SLOVENSKI STANDARD
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Digitalne izboljġane brezvrviļ ne telekomunikacije (DECT) ï Digitalno omreġje z integriranimi storitvami (ISDN) ï Medsebojno delovanje DECT/ISDN za vmesne sisteme ï Specifikacija medsebojnega delovanja in profila

Digital Enhanced Cordless Telecommunications (DECT); Integrated Services Digital Network (ISDN); DECT/ISDN interworking for intermediate system configuration; Interworking and profile specification

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Foreword

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

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Introduction

For interworking between an Integrated Services Digital Network (ISDN) and a DECT system, two profiles have been defined. The first profile is the DECT/ISDN profile for end system configuration. The second profile is the DECT/ISDN profile for intermediate system configuration. The first profile is also called the "ISDN Access Profile (IAP)". The second profile is also called the "Intermediate ISDN access Profile (IIP)".

The IAP applies when a Fixed Part (FP) and a Portable Part (PP) together constitute an ISDN terminal. The ISDN applications and any supplementary services are located in the PP (no Interworking Unit (IWU) in the PP). The FP maps the received layer 3 messages at the ISDN interface to the DECT layer 3 messages and vice-versa.

The IIP applies when a FP and a PP together constitute a gateway between an ISDN network and an ISDN terminal. The FP and the PP have an IWU, which maps the messages between the ISDN interface and the DECT air interface.

The present document specifies the DECT/ISDN profile for intermediate system configuration only. For details on DECT/ISDN profile for end system configuration, see EN 300 434-1 [27].

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

One of the main objectives is to describe how the ISDN services are mapped across the DECT air interface in a formal way, so that equipment interoperability of different manufacturers' equipment can be achieved.

1 Scope

The present document specifies how Integrated Services Digital Network (ISDN) services can be provided over Digital Enhanced Cordless Telecommunications (DECT). It is based on DECT Common Interface (CI) specification EN 300 175, parts 1 [1] to 8 [8], to enable ISDN terminals to have cordless access to an ISDN infrastructure. Both public ISDN and private ISDN are within the scope of the present document.

The user has transparent access to the ISDN services and functions. In respect to bearer services, the following are supported: speech, 3,1 kHz audio, unrestricted 64 kbit/s data, packet data and user signalling bearer service.

The DECT intermediate system configuration differs from the DECT end system configuration as follows. The intermediate system is used to enable ISDN terminals to have cordless access to an ISDN infrastructure via a DECT air interface. The end system is used where the DECT Fixed Part (FP) and the DECT Portable Part (PP) together form an end system with the behaviour of an ISDN Terminal Equipment (TE).

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 ETS 300 108: "Integrated Services Digital Network (ISDN); Circuit-mode 64 kbit/s unrestricted 8 kHz structured bearer service category; Service description".

[10] ETSI ETS 300 109: "Integrated Services Digital Network (ISDN); Circuit-mode 64 kbit/s 8 kHz structured bearer service category usable for speech information transfer Service description".

[11] ETSI ETS 300 110: "Integrated Services Digital Network (ISDN); Circuit-mode 64 kbit/s 8 kHz structured bearer service category usable for 3,1 kHz audio information transfer; Service description".

[12] ETSI ETS 300 475-1: "Private Telecommunication Network (PTN); Reference configuration; Part 1: Reference configuration for PTN eXchanges (PTNX) [ISO/IEC 11579-1 (1994), modified]".

[13] ETSI ETS 300 012: "Integrated Services Digital Network (ISDN); Basic user-network interface; Layer 1 specification and test principles".

[14] ETSI EN 300 403-1: "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Signalling network layer for circuit-mode basic call control; Part 1: Protocol specification [ITU-T Recommendation Q.931 (1993), modified]".

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

[16] ETSI ETS 300 192: "Private Telecommunication Network (PTN); Signalling protocol at the S-reference point; Circuit mode basic services".

[17] ETSI EN 300 171: "Private Integrated Services Network (PISN); Specification, functional models and information flows; Control aspects of circuit-mode basic services [ISO/IEC 11574 (1994) modified]".

