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Javni prevoz - Komunikacija med brezkontaktnimi čitalniki/terminali in prevoznimi mediji - 1. del: Zahteve za izvajanje ISO/IEC 14443

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

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

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Ta slovenski standard je istoveten z: CEN/TS 16794-1:2019

ICS:

35.240.15	Identifikacijske kartice. Čipne kartice. Biometrija	Identification cards. Chip cards. Biometrics
35.240.60	Uporabniške rešitve IT v prometu	IT applications in transport

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CEN/TS 16794-1

October 2019

ICS 35.240.15; 35.240.60

Supersedes CEN/TS 16794-1:2017

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 June 2019 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.

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EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents	Page
European foreword.....	4
1 Scope	5
2 Normative references	5
3 Terms and definitions	6
4 Symbols and abbreviations	7
5 Conformance.....	7
6 Dual conformance of PT devices to the CEN/TS 16794 series and EMV Contactless Interface Specification.....	7
7 Interoperability of PT devices and NFC mobile devices.....	8
7.1 Description of the “concept for interoperability”	8
7.2 References for implementation and test of NFC mobile devices	9
7.3 Limitations.....	10
8 Requirements applicable to PT readers	10
8.1 General.....	10
8.2 Categories of PT reader.....	10
8.2.1 General.....	10
8.2.2 IFM reader	10
8.2.3 Common reader	12
8.3 Normative requirements applicable to PT readers.....	12
8.4 Specific requirements applicable to PT readers.....	13
8.5 Requirements on polling and recognizing contactless objects	14
8.6 Performance requirements (informative).....	15
9 Requirements applicable to PT objects	15
9.1 General.....	15
9.2 Normative requirements applicable to PT objects	15
9.3 Specific requirements applicable to PT objects.....	15
9.4 Performance requirements (informative).....	16
10 Implementation characteristics	16
10.1 General.....	16
10.2 ICS for PT readers – PCD	16
10.2.1 General.....	16
10.2.2 PCD product description	16

10.2.3	PCD general technical characteristics.....	17
10.2.4	PCD supported options.....	17
10.2.5	PCD test parameters.....	18
10.3	ICS for PT objects - PICC.....	19
10.3.1	General	19
10.3.2	PICC product description.....	19
10.3.3	PICC general technical characteristics.....	19
10.3.4	PICC supported options.....	19
10.3.5	PICC test parameters.....	20
11	Test conditions for PT reader and PT objects.....	21
11.1	General	21
11.2	Temperature	21
11.3	Test conditions for PT readers	22
11.3.1	General	22
11.3.2	Initial positions template	22
11.3.3	Test positions.....	22
11.3.4	Test mode.....	31
11.4	Test conditions for PT objects.....	32
11.4.1	Test positions.....	32
11.4.2	Test application.....	33
Annex A (informative)	Examples of polling sequences and scenarios	35
Annex B (informative)	Loopback interface for PT reader testing.....	37
Bibliography	38

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[SIST-TS CEN/TS 16794-1:2019](https://standards.iteh.ai/catalog/standards/sist/8898fd4-d7de-4609-93f3-id343f988408/sist-ts-cen-ts-16794-1-2019)

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CEN/TS 16794-1:2019 (E)**European foreword**

This document (CEN/TS 16794-1:2019) 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 shall not be held responsible for identifying any or all such patent rights.

This document supersedes CEN/TS 16794-1:2017.

This edition 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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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1 Scope

This document constitutes the 3rd 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 series (ISO/IEC 14443-1, ISO/IEC 14443-2, ISO/IEC 14443-3 and ISO/IEC 14443-4) contactless communications protocol.

This document applies to PT devices:

- PT readers which are contactless fare management system terminals acting as a PCD contactless reader based on the ISO/IEC 14443 series;
- PT objects which are contactless fare media acting as a PICC contactless object based on the ISO/IEC 14443 series.

