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Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 6: Identities and addressing

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650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
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Foreword

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

The present document is part 6 of a multi-part deliverable. Full details of the entire series can be found in part 1 [1].

Further details of the DECT system may be found in TR 101 178 and ETR 043 (see bibliography).

National transposition dates	
Date of adoption of this EN:	12 November 2004
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1 Scope

The present document gives an introduction and overview of the complete Digital Enhanced Cordless Telecommunications (DECT) Common Interface (CI).

The present document specifies the identities and addressing structure of the Digital Enhanced Cordless Telecommunications (DECT) Common Interface (CI).

There are four categories of identities to be used for identification and addressing in a general DECT environment. These four categories are:

- Fixed Part (FP) identities;
- Portable Part (PP) identities;
- connection-related identities;
- equipment-related identities.

Fixed part identities and portable part identities are used for:

- access information from fixed parts to portable parts;
- access requests from portable parts;
- identification of portable parts;
- identification of fixed parts and radio fixed parts;
- paging;
- billing.

These identities support:

- different environments, such as residential, public or private;
- supply to manufacturers, installers, and operators of globally unique identity elements with a minimum of central administration;
- multiple access rights for the same portable;
- large freedom for manufacturers, installers, and operators to structure the fixed part identities, e.g. to facilitate provision of access rights to groups of DECT systems;
- roaming agreements between DECT networks run by the same or different owners/operators;
- indication of handover domains;
- indication of location areas, i.e. paging area;
- indication of subscription areas of a public service.

The present document also provides for length indicators and other messages that can override the default location and/or paging area and domain indications given by the structure of the identities.

Connection related identities are used to identify the protocol instances associated with a call and are used for peer-to-peer communication.

Equipment related identities are used to identify a stolen PP and to derive a default identity coding for PP emergency call set-up.

Coding of identity information elements for higher layer messages is found in EN 300 175-5 [5], clause 7.7.

User authentication and ciphering need additional key information and is outside the scope of the present document, but is covered in other parts of EN 300 175 parts 1 to 8 [1] to [7], e.g. part 7.

2 References

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

- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

[1] ETSI EN 300 175-1: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 1: Overview".

[2] ETSI EN 300 175-2: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 2: Physical Layer (PHL)".

[3] ETSI EN 300 175-3: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 3: Medium Access Control (MAC) layer".

[4] ETSI EN 300 175-4: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 4: Data Link Control (DLC) layer".

[5] ETSI EN 300 175-5: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 5: Network (NWK) layer".

[6] ETSI EN 300 175-7: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 7: Security features".

[7] ETSI EN 300 175-8: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 8: Speech coding and transmission".

[8] ITU-T Recommendation E.164: "The international public telecommunication numbering plan".

[9] Void.

[10] ITU-T Recommendation E.212: "The international identification plan for mobile terminals and mobile users".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in EN 300 175-1 [1] apply.

3.2 Abbreviations

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

ARC	Access Rights Class
ARD	Access Rights Details
ARI	Access Rights Identity

BACN	Bank ACcount Number
BCD	Binary Coded Decimal
CBI	Collective Broadcast Identifier
CI	Common Interface
CMD	CoMmanD bit
CTM	Cordless Terminal Mobility
DECT	Digital Enhanced Cordless Telecommunications
DLC	Data Link Control
EIC	Equipment Installer's Code
EMC	Equipment Manufacturer's Code
FIL	FILl bits
FMID	Fixed part MAC Identity
FP	Fixed Part
FPN	Fixed Part Number
FPS	Fixed Part Sub-number
FT	Fixed radio Termination
GOP	GSM OPerator code
GSM	Global System for Mobile
ID	Identification
IMSI	International Mobile Subscriber Identity
IPEI	International Portable Equipment Identity
IPUI	International Portable User Identity
ISDN	Integrated Services Digital Network
LA	Location Area
LAI	Location Area Identification
LAL	Location Area Level
LAN	Local Area Network
lsb	least significant bit
LSIG	Link SIGnature
MAC	Medium Access Control
MCC	Mobile Country Code
msb	most significant bit
N_T	Identities information, one N-channel message
NWK	NetWorK
PABX	Private Automatic Branch eXchange
PARI	Primary Access Rights Identity
PARK	Portable Access Rights Key
PARK{y}	PARK with value y for its park length indicator
PBX	Private Branch Exchange
PHL	PHysical Layer
PLI	Park Length Indicator
PLMN-Id	Public Land Mobile Network Identification
PMID	Portable part MAC IDentity
POC	Public Operator Code
PP	Portable Part
PSN	Portable equipment Serial Number
PSTN	Public Switched Telephone Network
PT	Portable radio Termination
PUN	Portable User Number
PUT	Portable User Type
Q_H	Q field header
Q_T	System information and multiframe marker
RFP	Radio Fixed Part
RFPI	Radio Fixed Part Identity
RPN	Radio fixed Part Number
SARI	Secondary Access Rights Identity
SP-id	Service Provider identity
TARI	Tertiary Access Rights Identity
TPUI	Temporary Portable User Identity
UMTS	Universal Mobile Telecommunication Systems
WRS	Wireless Relay Station

4 General description of FP and PP identities

Every radio FP broadcasts for its purpose a unique identity which contains a globally unique (to a service provider) Access Rights Identity (ARI). Every PP has both a Portable Access Rights Key (PARK) and an International Portable User Identity (IPUI). These operate as a pair. A PP is allowed to access any radio FP which broadcasts an ARI that can be identified by any of the portable access rights keys of that PP.

