Testing (PIXIT) proforma".



- [26] ETS 300 329: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); EMC Standard for DECT Equipment".
- [27] ETS 300 331: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); DECT Authentication Module (DAM)".
- [28] ETS 300 339: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); General EMC Standard for Radio".
- [29] ETS 300 370: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications/Global System for Mobile communications (DECT/GSM) inter-working profile; Access and mapping (Protocol/procedure description for 3,1 kHz speech service)".
- [30] ETS 300 434-1: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT) and Integrated Services Digital Network (ISDN) interworking for end system configuration; Part 1: Interworking specification".
- [31] ETS 300 434-2: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT) and Integrated Services Digital Network (ISDN) interworking for end system configuration; Part 2: Access profile".
- [32] ETS 300 435: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Data Services Profile (DSP); Base standard including interworking to connectionless networks (service types A and B, Class 1)".
- [33] ETS 300 444: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Generic Access Profile (GAP)".
- [34] ETS 300 466: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications/Global System for Mobile Communications (DECT/GSM) interworking profile; General description of service requirements; Functional capabilities and information flows".
- [35] ETS 300 474-1: "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; Part 1: Portable radio Termination (PT)".
- [36] ETS 300 474-2: "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; Part 2: Fixed radio Termination (FT)".
- [37] ETS 300 476-1: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Protocol Implementation Conformance Statement (PICS) proforma; Part 1: Network (NWK) layer - Portable radio Termination (PT)".
- [38] ETS 300 476-2: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Protocol Implementation Conformance Statement (PICS) proforma; Part 2: Data Link Control (DLC) layer - Portable radio Termination (PT)".
- [39] ETS 300 476-3: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Protocol Implementation Conformance Statement (PICS) proforma; Part 3: Medium Access Control (MAC) layer - Portable radio Termination (PT)".

- [40] ETS 300 476-4: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Protocol Implementation Conformance Statement (PICS) proforma; Part 4: Network (NWK) layer - Fixed radio Termination (FT)".
- [41] ETS 300 476-5: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Protocol Implementation Conformance Statement (PICS) proforma; Part 5: Data Link Control (DLC) layer - Fixed radio Termination (FT)".
- [42] ETS 300 476-6: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Protocol Implementation Conformance Statement (PICS) proforma; Part 6: Medium Access Control (MAC) layer - Fixed radio Termination (FT)".
- [43] ETS 300 476-7: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Protocol Implementation Conformance Statement (PICS) proforma; Part 7: Physical layer".
- [44] ETS 300 494-1: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Generic Access Profile (GAP); Profile Test Specification (PTS); Part 1: Summary".
- [45] ETS 300 494-2: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Generic Access Profile (GAP); Profile Test Specification (PTS); Part 2: Profile Specific Test Specification (PSTS) - Portable radio Termination (PT)".
- [46] ETS 300 494-3: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Generic Access Profile (GAP); Profile Test Specification (PTS); Part 3: Profile Specific Test Specification (PSTS) - Fixed radio Termination (FT)".
- [47] ETS 300 497-1: "Radio Equipment and Systems (RES); 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".
- [48] ETS 300 497-2: "Radio Equipment and Systems (RES); 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)".
- [49] ETS 300 497-3: "Radio Equipment and Systems (RES); 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)".
- [50] ETS 300 497-4: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI) Test Case Library (TCL); Part 4: Test Suite Structure (TSS) and Test Purposes (TP) - Data Link Control (DLC) layer".
- [51] ETS 300 497-5: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI) Test Case Library (TCL); Part 5: Abstract Test Suite (ATS) - Data Link Control (DLC) layer".
- [52] ETS 300 497-6: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI) Test Case Library (TCL); Part 6: Test Suite Structure (TSS) and Test Purposes (TP) - Network (NWK) layer - Portable radio Termination (PT)".

- [53] ETS 300 497-7: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI) Test Case Library (TCL); Part 7: Abstract Test Suite (ATS) for Network (NWK) layer - Portable radio Termination (PT)".
- [54] ETS 300 497-8: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI) Test Case Library (TCL); Part 8: Test Suite Structure (TSS) and Test Purposes (TP) - Network (NWK) layer - Fixed radio Termination (FT)".
- [55] ETS 300 497-9: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI) Test Case Library (TCL); Part 9: Abstract Test Suite (ATS) for Network (NWK) layer - Fixed radio Termination (FT)".
- [56] ETS 300 499: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications/Global System for Mobile Communications (DECT/GSM) interworking profile; Mobile services Switching Centre (MSC) - Fixed Part (FP) interconnection".
- [57] ETS 300 651: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Data Services Profile (DSP); Generic data link service; Service type C, class 2".
- [58] ETS 300 699: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Data Services Profile (DSP); Generic data link service for closed user groups (service type C, class 1)".
- [59] ETS 300 700: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Wireless Relay Station (WRS)".
- [60] ETS 300 701: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Data Services Profile (DSP); Generic frame relay service with mobility (service types A and B, class 2)".
- [61] ETS 300 702-1: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications/Global System for Mobile communications (DECT/GSM) interworking profile; Part 1: Profile Test Specification (PTS) summary".
- [62] ETS 300 702-2: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications/Global System for Mobile telecommunications (DECT/GSM) interworking profile; Part 2: Profile Specific Test Specification (PSTS) Portable radio Termination (PT)".
- [63] ETS 300 702-3: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications/Global System for Mobile telecommunications (DECT/GSM) interworking profile; Part 3: Profile Specific Test Specification (PSTS) Fixed radio Termination (FT)".
- [64] ETS 300 703: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications/Global System for Mobile communications (DECT/GSM) Inter-Working Profile (IWP); GSM phase 2 supplementary services implementation".
- [65] ETS 300 704-1: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications/Global System for Mobile communications (DECT/GSM) Interworking Profile (IWP); Profile Implementation Conformance Statement (ICS); Part 1: Portable radio Termination (PT)".

- [66] ETS 300 704-2: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications/Global System for Mobile communications (DECT/GSM) Interworking Profile (IWP); Profile Implementation Conformance Statement (ICS); Part 2: Fixed radio Termination (FT)".
- [67] ETS 300 705-1: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications/Integrated Services Digital Network (DECT/ISDN) interworking for end system configuration; Profile Implementation Conformance Statement (ICS); Part 1: Portable radio Termination (PT)".
- [68] ETS 300 705-2: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications/Integrated Services Digital Network (DECT/ISDN) interworking for end system configuration; Profile Implementation Conformance Statement (ICS); Part 2: Fixed radio Termination (FT)".
- [69] ETS 300 755: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Data services profile; Multimedia Messaging Service (MMS) with specific provision for facsimile services; (Service type F, class 2)".
- [70] ETS 300 756: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications / Global System for Mobile communications (DECT/GSM) interworking profile; Implementation of bearer services".
- [71] ETS 300 757 (1996): "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Data services profile; Low rate messaging service; (Service type E, class 2)".
- [72] ETS 300 758-1: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Integrated Services Digital Network (ISDN); DECT/ISDN interworking for end system configuration Profile Test Specification (PTS); Part 1: Summary".
- [73] ETS 300 758-2: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Integrated Services Digital Network (ISDN); DECT/ISDN interworking for end system configuration Profile Test Specification (PTS); Part 2: Profile Specific Test Specification (PSTS) for Portable radio Termination (PT)".
- [74] ETS 300 758-3: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Integrated Services Digital Network (ISDN); DECT/ISDN interworking for end system configuration Profile Test Specification (PTS); Part 3: Profile Specific Test Specification (PSTS) for Fixed radio Termination (FT)".
- [75] ETS 300 759-1: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); DECT Authentication Module (DAM); Part 1: Test specification for DAM".
- [76] ETS 300 759-2: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); DECT Authentication Module (DAM); Part 2: Test specification for Portable Part (PP), DAM/PP interface".
- [77] ETS 300 760: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); DECT Authentication Module (DAM); Implementation Conformance Statement (ICS) proforma specification".
- [78] ETS 300 764: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications/Global System for Mobile communications (DECT/GSM) Interworking Profile (IWP); Implementation of short message service, point-to-point and cell broadcast".

- [79] ETS 300 765-1: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Radio in the Local Loop (RLL) Access Profile (RAP); Part 1: Basic telephony services".
- [80] ETS 300 765-2, "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Radio in the Local Loop (RLL) Access Profile (RAP); Part 2: Advanced telephony services".
- [81] ETS 300 787: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications/Global System for Mobile communications (DECT/GSM); DECT access to GSM via Integrated Services Digital Network (ISDN); General description of service requirements".
- [82] ETS 300 788: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications/Global System for Mobile communications (DECT/GSM); DECT access to GSM via Integrated Services Digital Network (ISDN); Functional capabilities and information flows".
- [83] ETS 300 792: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications / Global System for Mobile communications (DECT/GSM); DECT/GSM interworking profile; Implementation of facsimile group 3".
- [84] ETS 300 822: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Integrated Services Digital Network (ISDN); DECT/ISDN interworking for intermediate system configuration; Interworking and profile specification".
- [85] ETS 300 824: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Cordless Terminal Mobility (CTM); CTM Access Profile (CAP)".
- [86] ETS 300 825: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); 3 Volt DECT Authentication Module (DAM)".
- [87] DE/DECT-060081: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); DECT Authentication Module (DAM) Interworking Profile (IWP); Test specification for the DAM/Portable Part (PP) interface (higher layer tests)".
- [88] DE/DECT-020082: "Radio Equipment and Systems (RES); Digital Enhanced Cordless telecommunications (DECT); Data Services Profile (DSP); Isochronous data bearer services with mobility (service type D, mobility class 2)".
- [89] DE/DECT-020084: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Data Services Profile (DSP); Isochronous data bearer services for closed user groups (service type D, mobility class 1)".
- [90] DE/DECT-020087: "Digital Enhanced Cordless Telecommunications (DECT); Dynamic multimedia service change on the DECT access interface".
- [91] DE/DECT-020099: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Data Services Profile (DSP); Point-to-Point Protocol (PPP) interworking for internet access and general multi-protocol datagram transport".
- [92] ETR 015: "Radio Equipment and Systems; Digital European Cordless Telecommunications (DECT); Reference document".

- [93] ETR 041: "Transmission and Multiplexing (TM); Digital European Cordless Telecommunication (DECT); Transmission aspects 3,1 kHz telephony; Interworking with other networks".
- [94] ETR 042: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); A Guide to DECT features that influence the traffic capacity and the maintenance of high radio link transmission quality, including the results of simulations".
- [95] ETR 043: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Common interface; Services and facilities requirements specification".
- [96] ETR 056: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); System description document".
- [97] ETR 139: "Radio Equipment and Systems (RES); Radio in the Local Loop (RLL)".
- [98] ETR 159: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Wide area mobility using the Global System for Mobile communications (GSM)".
- [99] ETR 183: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Conformance testing on DECT equipment".
- [100] ETR 185: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Data Services Profile (DSP); Profile overview".
- [101] ETR 246: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Application of DECT Wireless Relay Station (WRS)".
- [102] ETR 308: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Services, facilities and configurations for DECT in the local loop".
- [103] ETR 310: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Traffic capacity and spectrum requirements for multi-system and multi-service DECT applications co-existing in a common frequency band".
- [104] ETR 341: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications/Global System for Mobile communications (DECT/GSM) interworking profile; Profile overview".
- [105] TBR 5: "European digital cellular telecommunications system; Attachment requirements for Global System for Mobile communications (GSM) mobile stations; Access".
- [106] TBR 6: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); General terminal attachment requirements".
- [107] TBR 9: "European digital cellular telecommunications system; Attachment requirements for Global System for Mobile communications (GSM) mobile stations; Telephony".
- [108] TBR 10: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); General terminal attachment requirements; Telephony applications".

- [109] TBR 11: "Radio Equipment and Systems (RES); Attachment requirements for terminal equipment for Digital European Cordless Telecommunications (DECT) Public Access Profile (PAP) applications".
- [110] TBR 19: "European digital cellular telecommunications system (Phase 2); Attachment requirements for Global System for Mobile communications (GSM) mobile stations; Access".
- [111] TBR 20: "European digital cellular telecommunications system (Phase 2); Attachment requirements for Global System for Mobile communications (GSM) mobile stations; Telephony".
- [112] TBR 22: "Radio Equipment and Systems (RES); Attachment requirements for terminal equipment for Digital Enhanced Cordless Telecommunications (DECT) Generic Access Profile (GAP) applications".
- [113] TBR 36: "Digital Enhanced Cordless Telecommunications (DECT); Global System for Mobile communications (GSM); DECT access to GSM Private Land Mobile Network (PLMN) for 3,1 kHz speech applications".
- [114] TBR 39: "Digital Enhanced Cordless Telecommunications (DECT); Global System for Mobile communications (GSM); DECT/GSM dual-mode terminals".
- [115] TBR 40: "Digital Enhanced Cordless Telecommunications (DECT); Integrated Services Digital Network (ISDN); DECT/ISDN dual-mode terminals".
- [116] Commission Decision "DECT Access (CTR 6)" (Official Journal L194 94/471/EC).
- [117] Commission Decision "DECT Telephony (CTR 10)" (Official Journal L194 94/472/EC).
- [118] Draft Commission Decision "DECT Public Access Profile (CTR 11)".
- [119] 89/336/EEC: "Council Directive of 3 May 1989 on the approximation of laws of the Member States relating to Electromagnetic Compatibility (Official Journal L139 of 23/5/89)" including 92/31/EEC.
- [120] 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).
- [121] 91/287/EEC: "Council Directive of 3 June 1991 on the frequency band to be designated for the coordinated introduction of digital European cordless telecommunications (DECT) into the Community".
- [122] 91/288/EEC: "Council Directive of 3 June 1991 on the coordinated introduction of digital European cordless telecommunications (DECT) into the Community".
- [123] CCITT Recommendation G.726 (1991): "40, 32, 24, 16 kbit/s adaptive differential pulse code modulation (ADPCM)".
- [124] TRAC Handbook: "Handbook on CTRs".
- [125] TRAC Procedure: "Procedure for the Production of CTRs".
- [126] ETSI Handbook: "Making Better Standards - practical ways to greater efficiency and success".
- [127] ISO/IEC 9646 (1995): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework".

