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**Radio Equipment and Systems (RES);
Digital European Cordless Telecommunications (DECT)
Common interface
Part 1: Overview**

ETSI

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Contents

Foreword	5
1 Scope	7
2 Normative references	7
3 Definitions and abbreviations	9
3.1 Definitions.....	9
3.2 Abbreviations.....	17
4 Structure of the ETS.....	21
4.1 Part 1: Overview.....	21
4.2 Part 2: Physical layer	22
4.3 Part 3: Medium access control layer.....	22
4.4 Part 4: Data link control layer.....	22
4.5 Part 5: Network layer	22
4.6 Part 6: Identities and addressing	22
4.7 Part 7: Security features.....	22
4.8 Part 8: Speech coding and transmission.....	22
4.9 Part 9: Public access profile.....	23
5 The objectives of the ETS	23
6 General description of the system	24
7 Description of the protocol architecture	24
7.1 General.....	24
7.2 The DECT layered structure.....	25
7.3 Physical layer	25
7.4 MAC layer	26
7.5 DLC layer.....	26
7.6 Network layer	26
7.7 Lower Layer Management Entity (LLME).....	27
7.8 Interworking units.....	27
8 Proprietary escapes within the common interface	27
8.1 Primary escape routes	27
8.2 Secondary escape routes	28
9 Levels of conformance.....	28
History	29

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Foreword

This European Telecommunication Standard (ETS) has been produced by the Radio Equipment and Systems (RES) Technical Committee of the European Telecommunications Standards Institute (ETSI), and was adopted, having passed through the ETSI standards approval procedure (Public Enquiry 23: 1991-09-02 to 1991-12-27, Vote 22: 1992-05-25 to 1992-07-17).

The ETS forms part 1 of a series of 9 laying down the arrangements for the Digital European Cordless Telecommunications (DECT) Common Interface, and provides an overview of the whole ETS.

The following aspects of this ETS are subject to controlled distribution:

- a) DECT identities, as defined in Part 6;
- b) DECT cryptographic algorithms.

The cryptographic algorithms specify the details of the DECT standard authentication algorithm and the DECT standard cipher.

These aspects are distributed on an individual basis. Further information and details of the current distribution procedures can be obtained from the ETSI Secretariat at the address on the first page of this document.

Further details of the DECT system may be found in ETSI Technical Reports, ETR 015 [16] and ETR 043 [15], and also in draft ETSI Technical Report: "Digital European Cordless Telecommunications System description document [17]".

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1 Scope

This part of ETS 300 175 gives an introduction and overview of the complete Digital European Cordless Telecommunications (DECT) Common Interface.

This part contains an abstract of the other parts of the DECT standard together with a general description of:

- the objectives of this ETS;
- the DECT Common Interface;
- the protocol architecture of DECT.

This part also provides an extensive vocabulary, in particular it contains the common definitions of all the technical terms used in different parts of this ETS.

2 Normative references

This European Telecommunication Standard (ETS) incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to, or revisions of, any of these publications apply to this ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- [1] ETS 300 175-1: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT) Common Interface Part 1: Overview".
- [2] ETS 300 175-2: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT) Common Interface Part 2: Physical layer".
- [3] ETS 300 175-3: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT) Common Interface Part 3: Medium access control layer".
- [4] ETS 300 175-4: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT) Common Interface Part 4: Data link control layer".
- [5] ETS 300 175-5: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT) Common Interface Part 5: Network layer".
- [6] ETS 300 175-6: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT) Common Interface Part 6: Identities and addressing".
- [7] ETS 300 175-7: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT) Common Interface Part 7: Security features".
- [8] ETS 300 175-8: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT) Common Interface Part 8: Speech coding and transmission".
- [9] ETS 300 175-9: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT) Common Interface Part 9: Public access profile".
- [10] Reserved.

- [11] Reserved.
- [12] I-ETS 300 176: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT) Approval test specification".
- [13] Reserved for future ETS version of [12].
- [14] CEPT Recommendation T/SGT SF2 (89) 6/0: "Draft Recommendation T/SF Services and Facilities of Digital European Cordless Telecommunications".
- [15] ETR 043: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT) Common interface Services and facilities requirements specification".
- [16] ETR 015: "Digital European Cordless Telecommunications Reference document".
- [17] Draft Technical Report: "Digital European Cordless Telecommunications System description document".
- [18] ETR 042: "Radio Equipment and Systems; Digital European Cordless Telecommunications (DECT) A Guide to the DECT features that influence the traffic capacity and the maintenance of high radio link transmission quality, including the results of simulations".
- [19] Reserved for future DECT related document.
- [20] CCIR Report 662 (1978): "Definition of spectrum use and efficiency".
- [21] CCITT Recommendation X.200 (1988): "Reference Model of Open Systems Interconnection for CCITT applications".
- [22] CCITT Recommendation X.210 (1988): "OSI layer service conventions".
- [23] ECMA TR/44 (1989): "An architectural framework for private networks".
- [24] CCITT Recommendation T.50 (1988): "International Alphabet No. 5".
- [25] International Standard ISO.2022 (1986 E): "Information processing - ISO 7-bit and 8-bit coded character sets - Code extension techniques".
- [26]-[28] Reserved.
- [29] European Telecommunication Standard ETS 300 102-1: "ISDN User-network interface layer; Specification for basic call control".
- [30] European Telecommunication Standard ETS 300 102-2: "ISDN User-network interface layer 3 Specification Description Language (SDL) diagrams".
- [31] ETS 300 133-1 to -7: "Paging Systems (PS); European Radio Message System (ERMES)".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of this ETS, the following definitions apply.

