

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.

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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 independency 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
IFM reader**
PT reader used in interoperable fare management system terminals

Note 1 to entry: See 8.2.

3.3**NFC mobile device**

mobile device capable of near field communication that is offered in the consumer market and is used by PT customers as a contactless object or a contactless reader

3.4**NFC mobile device in card emulation mode**

mobile device used as a PT object

3.5**NFC mobile device in reader/writer mode**

mobile device used as a PT reader

3.6**non ISO/IEC 14443-3 frame coding**

frame using either:

ISO/IEC 14443-2 Type A modulation, with coding different from REQA or WUPA; or

ISO/IEC 14443-2 Type B modulation, with coding different from REQB or WUPB; or

ISO/IEC 18092 modulation; or

ISO/IEC 15693-2 modulation

3.7**Test PCD assembly**

Test PCD assembly (test reader) as defined in test method ISO/IEC 10373-6

3.8**PT device**

PT reader or PT object

3.9**PT object**

ISO/IEC 14443 PICC specifically designed for the use in PT systems

3.10**PT reader**

ISO/IEC 14443 PCD specifically designed for the use in PT systems

3.11**Reference PICC**

Reference PICC (test card) as defined in test method ISO/IEC 10373-6

4 Symbols and abbreviations

For the purposes of this document, the abbreviations given in ISO/IEC 14443, ISO/IEC 10373-6 and the following apply.

ICS	Implementation Conformance Statements
NFC	Near Field Communication
PT	Public Transport
t_{detect}	Maximum Reference PICC time-to-detection

5 Conformance

Conformance to this document carries a number of requisites:

- For a PT reader, to meet all the [Rdrnn] requirements listed herein that are applicable according to the applicant's stated implementation characteristics (ICS), under the test conditions stipulated in Clause 9 and following the PCD test plan set out in CEN/TS 16794-2.
- For a PT object, to meet all the [Objnn] requirements listed herein that are applicable according to the applicant's stated implementation characteristics (ICS), under the test conditions stipulated in Clause 9 and following the PICC test plan set out in CEN/TS 16794-2.

Conformance of NFC mobile devices is tested according to NFC Forum specifications and is out of scope of this document.

The description of the certification or qualification processes to be carried out for demonstrating the conformance of PT devices to CEN/TS 16794-1 is out of scope of this document.

6 Interoperability of PT devices and NFC mobile devices

6.1 Description of the “concept for interoperability”

The contactless interface for NFC mobile devices follows the implementation and test specifications of the NFC Forum as specified by the NFC Forum and referenced in GSMA TS.26 and TS.27.

The ISO/IEC 14443 conformant contactless interface of PT devices is designed and tested according to the rules set out in this technical specification.

The concept for interoperability was established to synchronise the specifications for the contactless interface of NFC mobile devices and those for the contactless interface of PT devices in order to:

- ensure the interoperability between NFC mobile devices and PT devices; and
- avoid unnecessary test and certification effort.

The NFC Forum conducted a comparison of NFC Forum Analog and Digital specifications with ISO/IEC 14443 and ISO/IEC 10373-6 standards. Procedures that support correlation between results from tests according to NFC Forum specifications and those according to ISO/IEC 10373-6 have been defined.