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**Road transport and traffic telematics —  
Automatic vehicle and equipment  
identification — System specifications**

*Télématique de la circulation et du transport routier — Identification  
automatique des véhicules et équipements — Spécification des systèmes*

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of normative document:

- an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;
- an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed every three years with a view to deciding whether it can be transformed into an International Standard.

Attention is drawn to the possibility that some of the elements of this Technical Specification may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/TS 14815 was prepared by the European Committee for Standardization (CEN) in collaboration with ISO Technical Committee TC 204, *Transport information and control systems*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Throughout the text of this document, read "...this European pre-Standard..." to mean "...this Technical Specification...".

Annexes A to E of this Technical Specification are for information only.

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## FOREWORD

This European Prestandard has been prepared by Technical Committee CEN/TC 278 "Road transport and traffic telematics", the secretariat of which is held by NNI, in collaboration with Technical Committee ISO/TC 204 "Transport information and control systems".

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, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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## INTRODUCTION

### SYSTEM SPECIFICATION

This pre-Standard is designed to enable users and suppliers of AVI/AEI systems to specify system specification that will enable a nominal interoperability based on a DSRC link (see clause 5.5).

The terms “AVI” and “AEI” are used both to describe “independently functioning AVI/AEI systems” and as “the function of identification within other RTTT/TICS systems”. Both such uses are supported by this pre-Standard where no other application or sector standard applies.

Whilst it may be desirable to determine a single set of requirements for operation in all environments and under all operating conditions, this could impose unacceptable costs.

This pre-Standard therefore provides standard “classes” for different aspects of system specification, such that a system specifier may select the appropriate performance parameters to meet a particular requirement. Supporting (informative) annexes also provide a number of general use “categories” which may be used to specify the environmental and operating parameters to support interoperable applications.

The architecture descriptions provided in this pre-Standard are in compliance with the guidelines provided by CEN TC 278 WG13/ISO TC 204 WG1.

For the data structure elements, Abstract Syntax Notation One (ASN.1) Packed Encoding Rules (PER) (ref. ISO/IEC 8824:1998 and ISO/IEC 8825-1:1998, ISO/IEC 8825-2:1998 and ISO/IEC DIS 8825-3:1992) are used. This usage provides maximum interoperability and conformance to existing Standards.

For detailed information on the use of ASN.1 PER for AVI/AEI applications reference is made to pre-Standard ENV ISO 14816 (AVI/AEI Numbering and Data Structures).

This pre-Standard (ENV ISO 14815) provides classification procedures and details test requirements needed to support system definition. These requirements are, wherever possible, determined by reference to existing Standards and established practices.

### TEST REQUIREMENTS

Test Requirements are determined for AVI/AEI system components. The requirements to meet this pre-Standard encompass general performance measurement, operational, and environmental aspects.

### HOW TO USE THIS STANDARD

It is also an objective to provide users with different applications and in different environmental circumstances a useful tool that is flexible enough to serve the various different needs. The categorisation and classification system in this pre-Standard provides for this.

A brief guide showing how to use this pre-Standard is provided at the end of Annex A of this pre-Standard.

#### **COMPLIANCE**

**In order to claim compliance with this pre-Standard, a supplier shall provide, for each physically separated component, detail of the classification of its product for all relevant (environmental and operational) parameters determined within this pre-Standard.**

## 1. SCOPE

This pre-Standard defines a generic AVI/AEI System specification for nominal AVI/AEI to provide an *enabling* Standard, which, whilst allowing the system specifier to determine the performance levels and operating conditions, provides a framework for nominal interoperability.

Within the Road context of the Transport and Traffic Telematics Sector, AVI and AEI systems have the specific objective of achieving a unique or unambiguous positive identification of a vehicle or item of equipment, and to make that identification automatically.

Whilst AVI may also be seen as an essential component of some applications, the particular needs of such systems are outside the scope of this pre-Standard. As far as is possible, care is still taken to provide a useful tool for such applications.

This pre-Standard only refers to AVI/AEI in the road environment. Multimodal and intermodal exchanges of AVI/AEI are outside the scope of this pre-Standard

Where AVI/AEI applications are part of a larger system, and where no standardised application specific test requirements exist, these test requirements shall apply.

Anonymity and privacy issues are not handled in this part standard. Please refer to ENV ISO 14816.

This pre-Standard is designed for system specification that will enable a nominal interoperability based on a DSRC link (as defined by prENV ISO 17264 and referred to in clause 5.5). AVI/AEI systems that are relying on other link types are outside the scope of this pre-Standard for those parameters where the link type influences parameters.