This edition addresses interoperability of consumer-market NFC mobile devices, compliant to NFC Forum specifications, with above mentioned PT devices, aligns with the 4th edition of the ISO/IEC 14443 series and maintains the possibility for PT readers to comply with the requirements from EMV Contactless Interface Specification and the present document.

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 the parameters used for the low-level protocol layers that serve as the platform for these application-to-application exchanges.

2 Normative references

SIST-TS CEN/TS 16794-1:2019

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The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. 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), *Cards and security devices for personal identification — Contactless proximity objects*

EMV Level 1 Specifications for Payment Systems — EMV Contactless Interface Specification — Version 3.0 March 2018

NFC Forum™ - NFC Analog Specification, Technical Specification - NFC Forum™- ANALOG 2.1 - NFC Forum-TS-Analog-2.1 - August 2018 (or later)

NFC Forum™ - NFC Digital Specification, Technical Specification - NFC Forum™ - DIGITAL 2.1 - NFC Forum-TS-Digital-2.1 - September 2018(or later)

NFC Forum™ - NFC Activity Specification, Technical Specification - NFC Forum™ - ACTIVITY 2.0 - NFC Forum-TS-Activity-2.0 - April 2017 (or later)

CEN/TS 16794-1:2019 (E)**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.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <http://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

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

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

mobile device used as a PT object

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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**PT device**

PT reader or PT object

3.8**PT object**

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

3.9**PT reader**

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

3.10**Reference PICC**

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

3.11**Test PCD assembly**

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

4 Symbols and abbreviations

For the purposes of this document, the abbreviations given in the ISO/IEC 14443 series, 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

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5 Conformance

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Conformance to this document carries a number of requisites:

- For a PT reader, to meet all the [Rdr n] requirements listed herein that are applicable according to the applicant's stated implementation characteristics (ICS), under the test conditions stipulated in Clause 11 and following the PCD test plan set out in CEN/TS 16794-2.
- For a PT object, to meet all the [Obj n] requirements listed herein that are applicable according to the applicant's stated implementation characteristics (ICS), under the test conditions stipulated in Clause 11 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 Dual conformance of PT devices to the CEN/TS 16794 series and EMV Contactless Interface Specification

In the current state of EMV Contactless Interface Specification and CEN/TS 16794 development, no interoperability is warranted between EMV devices (compliant with EMV Contactless Interface Specification) and PT devices (compliant with the CEN/TS 16794 series).

Consequently, when PT readers need to accept EMV media and PT objects, a dual conformance of PT readers according to the CEN/TS 16794 series and EMV Contactless Interface Specification is required.

CEN/TS 16794-1:2019 (E)

Similarly, when PT objects need to be used with EMV payment terminal and PT readers, a dual conformance of PT objects according to the CEN/TS 16794 series and EMV Contactless Interface Specification is required.

EMV Contactless Interface Specification defines requirements that may be more restrictive than or conflicting with the ones in the ISO/IEC 14443 series. When this is the case, some warnings are inserted into the present document.

This document allows PT devices to comply with the requirements of EMV Contactless Interface Specification and of CEN/TS 16794-1.

Table 1 summarizes how dual conformance of PT devices to the CEN/TS 16794 series and EMV Contactless Interface Specification is managed.

Table 1 — Conformity and interoperability matrix for EMV Contactless Interface Specification

		Contactless Objects	
		PT Objects <i>Specified and tested according to CEN/TS 16794 series</i>	EMV cards <i>Specified and tested according to EMV Contactless Interface Specification</i>
Contactless readers	PT readers (IFM readers and Common readers) <i>Specified and tested according to the CEN/TS 16794 series</i>	Conformity based on the CEN/TS 16794 series	No interoperability warranted
	EMV readers <i>Specified and tested according to EMV Contactless Interface Specification</i>	No interoperability warranted	Conformity based on EMV Contactless Interface Specification

7 Interoperability of PT devices and NFC mobile devices

7.1 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 series conformant contactless interface of PT devices is designed and tested according to the rules set out in this document.

