

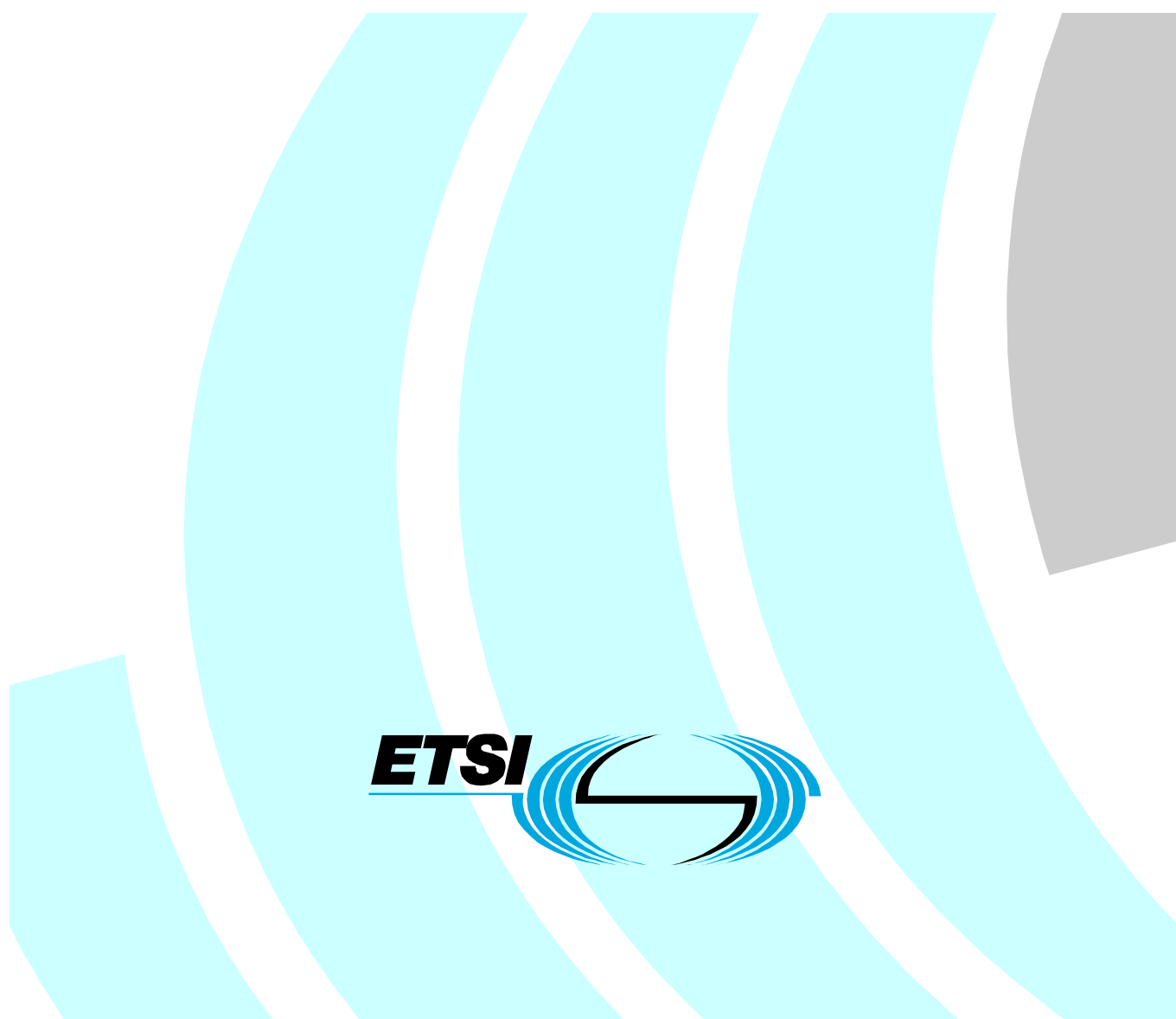
# ETSI TS 101 863-1 V1.1.2 (2001-11)

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*Technical Specification*

## **Digital Enhanced Cordless Telecommunications (DECT); DECT/UMTS Interworking Profile (IWP); Part 1: General description and overview**

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**Reference**

RTS/DECT-000213-1

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**Keywords**

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## Foreword

This Technical Specification (TS) has been produced by ETSI Project Digital Enhanced Cordless Telecommunications (DECT).

The present document is based on DECT Common Interface (CI) specification EN 300 175, parts 1 [1] to 8 [8] to enable DECT terminals to interwork in the public and private environment with DECT systems which are connected to a UMTS core infrastructure.

In addition, the present document is based on the DECT Generic Access Profile (GAP), EN 300 444 [14] to enable the same DECT/UMTS terminal to interwork with a DECT FP complying to the GAP requirements, irrespective of whether this FP provides residential, business or public access services. General attachment requirements and speech attachment requirements are based on EN 301 406 [15].

The present document is part 1 of a multi-part deliverable covering the DECT/UMTS Interworking Profile (IWP), as identified below:

- Part 1: "General description and overview";**
- Part 2: "CN-FP interworking";
- Part 3: "3,1 kHz speech service";
- Part 4: "Supplementary services";
- Part 5: "SMS point-to-point and cell broadcast";
- Part 6: "Packet switched data".

The present document defines a general purpose, but strict, mobility profile in terms of features, procedures, data structures, information elements and fields within the information elements at the DECT air interface in order to achieve full inter-operability between equipment, i.e. DECT systems and terminals, which fulfil the requirements of the present document. The present document also fulfils the minimum requirements of the GAP enabling backwards compatibility with the respective equipment.

Further details on the DECT system may be found in TR 101 178 [11], ETR 043 [12], and in EN 300 176-1 [9] and EN 300 176-2 [10].

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# 1 Scope

The present document specifies the Digital Enhanced Cordless Telecommunications (DECT) access protocols and Fixed Part (FP) and Portable Part (PP) interworking/mappings necessary to ensure that the Universal Mobile Telecommunication System (UMTS) services can be provided over DECT. To enable DECT terminals to interwork with DECT systems which are connected to the UMTS infrastructure, from the DECT side of the present document is based on EN 300 444 [14] and on the DECT Common Interface specification EN 300 175 parts 1 [1] to 8 [8] (for the cases not covered by Generic Access Profile (GAP)), from UMTS side the present document assumes interworking with UMTS specification release 1999 and later.

An air-interface profile is specified for a particular set of UMTS services so that inter-operability of DECT equipment for these services can be achieved. Interworking functions/mappings are specified for Mobile Switching Centre (MSC) attachment for the DECT FP as the FP is using the Iu-interface towards the UMTS core network in the respect that the FP emulates a UTRAN Radio Network Controller (RNC) with regards to the UTRAN messages which are relevant to the present document. Interworking functions/mappings for the PP are specified for MSC environment.

The provision of the (UMTS) Subscriber Identity Module (SIM, USIM) and DECT Authentication Module (DAM) within the DECT portable are also considered.

UMTS interfaces to non-UMTS networks are out of the scope of the present document.

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# 2 References

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

- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

- [1] ETSI EN 300 175-1: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 1: Overview".
- [2] ETSI EN 300 175-2: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 2: Physical Layer (PHL)".
- [3] ETSI EN 300 175-3: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 3: Medium Access Control (MAC) layer".
- [4] ETSI EN 300 175-4: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 4: Data Link Control (DLC) layer".
- [5] ETSI EN 300 175-5: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 5: Network (NWK) layer".
- [6] ETSI EN 300 175-6: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 6: Identities and addressing".
- [7] ETSI EN 300 175-7: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 7: Security features".
- [8] ETSI EN 300 175-8: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 8: Speech coding and transmission".
- [9] ETSI EN 300 176-1: "Digital Enhanced Cordless Telecommunications (DECT); Approval test specification; Part 1: Radio".