The Scope of this pre-Standard is confined to Generic AVI/AEI System specification for systems that have the following 'core' components:

A means of communication between the vehicle/equipment and the reading station (e.g. a DSRC link, reference prENV ISO 17264 )

Operation within a reference architecture which enables compatible systems to read and interpret the identification (See ENV 12314-1)

Compliance to commonly understood data structures that enable meaningful interpretation of the data exchanged in the identification sequence (See ENV ISO 14816)

The provision of operating and environmental parameters (or classes of operating parameters) within which such systems must successfully function without impairing interoperability. This to ensure that the System specifier can state his requirements clearly to Implementation Designers and Integrators, and measure the performance of such systems (This standard, ENV ISO 14815)

## 2. NORMATIVE REFERENCES

This pre-Standard incorporates by dated or undated reference provisions from other publications.

For dated references, subsequent amendments to or revisions of any of these publications apply to this pre-Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

These normative references are cited at the appropriate places in the text (in order of appearance) and the publications are listed hereafter (including amendments).

ENV 12314-1	Road Transport and Traffic Telematics - Automatic vehicle and equipment identification - Part 1: Reference architectures and terminology (ISO TR 14814)
ENV 12795	Road Transport and Traffic Telematics - Dedicated Short-Range Communication (DSRC) - DSRC Data link layer: Medium Access and Logical Link Control
ENV ISO 14816	Road Transport and Traffic Telematics - Automatic vehicle and equipment identification - Numbering and data structures
ENV ISO 17264	Road Transport and Traffic Telematics - Automatic Vehicle and Equipment Identification (AVI/AEI) - AVI/AEI Interfaces
EN 50081	Electromagnetic compatibility – Generic emission Standard
EN 300 674	Electromagnetic compatibility and Radio spectrum Matters (ERM) - Road Transport and Traffic Telematics (RTTT) - Technical characteristics and test methods for data transmission equipment operating in the 5, 8 GHz Industrial, Scientific and Medical (ISM) band
IEC 60068-1:1988	Environmental Testing Procedures - Part 1: General and Guidance
IEC 60068-4:1987	Basic Environmental Testing Procedures - Part 4: Information for specification writers - Test Summaries
IEC 60215:1987	Safety requirements for radio transmitting equipment
IEC 60721-3-4:1995	Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities – Section 4: Stationary use at non-weather protected locations
IEC 60721-3-5:1988	Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities – Section 5: Ground vehicle installations
IEC 61000-4-2	Electromagnetic compatibility (EMC) – Part 4: Testing and measuring techniques – Section 2: Electrostatic discharge immunity test – Basic EMC Publication
IEC 61000-4-6	Electromagnetic compatibility (EMC) - Part 4: Testing and measuring techniques – Section 6: Immunity to conducted disturbances, induced by radio-frequency fields
ISO 7637-1:1990	Road vehicles - electrical disturbance by conduction and coupling - Part 1: Passenger cars and light commercial vehicle with nominal 12V supply voltage - Electrical transient conduction along supply lines only
ISO/IEC 8824-1:1998	Information technology - Abstract Syntax Notation One (ASN.1) - Part 1: Specification of the basic notation
ISO/IEC 8824-2:1998	Information technology - Abstract Syntax Notation One (ASN.1) - Part 2: Information object specification



ISO/IEC 8824-3:1998	Information technology - Abstract Syntax Notation One (ASN.1) - Part 3: Constraint Specification
ISO/IEC 8824-4:1998	Information technology - Abstract Syntax Notation One (ASN.1) - Part 4: Parameterization of the ASN.1 specifications
ISO/IEC 8825-1:1998	Information technology - ASN.1 encoding rules - Part 1: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER)
ISO/IEC 8825-2:1998	Information technology - ASN.1 encoding rules - Part 2: Specification of Packed Encoding Rules (PER)
ISO/IEC DIS 8825-3:1992	Information technology - ASN.1 encoding rules – Part 3: Distinguished canonical encoding rules
CEPT/ERC T/R 22/04 : 1991	Harmonisation of Frequency Bands for Road Transport Information Systems
US MIL-STD-721	Definition of Terminology

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### 3. DEFINITIONS

The Glossary of Definitions used is maintained within the pre-Standard ENV ISO 14815 Reference Architectures and Terminology.

For the purpose of this pre-Standard, the following definitions apply.

