Federal Office
for Information Security

Certification Report

BSI-DSZ-CC-0707-2012

for

NXP Secure Smart Card Controllers P5CD016V1D / P5CD021V1D / P5CD041V1D / P5Cx081V1D with DESFire EV1

from

NXP Semiconductors Germany GmbH

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Bundesamt
für Sicherheit in der
Informationstechnik

Deutsches IT-Sicherheitszertifikat

erteilt vom Bundesamt für Sicherheit in der Informationstechnik

BSI-DSZ-CC-0707-2012

Smartcards: Controller, Operating System

NXP Secure Smart Card Controllers P5CD016V1D / P5CD021V1D / P5CD041V1D / P5Cx081V1D with DESFire EV1

from	NXP Semiconductors Germany GmbH
PP Conformance:	Security IC Platform Protection Profile, Version 1.0, 15 June 2007, BSI-CC-PP-0035-2007
Functionality:	PP conformant plus product specific extensions Common Criteria Part 2 extended
Assurance:	Common Criteria Part 3 conformant EAL 4 augmented by ALC_DVS.2, AVA_VAN.5, ATE_DPT.2, ASE_TSS.2

Common Criteria Recognition Arrangement for components up to EAL 4

Common Criteria

The IT product identified in this certificate has been evaluated at an approved evaluation facility using the Common Methodology for IT Security Evaluation (CEM), Version 3.1 extended by advice of the Certification Body for components beyond EAL 5 and guidance specific for the technology of the product for conformance to the Common Criteria for IT Security Evaluation (CC), Version 3.1.

This certificate applies only to the specific version and release of the product in its evaluated configuration and in conjunction with the complete Certification Report.

The evaluation has been conducted in accordance with the provisions of the certification scheme of the German Federal Office for Information Security (BSI) and the conclusions of the evaluation facility in the evaluation technical report are consistent with the evidence adduced.

This certificate is not an endorsement of the IT product by the Federal Office for Information Security or any other organisation that recognises or gives effect to this certificate, and no warranty of the IT product by the Federal Office for Information Security or any other organisation that recognises or gives effect to this certificate, is either expressed or implied.

Bonn, 13 August 2012

For the Federal Office for Information Security

SOGIS IT SECURITY CERTIFIED

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Preliminary Remarks

Under the BSIG[1] Act, the Federal Office for Information Security (BSI) has the task of issuing certificates for information technology products.

Certification of a product is carried out on the instigation of the vendor or a distributor, hereinafter called the sponsor.

A part of the procedure is the technical examination (evaluation) of the product according to the security criteria published by the BSI or generally recognised security criteria.

The evaluation is normally carried out by an evaluation facility recognised by the BSI or by BSI itself.

The result of the certification procedure is the present Certification Report. This report contains among others the certificate (summarised assessment) and the detailed Certification Results.

The Certification Results contain the technical description of the security functionality of the certified product, the details of the evaluation (strength and weaknesses) and instructions for the user.

[1] Act on the Federal Office for Information Security (BSI-Gesetz - BSIG) of 14 August 2009, Bundesgesetzblatt I p. 2821

Contents

A Certification

1 Specifications of the Certification Procedure

The certification body conducts the procedure according to the criteria laid down in the following:

- BSIG[2]
- BSI Certification Ordinance[3]
- BSI Schedule of Costs[4]
- Special decrees issued by the Bundesministerium des Innern (Federal Ministry of the Interior)
- DIN EN 45011 standard
- BSI certification: Procedural Description (BSI 7125) [3]
- Common Criteria for IT Security Evaluation (CC), Version 3.1[5] [1]
- Common Methodology for IT Security Evaluation, Version 3.1 [2]
- BSI certification: Application Notes and Interpretation of the Scheme (AIS) [4]

2 Recognition Agreements

In order to avoid multiple certification of the same product in different countries a mutual recognition of IT security certificates - as far as such certificates are based on ITSEC or CC - under certain conditions was agreed.

2.1 European Recognition of ITSEC/CC – Certificates (SOGIS-MRA)

The SOGIS-Mutual Recognition Agreement (SOGIS-MRA) Version 3 became effective in April 2010. It defines the recognition of certificates for IT-Products at a basic recognition level and in addition at higher recognition levels for IT-Products related to certain technical domains only.

The basic recognition level includes Common Criteria (CC) Evaluation Assurance Levels EAL1 to EAL4 and ITSEC Evaluation Assurance Levels E1 to E3 (basic). For higher recognition levels the technical domain Smart card and similar Devices has been defined. It includes assurance levels beyond EAL4 resp. E3 (basic). In Addition, certificates issued for Protection Profiles based on Common Criteria are part of the recognition agreement.

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2 Act on the Federal Office for Information Security (BSI-Gesetz - BSIG) of 14 August 2009, Bundesgesetzblatt I p. 2821

3 Ordinance on the Procedure for Issuance of a Certificate by the Federal Office for Information Security (BSI-Zertifizierungsverordnung, BSIZertV) of 07 July 1992, Bundesgesetzblatt I p. 1230

4 Schedule of Cost for Official Procedures of the Bundesamt für Sicherheit in der Informationstechnik (BSI-Kostenverordnung, BSI-KostV) of 03 March 2005, Bundesgesetzblatt I p. 519

5 Proclamation of the Bundesministerium des Innern of 12 February 2007 in the Bundesanzeiger dated 23 February 2007, p. 3730

As of September 2011 the new agreement has been signed by the national bodies of Austria, Finland, France, Germany, Italy, The Netherlands, Norway, Spain, Sweden and the United Kingdom.Details on recognition and the history of the agreement can be found at https://www.bsi.bund.de/zertifizierung.

The SOGIS-MRA logo printed on the certificate indicates that it is recognised under the terms of this agreement by the nations listed above.

2.2 International Recognition of CC – Certificates (CCRA)

An arrangement (Common Criteria Recognition Arrangement) on the mutual recognition of certificates based on the CC Evaluation Assurance Levels up to and including EAL 4 has been signed in May 2000 (CCRA). It includes also the recognition of Protection Profiles based on the CC.

As of September 2011 the arrangement has been signed by the national bodies of: Australia, Austria, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, India, Israel, Italy, Japan, Republic of Korea, Malaysia, The Netherlands, New Zealand, Norway, Pakistan, Republic of Singapore, Spain, Sweden, Turkey, United Kingdom, United States of America. The current list of signatory nations and approved certification schemes can be seen on the website: http://www.commoncriteriaportal.org.

The Common Criteria Recognition Arrangement logo printed on the certificate indicates that this certification is recognised under the terms of this agreement by the nations listed above.

This evaluation contains the components ALC_DVS.2, AVA_VAN.5, ASE_TSS.2 that are not mutually recognised in accordance with the provisions of the CCRA. For mutual recognition the EAL4 components of these assurance families are relevant.

3 Performance of Evaluation and Certification

The certification body monitors each individual evaluation to ensure a uniform procedure, a uniform interpretation of the criteria and uniform ratings.

The product NXP Secure Smart Card Controllers P5CD016V1D / P5CD021V1D / P5CD041V1D / P5Cx081V1D with DESFire EV1 has undergone the certification procedure at BSI.