Antenna diversity: implies that the Radio Fixed Part (RFP) for each bearer independently can select different antenna properties such as gain, polarisation, coverage patterns, and other features that may effect the practical coverage. A typical example is space diversity, provided by two vertically polarised antennas separated by 10 - 20 cm.

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

NOTE: An operative portable part is assumed to be ready to receive calls.

Authentication (of a subscriber): the process whereby a DECT subscriber is positively verified to be a legitimate user of a particular fixed part.

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

Bearer: see Medium Access Control (MAC) bearer or bearer service.

Bearer handover: the internal handover process provided by the MAC layer, whereby one MAC connection can modify its underlying bearers while maintaining the service provided to the Data Link Control (DLC) layer.

NOTE: Bearer handover is slot based.

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

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

Broadcast: a simplex point-to-multipoint mode of transmission.

NOTE: The transmitter may disregard the presence or absence of receivers.

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

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

Cell: the domain served by a single antenna(e) system (including a leaky feeder) of one fixed part.

NOTE: A cell may include more than one source of radiated Radio Frequency (RF) energy (i.e. more than one radio end point).

Central Control Fixed Part (CCFP): a physical grouping that contains the central elements of a fixed part. A fixed part shall contain a maximum of one CCFP.

NOTE: A CCFP controls one or more RFPs.

Centrex: an implementation of a private telecommunication network exchange that is not located on the premises of the private network operator. It may be co-located with, or physically a part of a public exchange.

Channel: see physical channel.

Cluster: a logical grouping of one or more cells between which bearer handover is possible. A Cluster Control Function (CCF) controls one cluster.

NOTE: Internal handover to a cell which is not part of the same cluster can only be done by connection handover.

Connection: see "MAC connection".

Connection handover: the internal handover process provided by the DLC layer, whereby one set of DLC entities (C-plane and U-plane) can reroute data from one MAC connection to a second new MAC connection, while maintaining the service provided to the network layer.

NOTE: Connection handover is DLC frame based.

ConnectionLess mode (C/L): a transmission mode that transfers one packet (one self contained unit) of data from one source point to one (or more) destination points in a single phase.

NOTE: Connectionless transmissions require the peer-to-peer associations to be prearranged, and the transmission is unacknowledged at that layer.

Connection Oriented mode (C/O): a transmission mode that transfers data from one source point to one or more destination points using a protocol based on three phases: "Set-up", "Data transfer" and "Release".

NOTE: Connection oriented mode requires no prearranged associations between peer entities (unlike C/L mode).

Coverage area: the area over which reliable communication can be established and maintained.

DECT NetWork (DNW): a 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: 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.

DLC broadcast: a simplex "connectionless" mode of transmission from the DLC broadcast entity of one fixed radio termination to the DLC broadcast entities in one or more portable radio terminations.

NOTE: The transmitter may disregard the presence or absence of receivers.

DLC data link (DLC LINK): an association between two DLC layer entities. This can either be one C-plane association or one U-plane association.

NOTE: This is not the same as a MAC connection.

DLC frame: the format used to structure all messages that are exchanged between DLC layer peer entities.

NOTE: Different DLC frames are used in the C-plane and the U-plane, and there is more than one format of DLC frame in each plane.

Double-simplex bearer: the use of two simplex bearers operating in the same direction on two physical channels. These pairs of channels shall always use the same RF carrier and shall always use evenly spaced slots (i.e. separated by 0,5 Time Division Multiple Access (TDMA) frame).

A double-simplex bearer shall only exist as part of a multibearer MAC connection.

Down-link: transmission in the direction FT to PT.

Duplex bearer: the use of two simplex bearers operating in opposite directions on two physical channels. These pairs of channels shall always use the same RF carrier and shall always use evenly spaced slots (i.e. separated by 0,5 TDMA frame).

End System (ES): a logical grouping that contains application processes and supports telecommunication services.

NOTE: From the OSI point of view, end systems are considered as sources and sinks of information.

External handover: the process of switching a call in progress from one fixed radio termination to another fixed radio termination.

Field: a continuous region of data (i.e. adjacent bits) that jointly convey information. Typically, a message will contain several fields. If data is not continuous then it shall be defined as two (or more) fields.

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

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

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

NOTE: A fixed radio termination only includes elements that are defined in ETS 300 175. This includes radio transmission elements (layer 1) together with a selection of layer 2 and layer 3 elements.

Flow control: the mechanism that is used to regulate the flow of data between two peer entities.

Fragment: one of the service data units that is produced by the process of fragmentation.

NOTE: This is not the same as a segment.

Fragmentation: the process of dividing a protocol data unit into more than one service data unit for delivery to a lower layer. The reverse process is recombination.

NOTE: This is not the same as segmentation.

Frame: see TDMA frame or DLC frame.

Full slot (Slot): one 24th of a TDMA frame which is used to support one physical channel.

Generic: a generalised set or general purpose set, often in the sense of basic or ordinary.

Geographically unique: this term relates to fixed part identities, PARIs and RFPIs. It indicates that two fixed parts with the same PARI, or respectively two RFPs with the same RFPI, can not be reached or listened to at the same geographical position.

NOTE: PARI stands for Primary Access Rights Identifier, RFPI stands for Radio Fixed Part Identifier.

Global NetWork (GNW): a telecommunication network capable of offering a long distance telecommunication service.

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

Globally unique identity: the identity is unique within DECT (without geographical or other restrictions).

Guard space: the nominal interval between the end of a radio transmission in a given slot, and the start of a radio transmission in the next successive slot.

NOTE: This interval is included at the end of every slot, in order to prevent adjacent transmissions from overlapping even when they originate with slightly different timing references (e.g. from different radio end points).