[18] ITU-T Recommendation I.232.1 (1988): "Packet-mode bearer service categories: Virtual call and permanent virtual circuit bearer service category".

[19] ETSI ETS 300 049: "Integrated Services Digital Network (ISDN); ISDN Packet Mode Bearer Service (PMBS); ISDN Virtual Call (VC) and Permanent Virtual Circuit (PVC) bearer services provided by the D-channel of the user access - basic and primary rate".

[20] ETSI ETS 300 048: "Integrated Services Digital Network (ISDN); ISDN Packet Mode Bearer Services (PMBS); ISDN Virtual Call (VC) and Permanent Virtual Call (PVC) bearer services provided by the B-channel of the user access - basic and primary rate".

[21] ETSI EN 300 196-1: "Integrated Services Digital Network (ISDN); Generic functional protocol for the support of supplementary services; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[22] ETSI ETS 300 125: "Integrated Services Digital Network (ISDN); User-network interface data link layer specification; Application of CCITT Recommendations Q.920/I.440 and Q.921/I.441".

[23] ITU-T Recommendation G.711 (1988): "Pulse code modulation (PCM) of voice frequencies".

[24] ITU-T Recommendation G.726 (1990): "40, 32, 24, 16 kbit/s Adaptive Differential Pulse Code Modulation (ADPCM)".

[25] ITU-T Recommendation G.821: "Error performance of an international digital connection operating at a bit rate below the primary rate and forming part of an integrated services digital network".

[26] ITU-T Recommendation I.411 (1993): "ISDN user-network interfaces - Reference configurations".

[27] ETSI EN 300 434-1: "Digital Enhanced Cordless Telecommunications (DECT); Integrated Services Digital Network (ISDN); DECT/ISDN interworking for end system configuration; Part 1: Interworking specification".

3 Definitions and abbreviations

3.1 Definitions

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

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

NOTE 1: The DECT user-network interface corresponds to the top of the network layer (layer 3).

broadcast: simplex point-to-multipoint mode of transmission

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

NOTE 2: The C-plane stack always contains protocol entities up to and including the network layer.

call: all of the Network (NWK) layer processes involved in one network layer peer-to-peer association

NOTE 3: Call may sometimes be used to refer to processes of all layers, since lower layer processes are implicitly required.

DECT intermediate fixed system: logical grouping that contains all the functions between the DECT DI reference point and the reference point on the fixed side of the DECT air interface

NOTE 4: The DECT Intermediate Fixed System (DIFS) = FT + (local network up to the fixed side ISDN reference point (including fixed side IWU)).

DECT intermediate portable system: logical grouping that contains all the functions between the DECT DI reference point and the ISDN S reference point on the portable side of the DECT air interface

NOTE 5: The DECT Intermediate Portable System (DIPS) = PT + (PA (Portable Application) up to the portable side ISDN S reference point (including portable side IWU)).

DECT network: network that uses the DECT air interface to interconnect a local network to one or more portable applications

The logical boundaries of the DECT network are defined to be at the top of the DECT network layer.

NOTE 6: A DECT Network (DNW) is a logical grouping that contains one or more fixed radio terminations plus their associated portable radio termination. The boundaries of the DECT network are not physical boundaries.

end system: logical grouping that contains application processes and supports telecommunication services

NOTE 7: From the Open Systems Interconnection (OSI) point of view, end systems are considered as sources and sinks of information.

equipment interoperability: capability of fixed and PPs supplied by different manufacturers to interoperate in a multivendor environment

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 8: A DECT FP contains the logical elements of at least one fixed radio termination, plus additional implementation specific elements.

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

NOTE 9: A fixed radio termination 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.

Generic Access Profile (GAP): profile applicable to all DECT Portable radio Terminations (PTs) and Fixed radio Terminations (FTs) which are subject to CTR 10 (i.e. 3,1 kHz telephony teleservice)

The GAP ensures air interface interoperability of DECT equipment capable of 3,1 kHz telephony applications, in such a way that any DECT Portable radio Termination (PT) conforming to the GAP is interoperable with any DECT FT conforming to the GAP.

incoming call: call received at a PP

Interworking Unit (IWU): unit that is used to interconnect subnetworks

NOTE 10: The IWU will contain the interworking functions necessary to support the required subnetwork interworking.