The evaluation of the product NXP Secure Smart Card Controllers P5CD016V1D / P5CD021V1D / P5CD041V1D / P5Cx081V1D with DESFire EV1 was conducted by T-Systems GEI GmbH. The evaluation was completed on 16 July 2012. The T-Systems GEI GmbH is an evaluation facility (ITSEF)[6] recognised by the certification body of BSI.

For this certification procedure the sponsor and applicant is: NXP Semiconductors Germany GmbH.

The product was developed by: NXP Semiconductors Germany GmbH.

The certification is concluded with the comparability check and the production of this Certification Report. This work was completed by the BSI.

[6] Information Technology Security Evaluation Facility

4 Validity of the Certification Result

This Certification Report only applies to the version of the product as indicated. The confirmed assurance package is only valid on the condition that

- all stipulations regarding generation, configuration and operation, as given in the following report, are observed,
- the product is operated in the environment described, as specified in the following report and in the Security Target.

For the meaning of the assurance levels please refer to the excerpts from the criteria at the end of the Certification Report.

The Certificate issued confirms the assurance of the product claimed in the Security Target at the date of certification. As attack methods evolve over time, the resistance of the certified version of the product against new attack methods needs to be re-assessed. Therefore, the sponsor should apply for the certified product being monitored within the assurance continuity program of the BSI Certification Scheme (e.g. by a re-certification). Specifically, if results of the certification are used in subsequent evaluation and certification procedures, in a system integration process or if a user's risk management needs regularly updated results, it is recommended to perform a re-assessment on a regular e.g. annual basis.

In case of changes to the certified version of the product, the validity can be extended to the new versions and releases, provided the sponsor applies for assurance continuity (i.e. re-certification or maintenance) of the modified product, in accordance with the procedural requirements, and the evaluation does not reveal any security deficiencies.

5 Publication

The product NXP Secure Smart Card Controllers P5CD016V1D / P5CD021V1D / P5CD041V1D / P5Cx081V1D with DESFire EV1 has been included in the BSI list of certified products, which is published regularly (see also Internet: https://www.bsi.bund.de and [5]). Further information can be obtained from BSI-Infoline +49 228 9582-111.

Further copies of this Certification Report can be requested from the developer[7] of the product. The Certification Report may also be obtained in electronic form at the internet address stated above.

[7] NXP Semiconductors Germany GmbH
Business Unit Identification
Stresemannallee 101
22529 Hamburg

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B Certification Results

The following results represent a summary of

- the Security Target of the sponsor for the Target of Evaluation,
- the relevant evaluation results from the evaluation facility, and
- complementary notes and stipulations of the certification body.

1 Executive Summary

The Target of Evaluation (TOE) is called "NXP Secure PKI Smart Card Controllers P5Cx081V1D/P5CD041V1D/P5CD021V1D/P5CD016V1D with DESFire EV1". It is a hardware platform with IC Dedicated Support Software that provides additional security services mainly independent of the Security IC Embedded Software. The TOE can be used for high-end safeguarded applications, and is designed for embedding into chip cards according to ISO/IEC 7816 and for contactless applications. The Security IC Embedded Software can call the DESFire EV1 Software. If the DESFire EV1 Software is called it provides its own security functionality and operates independent of the Security IC Embedded Software on the memory partitions assigned to the DESFire EV1 Software. The DESFire EV1 Software supports DESFire compatible applications in the field of Electronic fare collection, Stored value card systems, Access control systems, Loyalty, etc….

The TOE can be delivered in different major configurations. These major configurations support different memory types and a different contact-less interface. Therefore they have own names for unique identification. All major configurations are based on the same hardware platform and the same IC Dedicated Software. The details of the configuration are explained in the ST [6] and [8] in chapter 1.4.1.

The hardware platform incorporates an 8-bit processing unit, volatile and non-volatile memories accessible via a Memory Management Unit, cryptographic coprocessors, other security components and two communication interfaces.

The IC Dedicated Software includes IC Dedicated Support Software and IC Dedicated Test Software. The IC Dedicated Test Software is disabled before the TOE is delivered. The IC Dedicated Support Software consists of the DESFire EV1 Software and the Boot-ROM Software. The Boot-ROM Software is used during each start-up of the TOE. The DESFire EV1 Software provides a set of functions to manage various kinds of data files stored in the non-volatile EEPROM partition for the DESFire EV1 Software.

The hardware platform and the IC Dedicated Support Software enforce a separation between the DESFire EV1 Software and the Security IC Embedded Software provided by the customer.

The TOE includes a Data Sheet for the hardware platform, a functional specification for the functionality provided by the DESFire EV1 Software, a document describing the Instruction Set of the hardware platform and the Guidance Document providing a description regarding the secure configuration and usage of the TOE.

The security functionality of the TOE is designed to act as an integral part of a complete security system in order to strengthen the design as a whole. Several security mechanisms are completely implemented in and controlled by the TOE. Other security mechanisms allow for configuration or even require handling of the response of the TOE by the Security IC Embedded Software. With different CPU modes and a Memory Management Unit the TOE is intended to support multi-application projects.

The hardware platform comprises different kind of on-chip memories. The ROM comprises the Security IC Embedded Software as well as the IC Dedicated Software.

The TOE is delivered as a sawn wafer, or as module or other packaged form.

The Security Target [6] is the basis for this certification. It is based on the certified Protection Profile Security IC Platform Protection Profile, Version 1.0, 15 June 2007, BSI-CC-PP-0035-2007 [7].

The TOE Security Assurance Requirements (SAR) are based entirely on the assurance components defined in Part 3 of the Common Criteria (see part C or [1], Part 3 for details). The TOE meets the assurance requirements of the Evaluation Assurance Level EAL 4 augmented by ALC_DVS.2, AVA_VAN.5, ATE_DPT.2, ASE_TSS.2.

The TOE Security Functional Requirements (SFR) relevant for the TOE are outlined in the Security Target [6] and [8], chapter 6. They are selected from Common Criteria Part 2 and some of them are newly defined. Thus the TOE is CC Part 2 extended.

The TOE Security Functional Requirements are implemented by the following TOE Security Features and Services:

Identifier	Addressed issue
SS.HW_RNG	Random Number Generator
SS.HW_DES	Triple-DES Coprocessor
SS.HW_AES	AES Coprocessor
SS.DF_AUTH	DESFire Authentication
SS.DF_ACCESS	Access Control to DESFire Data
SS.DF_CONFID	DESFire Communication Confidentiality
SS.DF_TYPECHECK	DESFire Filetype Consistency Check
SS.DF_TRANS	DESFire Transaction Protection
SF.OPC	Control of Operating Conditions
SF.PHY	Protection against Physical Manipulation
SF.LOG	Logical Protection
SF.COMP	Protection of Mode Control
SF.MEM_ACC	Memory Access Control
SF.SFR_ACC	Special Function Register Access Control

Table 1: TOE Security Features and Services

For more details please refer to the Security Target [6] and [8], chapter 7.

The assets to be protected by the TOE are defined in the Security Target [6] and [8], chapter 3. Based on these assets the TOE Security Problem is defined in terms of Assumptions, Threats and Organisational Security Policies. This is outlined in the Security Target [6] and [8], chapter 3.