Half slot: one 48th of a TDMA frame which is used to support one physical channel.

Handover: the 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: 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: a call received at a portable part.

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

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

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

Interoperability: the capability of fixed parts and portable parts, that enable a portable part to obtain access to teleservices in more than one location area and/or from more than one operator (more than one service provider).

Interoperator roaming: roaming between fixed part coverage areas of different operators (different service providers).

InterWorking Unit (IWU): a unit that is used to interconnect subnetworks.

NOTE: The IWU will contain the InterWorking Functions (IWF) necessary to support the required subnetwork interworking.

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

Intraoperator roaming: roaming between different fixed part coverage areas of the same operator (same service provider).

Link: see DLC data link.

Local NetWork (LNW): a telecommunication network capable of offering local telecommunication services.

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

Locally unique identity: the identity is unique within one FP or location area, depending on application.

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

Location registration: the 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: These databases are not included within the DECT fixed radio termination.

Logical channel: a generic term for any distinct data path. Logical channels can be considered to operate between logical end points.

Lower Layer Management Entity (LLME): a management entity that spans a number of lower layers, and is used to describe all control activities which do not follow the rules of layering.

NOTE: The DECT LLME spans the network layer, the DLC layer, the MAC layer and the physical layer.

MAC bearer (Bearer): MAC bearers are the service elements that are provided by each Cell Site Function (CSF). Each MAC bearer corresponds to a single service instance to the physical layer. See also simplex bearer, duplex bearer and double simplex bearer.

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

Multiframe: a repeating sequence of 16 successive TDMA frames, that allows low rate or sporadic information to be multiplexed (e.g. basic system information or paging).

Network (telecommunication network): all the means of providing telecommunication services between a number of locations where the services are accessed via equipment attached to the network.

Node: a point at which switching occurs.

Operator (DECT operator): the individual or entity who or which is responsible for operation of one or more DECT fixed parts.

NOTE: The term does not imply any legal or regulatory conditions, nor does it imply any aspects of ownership.

Outgoing call: a call originating from a portable part.

Paging: the process of broadcasting a message from a DECT fixed part to one or more DECT portable parts.

NOTE: Different types of paging message are possible. For example, the {Request paging} message orders the recipient to respond with a call set-up attempt.

Paging area: the domain in which the portable part will be paged as a part of incoming call establishment.

NOTE: In general, the paging area will be equal to the Temporary Portable User Identity (TPUI) domain, since the TPUI is used for paging.

Phase: one discrete part of a procedure, where the start and end of the part can be clearly identified (e.g. by the arrival or dispatch of a primitive).

Physical channel (channel): the simplex channel that is created by transmitting in one particular slot on one particular RF channel in successive TDMA frames. See also simplex bearer.

NOTE: One physical channel provides a simplex service. Two physical channels are required to provide a duplex service.

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

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

Portable HandSet (PHS): a single physical grouping that contains all of the portable elements that are needed to provide a teleservice to the user.

NOTE: PHS is a subset of all possible portable parts. This subset includes all physical groupings that combine one portable radio termination plus at least one portable application in a single physical box.

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

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

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

NOTE: A portable radio termination only includes elements that are defined in ETS 300 175. This includes radio transmission elements (layer 1) together with a selection of layer 2 and layer 3 elements.

Primitive: a distinct (but abstract) data element that is passed between adjacent protocol layers.

NOTE: A service primitive contains one SDU.

Private: an attribute indicating that the application of the so qualified term, e.g. a network, an equipment, a service, is offered to, or is in the interest of, a determined set of users.

NOTE: The term does not include any legal or regulatory aspects, nor does it indicate any aspects of ownership.

Public: an attribute indicating that the application of the so qualified term, e.g. a network, an equipment, a service, is offered to, or is in the interest of, the general public.

NOTE: The term does not include any legal or regulatory aspects, nor does it indicate any aspects of ownership.

Public Access Profile (PAP): a defined part of ETS 300 175 that ensures interoperability between FPs and PPs for public access services.

Public access service: a service that provides access to a public network for the general public.

NOTE: The term does not imply any legal or regulatory aspect, nor does it imply any aspects of ownership.

Radio channel: no defined meaning. See RF channel or physical channel.

Radio End Point (REP): a physical grouping that contains one radio transceiver (transmitter/receiver), fixed or portable.

NOTE: A REP may operate only as a receiver or only as a transmitter.

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

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

RF carrier (carrier): the centre frequency occupied by one DECT transmission.

RF channel: the nominal range of frequencies (RF spectrum) allocated to the DECT transmissions of a single RF carrier.

Roaming: the movement of a portable part from one fixed part coverage area to another fixed part coverage area, where the capabilities of the fixed parts enable the portable part to make or receive calls in both areas.

NOTE: Roaming requires the relevant FPs and PPs to be interoperable.

Roaming service: a service which can be used in more than one fixed part coverage area.

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

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

Segmentation: the process of partitioning one Service Data Unit (SDU) from a higher layer into more than one Protocol Data Unit (PDU). The reverse process is assembly.

Service provider (telecommunications service provider): the individual, or entity, who, or which, interfaces to the customer in providing telecommunications service.

NOTE 1: The term does not imply any legal or regulatory conditions, nor does it indicate whether public service or private service is provided.

NOTE 2: The term service provider is also used with a different meaning in the ISO/OSI layered model.

Sequencing (sequence numbering): the process of adding a sequence number to a set of data packets so that the packets can be reassembled in the correct order, regardless of the order they are received. See also segmentation.

Simplex bearer: a simplex bearer is the MAC layer service that is created using one physical channel. See also duplex bearer and double simplex bearer.

