



SLOVENSKI STANDARD
SIST EN 12834:2004

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Cestna transportna in prometna telematika (RTTT) – Posebna komunikacija kratkega dosega (DSRC) – Aplikacijska plast DSRC

Road transport and traffic telematics - Dedicated Short Range Communication (DSRC) - DSRC application layer

Straßenverkehrstelematik - Nahbereichskommunikation Fahrzeug-Bake (DSRC) - Anwendungsschicht

Télématique de la circulation et du transport routier - Communication a courte portée - Couche applicative

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ICS:

35.100.70	Uporabniški sloj	Application layer
35.240.60	Uporabniške rešitve IT v transportu in trgovini	IT applications in transport and trade

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EUROPEAN STANDARD

EN 12834

NORME EUROPÉENNE

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November 2003

ICS 35.100.70; 35.240.60

English version

Road transport and traffic telematics - Dedicated Short Range Communication (DSRC) - DSRC application layer

Télématique de la circulation et du transport routier -
Communication à courte portée - Couche applicative

Straßenverkehrstelematik - Nahbereichskommunikation
Fahrzeug-Bake (DSRC) - Anwendungsschicht

This European Standard was approved by CEN on 4 December 2002.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

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COMITÉ EUROPÉEN DE NORMALISATION
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EN 12834:2003 (E)

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Foreword

This document (EN 12834:2003) has been prepared by Technical Committee CEN TC 278 "Road Transport and Traffic Telematics", the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2004, and conflicting national standards shall be withdrawn at the latest by May 2004.

This document supersedes ENV 12834:1997.

The development of this European Standard was carried out under European Commission Mandate M/018.

This European Standard forms part of a series of European Standards defining the framework of a Dedicated Short-Range Communication (DSRC) link in the Road Transport and Traffic Telematics (RTTT) environment.

The communication requirements of many RTTT applications can be fulfilled by DSRC. The DSRC standards enable compliant communication systems to serve multiple RTTT applications in parallel.

The small service areas and severe real-time constraints require a specific protocol architecture leading to the reduced protocol stack shown in Figure A, built up by the Application Layer, the Data Link Layer, and the Physical Layer. Such an architecture is very common for real-time environments.

This European Standard gives the architecture and services offered by the DSRC Application Layer.

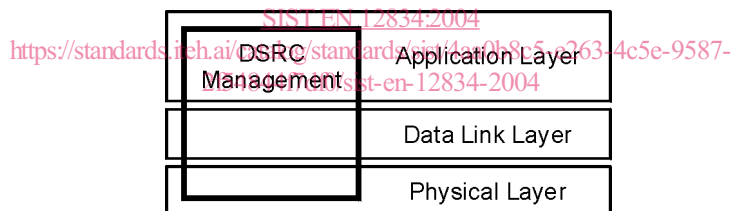


Figure A — DSRC protocol stack

The following set of European Standards for the DSRC link is issued by CEN:

- EN 12253 "DSRC Physical Layer using Microwave at 5,8 GHz";
- EN 12795 "DSRC Data Link Layer: MAC and LLC";
- **EN 12834 "DSRC Application Layer" (this European Standard);**
- prEN 13372 "DSRC Profiles for RTTT Applications".

Annexes A and B are normative. Annexes C and D are informative.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

EN 12834:2003 (E)

1 Scope

This European Standard specifies the Application Layer Core which provides communication tools for applications based on DSRC. These tools consist of Kernels that can be used by application processes via service primitives. The application processes, including application data and application specific functions, are outside the scope of this European Standard.

The standard is named “Application Layer” although

- it does not cover all functionality of OSI Layer 7 and
- it includes functionality from lower layers.

This European Standard uses services provided by DSRC Data Link Layer, [EN 12795], and covers functionality of intermediate layers of the OSI Basic Reference Model [EN ISO/IEC 7498-1].

Figure 1 illustrates the global data flow between the parts of the DSRC stack (Physical, Data Link and Application Layers) and the application.