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

- facilitate 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 series and ISO/IEC 10373-6. Procedures that support correlation between results from tests according to NFC Forum specifications and those according to ISO/IEC 10373-6 have been defined.

The correlation is used to translate test results from the NFC Forum's terminology into the ISO/IEC 10373-6 method for describing the relevant parameters. This is the foundation for the following characteristics of the concept for interoperability:

1) Development of PT devices and NFC mobile devices:

Despite the fact that different methods for describing the relevant parameters are used, this document and the relevant implementation specifications from the NFC Forum can be synchronized. The necessary alignment is conducted by a liaison between CEN TC278 and the NFC Forum. By synchronizing the implementations' specifications, interoperability is integrated into the design processes of NFC mobile devices and PT devices and makes it a common feature for both types of devices.

2) Test and certification of PT devices and NFC mobile devices:

Based on the concept for interoperability it is possible to judge if an NFC mobile device that went through NFC Forum testing is interoperable with a PT device that complies with the ISO/IEC 14443 requirements set out in this document. Therefore, it will be sufficient evidence of interoperability to test and certify ISO/IEC 14443 conformant PT devices according to CEN/TS 16794-2 and to test and certify NFC mobile devices according to NFC Forum's test and certification procedures.

The detailed methodology used to demonstrate the concept of interoperability between NFC Forum compliant devices and ISO/IEC 14443 compliant devices is described in the NFC Forum™ document describing the methodology used to demonstrate the concept of interoperability [4].

Table 2 summarizes how contactless communication can be ensured either via conformity testing between PT readers and PT objects or via interoperability testing between PT devices and NFC mobile devices.

Table 2 — Conformity and interoperability matrix for NFC Forum specifications

		Contactless Objects	
		PT Objects <i>Specified and tested according to the CEN/TS 16794 series</i>	NFC mobile devices in card emulation mode <i>Specified and tested according to NFC Forum specifications</i>
Contactless readers	PT readers (IFM readers and Common readers) <i>Specified and tested according to the CEN/TS 16794 series</i>	Conformity based on the CEN/TS 16794 series	Interoperability
	NFC mobile devices in reader/writer mode <i>Specified and tested according to NFC Forum specifications</i>	Interoperability	Conformity based on NFC Forum specifications

7.2 References for implementation and test of NFC mobile devices

The applicable NFC Forum specifications for designing and testing the contactless communication of NFC mobile devices are listed in Clause 2.

Conformance of NFC mobile devices to these specifications is a mandatory prerequisite to ensure interoperability of NFC mobile devices with PT devices as presented in Table 2.

CEN/TS 16794-1:2019 (E)

7.3 Limitations

Only parameters, parameter settings or modes of operations that are relevant for PT use cases have been regarded and synchronized for both NFC mobile and PT devices. These use cases are described in the STA document “Documentation of Use Cases for NFC Mobile Devices in Public Transport” [1].

The following parameters, settings or modes are currently not covered by the synchronization of specifications according to the concept for interoperability described in 7.1:

1. communication bit rates higher than 106 kbit/s;
2. peer-to-peer mode according to NFC Forum specifications;
3. ISO/IEC 18092 mode of communication;
4. ISO/IEC 15693 mode of communication.

8 Requirements applicable to PT readers

8.1 General

This clause sets out the requirements applicable to **PT readers** so that they can read contactless objects, i.e. PT objects or NFC mobile devices in card emulation mode. In addition, PT readers can also comply with the requirements from EMV Contactless Interface Specification and the present document.

The requirements described in 8.3, 8.4 and 8.5 are normative and mandatory to achieve interoperability.

The requirement described in 8.6 is informative only, hence not necessary to achieve interoperability.

