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**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**



Reference

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Keywords

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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Project Digital Enhanced Cordless Telecommunications (DECT).

National transposition dates	
Date of adoption of this EN:	12 January 2001
Date of latest announcement of this EN (doa):	30 April 2001
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1 Scope

The present document is a part of the Digital European Cordless Telecommunications/Global System for Mobile Communications (DECT/GSM) interworking profile and specifies requirements needed to ensure that GSM basic services can be provided over the DECT air interface.

To enable DECT terminals to inter-work with DECT systems which are connected to the GSM infrastructure, the present document specifies the additions to the GAP specification, EN 300 444 [12] on which this profile is based. The additions are based on the DECT Common Interface specification given in EN 300 175-1 [2] to EN 300 175-8 [9].

From the GSM side the present document assumes interworking with GSM Public Land Mobile Network (PLMN) phase 2. Interworking with GSM Phase 1 is outside the scope of the present document.

Interworking requirements are based upon Mobile Switching Centre (MSC) attachment for the DECT Fixed Part (FP) as the FP is using the A-interface towards the GSM MSC in the respect that the FP emulates a GSM Base Station Controller (BSC) with regards to the GSM messages which are relevant to the present document. The complete interface used between the DECT FP and the GSM MSC is specified in ETS 300 499 [13]. Attachment via other interfaces to GSM-networks is outside the scope of the present document.

The DECT access protocols and FP and Portable Part (PP) interworking/mappings necessary for the support of basic voice telephony service are specified in EN 300 370 [11]. The interworking/mappings and access requirements for the support of other services of the present document, will be included in future standards of the DECT/GSM interworking profile.

The whole set of GSM services according to GSM Phase 2 is supported unless it is explicitly stated in the following clauses of the present document.

The DECT PP has to accept the GSM Subscriber Identification Module (SIM) as well as the DECT Authentication Module (DAM), with a GSM application. The functional separation of the DECT/GSM interworking among DECT FP and PP allows for terminal portability. All roaming scenarios based on SIM roaming as described in GSM specifications are applicable. Additionally subscribers using a SIM or DAM with GSM application in conjunction with a DECT PP, capable of DECT GSM interworking may also roam among FPs connected to different GSM networks.

Handover among DECT radio access systems and GSM radio access systems as well as handover among DECT cells connected to different Common Control Fixed Parts (CCFPs), which are individually linked to a MSC, is outside the scope of the present document.

2 References

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

- [1] ETSI ETS 300 133-2: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Enhanced Radio MESSage System (ERMES); Part 2: Service aspects".
- [2] ETSI EN 300 175-1: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 1: Overview".
- [3] ETSI EN 300 175-2: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 2: Physical Layer (PHL)".