The IPUI is used to identify the portable in the domain defined by its related ARI. The IPUI can either be locally unique or globally unique.

Figure 4.1 illustrates the identity structure.

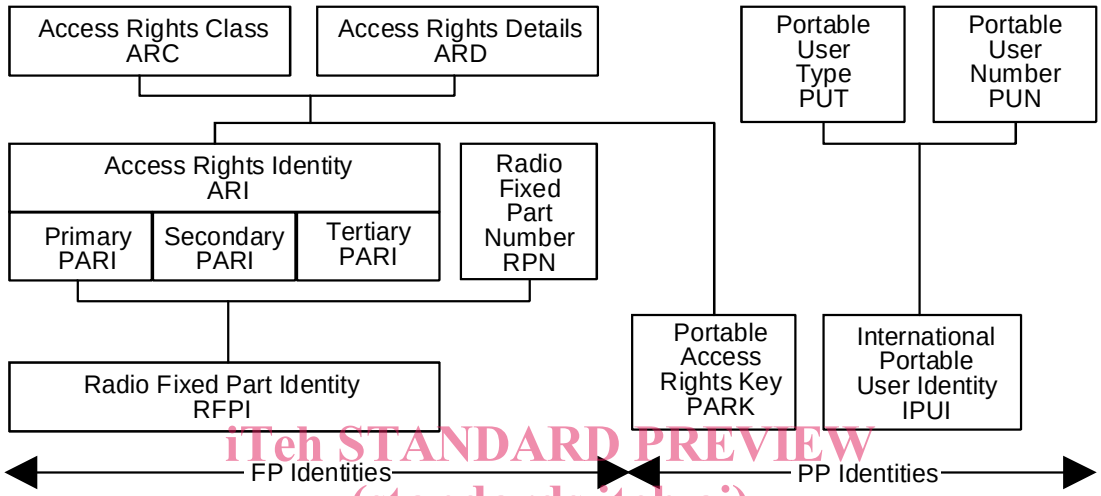

Figure 4.1: General identity structure

The common base for the DECT identity structure is the Access Rights Class (ARC) and Access Rights Details (ARD). These need to be known by both the FP and the PPs. In the FP the ARC and ARD are called Access Rights Identity (ARI), and in the PP they are called Portable Access Rights Key (PARK). The distinction between PARK and ARI is that each PARK can have a group of ARDs allocated, PARK{y}. "y" is the value of the PARK length indicator given in the PP subscription process.

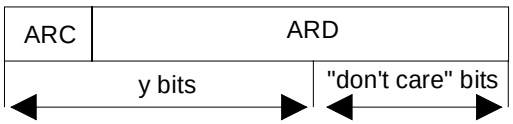

Figure 4.2: Structure of PARK{y}

If the ARI is a primary ARI, i.e. PARI, it will form, together with a RFP number, the broadcast identity RFPI. ARIs can also be less frequently broadcast as Secondary Access Rights Identities (SARIs) and may also be available as Tertiary Access Rights Identities (TARIs), which are not broadcast, but are accessible upon request.

The PUT and PUN form the PP user's identity, IPUI. This identity can either be globally unique or locally unique. In addition to IPUIs, shorter temporary identities, TPUIs, may be used for paging.

A PP is identified by its pairs of PARK{y} and IPUI. A PP is only allowed to access a FP if one of its PARKs includes one of the ARIs of the FP, i.e. the PARI, a SARI or a TARI.

4.1 Combinations of ARIs, PARKs and IPUIs

DECT provides a flexible radio access technology for a large variety of private and public networks or systems. This leads to different requirements on e.g. sub-system grouping, distribution and installation of equipment, identity allocations and subscription.

Therefore five access rights classes A to E and a number of IPUIs have been defined to meet the need for a differentiation in the identity structures.

Table 4.1 gives an overview of likely combinations of the main identities. As described in clause 6.2 some flexibility is allowed in combinations of the IPUI types, e.g. IPUI type N could be used by a service provider in combination with any ARC.

Table 4.1: Combinations of identities ARI, PARK and IPUI

ARI class	Environment	SARI/ TARI	PARK class	IPUI type
A	Residential and private (PBX) single and small multiple cell systems	No	A	N, S
B	Private (PABXs) multiple cell	Yes	B	O, S, T
C	Public single- and multiple cell systems	Yes	C	P, Q, R, S
D	Public DECT access to a GSM/UMTS operator network	Yes	D	R
E	PP to PP direct communication (private)	Yes	E	N

5 FP identities

FP identities are used to inform PPs about the identity of a DECT FP and the access rights to that DECT FP and thereby reduce the number of access attempts from unauthorized portables.