The TOE supports different configurations. The configurations of the customer visible EEPROM size and the contactless interface are named major configurations because each configuration has its own product name. All major configurations support specific configuration options that must be addressed by the Security IC Embedded Software and may have an impact on the security of the TOE. Each major configuration provides further configurations, which are named minor configuration options.

The hardware platform can be configured to support different sizes of the EEPROM and different contactless interfaces. Five major configuration options are available, which are denoted by product names P5CD081V1D, P5CN081V1D, P5CD041V1D, P5CD021V1D and P5CD016V1D. All of them are equipped with a physical EEPROM of 80 kBytes and two interfaces comprising the ISO/IEC 7816 contact interface and the contactless interface. Their major differences are related to availability of EEPROM space and the behaviour of contactless interface as detailed below.

The DESFire EV1 Software can be configured to support one of four possible configurations named A, D2, D4, and D8. The EEPROM memory sizes of these configurations are 2688 Byte for configuration D2, 5248 Byte for configuration D4, and 8320 Byte for configuration D8. Configuration A means that no EEPROM memory is reserved for DESFire and that the functionality of the DESFire EV1 Software is not available (except the CVEC2 call to Set/Get baud Rate). The EEPROM size available for the Security IC Embedded Software is reduced by the EEPROM size configured for the DESFire EV1 Software. The configuration of the DESFire EV1 Software is reflected in the commercial type names as listed in Table 3 of the Security Target [6] and [8]. The minor configuration options of all major configurations are described in chapter 1.4.1.2. of the Security Target [6] and [8].

A number of package types are supported for each major configuration of the TOE. The commercial types are named according to the following format.

- P5CD016pp/T1Drrffz for major configuration P5CD016V1D
- P5CD021pp/T1Drrffz for major configuration P5CD021V1D
- P5CD041pp/T1Drrffz for major configuration P5CD041V1D
- P5CD081pp/T1Drrffz for major configuration P5CD081V1D
- P5CN081pp/T1Drrffz for major configuration P5CN081V1D

The commercial type name of each major configuration varies with the package type as indicated by the variable pp, - and with the Security IC Embedded Software as indicated by the variables rr, ff and z. The variables are replaced according to the rules in Table 3 the Security Target [6] and [8].

The complete resulting commercial type name is dependent on the customer software, i.e. the Security IC Embedded Software. Thus, a full commercial product name, which fits in the variable forms described in Table 4, determines an evaluated hardware, but gives no conclusion on the Security IC Embedded Software and whether it uses the proper hardware configuration as detailed in chapter 1.4.1.2. of the Security Target [6] and [8].

The vulnerability assessment results as stated within this certificate do not include a rating for those cryptographic algorithms and their implementation suitable for encryption and decryption (see BSIG Section 9, Para. 4, Clause 2).

The certification results only apply to the version of the product indicated in the certificate and on the condition that all the stipulations are kept as detailed in this Certification Report. This certificate is not an endorsement of the IT product by the Federal Office for Information Security (BSI) or any other organisation that recognises or gives effect to this certificate, and no warranty of the IT product by BSI or any other organisation that recognises or gives effect to this certificate, is either expressed or implied.

2 Identification of the TOE

The Target of Evaluation (TOE) is called:

NXP Secure Smart Card Controllers P5CD016V1D / P5CD021V1D / P5CD041V1D / P5Cx081V1D with DESFire EV1,

The following table outlines the TOE deliverables:

No	Form of Delivery
1	NXP BU ID P5CD081V1D with DESFire EV1 Secure Smart Card Controller (GDS 2 File: T046B_20090210.gds2 with changed metal 5 described in T046D_ME5_20100128.gds2)
2	Test ROM Software (part of the IC Dedicated Test Software), Version 1.3, July 07th, 2011, Test ROM on the chip (TestRom_042_107.hex)
3	Boot ROM Software (part of the IC Dedicated Support Software), Version 1.3, July 11th, 2011, Test-ROM on the chip (TestRom_042_107.hex)
4	DESFire EV1 Software (part of the IC Dedicated Support Software), Version 1.3, July 11th, 2011, Test ROM on the chip (TestRom_042_107.hex))
5	Data Sheet P5CD016/021/041/051 and P5Cx081 family, Secure dual interface and contact PKI Smart Card Controller, NXP Semiconductors, Doc.No. 148936, Revision 3.6, February 14th, 2012 [11]
6	P5CD016/021/041 V1D and P5Cx081 V1D with MIFARE DESFire EV1 OS Product Data Sheet Addendum, NXP Semiconductors, Doc.No. 192730, Revision 3.0, December 7th, 2011 [12]
7	Instruction Set, SmartMX-Family, Secure and PKI Smart Card Controller, Philips Semiconductors, Revision 1.1, Document Number: 084111, July 04, 2006 [13]
8	MF3ICD81 Mifare DESFire EV1 Product Data Sheet, NXP Semiconductors, Doc.No. 134036, Rev. 3.6, 09 February 2011[14]
9	Guidance, Delivery and Operation Manual NXP Secure Smart Card Controllers P5CD016V1D/P5CD021V1D/P5CD041V1D/P5Cx081V1D, NXP Semiconductors, Doc.No. 208730, Revision 3.0, 10. Januar 2012 [15]

Table 2: Deliverables of the TOE

Note that only 6 items (the hardware platform and five documents) are delivered since the IC Dedicated Software included in the ROM is delivered on the chip. There is one Data Sheet and one Guidance, Delivery and Operation Manual for all configurations of the TOE.

The TOE hardware (first item of table 2 above) is available in different package formats as listed in the third column of the table 4 of the Security Target [6] and [8].

The requirements for the delivery of these package types are described in Chapter 2 of the Guidance [15]. For each delivery form NXP BU ID offers two ways of delivery of the TOE:

- The customer collects the product himself at the NXP BU ID site.
- The product is sent to the customer by NXP BU ID with special protective measures. The TOE documentation is delivered in electronic form.

The commercial type name is the identification used to order the TOE in the respective package type and configuration. This means that a full commercial product name that fits in the variable forms described in table 4 of the ST [6] and [8] determines that the smart card product is the evaluated TOE. In addition the hardware version can be identified by the nameplate "T046D" on the surface of the die. Also, each configuration has a different device coding described in [14].

3 Security Policy

The Security Policy is expressed by the set of Security Functional Requirements implemented by the TOE. The security policy of the TOE is to provide basic Security Functions to be used to ensure an overall smart card system security. Therefore, the TOE

implements algorithms (Triple-DES and AES) to ensure the confidentiality of plain text data by encryption, to support secure authentication protocols, and to provide a random number generation of appropriate quality.

The security policy of the TOE is also to provide protection against leakage of information (e.g. to ensure the confidentiality of cryptographic keys during cryptographic functions performed by the TOE), against physical probing, against malfunctions, against physical manipulations and against abuse of functionality. The hardware platform and the IC Dedicated Support Software enforce a separation between the DESFire EV1 Software and the Security IC Embedded Software provided by the customer. Hence the TOE shall

- maintain the integrity and the confidentiality of data stored in the memory of the TOE and
- maintain the integrity, the correct operation and the confidentiality of Security Functions (security mechanisms and associated functions) provided by the TOE.