- [4] ETSI EN 300 175-3: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 3: Medium Access Control (MAC) Layer".
- [5] ETSI EN 300 175-4: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 4: Data Link Control (DLC) Layer".
- [6] ETSI EN 300 175-5: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 5: Network (NWK) Layer".
- [7] ETSI EN 300 175-6: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 6: Identities and Addressing".
- [8] ETSI EN 300 175-7: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 7: Security Features".
- [9] ETSI EN 300 175-8: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 8: Speech Coding and Transmission".
- [10] ETSI EN 300 176: "Digital Enhanced Cordless Telecommunications (DECT); Approval test specification".
- [11] ETSI EN 300 370: "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)".
- [12] ETSI EN 300 444: "Digital Enhanced Cordless Telecommunications (DECT); Generic Access Profile (GAP)".
- [13] ETSI ETS 300 499: "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".
- [14] ETSI ETS 300 501: "European digital cellular telecommunications system (Phase 2); Bearer Services (BS) supported by a GSM Public Land Mobile Network (PLMN) (GSM 02.02)".
- [15] ETSI ETS 300 502: "European digital cellular telecommunications system (Phase 2); Teleservices supported by a GSM Public Land Mobile Network (PLMN) (GSM 02.03)".
- [16] ETSI ETS 300 503: "Digital cellular telecommunications system (Phase 2); General on supplementary services (GSM 02.04)".
- [17] ETSI ETS 300 505: "Digital cellular telecommunications system (Phase 2); Mobile Station (MS) features (GSM 02.07 version 4.8.2)".
- [18] ETSI ETS 300 507: "Digital cellular telecommunications system (Phase 2); Service accessibility (GSM 02.11)".
- [19] ETSI ETS 300 508: "Digital cellular telecommunications system (Phase 2); International Mobile station Equipment Identities (IMEI) (GSM 02.16 version 4.7.0)".
- [20] ETSI ETS 300 509: "European digital cellular telecommunications system (Phase 2); Subscriber Identity Module (SIM); Functional characteristics (GSM 02.17)".
- [21] ETSI ETS 300 510: "Digital cellular telecommunications system (Phase 2); Description of Charge Advice Information (CAI) (GSM 02.24)".
- [22] ETSI ETS 300 511: "European digital cellular telecommunications system (Phase 2); Man-Machine Interface (MMI) of the Mobile Station (MS) (GSM 02.30)".
- [23] ETSI ETS 300 512: "Digital cellular telecommunications system (Phase 2); Procedures for call progress indications (GSM 02.40)".
- [24] ETSI ETS 300 514: "Digital cellular telecommunications system (Phase 2); Line identification supplementary services; Stage 1 (GSM 02.81 version 4.6.1)".

- [25] ETSI ETS 300 515: "Digital cellular telecommunications system (Phase 2); Call Forwarding (CF) supplementary services; Stage 1 (GSM 02.82)".
- [26] ETSI ETS 300 516: "Digital cellular telecommunications system (Phase 2); Call Waiting (CW) and Call Hold (HOLD) supplementary services; Stage 1 (GSM 02.83)".
- [27] ETSI ETS 300 517: "Digital cellular telecommunications system (Phase 2); Multi Party (MPTY) supplementary services; Stage 1 (GSM 02.84)".
- [28] ETSI ETS 300 518: "Digital cellular telecommunications system (Phase 2); Closed User Group (CUG) supplementary services; Stage 1 (GSM 02.85)".
- [29] ETSI ETS 300 519: "Digital cellular telecommunications system (Phase 2); Advice of Charge (AoC) supplementary services; Stage 1 (GSM 02.86)".
- [30] ETSI ETS 300 520: "Digital cellular telecommunications system (Phase 2); Call Barring (CB) supplementary services; Stage 1 (GSM 02.88)".
- [31] ETSI ETS 300 521: "European digital cellular telecommunications system (Phase 2); Network functions (GSM 03.01)".
- [32] ETSI ETS 300 527: "Digital cellular telecommunications system (Phase 2); Handover procedures (GSM 03.09)".
- [33] ETSI ETS 300 529: "Digital cellular telecommunications system (Phase 2); Technical realization of supplementary services (GSM 03.11)".
- [34] ETSI ETS 300 530: "European digital cellular telecommunications system (Phase 2); Location registration procedures (GSM 03.12)".
- [35] ETSI ETS 300 532: "European digital cellular telecommunications system (Phase 2); Support of Dual Tone Multi-Frequency signalling (DTMF) via the GSM system (GSM 03.14)".
- [36] ETSI ETS 300 542: "Digital cellular telecommunications system (Phase 2); Line identification supplementary services; Stage 2 (GSM 03.81 version 4.8.1)".
- [37] ETSI ETS 300 543: "Digital cellular telecommunications system (Phase 2); Call Forwarding (CF) supplementary services; Stage 2 (GSM 03.82)".
- [38] ETSI ETS 300 544: "European digital cellular telecommunications system (Phase 2); Call Waiting (CW) and Call Hold (HOLD) supplementary services; Stage 2 (GSM 03.83)".
- [39] ETSI ETS 300 545: "European digital cellular telecommunications system (Phase 2); Multi Party (MPTY) supplementary services; Stage 2 (GSM 03.84)".
- [40] ETSI ETS 300 546: "Digital cellular telecommunications system (Phase 2); Closed User Group (CUG) supplementary services; Stage 2 (GSM 03.85)".
- [41] ETSI ETS 300 547 "European digital cellular telecommunications system (Phase 2); Advice of Charge (AoC) supplementary services - Stage 2 (GSM 03.86)".
- [42] ETSI ETS 300 548: "European digital cellular telecommunications system (Phase 2); Call Barring (CB) supplementary services; Stage 2 (GSM 03.88)".
- [43] ETSI ETS 300 549: "Digital cellular telecommunications system (Phase 2); Unstructured Supplementary Service Data (USSD); Stage 2 (GSM 03.90)".
- [44] ETSI ETS 300 557: "Digital cellular telecommunications system (Phase 2); Mobile radio interface; Layer 3 specification (GSM 04.08 version 4.23.1)".
- [45] ETSI ETS 300 558: "Digital cellular telecommunications system (Phase 2); Mobile radio interface layer 3; Supplementary services specification; General aspects (GSM 04.10)".
- [46] ETSI ETS 300 564: "Digital cellular telecommunications system (Phase 2); Mobile radio interface layer 3; Supplementary services specification; Formats and coding (GSM 04.80)".