- [10] ETSI EN 300 176-2: "Digital Enhanced Cordless Telecommunications (DECT); Approval test specification; Part 2: Speech".
- [11] ETSI TR 101 178: "Digital Enhanced Cordless Telecommunications (DECT); A High Level Guide to the DECT Standardization".
- [12] ETSI ETR 043: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Services and facilities requirements specification".
- [13] ETSI EN 300 757: "Digital Enhanced Cordless Telecommunications (DECT); Low Rate Messaging Service (LRMS) including Short Messaging Service (SMS)".
- [14] ETSI EN 300 444: "Digital Enhanced Cordless Telecommunications (DECT); Generic Access Profile (GAP)".
- [15] ETSI EN 301 406: "Digital Enhanced Cordless Telecommunications (DECT); Harmonized EN for Digital Enhanced Cordless Telecommunications (DECT) covering essential requirements under article 3.2 of the R&TTE Directive; Generic radio".
- [16] ETSI TS 101 863-2: "Digital Enhanced Cordless Telecommunications (DECT); DECT/UMTS Interworking Profile (IWP); Part 2: CN-FP interworking".
- [17] ETSI TS 101 863-3: "Digital Enhanced Cordless Telecommunications (DECT); DECT/UMTS Interworking Profile (IWP); Part 3: 3,1 KHz speech service".
- [18] ETSI TR 121 905: "Universal Mobile Telecommunications System (UMTS); Vocabulary for 3GPP Specifications (3GPP TR 21.905)".
- [19] ETSI TS 122 002: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Circuit Bearer Services (BS) supported by a Public Land Mobile Network (PLMN) (3GPP TS 22.002)".
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- [21] ETSI TS 122 004: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); General on supplementary services (3GPP TS 22.004)".
- [22] ETSI TS 100 906: "Digital cellular telecommunications system (Phase 2+); Mobile Stations (MS) features (GSM 02.07)".
- [23] ETSI TS 122 011: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Service accessibility (3GPP TS 22.011)".
- [24] ETSI TS 122 016: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); International Mobile station Equipment Identities (IMEI) (3GPP TS 22.016)".
- [25] ETSI TS 100 922: "Digital cellular telecommunications system (Phase 2+); Subscriber Identity Modules (SIM); Functional characteristics (GSM 02.17)".
- [26] ETSI TS 122 024: "Digital telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Description of Charge Advice Information (CAI) (3GPP TS 22.024)".
- [27] ETSI TS 122 030: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Man-Machine Interface (MMI) of the User Equipment (UE) (3GPP TS 22.030)".
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- [29] ETSI TS 122 067: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Enhanced Multi-Level Precedence and Pre-emption service (eMLPP) - Stage 1 (3G TS 22.067)".
- [30] ETSI TS 122 072: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Call Deflection Service description - Stage 1 (3G TS 22.072)".
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- [32] ETSI TS 122 082: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Call Forwarding (CF) supplementary services - Stage 1 (3G TS 22.082)".
- [33] ETSI TS 122 083: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Call Waiting (CW) and Call Holding (HOLD); Supplementary Services - Stage 1 (3G TS 22.083)".
- [34] ETSI TS 122 084: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); MultiParty (MPTY) Supplementary Services - Stage 1 (3G TS 22.084)".
- [35] ETSI TS 122 085: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Closed User Group (CUG) Supplementary Services - Stage 1 (3G TS 22.085)".
- [36] ETSI TS 122 086: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Advice of Charge (AoC) Supplementary Services - Stage 1 (3G TS 22.086)".
- [37] ETSI TS 122 087: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); User-to-User Signalling (UUS); Service description - Stage 1 (3G TS 22.087)".
- [38] ETSI TS 122 088: "Digital cellular telecommunications system (Phase 2+) GSM); Universal Mobile Telecommunications System (UMTS); Call Barring (CB) Supplementary Services - Stage 1 (3G TS 22.088)".
- [39] ETSI TS 122 090: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Unstructured Supplementary Service Data (USSD) - Stage 1 (3G TS 22.090)".
- [40] ETSI TS 122 091: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Explicit Call Transfer (ECT) (3GPP TS 22.091)".
- [41] ETSI TS 122 093: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Completion of Calls to Busy Subscriber (CCBS); Service description, Stage 1 (3G TS 22.093)".
- [42] ETSI TS 122 096: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Name identification supplementary services; Stage 1 (3G TS 22.096)".
- [43] ETSI TS 122 135: "Universal Mobile Telecommunications System (UMTS); Multicall; Service description; Stage 1 (3GPP TS 22.135)".
- [44] ETSI TS 100 521: "Digital cellular telecommunications system (Phase 2+); Network functions (GSM 03.01)".
- [45] ETSI TS 123 009: "Universal Mobile Telecommunications System (UMTS); Handover procedures (3GPP TS 23.009)".

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- [47] ETSI TS 123 012: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Location Management Procedures (3GPP TS 23.012)".
- [48] ETSI TS 123 014: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Support of Dual Tone Multi-Frequency (DTMF) signalling (3GPP TS 23.014)".
- [49] ETSI TS 123 060: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); General Packet Radio Service (GPRS); Service description; Stage 2 (3GPP TS 23.060)".
- [50] ETSI TS 123 081: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Line identification supplementary services - Stage 2 (3GPP TS 23.081)".
- [51] ETSI TS 123 082: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Call Forwarding (CF) supplementary services - Stage 2 (3GPP TS 23.082)".
- [52] ETSI TS 123 083: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Call Waiting (CW) and Call Hold (HOLD) supplementary services - Stage 2 (3GPP TS 23.083)".
- [53] ETSI TS 123 084: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Multi Party (MPTY) supplementary services - Stage 2 (3GPP TS 23.084)".
- [54] ETSI TS 123 085: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Closed User Group (CUG) supplementary service - Stage 2 (3GPP TS 23.085)".
- [55] ETSI TS 123 086: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Advice of Charge (AoC) supplementary services - Stage 2 (3GPP TS 23.086)".
- [56] ETSI TS 123 088: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Call Barring (CB) Supplementary Services - Stage 2 (3GPP TS 23.088)".
- [57] ETSI TS 123 090: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Unstructured Supplementary Service Data (USSD) - Stage 2 (3GPP TS 23.090)".
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- [64] ETSI TS 129 002: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Mobile Application Part (MAP) specification (3GPP TS 29.002)".
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- [66] ETSI TS 133 102: "Universal Mobile Telecommunications System (UMTS); 3G Security; Security Architecture (3GPP TS 33.102)".
- [67] ISO/IEC 8859-1: "Information processing - 8-bit single-byte coded graphic character sets - Part 1: Latin alphabet No.1".
- [68] ISO/IEC 9646-6: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 6: Protocol profile test specification".
- [69] ETSI ETS 300 133-2: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Enhanced Radio MESSage System (ERMES); Part 2: Service aspects".
- [70] ITU-T Recommendation Q.6xx series: "International Telecommunication Union; Interworking of signalling systems".
- [71] ETSI TS 101 863-5: "Digital Enhanced Cordless Telecommunications (DECT); DECT/UMTS Interworking Profile (IWP); Part 5: SMS point to point and cell broadcast".

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## 3 Definitions, symbols and abbreviations

Generic DECT definitions, symbols and abbreviations can be found in the base standard EN 300 175-1 [1].

### 3.1 Definitions

For the purposes of the present document, the terms and definitions given in EN 300 175-1 [1] and TR 121 905 [18] apply.

### 3.2 Symbols

For the purposes of the present document, the symbols given in EN 300 175-1 [1], TR 121 905 [18] and the following apply:

A	Interface between MSC and 2G BSS
D	Interface between MSC/VLR and HLR
Gb	Interface between an SGSN and a BSC
Gc	Interface between a GGSN and an HLR
Gd	Interface between an SMS-GMSC and an SGSN, and between an SMS-IWMSC and an SGSN
Gf	Interface between an SGSN and an EIR
Gi	Reference point between Packet Domain and an external packet data network
Gn	Interface between two GSNs within the same PLMN
Gp	Interface between two GSNs in different PLMNs. The Gp interface allows support of Packet Domain network services across areas served by the co-operating PLMNs
Gr	Interface between an SGSN and an HLR
Gs	Interface between an SGSN and MSC
Iu	Interface between the RNS and the core network. It is also considered as a reference point
MS	It is used to access the GSM services through this interface
R	The reference point between a non-ISDN compatible TE and MT. Typically this reference point supports a standard serial interface
Um	The interface between the MS and the GSM fixed network part. The Um interface is the GSM network interface for providing packet data services over the radio to the MS.

Uu            The MT part of the Interface between the mobile station (MS) and the UMTS fixed network part. The Uu interface is the UMTS network interface for providing packet data services over the radio to the MS. The MT part of the MS is used to access the UMTS services through this interface

### 3.3 Abbreviations

For the purposes of the present document, the abbreviations given in EN 300 175-1 [1], TR 121 905 [18] and the following apply:

3G-MSC	3 <sup>rd</sup> Generation Mobile Switching Centre
AAL	ATM Adaptation Layer
AoCC	Advice of Charge (Charging)
AoCI	Advice of Charge (Information)
ATM	Asynchronous Transfer Mode
BAIC	Barring of All Incoming Calls
BAOC	Barring of All Outgoing Calls
BC	BroadCast
BIC-Roam	Barring of Incoming Calls when Roaming Outside the Home PLMN Country
BOIC	Barring of Outgoing International Calls
BOIC-exHC	Barring of Outgoing International Calls except those directed to the Home PLMN Country
CBC	Cell Broadcast Centre
CBS	Cell Broadcast Service
CC	Call Control
CCBS	Completion of Calls to Busy Subscribers
CD	Call Deflection
CFB	Call Forwarding on mobile subscriber Busy
CFNRc	Call Forwarding on mobile subscriber Not Reachable
CFNRy	Call Forwarding on No Reply
CFU	Call Forwarding Unconditional
CGF	Charging Gateway Functionality
CLIP	Calling Line Identification Presentation
CLIR	Calling Line Identification Restriction
CLMS	ConnectionLess Message Service
CNAP	Calling NAME Presentation
CoLP	Connected Line identification Presentation
CoLR	Connected Line identification Restriction
CS	Circuit Switched
CUG	Closed User Group
CW	Call Waiting
DAM	DECT Authentication Module
DECT	Digital Enhanced Cordless Telecommunications
DLC	Data Link Control layer
ECT	Explicit Call Transfer
EIR	Equipment Identity Register
eMLPP	enhanced Multi-Level Precedence and Pre-emption
ERMES	Enhanced Radio MESSage System
FP	Fixed Part
GAP	Generic Access Profile
GGSN	Gateway GPRS Support Node
GMM	Global Multimedia Mobility
GPRS	General Packet Radio Service
GSM	Global System for Mobile communications
HLR	Home Location Register
HOLD	call HOLD
IC	Integrated Circuit
ISUP	ISDN User Part
ISDN	Integrated Services Digital Network
IWU	Inter-Working Unit
MAC	Medium Access Control layer
MAP	Mobile Application Part
MC	MultiCall

MCC	Mobile Country Code
MNC	Mobile Network Code
MPTY	Multi ParTY service
MS	Mobile Station
MSC	Mobile Switching Centre
MT	Mobile Termination
MTP3b	Message Transfer Part level 3 for Q.2140
NWK	NetWorK
PDN	Packet Data Network
PLMN	Public Land Mobile Network
PLMN-Id	Public Land Mobile Network Identifier
PP	Portable Part
PS	Packet Switched
RANAP	Radio Access Network Application Part
RNS	Radio Network Subsystem
RNSAP	Radio Network Subsystem Application Part
RPN	Radio fixed Part Number
SABP	Service Area Broadcast Protocol
SCCF	Service Specific Coordination Function
SCCP	Signalling Connection Control Part
SGSN	Serving GPRS Support Node
SIM	Subscriber Identification Module
SM	Systems Management
SMS	Short Message Service
SM-SC	Short Message-Service Centre
SMS-GMSC	Short Message-Service Gateway MSC
SMS-IWMSC	Short Message Service-InterWorking MSC
SPNP	Support of Private Numbering Plan
SSCOP	Service Specific Connection Oriented Protocol
TE	Terminal Equipment
TMSI	Temporary Mobile Subscriber Identity
TON	Type Of Number
UE	User Equipment
UICC	UMTS IC Card (=USIM)
UIP	UMTS/DECT Interworking Profile
UMTS	Universal Mobile Telecommunications System
USIM	UMTS Subscriber Identity Module
USSD	Unstructured Supplementary Services Data
UTRAN	UMTS Terrestrial Radio Access Network
UUS	User-to-User Signalling

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## 4 General

The present document specifies how UMTS services are provided over the DECT air interface.

