

PD CEN ISO/TS 18234-7:2013



BSI Standards Publication

**Intelligent transport systems —  
Traffic and travel information  
via transport protocol experts  
group, generation 1 (TPEG1)  
binary data format**

Part 7: Parking information (TPEG1-PKI)

**bsi.**

...making excellence a habit.™

**National foreword**

This Published Document is the UK implementation of CEN ISO/TS 18234-7:2013.

The UK participation in its preparation was entrusted to Technical Committee EPL/278, Intelligent transport systems.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2013. Published by BSI Standards Limited 2013

ISBN 978 0 580 80796 1

ICS 03.220.01; 35.240.60

**Compliance with a British Standard cannot confer immunity from legal obligations.**

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 October 2013.

**Amendments issued since publication**

Date	Text affected
------	---------------

---

ICS 03.220.01; 35.240.60

English Version

**Intelligent transport systems - Traffic and travel information via transport protocol experts group, generation 1 (TPEG1) binary data format - Part 7: Parking information (TPEG1-PKI) (ISO/TS 18234-7:2013)**

Systèmes intelligents de transport - Informations sur le trafic et le tourisme via les données de format binaire du groupe d'experts du protocole de transport, génération 1 (TPEG1) - Partie 7: Informations relatives aux parcs de stationnement (TPEG-PKI) (ISO/TS 18234-7:2013)

Intelligente Transportsysteme - Reise- und Verkehrsinformation über Datenströme der Transportprotokoll Expertengruppe (TPEG) - Teil 7: Parkinformationen (TPEG-PKI) (ISO/TS 18234-7:2013)

This Technical Specification (CEN/TS) was approved by CEN on 15 July 2013 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

CEN members are required to announce the existence of this CEN/TS in the same way as for an EN and to make the CEN/TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the CEN/TS) until the final decision about the possible conversion of the CEN/TS into an EN is reached.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

## Foreword

This document (CEN ISO/TS 18234-7:2013) has been prepared by Technical Committee ISO/TC 204 "Intelligent transport systems" in collaboration with Technical Committee CEN/TC 278 "Intelligent transport systems" the secretariat of which is held by NEN.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

### Endorsement notice

The text of ISO/TS 18234-7:2013 has been approved by CEN as CEN ISO/TS 18234-7:2013 without any modification.

## Contents

Page

Foreword .....	v
Introduction.....	vii
1 Scope.....	1
2 Normative references.....	1
3 Terms and definitions .....	1
4 Abbreviated terms .....	2
5 Application identification.....	2
6 Service Component Frame .....	3
7 Message Components .....	3
7.1 List of Generic Component Ids .....	3
7.2 Parking Message .....	4
7.2.1 MessageManagement .....	5
7.2.2 ParkingLocation .....	6
7.2.3 ParkingSiteDescription .....	6
7.2.4 CurrentCapacity.....	23
7.2.5 ExpectedCapacity.....	25
7.2.6 Advice .....	26
8 Parking Information Tables .....	27
8.1 Structure and semantics.....	27
8.2 Indexing .....	27
8.3 CEN-English 'Word', Comments and Examples .....	28
8.3.1 pki001:VehicleType .....	28
8.3.2 pki002:ParkingType.....	29
8.3.3 pki003:UserType.....	30
8.3.4 pki004:FuelType .....	31
8.3.5 pki005:AvailableFeatures .....	31
8.3.6 pki006:EventType .....	32
8.3.7 pki007:Reservability .....	32
8.3.8 pki008:FacilityType .....	33
8.3.9 pki009:SupervisionType .....	33
8.3.10 pki010:SecurityType.....	34
8.3.11 pki011:AssociatedService .....	34
8.3.12 pki012:ParkingStatus .....	35
8.3.13 pki013:PaymentMethod .....	35
8.3.14 pki014:SiteServed.....	36
8.3.15 pki015:GateType.....	36
8.3.16 pki016:ContactType .....	37
8.3.17 pki017:TransportType .....	37
8.3.18 pki018:OpeningHoursType.....	38
8.3.19 pki019:TermType .....	38
8.3.20 pki020:Advice .....	39
8.3.21 pki021:Tendency .....	39
8.3.22 pki022:FeeType.....	40
Annex A (normative) Binary SSF and Data Types.....	41
A.1 Conventions and symbols.....	41
A.1.1 Conventions .....	41
A.1.2 Symbols.....	41