- [47] ETSI ETS 300 578: "Digital cellular telecommunications system (Phase 2); Radio subsystem link control (GSM 05.08 version 4.22.0)".
- [48] ETSI EN 300 607: "Digital cellular telecommunications system (Phase 2+); Mobile Station (MS) conformance specification (GSM 11.10 version 7.1.1 Release 1998)".
- [49] ETSI ETS 300 608: "Digital cellular telecommunications system (Phase 2); Specification of the Subscriber Identity Module - Mobile Equipment (SIM - ME) interface (GSM 11.11 version 4.21.1)".
- [50] ETSI ETS 300 625: "Digital cellular telecommunications system (Phase 2); Unstructured Supplementary Service Data (USSD); Stage 1 (GSM 02.90 version 4.1.1)".
- [51] ETSI ETS 300 702: "Digital Enhanced Cordless Telecommunications (DECT); Global System for Mobile communications (GSM); DECT/GSM Interworking Profile (IWP)".
- [52] ETSI EN 300 703: "Digital Enhanced Cordless Telecommunications (DECT); Global System for Mobile communications (GSM); DECT/GSM Interworking Profile (IWP); GSM Phase 2 supplementary services implementation".
- [53] ETSI 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)".
- [54] ETSI ETS 300 704-2: "Digital Enhanced Cordless Telecommunications (DECT); Global System for Mobile communications (GSM); DECT/GSM Interworking Profile (IWP); Profile Implementation Conformance Statement (ICS)".
- [55] ETSI ETS 300 756: "Digital Enhanced Cordless Telecommunications (DECT); Global System for Mobile communications (GSM); DECT/GSM Interworking Profile (IWP); Implementation of bearer services".
- [56] ETSI ETS 300 764: "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".
- [57] ETSI ETS 300 792: "Digital Enhanced Cordless Telecommunications (DECT); Global System for Mobile communications (GSM); DECT/GSM Interworking Profile (IWP); Implementation of facsimile group 3".
- [58] ETSI ETR 015: "Digital Enhanced Cordless Telecommunications (DECT); Reference document".
- [59] ETSI ETR 043: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Services and facilities requirements specification".
- [60] ETSI ETR 056: "Digital Enhanced Cordless Telecommunications (DECT); System description document".
- [61] ETSI TBR 10: "Digital Enhanced Cordless Telecommunications (DECT); General Terminal Attachment Requirements; Telephony Applications".
- [62] ETSI TBR 6: "Digital Enhanced Cordless Telecommunications (DECT); General terminal attachment requirements".
- [63] ISO Publication 8859-7: "Information processing - 8-bit single-byte coded graphic character sets - Part 7: Latin/Greek alphabet".