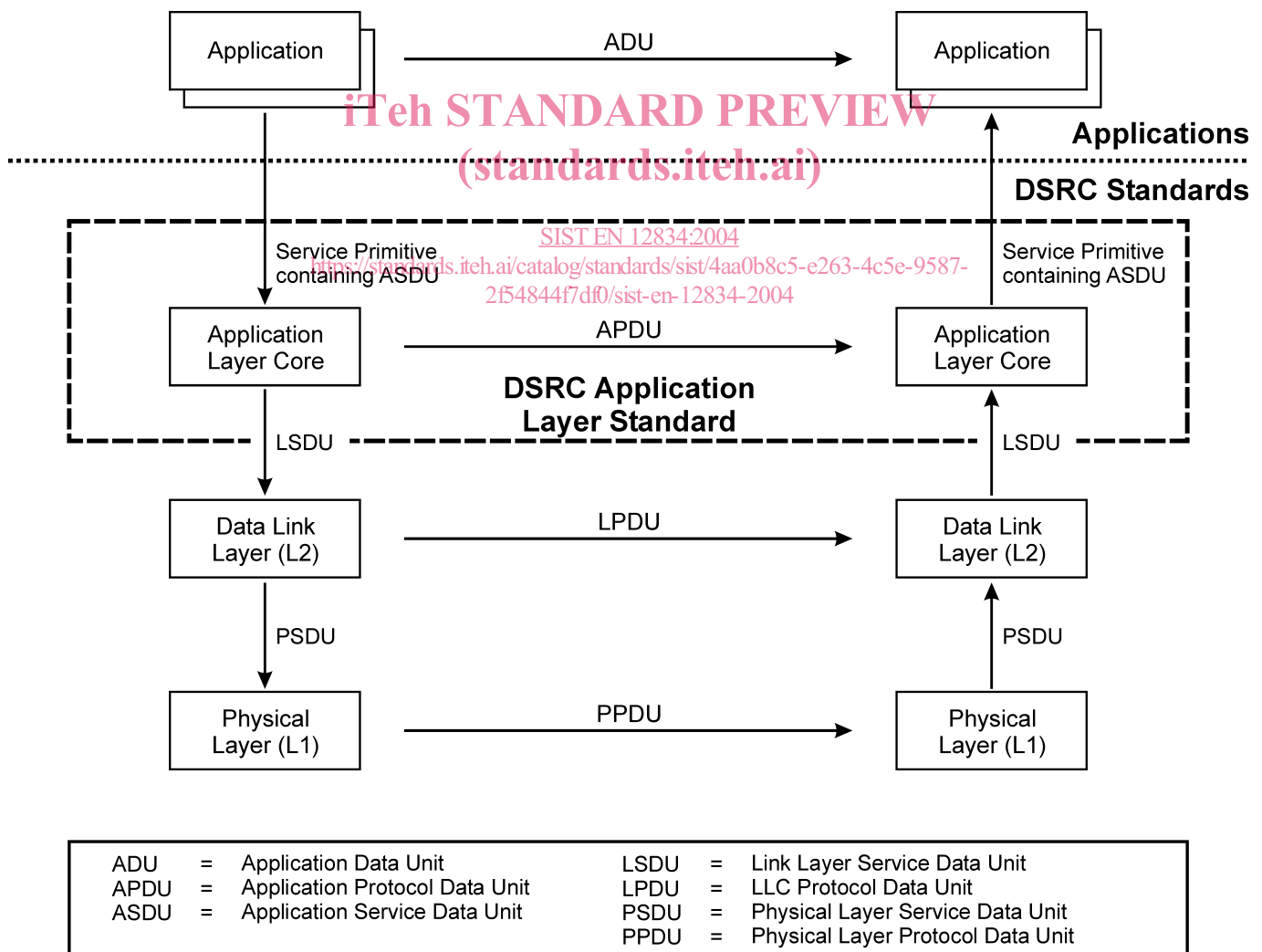


Figure 1 — Architecture and data flow of the DSRC stack

NOTE For definitions of the terms used in Figure 1 see [EN ISO/IEC 7498-1].

