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Digital Enhanced Cordless Telecommunications (DECT); Data Services Profile (DSP); Base standard including interworking to connectionless networks (service types A and B, class 1)

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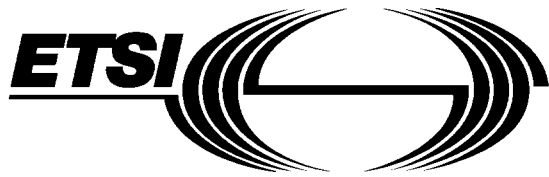
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Base standard including inter-working to connectionless
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Foreword

This draft European Telecommunication Standard (ETS) has been produced by the Radio Equipment and Systems (RES) Technical Committee of the European Telecommunications Standards Institute (ETSI).

Transposition dates	
Date of adoption of this ETS:	15 December 1995
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1 Scope

This ETS defines a profile for Digital European Cordless Telecommunications (DECT) systems conforming to ETS 300 175 [1] to [9]. It is part of a family of profiles that build upon and extend each other, aimed at the general connection of terminals supporting non-voice services to a fixed infra-structure, private and public.

This ETS specifies a generic frame relay service for use within closed user groups. This service is used by other Data Services Profile (DSP) standards when providing inter-working to levels above the Medium Access Control (MAC) layer of the attached network. Annex B contains inter-working conventions to specific attached data networks. This includes inter-working to the MAC layer of international standard connectionless Local Area data Networks (LANs).

This ETS defines both Type A and Type B services. Type A is optimised for low power and simplicity, while Type B is optimised for high speed and throughput. Both are fully compatible and can inter-work with each other.

This ETS defines the requirements on the Physical (PHL), MAC, Data Link Control (DLC) and Network (NWK) layers of DECT.

This ETS also specifies Management Entity (ME) requirements and generic inter-working conventions that ensure the efficient use of the DECT frequency spectrum.

2 Normative references

This 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 apply.

- [1] ETS 300 175-1: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Common Interface (CI); Part 1: Overview".
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- [2] ETS 300 175-2: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Common Interface (CI); Part 2: Physical Layer (PHL)".
- [3] ETS 300 175-3: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Common Interface (CI); Part 3: Medium Access Control (MAC) layer".
- [4] ETS 300 175-4: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Common Interface (CI); Part 4: Data Link Control (DLC) layer".
- [5] ETS 300 175-5: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Common Interface (CI) Part 5: Network (NWK) layer".
- [6] ETS 300 175-6: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Common Interface (CI) Part 6: Identities and addressing".
- [7] ETS 300 175-7: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Common Interface (CI) ;Part 7: Security features".
- [8] ETS 300 175-8: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Common Interface (CI); Part 8: Speech coding and transmission".

- [9] ETS 300 175-9: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Common Interface (CI); Part 9: Public Access Profile (PAP)".
- [10] TBR 006: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT), General terminal attachment requirements".
- [11] I-ETS 300 176: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT), Approval test specification".
- [12] CEPT Recommendation T/SGT SF2 (89) 6/0: "Draft Recommendation T/SF Services and Facilities of Digital European Cordless Telecommunications".
- [13] ETR 043: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT) Common interface. Services and Facilities requirements specification".
- [14] ETR 015: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Reference document".
- [15] ETR 056: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); System description document".
- [16] ETR 042: "Radio Equipment and Systems (RES); 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".
- [17] ISO 8802: "Information processing - Local Area Networks".

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3 Definitions and abbreviations

3.1 Definitions

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

Access Rights Identity (ARI): A globally unique identity that shows the access rights related to a service provider. The ARI consists of an Access Rights Class (ARC) and Access Rights Details (ARD). There are three categories of ARIs:

- Primary ARI (PARI);
- Secondary ARI (SARI);
- Tertiary ARI (TARI).

kbyte: 1 000 bytes.

kbyte: 1 024 bytes.

mobility class 1: Local area applications, for which terminals are pre-registered off-air with one or more specific fixed parts, and establishment of service and user parameters is therefore implicit, according to a profile-defined list.

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).

service type A: Low speed frame relay, with a net sustainable throughput of up to 24 kbits/s, optimised for burst data, low power consumption and low complexity applications such as hand-portable equipment.

service type B: High performance frame relay, with a net sustainable throughput of up to 552 kbits/s, optimised for high speed and low latency with burst data. Equipment implementing the Type B profile shall inter-operate with Type A equipment.

Time Division Multiple Access (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.

