

Certification Report

TnD v5.1 on ID-One Cosmo X (PACE/EAC1/Polymorphic eMRTD/LDS2 configuration)

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Foreword

The Netherlands Scheme for Certification in the Area of IT Security (NSCIB) provides a third-party evaluation and certification service for determining the trustworthiness of Information Technology (IT) security products. Under this NSCIB, TrustCB B.V. has the task of issuing certificates for IT security products, as well as for protection profiles and sites.

Part of the procedure is the technical examination (evaluation) of the product, protection profile or site according to the Common Criteria assessment guidelines published by the NSCIB. Evaluations are performed by an IT Security Evaluation Facility (ITSEF) under the oversight of the NSCIB Certification Body, which is operated by TrustCB B.V. in cooperation with the Ministry of the Interior and Kingdom Relations.

An ITSEF in the Netherlands is a commercial facility that has been licensed by TrustCB B.V. to perform Common Criteria evaluations; a significant requirement for such a licence is accreditation to the requirements of ISO Standard 17025 “General requirements for the accreditation of calibration and testing laboratories”.

By awarding a Common Criteria certificate, TrustCB B.V. asserts that the product or site complies with the security requirements specified in the associated (site) security target, or that the protection profile (PP) complies with the requirements for PP evaluation specified in the Common Criteria for Information Security Evaluation. A (site) security target is a requirements specification document that defines the scope of the evaluation activities.

The consumer should review the (site) security target or protection profile, in addition to this certification report, to gain an understanding of any assumptions made during the evaluation, the IT product's intended environment, its security requirements, and the level of confidence (i.e., the evaluation assurance level) that the product or site satisfies the security requirements stated in the (site) security target.

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Recognition of the Certificate

Presence of the Common Criteria Recognition Arrangement (CCRA) and the SOG-IS logos on the certificate indicates that this certificate is issued in accordance with the provisions of the CCRA and the SOG-IS Mutual Recognition Agreement (SOG-IS MRA) and will be recognised by the participating nations.

International recognition

The CCRA was signed by the Netherlands in May 2000 and provides mutual recognition of certificates based on the Common Criteria (CC). Since September 2014 the CCRA has been updated to provide mutual recognition of certificates based on cPPs (exact use) or STs with evaluation assurance components up to and including EAL2+ALC_FLR.

For details of the current list of signatory nations and approved certification schemes, see <http://www.commoncriteriaportal.org>.

European recognition

The SOG-IS MRA Version 3, effective since April 2010, provides mutual recognition in Europe of Common Criteria and ITSEC certificates at a basic evaluation level for all products. A higher recognition level for evaluation levels beyond EAL4 (respectively E3-basic) is provided for products related to specific technical domains. This agreement was signed initially by Finland, France, Germany, The Netherlands, Norway, Spain, Sweden and the United Kingdom. Italy joined the SOG-IS MRA in December 2010.

For details of the current list of signatory nations, approved certification schemes and the list of technical domains for which the higher recognition applies, see <https://www.sogis.eu>.

1 Executive Summary

This Certification Report states the outcome of the Common Criteria security evaluation of the TnD v5.1 on ID-One Cosmo X (PACE/EAC1/Polymorphic eMRTD/LDS2 configuration). The developer of the TnD v5.1 on ID-One Cosmo X (PACE/EAC1/Polymorphic eMRTD/LDS2 configuration) is IDEMIA located in Courbevoie, France and they also act as the sponsor of the evaluation and certification. A Certification Report is intended to assist prospective consumers when judging the suitability of the IT security properties of the product for their particular requirements.

The TOE is a composite product that consist of an IDEMIA applet named TnD v5.1 and its supporting “Common” library package on top of the COSMO X Global Platform Java Card 3.0.5 operating system and Infineon SLC37 contact/contactless smart card security controller in **PACE/EAC1/Polymorphic eMRTD/LDS2 configuration**.