The following subjects are covered by this European Standard:

- application Layer structure and framework;
- services to enable data transfer and remote operations;
- application multiplexing procedure;
- fragmentation procedure;
- concatenation and Chaining procedures;
- common encoding rules to translate data from abstract syntax ASN.1, [ISO/IEC 8824-1], into transfer syntax, [ISO/IEC 8825-2], and vice versa;
- communication initialisation and release procedures;
- broadcast service support;
- DSRC management support including communication profile handling.

It is outside the scope of this European Standard to define a security policy. Some transport mechanisms for security related data are provided.

NOTE During the lifetime of ENV 12834:1997, no implementation of the Broadcast Pool functionality has become known. Broadcast Pool functionality is therefore considered untested and is kept in this European Standard for compatibility with the ENV only.

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EN 12834:2003 (E)**2 Normative references**

This European Standard 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 European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

ISO/IEC 8824-1:2000, *Information technology - Abstract Syntax Notation One (ASN.1): Specification of basic notation*.

ISO/IEC 8825-2:2000, *Information technology - ASN.1 encoding rules: Specification of Packed Encoding Rules (PER)*.

EN ISO/IEC 7498-1, *Information technology - Open Systems Interconnection - Basic Reference Model: The Basic Model (ISO/IEC 7498-1)*.

EN 12795, *Road Transport and Traffic Telematics (RTTT) - Dedicated Short Range Communication (DSRC) - DSRC Data Link Layer: Medium Access and Logical Link Control*.

prEN 13372, *Road Transport and Traffic Telematics (RTTT) - Dedicated Short-Range Communication (DSRC) - DSRC Profiles for RTTT Applications*.

ENV ISO 14906, *Road Transport and Traffic Telematics (RTTT) - Electronic Fee Collection (EFC) - Application interface definition for dedicated short range communications (ISO/TR 14906:1998)*.

ENV ISO 14816, *Road Traffic and Transport Telematics - Automatic vehicle and equipment identification - Numbering and data structures (ISO/TR 14816:2000)*.

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3 Terms and definitions

For the purpose of this European Standard, the following terms and definitions apply.

3.1**application**

user of the services offered by the DSRC communication stack

3.2**attribute**

takes a value, which may have a structure, consisting of a set or sequence of data elements

NOTE The value of an attribute can be observed or modified by sending a request to GET (read) or SET (write) the value.

3.3**attribute identifier**

unambiguously distinguishes an attribute from all other attributes within the same element

3.4**Beacon service table**

data structure transmitted by the RSU indicating available services

3.5**broadcast pool**

data structure broadcast from the RSU to the OBUs

3.6**chaining**

function performed by the Transfer Kernel to link the execution of service primitives together

3.7**concatenation**

function performed by the Transfer Kernel to map multiple Application Layer Protocol Data Units or Application Layer Protocol Data Layer Fragments into one Data Link Layer Service Data Unit

3.8**element**

coherent set of data and functionality. Application Elements are created by the Applications and are addressed using Element Identifiers

3.9**element identifier**

unambiguously distinguishes an element from all other elements residing in the same OBU

3.10**fragmentation**

function performed by the Transfer Kernel to map one ASDU on multiple LSDUs

3.11**head of the line**

queuing discipline (also referred to as strict or fixed priority queuing), where a number of queues are served in priority order. A lower priority queue is served if all higher priority queues are empty, each queue is served in First-Come-First-Serve order, each user goes head of the line of the users of lower priorities but behind all users of equal or higher priority

3.12**management**

provides and distributes values for the communication parameters for controlling the DSRC Communication stack

3.13**multiplexing**

function within the Transfer Kernel allowing simultaneous support for more than one Application in a single OBU

3.14**operation**

abstract representation of behaviour invoked in an entity

3.15**profile**

information about capabilities and settings in the different DSRC layers

3.16**time**

number of seconds passed since 1st January 1970, 00:00 (UTC)

NOTE This format is also known as 'UNIX time'.

3.17**vehicle service table**

data structure transmitted by the OBU indicating available services

EN 12834:2003 (E)**4 Abbreviations**

For the purpose of this European Standard, the following abbreviations apply.