Single Radio Fixed Part (SRFP): a radio fixed part that contains only one REP.

NOTE: The SRFP is defined for DECT system analysis. Unless otherwise stated, a SRFP is assumed to support multiple calls, and is limited only by the capacity of its single radio end point.

Subscriber (customer): the natural person, or the juristic person who has subscribed to telecommunication services, and is, therefore, responsible for payment.

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

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

Supplementary service: a service that modifies or supplements a basic telecommunication service.

NOTE: Three functional groups of supplementary services are defined for DECT:

- 1) DECT TRANSPARENT supplementary services
 - the service elements are unspecified within the DECT ETS 300 175;
- 2) DECT STANDARD supplementary services
 - the service elements are specified within the DECT ETS 300 175, by reference to other standards;
- 3) DECT SPECIFIC supplementary services
 - the service elements are fully specified within the DECT ETS 300 175.

Switching: the process of interconnecting functional units, transmission channels or telecommunication circuits for as long as required to convey signals.

TDMA frame: a time-division multiplex of 10 ms duration containing 24 successive full slots. A TDMA frame starts with the first bit period of full slot 0 and ends with the last bit period of full slot 23.

Telecommunication: any transmission and/or emission and/or reception of signals representing signs, writing, images, and sounds or intelligence of any nature by wire, radio, optical or other electromagnetic systems.

Teleservice: a 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.

TPUI domain: the domain over which every TPUI is (locally) unique.

NOTE: In general, the TPUI domain will be equal to the paging area and thereby equal to the location area.

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

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

Up link: transmission in the direction PT to FT.

User (of a telecommunication network): a person or machine delegated by a subscriber (by a customer) to use the services, and/or facilities, of a telecommunication network.

3.2 Abbreviations

For the purposes of this ETS the following abbreviations apply.

AC	Authentication Code
ACP	Adjacent Channel Power. The transmitted power that spills over into an adjacent RF channel
ACK	ACKnowledgement
ADPCM	Adaptive Differential Pulse Code Modulation
ARC	Access Rights Class, shows the type of access to a DECT network, such as public, residential or private
ARD	Access Rights Details, is a unique number within one ARC
ARI	Access Rights Identity is, to a service provider, a globally unique identity that shows the access rights related to that service provider. The ARI consists of an ARC and an ARD. There are three categories of ARIs: <ul style="list-style-type: none">- PARI (Primary ARI);- SARI (Secondary ARI);- TARI (Tertiary ARI).
ARQ	Automatic Repeat reQuest. The process of automatically requesting a retransmission of data that is received in error
BCD	Binary Coded Decimal
BMC	Broadcast Message Control. A MAC layer functional grouping
CBC	Connectionless Bearer Control. A MAC layer functional grouping
CC	Call Control. A NWK layer functional grouping
CCF	Cluster Control Function. A MAC layer functional grouping
CCFP	Central Control Fixed Part. See definitions
CCITT	(The) International Telegraph and Telephone Consultative Committee
CEP	Connection End Point. A logical reference point between peers
CEPT	Conference of European Posts and Telecommunications
CI	Common Interface (standard)
CK	Cipher Key
CODEC	COder-DECoder
CLMS	ConnectionLess Message Service. A NWK layer functional grouping
CMC	Connectionless Message Control. A MAC layer functional grouping
COMS	Connection Oriented Message Service. A NWK layer functional grouping

CRC	Cyclic Redundancy Check. A cyclically generated field of parity bits
CSF	Cell Site Function. A MAC layer functional grouping
CSPDN	Circuit Switched Public Data Network
CX	Co-eXistence standard
C-PLANE	Control PLANE. See definitions
C/L	ConnectionLess mode. See definitions
C/O	Connection Orientated mode. See definitions
DAM	DECT Authentication Module
DBC	Dummy Bearer Control. A MAC layer functional grouping
dBc	dB relative to the peak power of an unmodulated carrier
dBm	dB relative to 1 milliwatt
DCK	Derived Cipher Key
DECT	Digital European Cordless Telecommunications
DLC	Data Link Control. Layer 2b of the DECT protocol stack
DLEI	Data Link Endpoint Identifier (DLC layer)
DLI	Data Link identifier (DLC layer)
DNW	DECT NetWork. See definitions
DSAA	DECT Standard Authentication Algorithm
DSC	DECT Standard Cipher
ERP	Effective Radiated Power
ES	End System
FMID	Fixed part MAC IDentity. (MAC layer)
FP	Fixed Part. See definitions
FT	Fixed radio Termination. See definitions
GFSK	Gaussian Frequency Shift Keying
GNW	Global NetWork. See definitions
HDB	Home Data Base
IA5	International Alphabet No.5 (defined by CCITT)
IFEI	International Fixed Equipment Identity
IPEI	International Portable Equipment Identity