The TOE supports the ICAO and TR-3110-1 and -3 defined protocols for EAC1 (Chip Authentication v1 and Terminal Authentication v1), PACE (Generic Mapping (GM), Integrated Mapping (IM) and Chip Authentication Mapping (CAM)), Active Authentication (AA) and LDS2 protocol extensions for EAC1 and PACE. In addition, the TOE supports Polymorphic Authentication protocol (PMA) for privacy-protected authentication with polymorphic ID attributes.

For compliance with the protection profiles claimed in the security target, the PACE and EAC1 protocols **MUST** be configured on the TOE for each configured ID document application mentioned below.

Within the scope of the Security Target *[ST]*, the TOE can be configured as a stand-alone application or as a combination of the following official ID document applications:

- ICAO/EAC eMRTD, including LDS2 Travel records (stamps), Visa records and Additional biometrics in accordance with ICAO *[ICAO-9303]* and *[LDS2_TR]* specifications,
- Polymorphic eMRTD according to Dutch national specification and
- EU/ISO Driving Licence compliant to ISO/IEC 18013 or ISO/IEC TR 19446.

The Polymorphic eMRTD application is in compliance with the Polymorphic eMRTD Specification of the Dutch National Office of Identity Data (written by IDEMIA). This ensures authentication to an authentication service at eIDAS High assurance level, without revealing privacy sensitive ID attributes to the authentication service provider. This is accomplished by the TOE’s Polymorphic Authentication (PMA) protocol, which randomizes Polymorphic Pseudonym, Identity and Complementary ID attributes.

The TOE may also be used as an ISO Driving Licence (IDL) compliant to ISO/IEC 18013 or ISO/IEC TR 19446, as both eMRTD and IDL applications share the same protocols and data structure organization.

The TnD v5.1 application embeds other secure functionalities (e.g. BAC and EAC in combination with BAC), which are not in the scope of this evaluation, but are covered in the scope of other evaluated configurations of this product.

The TOE was previously evaluated by SGS Brightsight B.V. located in Delft, The Netherlands and was certified under the accreditation of TÜV Rheinland Nederland on 26 August 2021 (CC-21-0362721) The current evaluation of the TOE has also been conducted by SGS Brightsight B.V. and was completed on 09 August 2023 with the approval of the ETR. The certification procedure has been conducted in accordance with the provisions of the Netherlands Scheme for Certification in the Area of IT Security *[NSCIB]*.

The major changes from previous evaluations are:

The ST has been updated to change the references to other updated documents.

The user guidance has been updated to reflect underlying platform functionality and to make editorial and changes and clarifications.

The STAR reports were renewed.

An update to the security target [ST] and security guidelines to cover changes in the underlying platform certificate and provide additional configuration guidance.

Updated design compliance with respect to the updated platform security recommendations.

The certification took into account that the security evaluation reused the evaluation results of previously performed evaluations. A full, up-to-date vulnerability analysis has been made, as well as renewed testing.

The scope of the evaluation is defined by the security target [ST], which identifies assumptions made during the evaluation, the intended environment for the TnD v5.1 on ID-One Cosmo X (PACE/EAC1/Polymorphic eMRTD/LDS2 configuration), the security requirements, and the level of confidence (evaluation assurance level) at which the product is intended to satisfy the security requirements. Consumers of the TnD v5.1 on ID-One Cosmo X (PACE/EAC1/Polymorphic eMRTD/LDS2 configuration) are advised to verify that their own environment is consistent with the security target, and to give due consideration to the comments, observations and recommendations in this certification report.

The results documented in the evaluation technical report [ETR]¹ for this product provide sufficient evidence that the TOE meets the EAL5 augmented (EAL5+) assurance requirements for the evaluated security functionality. This assurance level is augmented with ALC_DVS.2 (Sufficiency of security measures) and AVA_VAN.5 (Advanced methodical vulnerability analysis).

The evaluation was conducted using the Common Methodology for Information Technology Security Evaluation, Version 3.1 Revision 5 [CEM] for conformance to the Common Criteria for Information Technology Security Evaluation, Version 3.1 Revision 5 [CC] (Parts I, II and III).