3.2 Abbreviations

For the purposes of this ETS, the following abbreviations apply:

ARC	Access Rights Class
ARD	Access Rights Details
ARI	Access Rights Identity
B _s	slow Broadcast channel
C	higher layer control Channel (see C _S and C _F)
CBC	Connectionless Bearer Control
C _F	higher layer signalling Channel (fast)
C/L	ConnectionLess
CL	higher layer ConnectionLess channel (protected; see CL _S and CL _F)
CL _F	higher layer ConnectionLess channel (fast)
CL _S	higher layer ConnectionLess channel (slow)
C/O	Connection Oriented
C-plane	Control plane
CRC	Cyclic Redundancy Check
CSMA/CA	Carrier Sense Multiple Access/Collision Avoidance
CSMA/CD	Carrier Sense Multiple Access/Collision Detection
C _S	higher layer signalling Channel (slow)
CUG	Closed User Group
DECT	Digital European Cordless Telecommunications
DLC	Data Link Control
DNW	DECT NetWork
E/U-MUX	Switch between E-type and U-type MultipleXes
FCS	Frame Check Sequence
FDDI	Fibre Distributed Data Interface
FMID	Fixed part MAC IDentity
FP	Fixed Part
FT	Fixed radio Termination
G _F	higher layer information control channel
I	higher layer Information channel (see I _N and I _P)
I _N	higher layer Information channel (unprotected)
I _P	higher layer Information channel (protected)
IPUI	International Portable User Identity
IWF	InterWorking Functions
IWU	InterWorking Unit
LAN	Local Area data Network
LBN	Logical Bearer Number
LCN	Logical Connection Number (DLC/MAC layer)
LLN	Logical Link Number (DLC layer)
LSB	Least Significant Bit
M	MAC control channel
MAC	Medium Access Control
ME	Management Entity
MSB	Most Significant Bit
MUX	time MultipleXors
N	identities channel
NOS	Network Operating System
OSI	Open Systems Interconnection
P	Paging channel
PARI	Primary Access Rights Identity
PARK	Portable Access Rights Key
PDU	Protocol Data Unit

PHL	Physical Layer
PMID	Portable part MAC IDentity
PP	Portable Part
PT	Portable radio Termination
Q	system information channel
RFP	Radio Fixed Part
RFPI	Radio Fixed Part Identity
SAP	Service Access Point
SAPI	Service Access Point Identifier
SARI	Secondary Access Rights Identity
SDU	Service Data Unit
SI _N	higher layer connectionless channel (unprotected)
SI _P	higher layer connectionless channel (protected)
TARI	Tertiary Access Rights Identity
T-MUX	Tail MUX
TDD	Time Division Duplex
TDMA	Time Division Multiple Access
TPUI	Temporary Portable User Identity
U-plane	User-plane
WAN	Wide Area Network

4 Description of services

4.1 Reference configuration

The reference configuration for this profile shall be as shown in figure 1.

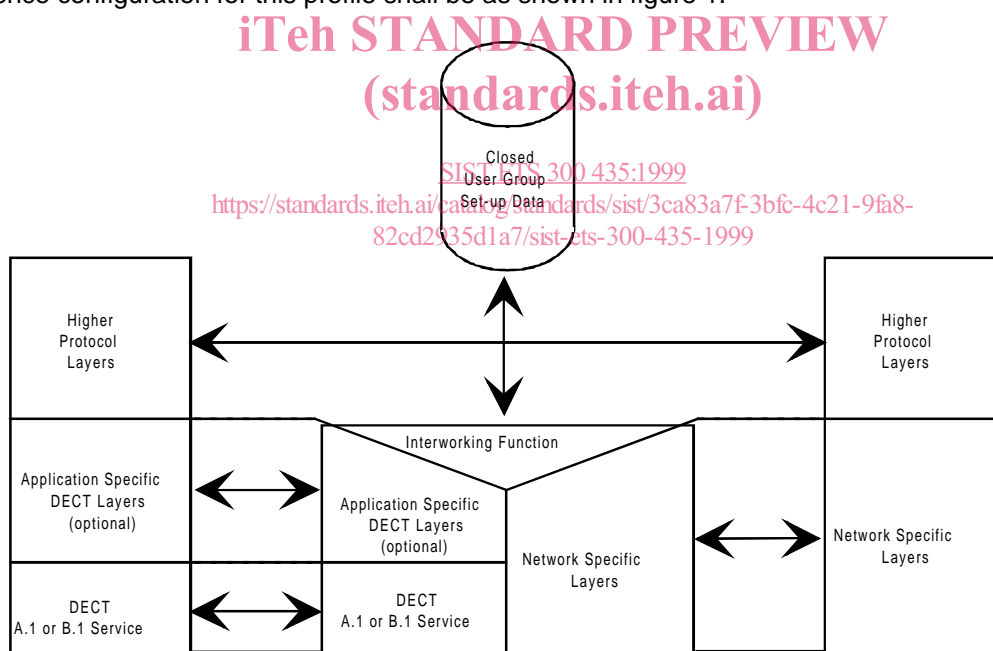


Figure 1: Profile reference configuration showing inter-working to a network via the generic frame relay service

The profile reference configuration is based upon the following principles:

- inter-Working is with an external network via the generic frame relay service (service Type A or B);
- inter-Working with the end system network layer or above is not a requirement of this ETS;
- the set of supported Portable Parts (PPs) shall constitute a closed user group.

4.2 Service objectives

The profile has the service objectives given in tables 1 and 2, as outlined in ETR 043 [13].