3 Definitions and abbreviations

3.1 Definitions

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

attach: process whereby a PP within the coverage area of a FP to which it has access rights, notifies this FP that it is operative. The reverse process is detach, which reports the PP as inoperative

NOTE 1: An operative PP is assumed to be ready to receive calls.

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

NOTE 2: Authentication is generally performed at call set-up, but may also be done at any other time (e.g. during a call).

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

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

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

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

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

NOTE 5: A DECT FP contains the logical elements of at least one Fixed radio Termination (FT), plus additional implementation specific elements.

Fixed part GSM PLMN attachment (DECT FP attached to A GSM MSC): definition of a functional environment where a DECT system (FP) is attached to an GSM MSC. The MSC in this case refers to a functional entity providing the required Mobility Management (MM) and Call Control (CC) functionality defined in the present document in order to communicate with the FP

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

NOTE 6: A FT only includes elements that are defined in the DECT CI standard. This includes radio transmission elements together with a selection of layer 2 and layer 3 elements.

handover: process of switching a call in progress from one physical channel to another physical channel. These processes can be internal (see internal handover) or external (see external handover)

NOTE 7: There are two physical forms of handover, intra-cell handover and inter-cell handover. Intra-cell handover is always internal. Inter-cell handover can be internal or external.

incoming call: call received at a PP

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

internal handover: handover processes that are completely internal to one Fixed radio Termination (FT). Internal handover re-connects the call at the lower layers, while maintaining the call at the NWK layer

NOTE 8: The lower layer reconnection can either be at the Data Link Control (DLC) layer (connection handover) or at the MAC layer (bearer handover).

inter-operability: capability of FPs and PPs, that enable a PP to obtain access to teleservices in more than one location area and/or from more than one operator (more than one service provider)

inter-operator roaming: roaming between FP coverage areas of different operators (different service providers)

Interworking Unit (IWU): unit that is used to interconnect sub-networks

NOTE 9: The IWU contains the interworking functions necessary to support the required sub-network interworking.

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

intra-operator roaming: roaming between different FP coverage areas of the same operator (same service provider)

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

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

NOTE 10: These databases are not included within the DECT FT.

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

outgoing call: call originating from a PP

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

NOTE 11: A DECT PP is logically divided into one portable termination plus one or more portable applications.

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

NOTE 12: A PT only includes elements that are defined in the DECT CI standard. This includes radio transmission elements (layer 1) together with a selection of layer 2 and layer 3 elements.

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

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

roaming: movement of a PP from one FP coverage area to another FP coverage area, where the capabilities of the FPs enable the PP to make or receive calls in both areas

NOTE 13: Roaming requires the relevant FPs and PP to be inter-operable.

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

NOTE 14: Subscription registration is usually required before a user can make or receive calls.

3.2 Abbreviations

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

AoCC	Advice of Charge (Charging) (supplementary service)
CC	Call Control
CHV	Card Holder Verification
CI	Common Interface
DAM	DECT Authentication Module
DLC	Data Link Control
DTMF	Dual Tone Multi-Frequency
FP	Fixed Part
FT	Fixed radio Termination
IPEI	International Portable Equipment Identity
IWU	InterWorking Unit
MAC	Medium Access Control

MM	Mobility Management
MS	Mobile Station
MSC	Mobile Switching Centre
NWK	NetWorK
PP	Portable Part
PT	Portable radio Termination. See definition
RFP	Radio Fixed Part
SIM	Subscriber Identification Module

4 Conformance

Conformance to the present document is met by conforming to EN 300 370 [11], ETS 300 702 [51], ETS 300 764 [56], ETS 300 756 [55] and ETS 300 792 [57]. The procedures contained in EN 300 370 [11], ETS 300 499 [13], EN 300 703 [52], ETS 300 764 [56], ETS 300 756 [55] and ETS 300 792 [57] fulfil the requirements relevant to the interworking of equipment, in order to provide the services listed in the present document. Therefore no methods of testing is provided in the present document.

