
Elektronsko pobiranje pristojbin - Sistemi na osnovi slik - Zgradba preskuševalnega niza in namen preskušanja (ISO/DTS 25588:2026)

Electronic fee collection - Image-based systems - Test suite structure and test purposes (ISO/DTS 25588:2026)

Elektronische Gebührenerhebung - Mautsystem basierend auf der Verarbeitung von Fahrzeugbildern - Struktur der Prüffolge und Prüfabsicht (ISO/DTS 25588:2026)

Perception de télépéage - Systèmes de péage basés sur l'analyse d'images - Structure de la suite d'essais et objectifs des essais (ISO/DTS 25588:2026)

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FINAL DRAFT

Technical Specification

ISO/DTS 25588

Electronic fee collection — Image-based systems — Test suite structure and test purposes

*Perception de télépéage — Systèmes basés sur l'analyse d'images
— Structure de la suite d'essais et objectifs des essais*

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CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
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Foreword

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Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

ISO/TR 25221 [1] identifies relevant characteristics of an image-based system and classifies these characteristics in a number of processes that can be combined in various ways to perform services such as electronic fee collection (EFC). The overall system performance or conformity to specifications depends on the combination of the different processes (the architecture of the system) and the related business processes, so it would be rather pointless to specify tests to measure it. However, test procedures can be specified to determine conformity to specifications for the isolated processes that ISO/TR 25221 [1] has identified, as long as they can be accessed separately. This document specifies a component test suite for image-based EFC systems.

Although this document is principally oriented at EFC systems, the test purposes herein specified are considered general enough to be used to evaluate other image-based systems, such as:

- Parking
 - Free-flow entry exit
 - Gated parking
 - Vehicle-based car park compliance checks and collection of evidence of non-compliance
 - Vehicle-based roadside inspection or enforcement
- Traffic violation detection
 - Roadside
 - Vehicle-based

Key performance indicators (KPI) or numerical thresholds for parameters of EFC systems, including image-based ones, are intended to be defined in a future edition of ISO/TS 37444 [2].

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Electronic fee collection — Image-based systems — Test suite structure and test purposes

1 Scope

This document specifies the set-up of a testing system and the test suite structure and test purposes, i.e. tests to assess conformity to specification for implemented processes of image-based electronic fee collection (EFC) systems.

The test purposes specified in this document are solely for evaluating the behaviour of isolated processes in an image-based EFC system.

The focus of the tests is related to the components and interfaces in the roadside system required for fulfilling the needs of an image-based EFC system. Generic and overall tests related to the reliability and qualitative capabilities of the complete charging point are outside of the scope of this document.

This document contains four annexes:

- [Annex A](#), normative, that specifies the additional needed information that an implementation provides to the tester to run tests;
- [Annex B](#), normative, that specifies the format of the data to be produced for each test run;
- [Annex C](#), informative, that collects a number of test purposes used to measure characteristics in implemented systems;
- [Annex D](#), informative, that collects licence plate design and manufacturing considerations.

2 Normative references

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.

ISO 17573-2, *Electronic fee collection — System architecture for vehicle related tolling — Part 2: Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 17573-2 and the following apply.

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

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

3.1 performance test

testing that simulates the expected workload on an application to assess factors such as transaction speed, user behaviour, and system stability under normal or peak conditions

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3.2

identification

correct recognition of all characters contained in a licence plate and of the elements that identify the country of registration of the vehicle

3.3

image-based EFC system identifier

device in the image-based EFC system that is in charge of a vehicle's licence plate *identification* ([3.2](#))

3.4

reference space

volume where the image-based electronic fee collection (EFC) system is declared to be operating properly

3.5

actual distance

distance between the *image-based EFC system identifier* ([3.3](#)) and the vehicle's licence plate within which the image-based EFC system is declared to be operating properly

4 Abbreviated terms and symbols

For the purposes of this document, the abbreviated terms in [Table 1](#) apply.

Table 1 — Abbreviations

AD	actual distance
AI	artificial intelligence
ANPR	automatic number plate recognition
EFC	electronic fee collection
IBES	image-based electronic fee collection system
LPN	licence plate number
OCR	optical character recognition
PD	passage detection
PIXIT	Protocol Implementation eXtra Information for Test
RS	reference space
RSE	roadside equipment
RSW	reference space width
SUT	system under test
SVM	support vector machine
TCLS	toll charger local system
VI	vehicle identification
VC	vehicle classification

For the purposes of this document, the symbols in [Table 2](#) apply.