<b>A.2</b>	<b>Representation of syntax</b> .....	<b>42</b>
<b>A.2.1</b>	<b>General</b> .....	<b>42</b>
<b>A.2.2</b>	<b>Data type notation</b> .....	<b>42</b>
<b>A.2.3</b>	<b>Application dependent data types</b> .....	<b>45</b>
<b>A.2.4</b>	<b>Toolkits and external definition</b> .....	<b>50</b>
<b>A.2.5</b>	<b>Application design principles</b> .....	<b>50</b>
<b>A.3</b>	<b>TPEG data stream description</b> .....	<b>51</b>
<b>A.3.1</b>	<b>Diagrammatic hierarchy representation of frame structure</b> .....	<b>51</b>
<b>A.3.2</b>	<b>Syntactical Representation of the TPEG Stream</b> .....	<b>51</b>
<b>A.3.3</b>	<b>Description of data on Transport level</b> .....	<b>56</b>
<b>A.3.4</b>	<b>Description of data on Service level</b> .....	<b>57</b>
<b>A.3.5</b>	<b>Description of data on Service component level</b> .....	<b>58</b>
<b>A.4</b>	<b>General binary data types</b> .....	<b>58</b>
<b>A.4.1</b>	<b>Primitive data types</b> .....	<b>58</b>
<b>A.4.2</b>	<b>Compound data types</b> .....	<b>64</b>
<b>A.4.3</b>	<b>Table definitions</b> .....	<b>66</b>
<b>A.4.4</b>	<b>Tables</b> .....	<b>68</b>
<b>Annex B</b>	<b>(normative) TPEG Message Management Container, MMC (Binary)</b> .....	<b>84</b>
<b>B.1</b>	<b>Terms and Definitions</b> .....	<b>84</b>
<b>B.1.1</b>	<b>Message</b> .....	<b>84</b>
<b>B.1.2</b>	<b>Monolithic Message Management</b> .....	<b>84</b>
<b>B.1.3</b>	<b>Multi-Part Message Management</b> .....	<b>84</b>
<b>B.1.4</b>	<b>Top Level Container</b> .....	<b>84</b>
<b>B.2</b>	<b>Symbols (and abbreviated terms)</b> .....	<b>84</b>
<b>B.2.1</b>	<b>MMC</b> .....	<b>84</b>
<b>B.2.2</b>	<b>PKI</b> .....	<b>84</b>
<b>B.3</b>	<b>Introduction</b> .....	<b>84</b>
<b>B.4</b>	<b>Message Components</b> .....	<b>85</b>
<b>B.4.1</b>	<b>MMCTemplate</b> .....	<b>85</b>
<b>B.4.2</b>	<b>MessageManagementContainer</b> .....	<b>87</b>
<b>B.4.3</b>	<b>MMCMasterMessage</b> .....	<b>88</b>
<b>B.4.4</b>	<b>MMCMessagePart</b> .....	<b>90</b>
<b>B.5</b>	<b>Datatypes</b> .....	<b>91</b>
<b>B.5.1</b>	<b>MultiPartMessageDirectory</b> .....	<b>91</b>
<b>B.6</b>	<b>Tables</b> .....	<b>91</b>
<b>B.6.1</b>	<b>Structure and semantics</b> .....	<b>91</b>
<b>B.6.2</b>	<b>Indexing</b> .....	<b>92</b>
<b>B.6.3</b>	<b>Codes, Names and Comments</b> .....	<b>92</b>
	<b>Bibliography</b> .....	<b>94</b>

## 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 2.

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 after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

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

ISO/TS 18234-7 was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 278, *Road transport and traffic telematics*, in collaboration with ISO Technical Committee ISO/TC 204, *Intelligent transport systems*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

ISO/TS 18234 consists of the following parts, under the general title *Intelligent transport systems — Traffic and travel information via transport protocol experts group, generation 1 (TPEG1) binary data format*:

- *Part 1: Introduction, numbering and versions (TPEG1-INV)*
- *Part 2: Syntax, semantics and framing structure (TPEG1-SSF)*
- *Part 3: Service and network information (TPEG1-SNI)*
- *Part 4: Road Traffic Message application (TPEG1-RTM)*
- *Part 5: Public Transport Information (PTI) application*
- *Part 6: Location referencing applications*

- *Part 7: Parking information (TPEG1-PK1)*
- *Part 8: Congestion and travel-time application (TPEG1-CTT)*
- *Part 9: Traffic event compact (TPEG1-TEC)*
- *Part 10: Conditional access information (TPEG1-CAI)*
- *Part 11: Location Referencing Container (TPEG1-LRC)*

## Introduction

TPEG technology uses a byte-oriented data stream format, which may be carried on almost any digital bearer with an appropriate adaptation layer. TPEG messages are delivered from service providers to end-users, and are used to transfer information from the database of a service provider to a user's equipment.