IPUI	International Portable User Identity. The IPUI is an identity that uniquely defines one user within the domain defined by his Access Rights as related to this IPUI. The IPUI consists of a PUT and a PUN. The IPUI may be locally unique or globally unique depending on type of PUT
IRC	Idle Receiver Control. A MAC layer functional grouping
ISDN	Integrated Services Digital Network
IWF	InterWorking Functions
IWU	InterWorking Unit. See definitions
K	authentication Key
KS	PP authentication Session Key
KS'	FP authentication Session Key
KSG	Key Stream Generator
KSS	Key Stream Segment
LAPC	a DLC layer C-plane protocol entity
LAN	Local Area Network
LBN	Logical Bearer Number. (MAC layer)
LCE	Link Control Entity. A NWK layer functional grouping
LCN	Logical Connection Number. (DLC/MAC layer)
LLME	Lower Layer Management Entity. See definitions
LLN	Logical Link Number. (DLC layer)
LNW	Local NetWork. See definitions
MAC	Medium Access Control. Layer 2a of the DECT protocol stack
MBC	Multiple Bearer Control. A MAC layer functional grouping
MCEI	MAC Connection Endpoint Identification
MM	Mobility Management. A NWK layer functional grouping
MUX	time MUltipleXor
NWK	NetWorK. Layer 3 of the DECT protocol stack
OSI	Open Systems Interconnection
PA	Portable Application. See definitions
PARI	Primary Access Rights Identity. The PARI is the most frequently transmitted ARI. Every DECT RFP must transmit a PARI
PARK	Portable Access Rights Key, states the access rights for a PP

PARK{y}	PARK with value y for it's Park length indicator
PBX(PABX)	Private Automatic Branch eXchange
PCI	Protocol Control Information
PDU	Protocol Data Unit
PHL	PHysical Layer 1 of the DECT protocol stack
PHS	Portable HandSet. See definitions
PLI	Park Length Indicator. The PLI associates a group of FP ARIs to the PARK, by indicating how many of the first ARC + ARD bits are relevant. The remaining bits have don't care status. The PLI is programmed into a PP as part of the subscription process
PMID	Portable part MAC IDentity. (MAC layer)
POT(S)	Plain Old Telephone (Service). The basic analogue telephony teleservice
PP	Portable Part. See definitions
PSPDN	Packet Switched Public Data Network
PSTN	Public Switched Telephone Network
PT	Portable radio Termination. See definitions
PTN	Private Telecommunication Network
PUN	Portable User Number. The PUN is a globally or locally unique number within one PUT
PUT	Portable User Type. The PUT shows the numbering plan structure of a PUN
RAND_F	a RANDom challenge issued by a FT
RAND_P	a RANDom challenge issued by a PT
REP	Radio End Point. See definitions
RES1	a RESponse calculated by a PT
RES2	a RESponse calculated by an FT
RF	Radio Frequency
RFP	Radio Fixed Part. See definitions
RFPI	Radio Fixed Part Identity. Every RFP frequently transmits this identity, that is geographically unique. The RFPI shows: <ul style="list-style-type: none">- PARI;- the RFPs local identity within that fixed part;- domains for handover and location areas.
RPN	Radio fixed Part Number

RS	a value used to establish authentication session keys
RSSI	Radio Signal Strength Indicator. A quantitative measure of the RF signal strength of one RF channel
SAP	Service Access Point. A logical reference point between layers
SARI	Secondary Access Rights Identity. The SARI is less frequently broadcast than the PARI
SCK	Static Cipher Key
SDU	Service Data Unit
SS	Supplementary Services. A NWK layer functional grouping
TARI	Tertiary Access Rights Identity. The TARI is not broadcast at all and is only available as a yes/no answer upon a request that includes the wanted ARI
TBC	Traffic Bearer Control. A MAC layer functional grouping
TDD	Time Division Duplex
TDMA	Time Division Multiple Access
TI	Transaction Identifier. (NWK layer)
TPUI	Temporary Portable User Identity
UAK	User Authentication Key
UPI	User Personal Identification
U-PLANE	User PLANE. See definitions
VDB	Visitors Data Base
XRES1	an eXpected RESponse calculated by a FT
XRES2	an eXpected RESponse calculated by a PT

4 Structure of the ETS

ETS 300 175 consists of 9 parts (Parts 1 to 9 inclusive) which are briefly described in the following subclauses.

Parts 2 to 5 inclusive, specify the air interface. They are structured into layers corresponding to the lower layers of the ISO OSI model. Part 6 specifies the identities and addressing structure and Part 7 specifies the security features. Part 8 specifies speech aspects and Part 9 specifies the public access profile.

In addition there exists a DECT approval test specification I-ETS 300 176 [12] which is not further described in this document.

4.1 Part 1: Overview

The overview contains an introduction to the complete ETS. It includes a description of the system and the protocol architecture and a vocabulary of terms.

4.2 Part 2: Physical layer

The Physical Layer (PHL layer) specifies radio parameters such as the frequency, timing and power values, the bit and slot synchronisation and the transmitter and receiver performance.

4.3 Part 3: Medium access control layer

The Medium Access Control layer (MAC layer) specifies three groups of MAC services. These are the broadcast message control service, the connectionless message control service and the multi-bearer control service. It also specifies the logical channels, which are used by the above mentioned services, and how they are multiplexed and mapped on to the physical channels.

4.4 Part 4: Data link control layer

The Data Link Control layer (DLC layer) specifies two groups of DLC services. These are the services for the control plane and the services for the user plane.

For the control plane a point-to-point service and a broadcast service are defined. The point-to-point service can operate in acknowledged, or unacknowledged, mode and provides addressing, frame delimiting, error control, flow control, segmentation of network layer information fields, fragmentation of DLC frames and connection handover.

For the user plane the transparent unprotected service, the frame relay service, the frame switching service and the rate adaptation service are defined.

4.5 Part 5: Network layer

The Network layer (NWK layer) specifies the functions for the link control, the call control, the supplementary services, the connection oriented message service, the connectionless message service and the mobility management. For the above mentioned groups it contains the procedures, messages and information elements.

4.6 Part 6: Identities and addressing

The identities and addressing specifies the main identities and addresses which are used in DECT. They are divided into the following four categories: fixed part identities, portable part identities, connection related identities and equipment related identities.

Several of the fixed part identities and portable part identities are allocated centrally in order to maintain global uniqueness for these identities.