Table 2 — Symbols

Symbol	Meaning
DET	detection of true positive vehicles
CDI	classification rate when classification is independent of detection and identification
CIC	classification rate when classification happens after identification
CLI	classification rate dependent on licence plate reading
CNR	classification true negative rate
DFP	detection of false positives rate

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Table 2 (continued)

Symbol	Meaning
ICI	identification rate when classification precedes identification
IDI	identification rate when detection precedes identification
LSI	laboratory static identification

5 Processes and variables under test

Table 3, derived from Table 5 in ISO/TR 25221:2025 [3], shows the variables and processes that may be subject to conformance test both in laboratory and in the field. The latter tests are at the frontier between conformance and performance tests.

Table 3 — Process and variables subject to tests

Process	Variable	Laboratory test		Test in field	
		Testability	Conditions	Testability	Conditions
Passage detection	Detection rate	No		Yes	Additional trusted detection system available
	Detection of false positives rate	No		Yes	Additional trusted detection system available
	Detection of false negatives rate	No		Yes	Additional trusted detection system available
Vehicle identification	Identification rate when detection precedes identification	Yes	Optical character recognition (OCR) separately testable	Yes	OCR separately testable
	Identification rate when classification precedes identification	Yes	OCR separately testable	Yes	OCR separately testable
Classification	Classification rate when independent of detection and identification	Yes	Classification system separately testable	Yes	Additional trusted detection system available
	Classification rate when classification happens after identification	Yes	Classification system separately testable	Yes	Additional trusted identification system available

6 Test setup

6.1 General setup requirements

Subclauses 6.1 to 6.6 describe the general setup for laboratory and on site tests. Further details regarding any specific tests are specified, if necessary, in the relative paragraphs.

Some assumptions are taken about licence plates, which shall be noted and reported when performing tests. These include, but are not limited to:

- Modern cameras use both natural light and IR images in their detection process.
- All plates are retro-reflective. This is important to locate the plate on a vehicle. The retro-reflectivity provides a high contrast rectangle to find.

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- Plate colour, fonts, images, labels are regulated to ensure the plate and its characters are clearly identifiable.
- Plates are fitted to vehicles in a predictable manner in a predictable area.
- Frames and screws have a negative impact on ANPR, specifically obscuring the retro-reflectivity of the plate.
- The measurement does not deal with plate-tampering to confuse detection, though the test as written can be used for that purpose as well.
- Poor plate material quality and tooling have an impact on ANPR performance as plates age. The main issues are:
 - Delamination.
 - Character print decal impacts sharpness of character edges.

The system under test (SUT) shall expose a fully operational replica of the roadside equipment (RSE) and any centralized correlation component used in operation. When correlation among multiple RSE sources is centralized, the same correlation logic shall be part of the SUT during tests to surface possible end-to-end failure modes (e.g. race conditions, late event merging).

Specific requirements that the SUT shall provide for testing purposes are detailed in [Annex A](#).

6.2 Laboratory test setup

Laboratory tests aim at verifying:

- the ability of the system to correctly acquire and recognize license plates under controlled lighting, geometry, motion and occlusion conditions;
- the robustness of the ANPR process under variations of perspective, illumination, plate position and simultaneous presence of multiple plates within the reference space (RS).

The tests shall be conducted in a controlled indoor environment, providing:

- controlled ambient light levels (0 lux to 10,000 lux depending on the test);
- free space to position plates and cameras at required geometries;
- mechanical equipment enabling precise placement and rotation of plates.

Laboratory instrumentation includes:

- A set of licence plates manufactured with materials compliant with current regulatory prescriptions (as per the applicable highway code). Plates may be of any of the following types:
 - rear plates for motor vehicles;
 - front plates for motor vehicles;
 - rear plates for motorcycles;
 - plates for mopeds.
- An RS with the following characteristics:
 - Adjustable incandescent (e.g. halogen) lamp with illuminance levels as required by the tests and horizontal incidence angle of $13^\circ \pm 1^\circ$ relative to plate axis.