One of the main objectives is to describe how the UMTS services are mapped across the DECT air interface in a formal way, so that inter-operability of different manufacturer's equipment can be achieved. This is done by describing the interworking unit procedures and mappings loosely following ITU-T Recommendations Q.601 to Q.699 [70] and by describing an air interface profile following ISO/IEC 9646-6 [68]. This last document enables the subsequent generation of tests cases, if required.

All references to USIM card means either to a USIM card or a multi-application card with USIM functionality.

The present document gives an overview on DECT/UMTS interworking and specifies the requirements to provide UMTS basic services over the DECT air interface.

The following clauses describe the teleservices, data services and the supplementary services that are supported and the requirements on both the PP and FP.

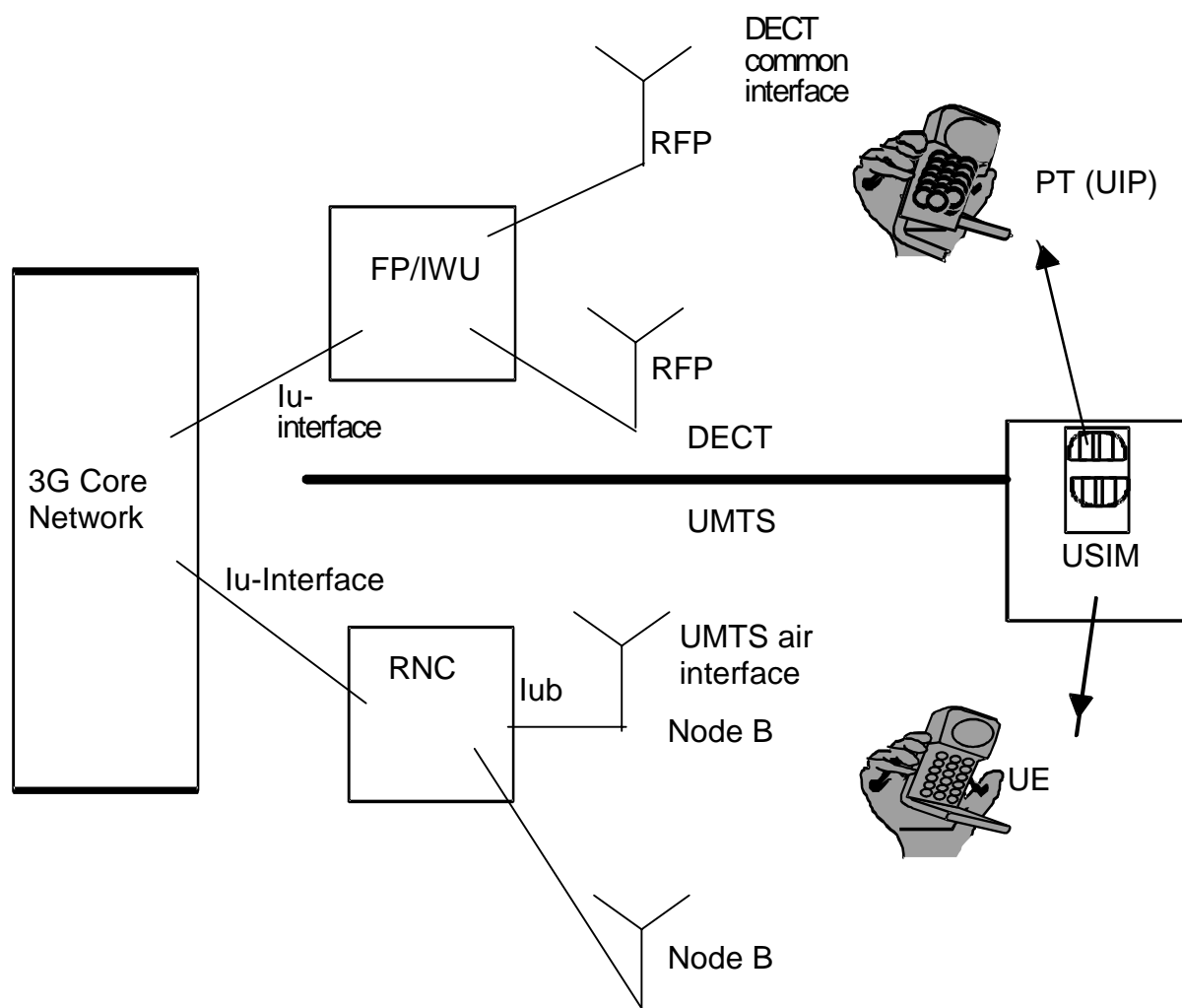
UMTS basic services according to UMTS Release 99 and later shall be supported unless explicitly stated otherwise. The services described in clause 7 are, in general terms, as provided to the user. All cases of non-support of UMTS services are explicitly mentioned and appropriate exception handling procedures are described in the relevant clauses.

## 5 Overview

DECT is a standard for short range, low power, digital cordless communications. UMTS is a standard for digital radio telephony and data networks, offering high mobility. The combination of DECT with UMTS offers new possibilities.

DECT/UMTS integration is done by interconnection via the Iu-interface.

The main body of the present document describes the UMTS/DECT interworking profile (UIP) based on the UMTS Iu-interface.



**Figure 1: DECT/UMTS interworking based on Iu-interface interconnection**

DECT/UMTS interworking based on Iu-interface interconnection is shown in figure 1. The DECT Fixed Part (FP) is connected to the core network of UMTS, either via the CS domain (e.g. CS voice service) or via the PS domain (e.g. packet data services) on the UMTS Iu-interface. Interworking Units (IWUs) in the DECT Fixed Part and Portable Part (PP) make the translation between DECT and UMTS layer 3 protocols. To the UMTS core network, the DECT FP appears like a radio network controller (RNC). An advantage of this method of interworking is that no changes to the Iu-interface or core network are required. However, changes to the Iu-interface may be considered in the future for more efficient interworking (e.g. to allow Adaptive Pulse Code Modulation (ADPCM), DECT specific services).

The terminal that attaches to the FP is a UIP compliant DECT PP and accepts a card with a UMTS Subscriber Identity Module (USIM). It can roam between Radio Fixed Parts (RFPs) connected to the same FP, or between RFPs connected to different RFPs by involving the CN. The USIM can be physically moved to a UE which accesses the Public Land Mobile radio Network (PLMN) via the UMTS air interface.

## 5.1 Access and mapping standards

In the following standards, IWUs are specified in the FP and PP for mapping DECT protocols to UMTS layer 3 protocols defined in TS 124 008 [58].

The access and mapping standards are based on the GAP, EN 300 444 [14] but interworking with UMTS networks adds some requirements such as:

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

### 5.1.1 General description and overview, TS 101 863-1

The present document gives a general overview on DECT/UMTS inter-working and specifies the inter-working requirements.

### 5.1.2 CN-FP interworking, TS 101 863-2

TS 101 863-2 [16] specifies how the FP is attached to the 3G core network.

### 5.1.3 Access and mapping for 3,1 kHz speech service, TS 101 863-3

TS 101 863-3 [17] specifies how UMTS 3,1 kHz speech service is mapped across the DECT air interface and is organized as follows:

- IWU mappings for 3,1 kHz speech;
- connection types - identifies the main DECT connection types at the air interface supporting optimized groups of services;
- external handover - i.e. in-call handover between different DECT FP s involving the 3G-MSC.

### 5.1.4 Supplementary services implementation, TS 101 863-4

TS 101 863-4 (see bibliography) specifies the PP interworking requirements and FP interworking requirements and mappings necessary to ensure that UMTS supplementary services can be provided over a DECT common interface.

The general interworking functions, the inter-working model, and the inter-working context of this part apply.

The protocol in TS 124 010 [59] is used for the support of supplementary services. The UMTS supplementary service messages are passed transparently.

### 5.1.5 Implementation of short message services, point-to-point and cell broadcast services, TS 101 863-5

TS 101 863-5 (see bibliography) specifies the PP and FP interworking requirements and mappings necessary to ensure that the UMTS point-to-point short message services (UMTS Teleservices 21 and 22) and Cell Broadcast Service (UMTS Teleservice 23) can be provided over a DECT common interface. It describes point-to-point SMS and Cell Broadcast Services (CBS).

The general interworking functions, the inter-working model, and the inter-working context of this part apply for point-to-point SMS. TS 101 863-5 (see bibliography) defines a new reference model for CBS.

TS 101 863-5 (see bibliography) is based on EN 300 757 [13] for point-to-point SMS. For CBS, the basis is the CLMS fixed service provided by the DECT common interface network layer in EN 300 175-5 [5]. For CBS, only DECT air interface functions are defined.

### 5.1.6 Packet switched data services, TS 101 863-6

TS 101 863-6 (see bibliography) specifies the PP and FP interworking requirements and mappings necessary to ensure that the UMTS packet switched data services can be provided over a DECT common interface.

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## 6 Interworking requirements

### 6.1 General

The present document defines the mandatory requirements for the FP in terms of interworking functions between the air interface and the external network as well as minimum requirements at the DECT air interface. It also defines the mandatory requirements for the PP in terms of interworking functions between the air interface and the Portable Application (PA) as well as the minimum requirements for the PP at the DECT air interface.

The interworking mappings shall be based on UMTS Release 99 and later.