TrustCB B.V., as the NSCIB Certification Body, declares that the evaluation meets all the conditions for international recognition of Common Criteria Certificates and that the product will be listed on the NSCIB Certified Products list. Note that the certification results apply only to the specific version of the product as evaluated.

¹ The Evaluation Technical Report contains information proprietary to the developer and/or the evaluator, and is not available for public review.

2 Certification Results

2.1 Identification of Target of Evaluation

The Target of Evaluation (TOE) for this evaluation is the TnD v5.1 on ID-One Cosmo X (PACE/EAC1/Polymorphic eMRTD/LDS2 configuration) from IDEMIA located in Courbevoie, France.

The TOE is comprised of the following main components:

Delivery item type	Identifier	Version
Platform	ID-One Cosmo X	SAAAAR Code: 093363 + patch 099E71 093364 + patches 099441 and 099E21 093366
Software	TnD applet (SAAAAR 203621FF)	v5.1 (00000208)
	Common Package (SAAAAR 417641FF)	v1.0 (01010008, Config 1) (01040007, Config 2)

To ensure secure usage a set of guidance documents is provided, together with the TnD v5.1 on ID-One Cosmo X (PACE/EAC1/Polymorphic eMRTD/LDS2 configuration). For details, see section 2.5 "Documentation" of this report.

For a detailed and precise description of the TOE lifecycle refer to the [ST], chapter 4.

2.2 Security Policy

The TOE encompasses the following features:

- In Personalisation phase:
 - Authentication protocol for personalisation agent authentication;
 - 3DES, AES128, AES192 and AES256 Global Platform secure messaging;
 - Access control;
 - Creation and configuration of application instances and their logical data structure;
 - Secure data loading;
 - Secure import and/or on-chip generation of Chip Authentication key pairs for CAV1 and PACE-CAM;
 - Secure import and/or on-chip generation of the AA key pair;
 - Life-cycle phase switching to operational phase.
- In operational phase:
 - PACE mapping types Generic Mapping (GM), Integrated Mapping (IM) and Chip Authentication Mapping (CAM)*; Note*: The availability of PACE-CAM depends on platform configuration;
 - PACE passwords: MRZ, CAN, PIN and PUK;
 - PACE PIN/PUK suspend/resume mechanism according to [TR-03110-2] in case of TOE communication over the contactless interface;
 - PIN/PUK verify and PIN reset;

- EAC1: Chip Authentication v1 (CAv1) and Terminal Authentication v1 (TAv1);
- Active Authentication (AA);
- After CAv1: restart ICAO secure messaging in 3DES, AES128, AES192 or AES256 cipher mode;
- After PACE start ICAO secure messaging in 3DES, AES128, AES192 or AES256 cipher mode;
- After EAC1: access control to DG3 and DG4 based on the effective authorization established during TAv1;
- After EAC1: Polymorphic Authentication;
- LDS2 protocol extensions for PACE, TAv1 and CAv1 and EAC1 access control to LDS2 applications (Travel records, Visa records and Additional Biometrics);
- Automatic BAC phasing out;
- Digital Blurring of Images (DBI).

2.3 Assumptions and Clarification of Scope

2.3.1 Assumptions

The assumptions defined in the Security Target are not covered by the TOE itself. These aspects lead to specific Security Objectives to be fulfilled by the TOE-Environment. For detailed information on the security objectives that must be fulfilled by the TOE environment, see section 7.2 of the [ST].

2.3.2 Clarification of scope

The evaluation did not reveal any threats to the TOE that are not countered by the evaluated security functions of the product

TnD v5.1 applet supports Match on Card (MoC) functionality, which is used to support the DBI deactivation. MoC as a security feature is not within the scope of the [ST], though may be configured without impacting the security of the TOE.

Note that the ICAO MRTD infrastructure critically depends on the objectives for the environment to be met. These are not weaknesses of this particular TOE, but aspects of the ICAO MRTD infrastructure as a whole.