### 3 Abbreviations

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

ACTE	Approvals Committee for Terminal Equipment
ADPCM	Adaptive Differential Pulse Code Modulation
AMPS	Advanced Mobile Phone Service
ARI	Access Rights Identity
ATS	Abstract Test Suite
BA	Basic Access
CC	Call Control
CEC	Commission of the European Community
CI	Common Interface
CTA	Cordless Terminal Adapter
CTM	Cordless Terminal Mobility
CTR	Common Technical Regulation
CTS	Conformance Testing Service
DAM	DECT Authentication Module
DECT	Digital Enhanced Cordless Telecommunications
DSS1	Digital Subscriber Signalling System No. 1 protocol
DTAAB	DECT Type Approval Advisory Board
DTMF	Dual Tone Multiple Frequency
EEC	European Economic Community
EMC	ElectroMagnetic Compatibility
ES	End System
FP	Fixed Part
FPLMTS	Future Public Land Mobile Telephone System
FT	Fixed Termination
GAP	Generic Access Profile
GSM	Global System for Mobile communication
IN	Intelligent Network
IS	Intermediate System
ISDN	Integrated Services Digital Network
IWP	Inter-Working Profile
IWU	Inter-Working Unit
LAN	Local Area Network
MM	Mobility Management
NA	Network Aspects
NMT	Nordic Mobile Telephone
NTP	Network Termination Point
PAP	Public Access Profile
PARK	Portable Access Rights Key
PBX	Private Branch Exchange
PCS	Personal Communications Services
PICS	Protocol Implementation Conformance Statement
PLMN	Public Land Mobile Network
PP	Portable Part
PRA	Primary Rate Access
PSTN	Public Switched Telephone Network
PT	Portable Termination
RAP	Radio local loop Access profile
RLL	Radio in the Local Loop
SARI	Secondary Access Rights Identity
SDH	Synchronous Digital Hierachy
SIM	Subscriber Identity Module
SMS	Short Message Service
TACS	Total Access Communications System
TCL	Test Case Library
TDMA	Time-Division Multiple Access
TRAC	Telecommunications Regulations Applications Committee
UMTS	Universal Mobile Telephone System
WRS	Wireless Relay Station



## 4 DECT services and applications

DECT is a general radio access technology for short range wireless telecommunications. It is a high capacity, pico-cellular digital technology, for cell radii ranging from about 10 m to 5 km depending on application and environment. It provides telephony quality voice services, and a broad range of data services, including ISDN. It can be effectively implemented as a simple residential cordless telephone or as a system providing all telephone services in a city centre.

Figure 1 gives a high level graphic overview of applications and features of DECT.

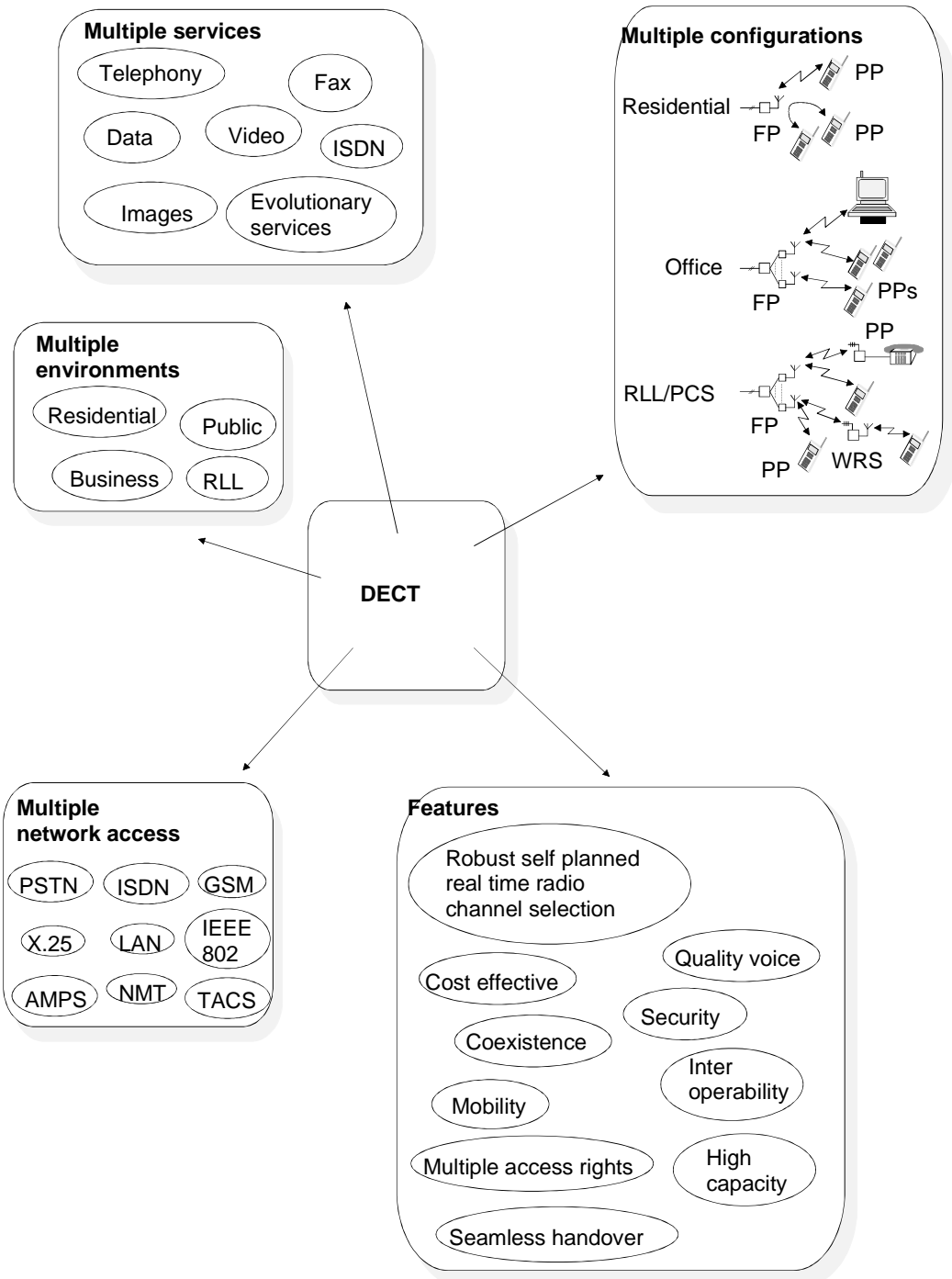


Figure 1: Overview of DECT applications and features

#### 4.1 General access technology

DECT is a general radio access technology that can be used by many different applications to connect to different telecommunication networks.

It is essential to see the implications of the difference between an access technology and mobile radio systems like NMT, TACS, AMPS or GSM/DCS1800. In these mobile radio systems the whole network is part of the specification and a mobile unit can only access the unique network that is part of the mobile radio system. DECT as a general access technology provides a comprehensive set of protocols which provide the flexibility to interwork between numerous different applications and networks.

Thus a local and/or public network is not part of the DECT specification. Figure 2 illustrates this.

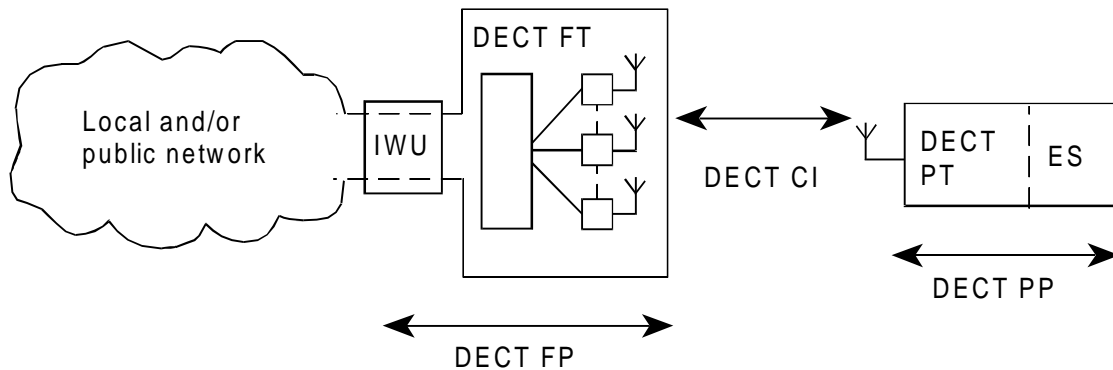


Figure 2: The DECT CI

DECT covers, in principle, only the air interface between the DECT Fixed Part (FP) and Portable Part (PP). The Interworking Unit (IWU) between a network and the DECT Fixed radio Termination (FT) is network specific and is not part of the DECT CI specification. Similarly, the End System (ES), the application(s) in a DECT PP is also excluded. The IWU and end system are only specified as regards general end-to-end compatibility requirements e.g. on speech transmission. The IWU and ES are also subject to general attachment requirements for the relevant public network, e.g. the PSTN/ISDN.

NOTE: An ES depends on the application supported in a PP. For a speech telephony application the ES may be a microphone, speaker, keyboard and display. The ES could equally well be a serial computer port, a fax machine or whatever the application requires.

The DECT air interface makes the specific services and features of each network, local or global, available to the users of DECT terminal. Except for cordless capability and mobility, DECT does not offer a specific service; it is transparent to the services provided by the connected network.

Thus the DECT CI standard is, and has to be, a tool box with protocols and messages from which a selection is made to access any specific network, and to provide means for market success for simple residential systems as well as for more complex systems e.g. office ISDN services.

The DECT CI standard has a layered structure and is contained in ETS 300 175, Parts 1 to 9 [7] - [15]. It is a set of requirements, procedures and messages. The DECT messages also contain codes that are reserved for evolutionary applications and proprietary extensions.

## 4.2 Support of multiple applications

Even when a terminal consists of a single portable part, the DECT standard does not put any technical restrictions to the number of applications it can support. The same DECT terminal can therefore be used for different applications. This provides for effective use of DECT e.g. combined devices supporting accessing to multiple networks (a residential base station, an office system and/or a public system) or combined speech/data applications.

The DECT CI is designed in such a way that the same fixed part can be used for different applications simultaneously. A fixed part may, for example, provide connection to the PSTN for some terminals, while at the same time provide connection to a LAN for other terminals. DECT provides means for sharing base stations or systems between different operators and/or applications, e.g. hosting private user groups in a large public system, providing public access through a privately owned system or hosting public access to several services provided in a system owned by one of the service providers.

## 5 The standards making process

The DECT standardization has been carried out by the members of the European Telecommunications Standards Institute, more specifically, the technical work has been carried out in the Radio Equipment and Systems Sub-Technical Committee No. 3 (STC RES-03). The membership of ETSI is open to manufacturers, operators and regulators of telecommunications systems.

Following re-organization in ETSI along project-oriented lines. The work of STC RES-03 was transferred to the DECT Project in October 1996.

### 5.1 ETSI document types

There are several types of documents that have been produced by RES-03:

- ETSI Technical Standards (ETSS) contain the detailed technical requirements, and are published after a formal European wide review process (Public Enquiry and Vote);
- ETSI Technical Reports (ETRs) contain information of a more general nature which provides useful background information on the standards;
- ETSI Technical Basis for Regulations (TBRs) contain technical requirements and test methods for use in the corresponding Common Technical Regulations (CTRs). The issue of regulatory requirements are covered in further detail in clause 11.

Following the re-organization of ETSI new deliverable types and procedures are being introduced.

### 5.2 Other bodies

In addition to ETSI several other bodies are involved in the DECT standardization process.

The Commission of the European Community provides support in developing the market for DECT equipment both in terms of legislation covering the allocation of the frequencies used by DECT (in conjunction with CEPT ERC), in supporting the regulatory environment for DECT products (through the ACTE committee), and financing of part of the standardization effort.

CEPT has a membership of 43 European administrations. Its ECTRA committee is responsible for managing telecommunications matters; its ERC committee manages radio matters. The ERC plans and allocates spectrum for pan-European services and promotes measures to harmonize standards and regulatory requirements for these services.

ACTE is the Approvals Committee for Terminal Equipment. It consists of representatives of telecommunications regulators from all EC countries.

DTAAB (DECT Type Approval Advisory Board) is a sub-group of the Telecommunications Regulations Applications Committee (TRAC). It includes representatives from test houses, operators, standardization bodies, type approval authorities, regulatory authorities and manufacturers. DTAAB meets on a regular basis to consider the resolution in a harmonized way of problems relating to the DECT area. The common understanding is recorded in various Advisory Notes (ANs) which combine to define a set of advice on the best practice to be applied to regulatory type examination and approval of DECT terminal equipment.

## **6 The basic DECT standards**

### **6.1 The base standard, Common Interface**

The basic standard for DECT is the Common Interface (CI) ETS 300 175 [7] - [15]. It defines the operation of the DECT air interface and contains details of all messages and procedures used in DECT equipment. Not all of the procedures described in ETS 300 175 [7] - [15] are actually required in any particular application. ETS 300 175 [7] - [15] does not specify which procedures are required in each particular application. To achieve interoperability of equipment requires other documents (profiles, see subclause 8) to specify more specific requirements for each applications.

The contents of each part of ETS 300 175 [7] - [15] is now described.

#### **Part 1: Overview**

This is a general introduction to the other parts of ETS 300 175 [7] - [15].

#### **Part 2: Physical (PHL) layer**

The PHL layer describes the requirements of the radio parameters of the DECT system, e.g. the frequency of operation, the modulation method, the TDMA data transmission structure, power limits, spurious emission requirements etc. Most of the requirements of this part of the standard are applicable to all DECT products.

#### **Part 3: Medium Access Control (MAC) layer**

The MAC layer defines the procedures and protocols used to set-up transmission bearers across the air interface.

#### **Part 4: Data Link Control (DLC) layer**

The DLC layer is concerned with the provision of reliable data links to the Network layer. Its function can be compared to the ISDN layer 2 LAPD protocol.

#### **Part 5: Network (NWK) layer**

The NWK layer is the main signalling layer of the protocol stack, containing the functions for call control, mobility management, connection oriented service, connectionless message service and supplementary services.

#### **Part 6: Identities and addressing**

Each DECT equipment, whether portable part (PP) or fixed part (FP), requires to be programmed with various identities to enable PPs to access the appropriate networks and to route calls to the appropriate terminal. DECT has a very flexible identity structure which is explained in part 6.

#### **Part 7: Security aspects**

The use of radio in telecommunications introduces several security issues, including, but not limited to, prevention of eavesdropping and fraudulent access to networks via impersonation of PT identities. The DECT security procedures are defined in part 7.

## **Part 8: Telephony**

Part 8 defines the telephony requirements for DECT systems used for the transmission of 3,1 kHz speech e.g. digital transmission levels, audio frequency masks, echo control/suppression requirements necessary to ensure interworking with public telecommunications networks.

## **Part 9: Public Access Profile (PAP)**

The PAP was the first profile to be defined for DECT. It was intended for use in wide area cordless systems run by public operators. It soon became clear that a more general profile covering a basic set of cordless functionality suitable for use in systems ranging from domestic cordless telephones, business cordless PBX systems and public access applications was needed. This resulted in the Generic Access Profile (GAP). As a result the PAP was superseded by GAP before any PAP products appeared on the market. The PAP is not covered further in this ETR.

### **6.2 Profiles**

In addition to the PAP and the GAP, other profiles are specified and used in conjunction with the Cordless Interface. The profiles are additional specifications that define how the CI is used by different applications. Further information on the currently existing profiles and their applications is given in clause 8.

### **6.3 DECT Authentication Module (DAM)**

Access rights information and other subscription related information can be loaded into a PP either over the air, via a connector, or by inserting a DAM.

The DECT Authentication module is a chip card that can be programmed with DECT identities and inserted into a DECT PP with an appropriate DAM card interface. It provides means by which a DECT system operator can load user identities, access rights information and security parameters (authentication and cipher keys) into a PP.

A DAM card can be used in conjunction with different profiles, i.e. it is not restricted to any particular DECT application profile.

The DAM card is specified in ETS 300 331 [136] and is compatible with the corresponding card in GSM (the SIM card). ETS 300 825 [86] covers the requirements for DAM cards using 3V technology.

