



BSI Standards Publication

Public transport - Communication between contactless readers and fare media

Part 1: Implementation requirements for ISO/IEC 14443

National foreword

This Published Document is the UK implementation of CEN/TS 16794-1:2017. It supersedes PD CEN/TS 16794-1:2015, which is withdrawn.

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 2017
Published by BSI Standards Limited 2017

ISBN 978 0 580 96149 6

ICS 35.240.15; 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 August 2017.

Amendments/corrigenda issued since publication

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

TECHNICAL SPECIFICATION
 SPÉCIFICATION TECHNIQUE
 TECHNISCHE SPEZIFIKATION

CEN/TS 16794-1

July 2017

ICS 35.240.15; 35.240.60

Supersedes CEN/TS 16794-1:2015

English Version

**Public transport - Communication between contactless
 readers and fare media - Part 1: Implementation
 requirements for ISO/IEC 14443**

Transport Public - Système billettique interopérable -
 Communication entre terminaux et objets sans contact
 - Partie 1: Exigences d'implémentation pour l'ISO/IEC
 14443

Öffentlicher Verkehr - Kommunikation zwischen
 berührungslosen Lesegeräten und Fahrscheinmedien -
 Teil 1: Implementierungsanforderungen zur ISO/IEC
 14443

This Technical Specification (CEN/TS) was approved by CEN on 17 April 2017 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, Serbia, 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

Contents

Page

| | |
|--|----|
| European foreword..... | 3 |
| 1 Scope..... | 4 |
| 2 Normative references..... | 4 |
| 3 Terms and definitions | 4 |
| 4 Symbols and abbreviations | 6 |
| 5 Conformance..... | 6 |
| 6 Interoperability of PT devices and NFC mobile devices..... | 6 |
| 6.1 Description of the “concept for interoperability” | 6 |
| 6.2 References for implementation and test of NFC mobile devices | 7 |
| 6.3 Limitations..... | 8 |
| 7 Requirements applicable to PT readers | 8 |
| 7.1 General..... | 8 |
| 7.2 Categories of PT reader..... | 8 |
| 7.3 Normative requirements applicable to PT readers..... | 9 |
| 7.4 Specific requirements applicable to PT readers..... | 9 |
| 7.5 Requirements on polling and recognizing contactless objects | 10 |
| 7.6 Performance requirements (informative)..... | 11 |
| 8 Requirements applicable to PT objects | 11 |
| 8.1 General..... | 11 |
| 8.2 Normative requirements applicable to PT objects | 11 |
| 8.3 Specific requirements applicable to PT objects..... | 12 |
| 8.4 Performance requirements (informative) | 12 |
| 9 Test boundaries and test conditions for PT readers and PT objects..... | 12 |
| 9.1 Implementation characteristics | 12 |
| 9.1.1 General..... | 12 |
| 9.1.2 ICS for PT readers - PCD..... | 12 |
| 9.1.3 ICS for PT objects - PICC..... | 15 |
| 9.2 Test conditions..... | 17 |
| 9.2.1 General..... | 17 |
| 9.2.2 Temperature..... | 17 |
| 9.2.3 Test positions for PT readers | 17 |
| 9.2.4 Test positions for PT object..... | 31 |
| 9.2.5 Test mode for PT readers..... | 35 |
| 9.2.6 Test application for PT object..... | 35 |
| Annex A (informative) Examples of polling sequences and scenarios..... | 36 |
| A.1 Examples of polling sequences..... | 36 |
| A.2 Examples of polling scenarios | 37 |
| Annex B (informative) Loopback interface for PT reader testing..... | 38 |
| Bibliography..... | 39 |

European foreword

This document (CEN/TS 16794-1:2017) has been prepared by 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.

This document supersedes CEN/TS 16794-1:2015.

This version updates the requirements applicable to the contactless interface of PT readers and objects to introduce interoperability with NFC mobile devices compliant to NFC Forum specifications.

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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This Technical Specification constitutes the 2nd edition of CEN/TS 16794-1. It sets out the technical requirements to be met by contactless Public Transport (PT) devices in order to be able to interface together using the ISO/IEC 14443 standard contactless communications protocol.

This Technical Specification applies to PT devices:

PT readers which are contactless fare management system terminals acting as a PCD contactless reader based on ISO/IEC 14443 standard series;

PT objects which are contactless fare media acting as a PICC contactless object based on ISO/IEC 14443 standard series.

This new version also addresses interoperability of consumer-market NFC mobile devices, compliant to NFC Forum specifications, with above mentioned PT devices.

An interface-oriented test approach is used to evaluate the conformity of PT devices and is defined in CEN/TS 16794-2.

Application-to-application exchanges executed once contactless communication has been established at RF level fall outside the scope of this document. In line with the rules on independence between OSI protocol layers, this document works on the assumption that application-to-application exchanges are not contingent on the type of contactless communication established or by the parameters used for the low-level protocol layers that serve as the platform for these application-to-application exchanges.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

CEN/TS 16794-2, *Public transport - Communication between contactless readers and fare media - Part 2: Test plan for ISO/IEC 14443*

ISO/IEC 10373-6, *Identification cards - Test methods - Part 6: Proximity cards*

ISO/IEC 14443 (all parts), *Identification cards - Contactless integrated circuit cards - Proximity cards*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 14443-1, ISO/IEC 14443-2, ISO/IEC 14443-3, ISO/IEC 14443-4, ISO/IEC 10373-6 and the following apply.

**3.1
common reader**
PT reader used in interoperable fare management system terminals with reduced performance requirements

Note 1 to entry: See 8.2.

**3.2
FM reader**
PT reader used in interoperable fare management system terminals

Note 1 to entry: See 8.2.