The environment in which the TOE is personalised must perform proper and safe personalisation according to the guidance and referred ICAO guidelines.

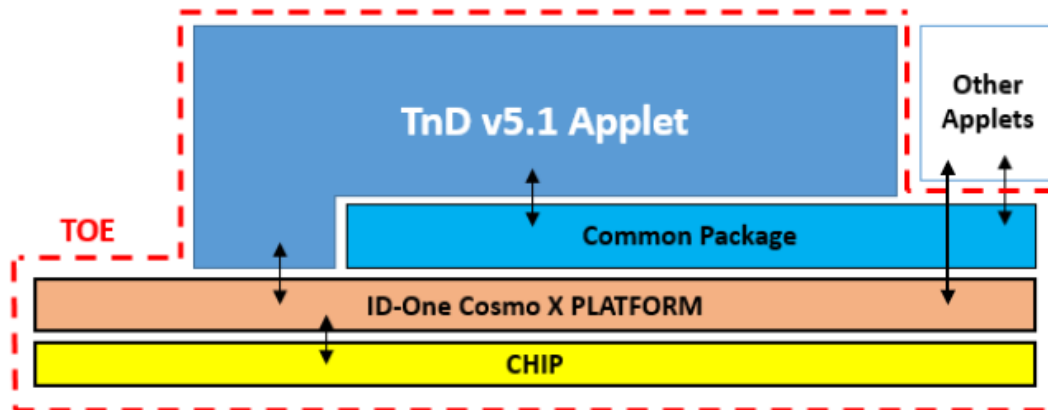
The environment in which the TOE is used must ensure that the inspection system protects the confidentiality and integrity of the data send and read from the TOE.

2.4 Architectural Information

From physical/hardware point of view, the TOE is a bare microchip with its external interfaces for communication. The physical medium on which the microchip is mounted is not part of the target of evaluation because it does not alter nor modify any security functions of the TOE.

The TOE may be used in several form factors, like wafer, chip modules on a reel, chip modules embedded in ID3 passport booklets or ID3 holder pages, chip modules embedded in ID1 cards, chip modules embedded in antenna inlays, etc.

The logical architecture, originating from the Security Target [ST] of the TOE can be depicted as follows:



Logical architecture of the TOE.

The Target of Evaluation (TOE), addressed by the security target, is an electronic travel document representing a contactless/contact based smart card or passport, programmed according to the Logical data structure (LDS) and authentication protocols specified in [ICAO-9303], [9303-10_LDS2], [LDS2_TR], [TR-03110-1], [TR-03110-3] and [PCA-eMRTD].

In accordance with [EAC-PP-V2] and [PACE-PP] and the communication between terminal and chip SHALL be established and protected by the Password Authenticated Connection Establishment (PACE) protocol.

The TOE may also be used as an ISO driving license, compliant to ISO/IEC 18013 or ISO/IEC TR 19446.

The Polymorphic eMRTD extensions present on the TOE enable secure authentication with enhanced privacy protection features. It provides the ID document holder the possibility to authenticate towards a service provider at eIDAS High assurance level in a non-traceable and non-linkable manner thanks to usage of Polymorphic Pseudonyms and other Polymorphic ID attributes. This is accomplished by the TOE's Polymorphic Authentication (PMA) protocol, which randomizes Polymorphic Pseudonym, Identity and Complementary ID attributes.

The ICAO LDS2 protocol and Logical Data Structure extensions are available in the TOE for supporting secure access and storage Electronic visas, electronic travel stamps or additional biometrics like fingerprint or an iris scan.

The "TnD v5.1 on Cosmo X" TOE consists of:

- The MRTD's chip circuitry and the IC dedicated software;
- The IC embedded software being the "ID-One Cosmo X platform" consisting of:
 - Java Card virtual machine, ensuring language-level security;
 - Java Card runtime environment, providing additional security features for Java card technology enabled devices;
 - Java card API, providing access to card's resources for the Applet;
 - Global Platform Card Manager, responsible for management of Applets on the card.
 - Crypto Library.
- TnD v5.1 Applet along with its Common (library) Package loaded in non-volatile (FLASH) memory;
- The associated guidance documentation in [AGD_PRE] and [AGD_OPE];
- The Personalization Agent Key set (see [AGD_PRE]).