In order to conform to the present document, the PT and FT shall satisfy the requirements identified in ETS 300 704-1 [53] and ETS 300 704-2 [54] respectively.

5 Introduction

The present document is a part of a set of standards for the DECT/GSM interworking profile (IWP) concept that includes:

- general description of service requirements, functional capabilities and information flows, (the present document);
- access and mapping (protocol/procedure description for 3,1 kHz speech service) (EN 300 370 [11]);
- GSM-MSC - DECT-FP Fixed Interconnection (ETS 300 499 [13]);
- GSM Phase 2 supplementary services implementation (EN 300 703 [52]);
- implementation of short message services, point-to-point and cell broadcast (ETS 300 764 [56]);
- implementation of bearer services (ETS 300 756 [55]);
- implementation of facsimile group 3 (ETS 300 792 [57])

The present document is based on EN 300 175-1 [2] to EN 300 175-8 [9] to enable DECT terminals to inter-work in the public and private environment with DECT systems which are connected to a GSM core infrastructure.

In addition, the present document is based on the DECT Generic Access Profile (GAP) EN 300 444 [12] to enable the same DECT/GSM terminal to inter-work 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 TBR 6 [62] and TBR 10 [61].

Further details on the DECT system may be found in ETR 015 [58], ETR 043 [59], ETR 056 [60], and EN 300 176 [10].

6 General

The present document specifies the requirements to provide GSM basic services over the DECT air interface.

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

GSM basic services according to GSM phase 2 shall be supported unless explicitly stated otherwise. The services described in clause 7 is, in general terms, as provided to the user. All cases of non-support of GSM services are explicitly mentioned and appropriate exception handling procedures are described in the relevant subclauses.

The interworking procedures and mappings are defined in EN 300 370 [11], ETS 300 499 [13], ETS 300 702 [51], EN 300 703 [52], ETS 300 756 [55], ETS 300 764 [56] and ETS 300 792 [57].

7 GSM service provision

7.1 General

GSM services (tele-, bearer and/or supplementary services) according to GSM Phase 2, shall be supported, 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 GSM services not supported

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

7.1.2 Bearer service

The bearer services shall be supported as specified in ETS 300 501 (GSM 02.02) [14].

7.1.2.1 Exception handling

For bearer services the GSM error handling as defined in ETS 300 557 [44] (GSM 04.08) shall be supported.

7.1.3 Teleservice

The teleservices shall be supported as specified in ETS 300 502 [15] (GSM 02.03). For information purposes the teleservices in ETS 300 502 [15] (GSM 02.03) are reproduced in annex A.

7.1.3.1 Exception handling

For teleservices the GSM error handling as defined in ETS 300 557 [44] (GSM 04.08) shall be supported.

7.1.4 Tones

In order to provide GSM users indication of the progress of their calls, supervisory tones shall be supported as specified in ETS 300 512 [23] (GSM 02.40). Tones not provided by the GSM 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 ETS 300 503 [16]] (GSM 02.04). For information purposes the supplementary services in ETS 300 503 [16]] (GSM 02.04) 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 GSM network and the DECT FP shall be according to the supplementary service handling, specified in ETS 300 529 [33] (GSM 03.11), ETS 300 558 [45] (GSM 04.10) and in the specific supplementary service GSM technical specifications.

The GSM MMI procedures as defined in ETS 300 511 [22] (GSM 02.30) shall be supported by the DECT PP using the protocol to convey it to the DECT FP, as described in EN 300 175-5 [6], subclause 10.2.

GSM 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 GSM network, nor in the DECT FP or PP.