4 Assumptions and Clarification of Scope

The Assumptions defined in the Security Target and some aspects of Threats and Organisational Security Policies are not covered by the TOE itself. These aspects lead to specific security objectives to be fulfilled by the TOE-Environment. The following topics are of relevance: OE.Plat-Appl, OE.Resp-Appl, OE.Process-Sec-IC, OE.Check-FabKey, OE.Check-OriginalityKey, OE.Secure-Values, OE.Terminal-Support. Details can be found in the Security Target [6] and [8], chapter 4.

5 Architectural Information

The NXP BU ID P5CD081V1D with DESFire EV1 smartcard controller is an integrated circuit (IC) providing a hardware platform for Security IC Embedded Software. The IC Dedicated Support Software (Mifare DESFire EV1) provides additional security services independent of the Security IC Embedded Software. However the Security IC Embedded Software must start (call) the IC Dedicated Software. A top level block diagram and a list of subsystems can be found within the TOE description of the Security Target, [6] and [8].

The implementation of the Security Functionality of the hardware platform is based on the components 8-bit CPU, Special Function Registers, Triple-DES Co-Processor, AES co-processor, FameXE Co-Processor, Random Number Generator (RNG), Power Module with Security Sensors and Filters are used. The CPU is equipped with a Memory Management Unit and provides different CPU Modes (System Mode and User Mode) in order to separate different applications running on the TOE. Security measures for physical protection are realized within the layout of the whole circuitry.

The Special Function Registers that can be controlled by the Security IC Embedded Software provide one interface to the security functionality of the TOE. The P5CD081V1D with DESFire EV1 provides different levels of access control to the SFR with the different CPU Modes and additional configurable access control to Special Function Registers in the least-privileged CPU Mode, the User Mode.

The FameXE does not provide a cryptographic algorithm itself. The modular arithmetic functions are suitable to implement different asymmetric cryptographic algorithms.

The TOE executes the IC Dedicated Support Software (Boot Software) during the start up to configure and initialise the hardware. This software is executed in the Boot Mode that is not accessible after the start up is finished.

The Mifare DESFire EV1 provides security functionality to manage different types of files within a memory partition not accessible for the Security IC Embedded Software. This comprises authentication and access control as well as integrity protection and encryption during the transfer depending on the configuration.

The Mifare DESFire EV1 is executed in a dedicated CPU Mode called Mifare Mode to ensure a strict separation between IC Dedicated Support Software and Security IC Embedded Software. Based on the partitioning of the memories the Mifare DESFire EV1 is not able to access the Security IC Embedded Software and the data of the Security IC Embedded Software. In the same way the access to the IC Dedicated Software and the associated data is denied for the Security IC Embedded Software.

The Security IC Embedded Software has full control because the Security IC Embedded Software must configure the possible shared memory area for the data exchange (with the Mifare DESFire EV1) and the access to components of the hardware (e.g. access to the cryptographic coprocessors by the Mifare DESFire EV1). In addition the Security IC Embedded Software must start the Mifare DESFire EV1 software or process specific functions of the Mifare DESFire EV1 software using dedicated vector calls.

6 Documentation

The evaluated documentation as outlined in table 2 is being provided with the product to the customer. This documentation contains the required information for secure usage of the TOE in accordance with the Security Target.

Additional obligations and notes for secure usage of the TOE as outlined in chapter 10 of this report have to be followed.

7 IT Product Testing

The P5CD081V1D with DESFire EV1 and its major configurations were all tested during the evaluation.

The tests performed by the developer can be divided into the following categories:

- technology development tests as the earliest tests to check the technology against the specification and to get the technology parameters used in simulations of the circuitry (this testing is not strictly related to Security Functionalities);
- tests which are performed in a simulation environment with different tools for the analogue circuitries and for the digital parts of the hardware platform;
- regression tests of the hardware within a simulation environment based on special software dedicated only for the regression tests;
- regression tests which are performed for the IC Dedicated Test Software and for the IC Dedicated Support Software on emulator versions of the TOE and within a software simulation of the hardware platform using special hardware;
- characterisation and verification tests to release the TOE to production: a) used to determine the behaviour of the hardware platform with respect different operating conditions and varied process parameters (often also referred to as characterisation

tests); b) special verification tests for Security Functionalities of the hardware platform and the IC Dedicated Software which were done with samples of the TOE (referred also as developers security evaluation) and which include also layout tests by automatic means and optical control, in order to verify statements concerning the layout

- functional production tests, which are done for every chip to check its correct functionality as a last step of the production process (phase 3).

The developer tests cover all Security Functionalities and all security mechanisms as identified in the functional specification.

The evaluators were able to repeat the tests of the developer. A test protocol of the tests provided by the developer was verified. The tests of the developer are repeated by sampling. In addition the evaluators performed independent tests to supplement, augment and to verify the tests performed by the developer. The tests of the evaluators comprise special tests and examination of the hardware platform using open samples. In addition the evaluators perform tests of the hardware platform using different configurations.

The evaluation shows that the actual version of the TOE provides the TOE Security Functionality as specified by the developer. The test results confirm the correct implementation of the TOE Security Functionality.

For penetration testing the evaluators took all TOE Security Functionality into consideration. Extensive penetration testing was performed to test the security mechanisms used to provide the Security Services and Security Features. The tests for the hardware platform comprise the use of bespoke equipment and expert knowledge. The penetration tests considered both the physical tampering of the hardware platform and attacks which do not modify the hardware platform physically. Also the support of attacks by reverse engineering was considered. The test of the hardware platform comprises attacks that must be averted by the combination of the hardware platform and the Security IC Embedded Software as well as attacks against the hardware platform directly. In addition side channel analysis was performed for the co-processors for AES and DES.

8 Evaluated Configuration

A combination of different package types and configurations of the TOE are included in the certification. Each variant has a different commercial type name. The TOE will be available in five major configuration options which are denoted by product names P5CD081V1D, P5CN081V1D, P5CD041V1D, P5CD021V1D and P5CD016V1D.

For information about the different commercial type names in relation to the hardware platform, the EEPROM variations, and the different package formats please read chapters 1 and 2 of this report and chapter 1.4 of the Security Target [6] and [8] .

9 Results of the Evaluation

9.1 CC specific results

The Evaluation Technical Report (ETR) [9] was provided by the ITSEF according to the Common Criteria [1], the Methodology [2], the requirements of the Scheme [3] and all interpretations and guidelines of the Scheme (AIS) [4] as relevant for the TOE.

The Evaluation Methodology CEM [2] was used for those components up to EAL5 extended by advice of the Certification Body for components beyond EAL 5 and guidance specific for the technology of the product [4] (AIS 34).

The following guidance specific for the technology was used:

(i) The Application of CC to Integrated Circuits

(ii) Application of Attack Potential to Smart Cards

(iii) Functionality classes and evaluation methodology of physical random number generators

(see [4], AIS 25, AIS 26, AIS 31, AIS 34, AIS 35, AIS 37 were used.)

To support composite evaluations according to AIS 36 the document ETR for composite evaluation [10] was provided and approved. This document provides details of this platform evaluation that have to be considered in the course of a composite evaluation on top.

The assurance refinements outlined in the Security Target were followed in the course of the evaluation of the TOE.