## **7 Related work in other ETSI committees**

### **7.1 Electro Magnetic Compatibility (EMC) standards**

Like all other electronic equipment sold in EU member states, DECT equipment is subject to the requirements of the EMC directive 89/336/EEC [119]. It is the responsibility of ETSI to produce the standards which define the actual EMC performance requirements for compliance to the directive. The RES-09 sub-technical committee (STC RES-09) is responsible for writing all EMC standards within the RES technical committee and its sub-technical committees.

The relevant EMC standard for DECT equipment is ETS 300 329 [26]. ETS 300 329 [26] specifies both performance requirements and the methods to check conformance to the requirements.

Outside Europe other EMC standards may be applicable according to local regulations.

### **7.2 Network standardization related to DECT**

DECT is designed as an access technology to many networks. There is work in various ETSI committees to introduce the necessary protocols to support mobility in different networks.

There is work in ETSI STC BTC-1 and ECMA to introduce mobility support in private telecommunications networks, thereby providing the ability for users to roam between different company offices connected to a corporate network.

GSM networks, standardized in ETSI TC SMG already support mobility. There is therefore interest to re-use the mobility protocols of GSM networks in conjunction with the DECT air interface (this is DECT/GSM interworking). The work of TC SMG therefore is of relevance to the DECT standardization.

There is also work in ETSI TC NA and TC SPS to add mobility support in IN based networks thereby allowing users to roam across very wide areas of the public network. This work forms part of the ETSI Project (EP) Cordless Terminal Mobility (CTM). The CTM Project also includes roaming between different networks (public-public and/or public-private)

A further DECT concept requiring network standardization is DECT/GSM interworking via ISDN. If DECT/GSM interworking access is provided on a PBX, the interface between the PBX and the PLMN network will probably utilize an ISDN link. The DSS1 protocols for ISDN access need enhancement to support mobility. Responsibility for the enhanced DSS1 protocols belongs to TC SPS. Work has been done in RES-03 to define the basic requirements for the enhanced protocols on the alpha (a network access interface) interface (ETS 300 787 [81], ETS 300 788 [82].) Related work concerning the beta interface (a peer to peer interface between network elements) is being carried out in SMG committees.

## 8 Application of standards to different applications

In this clause the specific documents applicable to different applications are described.

Interoperability with equipment from different manufacturers and with different systems is provided for a specific service and application if the equipment, FPs and PPs conform to an ETSI defined profile standard. A profile defines a selection of messages and procedures from the DECT CI standard and gives an unambiguous description of the air interface for specified service(s) and application(s). Examples are the Generic Access Profile (GAP) and the DECT/GSM Interworking Profile (IWP).

A DECT profile standard is a chosen subset of the DECT CI standard for a specific application. It includes all requirements for interoperability for equipment from different manufacturers. If the CI standard has some ambiguity or lacks some provision, this is clarified or added in the profile standard. All defined features are process mandatory. This means that if a feature is used, it is used in a specified manner. Whether the provision of a feature is mandatory or optional is stated separately for FPs and PPs.

The main difference between profiles is related to the protocols. The radio requirements as defined in ETS 300 175-2 [8] are generally applicable to all DECT profiles. The telephony requirements as defined in ETS 300 175-8 [14] are applicable to all profiles applications supporting 3,1 kHz speech.

### 8.1 GAP

The Generic Access Profile, GAP, ETS 300 444 [33] is the basic DECT profile. It contains the basic functionality required for speech applications e.g. for domestic cordless telephones, business cordless PBX systems and public access applications. It forms the basis of all other 3,1 kHz speech telephony applications. It defines the minimum interoperability requirements to ensure that a PP conforming to the GAP should be interoperable with any GAP compatible FP, regardless of manufacturer.

The protocol elements of GAP can be broadly categorized between Mobility Management(MM) and Call Control (CC). The CC protocols are closely related to the provision of speech telephony services. The CC protocols of other speech telephony applications are based on GAP. The MM protocols cover aspects related to mobility such as location tracking, identities and security features. The MM protocols are applicable (with perhaps some minor changes) to all mobility applications (both speech and non-speech). The MM protocols of most profiles are based on GAP.

The GAP defines the components of the DECT CI standard which need to be met in order to achieve basic cordless interoperation.

Most of the physical layer requirements of ETS 300 175-2 [128] are required by GAP equipment.

The telephony requirements of ETS 300 175-8 [129] are required in GAP equipment.

The protocol components of parts 3, 4, 5, 6, 7 of the base standard (ETS 300 175 [7] - [15]) required for GAP equipment are given in the GAP (ETS 300 444 [130]).

To build a GAP PP or FP, a manufacturer also has to take into account the requirements of the relevant EMC and safety legislation, and (for the FP) the requirements of the telecommunications network to which the FP is intended to be connected.

The relationship between the standards and GAP products is shown graphically in figure 3.

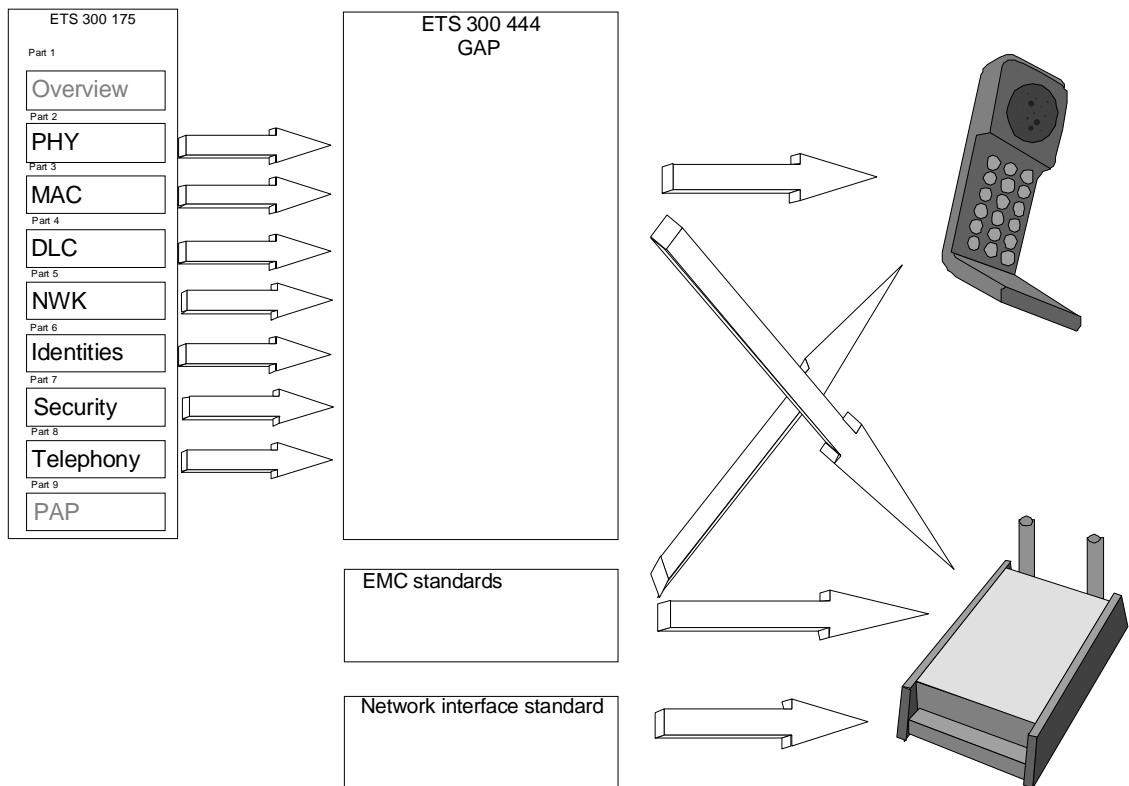
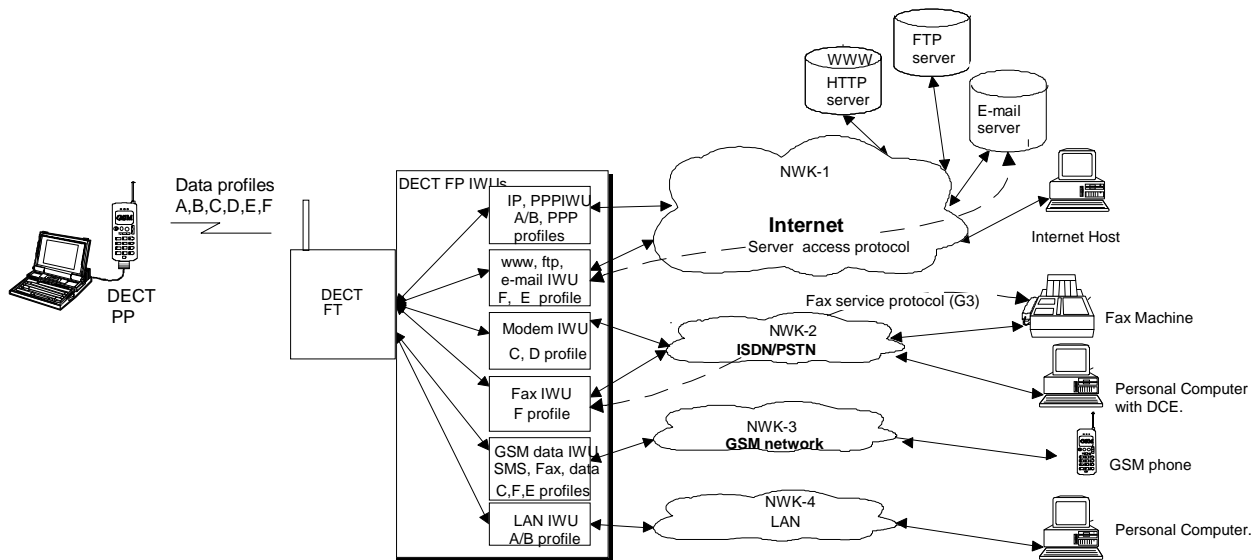


Figure 3: Standards relating to GAP

## 8.2 DATA profiles

DECT is equipped with powerful wireless data capabilities. A family of profiles complete the Open Standard character of such services, by ensuring inter-operability between products from different manufacturers. They all exploit the powerful lower-layer data services of DECT, which are specifically oriented towards LAN, multi-media and serial data capability, but each member of the profile family has been optimized for a different kind of user service. The different profiles are modular and closely related, so that they may be economically and efficiently implemented. The services and relationships of the different profiles are described in ETR 185 [100].



**Figure 4: DECT data profiles**

The DECT data profiles provide security (authentication and encryption), call charging, flexible throughput (up to 552 kbit/s), high reliability and error correction and other features, thus making them suitable for public wireless data services as well as data services in the private and business environments.

The family of profiles comprises the following members:

- ETS 300 435 [32]: data services profile; Base standard including interworking to connectionless networks (Service types A and B, Class 1): this standard is the basis for data profile types C and F, and includes annexes for interworking with Ethernet and Token Ring LANs at a throughput of up to 69 kbyte/s (552 kbit/s);
- ETS 300 701 [60]: data services profile, generic frame relay service with mobility (service types A and B, Class 2): supports similar services to ETS 300 435 when applied to environments in which significant mobility is required, in addition to the Ethernet and token ring LANs direct interworking with Internet Protocol (IP) has been defined;
- ETS 300 699 [58]: data services profile, generic data link service for closed user groups (service type C, Class 1): is aimed at applications for which a high degree of data integrity is necessary, and includes annexes for interworking with V.24 interfaces;
- ETS 300 651 [57]: data services profile, generic data link service (service type C, Class 2): extends the data stream service into environments, such as public services, where significant mobility is a characteristic. The profile contains interworking annexes to V.24 and connection oriented bearer services. This service may be used to provide interworking with a voice-band modem service over public networks such as PSTN or ISDN;
- ETS 300 755 [69]: data services profile, multimedia messaging service with specific provision for facsimile services (service type F, Class 2): creates high level inter-operability for a range of telematic services, including fax, through a multi-media file transfer mechanism built on the data stream service (C.2 profile), with full support for roaming and public services. One of the main applications of this profile is to provide interworking to public and private group 3 fax services;
- ETS 300 757 [71]: data services profile, low rate messaging service (service type E, Class 2): provides a means for the low rate and low power consumption transfer of different types of messages, including alphanumeric paging messages. It provides both point-to-point and point-to-multipoint messaging through the signalling channels and uses the Multimedia Messaging Service (MMS) specified in ETS 300 755 [69] and is therefore a subset of the MMS. This service may be used for private and public roaming messaging applications such as the GSM Short Message Service (SMS), see ETS 300 764 [78];



- D2 profile (DE/DECT-020082) [88]: is suitable for transparent and isochronous transfer of synchronous data streams and is intended for use in private and public roaming applications. Different qualities of service are specified from unprotected to fully protected providing different levels of error performance and different levels of complexity. Interworking to isochronous modems and standard synchronous circuits is the aim of this profiles as well as Video telephony, video conferencing and secure telephone services over external networks;
- D1 profile (DE/DECT-020084) [89]: provides the equivalent service to the D.2 profile for Closed User Groups;
- Point-to-Point Protocol (PPP) interworking for Internet access and general multi-protocol datagram transport (DE/DECT-020099) [91]; builds upon services offered by the Data Service Profiles as defined in ETS 300 701 [60] and ETS 300 651 [57]. It specifies an interworking profile for non-voice equipment with roaming mobility, providing Point-to-Point Protocol (PPP) transmission to allow dial-up Internet access and general multi-protocol datagram transport. PPP packet transfers on the DECT air interface are specified via a highly efficient DECT packet transmission protocol. However, interworking to the fixed network may be via a number of interface protocols, including X.25, Frame Relay, SDH, and traditional circuit switched voice band modem and ISDN connection.

In addition to these profiles an ETS is under development on Dynamic Multimedia Service Change on the DECT access interface (DE/DECT-020087 [90]). It specifies the DECT air interface requirements and service change procedures to enable dynamic inter-profile and inter-service changes within an active call. This includes, but is not limited to, in-call switching between voice and data. Its provisions shall support the integration of such additional services into a number of profiles.

Further profiles or interworking specifications may be created to respond to market demand.

### 8.3 ISDN end system

Two profiles are defined so far for the DECT/ISDN Interworking, the End System (ES) profile and the Intermediate System (IS) profile. The intermediate system is further described in subclause 8.4

In the ISDN ES, the PP has access to the services of the ISDN network via the FP using DECT signalling over the air interface.

The ES (see figure 5) provides for interoperability of FPs and PPs from different manufacturers allowing access to ISDN where the FP and the PP together appear to the network as an ISDN terminal (TE1). The ES might be a voice terminal or another type of ISDN terminal.

The DECT CI and Generic Access Profile covers the air interface, but leaves the details of how the DECT air interface protocols interwork with the interface to the network to the implementor. Interactions with the network are described in terms of abstract primitives. The ISDN end system profile defines detailed interworking mappings between the DECT protocols on the air interface and the ISDN protocols at the network interface.

