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Contents

Foreword 5

1 Scope 7

2 Definitions and abbreviations 7
2.1 Definitions 9
2.2 Abbreviations 17

Annex A: DECT reference model 18

Annex B: System protocol architecture 34

Annex C: Identities and addressing 65

Annex D: Mobility functions 80

Annex E: Interworking 98

Annex F: Supplementary services 220

Annex G: Bibliography 234

History 235

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Foreword

This ETSI Technical Report (ETR) has been produced by the Radio Equipment and Systems (RES) Technical Committee of the European Telecommunications Standards Institute (ETSI).

ETRs are informative documents resulting from ETSI studies which are not appropriate for European Telecommunication Standard (ETS) or Interim - European Telecommunication Standard (I-ETS) status.

An ETR may be used to publish material which is either of an informative nature, relating to the use or application of ETSs or I-ETSs, or which is immature and not yet suitable for formal adoption as an ETS or I-ETS.

This ETR aims to provide an overall description of the Digital European Cordless Telecommunications (DECT) system in terms of interfacing to other networks.

The Annexes A - F are the chapters of the original document.

NOTE: This version of ETR 056 has been produced in electronic format from the originally published paper version. In case of discrepancies between this version and the original, the original approved version (available from the ETSI secretariat) takes precedence.

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1 Scope

This ETR describes DECT from a systems point of view and examines some of the issues associated with the interworking of DECT with a host network.

This ETR was drafted to provide assistance for those persons who want a better understanding of the DECT system and its architecture.

Emphasis has been placed on the special features of the DECT system, for example, the identity structures, the mobility management and supplementary services, along with recommendations for efficient interworking between DECT and PSTN, ISDN and GSM.

2 Definitions and abbreviations

2.1 Definitions

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

Antenna diversity: antenna diversity implies that the 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 polarized 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 1: 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 2: Authentication is generally performed at call setup, but may also be done at any other time (e.g. during a call).

Bearer: see 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 DLC layer.

NOTE 3: 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 4: 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 5: 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 6: The C-plane stack always contains protocol entities up to and including the network layer.

Call: all of the NWK layer processes involved in one network layer peer-to-peer association.

NOTE 7: 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 feader) of one fixed part.

NOTE 8: A cell may include more than one source of radiated 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 contains a maximum of one CCFP.

NOTE 9: 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 10: 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 11: 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 12: 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: "Setup", "Data transfer" and "Release".

NOTE 13: 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 14: 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 15: 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 16: 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 17: 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 always use the same RF carrier and always use evenly spaced slots (i.e. separated by 0,5 TDMA frame).

A double-simplex bearer only exists 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 always use the same RF carrier and 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 18: 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 is 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 19: 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 20: 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 21: 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 22: 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 23: 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 24: 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 25: 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 26: 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 27: 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 28: The IWU should 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 29: 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 30: 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 31: 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 32: 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 33: Different types of paging message are possible. For example, the {Request paging} message orders the recipient to respond with a call setup attempt.

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

NOTE 34: In general, the paging area will be equal to the 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 35: 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 36: 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 37: 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 38: 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 39: 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 40: 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 41: 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 42: 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 43: 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 44: 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 45: 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 46: 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 47: The term does not imply any legal or regulatory conditions, nor does it indicate whether public service or private service is provided.

NOTE 48: 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 49: 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.