The basis for interworking shall be the protocols defined in TS 124 008 [58] and TS 125 410 [62].

The procedures which are used depend on which Access Rights Identity (ARI) type is chosen by the PP; either according to the minimum requirements of the GAP or the MM procedures as described in the present document, i.e. the PPs, which are based on the present document shall always be capable of interworking with FP which fulfil the minimum requirements of the GAP, EN 300 444 [14]. The FPs, which fulfil the requirements of the present document, and which also support non-UMTS/GSM ARIs (classes A, B or C) shall also support the minimum requirements of the GAP.

The present document defines interworking environments for the FP and the PP in the case when DECT FPs are functionally attached to the UMTS CN, i.e. the higher layer capabilities broadcast attribute a39 "SIM services available" (see EN 300 175-5 [5], clause F.1) set to "1" B in all environments (public, business and residential).

All messages, information elements or fields within the information elements which are not mapped across the FP to the UMTS network shall either be ignored or processed locally.

### 6.2 Reference configurations

Reference configurations describe the functional groupings of DECT and UMTS and their relationships via reference points. In general, reference points may or may not correspond to a physical interface. The functional groupings and reference points for UMTS access are described in TS 125 410 [62]. The UMTS network entities and physical interfaces are described in TS 125 401 [61]. The functional (logical) groupings and reference points for DECT are described in clause 6.2.1.

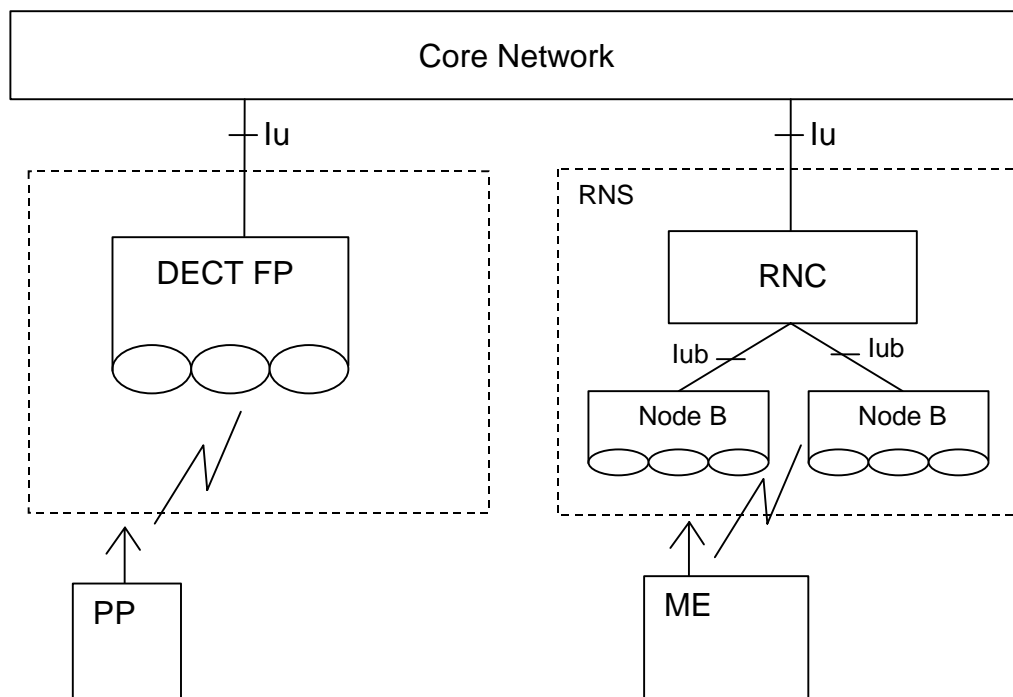


### 6.2.1 FP functional attachment to the UMTS PLMN

Reference point "Iu" in figure 1 is the interface which supports the functional structure of the UMTS Iu-interface at the network layer reflecting the associated Integrated Services Digital Network (ISDN) User Part (ISUP)/Telephony User Part (TUP) and UMTS Mobile Application Part (MAP) [64] functions.

In the present document, UMTS or DECT procedures are considered only where mapping is required, i.e.:

- UMTS MM and CC are completely covered in TS 101 863-3 [17] as far as CS basic speech is concerned.

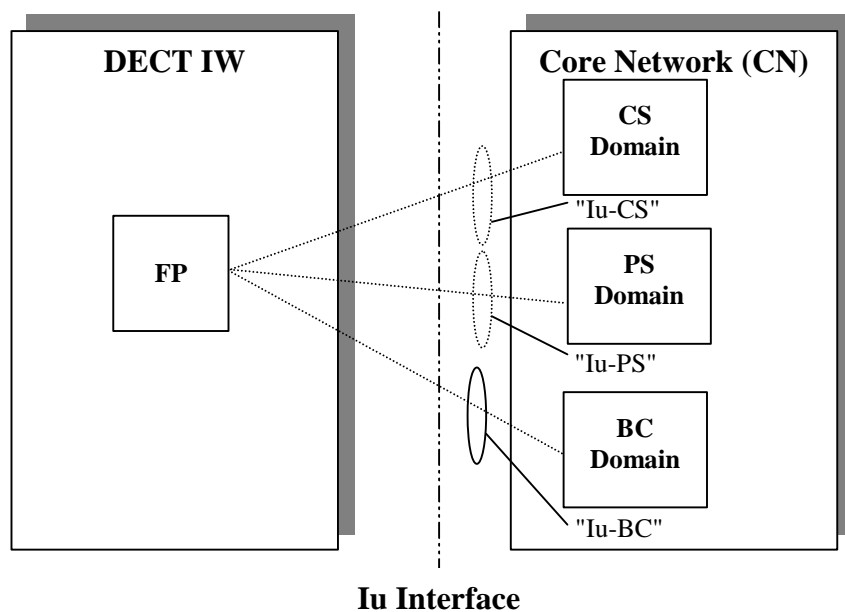


**Figure 2: Attachment to the UMTS core network**

### 6.3 General interworking model for FP UMTS attachment

In UMTS the interface between the radio access network (UTRAN) and the core network (CN) is split into (see figure 3):

- Iu-CS (circuit switched interface);
- Iu-PS (packet switched interface);
- Iu-BC (cell broadcast interface).



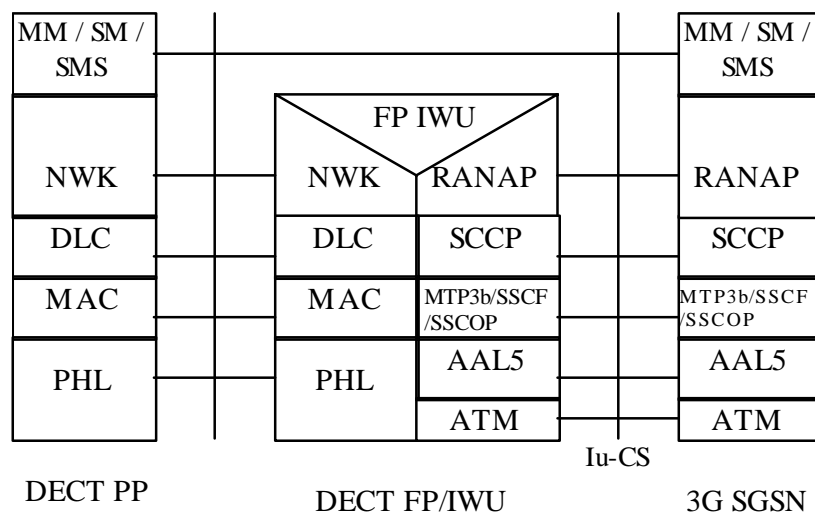
**Figure 3: FP attachment towards 3G CN**

The description of the interworking model will follow this structure.

### 6.3.1 Interworking model for FP UMTS attachment, circuit switched

The interworking model shown in figure 4 is used to describe the protocol interactions at control plane (C-Plane) and of the FP and PP. The protocol architecture model also shows the location of the IWUs.

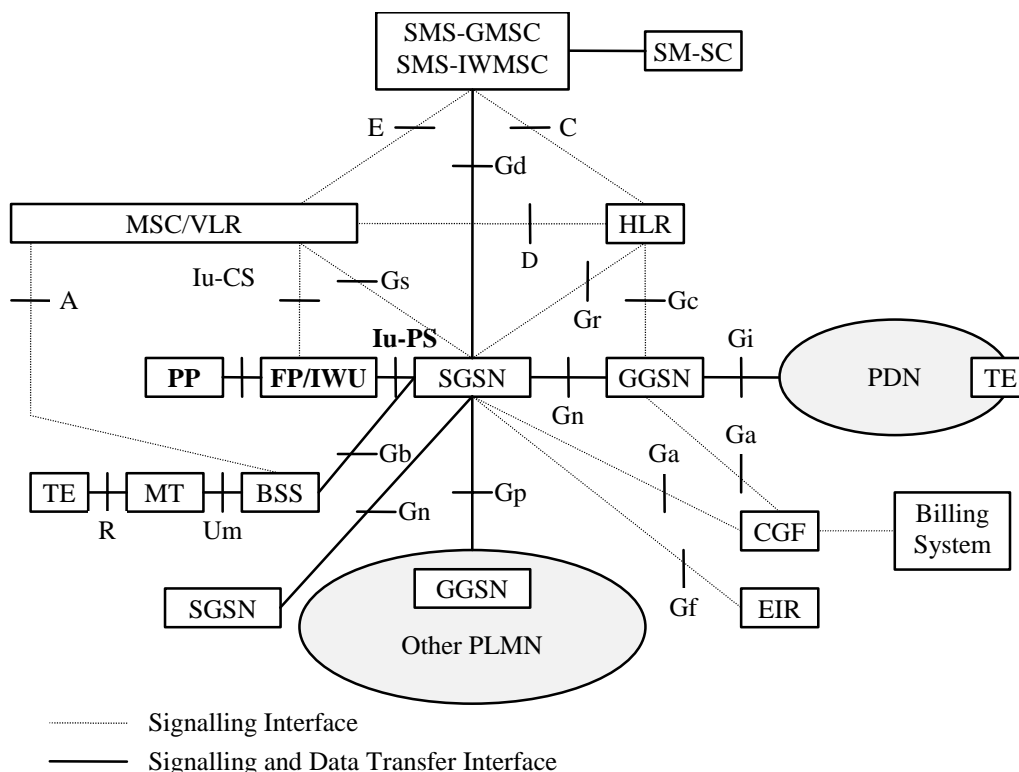
The IWU (figure 3) in the FP provides the mapping between a subset of UMTS layer 3 to the corresponding DECT NWK protocols. The IWU in PP provides mapping between a subset of the DECT NWK protocol and the UMTS application (UMTS Subscriber Identity Module (USIM) application).