ISDN access profile: defined part of the DECT/ISDN interworking standard that ensures interoperability between FPs and PPs for the access of ISDN services

local network: telecommunication network capable of offering local telecommunication services

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

MAC Connection (CONNECTION): association between one source Medium Access Control (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

paging: process of broadcasting a message from a DECT FP to one or more DECT PPs

NOTE 12: Different types of paging message are possible. For example, the {LCE_REQUEST-PAGE} message orders the recipient to respond with a call setup attempt.

portable application: logical grouping that contains all the elements that lie beyond the DECT network boundary on the portable side

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

Portable Part (DECT Portable Part) (PP): physical grouping that contains all elements between the user and the DECT air interface

PP is a generic term that may describe one or several physical pieces.

NOTE 14: A DECT PP is logically divided into one PT plus one or more 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 15: A portable radio termination 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 a FP that contains all the (REP) radio end points (one or more) that are connected to a single system of antennas

segment: one of the pieces of data that is produced by the process of segmentation

NOTE 16: In general, one segment only represents a portion of a complete message.

segmentation: process of partitioning one service data unit from a higher layer into more than one protocol data unit

The reverse process is assembly.

supplementary service: service that modifies or supplements a basic telecommunication service

teleservice: type of telecommunication service that provides the complete capability, including terminal equipment functions, for communication between users, according to protocols that are established by agreement

U-plane: user plane of the DECT protocol stacks. This plane contains most of the end-to-end (external) user information and user control

NOTE 17: The U-plane protocols do not include any internal DECT protocol control, and it may be null at the network layer and at the Data Link Control DLC layers for some services.

3.2 Abbreviations

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

BA	Basic Access
C	C reference point
CC	Call Control
CEI	Connection Endpoint Identifier
CI	Common Interface
DECT	Digital Enhanced Cordless Telecommunications
DI	DECT reference point for Intermediate system
DIFS	DECT Intermediate Fixed System
DIPS	DECT Intermediate Portable System
DLC	Data Link Control
DNW	DECT NetWork
ECN	Exchange Connection Number
FEC	Forward Error Control
FP	Fixed Part
FT	Fixed radio Termination
GAP	Generic Access Profile
IA	Interface Adapter
IE	Information Element
IFS	Intermediate Fixed System
IPS	Intermediate Portable System
ISDN	Integrated Services Digital Network
IWU	InterWorking Unit
LA	Link Association
LAE	Link Association Entity
LCE	Link Control Entity
LCN	Logical Connection Number
LLME	Lower Layer Management Entity
MAC	Medium Access Control
MBC	Multi-Bearer Control
MCEI	MAC Connection Endpoint Identifier
MM	Mobility Management
MoU	Memorandum of Understanding
MUX	MUltipleXer
NTP	Normal Transmit Power
NWK	NetWorK
OSI	Open Systems Interconnection
P	P reference point
PA	Portable Application
PARI	Primary Access Rights Identity
PP	Portable Part
PRA	Primary Rate Access
PT	Portable radio Termination
R	R reference point
REP	Radio End Point
RFP	Radio Fixed Part
RFPI	Radio Fixed Part Identity
S	S reference point
S/T	S/T reference point

SAP	Service Access Point
SARI	Secondary Access Rights Identity
SDU	Service Datan Unit
SS	Supplementary Services
T	T reference point
TE1	ISDN terminal
TEI	Terminal Endpoint Identifier
TI	Transaction Identifier
vBA	virtual Basic Access

3.3 Symbols

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

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

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

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

4 Interworking requirements

4.1 Reference configurations and interfaces

4.1.1 Reference configurations

reference configurations describe the functional groupings of DECT and ISDN 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 are described in ITU-T Recommendation I.411 [26] for public ISDN and in ETS 300 475-1 [12] for private ISDN.

The DECT intermediate system reference configurations are used where the DECT Intermediate Fixed System (DIFS) and DECT Intermediate Portable System (DIPS) together form an intermediate system to connect an ISDN terminal to an ISDN network.

Figure 1 shows the intermediate system reference configurations.