2.5 Documentation

The following documentation is provided with the product by the developer to the customer:

Reference	Identifier	Version
[AGD_OPE]	TnD v5.1 on ID-One Cosmo X - Operational User Guidance (AGD_OPE)	FQR 220 1580 Ed 2
[AGD_PRE]	TnD v5.1 on ID-One Cosmo X - Preparative Procedures (AGD_PRE)	FQR 220 1579 Ed 4

2.6 IT Product Testing

Testing (depth, coverage, functional tests, independent testing): The evaluators examined the developer's testing activities documentation and verified that the developer has met their testing responsibilities.

2.6.1 Testing approach and depth

The developer tested the TOE using both a standardised accreditation test suite and a proprietary test suite for Common Criteria to ensure that all SFRs in the Security Target were tested. By performing an extensive requirements analysis and testing accordingly, the developer ensured that the required depth and coverage of testing was achieved.

For the testing performed by the evaluators, the sample of repeated developer tests was chosen to get a coverage of all the features while ensuring coverage of all product configurations, i.e., including PACE(-CAM), CA, TA, AA, DBI, BAC, PIN, and PMA, as well as configurations where relevant platform functionality was not available. Additionally, this sample allowed the evaluator to observe different cryptographic algorithms including RSA, ECDSA, and ECDH. Finally, the sample included a range of different important (internal) applet security features, such as certificate chaining, the state machine, access control of the file system, slow down, verification failure, and certificate attribute checking, covering both the personalization as well as the operational phase. The repetition was performed through witnessing.

The developer test strategy already included a high depth of testing. The evaluator-defined tests focused on the verification of specific countermeasures and on passport traceability, in addition to a verification of the preparatory guidance.

2.6.2 Independent penetration testing

- When evaluating the evidence in the classes ASE, ADV and AGD the evaluator considered whether potential vulnerabilities can already be identified due to the TOE type and/or specified behaviour in such an early stage of the evaluation.
- For ADV_IMP a thorough implementation representation review was performed on the TOE. During this attack-oriented analysis, the protection of the TOE was analysed using the knowledge gained from all previous evaluation classes. This resulted in the identification of (additional) potential vulnerabilities. This analysis was performed according to the attack methods in [JIL-AAPS]. An important source for assurance in this step was the technical report [PF-ETRFC] of the underlying platform.
- All potential vulnerabilities were analysed using the knowledge gained from all evaluation classes and information from the public domain. A judgment was made on how to assure that these potential vulnerabilities are not exploitable. The potential vulnerabilities were addressed by penetration testing, a guidance update or in other ways that were deemed appropriate.

The TOE penetration tests that were defined are presented below.

For the first certification penetration testing comprised one week, 100% of which consisted of perturbation attacks.

For this current evaluation, the vulnerability analysis led to additional penetration testing of one week, 100% of which consisted of logical attacks.

2.6.3 Test configuration

The configuration of the sample used for independent evaluator testing and penetration testing was the same as described in the [ST].

Independent testing for the previous certification was performed on an earlier revision of the TOE. The assurance gained from testing on an earlier revision has been assessed to be valid for the final TOE version, because the changes introduced were minimal and did not have an impact on the TSF.

Testing performed in this current certification was performed on the latest revision of the TOE.

2.6.4 Test results

The testing activities, including configurations, procedures, test cases, expected results and observed results are summarised in the [ETR], with references to the documents containing the full details.

The developer's tests and the independent functional tests produced the expected results, giving assurance that the TOE behaves as specified in its [ST] and functional specification.

No exploitable vulnerabilities were found with the independent penetration tests.