As a result of the evaluation the verdict PASS is confirmed for the following assurance components:

- All components of the EAL 4 package including the class ASE as defined in the CC (see also part C of this report)
- The components ALC_DVS.2, AVA_VAN.5, ATE_DPT.2, ASE_TSS.2 augmented for this TOE evaluation.

The evaluation has confirmed:

- PP Conformance: Security IC Platform Protection Profile, Version 1.0, 15 June 2007, BSI-CC-PP-0035-2007 [7]
- for the Functionality: PP conformant plus product specific extensions
  Common Criteria Part 2 extended
- for the Assurance: Common Criteria Part 3 conformant
  EAL 4 augmented by ALC_DVS.2, AVA_VAN.5, ATE_DPT.2, ASE_TSS.2

For specific evaluation results regarding the development and production environment see annex B in part D of this report.

The results of the evaluation are only applicable to the TOE as defined in chapter 2 and the configuration as outlined in chapter 8 above.

9.2 Results of cryptographic assessment

The vulnerability assessment results as stated within this certificate do not include a rating for those cryptographic algorithms and their implementation suitable for encryption and decryption (see BSIG Section 9, Para. 4, Clause 2). This holds for SS.HW_DES: Triple-DES Coprocessor, SS.HW_AES: AES Coprocessor, SS.DF_AUTH: DESFire Authentication, and SS.DF_CONFID: DESFire Communication Confidentiality.

The following cryptographic algorithms are used by the TOE to enforce its security policy.

Hash functionalities:

- none

Algorithms for the encryption and decryption:

- Triple Data Encryption Algorithm (TDEA) with cryptographic key sizes of 112 or 168 bit according to FIPS PUB 46-3 DATA ENCRYPTION STANDARD (DES) Reaffirmed 1999 October 25, keying options 1 and 2.
- AES according to FIPS PUB 197 with cryptographic key sizes of 128, 192 or 256 bit

This holds for the following security functionality:

- SS.HW_DES: Triple-DES Coprocessor
- SS.HW_AES: AES Coprocessor

The DESFire EV1 Software supports TDEA with cryptographic key sizes of 112 or 168 bit and AES with cryptographic key sizes of 128.

This holds for the following security functionality:

- SS.DF_AUTH: DESFire Authentication
- SS.DF_CONFID: DESFire Communication Confidentiality

The strength of the cryptographic algorithms was not rated in the course of this certification procedure (see BSIG Section 4, Para. 3, Clause 2). But Cryptographic Functionalities with a security level of 80 bits or lower can no longer be regarded as secure against attacks with high attack potential without considering the application context. Therefore for this functionalites it shall be checked whether the related crypto operations are appropriate for the intended system. Some further hints and guidelines can be derived from the 'Technische Richtlinie BSI TR-02102' (https://www.bsi.bund.de).

The Cryptographic Functionality 2-key Triple DES (2TDES) provided by the TOE achieves a security level of maximum 80 Bits (in general context).

10 Obligations and Notes for the Usage of the TOE

The documents as outlined in table 2 contain necessary information about the usage of the TOE and all security hints therein have to be considered. In addition all aspects of Assumptions, Threats and OSPs as outlined in the Security Target not covered by the TOE itself need to 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. In order for the evolution of attack methods and techniques to be covered, he should define the period of time until a re-assessment for the TOE is required and thus requested from the sponsor of the certificate.

Some security measures are partly implemented in the hardware and require additional configuration or control or measures to be implemented by the IC Dedicated Support Software or Embedded Software.

For this reason the TOE includes guidance documentation (see table 2) which contains guidelines for the developer of the IC Dedicated Support Software and Embedded Software on how to securely use the microcontroller chip and which measures have to be implemented in the software in order to fulfil the security requirements of the Security Target of the TOE.

In the course of the evaluation of the composite product or system it must be examined if the required measures have been correctly and effectively implemented by the software. Additionally, the evaluation of the composite product or system must also consider the evaluation results as outlined in the document ETR for composite evaluation [10].

The guidance documentation [15] contain all necessary information about the usage of the TOE by the Security IC Embedded Software developer.

11 Security Target

For the purpose of publishing, the Security Target [8] of the Target of Evaluation (TOE) is provided within a separate document as Annex A of this report. It is a sanitised version of the complete Security Target [6] used for the evaluation performed. Sanitisation was performed according to the rules as outlined in the relevant CCRA policy (see AIS 35 [4]).

12 Definitions

12.1 Acronyms

AES Advanced Encryption Standard

AIS Application Notes and Interpretations of the Scheme

BSI Bundesamt für Sicherheit in der Informationstechnik / Federal Office for Information Security, Bonn, Germany

BSIG BSI-Gesetz / Act on the Federal Office for Information Security

CCRA Common Criteria Recognition Arrangement

CC Common Criteria for IT Security Evaluation

CEM Common Methodology for Information Technology Security Evaluation

CPU Central Programming Unit

DES Data Encryption Standard

EAL Evaluation Assurance Level

EEPROM Electrically Erasable Programmable Read-Only Memory

ETR Evaluation Technical Report

IC Integrated Circuit

IT Information Technology

ITSEC Information Technology Security Evaluation Criteria

ITSEF Information Technology Security Evaluation Facility

PP Protection Profile

RNG Random Number Generator

ROM Read Only Memory

RSA Rivest Shamir Adleman Algorithmus

SAR Security Assurance Requirement

SFP Security Function Policy

SFR	Security Functional Requirement
ST	Security Target
TDEA	Triple Data Encryption Algorithm
TOE	Target of Evaluation
TSF	TOE Security Functionality

12.2 Glossary

Augmentation - The addition of one or more requirement(s) to a package.

Extension - The addition to an ST or PP of functional requirements not contained in part 2 and/or assurance requirements not contained in part 3 of the CC.

Formal - Expressed in a restricted syntax language with defined semantics based on well-established mathematical concepts.

Informal - Expressed in natural language.

Object - An passive entity in the TOE, that contains or receives information, and upon which subjects perform operations.

Protection Profile - An implementation-independent statement of security needs for a TOE type.

Security Target - An implementation-dependent statement of security needs for a specific identified TOE.

Semiformal - Expressed in a restricted syntax language with defined semantics.

Subject - An active entity in the TOE that performs operations on objects.

Target of Evaluation - A set of software, firmware and/or hardware possibly accompanied by guidance.

TOE Security Functionality - combined functionality of all hardware, software, and firmware of a TOE that must be relied upon for the correct enforcement of the SFRs

13 Bibliography

[1] Common Criteria for Information Technology Security Evaluation, Version 3.1,
Part 1: Introduction and general model, Revision 3, July 2009
Part 2: Security functional components, Revision 3, July 2009
Part 3: Security assurance components, Revision 3, July 2009

[2] Common Methodology for Information Technology Security Evaluation (CEM), Evaluation Methodology, Version 3.1, Rev. 3, July 2009

[3] BSI certification: Procedural Description (BSI 7125)

[4] Application Notes and Interpretations of the Scheme (AIS) as relevant for the TOE[8].