4.7 Part 7: Security features

The security features specify the overall security architecture for DECT, the types of cryptographic algorithms required and the way in which they are to be used, and the requirements for integrating the security features provided by the architecture into the DECT air interface. It also describes how the features may be managed and how they relate to certain DECT fixed systems and local network configurations.

4.8 Part 8: Speech coding and transmission

The speech coding and transmission specifies the requirements for DECT equipment which includes all the necessary functions to provide real-time two-way speech conversation. It defines the speech encoding algorithm and the detailed speech performance characteristics such as sensitivity, frequency response, sidetone, terminal coupling loss, distortion, variation of gain with input level, out of band signals, noise, acoustic shock, delay and network echo control.

A 3,1 kHz telephony teleservice conveyed over a DECT link (including FP and PP) which is capable of being connected (directly or indirectly) to the public network access point shall comply with the requirements in Part 8.

Furthermore, all DECT implementations capable of voice transmission that are not required to comply with Part 8 shall not use more than 20 % of the available physical channels for connections that use more than one full slot duplex bearer.

Tethered fixed point local loop applications are not required to comply with the requirements of Part 8.

4.9 Part 9: Public access profile

The public access profile specifies the mandatory (minimum) and optional requirements for DECT equipment offering, or using, public access services. This profile specifies an interoperable subset of the protocol independently for fixed parts and portable parts, by detailed references to the other parts of the ETS.

5 The objectives of the ETS

The DECT standard has grown out of the need to provide cordless communications, primarily for voice traffic, and also to provide support for a range of data traffic requirements.

The DECT standard is designed to support this versatility of applications at a cost that encourages wide adoption. It is envisaged that DECT will provide personal telecommunication services in residential, neighbourhood and business environments. It is particularly targeted at the following applications:

- residential - domestic cordless telephones;
- public access services;
- cordless business telephones (PBXs);
- cordless data - Local Area Networks (LANs);
- evolutionary applications (extensions to cellular radio, and extensions of the local public network).

One primary objective of this common interface standard is to provide for inter-operability between equipments of different origin, so offering users a family of telecommunication services for voice or data, either as basic services, or with optional (and compatible) extensions.

While providing for compatibility, this ETS provides standard escape routes that allow manufacturers to retain options for innovation and product differentiation (see Clause 8). In addition, reserved codes have been included in the ETS to provide mechanisms for evolutionary development of this ETS. At the same time, the existence of this common standard allows implementors to design systems that can provide telecommunications to users in several different locations.

At a more detailed level, the protocols in this document are designed to provide for the specific services and facilities defined in the related Technical Report, ETR 043 [15] and CEPT Recommendation T/SGT SF2 (89) 6/0 [14]. In the design process, the following additional objectives were considered:

- the structure should allow any other reasonable application;
- the structure should allow any reasonable implementation.

Lastly, this ETS also has the objective of regulating the use of, and interface of, two shared resources:

- the RF spectrum which is allocated to provide for the cordless operation of the communication system; and
- one or more networks for which the DECT network provides cordless connection.

It is the objective of this ETS to ensure that conforming equipments will be able to use the above resources efficiently and with the minimum degree of mutual interference (i.e. avoiding adverse affects to existing, or future, users of those resources - see also CCIR Report 662 [20]).

6 General description of the system

DECT is based on a micro-cellular radio communication system that provides low-power radio (cordless) access between portable parts and (DECT) fixed parts at ranges up to a few hundred metres. The basic technical characteristics are as follows:

Frequency band:	1 880 - 1 900 MHz;
Number of carriers:	10;
Carrier spacing:	1,728 MHz;
Peak transmit power:	250 mW;
Carrier multiplex:	TDMA; 24 slots per frame;
Frame length:	10 ms;
Basic duplexing:	TDD using 2 slots on same RF carrier;
Gross bit rate:	1 152 kbps;
Net channel rates:	32 kbps B-field (traffic) per slot; 6,4 kbps A-field (control/signalling) per slot.

A connection is provided by transmitting bursts of data in the defined time slots. These may be used to provide simplex or duplex communications. Duplex operation uses a pair of evenly spaced slots; one for transmit and one for receive.

The simplest duplex service uses a single pair of time slots to provide a 32 kbps digital information channel capable of carrying coded speech or other low rate digital data. Higher data rates are achieved by using more time slots in the TDMA structure, and a lower data rate may be achieved by using half-slot data bursts.

DECT is able to support a number of alternative system configurations ranging from single cell equipment (e.g. domestic fixed parts) to large multiple cell installations (e.g. large business cordless PBXs).

The protocols are designed to support uncoordinated system installation, even where the systems co-exist in the same physical location. Efficient sharing of the radio spectrum (of the physical channels) is achieved using a careful mechanism for selection of channels prior to their use: this is called dynamic channel selection (see ETR 042 [18] dealing with DECT features).

In addition, the DECT protocols provide two internal mechanisms to support rapid handover of calls in progress (both intracell and intercell handover are supported). These handover mechanisms allows a high quality of service to be maintained where the mobility of the portable part requires transparent re-connection to another fixed part or where a new physical channel is required in response to a disturbances in the radio environment. The importance of handover is discussed in ETR 042 [18] dealing with DECT features .

7 Description of the protocol architecture

7.1 General

The structure of this ETS is based on the layered principles used in the ISO Open Systems Interconnection (OSI) model. The complete common interface corresponds to the lower 3 layers of the ISO OSI model, but DECT defines 4 layers of protocol. These lower layers differ from the OSI model because the OSI model takes no account of either the uncertainties introduced by using radio transmissions at the physical layer or of the concept of handover.