**Figure 4: Interworking model for C-plane for CS FP UMTS PLMN attachment**

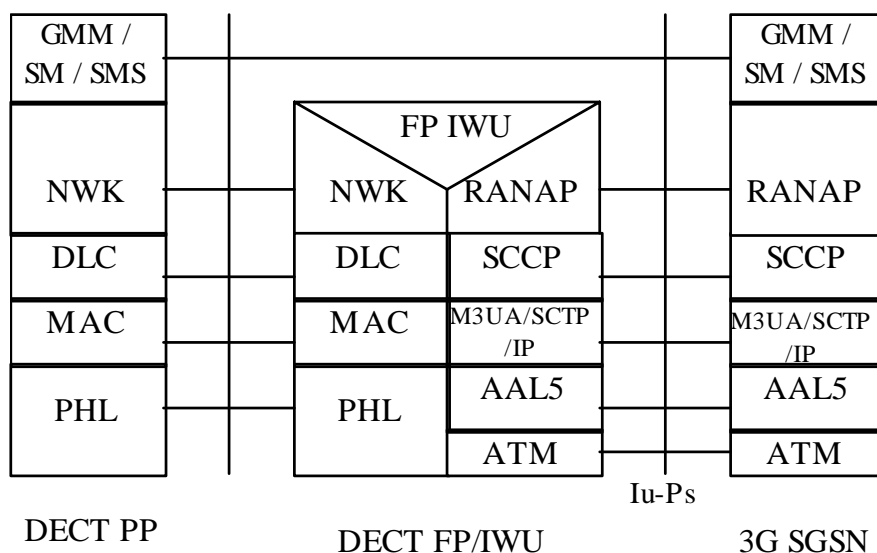
### 6.3.2 Interworking model for FP UMTS attachment, packet switched

The DECT FP IWU is connected to the SGSN via the Iu-PS interface.



**Figure 5: Overview of the packet domain logical interworking architecture**

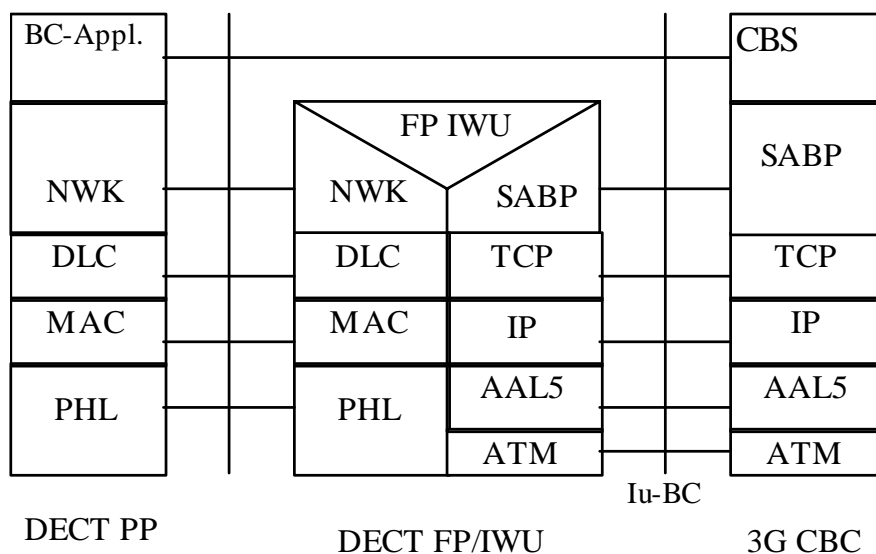
Figure 5 gives an overview of the packet domain interworking architecture as defined in TS 123 060 [49]. Possible modes of operation are PS/CS mode (FP IWU is attached to both PS and CS core network domain), PS mode (FP IWU is only attached to PS core network domain) and CS mode (FP IWU is only attached to CS network domain).



**Figure 6: Interworking model for C-plane for PS FP UMTS PLMN attachment**

The PS interworking model for C-plane is described in figure 6.

### 6.3.3 Interworking model for FP UMTS attachment, broadcast



**Figure 7: Interworking model for Iu-BC**

The DECT FP IWU is attached to via the Iu-BC interface to the Cell Broadcast Centre (CBC), see figure 7. The interworking procedure defined in TS 101 863-5 (see bibliography) describes the requirements & mapping necessary to ensure that the Service Area Broadcast Protocol (SABP) can be provided between CBC and DECT. The SABP shall be supported according to TS 125 419 [63].

## 6.4 Interworking context

### 6.4.1 General

The PP shall be backwards compatible with the minimum requirements of GAP. This means that all mandatory parts of GAP remain mandatory. The FP is based on GAP, but not all the mandatory provisions are required in all environments.

The FPs can be divided in two categories:

- the FPs which support ARI class D only. These FPs are "transparent" in terms of procedures and are normally initiated either by the PP or the UMTS PLMN. These FPs shall support the procedures as defined in the relative clause of clause 6 of the present document;
- the FPs which support ARI class D but also support ARI classes A, B or C shall support, in addition to the procedures defined in clause 6 of the present document, the mandatory procedures as defined in EN 300 444 [14].

### 6.4.2 Basic interworking rules

In the context of the present document, the broadcast attribute a39 (SIM services available) shall uniquely determine if the FP is attached to the UMTS PLMN. The interpretation of the broadcast attribute a39, when set to value "1", is as follows:

- a PP shall always use International Portable User Identity (IPUI) type R (IPUI shall incorporate an IMSI) if it wants to access a UMTS PLMN;
- a FP belonging to ARI class D shall support the DECT/UMTS interworking profile. The UMTS Operator code (PLMN-Id) value is described in EN 300 175-6 [6];

An FP belonging to ARI class A, B, or C in addition to ARI class D shall support the minimum requirements of the GAP.

- c) the profile as defined in the present document may be used in association only with FPs belonging to ARI class D;
- d) a PP accessing an FP of ARI class D may attempt to access the FP/UMTS PLMN regardless of the PLMN-Id value, as defined in EN 300 175-6 [6], clause 5.4. If, however, the ARI class D is stored in the forbidden PLMNs list in the USIM, the PP shall not attempt to access the system except using manual intervention by the user;

NOTE: A standard UMTS subscriber (using UE) is allowed to roam between different PLMNs. There are no restrictions, but only a possible list of forbidden PLMNs in terms of accessing a visited PLMN, is applied.

- e) a PP accessing a FP belonging to ARI class A, B or C shall have a correct Portable Access Rights Key (PARK) authentication Key (K) value;
- f) IPUI R shall have the same value as the IMSI in the USIM;
- g) the FP shall broadcast the ARI class D as a PARI. Additional ARIs of class A, B or C may be broadcast as part of the Secondary ARI (SARI) list;
- h) if broadcast attribute a44 (access rights request supported, see EN 300 175-5 [5], clause F.1) is set to value "1" the PP may perform the access rights request procedure to FPs belonging to ARI classes A, B or C using the existing IPUI type R value. If a44 is set to value "0", the access rights procedures shall not be initiated by the PP;
- i) in association with ARI class D, the PP shall not initiate the following procedures: obtaining access rights or access rights terminate procedures;
- j) in association with ARI class D the FP shall not initiate the following procedures: authentication of PP (using DSAA), authentication of user (using DSAA), key allocation, FT terminating access rights, incrementing the (ZAP) value;
- k) all network layer entities no longer requiring the link shall issue an "NLR" (no link required) notification to the Link Control Entity (LCE) with a release reason "partial release". This applies to both PP and FP.

Table 1 shows the interworking requirements for the PP relating to different ARI classes. It is assumed that the system broadcasts "SIM services available", a39 (see EN 300 175-5 [5], clause F.1), as "1"B.

**Table 1: Interworking matrix for the PP**

Requirements\ARI class	ARI class D	ARI class A, B or C
Access to system	Direct, no PARK required	PARK required
Subscription	IPUI type R (IMSI) only	Relevant IPUI in association with PARK

Table 2 defines the associated UMTS and DECT procedures required in the FP and the PP.

**Table 2: Implementation/support requirements of DECT and UMTS procedures in the FP and the PP**

UMTS procedure	DECT procedure	PP	FP
Authentication procedure	Authentication of PT	M	M
Authentication procedure	Authentication of FT	M	M
Identity procedure	Identification of PT	M	M
Attach procedure	Attach (= Location registration)	M	M
Detach procedure	Detach	M	M
Location updating procedure	Location registration	M	M
TMSI re-allocation procedure	Temporary identity assignment	M	M
Security procedure	Cipher-switching initiated by FT Cipher-switching initiated by PT	M (note 1)	M (note 1)
IU-Relocation	External handover	O (note 4)	O (note 4)
CM service procedure	Outgoing call request	M	M
MM status procedure	-	-	I
-	Parameter retrieval (Location update)	M	M
Outgoing call initiation (note 2)	Outgoing call request and overlap sending procedure	M	M
Incoming call setup	Incoming call request	M	M
Emergency call establishment procedure	Emergency call establishment procedure	M	M
Accepted call establishment (note 3)	Accepted call establishment	M	M
Abnormal call clearing	Abnormal call release (call reject)	M	M
Normal call clearing	Normal call release	M	M
Paging	Paging	M	M
NOTE 1: Cipher switching initiated by the PT may depend on the implementation of external handover procedure.			
NOTE 2: Outgoing call initiation includes the following TS 124 008 [58] layer 3 procedures: 1) CM- service procedure; 2) receipt of Setup message.			
NOTE 3: Accepted call establishment consists of call proceeding confirmation, connection phases.			
NOTE 4: The implementation of this feature is optional in the PT and FT. Interworking requirements/mappings are process mandatory.			