[5] German IT Security Certificates (BSI 7148), periodically updated list published also in the BSI Website

[6] Security Target P5Cx081V1D/P5CD016V1D/P5CD021V1D/P5CD041V1D NXP Secure Smart Card Controllers, Revision 1.3, NXP Semiconductors, Business Unit Identification, October 24th, 2011 (confidential document)

[7] Security IC Platform Protection Profile, Version 1.0, 15 June 2007, BSI-CC-PP-0035-2007

[8] Security Target Lite P5Cx081V1D/P5CD016V1D/P5CD021V1D/P5CD041V1D NXP Secure Smart Card Controllers, Revision 1.1, NXP Semiconductors, Business Unit Identification, October 24th, 2011 (sanitised public document)

[9] Evaluation Technical Report BSI-DSZ-CC-0707, Version 1.1, June 8th, 2012, NXP Secure PKI Smart Card Controllers P5Cx081V1D/P5CD041V1D/P5 CD021V1D/P5CD016V1D with DESFire EV1, T-Systems GEI GmbH (confidential document)

[10] ETR for composition, NXP P5CD081V1D Secure Smart Card Controller, BSI-DSZ-CC-0707, T-Systems GEI GmbH, Version 1.2, 08.06.2012 (confidential document)

[11] Data Sheet P5CD016/021/041/051 and P5Cx081 family, Secure dual interface and contact PKI Smart Card Controller, NXP Semiconductors, Doc.No. 148936, Revision 3.6, February 14th, 2012

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[8] specifically

- AIS 25, Version 6, 7 September 2009, Anwendung der CC auf Integrierte Schaltungen including JIL Document and CC Supporting Document
- AIS 26, Version 8, 08 June 2011,Evaluationsmethodologie für in Hardware integrierte Schaltungen including JIL Document and CC Supporting Document
- AIS 31, Version 2, 19 Sept. 2011 Funktionalitätsklassen und Evaluationsmethodologie für physikalische Zufallszahlengeneratoren
- AIS 32, Version 6, 3 August 2010, CC-Interpretationen im deutschen Zertifizierungsschema
- AIS 34, Version 3, 3 September 2009, Evaluation Methodology for CC Assurance Classes for EAL5+ (CCv2.3 & CCv3.1) and EAL6 (CCv3.1)
- AIS 35, Version 2.0, 12 November 2007, Öffentliche Fassung des Security Targets (ST-Lite) including JIL Document and CC Supporting Document and CCRA policies
- AIS 36, Version 3, 19 October 2010, Kompositionsevaluierung including JIL Document and CC Supporting Document
- AIS 38, Version 2.0, 28 September 2007, Reuse of evaluation results

[12] P5CD016/021/041 V1D and P5Cx081 V1D with MIFARE DESFire EV1 OS Product Data Sheet Addendum, NXP Semiconductors, Doc.No. 192730, Revision 3.0, December 7th, 2011

[13] Instruction Set, SmartMX-Family, Secure and PKI Smart Card Controller, Philips Semiconductors, Revision 1.1, Document Number: 084111, July 04, 2006

[14] MF3ICD81 Mifare DESFire EV1 Product Data Sheet, NXP Semiconductors, Doc.No. 134036, Rev. 3.6, 09 February 2011

[15] Guidance, Delivery and Operation Manual NXP Secure Smart Card Controllers P5CD016V1D/P5CD021V1D/P5CD041V1D/P5Cx081V1D, NXP Semiconductors, Doc.No. 208730, Revision 3.0, 10. Januar 2012

C Excerpts from the Criteria

CC Part1:

Conformance Claim (chapter 10.4)

“The conformance claim indicates the source of the collection of requirements that is met by a PP or ST that passes its evaluation. This conformance claim contains a CC conformance claim that:

- describes the version of the CC to which the PP or ST claims conformance.
- describes the conformance to CC Part 2 (security functional requirements) as either:
  - **CC Part 2 conformant** - A PP or ST is CC Part 2 conformant if all SFRs in that PP or ST are based only upon functional components in CC Part 2, or
  - **CC Part 2 extended** - A PP or ST is CC Part 2 extended if at least one SFR in that PP or ST is not based upon functional components in CC Part 2.
- describes the conformance to CC Part 3 (security assurance requirements) as either:
  - **CC Part 3 conformant** - A PP or ST is CC Part 3 conformant if all SARs in that PP or ST are based only upon assurance components in CC Part 3, or
  - CC Part 3 extended - A PP or ST is CC Part 3 extended if at least one SAR in that PP or ST is not based upon assurance components in CC Part 3.

Additionally, the conformance claim may include a statement made with respect to packages, in which case it consists of one of the following:

- Package name Conformant - A PP or ST is conformant to a pre-defined package (e.g. EAL) if:
  - the SFRs of that PP or ST are identical to the SFRs in the package, or
  - the SARs of that PP or ST are identical to the SARs in the package.
- Package name Augmented - A PP or ST is an augmentation of a predefined package if:
  - the SFRs of that PP or ST contain all SFRs in the package, but have at least one additional SFR or one SFR that is hierarchically higher than an SFR in the package.
  - the SARs of that PP or ST contain all SARs in the package, but have at least one additional SAR or one SAR that is hierarchically higher than an SAR in the package.

Note that when a TOE is successfully evaluated to a given ST, any conformance claims of the ST also hold for the TOE. A TOE can therefore also be e.g. CC Part 2 conformant.

Finally, the conformance claim may also include two statements with respect to Protection Profiles:

- PP Conformant - A PP or TOE meets specific PP(s), which are listed as part of the conformance result.
- Conformance Statement (Only for PPs) - This statement describes the manner in which PPs or STs must conform to this PP: strict or demonstrable. For more information on this Conformance Statement, see Annex D.”

CC Part 3:

Class APE: Protection Profile evaluation (chapter 10)

“Evaluating a PP is required to demonstrate that the PP is sound and internally consistent, and, if the PP is based on one or more other PPs or on packages, that the PP is a correct instantiation of these PPs and packages. These properties are necessary for the PP to be suitable for use as the basis for writing an ST or another PP.“

Assurance Class	Assurance Components
Class APE: Protection Profile evaluation	APE_INT.1 PP introduction
	APE_CCL.1 Conformance claims
	APE_SPD.1 Security problem definition
	APE_OBJ.1 Security objectives for the operational environment APE_OBJ.2 Security objectives
	APE_ECD.1 Extended components definition
	APE_REQ.1 Stated security requirements APE_REQ.2 Derived security requirements

APE: Protection Profile evaluation class decomposition”

Class ASE: Security Target evaluation (chapter 11)

“Evaluating an ST is required to demonstrate that the ST is sound and internally consistent, and, if the ST is based on one or more PPs or packages, that the ST is a correct instantiation of these PPs and packages. These properties are necessary for the ST to be suitable for use as the basis for a TOE evaluation.”

Assurance Class	Assurance Components
Class ASE: Security Target evaluation	ASE_INT.1 ST introduction
	ASE_CCL.1 Conformance claims
	ASE_SPD.1 Security problem definition
	ASE_OBJ.1 Security objectives for the operational environment ASE_OBJ.2 Security objectives
	ASE_ECD.1 Extended components definition
	ASE_REQ.1 Stated security requirements ASE_REQ.2 Derived security requirements
	ASE_TSS.1 TOE summary specification ASE_TSS.2 TOE summary specification with architectural design summary

ASE: Security Target evaluation class decomposition

Security assurance components (chapter 7)

“The following Sections describe the constructs used in representing the assurance classes, families, and components.“
“Each assurance class contains at least one assurance family.”
“Each assurance family contains one or more assurance components.”