For supplementary services the GSM error handling as defined in ETS 300 529 [33] (GSM 03.11), ETS 300 558 [45] (GSM 04.10) and ETS 300 564 [46] (GSM 04.80) shall be supported.

7.1.5.3 Number Identification Supplementary Services (NISS)

These services shall be supported according to ETS 300 514 [24] (GSM 02.81).

7.1.5.4 Call Offering Supplementary Services (COSS)

These services shall be supported according to ETS 300 515 [25] (GSM 02.82).

7.1.5.5 Call Completion Supplementary Services (CCSS)

These services shall be supported according to ETS 300 516 [26] (GSM 02.83).

7.1.5.6 Multi Party Supplementary Services (MPSS)

These services shall be supported according to ETS 300 517 [27] (GSM 02.84).

7.1.5.7 Community of Interest Supplementary Services (CISS)

These services shall be supported according to ETS 300 518 [28] (GSM 02.85).

7.1.5.8 Charging Supplementary Services (CSS)

These services shall be supported according to ETS 300 519 [29] (GSM 02.86).

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 ETS 300 519 [29] (GSM 02.86) and ETS 300 510 [21] (GSM 02.24).

7.1.5.9 Call Restriction Supplementary Services (CRSS)

These services according to ETS 300 520 [30] (GSM 02.88) shall be supported.

7.1.6 Unstructured Supplementary Services Data (USSD)

USSD shall be supported as specified in ETS 300 625 [50] (GSM 02.90).

7.1.6.1 Exception handling

For USSD the GSM error handling as defined in ETS 300 558 [45] (GSM 04.10) and ETS 300 564 [46] (GSM 04.80) shall be supported.

7.2 Functional capabilities and information flows

7.2.1 Supplementary services

The supplementary services shall be supported as specified in ETS 300 529 [33] (GSM 03.11).

7.2.1.1 General requirement

The DECT FP shall terminate all GSM supplementary services transactions and is supposed to map those transactions to the specified ones for DECT. For this reason, all references to MS in GSM 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 GSM network.

NOTE: The information flows of GSM stage 2 do not include the information exchange between the DECT FP and PP.

7.2.1.2 Number Identification Supplementary Services (NISS)

These services shall be supported according to ETS 300 542 [36] (GSM 03.81).

7.2.1.3 Call Offering Supplementary Services (COSS)

These services shall be supported according to ETS 300 543 [37] (GSM 03.82).

7.2.1.4 Call Completion Supplementary Services (CCSS)

These services shall be supported according to ETS 300 544 [38] (GSM 03.83).

7.2.1.5 Multi Party Supplementary Services (MPSS)

These services shall be supported according to ETS 300 545 [39] (GSM 03.84).

7.2.1.6 Community of Interest Supplementary Services (CISS)

These services shall be supported according to ETS 300 546 [40] (GSM 03.85).

7.2.1.7 Call Restriction Supplementary Services (CRSS)

These services shall be supported according to ETS 300 548 [42] (GSM 03.88).

7.2.1.8 Charging Supplementary Services (CSS)

These services shall be supported according to ETS 300 547 [41] (GSM 03.86). For support of these services, see subclause 7.1.5.8.

7.2.2 Unstructured Supplementary Services Data (USSD)

USSD shall be supported as specified in ETS 300 549 [43] (GSM 03.90).

7.2.3 Bearer services

The support of bearer services is given in ETS 300 756 [55].

7.2.4 Teleservices

The support of telephony and emergency calls (GSM teleservices 11, 12) shall be supported as specified in the GSM 03-series of specifications. The interworking procedures and mappings shall meet the requirements of EN 300 370 [11].

The support of facsimile services (GSM teleservices 61, 62) is given in ETS 300 792 [57].

The support of short message services (GSM teleservices 21, 22, 23) is given in ETS 300 764 [56].