The algorithmic security level of cryptographic functionality has not been rated in this certification process, but the current consensus on the algorithmic security level in the open domain, i.e., from the current best cryptanalytic attacks published, has been taken into account.

2.7 Reused Evaluation Results

There has been extensive reuse of the ALC aspects for the sites involved in the development and production of the TOE, by use of 10 Site Technical Audit Report{s}.

No sites have been visited as part of this evaluation.

2.8 Evaluated Configuration

The TOE is defined uniquely by its name and version number TnD v5.1 on ID-One Cosmo X (PACE/EAC1/Polymorphic eMRTD/LDS2 configuration).

2.9 Evaluation Results

The evaluation lab documented their evaluation results in the [ETR], which references an ASE Intermediate Report and other evaluator documents, and Site Technical Audit Report(s) for the site(s) [STAR]².

The verdict of each claimed assurance requirement is "Pass".

Based on the above evaluation results the evaluation lab concluded the TnD v5.1 on ID-One Cosmo X (PACE/EAC1/Polymorphic eMRTD/LDS2 configuration), to be **CC Part 2 extended, CC Part 3 conformant**, and to meet the requirements of **EAL 5 augmented with ALC_DVS.2 and AVA_VAN.5**. This implies that the product satisfies the security requirements specified in Security Target [ST].

The Security Target claims 'strict' conformance to the Protection Profile [PP0056] and [PP0068].

2.10 Comments/Recommendations

The user guidance as outlined in section 2.5 "Documentation" contains necessary information about the usage of the TOE.

In addition, all aspects of assumptions, threats and policies as outlined in the Security Target not covered by the TOE itself must be fulfilled by the operational environment of the TOE.

The customer or user of the product shall consider the results of the certification within his system risk management process. For the evolution of attack methods and techniques to be covered, the

² The Site Technical Audit Report contains information necessary to an evaluation lab and certification body for the reuse of the site audit report in a TOE evaluation.

customer should define the period of time until a re-assessment for the TOE is required and thus requested from the sponsor of the certificate.

The strength of the cryptographic algorithms and protocols was not rated in the course of this evaluation. This specifically applies to the following proprietary or non-standard algorithms, protocols and implementations: none

Not all key sizes specified in the security target have sufficient cryptographic strength for satisfying the AVA_VAN.5 “high attack potential”. In order to be protected against attackers with a “high attack potential”, sufficiently large cryptographic key sizes SHALL be configured for this TOE.

3 Security Target

The Security Target TnD v5.1 on ID-One Cosmo X (PACE/EAC1/Polymorphic eMRTD/LDS2 configuration), FQR 550 0430, Ed 2, 09 May 2023 [ST] is included here by reference.

Please note that, to satisfy the need for publication, a public version [ST-lite] has been created and verified according to [ST-SAN].

4 Definitions

This list of acronyms and definitions contains elements that are not already defined by the CC or CEM:

AA	Active Authentication
BAC	Basic Access Control
CA	Chip Authentication
CAM	Chip Authentication Mapping
CAN	Card Access Number
DBI	Digital Blurring of Images
EAC	Extended Access Control
ECDH	Elliptic Curve Diffie-Hellman algorithm
ECDSA	Elliptic Curve Digital Signature Algorithm
eMRTD	electronic MRTD
GM	Generic Mapping
IC	Integrated Circuit
ICAO	International Civil Aviation Organization
IM	Integrated Mapping
IT	Information Technology
ITSEF	IT Security Evaluation Facility
JIL	Joint Interpretation Library
LDS	Logical Data Structure
MAC	Message Authentication Code
MRTD	Machine Readable Travel Document
NSCIB	Netherlands Scheme for Certification in the area of IT security
PACE	Password Authenticated Connection Establishment
PIN	Personal Identification Number
PP	Protection Profile
PUK	Personal Unblocking Key
TA	Terminal Authentication
TOE	Target of Evaluation

5 Bibliography

This section lists all referenced documentation used as source material in the compilation of this report.

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(This is the end of this report.)