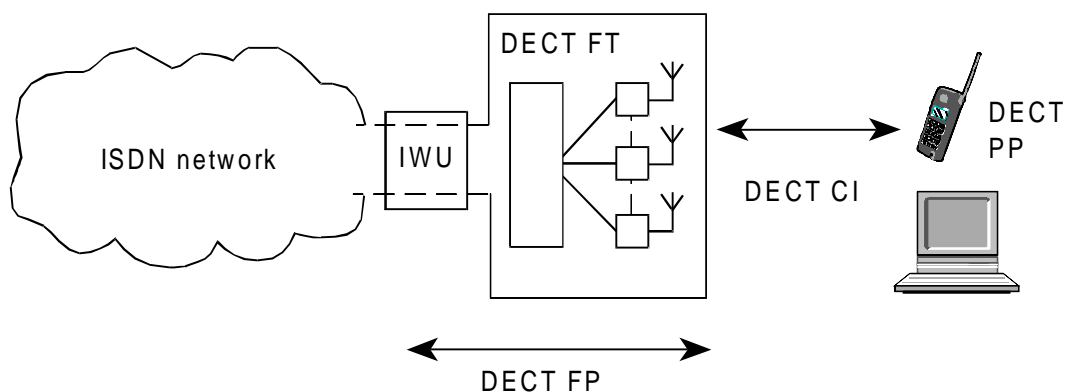


Figure 5: DECT ISDN end system

In addition to the basic features of GAP, the ISDN end system profile provides these features:

- the FP provides interworking between a GAP PP and ISDN;
- the supplementary services of ISDN can be made available to the user by a suitable PP;
- access to the 64kbit/s unrestricted digital information bearer service is possible via a suitable PP.

At the time the ISDN ES was written, the ISDN access standards did not provide support for mobility. I.E. the necessary messages to convey mobility management information between the terminal and network elements had not been defined. The interworking of DECT MM procedures to the access interface is therefore not covered in ETS 300 434 [30] - [31]. Standardization of mobility support in the access interface is now being developed in other ETSI bodies and the interworking will be defined (see subclause 7.2).

Where the PP is a speech terminal, the PP requirements are very closely related to the GAP with optional additions. An ISDN ES FP supporting 3,1kHz voice telephony, will interoperate with a GAP PP, (although obviously the additional optional features in ISDN ES cannot interoperate with a pure GAP PP). Similarly where the ISDN ES PP is a speech terminal, it will interoperate with a GAP FP

The DECT ISDN ES is defined in ETS 300 434 [30] - [31]. The relationship between the standards and ISDN ES products is shown graphically in figure 6.

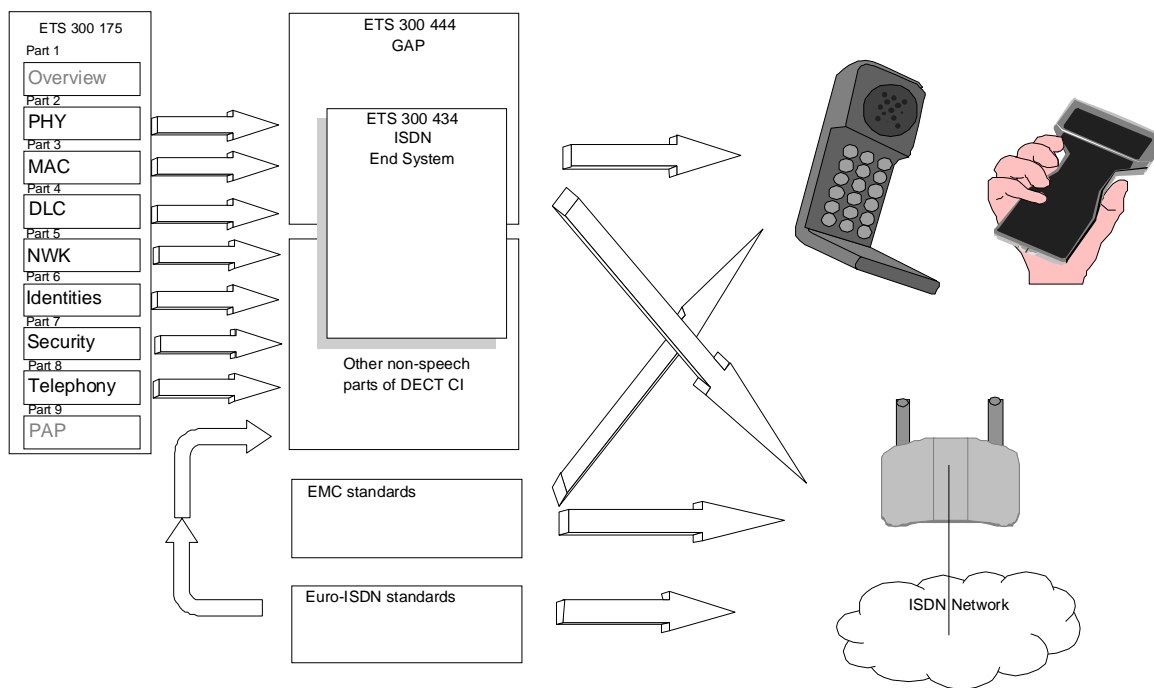
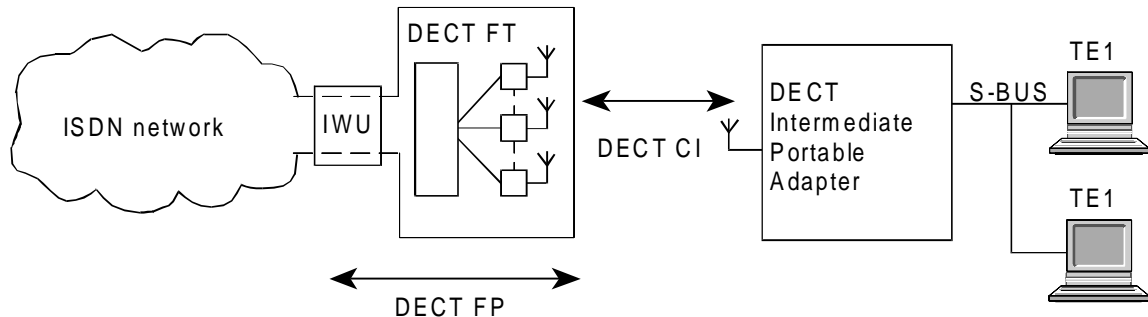


Figure 6: Standards relating to ISDN End System

#### 8.4 ISDN intermediate system

The IS (see figure 7) provides for a wireless link between an ISDN network and one or more ISDN terminals (TE1s) connected to an S-Interface at the S-reference point. The TE1s have transparent access to all network defined services based upon the basic channel structure 2B+D. B-channels support is provided in an intelligent manner allowing for efficient use of the DECT spectrum. Work is ongoing to include the possibility to support a primary rate interface at the DECT intermediate portable adapter.



**Figure 7: DECT ISDN intermediate system**

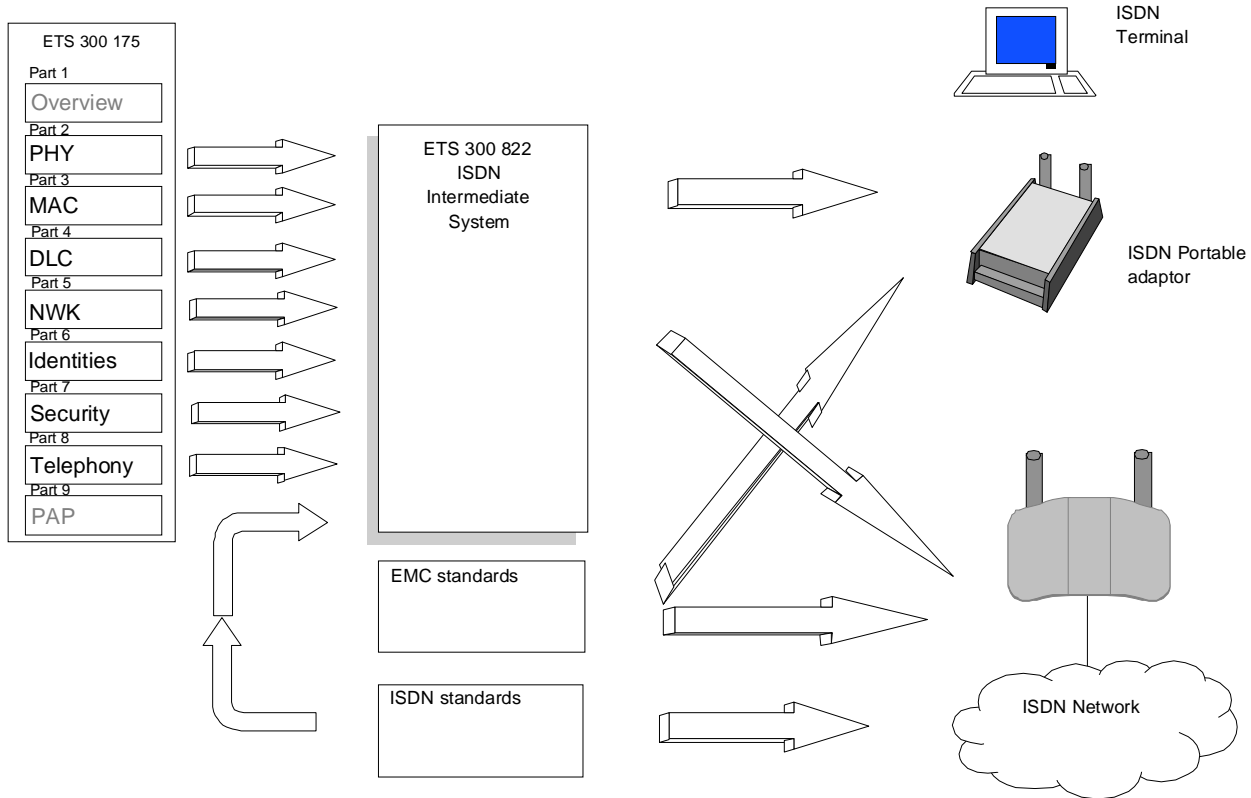
The DECT ISDN intermediate system conveys transparently all ISDN signalling by using the DECT network layer for the transport of ISDN messages and is based on ETS 300 175 [7] - [15].

The DECT ISDN intermediate system conveys ISDN protocols across the air interface to an S reference point at the PT. This is rather different to the GAP where the PT is also a telephony handset. Therefore a simple GAP handset can only interoperate if the DECT FP supports the GAP profile in addition to the DECT IS profile. Mobility management based on GAP is provided for use where the network access supports mobility protocols.

Depending on the application in the terminal equipment more than one DECT bearer may be required in ISDN IS. The ISDN IS FP monitors the ISDN layer 3 traffic, and dynamically allocates bearer resources as required.

The ISDN IS ensures that the minimum number of bearers is used. For speech applications ADPCM coding is always used thus reducing spectrum requirement for each ISDN B channel from 64 kbit/s to 32 kbit/s and requiring only a single DECT bearer.

Signalling information is normally carried in the signalling channel associated with the DECT bearer except for short periods when a complete DECT bearer may be needed to provide adequate bandwidth.



**Figure 8: Standards relating to DECT ISDN intermediate system**

### 8.5 CTM applications

The Cordless Terminal Mobility project within ETSI covers the standardization of mobility functions in "fixed" networks. The scope of application of CTM is fairly similar to the scope of DECT/GSM interworking. One important difference is that DECT/GSM interworking adds to a pre-existing network, whereas CTM is defining a network in support of mobility including (but not limited to) DECT.

Phase 1 CTM is based on GAP. Therefore a handset supporting only GAP features will interoperate with a CTM network. Figure 3 therefore also applies to CTM.

Additional features are envisaged in later phases of CTM. RES-03 have defined a CTM access profile (CAP) ETS 300 824 [85] in support of additional features for phase 2.

### 8.6 DECT/GSM applications

The DECT standards specify protocols which allow the provision of the mobility. They do not define how the network elements behind a DECT FP keep track of the location of a PP, or deliver an incoming call to the PP. Since DECT is an access profile, this is clearly outside the scope of DECT.

DECT air access can be used with many networks, including the networks used for providing mobility in cellular telecommunications systems such as GSM.

Because the mobility functionality for GSM networks are already standardized, it is attractive to re-use them to provide mobility through a DECT air interface. The specific components of the DECT CI necessary to interwork a DECT PP to a PLMN network (specifically the A interface) are defined in the DECT/GSM interworking profile ETS 300 370 [29]. This document, together with the related documents, ETS 300 499 [56] and ETS 300 703 [64], define both air interface protocol requirements and details of how the DECT protocols are mapped to the GSM A interface protocols.

From an interworking point of view, the DECT FP is connected via an IWU to the GSM PLMN network, which will see a DECT user as a GSM subscriber.

For further information see ETR 159 [98] and ETR 341 [104].

The GSM networks are closely based on the requirements of the GSM air interface. Although ETS 300 370 [29] is closely based on the ETS 300 444 [33], interworking with GSM networks adds some requirements in addition to GAP. The major examples are:

- the PP has to support GSM PLMN authentication algorithms, which are different from the standard DECT authentication algorithms;
- the GSM PLMN cipher keys have to be used;
- GSM PLMN identities have to be used;
- interworking of GSM procedures to DECT procedures adds some protocol additions (compared to GAP) to the DECT FP and PP.

It is still a requirement that PPs intending to interwork with a GSM PLMN (i.e. conforming to ETS 300 370 [29]) are still capable of interoperating with GAP FPs. The converse, GAP PP interworking with FPs connected to a GSM PLMN, is not a requirement, since the additional protocol elements of ETS 300 370 [29] are essential to interworking with such an FP.

NOTE: The FT could support access to both "GAP" and PLMN networks in which case such interworking would be possible.

ETS 300 370 [29] is based on interworking with an A interface directly connected to a GSM MSC. It is also possible, using the air interface protocols defined in ETS 300 370 [29] to interwork with a PLMN via ISDN interfaces. There is ongoing work within ETSI to define the additional mobility functions required in ISDN and the interworking mappings between the ISDN and DECT (see subclause 7.2).

The relationship between the DECT/GSM standards and the DECT/GSM equipment is shown graphically in figure 9.