8 Portable Part (PP) requirements

8.1 General

This clause is based on ETS 300 505 [17] (GSM 02.07), with the purpose of defining the PP features required for DECT/GSM interworking. They are also classified according to their type and whether support of them is mandatory or optional.

8.2 Description

An 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 subclause, shall not cause a mis-operation of the GSM network or DECT (FP, PP).

In tables 1 and 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 1.

Table 1: Basic PP features

Item no	Name	Mandatory (M) Optional (O)	Note
1	Display of called number	M	1
2	Indication of call progress signals	M	
3	Country/PLMN indication and PLMN selection	M	1
4	Keypad	O	2
5	IMEI/IPEI	M	
6	International Access Function ("+")	M	2
7	Autocalling restriction capabilities	M	3
8	Emergency calls capabilities	M	
9	Subscription identity management	M	
10	Support of DECT encryption	M	
11	Support ERMES alphabet	M	
NOTE 1: Mandatory where a human interface is provided, i.e. may be inappropriate for PP driven by external equipment.			
NOTE 2: 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 3: PPs with capabilities for autocalling shall restrict repeated call attempts according to the procedures described in ETS 300 505 (GSM 02.07) [17].			

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 ETS 300 512 [23] (GSM 02.40).

8.3.1.3 Country/PLMN indication and PLMN selection

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

The network selection procedures and access control classed in the PP, as defined in ETS 300 507 [18] (GSM 02.11) are not fully supported. The requirements in EN 300 370 [11] however applies. The network selection procedures and access control classes in the PP, as defined in ETS 300 507 [18] (GSM 02.11) 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 EN 300 370 [11].

8.3.1.6 International access function

Provision is made in GSM 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 GSM 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 ETS 300 505 [17] (GSM 02.07).

8.3.1.8 Emergency calls capabilities

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

8.3.1.9 Subscription identity management

The removal of the SIM 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 GSM cipher key, Kc.

8.3.1.11 Support of ERMES alphabet

The PP shall be able to transmit, receive and display characters of the Latin alphabet no. 1 and the special character "^" of the Greek alphabet, as specified in ISO 8859-7 [63].

8.3.2 Supplementary/additional PP features

The supplementary PP features are given in table 2.

Table 2: Supplementary and additional MS 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 GSM supplementary services using the MMI codes as described in ETS 300 511 [22] (GSM 02.30).

8.3.2.2 Abbreviated dialling

If the PP supports abbreviated dialling, it shall be according to ETS 300 505 [17] (GSM 02.07).

8.3.2.3 Fixed number dialling

If the PP supports fixed number dialling, it shall be according to ETS 300 505 [17] (GSM 02.07).

8.3.2.4 Last Numbers Dialed (LND)

If the PP supports LND, it shall be according to ETS 300 505 [17] (GSM 02.07).

8.4 Man-Machine Interface (MMI) of the PP

The purpose of this subclause 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 subclause is based on specification ETS 300 511 [22] (GSM 02.30) and refers to the following GSM technical specifications:

- GSM 02.07 (ETS 300 505 [17]);
- GSM 02.11 (ETS 300 507 [18]);
- GSM 02.17 (ETS 300 509 [20]);
- GSM 02.40 (ETS 300 512 [23]);
- GSM 03.01 (ETS 300 521 [31]);
- GSM 03.09 (ETS 300 527 [32]);
- GSM 03.12 (ETS 300 530 [34]);
- GSM 03.14 (ETS 300 532 [35]);
- GSM 04.08 (ETS 300 557 [44]);
- GSM 05.08 (ETS 300 578 [47]);
- GSM 11.10 (EN 300 607 [48]).

8.4.1 Physical user input features

ETS 300 511 [22] (GSM 02.30) specifies the minimum physical requirements for the support of GSM services and features. Where the service is supported in the FP and PP, then the same requirements, or equivalent, in ETS 300 511 [22] (GSM 02.30) shall be supported.

The following subclauses 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 ERMES alphabet.