Table 1

Offered services	Type A	Type B
Point-to-point Service Data Unit (SDU) transfer PP-FP	Yes	Yes
Point-to-point SDU transfer FP-PP	Yes	Yes
Point-to-multipoint SDU transfer FP-PP	Optional	Optional
Encryption	Optional	Optional

Table 2

Performance	Type A	Type B
Maximum sustainable unidirectional throughput	3 kbytes/s net 24 kbits/s net	69 kbytes/s net 552 kbits/s net
Maximum sustainable full bi-directional throughput	3 kbytes/s net 24 kbits/s net	36 kbytes/s net 288 kbits/s net
Establishment of PT to FT link (average)	< 50 ms average	< 50 ms average
Establishment of FT to PT link (average)	< 160 ms average	< 50 ms average
Undetected bit error ratio	< 10 ⁻¹⁰	< 10 ⁻¹⁰
Uncorrected error rate	< 10 ⁻⁷	< 10 ⁻⁷
Maximum supported SDU size	1,5 Kbytes	1,5 Kbytes

5 PHL layer requirements

Full slots shall be used. The Portable radio Termination (PT) shall be capable of operating on any one, and no more than one, physical channel in each time slot. All Radio Fixed Parts (RFPs) shall be capable of operating on at least any one physical channel in each time slot. Use of the Z-field is not defined by the DSP.

6 MAC layer requirements

The minimum instance shall only require the capability to establish and maintain single-bearer connections. The provisions of ETS 300 175-3 [3] shall be implemented with respect to the services, procedures, messages and information elements coding listed in annexes C to F. The provisions of ETS 300 175-6 [6] shall be implemented with respect to the structure and use of identities.

If the Fixed Part (FP) - Portable Part (PP) point-to-multipoint service is implemented the MAC layer shall in addition implement the protected data connectionless downlink service SI_p, as defined in annex A.

7 DLC layer requirements

The DLC U-plane shall be LU2 (Class 1), FU6, (see ETS 300 175-4 [4]). No C-plane functionality is required for the service Types A and B, mobility Class 1.

If the FP-PP point-to-multipoint service is provided the DLC layer shall transmit and receive all FP-PP point-to-multipoint SDUs via LU2 (Class 1) and FU6a framing and segmentation and the PPs shall not send the FU6b acknowledge frames. Such DLC frames shall be transferred via the SI_p service.

8 NWK layer requirements

Inter-operability between units shall be independent of NWK layer functionality. No, DECT NWK layer services are required for service Types A and B, mobility Class 1.

9 Management entity requirements

The LLME shall ensure that a connection is always released, together with all its bearers, after no greater than $5/n$ seconds, where n = number of bearers, after the last non point-to-multipoint SDU in the IWU buffer has been successfully transferred. The presence of point-to-multipoint SDUs in a buffer shall by itself neither cause the establishment nor the maintenance of a DECT connection-oriented bearer.

In cases where both the PP and the FP are capable of diversity switching, the default operation in the absence of other user intervention shall be for the FP diversity to remain in operation and for the PP to disable its diversity function.

Paging shall always use the default Temporary Portable User Identity (TPUI).

Bi-directional links shall be composed of two unidirectional links in opposite directions on the same MAC connection.

10 Generic frame relay service inter-Working conventions

All data frames shall always be transmitted as DECT DLC layer SDUs, with the earliest bits transferred first in the earliest octet of the earliest U-plane segment.

The DECT equipment shall be capable of supporting SDU frames of at least 1,5 Kbytes. The equipment may optionally support larger SDUs.

Where SDU sizes larger than 1,5 Kbytes are supported by either the FT or the PT the smaller value shall be used in communications, or if this is not possible, the FT equipment shall not allow PT equipment to be registered.

All point-to-multipoint packets shall be transmitted by the FP over the connectionless downlink, and may also be transmitted over previously established connections.

The same International Portable User Identity (IPUI) type shall be used within a given local environment. The IPUI values shall be assigned in such a manner so as to ensure each individual IPUI is unique within all the local environments that support it.

11 Configuration capabilities

In order to assure reliable inter-Working between devices complying with this profile in mobility Class 1, it shall be possible to install the following parameters in the FPs and/or PPs of the system. The values of parameters referring to the PP shall be clearly indicated in the documentation of the PP, and means shall be provided in FPs for such values to be registered. The values of parameters referring to the FP shall be clearly indicated in the documentation of the FP, and means shall be provided in PP for such values to be registered.

Table 3

Variable parameter	Value	Fixed(F)/Portable(P)
Service associated with identity	Type A or B	F, P
Network associated with identity	Selected from annex B	F, P
IPUI	Unique value within local environment	P
ARI	Unique value within local environment	F
Maximum supported SDU size	Number of bytes	F, P
Multi-bearer capability	1-23	F, P
Asymmetric capability	Yes/No	F, P
Diversity capability	Yes/No	F, P
Fast paging available	Yes/No	F, P
Connectionless downlink supported	Yes/No	F, P
Encryption capability	Yes/No	F, P
Static cipher key	64 bits	F, P

A given set of values for the parameters shall be unique for the IPUI with which they are associated.

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