7.2 The DECT layered structure

A structure of four layers is used for the signalling protocols as shown in figure 1.

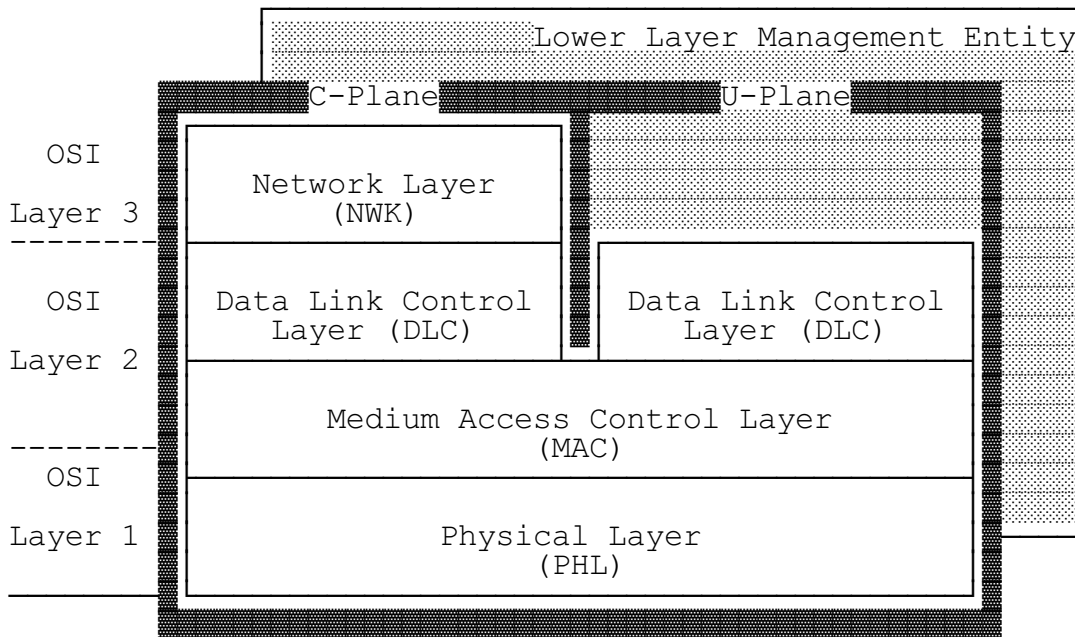


Figure 1: The layered structure

The top of the network layer corresponds to the top of the OSI layer 3. The intermediate boundaries have no OSI equivalent but for ease of understanding an approximate correspondence is given below:

OSI Layer 1: all of DECT PHL layer plus part of MAC layer;

OSI Layer 2: most of MAC layer plus all of DLC;

OSI Layer 3: all of the NWK layer.

7.3 Physical layer

The physical layer divides the radio spectrum into the physical channels. This division occurs in two fixed dimensions: frequency and time.

The frequency and time division uses Time Division Multiple Access (TDMA) operation on multiple RF carriers. Ten carriers are provided in the frequency band 1 880 to 1 900 MHz. The ETS also provides for possible extensions of the band to meet future demand. On each carrier the TDMA structure defines 24 timeslots in a 10 ms frame, where each timeslot may be used to transmit one self contained packet of data. Each transmitted packet contains a synchronisation field, together with control information, service information and error control.

NOTE: In addition the radio spectrum is divided spatially into cells, where the same physical channels may be re-used in different (geographic) locations. The spatial re-use operates according to the principles of Dynamic Channel Selection (DCS) as described in ETR 042 [18] dealing with DECT features .

Each fixed part radio end point operates according to a local timing reference and the physical layer is then responsible for transmitting packets of data under direct control of the MAC layer. Adjacent fixed parts may be synchronised. This provides some advantages, particularly in high traffic situations (see ETR 042 [18] dealing with DECT features).

7.4 MAC layer

The MAC layer performs two main functions. Firstly, it selects physical channels, and then establishes and releases connections on those channels. Secondly, it multiplexes (and demultiplexes) control information, together with higher layer information and error control information, into slot-sized packets.

These functions are used to provide three independent services: a broadcast service, a connection oriented service and a connectionless service.

The broadcast service is a special DECT feature: it multiplexes a range of broadcast information into a reserved field (the A-field), and this field appears as part of all active transmissions. The broadcast service is always transmitted in every cell (even in the absence of user traffic) on at least one physical channel. These "beacon" transmissions allow portable parts to quickly identify all fixed parts that are within range, to select one, and to lock to it without requiring any portable transmissions.

7.5 DLC layer

The DLC layer is concerned with the provision of very reliable data links to the network layer. Many of the imperfections of the radio transmissions are already removed by the efforts of the MAC layer, and the DLC layer is designed to work closely with the MAC layer to provide higher levels of data integrity than can be provided by the MAC layer alone.

The DECT layered model separates into two planes of operation at the DLC layer: the C-plane and the U-plane.

The C-plane is common to all applications, and provides very reliable links for the transmission of internal control signalling and limited quantities of user information traffic. Full error control is provided with a balanced link access protocol called LAPC.

The U-plane provides a family of alternative services, where each service is optimised to the particular need of a specific type of services. The simplest service is the transparent unprotected service used for speech transmission. Other services support circuit mode and packet mode data transmission, with varying levels of protection.

7.6 Network layer

The network layer is the main signalling layer of the protocol. It adopts a similar style to the ISDN layer 3 protocol (ETS 300 102 [30]) and offers a similar level of functions.

The NWK layer operates using an exchange of messages between peer entities. The basic set of messages supports the establishment, maintenance and release of calls. Additional messages support a range of extended capabilities.