The following table shows the assurance class decomposition.

Assurance Class	Assurance Components
ADV: Development	ADV_ARC.1 Security architecture description
	ADV_FSP.1 Basic functional specification ADV_FSP.2 Security-enforcing functional specification ADV_FSP.3 Functional specification with complete summary ADV_FSP.4 Complete functional specification ADV_FSP.5 Complete semi-formal functional specification with additional error information ADV_FSP.6 Complete semi-formal functional specification with additional formal specification
	ADV_IMP.1 Implementation representation of the TSF ADV_IMP.2 Implementation of the TSF
	ADV_INT.1 Well-structured subset of TSF internals ADV_INT.2 Well-structured internals ADV_INT.3 Minimally complex internals
	ADV_SPM.1 Formal TOE security policy model
	ADV_TDS.1 Basic design ADV_TDS.2 Architectural design ADV_TDS.3 Basic modular design ADV_TDS.4 Semiformal modular design ADV_TDS.5 Complete semiformal modular design ADV_TDS.6 Complete semiformal modular design with formal high-level design presentation

Assurance Class	Assurance Components
AGD: Guidance documents	AGD_OPE.1 Operational user guidance
	AGD_PRE.1 Preparative procedures
ALC: Life cycle support	ALC_CMC.1 Labelling of the TOE ALC_CMC.2 Use of a CM system ALC_CMC.3 Authorisation controls ALC_CMC.4 Production support, acceptance procedures and automation ALC_CMC.5 Advanced support
	ALC_CMS.1 TOE CM coverage ALC_CMS.2 Parts of the TOE CM coverage ALC_CMS.3 Implementation representation CM coverage ALC_CMS.4 Problem tracking CM coverage ALC_CMS.5 Development tools CM coverage
	ALC_DEL.1 Delivery procedures
	ALC_DVS.1 Identification of security measures ALC_DVS.2 Sufficiency of security measures
	ALC_FLR.1 Basic flaw remediation ALC_FLR.2 Flaw reporting procedures ALC_FLR.3 Systematic flaw remediation
	ALC_LCD.1 Developer defined life-cycle model ALC_LCD.2 Measurable life-cycle model
	ALC_TAT.1 Well-defined development tools ALC_TAT.2 Compliance with implementation standards ALC_TAT.3 Compliance with implementation standards - all parts
ATE: Tests	ATE_COV.1 Evidence of coverage ATE_COV.2 Analysis of coverage ATE_COV.3 Rigorous analysis of coverage
	ATE_DPT.1 Testing: basic design ATE_DPT.2 Testing: security enforcing modules ATE_DPT.3 Testing: modular design ATE_DPT.4 Testing: implementation representation
	ATE_FUN.1 Functional testing ATE_FUN.2 Ordered functional testing
	ATE_IND.1 Independent testing – conformance ATE_IND.2 Independent testing – sample ATE_IND.3 Independent testing – complete
AVA: Vulnerability assessment	AVA_VAN.1 Vulnerability survey AVA_VAN.2 Vulnerability analysis AVA_VAN.3 Focused vulnerability analysis AVA_VAN.4 Methodical vulnerability analysis AVA_VAN.5 Advanced methodical vulnerability analysis

Assurance class decomposition

Evaluation assurance levels (chapter 8)

“The Evaluation Assurance Levels (EALs) provide an increasing scale that balances the level of assurance obtained with the cost and feasibility of acquiring that degree of assurance. The CC approach identifies the separate concepts of assurance in a TOE at the end of the evaluation, and of maintenance of that assurance during the operational use of the TOE.

It is important to note that not all families and components from CC Part 3 are included in the EALs. This is not to say that these do not provide meaningful and desirable assurances. Instead, it is expected that these families and components will be considered for augmentation of an EAL in those PPs and STs for which they provide utility.”

Evaluation assurance level (EAL) overview (chapter 8.1)

“Table 1 represents a summary of the EALs. The columns represent a hierarchically ordered set of EALs, while the rows represent assurance families. Each number in the resulting matrix identifies a specific assurance component where applicable.

As outlined in the next Section, seven hierarchically ordered evaluation assurance levels are defined in the CC for the rating of a TOE's assurance. They are hierarchically ordered inasmuch as each EAL represents more assurance than all lower EALs. The increase in assurance from EAL to EAL is accomplished by substitution of a hierarchically higher assurance component from the same assurance family (i.e. increasing rigour, scope, and/or depth) and from the addition of assurance components from other assurance families (i.e. adding new requirements).

These EALs consist of an appropriate combination of assurance components as described in Chapter 7 of this CC Part 3. More precisely, each EAL includes no more than one component of each assurance family and all assurance dependencies of every component are addressed.

While the EALs are defined in the CC, it is possible to represent other combinations of assurance. Specifically, the notion of “augmentation” allows the addition of assurance components (from assurance families not already included in the EAL) or the substitution of assurance components (with another hierarchically higher assurance component in the same assurance family) to an EAL. Of the assurance constructs defined in the CC, only EALs may be augmented. The notion of an “EAL minus a constituent assurance component” is not recognised by the standard as a valid claim. Augmentation carries with it the obligation on the part of the claimant to justify the utility and added value of the added assurance component to the EAL. An EAL may also be augmented with extended assurance requirements.

Assurance Class	Assurance Family	Assurance Components by Evaluation Assurance Level						
		EAL1	EAL2	EAL3	EAL4	EAL5	EAL6	EAL7
Development	ADV_ARC		1	1	1	1	1	1
	ADV_FSP	1	2	3	4	5	5	6
	ADV_IMP				1	1	2	2
	ADV_INT					2	3	3
	ADV_SPM						1	1
	ADV_TDS		1	2	3	4	5	6
Guidance Documents	AGD_OPE	1	1	1	1	1	1	1
	AGD_PRE	1	1	1	1	1	1	1
Life cycle Support	ALC_CMC	1	2	3	4	4	5	5
	ALC_CMS	1	2	3	4	5	5	5
	ALC_DEL		1	1	1	1	1	1
	ALC_DVS			1	1	1	2	2
	ALC_FLR							
	ALC_LCD			1	1	1	1	2
	ALC_TAT				1	2	3	3
Security Target Evaluation	ASE_CCL	1	1	1	1	1	1	1
	ASE_ECD	1	1	1	1	1	1	1
	ASE_INT	1	1	1	1	1	1	1
	ASE_OBJ	1	2	2	2	2	2	2
	ASR_REQ	1	2	2	2	2	2	2
	ASE_SPD		1	1	1	1	1	1
	ASE_TSS	1	1	1	1	1	1	1
Tests	ATE_COV		1	2	2	2	3	3
	ATE_DPT			1	1	3	3	4
	ATE_FUN		1	1	1	1	2	2
	ATE_IND	1	2	2	2	2	2	3
Vulnerability assessment	AVA_VAN	1	2	2	3	4	5	5

Table 1: Evaluation assurance level summary”

Evaluation assurance level 1 (EAL1) - functionally tested (chapter 8.3)

“Objectives

EAL1 is applicable where some confidence in correct operation is required, but the threats to security are not viewed as serious. It will be of value where independent assurance is required to support the contention that due care has been exercised with respect to the protection of personal or similar information.