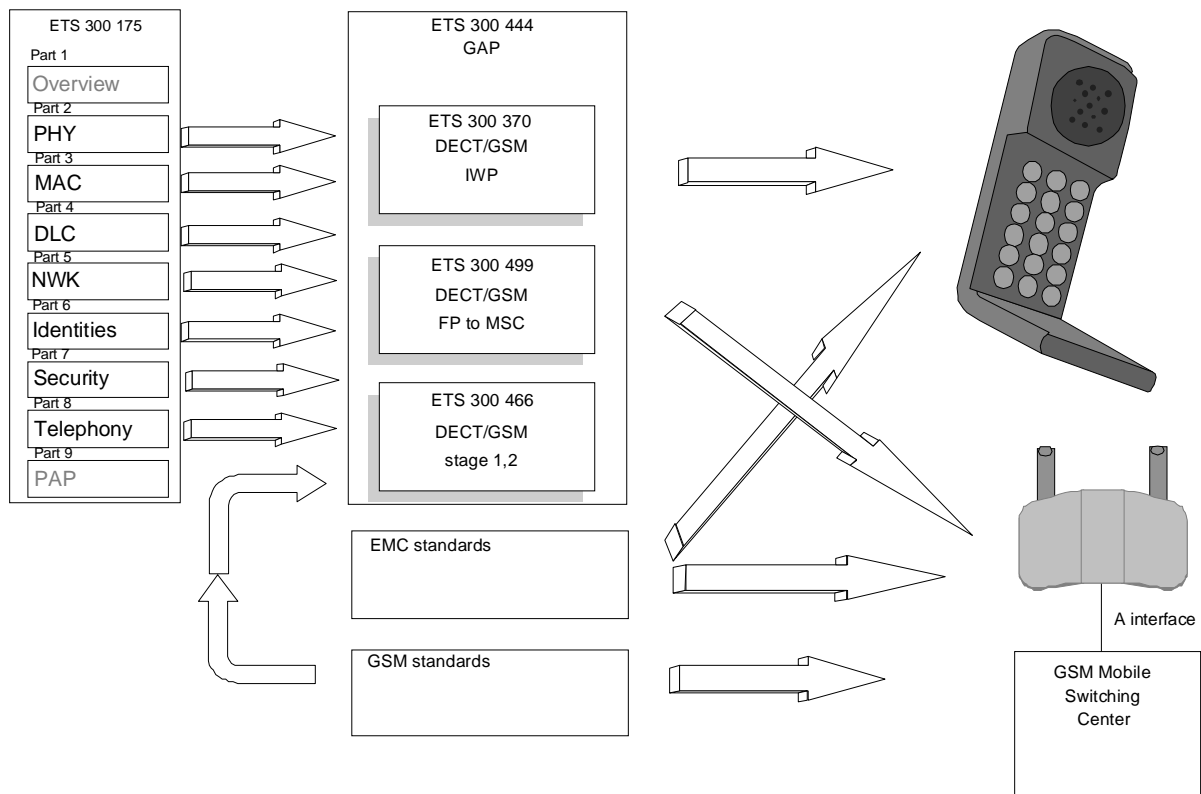


Figure 9: Documents relating to DECT/GSM interworking

ETS 300 370 [29] covers basic telephony (3,1 kHz speech). Other bearer services and supplementary services have been defined in GSM. Standards specifying how these services may be supported across a DECT air interface exist (see tables in annex A for more information).

## 8.7 RLL

Radio in the Local Loop (RLL) generally refers to the provision of a telephony service to a "standard telephone" by use of a radio interface. The need for copper wire in the final part of the connection from the local exchange is removed, and a very expensive part of the access network is eliminated.

ETR 308 [102] examines in detail the specific services that may be offered by DECT RLL. ETR 308 [131], identifies the basic wired analogue PSTN services that could be replaced by an RLL system, and also identifies that there are market opportunities for very much more advanced services than are possible with today's "standard telephones".

The basic RLL applications (PSTN replacement including modem applications V.34) are covered in ETS 300 765-1 [79]. More advanced applications of RLL, e.g. when the attached terminal is an ISDN TE or ISDN PABX is covered in ETS 300 765-2 [80]. ETS 300 765-2 [80] also covers requirements for broadband packet data applications up to 552 kbit/s.

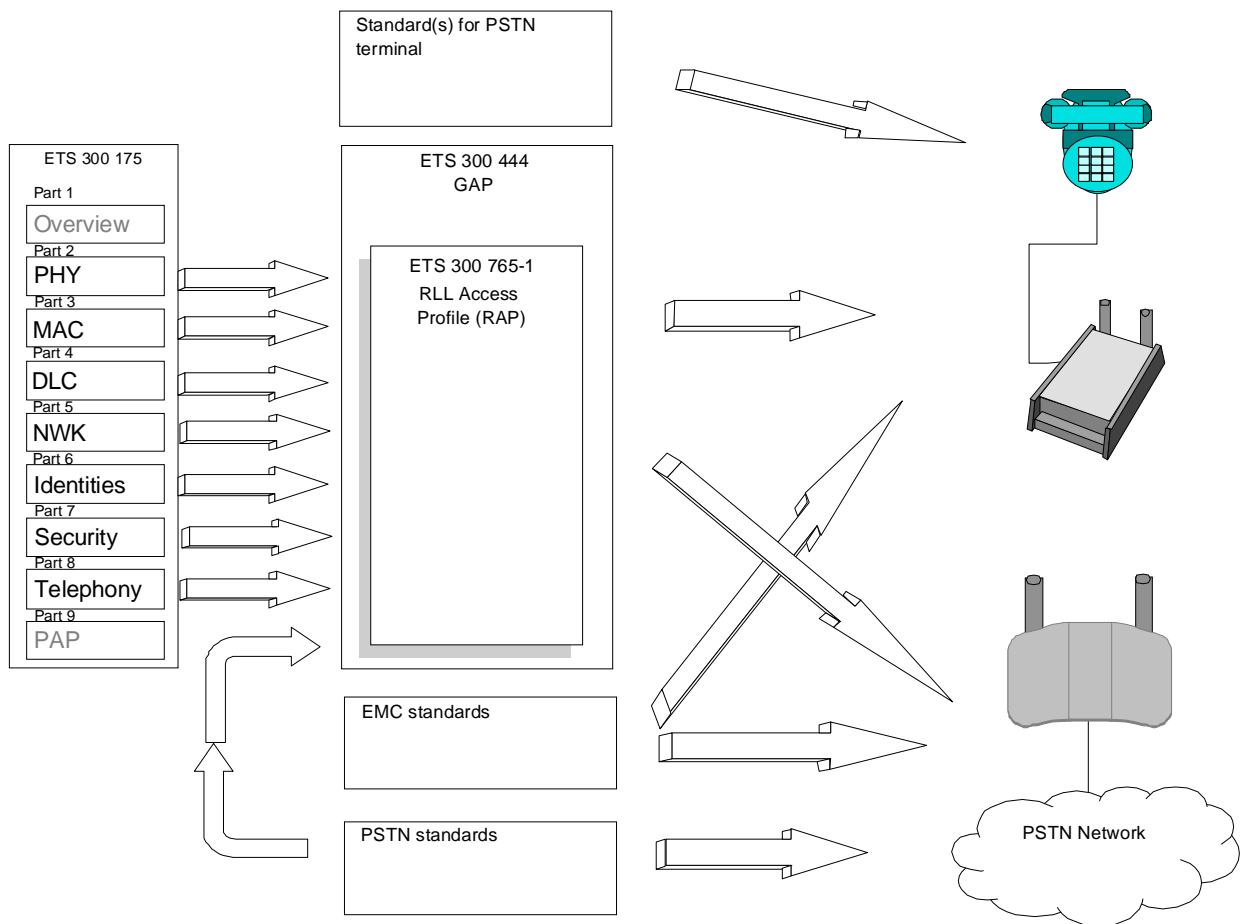
A RAP PP is also referred to as a Cordless Terminal Adapter (CTA). A CTA could provide multiple (replicated) analogue lines, suitable for interfacing to a PBX.

ETS 300 765-1 [79] is closely based on GAP, with minimal changes and additions. The basic changes are:

- user originated signalling information, DTMF tones, pulse dialled digits, register recall, and local exchange originated signalling, metre pulses, line reversals, need to be transferred across the air interface;
- removal of GAP features not relevant to RLL e.g. partial release;
- call clearing is modified to meet requirements for emergency calls;
- support for 64 kbit/s bearer service to enable use of fax and modems (up to V.34). (32 kbit/s ADPCM is not transparent to modem tones above 4 800 baud);
- addition of features to allow for operations and maintenance.

A RAP PP CTA will not interwork with a GAP FP unless the FP supports both GAP and RAP profiles.

The relationship between the DECT-RAP standards and DECT RAP-1 equipment is shown graphically in figure 10.



**Figure 10: Documents relating to RLL (basic telephony via PSTN)**

ETS 300 765-2 [80] refers completely to existing profiles for the optional provision of the services:

- DECT-ISDN intermediate system as defined in ETS 300 822 [84] for offering an ISDN basic rate service, (the ISDN IS standardization work will also include interworking of ISDN primary rate access, suitable for interfacing to ISDN PABXs); and
- the data profiles:
  - as defined in ETS 300 701 [60] for providing Internet access;
  - as defined in ETS 300 701 [60] for providing modem support; and
  - as defined in ETS 300 755 [69] for providing Group 3 Fax support.

The RAP-2 speech service has the same spectrum efficiency as all other DECT services using 32 kbit/s ADPCM. The RAP-2 profile (and of course the data and ISDN profiles) provides efficient transfer of data without the need to digitise modem signals. This is much more efficient than for example modem over 32 kbit/s ADPCM, especially. For packet oriented applications the data profiles allow for the air interface resources to be released when there is no data to send, providing even better use of the spectrum.

In addition, features have been introduced in ETS 300 765-2 for the Operation and Maintenance of CTAs supporting the above mentioned profiles and services. The Operation and Maintenance features are largely based upon those defined in ETS 300 765-1 [79].

The relationship between the DECT-RAP-2 standards and DECT RAP-2 equipment is shown graphically in figure 11.

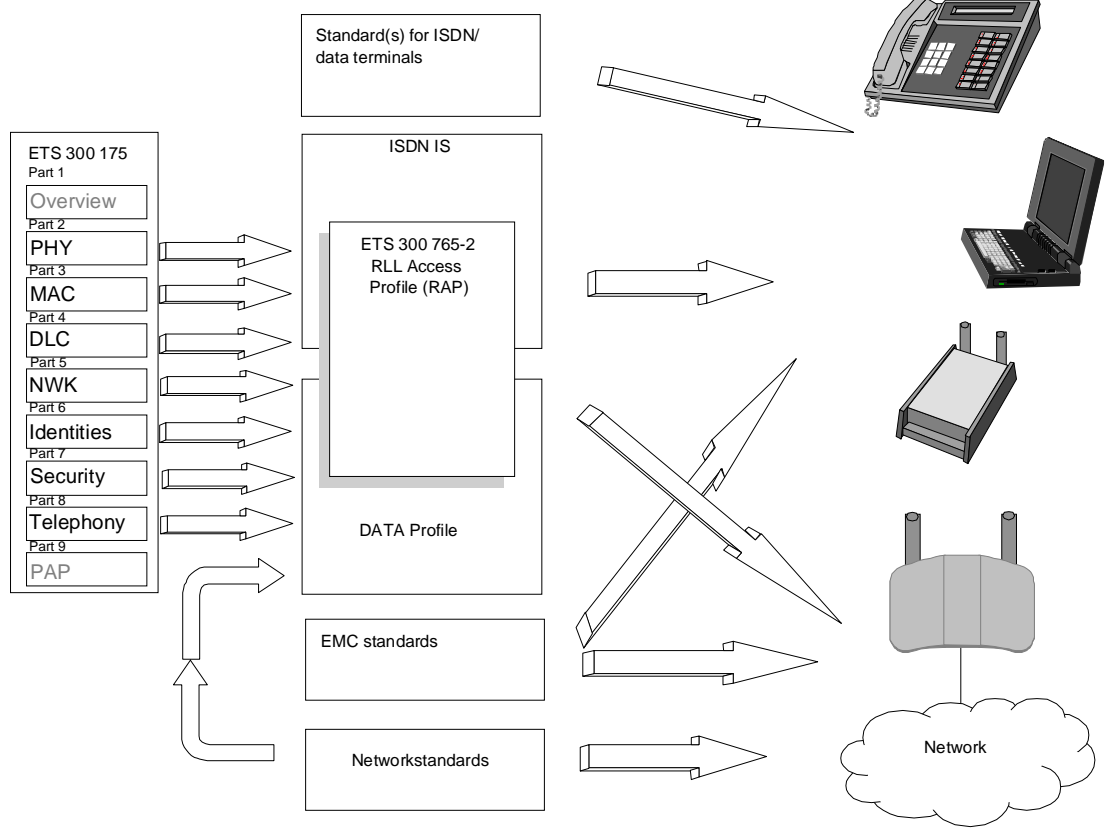


Figure 11: Documents relating to RLL (advanced telephony)

8.8 Wireless Relay Station (WRS)

The WRS is a special DECT unit capable of relaying DECT radio transmissions. The WRS works by linking two DECT radio links working on two different timeslots. The WRS can therefore provide RFP functionality without requiring a wired connection to the base station controller. A WRS utilizes the intelligent way, DECT accesses the radio frequency spectrum. The full Dynamic Channel Selection functionality is available to each of these links, and all information is transparently relayed through the wireless relay station. The RFP element acts towards a PP exactly as an ordinary RFP. A PP can not distinguish between a WRS and an RFP.

The WRS is suitable to provide cost effective infrastructures for low traffic density applications to extend or improve coverage indoors or outdoors behind obstacles. A typical application is illustrated in figure 12. A WRS may be used in conjunction with different DECT application profiles including fixed and/or mobile applications from the same infrastructure.

ETR 246 [101] provides more information on the application of WRS. The specification is ETS 300 700 [59].

As the WRS does not re-transmit in the same timeslot as it receives, a small delay is introduced. In case of multiple WRSs working in series, the delays can be added to unacceptable lengths. Most applications, however, are expected to be able to handle at least one WRS on the link. An additional issue to address is that each WRS in a DECT radio link occupies an additional amount of the available radio resource equal to that of a single, direct link. For reasons of effective spectrum utilization, the use of WRS can therefore be subject to special national regulation.



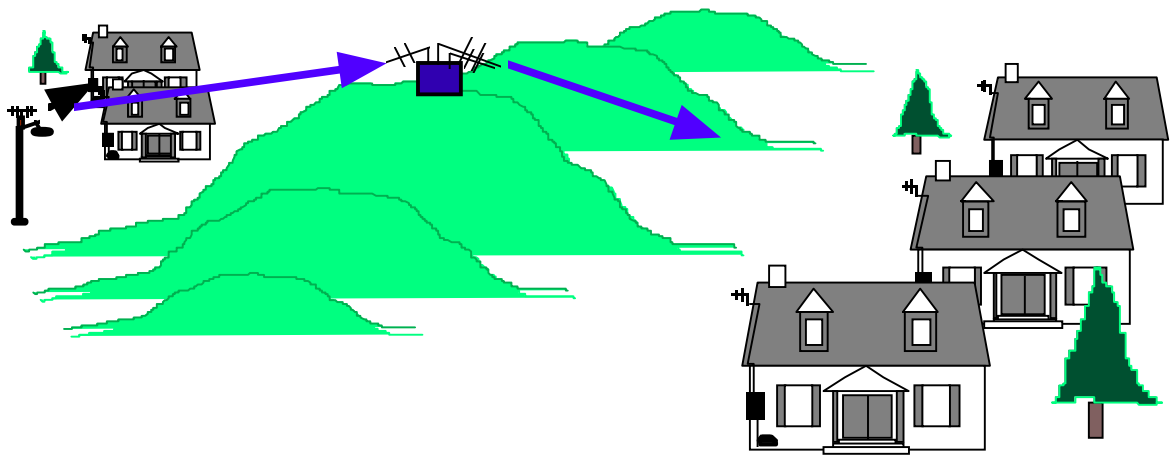


Figure 12: Typical WRS application

## 9 The distinction between conformance testing and regulation

Product standards define behaviour of an equipment. It is also necessary to define the methods by which compliance to the defined behaviour is checked. For very simple systems, if the product standard is suitable detailed and specific, a competent engineer can easily derive a test method. In more complex systems, where many possible behaviour sequences need to be checked, a separate document specifying conformance tests is required.