<b>AVI/AEI System:</b>	With the term "AVI/AEI System" is meant the AVI/AEI application in a RTTT system either as a stand-alone system or as part of a RTTT application.
<b>Bi-directional monologue:</b>	A "Read only" functionality with a start signal from the FE side.
<b>Category:</b>	In the Informative Annexes supporting this pre-Standard 'Category' is used to provide groupings of common class requirements to support interoperability between AVI/AEI systems of common purpose (e.g. a "Ruggedised" category versus a "Standard" category).
<b>Class:</b>	In this pre-Standard used to differentiate between System components with different "grades" of requirements for parameters. (e.g. class 1 for "extreme" operational and environmental requirements).
<b>Environmental parameters:</b>	In this pre-Standard used to describe different environmental component properties/specifications
<b>Extreme:</b>	Term used in this pre-Standard to refer to class 1 requirements for the "Ruggedised" system category "A".
<b>Fixed Equipment (FE):</b>	Equipment required to interrogate, receive and interpret the data in the On-Board Equipment (OBE) in order to present the identification.
<b>Lifetime:</b>	The period of time during which an item of equipment exists and functions according to the relevant requirements of this pre-Standard.
<b>Maintainability:</b>	The ability to keep in a condition of good repair or efficiency
<b>Mean Time to Failure:</b>	The average time that a system functions before first failure.
<b>Mean Time between Failures:</b>	The mean cycle (one failure and one repair) time of a maintained system.
<b>Nominal Interoperability:</b>	Stands for " Application Area Interoperability" in a region spanning two or more areas with cross-border operation between operator domains, districts or nations. The capability for a nominal AVI/AEI System FE to operate with a nominal AVI/AEI System OBE.
<b>Normal:</b>	Term used in this pre-Standard to refer to class 2 requirements for the "Standard" system category "B".
<b>On-Board Equipment (OBE):</b>	Equipment fitted to the vehicle or item to be identified and containing the unique or unambiguous positive identification.
<b>Operational parameters:</b>	In this pre-Standard used to describe different operational component properties/specifications
<b>Physical Architecture:</b>	The physical configuration and physical interconnection of equipment to achieve its function (not the equipment itself)
<b>Selected:</b>	Term used in this pre-Standard to refer to class 1-6 requirements for the system categories "3 - 6".

**Shadowing:**

A condition where the close proximity of a vehicle/equipment interposed between FE and OBE obscures the signals thus preventing a successful AVI/AEI transaction. The shadowing caused by normal traffic behaviour is taken into account and overcome to provide a successful transaction. Abnormal shadowing may be caused by large or unusually shaped vehicles/equipment or by vehicles travelling too closely together.

**(AVI/AEI) Transaction**

A completed cycle of communication (across the air interface at reference point delta) wherein a message identifying a vehicle or item of equipment is successfully received and understood by the receiver during one passage through the read zone. The number of attempts, retries and repeats is not relevant, it is only that one fully completed identification process communication cycle is successfully completed to the extent that no communications error could be detected.

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## 4. ABBREVIATIONS

The following abbreviations are used in this pre-Standard:

<b>AEI</b>	<b>A</b> utomatic <b>E</b> quipment <b>I</b> dentification
<b>AIB</b>	<b>A</b> ccredited, <b>I</b> ndependent, <b>T</b> esting <b>B</b> ody
<b>ASN.1</b>	<b>A</b> bstract <b>S</b> yntax <b>N</b> otation <b>O</b> ne
<b>AVI</b>	<b>A</b> utomatic <b>V</b> ehicle <b>I</b> dentification
<b>CEPT</b>	<b>C</b> omité <b>E</b> uropéenne de <b>P</b> ostes et <b>T</b> elecommunication (Fr.) European Committee for Post and Telecommunication
<b>DSRC</b>	<b>D</b> edicated <b>S</b> hort <b>R</b> ange <b>C</b> ommunication
<b>FE</b>	<b>F</b> ixed <b>E</b> quipment
<b>MTBF</b>	<b>M</b> ean <b>T</b> ime <b>B</b> etween <b>F</b> ailure
<b>OBE</b>	<b>O</b> n <b>B</b> oard <b>E</b> quipment
<b>OSI</b>	<b>O</b> pen <b>S</b> ystems <b>I</b> nterconnection
<b>RTTT</b>	<b>R</b> oad <b>T</b> ransport and <b>T</b> raffic <b>T</b> elematics (CEN TC278)
<b>TICS</b>	<b>T</b> ransport <b>I</b> nformation and <b>C</b> ontrol <b>S</b> ystems (ISO TC204)

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The following abbreviations are used to designate the IEC 60721 - Environmental classes :

<b>B</b>	-	Biological
<b>C</b>	-	Chemical substances
<b>F</b>	-	Contaminating fluids
<b>K</b>	-	Climatic
<b>M</b>	-	Mechanical
<b>S</b>	-	Mechanical substances
<b>Z</b>	-	Special Climatic conditions

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