A DECT FP broadcasts this information on the N_T-channel via all its radio FPs, at least once per multiframe. A PP needs to be able to interpret necessary parts of this broadcast information to detect the access rights to a system or even access rights agreements between system operators, i.e. operators A and B have a bilateral agreement permitting their users to roam between their systems. These agreements can change and cannot therefore be stored in PPs without updating them frequently. Therefore the FP handles access rights information which is embedded in the identity structure.

The DECT identity structure provides solutions for residential, public and private environments. This can also be extended to combinations between these environments, e.g. private groups of users within a public DECT network, and e.g. public users access to private DECT networks.

The base for the identity structure is formed by the ARCs and the ARDs:

ARC: shows the type of access to a DECT network, such as public, private or residential.

ARD: this number is unique to the service provider or to the equipment (e.g. in the case of residential and business applications this number is assigned by the manufacturer). Its structure depends on the ARC.

The ARC and ARD together form the basic identity, the ARI:

ARI: this identity is globally unique to a service provider, and shows the access rights related to this service provider. This identity may be applied to any number of FP installations. There are three categories of ARIs.

PARI: primary ARI has to be broadcast. This is also the most frequently broadcast ARI in order to give a higher grade of service to users with these access rights. The PARI is broadcast over the N_T-channel (see note). The PARI (in conjunction with RPN) also carries information about domains of handover and location areas.

SARI: secondary ARI. SARIs are less frequently broadcast than PARIs. They are sent as a SARI-list on the Q_T-channel. The message used for SARIs (there could be more than one SARI) is described in clause 5.6.

TARI: tertiary ARI. The TARI is not broadcast at all and is only available as a (or in a) "TARI reply" message, which is an answer to a "TARI request" message including the relevant PARK{y}. See clause 5.6.6 and EN 300 175-3 [3], clauses 7.2.5.10 and 7.3.5.2.

NOTE: Several FPs may apply the same ARI. However, as a PARI it has to be geographically unique.

The classification of primary, secondary and tertiary access rights gives the possibility for operators or system owners to offer their subscribers/users an almost unlimited list of roaming agreements. This classification can be seen as an iceberg with the PARI visible on the top followed by a less visible SARI list and in the depth the invisible TARIs. The PP procedure for handling PARIs, SARIs and TARIs is described in clause 8.2.

Structure of ARI, see figure 5.1.

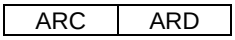

Figure 5.1: Structure of ARI

ARC: 8 available classes named A - H. Only classes A - E are currently defined.

ARD: details, depends on the ARC.

One ARI together with a radio FP number, forms the RFPI. The ARI embedded in the RFPI is the PARI.

The RFPI has three purposes:

- to carry the PARI;
- to uniquely identify RFPs geographically;
- to show domains for handover and location areas.

The RFPI is frequently transmitted as bits a8 to a47 in the A-field using the N_T-channel and has therefore a limitation of 40 bits. See EN 300 175-3 [3], clause 7.2.2.

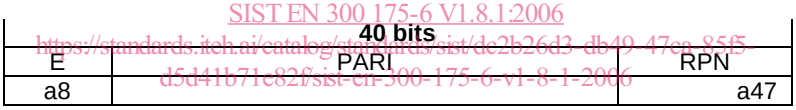

Figure 5.2: Structure of RFPI

E: this field indicates if there are any SARIs available. Value yes or no.

RPN: Radio fixed Part Number used for geographical separation.

Handover domains:

For DECT two handover domains are defined: internal handover (bearer and connection handover) to be within a FP, and external handover to be between FPs. Internal handover is possible between RFPs that have the same PARI in their RFPIs, i.e. only have changes in the RPN. See figure 5.3.

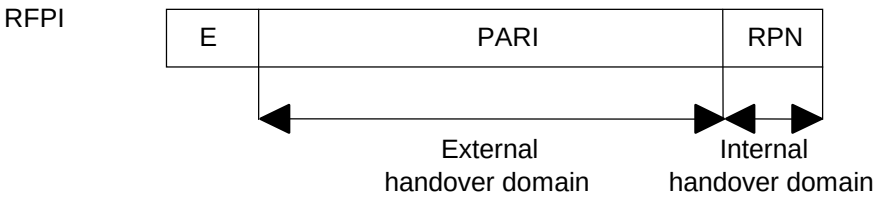

Figure 5.3: Indication of handover domains

The connection handover domain is always identical to the internal handover domain. The cluster size defines the bearer handover domain. A PP regards the cluster size as identical with the internal handover domain, if not else has been indicated by the optional PT "Bearer handover information", see EN 300 175-3 [3], clause 7.2.4.3.7. The RFPI for access rights classes A and C is also used for limited information on handover domains, see clauses 5.1 and 5.3.