Conformance testing standards provide a tool for manufacturers to check that they have in fact met the requirements of a standard, and will obviously assist in the process of assuring that equipment sourced from multiple vendors actually does interwork. The process of producing a test standard results in further review of the product standard it is testing and may provide further input to the validation and refinement of the product standard. The ETSI publication "Making Better Standards - practical ways to greater efficiency and success" [126] provides useful background information concerning conformance testing standards.

So far regulatory issues have not been mentioned. It is perfectly possible to have a conformance standard for voluntary conformance testing by a manufacturer with no regulatory requirement for the manufacturer to comply. There can be other (non-regulatory) factors such as customer demands that effectively compel a manufacturer to test compliance to a standard.

In situations where the requirements have to be met for good reasons, usually to avoid harm or annoyance to others, there may be a legal, regulatory requirement to conform to a standard, and it is generally required for a product to pass the relevant conformance test specification (or a sub set thereof) prior to being placed on the market (type approval).

Conformance testing of DECT products is addressed in clause 10.

The regulatory issues relating to DECT products are covered in clause 11.

## 10 Conformance testing

In this clause the specific documents related to the conformance testing of DECT application profiles is covered.

### 10.1 Radio conformance testing

The relevant document describing the conformance testing of the DECT radio requirements is ETS 300 176-1 [132]. This document is applicable to all DECT equipment, regardless of application.

NOTE: The conformance test document for DECT radio parameters ETS 300 176-1 [16] (edition 2) is identical in technical content to the related regulatory document TBR 6 [106].

### 10.2 Telephony conformance testing

The relevant document describing the conformance testing of the DECT telephony requirements is ETS 300 176-2[133]. This document is applicable to DECT equipment providing 3,1 kHz speech telephony applications.

NOTE: The conformance test document for DECT telephony parameters ETS 300 176-2 [18] (edition 2) is identical in technical content to the related regulatory document TBR 10 [108].

### 10.3 Protocol conformance testing

Protocol testing to ensure that a particular equipment complies to a particular set of requirements specified in a particular standard is an extremely complex issue. This subclause describes briefly how the various conformance test documents relate to each other as more extensive information for DECT conformance testing may be found in ETR 183 [99].

#### 10.3.1 The Protocol Implementation Conformance Statements (PICS)

The prerequisite to an Abstract Test Suite (ATS) development for a base standard is the development of a PICS standard listing all capabilities related to the particular protocol together with the required status for each particular capability. The PICS for the case of the DECT CI is the ETS 300 476 [37] - [43]. This standard provides protocol capabilities requirements status for the 3 DECT protocol layers MAC, DLC and NWK. It is in the form of a questionnaire on the status of each requirement in the Base Standard.

#### 10.3.2 The Test Case Library (TCL)

As it has been mention earlier the DECT standardization work has taken the approach of an intensive development of Profiles based on the DECT CI standard and when relevant on standards related to the particular network DECT is accessing. Depending on the set of features a profile is supporting and the services it offers it is therefore possible for a set of tests to be common for a number of profiles.

The idea of establishing a collection of test cases that are to be used for conformance testing of sets of standards lays behind the ETS 300 497 [47] - [55] DECT CI TCL. Where relevant tests exists in this library, the profile test specifications make reference to these instead of describing the tests all over again. As GAP has been recognized as the basis for all speech applications the GAP tests have served as foundation for establishing the TCL. Currently mainly GAP tests are included into the TCL, however a small number of test purposes and test cases covering more than GAP requirements are incorporated as well.

The standard provides protocol testing for the 3 DECT protocol layers MAC, DLC and NWK both PT and FT. The Physical layer testing is covered by ETS 300 176-1 [16].

### **10.3.3 The Profile Implementation Conformance Statements (ICS)**

Each DECT profile further clarifies the status of a sub-set of the Base Standard capabilities that have been identified as relevant to the profile. This is done by referencing the PICS and modifying the status of the requirements when necessary. Capabilities that form part of the profile sub-set but do not require changes to the status in the relevant PICS may be excluded from the Profile ICS.

If a profile is intended to include services covered by other DECT profiles, references to the relevant Profile ICS(s) and the related capability requirements listed in that Profile ICS(s) may be included (e.g. in the case for DECT/GSM ETS 300 704 [65] - [66] references to ETS 300 474 [35] - [36] are made).

If a profile is intended to cover access to other non DECT systems references to the relevant PICS(s) and related capability requirements listed in that non DECT PICS(s) may be included (e.g. in the case for DECT/ISDN ETS 300 705 [67] - [68] references to ETS 300 052 [1] - [6] are made).

### **10.3.4 The Profile Test Specification (PTS) standards**

For each DECT profile there should be a Profile Test Specification standard which identifies the test purposes and test cases which are relevant for the particular profile. This is done by cross referencing the appropriate test purposes and tests in the Base Standard ATS or any relevant PTS (e.g. TCL, GAP PTS or any other relevant non DECT standard Protocol or Profile ICS). If a test purpose is recognized as relevant but the TCL test case is not applicable to a specific application profile, new test cases may be provided. Further profile specific test purposes and test cases may be added if required.

### **10.4 DAM conformance requirements**

The DECT Authentication module could be used to provide subscription data in conjunction with any DECT application profile. There are conformance test documents both for the DAM cards (ETS 300 759 [75] - [76], ETS 300 760 [77]), and for the DAM interface on the terminal (DE/DECT-060081 [87]).

### **10.5 Other conformance requirements**

There may be a need to check conformance to other standards, for example electromagnetic compatibility, safety, network standards (for FPs). These are not covered further in this ETR.

**10.6 Documents applicable to specific profiles**

**10.6.1 GAP**

The relevant documents for conformance testing of GAP equipment are given in figure 13.

<b>Radio Aspects</b>	ETS 300 176-1 [16] Approval test Specification Part 1: Radio
<b>Telephony Aspects</b>	ETS 300 176-2 [18] Approval test Specification Part 2: Speech
<b>Protocol Aspects</b>	ETS 300 476 [37] - [43] 7 parts Common Interface PICS proforma
	ETS 300 497 [47] - [55] 9 parts Common Interface Test Case Library
	ETS 300 474 [35] - [36] 2 parts Generic Access Profile Profile ICS proforma
	ETS 300 494 [44] - [46] 3 parts Generic Access Profile Profile Test Specification

**Figure 13: Conformance testing documents related to GAP**

**10.6.2 DATA profiles**

It is the intention to have conformance test standards for the data profiles produced, but none have been completed so far. As the data profiles are (in general) without 3,1 kHz speech components, ETS 300 176-2 [18] does not apply.

The relevant documents for conformance testing of Data equipment are given in figure 14.

<b>Radio Aspects</b>	ETS 300 176-1 [16] Approval test Specification Part 1: Radio
<b>Telephony Aspects</b>	Not applicable
<b>Protocol Aspects</b>	No conformance testing documents are available yet

**Figure 14: Conformance testing documents related to Data**

### 10.6.3 ISDN end system

The relevant documents for conformance testing of ISDN ES equipment are given in figure 15. If an ES application supports 3,1 kHz voice telephony, the GAP conformance testing documents are also applicable.

<b>Radio Aspects</b>	ETS 300 176-1 [16] Approval test Specification Part 1: Radio
<b>Telephony Aspects</b> (where 3,1 kHz voice telephony service is supported)	ETS 300 176-2 [18] Approval test Specification Part 2: Speech
<b>Protocol Aspects</b>	ETS 300 476 [37] - [43] 7 parts Common Interface PICS proforma
	ETS 300 497 [47] - [55] 9 parts Common Interface Test Case Library
	ETS 300 705 [67] - [68] 2 parts ISDN ES Profile ICS proforma
	ETS 300 758 [72] - [74] 3 parts ISDN ES Profile Test Specification
where 3,1 kHz voice telephony service is supported:	ETS 300 474 [35] - [36] 2 parts Generic Access Profile Profile ICS proforma
	ETS 300 494 [44] - [46] 3 parts Generic Access Profile Profile Test Specification

Figure 15: Conformance testing documents related to ISDN ES

### 10.6.4 ISDN intermediate system

Protocol test specifications are not yet written. Where 3,1 kHz voice telephony is supported, ETS 300 176-2 [18] applies to the FP. The 3,1 kHz telephony requirements for the PT have to be derived from ETS 300 176-2 [18] and the terminal telephony parameters. ETS 300 176-1 [16] applies for the radio aspects.

<b>Radio Aspects</b>	ETS 300 176-1 [16] Approval test Specification Part 1: Radio
<b>Bearer services</b> (where 3,1 kHz voice telephony service is supported)	ETS 300 176-2 [18] Approval test Specification Part 2: Speech. (See text above)
<b>Protocol Aspects</b>	No relevant specifications

Figure 16: Conformance testing documents related to ISDN ES

### 10.6.5 CTM applications

CTM phase 1 is based on GAP. Conformance testing is therefore based on GAP, see subclause 10.6.1.

More specific conformance documents may be generated in later phases of CTM.

**10.6.6 DECT/GSM interworking applications**

Radio aspects are covered by ETS 300 176-1 [16]. Telephony aspects are covered by ETS 300 176-2 [18]. There are test specifications related to the basic telephony aspects of ETS 300 370 [29], but at the time of writing there are no conformance test specifications related to other GSM applications, e.g. supplementary services, SMS, fax, etc.

The relevant documents for conformance testing of DECT/GSM equipment are given in figure 17.

<b>Radio Aspects</b>	ETS 300 176-1 [16] Approval test Specification Part 1: Radio
<b>Telephony Aspects</b>	ETS 300 176-2 [18] Approval test Specification Part 2: Speech
<b>Protocol Aspects</b>	ETS 300 476 [37] - [43] 7 parts Common Interface PICS proforma
	ETS 300 497 [47] - [55] 9 parts Common Interface Test Case Library
	ETS 300 474 [35] - [36] 2 parts Generic Access Profile Profile ICS proforma
	ETS 300 494 [44] - [46] 3 parts Generic Access Profile Profile Test Specification
	ETS 300 704 [65] - [66] 2 parts DECT/GSM interworking Profile ICS proforma
	ETS 300 702 [61] - [63] 3 parts DECT/GSM interworking Profile Test Specification
	The above documents cover basic telephony only. There are no test standards for SMS, fax, supplementary services, etc.

**Figure 17: Conformance testing documents related to DECT/GSM**

**10.6.7 Radio in the Local Loop (RLL) Access Profile (RAP)**

There has not been any work in writing protocol test documents for the RAP (neither for ETS 300 765-1 [79] nor for ETS 300 765-2 [80]) so far. ETS 300 176-2 [18] applies to the FP. The requirements for the PT have to be derived from ETS 300 176-2 [18] and the PSTN telephony parameters (which will vary between different countries). ETS 300 176-1 [16] applies for the radio aspects.

<b>Radio Aspects</b>	ETS 300 176-1 [16] Approval test Specification Part 1: Radio
<b>Telephony Aspects</b>	ETS 300 176-2 [18] Approval test Specification Part 2: Speech. (See text above)
<b>Protocol Aspects</b>	No relevant standards yet

**Figure 18: Conformance testing documents related to RAP**

### 10.6.8 WRS

The relevant documents for conformance testing of WRS equipment are given in figure 19.

<b>Radio Aspects</b>	ETS 300 176 -1 [16] Approval test Specification Part 1: Radio
<b>Telephony Aspects</b>	No relevant specification
<b>Protocol Aspects</b>	No relevant standards

Figure 19: Conformance testing documents related to WRS

## 11 Regulatory

This clause covers the regulatory regime for DECT equipment in the member states of the EU. The regulatory situation in non-EU states is outside the scope of this ETR.

### 11.1 The terminal directive

The terminals directive, 91/263/EEC [120] sets the background for the free movement and use of terminal equipment in the EU member states.

DECT equipment is (in general) covered by the terminals directive when it is capable of accessing a public network directly or indirectly. The terminals directive specifies (in very general terms) the essential requirements which shall be met for terminal equipment to have pan-European type approval. The essential requirements are generally limited to protection of spectrum, protection of the network, safety issues, interworking with the network and interworking through the network (for voice telephony only).

Conformance to the terminal directive is demonstrated by conformance to the relevant CTR (Common Technical Regulation). These EU legal requirements refer to an associated TBR (Technical Basis for Regulation) for their technical content. A TBR is a special type of ETSI deliverable, identifying the essential requirements which shall be tested and the tests to be performed in order to ensure compliance to the terminals directive.

The terminals directive is only applicable to terminals. It is not applicable to equipment which is part of a network. The location of the network termination point (NTP) is therefore very important. If the DECT FP is connected to the NTP then the FT is a terminal equipment and subject to the terminals directive. If the NTP is the air interface then the FT shall be part of the network and not subject to the terminals directive. In general a PP is always a terminal. However, in the case of ISDN IS or the RAP profiles the NTP may be considered as the replicated network interface at the PP if the PP is supplied by the network operator. In this case the PP may not be a terminal equipment.

### 11.2 The EMC directive

The EMC directive, 89/336/EEC [119] sets the background for harmonization of the EMC requirements in the EU member states. From the end of 1996, such requirements are expected to be identical in all EU countries. All electrical and electronic equipment to be marketed in the EU shall fulfil the requirements of the EMC directive.

The EMC requirements for radio in general are described in ETS 300 339 [28] and the specific requirements for DECT are found in ETS 300 329 [26]. ETS 300 329 [26] may be used to demonstrate compliance to the EMC directive.

### 11.3 The DECT CTRs

For rapid introduction on a European wide basis, Council Directive 91/287/EEC [121] and Council Recommendation 91/288/EEC [122] refer to Council Directive 91/263/EEC [120] (Terminal Directive) for mutual recognition between countries of conformity. For this purpose Common Technical Regulations (CTRs) have been established for DECT relating to harmonized DECT TBRs and ETSS. Approval to the relevant DECT CTRs gives full access to the single European market.

Further information on Council Directive 91/263/EEC [120], and its application, is found in TRAC's "Handbook on CTRs" [124] and "Procedure for the Production of CTRs" [125].

Where the network interface of a DECT FP is territory specific, which is in general the case for PSTN connection, there may be territory specific type approval requirements for the network interface.

#### 11.3.1 CTR 6

Conformance to CTR 6 [116] is mandatory for all DECT equipment.

CTR 6 [116] references TBR 6 [106] for its technical contents.

TBR 6 [106] contains radio parameters and procedures required for the effective co-existence of uncoordinated private and public systems on the common designated DECT frequency band.

NOTE: TBR 6 [106] is, in its technical content, identical to ETS 300 176-1 [16].

#### 11.3.2 CTR 10

Conformance to CTR 10 [117] is mandatory for all DECT terminal equipment supporting a 3,1 kHz telephony teleservice capable of direct or indirect interworking via the public PSTN/ISDN. CTR 10 [117] references TBR 10 [106] for its technical content. TBR 10 [108] contains the speech coding and speech transmission requirements.

For all equipment where PPs are allowed to be tested as separate items under CTR 10 [117], the required speech characteristics are uniform. If a connection attempt between a separately approved PP and FP succeeds (related ARI and PARK), then the end-to-end speech characteristics and echo control requirements are met, independently of which access protocol was used. This is an essential feature for DECT as a general radio access technology, since a multitude of access protocols are supported.