EAL1 requires only a limited security target. It is sufficient to simply state the SFRs that the TOE must meet, rather than deriving them from threats, OSPs and assumptions through security objectives.

EAL1 provides an evaluation of the TOE as made available to the customer, including independent testing against a specification, and an examination of the guidance documentation provided. It is intended that an EAL1 evaluation could be successfully conducted without assistance from the developer of the TOE, and for minimal outlay.

An evaluation at this level should provide evidence that the TOE functions in a manner consistent with its documentation.”

Evaluation assurance level 2 (EAL2) - structurally tested (chapter 8.4)

“Objectives

EAL2 requires the co-operation of the developer in terms of the delivery of design information and test results, but should not demand more effort on the part of the developer than is consistent with good commercial practise. As such it should not require a substantially increased investment of cost or time.

EAL2 is therefore applicable in those circumstances where developers or users require a low to moderate level of independently assured security in the absence of ready availability of the complete development record. Such a situation may arise when securing legacy systems, or where access to the developer may be limited.”

Evaluation assurance level 3 (EAL3) - methodically tested and checked (chapter 8.5)

“Objectives

EAL3 permits a conscientious developer to gain maximum assurance from positive security engineering at the design stage without substantial alteration of existing sound development practises.

EAL3 is applicable in those circumstances where developers or users require a moderate level of independently assured security, and require a thorough investigation of the TOE and its development without substantial re-engineering.”

Evaluation assurance level 4 (EAL4) - methodically designed, tested, and reviewed (chapter 8.6)

“Objectives

EAL4 permits a developer to gain maximum assurance from positive security engineering based on good commercial development practises which, though rigorous, do not require substantial specialist knowledge, skills, and other resources. EAL4 is the highest level at which it is likely to be economically feasible to retrofit to an existing product line.

EAL4 is therefore applicable in those circumstances where developers or users require a moderate to high level of independently assured security in conventional commodity TOEs and are prepared to incur additional security-specific engineering costs.”

Evaluation assurance level 5 (EAL5) - semiformally designed and tested (chapter 8.7)

“Objectives

EAL5 permits a developer to gain maximum assurance from security engineering based upon rigorous commercial development practises supported by moderate application of specialist security engineering techniques. Such a TOE will probably be designed and developed with the intent of achieving EAL5 assurance. It is likely that the additional costs attributable to the EAL5 requirements, relative to rigorous development without the application of specialised techniques, will not be large.

EAL5 is therefore applicable in those circumstances where developers or users require a high level of independently assured security in a planned development and require a rigorous development approach without incurring unreasonable costs attributable to specialist security engineering techniques.”

Evaluation assurance level 6 (EAL6) - semiformally verified design and tested (chapter 8.8)

“Objectives

EAL6 permits developers to gain high assurance from application of security engineering techniques to a rigorous development environment in order to produce a premium TOE for protecting high value assets against significant risks.

EAL6 is therefore applicable to the development of security TOEs for application in high risk situations where the value of the protected assets justifies the additional costs.”

Evaluation assurance level 7 (EAL7) - formally verified design and tested (chapter 8.9)

“Objectives

EAL7 is applicable to the development of security TOEs for application in extremely high risk situations and/or where the high value of the assets justifies the higher costs. Practical application of EAL7 is currently limited to TOEs with tightly focused security functionality that is amenable to extensive formal analysis.”

Class AVA: Vulnerability assessment (chapter 16)

“The AVA: Vulnerability assessment class addresses the possibility of exploitable vulnerabilities introduced in the development or the operation of the TOE.”

Vulnerability analysis (AVA_VAN) (chapter 16.1)

"Objectives

Vulnerability analysis is an assessment to determine whether potential vulnerabilities identified, during the evaluation of the development and anticipated operation of the TOE or by other methods (e.g. by flaw hypotheses or quantitative or statistical analysis of the security behaviour of the underlying security mechanisms), could allow attackers to violate the SFRs.

Vulnerability analysis deals with the threats that an attacker will be able to discover flaws that will allow unauthorised access to data and functionality, allow the ability to interfere with or alter the TSF, or interfere with the authorised capabilities of other users.”

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D Annexes

List of annexes of this certification report

Annex A: Security Target provided within a separate document.

Annex B: Evaluation results regarding development and production environment

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Annex B of Certification Report BSI-DSZ-CC-0707-2012

Evaluation results regarding development and production environment

The IT product NXP Secure Smart Card Controllers P5CD016V1D / P5CD021V1D / P5CD041V1D / P5Cx081V1D with DESFire EV1 (Target of Evaluation, TOE) has been evaluated at an approved evaluation facility using the Common Methodology for IT Security Evaluation (CEM), Version 3.1 extended by advice of the Certification Body for components beyond EAL 4 and guidance specific for the technology of the product for conformance to the Common Criteria for IT Security Evaluation (CC), Version 3.1.

As a result of the TOE certification, dated 13 August 2012, the following results regarding the development and production environment apply. The Common Criteria assurance requirements ALC – Life cycle support (i.e. ALC_CMC.4, ALC_CMS.4, ALC_DEL.1, ALC_DVS.2, ALC_LCD.1, ALC_TAT.1)

are fulfilled for the development and production sites of the TOE listed below:

a) NXP Semiconductors Germany GmbH, Business Unit Identification, Stresemannallee 101, D-21147 Hamburg (Development and customer support)

b) NXP Semiconductors GmbH, Business Unit Identification, Document Control, Office Mikron-Weg 1, A-8101 Gratkorn (Document control)

c) Systems on Silicon Manufacturing Co. Pte. Ltd. (SSMC), 70 Pasir Ris Drive, 1 Singapore 519527 (Wafer fab)

d) Toppan Photomasks Korea Ltd., 345-1, Sooha-Ri, ShinDoon-Myon, 467-840 Ichon, South Korea (Mask shop)

e) Chipbond Technology Corporation No. 3, Li-Hsin Rd. V, Science Based Industrial Park, Hsin-Chu City, Taiwan R.O.C. (Bumping)

f) NXP Semiconductors GmbH, IC Manufacturing Operations - Test Center Hamburg (IMO TeCH), Stresemannallee 101, D-22529 Hamburg (Test center and configuration of the Fabkey and delivery)

g) NXP Semiconductors (Thailand) Assembly Plant Bangkok, Thailand (APB), 303 Moo 3 Chaengwattana Rd. Laksi, Bangkok 10210, Thailand (Test center, module assembly and delivery)

h) NXP Semiconductors Taiwan Ltd., Assembly Plant Kaohsiung (APK), # 10, Jing 5th Road, N.E.P.Z Kaohsiung 81170, Taiwan R.O.C (Test Center and module assembly)

i) NedCard B.V., Bijsterhuizen 25-29, 6604 LM Wijchen, The Netherlands (Module assembly), Site Certification ID BSI-DSZ-CC-S-0003

For the sites listed above, the requirements have been specifically applied in accordance with the Security Target [6] and [8]. The evaluators verified, that the threats, security objectives and requirements for the TOE life cycle phases up to delivery (as stated in the Security Target [6] and [8]) are fulfilled by the procedures of these sites.

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