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 a 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 ETS 300 511 [22] (GSM 02.30).

The PP shall support the initiation of an emergency call to the number 112 without a SIM-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 SIM interfaces

The DECT PP shall accept IC or plug-in SIM as well as IC or plug-in DAM, with a GSM application.

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

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

8.5.1 Entry of PIN and PIN2

According to ETS 300 511 [22] (GSM 02.30).

8.5.2 Change of PIN or PIN2

According to ETS 300 511 [22] (GSM 02.30).

8.5.3 Unblocking of PIN or PIN2

According to ETS 300 511 [22] (GSM 02.30).

8.5.4 Status information - return codes

The SIM gives status information, as responses to instructions, in two-byte codes (see GSM 11.11 (ETS 300 608 [49]), "Status Conditions Returned by the Card"). Some of the possible return codes are deeply related to the user's actions and should therefore be indicated to the user.

It is mandatory 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 Card Holder Verification (CHV), no attempt left (e.g. secret code locked)
6F XX	technical problem with no diagnostic given

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.

8.6 Service access

The PLMN selection procedures and access control classes in the PP as defined in GSM 02.11 (ETS 300 507 [18]) are not fully supported. The requirements in EN 300 370 [11] 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 GSM Mobile Equipment Identity and Software Version number (IMEISV)

All IMEISV enquiry procedures according to the principles laid down in GSM 02.16 (ETS 300 508 [19]) shall be supported by the FP.

9.2 Support of MS 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 a emergency call from the PP, the FP shall map it to a GSM emergency call towards the PLMN.

9.4 Support of international access function

In GSM, 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 GSM network, see ETS 300 511 [22] (GSM 02.30) and ETS 300 557 [44] (GSM 04.08).

open format: This format shall result in the TON of "Unknown" to be indicated to the GSM 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 "+" in front of a dialled number the FP shall map this type of number to "international format" towards the PLMN.

For PP originated calls on reception of a dialled number without "+" in front of this dialled number the FP shall map this type of number to "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 ERMES alphabet

The provision shall be made for the support of the ERMES alphabet, Latin alphabet no 1 and the special character "^" of the Greek alphabet, as specified in ETS 300 133-2 [1] and ISO 8859-7 [63].

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

Annex A (informative): GSM teleservices and supplementary services

For information, the teleservices in ETS 300 502 [15] (GSM 02.03) include the following:

- telephony (GSM teleservice 11);
- emergency calls (GSM teleservice 12);
- short message service mobile terminated point to point (GSM teleservice 21);
- short message service mobile originated point to point (GSM teleservice 22);
- short message service cell broadcast (GSM teleservice 23);
- alternate speech and facsimile group 3 (T/NT) (GSM teleservice 61);
- automatic facsimile group 3 (T/NT) (GSM teleservice 62).

For information, the supplementary services in ETS 300 503 [16] (GSM 02.04) include the following:

- Calling Line Identification Presentation, CLIP;
- Calling Line Identification Restriction, CLIR;
- Connected Line Identification Presentation, CoLP;
- Connected Line Identification Restriction, CoLR;
- Call Forwarding Unconditional, CFU;
- Call Forwarding on Mobile Subscriber Busy, CFB;
- Call Forwarding on No Reply, CFNRy;
- Call Forwarding on Mobile Subscriber Not Reachable, CFNRc;
- Call Waiting, CW;
- Call Hold, HOLD;
- Multi-Party Service, MPTY;
- Closed User Group, CUG;
- Advice of Charge Information, AoCI;
- Advice of Charge Charging, AUCC;
- Barring of All Outgoing Calls, BAOC;
- Barring of Outgoing International Calls, BOIC;
- Barring of Outgoing International Calls except those directed to the Home PLMN Country, BOIC-exHC;
- Barring of All Incoming Calls, BAIC;
- Barring of Incoming Calls when Roaming outside the Home PLMN Country, BIC-Roam.

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