NOTE: TBR 10 [108] is, in its technical content, identical to ETS 300 176-2 [18].

#### 11.3.3 CTR 11

Conformance to CTR 11 [118] is mandatory for all DECT equipment declared to be PAP compliant. Since PAP has been superseded by GAP, CTR 11 [118] is of little practical relevance.

CTR 11 [118] references TBR 11 [109], which in turn references the essential requirements of the PAP conformance requirements documents.

CTR 11 [118] will be withdrawn when CTR 22 comes into force.

#### 11.3.4 CTR 22

After a transition period which will last until 30 September 1996, CTR 22 will become mandatory for all DECT equipment that has to conform to CTR 10 [117].

CTR 22 references TBR 22, which in turn references the essential requirements of the GAP conformance requirements documents (see figure 13).



### **11.3.5 CTR 36**

Conformance to CTR 36 is mandatory for all DECT terminal equipment which claim conformance to the DECT/GSM interworking profile (ETS 300 370 [29]).

CTR 36 makes reference to TBR 36 [113], which in turn refers to the essential requirements of the DECT/GSM interworking profile conformance documents (see figure 17).

TBR 36 [134] is structured to identify separate requirements for Portable Parts and for Fixed Parts. Since, at present, the only interface for a DECT FP to connect to a GSM PLMN is through the GSM A-interface, and since this interface is not a public interface, therefore the DECT FP is considered a part of the network. Hence CTR 36 does not apply to DECT FP's which are part of a GSM network and are connected using the GSM A-interface. If the A-interface were to be offered as a public network interface, DECT FP's which are not part of the network, but which are connected using the A-interface, would become subject to CTR 36.

### **11.3.6 Future CTRs**

CTR 39, which will refer to TBR 39 [114], will provide the essential requirements for DECT/GSM Dual Mode Portable Parts/Mobile equipment. TBR 39 [114] will make reference to other DECT and GSM TBRs (TBR 5 [105], TBR 9 [107], TBR 19 [110] and TBR 20 [111] for GSM and TBR 6 [106], TBR 10 [108], TBR 22 [112] and TBR 36 [113] for DECT).

CTR 40, which will refer to TBR 40 [115], will provide the essential requirements for DECT ISDN interworking, covering both the End System Configuration and the Intermediate System Configuration.

There is no decision on whether a CTR for RAP is required, but since both FT and PT may be considered as part of the network and not terminal equipment, it may not be appropriate.

## **11.4 Licensing**

DECT equipment for private applications is exempt from licence requirements in the CEPT countries. Operation of a public DECT system may be subject to national regulation.

## **11.5 Type approval**

Compliance with the terminals directive (demonstrated by compliance with the relevant CTRs) generally provides pan-European type approval. Where the equipment is not subject to the terminals directive, national type approval requirements may apply. National type approval may also apply when terminals are intended for connection to networks which have territory specific requirements (e.g. this is the situation with PSTN at present).

## 11.6 Application to specific profiles

This subclause identifies the regulatory requirements, that apply to each profile. This subclause is provided for information but cannot be regarded as a definitive source of information on this issue. Regulatory issues are not the responsibility of ETSI.

**Table 1: Applicability of CTRs to DECT applications**

Profile	Radio	Telephony	Protocol	EMC	Safety	Network i/f
GAP	CTR 6	CTR 10	CTR 22	ETS 300 329	2	2
Data profiles	CTR 6			ETS 300 329	2	2
ISDN ES	CTR 6	CTR 10	CTR 22 future CTR 40	ETS 300 329	2	2
ISDN IS	CTR 6	1	future CTR 40	ETS 300 329	2	2
CTM	CTR 6	CTR 10	CTR 22	ETS 300 329	2	2
GSM interworking	CTR 6	CTR 10	CTR 22 future CTR 36	ETS 300 329	2	2
DECT/GSM Dual Mode (4)	CTR 39	CTR 39	CTR 39	ETS 300 329	2	2
RLL	CTR 6	1		ETS 300 329	2	2
WRS	CTR 6			ETS 300 329	2	2
NOTE 1:	Equipment could be tested in combination with associated wired terminal to CTR 10.					
NOTE 2:	Further regulatory requirements regarding safety and network interfaces may apply.					
NOTE 3:	CTRs are only applicable when the equipment is a terminal.					
NOTE 4:	CTR 39 makes reference to other DECT and GSM CTRs, see 11.3.6.					

## 12 Summary of the DECT ETRs

The introduction and application of the DECT standards are supported by ETSI Technical Reports (ETRs).

### 12.1 ETR 015: DECT reference document

ETR 015 [92] provides a rather detailed description of services and features in DECT. The document was published in 1991, and the latest developments in DECT are not covered.

### 12.2 ETR 041: DECT transmission aspects, 3,1 kHz telephony

ETR 041 [93] contains a detailed description of the 3,1 kHz telephony application contained in the base standard plus associated information on DECT 3,1 kHz telephony interworking with various networks. This ETR was prepared was written by ETSI Technical Committee Transmission and Multiplexing (TC-TM).

### 12.3 ETR 042: Traffic capacity aspects

The radio aspects are further described in ETR 042 [94]. This ETR was published in 1992, and does not include requirements or simulations for Radio Local Loop (RLL) and outdoor Personal Communications Network (PCN) applications. More up to date information is found in ETR 310 [103].

### 12.4 ETR 043: DECT services and facilities

ETR 043 [95] describes the range of services and facilities which DECT is required to provide and support. The information is intended to be network and product independent. The information, though covering all DECT services and facilities, is of general descriptive nature. The document describes basic transmission services, the basic bearer services and various network applications.

## **12.5 ETR 056: DECT system description document**

An overall description of the DECT system in terms of inter-working and interfacing to local and public networks such as PSTN, ISDN, X.25 etc. is provided in ETR 056 [96]. Emphasis has been placed on the special features of DECT, for example the identity structures allowing for attachment to different network types, aspects of mobility management, etc. along with recommendations for efficient inter-working of DECT and various networks.

## **12.6 ETR 139: Radio in the Local Loop**

ETR 139 [97] is not specifically related to DECT. It examines technologies in use or under development in Europe for Radio in the Local Loop. ETR 139 [135] defines the relevant applications and services appropriate to radio access in the local loop network, considers existing and recognized standards and technologies in Europe suitable for RLL and assesses the operational and regulatory issues associated with RLL.

## **12.7 ETR 159: DECT wide area mobility using GSM**

ETR 159 [98] describes the possible requirements when a DECT system is attached to a GSM fixed network. ETR 159 [98] provides an introduction to the requirements of wide area mobility, and describes how the GSM network can be the basis for wide area DECT mobility, utilizing the mobility functions available in GSM but not available in PSTN or current ISDN standards.

## **12.8 ETR 178: DECT A high level guide to the DECT standardization**

This ETR provides a high level description of the various components of the DECT standardization. It is directed at a wide audience, regulators, operators, manufacturers and others, and attempts to provide a basic overview of the DECT standards, without requiring detailed technical knowledge of DECT as a prerequisite.

## **12.9 ETR 183: DECT Conformance testing on DECT equipment**

ETR 183 [99] provides an introduction in DECT conformance testing. It gives a general overview on the DECT system, an introduction on conformance testing and DECT conformance testing in particular. It further shows how a ETSI customer can use the DECT Conformance test standards.

ETR 183 [99] contains an abstract of the DECT standard, the ISO/IEC 9646 [127] standard and the resulting issues from applying the requirements and techniques of ISO/IEC 9646 [127] on the DECT protocol stack together with a set of examples derived from the currently available test specification material from the test suites for different DECT layers.

## **12.10 ETR 185: DECT data service profile; overview**

ETR 185 [100] describes the objectives, structure and content of the DECT Data Services Profiles, which define a set of profile standards for systems conforming to the DECT standard. They are a family of profile standards which build upon, and extend, each other, aimed at the general connection of terminals offering non-voice services between themselves or to other communications network, both public and private, via a DECT Fixed Part.

ETR 185 also describes possible user scenarios in wireless computing. These scenarios have formed the guidelines of the DECT Data Services Profiles.

## **12.11 ETR 246: DECT Wireless relay stations**

An overall description of Wireless Relay Stations (WRS) is provided in ETR 246 [101]. WRS is an additional building block for the DECT fixed network. It is suitable to provide cost effective infrastructures for low traffic density applications.

## 12.12 ETR 308: DECT Services and configurations for RAP

ETR 308 [102] provides a comprehensive review of all the services and features related to RLL applications, including basic PSTN analogue telephone replacement and more advanced services. It also identifies the many possible RLL configurations. It provides detailed information on the features which need to be supported by the DECT RAP profiles. Much of the information is also relevant to RLL applications using other technologies.

## 12.13 ETR 310: DECT Traffic capacity and spectrum requirements

ETR 310 [103] describes the traffic capacity and the spectrum requirements for multi-system and multi-service DECT applications coexisting on a common frequency band. Configurations for typical DECT applications, and relevant mixes of these, including residential, office, public and RLL applications, are defined and the traffic capacity is analysed, mainly by advanced simulations. These results are used together with relevant deployment scenarios to estimate spectrum requirements for reliable services, specifically for a public multi-operator licensing regime. Recommendations are given on conflict solving rules that conserve the high spectrum efficiency gain of shared spectrum while maintaining control of the service quality in one's own system. These recommendations cover synchronization, directional gain antennas, traffic limits per DECT Radio Fixed Part (RFP), use of Wireless Relay Stations (WRS), different rules for private and public operators and procedures needed for timely local adjustments where and when the local traffic increases.

## 12.14 ETR 341: DECT/GSM interworking profile overview

ETR 341 [104] gives an overview and description of the standards within the DECT/GSM Interworking Profile (IWP).

## 12.15 Other ETRs

Other ETRs, finished or under preparation, are given in the table of DECT documents in annex A.

# 13 Further developments of DECT

One essential requirement in the ETR 043 [95] is flexibility for additions and evolutionary applications. This has been provided by the above described tool box concept, and is further amplified by the provision of escape codes and a multitude of reserved codes in messages in every layer of the specification. These reserved codes are reserved for future ETSI defined enhancements and for proprietary additions.

Besides defining new profiles from the existing tool box, it is also easy to add new contents to the tool box. Examples of new contents are 7 kHz telephony service provision, low bit rate speech codecs, lower and higher transmission bit rate options, new or extended frequency allocations (see note) (pan-European, national or outside Europe). Equipment based on these new features, could be required to be compliant to GAP or not dependent upon the application.

NOTE: Extended or new frequency allocations do not cause regulatory difficulties for roaming DECT handsets. The reason is that it is mandatory for DECT FP to broadcast not only its ARIs, but also other information as regarding which carrier frequencies the specific FP is allowed to operate on. PPs not allowed to start transmission on carriers others than those informed to the PP by the FP in the FP broadcast messages. DECT carriers have been defined for the whole frequency band 1 880 - 1 937 MHz in the second edition of ETS 300 175 [7] - [15] and TBR 6 [106].

It is possible to go further, e.g. by defining a dual mode physical layer, where the second layer is optimized for long range, improvement to the DECT coverage area in low density PCS applications may be achieved. Such a dual mode physical layer provision could, with a minimum amount of effort, enhance DECT to an attractive third generation PCS technology.

DECT instantaneous Dynamic Channel Selection provides co-existence between systems with different carrier spacing, different carrier bandwidth and different slot length.

### 13.1 Extended frequency bands

DECT provides for extension to the basic frequency allocation in a fully backward compatible way. Where additional frequencies are available this is indicated in the dummy bearer transmissions of each RFP. PPs will only utilize the additional frequencies where this is indicated by the FP transmissions.

### 13.2 Dual mode terminals

RES-03 committees are working on standards for terminals containing both DECT and GSM air interfaces. The terminal may access a network via either air interface using the same subscription, or might have multiple subscriptions. A user could replace a cellular phone and a cordless phone in the office with a single terminal.

Specification of the requirements for Dual Mode terminals is, at the time of writing, still at an early stage within RES-03 working groups. The requirements are expected to be a combination of DECT and GSM requirements, with some amendments relating to the fact that the terminals are combined (for example the transmissions of a dual mode terminal operating in DECT mode would fail the GSM spurious tests because a GSM terminal is not supposed to have large emissions in the DECT frequency band). The work is expected to result in the generation of a new regulatory standard TBR 39 [136].

### 13.3 UMTS/FPLMTS

Several different radio interfaces are expected in UMTS/FPLMTS (IMT-2000). DECT is in Europe seen as a one of several possible elements for the technical development of this system, utilizing DECT's ability to access different networks.

Together with DECT/GSM/DCS 1800 interworking and dual (triple mode) mode handsets, evolving products will provide 3rd generation mobile radio services. Figure 20 gives a high level graphic overview of DECT services and applications. Protected asymmetric links with bit rates beyond 552 kbit/s are possible if needed, for example by having multiple radio circuits in a subscriber unit.

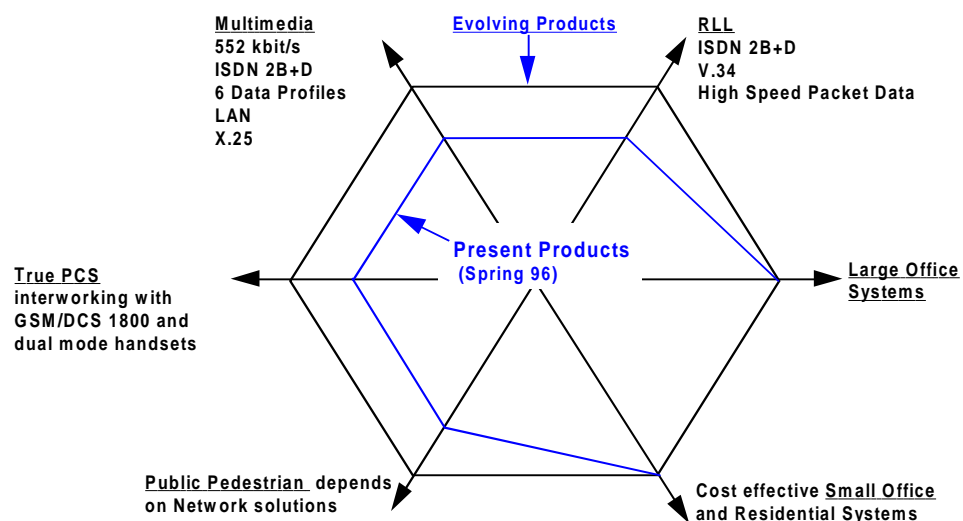


Figure 20: Graphic high level overview of DECT services and applications

### 13.4 DECT in the USA

The Personal Wireless Telecommunications (PWT) interoperability standards, PWT and PWT/E, in North America (standardized within the Telecommunications Industry Association, TIA), are based on DECT and provide basically the same services as DECT. PWT and PWT/E uses the DECT frame structure, MAC, DLC etc., but has a different modulation and different bandwidth and carrier spacing to meet local regulatory requirements. PWT operates in the US unlicensed band 1 910 - 1 920 MHz. PWT-E is an extension into the licensed bands 1 850 - 1 910 MHz and 1 930 - 1 990 MHz.

DECT and PWT standards may also be adopted in some Latin American countries. PWT, PWT-E and DECT do coexist very well on a common spectrum allocation, due to the common frame structure (see ETR 310 [103]).