### 6.4.3 Location area mapping

The following rules are applied for the functional FP to 3G CN attachment:

- a) RFPs belonging to the same DECT location area shall always be associated to the same UMTS location area;
- b) the association of RFPs to UMTS location areas (i.e. how the CN addresses the RFPs/FPs associated to a certain UMTS location area) is an implementation specific matter in the FP IWU (and CN).

In addition to the UMTS location areas, the FP may support "internal" DECT areas. The PP (as GAP is the base) shall support UMTS location areas, as well as location registration for DECT "internal" areas.

An FP can have several DECT location areas as far as their domains are never split between two UMTS location areas.

NOTE: If all RFPs belong to the same UMTS location area, the FP may have only one location area (LAL = default) or several.

If parts of the RFPs are in different UMTS location areas, the FP domain shall be divided into location areas according to the borders of the UMTS location areas. The FP may have as many or more than the number of UMTS areas.

Upon change of DECT location area without changing the UMTS location area, the location registration procedure should be terminated in the FT and the FT-IWU shall not start any UMTS related location procedure.

TPUIs may be assigned.

## 6.4.4 Interpretation of broadcast attributes

This clause refers to annex F of EN 300 175-5 [5] (Broadcast attributes coding) and clauses 7.2.3.4 and 7.2.3.5 of EN 300 175-3 [3]. It is assumed that the DECT system is attached to a UMTS PLMN. Values of broadcast attributes not described in this clause are outside the scope of the present document.

### 6.4.4.1 Standard capabilities: physical and MAC layer capabilities

**a12 Extended FP Info (QH = 4):** shall always be set to value "1";

Standard capabilities: higher layer capabilities:

**a32 ADPCM/G.721 Voice service:** shall always be set to value "1";

**a37 Standard ciphering supported:** shall always be set to value "1";

**a38 Location registration supported:** shall always be set to value "1";

**a39 SIM services available:** this broadcast attribute is always set to the value "1" for FPs attached to UMTS (PLMN);

**a44 Access Rights requests supported:** indicates that the PP may perform the access rights procedure to systems associated to the non-ARI class D systems. The PP shall not attempt to perform the Access Rights procedure associated to a system broadcasting ARI class D only;

**a45 External handover supported:** indicates that the FP supports the external hand over procedure;

**a46 Connection handover supported:** the "0" setting is not used. If it is set to value "1" at least connection handover is being supported.

### 6.4.4.2 Extended fixed part capabilities

**a40 Support of Emergency call:** shall always be set to value "1".

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## 7 UMTS service provision

### 7.1 General

UMTS services shall be supported according to UMTS Release 99 and later, unless explicitly stated otherwise. The specific services are described in general terms as provided to the user of the services.

#### 7.1.1 Processing of UMTS services not supported

The DECT FP shall perform the appropriate UMTS error handling for all UMTS services (tele-, bearer and/or supplementary services) which are not supported by the DECT FP or by the UMTS network.

#### 7.1.2 Bearer service

The bearer services shall be supported as specified in TS 122 002 [19].

##### 7.1.2.1 Exception handling

For bearer services the UMTS error handling as defined in TS 124 008 [58] shall be supported.

#### 7.1.3 Teleservice

The teleservices shall be supported as specified in TS 122 003 [20]. For information purposes the teleservices in TS 122 003 [20] are reproduced in annex A.

### 7.1.3.1 Exception handling

For teleservices the UMTS error handling as defined in TS 124 008 [58] shall be supported.

### 7.1.4 Tones

In order to provide UMTS users indication of the progress of their calls, supervisory tones shall be supported as specified in TS 100 512 [28]. Tones not provided by the UMTS network shall be generated in the DECT FP, except the alerting tone which is generated in the PP.

### 7.1.5 Supplementary services

The supplementary services shall be supported as specified in TS 122 004 [21]. For information purposes the supplementary services in TS 122 004 [21] are reproduced in annex A.

#### 7.1.5.1 General requirements

All supplementary services shall be provided and withdrawn by arrangement with the Operator.

The exchange of information between the UMTS network and the DECT FP shall be according to the supplementary service handling, specified in TS 123 011 [46] TS 124 010 [59] and in the specific supplementary service UMTS technical specifications.

The UMTS MMI procedures as defined in TS 122 030 [27] shall be supported by the DECT PP using the protocol to convey it to the DECT FP, as described in EN 300 175-5 [5], clause 10.2.

UMTS network indications and notifications to the user shall be supported by the DECT FP using the DECT protocol to convey it to the DECT PP.

#### 7.1.5.2 Exception handling

Incorrect user action of a specific supplementary service shall not cause a misoperation in neither the UMTS network, nor in the DECT FP or PP.

For supplementary services the UMTS error handling as defined in TS 123 011 [46], TS 124 010 [59] and TS 124 080 [60] shall be supported.

#### 7.1.5.3 Number Identification Supplementary Services (NISS)

These services shall be supported according to TS 122 081 [31].

#### 7.1.5.4 Call Offering Supplementary Services (COSS)

These services shall be supported according to TS 122 082 [32].

#### 7.1.5.5 Call Completion Supplementary Services (CCSS)

These services shall be supported according to TS 122 083 [33].

#### 7.1.5.6 Multi Party Supplementary Services (MPSS)

These services shall be supported according to TS 122 084 [34].

#### 7.1.5.7 Community of Interest Supplementary Services (CISS)

These services shall be supported according to TS 122 085 [35].



### 7.1.5.8 Charging Supplementary Services (CSS)

These services shall be supported according to TS 122 086 [36].

NOTE: The PLMN will terminate any call set-up in case the subscriber has subscribed to AoCC and the PP does not support the functionality as required in TS 122 086 [36] and TS 122 024 [26].

### 7.1.5.9 Call Restriction Supplementary Services (CRSS)

These services according to TS 122 088 [38] shall be supported.

## 7.1.6 Unstructured Supplementary Services Data (USSD)

USSD shall be supported as specified in TS 122 090 [39].

### 7.1.6.1 Exception handling

For USSD the UMTS error handling as defined in TS 124 010 [59] and TS 124 080 [60] shall be supported.

## 7.2 Functional capabilities and information flows

### 7.2.1 Supplementary services

The supplementary services shall be supported as specified in TS 123 011 [46].

#### 7.2.1.1 General requirement

The DECT FP shall terminate all UMTS supplementary services transactions and is supposed to map those transactions to the specified ones for DECT. For this reason, all references to UE in UMTS specifications mentioned below shall be applied to the FP instead.

The DECT FP shall convey all information designated for the served mobile user to the DECT PP.

The DECT FP shall convey all information from the DECT PP to the UMTS core network.

NOTE: The information flows of UMTS do not include the information exchange between the DECT FP and PP.

#### 7.2.1.2 enhanced Multi-Level Precedence and Pre-emption (eMLPP)

These services shall be supported according to TS 122 067 [29].

#### 7.2.1.3 Call Deflection supplementary services (CD)

These services shall be supported according to TS 122 072 [30].

#### 7.2.1.4 Number Identification Supplementary Services (NISS)

These services shall be supported according to TS 123 081 [50].

#### 7.2.1.5 Call Offering Supplementary Services (COSS)

These services shall be supported according to TS 123 082 [51].

#### 7.2.1.6 Call Completion Supplementary Services (CCSS)

These services shall be supported according to TS 123 083 [52].

### 7.2.1.7 Multi Party Supplementary Services (MPSS)

These services shall be supported according to TS 123 084 [53].

### 7.2.1.8 Community of Interest Supplementary Services (CISS)

These services shall be supported according to TS 123 085 [54].

### 7.2.1.9 User-to-User Signalling(UUS)

These services shall be supported according to TS 122 087 [37].

### 7.2.1.10 Call Restriction Supplementary Services (CRSS)

These services shall be supported according to TS 123 088 [56].

### 7.2.1.11 Charging Supplementary Services (CSS, AoCI)

These services shall be supported according to TS 123 086 [55]. For support of these services, see clause 7.1.5.8.

### 7.2.1.12 Explicit Call Transfer (ECT)

These services shall be supported according to TS 122 091 [40].

### 7.2.1.13 Completion of Calls to Busy Subscribers (CCBS)

These services shall be supported according to TS 122 093 [41].

### 7.2.1.14 Name Identification Supplementary Services (CNAP)

These services shall be supported according to TS 122 096 [42].

### 7.2.1.15 Multicall (MC)

These services shall be supported according to TS 122 135 [43].

## 7.2.2 Unstructured Supplementary Services Data (USSD)

USSD shall be supported as specified in TS 123 090 [57].

## 7.2.3 Bearer services

The support of bearer services is specified in TS 101 863-6 (see bibliography).

## 7.2.4 Teleservices

The support of telephony and emergency calls (UMTS teleservices 11, 12) shall be supported as specified in the UMTS 23-series of specifications. The interworking procedures and mappings shall meet the requirements of TS 101 863-3 [17].

Facsimile services (UMTS teleservices 61, 62) are out of scope of this interworking standard.

The support of short message services (UMTS teleservices 21, 22, 23) is specified in TS 101 863-5 [71].

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## 8 Portable Part (PP) requirements

### 8.1 General

This clause is based on TS 100 906 [22], with the purpose of defining the PP features required for DECT/UMTS interworking. They are also classified according to their type and whether support of them is mandatory or optional.