4.1**AID**

Application Identifier

4.2**APDU**

Application Protocol Data Unit

4.3**ASDU**

Application Service Data Unit

4.4**ASN.1**

Abstract Syntax Notation One

[ISO/IEC 8824-1:2000]

4.5**B-Kernel**

Broadcast Kernel

4.6**BST**

Beacon Service Table

4.7**DSRC**

Dedicated Short Range Communication

4.8**EFC**

Electronic Fee Collection

4.9**EID**

Element Identifier

4.10**ID**

Identifier

4.11**IID**

Invoker Identifier

4.12**I-Kernel**

Initialisation Kernel

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4.13**LID**

Logical Link Control Identifier

4.14**LLC**

Logical Link Control

4.15**LPDU**

LLC Protocol Data Unit

4.16**LSDU**

LLC Service Data Unit

4.17**L1**

Layer 1 of DSRC (Physical Layer)

4.18**L2**

Layer 2 of DSRC (Data Link Layer)

4.19**L7**

Application Layer Core of DSRC

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4.20**NEN**

Nederlands Normalisatie-instituut (see <http://www.nen.nl/cen278>)

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4.21**OBU**

On Board Unit

NOTE Equipment usually residing on board a vehicle.

4.22**PDU**

Protocol Data Unit

4.23**PER**

Packed Encoding Rules

[ISO/IEC 8825-2:2000]

4.24**RSU**

Road Side Unit

NOTE Often referred to as beacon.