The requirements on PT readers are identified by a numbering format that reads [Rdrnn] where nn is the number of the requirement.

This clause does not set out the requirements applicable to consumer market NFC mobile devices which follow NFC Forum specifications and certification.

8.2 Categories of PT reader

8.2.1 General

This document reflects that PT reader requirements depend on particular use cases. Those for mobile devices are documented in the STA document “Documentation of Use Cases for NFC Mobile Devices in Public Transport”.

Therefore, two categories of PT readers are defined:

- IFM reader,
- Common reader.

All implementation requirements and tests that are necessary to achieve interoperability between PT readers and PT objects are mandatory for both PT reader categories.

8.2.2 IFM reader

The first category, the “IFM reader”, covers use cases where performances (i.e. operating distance, transaction time, etc.) are key. As shown in Figure 1 and Figure 2, the IFM reader shall offer an operating range that covers the full scope of range A and range B defined in 11.3.3.2 and 11.3.3.4 respectively. All the test positions are defined in Table 4 and Table 5.

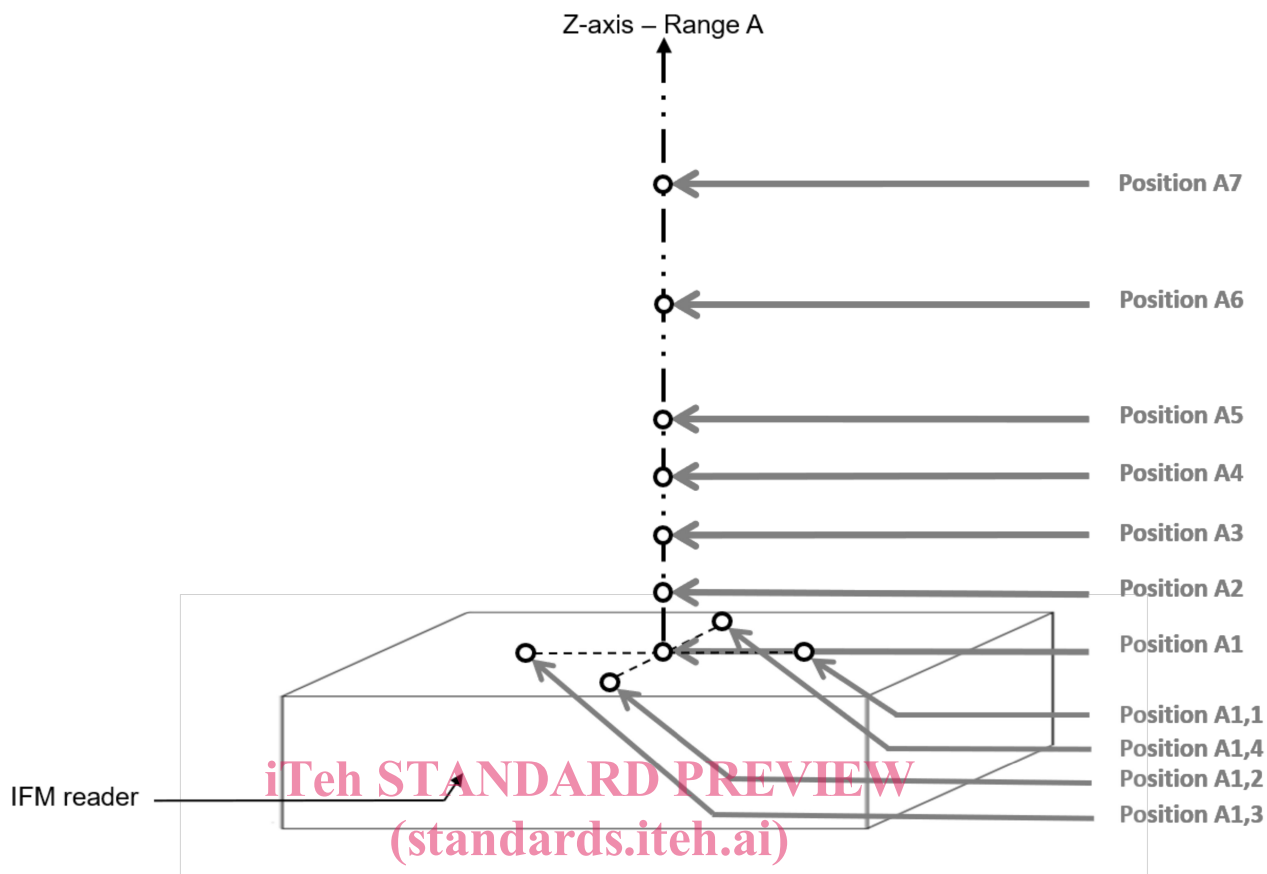


Figure 1 — Range A test positions for IFM reader
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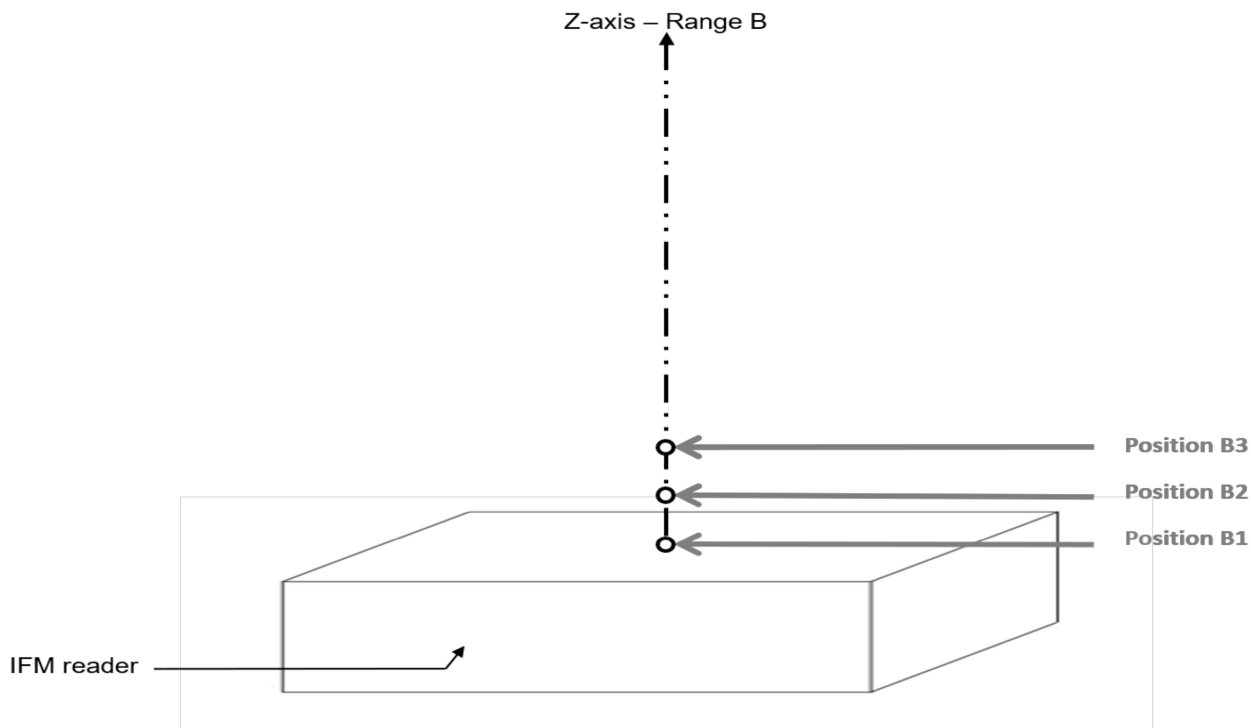


Figure 2 — Range B test positions for IFM reader