### 8.2 Description

A PP feature is defined as a piece of equipment of function which directly relates to the operation of the PP. On this basis, three categories of features can be distinguished:

- basic features;
- supplementary features; and
- additional features.

#### 8.2.1 Basic PP features

A basic PP feature is directly related to the operation of basic telecommunication services (e.g. key-pad function).

#### 8.2.2 Supplementary PP features

A supplementary PP feature is directly related to the operation of supplementary services (e.g. display of calling line number).

#### 8.2.3 Additional PP features

An additional PP feature is a feature which is neither a basic nor a supplementary feature (e.g. abbreviated dialling).

### 8.3 Requirements for implementing PP features

PP features are qualified as mandatory or optional. Mandatory features shall be implemented as long as they are relevant to the PP type. The method of implementation of all PP features shall be done in accordance with the present document. Any features additional to those specified in this clause, shall not cause a misoperation of the UMTS network or DECT (FP, PP).

In tables 2, the basic, supplementary, and additional PP features are listed. Mandatory features are marked by "M", and optional features are marked by "O".

Additional PP features not listed in table 2 are permitted without the requirement for this table to be amended, provided that these new features do not affect the mandatory interworking requirements.

Unless otherwise stated for a particular feature, the feature supported by the SIM should take priority over the same feature supported by the PP.

#### 8.3.1 Basic PP features

The basic PP features are given in table 3.

**Table 3: Basic PP features**

Item no	Name	Mandatory (M) Optional (O)	Note
1	Display of called number	C301	
2	Indication of call progress signals	M	
3	Country/PLMN indication and PLMN selection	C301	
4	Keypad	O	1
5	IMEI/IPEI	M	
6	International Access Function ("+")	M	1
7	Autocalling restriction capabilities	M	2
8	Emergency calls capabilities	M	
9	Subscription identity management	M	
10	Support of DECT encryption	M	
11	Support alpha-numeric display	M	
C301: Mandatory where a human interface is provided, optional for PP driven by external equipment (may be inappropriate).			
NOTE 1: The physical means of entering the characters 0 - 9, +, * and # may be keypad, voice input device, DTE or others, but it is mandatory that there shall be the means to enter this information.			
NOTE 2: PPs with capabilities for autocalling shall restrict repeated call attempts according to the procedures described in TS 100 906 [22].			

### 8.3.1.1 Display of called number

This feature enables the caller to check before call set-up whether the selected number is correct.

### 8.3.1.2 Indication of call progress signals

Indications shall be given such as tones, recorded messages or visual display based on signalling information returned from the PLMN.

Call progress indicators shall be supported as specified in TS 100 512 [28].

### 8.3.1.3 Country/PLMN indication and PLMN selection

The country/PLMN indicator shows in which UMTS PLMN the PP is currently registered.

The network selection procedures and access control classed in the PP, as defined in TS 122 011 [23] are not fully supported. The requirement in TS 101 863-3 [17] however applies. The network selection procedures and access control classes in the PP, as defined in TS 122 011 [23] are not supported. The user shall have the opportunity to access alternative PLMNs (by re-initializing the locking sequence) and register to the preferred allowed PLMN.

### 8.3.1.4 Keypad

A physical means of entering numbers, is not required as long as some means of entering "0 - 9", "\*", "#" and "+" is provided.

### 8.3.1.5 International Mobile station Equipment Identity (IMEI) and/or International Portable Equipment Identity (IPEI)

The mapping between IPEI and IMEI as well as between IPEI and IMEISV is defined in TS 101 863-3 [17].

### 8.3.1.6 International access function

Provision is made in UMTS for a direct standard method of gaining international access. For this purpose the PP shall have a means of entering a "+" which shall be transmitted over the air interface and have the effect of generating the international access code in the UMTS network. It may be used directly when setting up a call, or entered into the memory for abbreviated dialling.

Users may still place international calls conventionally, using the appropriate international access code.

### 8.3.1.7 Autocalling restriction capabilities

PPs with capabilities for autocalling shall restrict repeated call attempts according to the procedures described in TS 100 906 [22].

### 8.3.1.8 Emergency calls capabilities

The PP shall support emergency calls without the need for a USIM.

### 8.3.1.9 Subscription identity management

The removal of the USIM detaches the PP, causing a call in progress to be terminated, and preventing the initiation of further calls (except emergency calls).

### 8.3.1.10 Support of DECT encryption

The provision shall be made for support on the PP of no encryption, or support of encryption based on the DECT standard cipher. The DECT cipher key shall be derived from the UMTS cipher key, CK.

### 8.3.1.11 Support alpha-numeric display

The PP shall be able to transmit, receive and display characters of the ISO Latin alphabet no. 1 [67].

## 8.3.2 Supplementary/additional PP features

The supplementary PP features are given in table 4.

**Table 4: Supplementary and additional UE features**

Name	Mandatory (M) Optional (O)
2.1 Control of supplementary services	M
2.2 Abbreviated dialling	O
2.3 Fixed number dialling	O
2.4 Selection of directory No in short messages	O
2.5 Last Numbers Dialed (LND)	O

### 8.3.2.1 Support of supplementary services

The user shall be able to control UMTS supplementary services using the MMI codes as described in TS 122 030 [27].

### 8.3.2.2 Abbreviated dialling

If the PP supports abbreviated dialling, it shall be according to TS 100 906 [22].

### 8.3.2.3 Fixed number dialling

If the PP supports fixed number dialling, it shall be according to TS 100 906 [22].

#### 8.3.2.4 Last Numbers Dialed (LND)

If the PP supports LND, it shall be according to TS 100 906 [22].

### 8.4 Man-Machine Interface (MMI) of the PP

The purpose of this clause is to define minimum requirements for MMI for the PP. This includes requirements of the user procedures for Call Control (CC), control of those supplementary services that are supported, and requirements for physical input and output media.

This clause is based on specification TS 122 030 [27] and refers to the following UMTS technical specifications:

- TS 100 906 [22];
- TS 122 011 [23];
- TS 100 922 [25];
- TS 100 512 [28];
- TS 100 521 [44];
- TS 123 009 [45];
- TS 123 012 [47];
- TS 123 014 [48];
- TS 124 008 [58];

#### 8.4.1 Physical user input features

TS 122 030 [27] specifies the minimum physical requirements for the support of UMTS services and features. Where the service is supported in the FP and PP, then the same requirements, or equivalent, in TS 122 030 [27] shall be supported.

The following clauses give additional information.

##### 8.4.1.1 MMI related to PP features

ACCEPT, SEND and END functions:

- the physical means to perform these functions may be keypad, voice input device, DTE or other.

PP shall accept a "+" key in front of the dialled numbers for a call set-up.

#### 8.4.2 Physical output features

Display that supports the alphabet defined in clause 8.3.1.11.

#### 8.4.3 Support of Dual Tone Multi Frequency (DTMF)

DTMF shall be supported using the DECT keypad protocol towards the FP.

## 8.4.4 Procedures

### 8.4.4.1 Definition of functions

The following functions are applicable and mandatory for the logical procedures for PP originated and terminated calls and for the control of supplementary services:

- ACCEPT: acceptance of a mobile terminated call;
- SELECT: entry of information;
- SEND: transmission of the entered information to the network;
- INDICATION: contains indications to the PP users to give them information regarding progress of their calls. Tones that are not generated by the PLMN shall be generated in the FP, except the ringing tone;
- END: termination of, or disconnection, from the call. The execution of the END-function may be caused by either party involved in the call by e.g. termination, loss of coverage, invalidation of payment.

### 8.4.4.2 Call Control

With the exception of emergency calls, no additional call control is required, in addition to that provided by the DECT specification.

With a PP supporting telephony, it shall be able to place an emergency call by entering 112 followed by SEND in the manner specified in TS 122 030 [27].

The PP shall support the initiation of an emergency call to the number 112 without a USIM-module present in the PP regardless of the call being accepted or not by the network.

NOTE: In addition to the above procedure, calls to national emergency services may be made in the standard way for the country of the serving PLMN. However, with the exception of code "112", these are not treated within the PLMN as "Teleservice Emergency call", and would require a valid IMSI.

## 8.5 USIM interfaces

The DECT PP shall accept IC or plug-in USIM and GSM-SIM.

The following clauses define the minimum support required when a SIM is inserted into a DECT PP.

The USIM functionality may be included in a standard USIM or a multi-application card supporting both, DAM and USIM functionality (i.e. DECT application and UMTS application respectively). The user may select the DECT application or the UMTS application of a multi-application card depending on the network attachment of the FP.

A GSM SIM shall be supported as defined in TS 133 102 [66].

### 8.5.1 Entry of PIN and PIN2

According to TS 122 030 [27].

### 8.5.2 Change of PIN or PIN2

According to TS 122 030 [27].

### 8.5.3 Unblocking of PIN or PIN2

According to TS 122 030 [27].

## 8.5.4 Status information - return codes

The USIM gives status information, as responses to instructions, in two-byte codes (see TS 131 102 [65], "Status Conditions Returned by the UICC"). Some of the possible return codes are deeply related to the user's actions and should therefore be indicated to her.

It is mandatory (TS 122 030 [27]) to give the user the appropriate indication (respectively) when the following codes appear:

code	description
92 40	- memory problem (e.g. update impossible);
98 04	- access conditions not fulfilled (e.g. secret code verify rejected);
98 40	- unsuccessful CHV verification, no attempt left (e.g. Secret code locked);
6F xx	- technical problem with no diagnostic given. However, if this code is returned by the SIM in response to an ENVELOPE (SMS-PP DOWNLOAD) or ENVELOPE (CELL BROADCAST DOWNLOAD), then no indication shall be given to the user, since in this case the code is not related to a user action.

The status information indication can be a dedicated lamp, text-string or others, as long as it is unambiguously made available to the user via the MMI.

As regards all other codes, it is left to the manufacturers' discretion whether and how the user shall be informed.

The status information indication can be a dedicated lamp, text-string or others, as long as it is unambiguously made available to the user via the MMI.