## Annex A: Summary table of DECT standards

This table provides a summary of RES-03 work items and their status. The table was generated at the time of publication of this ETR, but it is inevitably out of date as soon as it is written. The table should therefore be used only as general information and should not be considered as a definitive list of DECT standards.

**Table A.1: Status of DECT documents (January 1997)**

Document no.	Work Item no.	Abbreviated title	Status
<b>ETSI Technical Reports</b>			
ETR 015	DTR/RES-03001	DECT reference document	published March 91
ETR 041	DTR/TM-05002	DECT, transmission aspects, 3,1 kHz telephony	published July 92
ETR 042	DTR/RES-03016	Guide to features that influence traffic capacity	published July 92
ETR 043	DTR/RES-03004	DECT services and facilities	published July 92
ETR 056	DTR/RES-03005	DECT system description document	published July 93
ETR 056 Ed. 2	DTR/DECT-000091	DECT system description document	
ETR 139	DTR/RES-03021	Radio in the Local Loop (RLL)	published November 94
ETR 183	DTR/RES-03012	Conformance test specification for DECT	published November 95
ETR 159	DTR/RES-03022	DECT wide area mobility services using GSM	published July 95
ETR 178	DTR/RES-03029	A high level guide to the DECT standardization	published October 95
ETR 178 Ed. 2	RTR/DECT-000088	A high level guide to the DECT standardization 2nd edition	(this document)
ETR 185	DTR/RES-03030	Data services profile, overview	published December 95
ETR 246	DTR/RES-03068	Application of DECT Wireless Relay Stations (WRS)	published November 95
ETR 341	DTR/RES-03058	DECT/GSM interworking profile overview	published December 96
ETR 308	DTR/RES-03074	Radio local loop Access Profile (RAP)	published August 96
ETR 310	DTR/RES-03077	Traffic capacity and spectrum requirements for multi-system and multi-service applications co-existing in a common frequency band	published August 96
ETR 310/C1	DTR/RES-03077	Corrigendum to ETR 310	published October 96
	DTR/DECT-010095	DECT/GSM; Integration based on dual-mode terminals	
	DTR/DECT-010096	DECT/GSM; Advanced integration of dual-mode terminals	
(continued)			

Table A.1 (continued): Status of DECT documents (January 1997)

Document no.	Work Item no.	Abbreviated title	Status
<b>DECT Common Interface standards</b>			
ETS 300 175-1 to 9	DE/RES-03002-1 to DE/RES-03002-9	DECT Common Interface (CI), parts 1 to 9	superseded (October 92)
ETS 300 175-1 to 9 Ed. 2	RE/RES-03027-1 to RE/RES-03027-9	DECT Common Interface (CI), parts 1 to 9 (second edition)	published September 96
ETS 300 175-5 /A1	RE/DECT-030089-5	DECT Common Interface (CI), Use of Long and Short Identities	
ETS 300 175-6 /A1	RE/DECT-030089-6	DECT Common Interface (CI), Use of Long and Short Identities	
I-ETS 300 176	DE/RES-03003	Approval test specification	published October 92
ETS 300 176 parts 1 and 2 Ed. 2	RE/RES-03028-1 and RE/RES-03028-2	Approval test specification (upgrade to ETS)	published November 96
ETS 300 323 parts 1 to 7	DE/RES-03023-1 to DE/RES-03023-7	PAP test specification, parts 1 to 7	published December 95
ETS 300 323/A1 Ed. 2	RE/RES-03054	Updates of ETS 300 323, some parts are amendments, some new editions	published March 95
ETS 300 476 parts 1 to 7	DE/RES-03042-1 to DE/RES-03042-7	CI PICS, parts 1 to 7	published August 96
EN 300 476 parts 1 to 7 Ed. 2	REN/DECT-040106-1 to REN/DECT-040106-7	CI PICS, parts 1 to 7, 2nd edition	
ETS 300 497 parts 1 to 9	DE/RES-03026-1 to DE/RES-03026-9	DECT CI Test Case Library (TCL) (9 parts)	published August 96
ETS 300 497 parts 1 to 9 Ed. 2	DE/DECT-040094-1 to DE/DECT-040094-9	DECT CI Test Case Library (TCL) Updates based on DTAAB work	
ETS 300 700	DE/DECT-050069	Wireless Relay Stations (WRS)	
<b>DECT Authentication Module standards</b>			
ETS 300 331	DE/RES-03013	DECT Authentication Module (DAM)	published November 95
ETS 300 825	RE/DECT-060100	DECT Authentication Module (DAM), 3 Volt specification	
ETS 300 760	DE/DECT-060046	DAM ICS	
ETS 300 759	DE/DECT-060019	DAM test specification	
	DE/DECT-060081	DAM IWP, Testspec for DAM/PP (higher layers)	
		(continued)	

**Table A.1 (continued): Status of DECT documents (January 1997)**

Document no.	Work Item no.	Abbreviated title	Status
<b>DECT Generic Access Profile standards</b>			
ETS 300 444	DE/RES-03023	Generic Access Profile (GAP)	published December 95
ETS 300 444/A1	REN/DECT-050111	Generic Access Profile (GAP), amendment 1, Synchronization	
ETS 300 474 parts 1 and 2	DE/RES-03043-1 and DE/RES-03043-2	GAP PICS, parts 1 and 2	published August 96
EN 300 474 parts 1 and 2 Ed. 2	REN/DECT-040107-1 and REN/DECT-040107-2	GAP PICS, parts 1 and 2, 2nd edition	
ETS 300 494 parts 1 to 3	DE/RES-03040-1 to DE/RES-03040-3	GAP test specification, parts 1 to 3	published August 96
ETS 300 494 parts 1 to 3/A1	DE/DECT-040093-1 to DE/DECT-040093-3	GAP test specification, parts 1 to 3 updates resulting from DTAAB work	

<b>CTM Access Profile Standards</b>			
ETS 300 824	DE/DECT-050080	CTM Access Profile, CAP	
ETS 300 824/A1	REN/DECT-050110	CTM Access Profile, CAP, amendment 1, Synchronization	

<b>DECT Data standards</b>			
ETS 300 435	DE/RES-03031	Data Services Profile, base standard including interworking with connectionless networks (Service Types A and B, Class 1)	published February 96
ETS 300 701	DE/RES-03032	Data Services Profile, generic frame relay service with mobility (Service Types A and B, Class 2)	published October 96
ETS 300 699	DE/RES-03035	Data Services Profile, generic data link service for closed user groups (Service Type C, Class 1)	published October 96
ETS 300 651	DE/RES-03036	Data Services Profile, generic data link service (Service Type C, Class 2)	published September 96
	DE/DECT-020084	Data Services Profile, Bearer services for CUGs (Service type D, Class 1)	
	DEN/DECT-020108	Data Services Profile, Isochronous Bearer, mobility (Service type D, Class 1), Phase 2	
	DE/DECT-020082	Data Services Profile, Isochronous Bearer, mobility (Service type D, Class 2)	
	DEN/DECT-020109	Data Services Profile, Isochronous Bearer, mobility (Service type D, Class 2), Phase 2	
ETS 300 757	DE/DECT-020078	Data Services Profile, low rate messaging service (Service type E, Class 2)	
ETS 300 755	DE/DECT-020038	Data Services Profile, multimedia messaging service with specific provision for facsimile services (Service type F, class 2)	
	DE/DECT-020087	DECT Data Service Change (data multimedia)	
	DE/DECT-020047	Conformance testing for DECT base data profile	
	DE/DECT-020099	Point-to-Point Protocol (PPP) interworking for Internet access and general multi-protocol datagram transport	

(continued)



Table A.1 (continued): Status of DECT documents (January 1997)

Document no.	Work Item no.	Abbreviated title	Status
<b>DECT/GSM interworking standards</b>			
ETS 300 370	DE/RES-03017	DECT/GSM IWP, 3,1 kHz speech	published July 95
ETS 300 370 Ed. 2	RE/DECT-010073	DECT/GSM IWP, 3,1 kHz speech (2nd edition)	
ETS 300 466	DE/RES-03048	DECT/GSM IWP, General description of service requirements	published July 96
ETS 300 499	DE/RES-03049	DECT/GSM IWP, FP to MSC interconnection	published September 96
ETS 300 704 parts 1 and 2	DE/DECT-010044-1 and DE/DECT-010044-2	DECT/GSM IWP, Implementation of 3,1 kHz speech, PICS	
ETS 300 702 part 1	DE/RES-03025-1	DECT/GSM IWP, 3,1 kHz speech, test specification	published October 96
ETS 300 702 parts 2 and 3	DE/DECT-010025-2 and DE/DECT-010025-3	DECT/GSM IWP, 3.1kHz speech, test specification	
ETS 300 703	DE/DECT-010050	DECT/GSM IWP, Implementation of GSM phase 2 supplementary services	
ETS 300 756	DE/DECT-010071	DECT/GSM IWP, Implementation of bearer services	
ETS 300 764	DE/DECT-010057	DECT/GSM IWP, Implementation of GSM SMS	
ETS 300 792	DE/DECT-010072	DECT/GSM IWP, Implementation of fax group 3	
	DE/DECT-010079	DECT/GSM IWP, Enhanced bearer services	
ETS 300 787	DE/DECT-010063	DECT access to GSM via ISDN + interface, service description (stage 1)	
ETS 300 788	DE/DECT-010064	DECT access to GSM via ISDN + interface, functional capabilities and information flows (stage 2)	
	DE/DECT-010065	DECT access to GSM via ISDN + interface (bearer and SMS services)	
	DE/DECT-010066	DECT access to GSM PLMN via ISDN + interface, basic call and mobility management	
	DE/DECT-010067	DECT access to GSM via ISDN + interface, GSM supplementary services	
	DE/DECT-010097	Implementation of General Packet Radio Service (GPRS)	
	DE/DECT-010098	Implementation of High Speed Circuit switched Data (HSCD)	
(continued)			

**Table A.1 (continued): Status of DECT documents (January 1997)**

Document no.	Work Item no.	Abbreviated title	Status
<b>DECT-ISDN interworking standards</b>			
ETS 300 434-1	DE/RES-03014-1	DECT/ISDN IWP for end system configuration, part 1	published April 96
ETS 300 434-2	DE/RES-03014-2	DECT/ISDN IWP for end system configuration, part 2	published April 96
ETS 300 705 parts 1 and 2	DE/DECT-030045-1 and DE/DECT-030045-2	DECT/ISDN IWP for end system configuration, PICS (2 parts)	
EN 300 705 parts 1 and 2 Ed. 2	REN/DECT-0030101-1 and REN/DECT-0030101-2	DECT/ISDN IWP for end system configuration, PICS (2 parts), 2nd edition	
ETS 300 758 parts 1 to 3	DE/DECT-030018-1 to DE/DECT-030018-3	DECT/ISDN IWP for end system configuration, test specification (3 parts)	
EN 300 758 parts 1 and 2 Ed. 2	REN/DECT-030102-1 and REN/DECT-030102-2	DECT/ISDN IWP for end system configuration, test specification (2 parts), 2nd edition	
ETS 300 822	DE/DECT-030039	DECT/ISDN IWP, Intermediate System Configuration	
	DEN/DECT-030103-1 and DEN/DECT-030103-2	DECT/ISDN IWP, Intermediate System Configuration, PICS	
	DEN/DECT-030104-1 to DEN/DECT-030104-3	DECT/ISDN IWP, Intermediate System Configuration, PTS	

<b>DECT Radio Local Loop standards</b>			
ETS 300 765-1	DE/DECT-050075-1	Radio local loop Access Profile (RAP) part 1	
ETS 300 765-1/A1	REN/DECT-050112	Radio local loop Access Profile (RAP) part 1, amendment 1, Synchronization and CRFP	
ETS 300 765-2	DE/DECT-050075-2	Radio local loop Access Profile (RAP) part 2	
	DE/DECT-050076	Radio local loop Access Profile (RAP) test specification	
	DEN/DECT-050105-1 and DEN/DECT-050105-2	Radio local loop Access Profile (RAP) PICS	
	DTR/RES-00011	RLL Project - Survey of ETSI activities and Recommendations for ETSI Work Program	
		(continued)	

Table A.1 (concluded): Status of DECT documents (January 1997)

Document no.	Work Item no.	Abbreviated title	Status
<b>DECT EMC standard</b>			
ETS 300 329	DE/RES-09010	EMC standard for DECT equipment	published November 94
ETS 300 329/A1	RE/RES-09036	EMC standard for DECT equipment	
<b>DECT Technical Basis for Regulation</b>			
TBR 6	DTBR/RES-03009	General terminal attachment req.	published December 93
TBR 6 Ed. 2	RTBR/RES-03051	General terminal attachment req. (2nd edition)	adopted, awaiting TRAC
TBR 10	DTBR/RES-03010	General terminal attachment req., telephony applications	published December 93
TBR 10 Ed. 2	RTBR/RES-03052	General terminal attachment req., telephony applications (2nd edition)	adopted, awaiting TRAC
TBR 11	DTBR/RES-03011	PAP attachment for terminal equipment	published September 94
TBR 11/A1	RTBR/RES-03053	PAP attachment for terminal equipment/A1	published March 95
TBR 22	DTBR/RES-03055	GAP attachment for terminal equipment	adopted, awaiting TRAC
TBR 22 Ed. 2	RTBR/DECT-000092	GAP attachment for terminal equipment update based on DTAAB work	
TBR 36	DTBR/DECT-010059	DECT/GSM radio access	
TBR 39	DTBR/DECT-010060	DECT/GSM dual mode portables/mobiles	
TBR 40	DTBR/DECT-030061	TBR for DECT ISDN portable parts	

## **Annex B: Technical characteristics of DECT**

The radio frequency spectrum for DECT is 1 880 - 1 900 MHz. In this radio frequency band, 10 frequencies are defined as default. Each radio frequency is divided into timeslots, usually 24 on each frequency, where each DECT channel usually uses two, one in each direction (TDMA). This allows for 120 channels on all 10 frequencies with the basic channel definition. These channels are the DECT radio resource, where all DECT communication occurs. Some DECT applications use more than one timeslot in each direction with some impact on the number of available channels. The DECT standard has provisions for other channel definitions (different carrier spacing, bandwidth and timeslot length) if so desired in future developments.

The mandatory real time Dynamic Channel Selection messages and procedures provide effective coexistence of uncoordinated private and public systems on the common designated DECT frequency band. Each device has access to all channels (time/frequency combinations). When a connection is needed, a channel is selected so that, at that instant and locality, minimum interference of all the common access channels is caused. This avoids any need for traditional frequency planning, and greatly simplifies the installations. This procedure also provides higher and higher capacity by closer and closer base station installations, while maintaining a high radio link quality. Not needing to split the frequency resource between different services or users gives a very efficient use of the allocated spectrum.

The basic telephony speech quality is provided by application of the ITU-T Recommendation G.726 [123] 32 kbit/s ADPCM speech codec and other speech transmission characteristics defined in ETS 300 175-8 [14]. Echo control is provided by low cost means in the DECT FP without the need to add any requirements on the attached local or public network. Further information on DECT speech transmission aspects when inter-working with other networks are also found in ETR 041 [93].

**History**

<b>Document history</b>	
October 1995	First Edition
January 1997	Second Edition