The brief history of TPEG technology development dates back to the European Broadcasting Union (EBU) Broadcast Management Committee establishing the B/TPEG project group in autumn 1997 with the mandate to develop, as soon as possible, a new protocol for broadcasting traffic and travel-related information in the multimedia environment. TPEG technology, its applications and service features are designed to enable travel-related messages to be coded, decoded, filtered and understood by humans (visually and/or audibly in the user's language) and by agent systems.

One year later in December 1998, the B/TPEG group produced its first EBU specifications. Two Technical Specifications were released. ISO/TS 18234-2 (TPEG-SSF) described the Syntax, Semantics and Framing Structure, which is used for all TPEG applications. ISO/TS 18234-4 (TPEG-RTM) described the first application, for Road Traffic Messages.

Subsequently, CEN/TC 278/WG 4, in conjunction with ISO/TC 204, established a project group comprising the members of B/TPEG and they have continued the work concurrently since March 1999. Since then two further parts were developed to make the initial complete set of four parts, enabling the implementation of a consistent service. ISO/TS 18234-3 describes the Service and Network Information Application, which should be used by all service implementations to ensure appropriate referencing from one service source to another. ISO/TS 18234-1 completes the series, by describing the other parts and their relationship; it also contains the application IDs used within the other parts. Additionally, ISO/TS 18234-5, the Public Transport Information Application (TPEG-PTI) and ISO/TS 18234-6 (TPEG-LRC), were developed.

This Technical Specification adds another powerful application to the ISO 18234-series allowing detailed parking information to be encoded and transmitted to the user. This Technical Specification includes new advanced message management and new datatypes, as specified in the annexes.

Today, traffic congestion has become a serious problem in urban areas. Some traffic congestion is attributed to drivers searching for parking spaces. Therefore, timely provision of parking information could help ease traffic congestion. Furthermore, parking information would be valuable for the visitor, particularly when it could be used to signal where a temporary parking facility is established for a special occasion.

TPEG applications are developed using UML modelling and a software tool is used to automatically select content which then populates this Technical Specification. Diagrammatic extracts from the model are used to show the capability of the binary coding in place of lengthy text descriptions; the diagrams do not necessarily include all relevant content possible.

This Technical Specification describes the binary data format of the on-air interface of the Parking Information application, (TPEG-PKI) with the technical version number TPEG-PKI\_1.0/001.



# Intelligent transport systems — Traffic and travel information via transport protocol experts group, generation 1 (TPEG1) binary data format —

## Part 7: Parking information (TPEG1-PKI)

### 1 Scope

This Technical Specification specifies the TPEG Parking Information Application (PKI) which is designed to deliver parking information to a variety of receivers using a number of different channels, foremost digital broadcasting and internet technologies. Parking information may be presented to the user in many different ways including textually, voiced and graphically using standard formats.

### 2 Normative references

The following referenced documents are indispensable for the application of this Technical Specification. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 639-1:2002, *Codes for the representation of names of languages — Part 1: Alpha-2 code*

ISO 3166-1:2006, *Codes for the representation of names of countries and their subdivisions — Part 1: Country codes*

ISO 4217:2001, *Codes for the representation of currencies and funds*

ISO/TS 18234-1, *Intelligent transport systems — Traffic and travel information via transport protocol experts group, generation 1 (TPEG1) binary data format — Part 1: Introduction, numbering and versions (TPEG1-INV)*

ISO/TS 18234-2, *Intelligent transport systems — Traffic and travel information via transport protocol experts group, generation 1 (TPEG1) binary data format — Part 2: Syntax, semantics and framing structure (SSF)*

ISO/TS 18234-3, *Intelligent transport systems — Traffic and travel information via transport protocol experts group, generation 1 (TPEG1) binary data format — Part 3: Service and network information (TPEG1-SNI)*

ISO/TS 18234-11, *Intelligent transport systems — Traffic and travel information via transport protocol experts group, generation 1 (TPEG1) binary data format — Part 11: Location Referencing Container (TPEG1-LRC)*

IEC 60559:1989, *Binary floating-point arithmetic for microprocessor systems*

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.