The basic Call Control (CC) provides a circuit switched service selected from one of the range of DLC options. Other network layer services are Supplementary Services (SS), Connection Oriented Message Service (COMS), ConnectionLess Message Service (CLMS) and Mobility Management (MM). These services are arranged as independent entities, and a particular application can be realised using more than one.

The MM is a particularly important group of services. This group contains the procedures that support the special cordless mobility of portable parts, for example authentication and location registration.

7.7 Lower Layer Management Entity (LLME)

The LLME contains defined procedures that concern more than one layer. The LLME procedures are included in three parts of the ETS: Parts 3, 4 and 5. Most of these procedures have only local significance, and they are defined in general terms to allow for alternative implementations. The location of some selected LLME procedures is as follows:

MAC layer:

- creation, maintenance and release of bearers, by activating and deactivating pairs of physical channels;
- physical channel management, including the choice of free physical channels and the assessment of the quality of received signals.

DLC layer:

- connection management, which includes the establishment and release of connections in response to network layer demands;
- routing of C-plane and U-plane data to suitable connections.

NWK layer:

- service negotiation and mapping.

7.8 Interworking units

Transport of the information to the end user requires additional layers of protocol that are outside the scope of the DECT standard. In general, an InterWorking Unit will be required to provide the necessary interworking functions. This IWU plays a important role in defining the exact service that is provided. Guidance on possible interworking arrangements for the target applications can be found in chapter 7 of Draft ETSI Technical Report on the DECT system [17].

8 Proprietary escapes within the common interface

A set of defined escape routes have been provided for implementors that wish to implement proprietary additions or alternatives to the common interface protocol, as shown in figure 2.

8.1 Primary escape routes

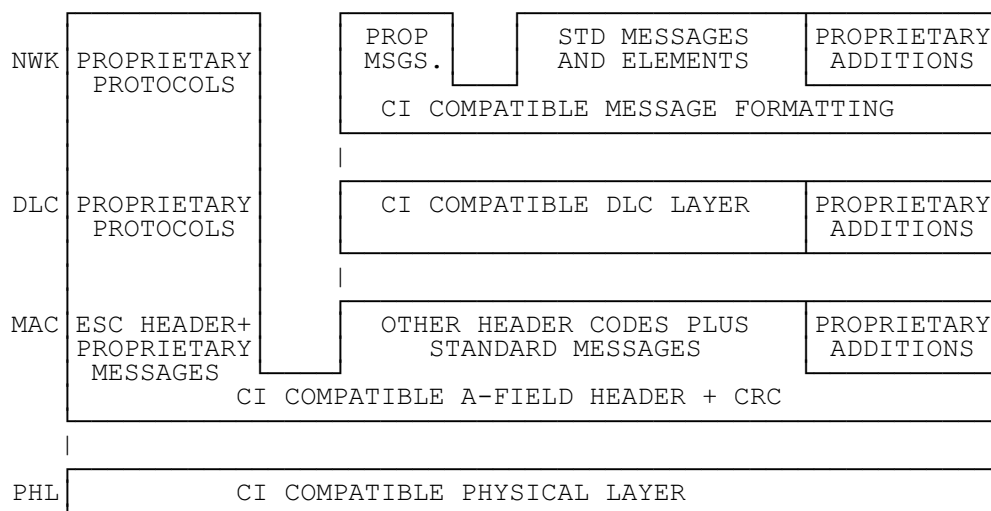


Figure 2: Structure of escape routes within the common interface

Two primary escape routes are defined within the common interface standard, one at the MAC layer and one at the network layer. In both cases these escape routes provide the possibility for manufacturers to branch into a family of proprietary protocols. These branches provide a compatible method for proprietary systems to operate without causing confusion or interference to systems that implement the other common interface provisions.

The lowest branch occurs at the MAC layer. The branch is defined at this level in order to ensure a minimum level of conformance to the common interface. The minimum level of conformance therefore includes all of the physical layer and the lower parts of the MAC layer (in particular, the MAC A-field header, A-field CRC and the channel selection procedures).

This MAC branch operates by using one reserved code in the MAC header field (the field that appears at the start of every transmission - see ETS 300 175-3 [3]). All equipment must understand this reserved code. This reserved code shall be used in every transmission from proprietary equipment and shall never be used by equipment that conforms to the standard branch. This means that transmissions from proprietary systems can be immediately identified by all other equipment.

For approvals testing purposes a small number of standard messages shall be supported by proprietary equipment when operating in a special test mode. No messages are mandated for proprietary equipment in normal operating mode.

At the network layer the escape route operates by using a reserved protocol discriminator code. All equipment must understand this code: it shall be used exclusively by proprietary protocols (other codes are reserved for the standard protocols) to clearly indicate that a proprietary protocol is in use. In this case proprietary protocols can co-exist with standard protocols as part of the same equipments.

8.2 Secondary escape routes

In addition to these primary escape routes, a series of secondary escape routes are defined at all layers using reserved codes or optional elements, as appropriate. These small branches allow proprietary information to be included in addition to the common interface information. They are designed to allow manufactures to enhance the common interface with proprietary features without compromising the basic level of interoperability.

9 Levels of conformance

The following levels of common interface conformance are defined:

CI-PROFILE-PLUS	ETSI approved CI operating profile(s) with proprietary extensions
CI-PROFILE	ETSI approved CI operating profile(s) (e.g. Public access profile)
CI-BASE	PHL and minimum MAC conformance

The CI-Base defines the minimum level of conformance to the common interface standard. This shall apply to all DECT equipment. It does not imply any speech transmission characteristics.

History

Document history	
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