## 8.6 Service access

The PLMN selection procedures and access control classes in the PP as defined in TS 122 011 [23] are not fully supported. The requirements in TS 101 863-3 [17] however apply.

The user shall have the opportunity to access alternative PLMNs (by re-initializing the locking sequence) and register to the preferred allowed PLMN.

# 9 Fixed Part (FP) requirements

## 9.1 Support of Mobile Equipment Identity and Software Version number (IMEISV)

All IMEISV enquiry procedures according to the principles laid down in TS 122 016 [24] shall be supported by the FP.

## 9.2 Support of UE classmark

For location registration purpose or call set-up the FP shall provide the following classmark information towards the PLMN:

- revision level: Phase 2 (or higher), Encryption A 5/1 is supported.

## 9.3 Support of emergency call capability

On reception of an emergency call from the PP, the FP shall map it to a UMTS emergency call towards the PLMN.



## 9.4 Support of international access function

In UMTS, two formats may be used, international or open. The Type of Number (TON) may be set to other values if required.

**international format:** This is entered by starting with a "+" followed by country code, even for national calls. Use of this function shall indicate a TON as "International" in the UMTS network, see TS 122 030 [27] and TS 124 008 [58].

**open format:** This format shall result in the TON of "Unknown" to be indicated to the UMTS network when the "+" is not entered, and the number is entered in the normal way for that network.

For PP originated calls on reception of the PLUS SIGN ("+") in front of a dialled number the FP shall map this type of number to "international format" towards the PLMN else the TON shall be open format.

## 9.5 Support of DTMF

The PP shall use the keypad protocol for the transmission of DTMF towards the FP. The FP shall convert this received DTMF keypad information to the appropriate signalling format towards the PLMN.

## 9.6 Support of alpha-numeric characters

The provision shall be made for the support Latin alphabet no 1 as specified in ETS 300 133-2 [69] and ISO 8859-1 [67].

The FP shall be able to map characters received from the UMTS PLMN into the corresponding 8 bit characters supported by the PP.

## Annex A (informative): UMTS teleservices and supplementary services

For information, the teleservices in TS 122 003 [20] are listed in table A.1.

**Table A.1: Teleservice categories and teleservices**

Dominant attribute	Category of teleservice		Individual Teleservice		
	Type of user information	No	Name	No	Name
Speech	1	Speech transmission	11 12	Telephony Emergency Calls	
Short message	2	Short message service	21 22 23	Short message MT/PP Short message MO/PP Cell Broadcast Service	
Facsimile	6	Facsimile transmission	61	Alternate speech and facsimile group 3	T NT
			62	Automatic Facsimile group 3	T NT
Speech	9	Voice Group service	91 92	Voice Group Call Service Voice Broadcast Service	

For information, the UMTS supplementary services are listed in table A.2.

Table A.2: Supported supplementary services in UMTS (TS 122 004 [21])

Spec/section	Supplementary Service						
	Reg	Eras	Act	Deact	Inv	Int	
TS 122 067 [29] eMLPP	a/s	w/r	-	-	n	dr	
TS 122 072 [30]. Call Deflection SS							
CD	-	-	p	w	u	-	
TS 122 081 [31]. Number Identif. SS							
CLIP	-	-	p	w	n	s	
CLIR	-	-	p	w	n	dr	
CoLP	-	-	p	w	n	s	
CoLR	-	-	p	w	n	s	
TS 122 082 [32]. Call Offering SS							
CFU	a/s	w/r/s	r/s	e/s	n	dr	
CFB	a/s	w/r/s	r/s	e/s	n	dr	
CFNRy	a/s	w/r/s	r/s	e/s	n	dr	
CFNRc	a/s	w/r/s	r/s	e/s	n	dr	
TS 122 083 [33]. Call Completion SS							
CW	-	-	a/s	a/s	n	s	
HOLD	-	-	p	w	u	-	
TS 122 084 [34]. Multi Party SS							
MPTY	-	-	-	-	u	-	
TS 122 085 [35]. Comm. of Interest SS							
CUG	-	-	p	w	u/n	-	
TS 122 087 [37]. User-to-User SS							
UUS	-	-	s	c	u/n	-	
TS 122 086 [36]. Charging SS							
AoCI	-	-	p	w	n	-	
AoCC	-	-	p	w	n	-	
TS 122 088 [38]. Call Restriction SS							
BAOC	a/s	w/r	a/s	s/a	n	dr	
BOIC	a/s	w/r	a/s	s/a	n	dr	
BOIC-exHC	a/s	w/r	a/s	s/a	n	dr	
BAIC	a/s	w/r	a/s	s/a	n	dr	
BAIC-Roam	a/s	w/r	a/s	s/a	n	dr	
TS 122 067 [29] eMLPP	a/s	w/r/s	-	-	u/n	s/dr	
TS 122 091 [40]. Call Transfer SS							
ECT	-	-	p	w	u	-	
TS 122 093 [41]. Completion of Calls to Busy Subscribers CCBS							
CCBS SS	-	-	p	w	n		
CCBS Requests			s	s/a/w		dr	
TS 122 096 [42] Name Identification SS							
CNAP	-	-	p	w	n	s	
TS 122 135 [43] Multicall							
MC	a/s	w	p	w	U/n	dr	

## Annex B (informative): Cross-references to DECT-GSM-interworking standards

Work for the present document was based on the existing DECT/GSM interworking standards. Table B.1 gives the cross-references between this deliverable and the corresponding GIP standards.

**Table B.1: Cross references between interworking standards**

<b>Part of DECT-UMTS interworking standard</b>	<b>Reference to existing DECT-GSM interworking standard including version used</b>	
Part 1: General description and overview	EN 300 466 (V1.1.2): "Digital Enhanced Cordless Telecommunications (DECT); Global System for Mobile communications (GSM); DECT/GSM Interworking Profile (IWP); General description of service requirements; Functional capabilities and information flows" 1996-12.	
Part 2: MSC-FP interworking	ETS 300 499 (Ed.1): "Digital Enhanced Cordless Telecommunications (DECT); Global System for Mobile communications (GSM); DECT/GSM Interworking Profile (IWP); Mobile services Switching Centre (MSC) - Fixed Part (FP) interconnection" 1996-09.	
Part 3: 3,1 kHz speech service	EN 300 370 (V1.2.2): "Digital Enhanced Cordless Telecommunications (DECT); Global System for Mobile communications (GSM); DECT/GSM Interworking Profile (IWP); Access and mapping (protocol/procedure description for 3,1 kHz speech service)" 2000-09.	
Part 4: Supplementary services	EN 300 703 (V1.2.2): "Digital Enhanced Cordless Telecommunications (DECT); Global System for Mobile communications (GSM); DECT/GSM Interworking Profile (IWP); GSM Phase 2 supplementary services implementation" 1998-02.	
Part 5: SMS point to point and cell broadcast	ETS 300 764 (Ed.1): "Digital Enhanced Cordless Telecommunications (DECT); Global System for Mobile communications (GSM); DECT/GSM Interworking Profile (IWP); Implementation of short message service, point-to-point and cell broadcast" 1997-04.	
Part 6: Packet switched data	-	

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## Annex C (informative): Bibliography

- ETSI TS 101 863-4: "Digital Enhanced Cordless Telecommunications (DECT); DECT/UMTS Interworking Profile (IWP); Part 4: Supplementary services".
- ETSI TS 101 863-6: "Digital Enhanced Cordless Telecommunications (DECT); DECT/UMTS Interworking Profile (IWP); Part 6: Packet switched data".
- ETSI TS 123 003: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Numbering, addressing and identification (3GPP TS 23.003 version 4.0.0 Release 4)".
- ETSI TS 125 411: "Universal Mobile Telecommunications System (UMTS); UTRAN Iu Interface Layer 1 (3GPP TS 25.411 version 3.3.0 Release 1999)".
- ETSI TS 125 412: "Universal Mobile Telecommunications System (UMTS); UTRAN Iu Interface Signalling Transport (3GPP TS 25.412 version 3.6.0 Release 1999)".
- ETSI TS 125 413: "Universal Mobile Telecommunications System (UMTS); UTRAN Iu Interface RANAP Signalling (3GPP TS 25.413 version 3.4.0 Release 1999)".
- ETSI TS 125 414: "Universal Mobile Telecommunications System (UMTS); UTRAN Iu Interface Data Transport and Transport Signalling (3GPP TS 25.414 version 3.6.0 Release 1999)".
- ETSI TS 125 415: "Universal Mobile Telecommunications System (UMTS); UTRAN Iu Interface User Plane Protocols (3GPP TS 25.415 version 3.5.0 Release 1999)".
- ETSI EN 300 466 (V1.1.2): "Digital Enhanced Cordless Telecommunications (DECT); Global System for Mobile communications (GSM); DECT/GSM Interworking Profile (IWP); General description of service requirements; Functional capabilities and information flows".
- ETSI ETS 300 499 (Edition 1): "Digital Enhanced Cordless Telecommunications (DECT); Global System for Mobile communications (GSM); DECT/GSM Interworking Profile (IWP); Mobile services Switching Centre (MSC) - Fixed Part (FP) interconnection".
- ETSI EN 300 370 (V1.2.2): "Digital Enhanced Cordless Telecommunications (DECT); Global System for Mobile communications (GSM); DECT/GSM Interworking Profile (IWP); Access and mapping (protocol/procedure description for 3,1 kHz speech service)".
- ETSI EN 300 703 (V1.2.2): "Digital Enhanced Cordless Telecommunications (DECT); Global System for Mobile communications (GSM); DECT/GSM Interworking Profile (IWP); GSM Phase 2 supplementary services implementation".
- ETSI ETS 300 764 (Edition 1): "Digital Enhanced Cordless Telecommunications (DECT); Global System for Mobile communications (GSM); DECT/GSM Interworking Profile (IWP); Implementation of short message service, point-to-point and cell broadcast".
- ITU-T Recommendation Q.2140: "

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## History

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