4.25**RTTT**

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4.26

T-APDU

Transfer Application Protocol Data Unit

4.27

T-Kernel

Transfer Kernel

4.28

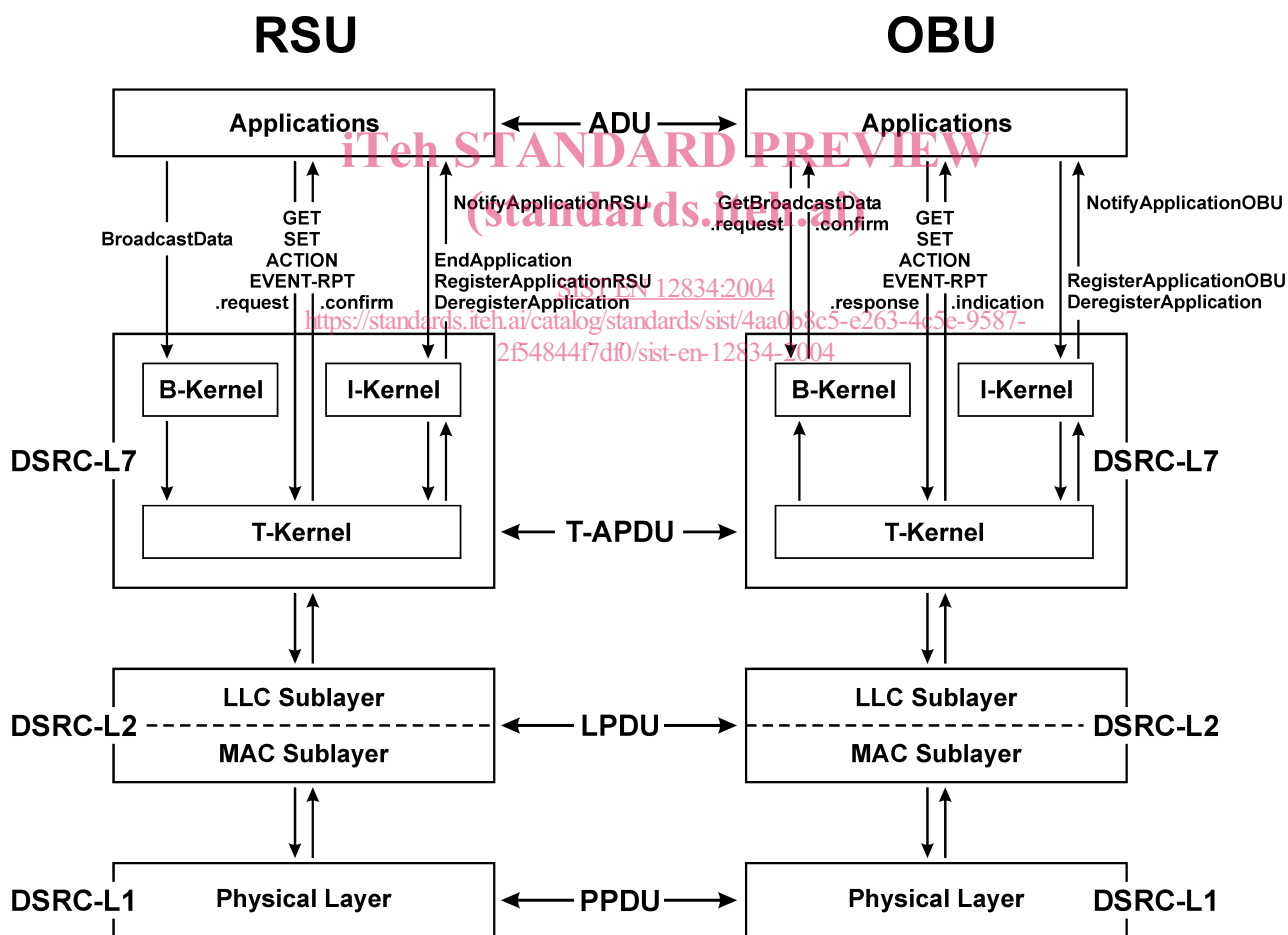
VST

Vehicle Service Table

5 Structure of the application layer core

The application layer core shall consist of the Transfer Kernel (T-Kernel) and either the Initialisation Kernel (I-Kernel) or the Broadcast Kernel (B-Kernel), or both.

Figure 2 shows the application layer kernels and the relationships to external entities. The T-Kernel provides the basic transportation facilities that can be used by the I-Kernel, by the B-Kernel, and by the applications.



LLC Logical Link Control
 LPDU LLC Protocol Data Unit
 MAC Medium Access Control
 PPDU Physical Layer Protocol Data Unit

Figure 2 — Context and structure of the application layer core

6 Transfer-kernel

6.1 General

The T-Kernel shall transfer information between two peer kernels or applications, and shall abstract from the realisation of this transfer.

The T-Kernel shall offer its services by means of service primitives defined in 6.2.

The T-Kernel shall transfer the information by means of T-APDUs defined in annex A.

The T-Kernel shall realise the transfer by a protocol with the behaviour defined in 6.3.

The T-Kernel shall use the services of the Logical Link Control sub-layer of the DSRC Data Link Layer, [EN 12795].

6.2 Services

6.2.1 Scope

The T-Kernel shall provide the following services:

- GET: the invocation of the GET service by an application shall result in the retrieval (reading) of information (i.e. attributes) from a peer application. The service shall only be requested in a confirmed mode, and a reply is expected;
- SET: the invocation of the SET service by an application shall result in the modification (writing) of information (i.e. attributes) by a peer application. The service may be requested in confirmed or non-confirmed mode. In confirmed mode a reply is expected;
- ACTION: the invocation of the ACTION service by an application shall result in the performance of an action by a peer application. An action is further qualified by the value of the ActionType, see [ENV ISO 14906] for examples. The service may be requested in confirmed or non-confirmed mode. In confirmed mode a reply is expected;
- EVENT-REPORT: the invocation of the EVENT-REPORT service by an application or by the I-Kernel shall result in the notification of an event to a peer application or I-Kernel. The service may be requested in confirmed or non-confirmed mode. In confirmed mode a reply is expected;
- INITIALISATION: the invocation of the INITIALISATION service by the I-Kernel shall result in an attempt to initialise the communication between an RSU and each OBU that has not yet established communication with that RSU. The INITIALISATION service shall only be used by the I-Kernel.

6.2.2 Service primitives

The T-Kernel shall provide the services given in 6.2.1 by the following service primitives:

- GET.request
- GET.indication
- GET.response
- GET.confirm
- SET.request