



Federal Office
for Information Security

Certification Report

BSI-DSZ-CC-0857-V2-2015

for

**NXP Secure Smart Card Controllers
P5CD016/021/041/051 and P5Cx081V1A/ V1A(s)**

from

NXP Semiconductors Germany GmbH

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Deutsches IT-Sicherheitszertifikat

erteilt vom



Bundesamt für Sicherheit in der Informationstechnik

BSI-DSZ-CC-0857-V2-2015 (*)

Smartcard Controller

**NXP Secure Smart Card Controllers P5CD016/021/041/051 and
P5Cx081V1A/ V1A(s)**

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 5 augmented by ALC_DVS.2, ASE_TSS.2 and
AVA_VAN.5



SOGIS
Recognition Agreement



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 CC Supporting Documents as listed in the Certification Report for conformance to the Common Criteria for IT Security Evaluation (CC), Version 3.1. CC and CEM are also published as ISO/IEC 15408 and ISO/IEC 18045.

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.

(*) 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 and Notification. For details on the validity see Certification Report part A chapter 4.

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, 27 April 2015

For the Federal Office for Information Security

Bernd Kowalski
Head of Department

L.S.



Common Criteria
Recognition Arrangement
for components up to
EAL 4



Deutsche
Akkreditierungsstelle
D-ZE-19615-01-00

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Preliminary Remarks

Under the BSIG¹ 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

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A. Certification

1. Specifications of the Certification Procedure

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

- Act on the Federal Office for Information Security²
- BSI Certification and Approval Ordinance³
- BSI Schedule of Costs⁴
- Special decrees issued by the Bundesministerium des Innern (Federal Ministry of the Interior)
- DIN EN ISO/IEC 17065 standard
- BSI certification: Technical information on the IT security certification, Procedural Description (BSI 7138) [3]
- BSI certification: Requirements regarding the Evaluation Facility (BSI 7125) [3]
- Common Criteria for IT Security Evaluation (CC), Version 3.1⁵ [1] also published as ISO/IEC 15408.
- Common Methodology for IT Security Evaluation (CEM), Version 3.1 [2] also published as ISO/IEC 18045.
- 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 SOGIS Technical Domains only.

The basic recognition level includes Common Criteria (CC) Evaluation Assurance Levels EAL 1 to EAL 4 and ITSEC Evaluation Assurance Levels E1 to E3 (basic). For

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 Security Certificates and approval by the Federal Office for Information Security (BSI-Zertifizierungs- und -Anerkennungsverordnung - BSIZertV) of 17 December 2014, Bundesgesetzblatt 2014, part I, no. 61, p. 2231

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

"Smartcards and similar devices" a SOGIS Technical Domain is in place. For "HW Devices with Security Boxes" a SOGIS Technical Domains is in place, too. This Domain is linked to a conformance claim to one of the related SOGIS Recommended Protection Profiles. In addition, certificates issued for Protection Profiles based on Common Criteria are part of the recognition agreement.

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.

This certificate is recognized under SOGIS-MRA for all assurance components selected.

2.2. International Recognition of CC – Certificates (CCRA)

The international arrangement on the mutual recognition of certificates based on the CC (Common Criteria Recognition Arrangement, CCRA-2014) has been ratified on 08 September 2014. It covers CC certificates based on collaborative Protection Profiles (cPP) (exact use), certificates based on assurance components up to and including EAL 2 or the assurance family Flaw Remediation (ALC_FLR) and certificates for Protection Profiles and for collaborative Protection Profiles (cPP).

The CCRA-2014 replaces the old CCRA signed in May 2000 (CCRA-2000). Certificates based on CCRA-2000, issued before 08 September 2014 are still under recognition according to the rules of CCRA-2000. For on 08 September 2014 ongoing certification procedures and for Assurance Continuity (maintenance and re-certification) of old certificates a transition period on the recognition of certificates according to the rules of CCRA-2000 (i.e. assurance components up to and including EAL 4 or the assurance family Flaw Remediation (ALC_FLR)) is defined until 08 September 2017.

As of September 2014 the signatories of the new CCRA are government representatives from the following nations: Australia, Austria, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, India, Israel, Italy, Japan, Malaysia, The Netherlands, New Zealand, Norway, Pakistan, Republic of Korea, Singapore, Spain, Sweden, Turkey, United Kingdom, and the United States.

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.

As this certificate is a re-certification of a certificate issued according to CCRA-2000 this certificate is recognized according to the rules of CCRA-2000, i.e. up to and including CC part 3 EAL 4 components. The evaluation contained the components ADV_FSP.5, ADV_INT.2, ADV_TDS.4, ALC_CMS.5, ALC_DVS.2, ALC_TAT.2, ASE_TSS.2, ATE_DPT.3 and AVA_VAN.5 that are not mutually recognised in accordance with the provisions of the CCRA-2000, for mutual recognition the EAL 4 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 P5CD016/021/041/051 and P5Cx081V1A/ V1A(s) has undergone the certification procedure at BSI. This is a re-certification based on BSI-DSZ-CC-0857-2013. Specific results from the evaluation process BSI-DSZ-CC-0857-2013 were re-used.

The evaluation of the product NXP Secure Smart Card Controllers P5CD016/021/041/051 and P5Cx081V1A/ V1A(s) was conducted by T-Systems GEI GmbH. The evaluation was completed on 21 April 2015. 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.

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 order to avoid an indefinite usage of the certificate when evolved attack methods require a re-assessment of the products resistance to state of the art attack methods, the maximum validity of the certificate has been limited. The certificate issued on 27 April 2015 is valid until 26 April 2020. The validity date can be extended by re-assessment or re-certification.

The owner of the certificate is obliged

⁶ Information Technology Security Evaluation Facility

1. when advertising the certificate or the fact of the product's certification, to refer to the Certification Report as well as to provide the Certification Report and the Security Target and user guidance documentation mentioned herein to any applicant of the product for the application and usage of the certified product,
2. to inform the Certification Body at BSI immediately about vulnerabilities of the product that have been identified by the developer or any third party after issuance of the certificate,
3. to inform the Certification Body at BSI immediately in the case that security relevant changes in the product's evaluated life cycle, e.g. related to development and production sites or processes, occur or the confidentiality of documentation and information related to the product or resulting from the evaluation and certification procedure is not given any longer. In particular, prior to the dissemination of confidential documentation and information related to the product or resulting from the evaluation and certification procedure that do not belong to the product deliverables according to the Certification Report part B chapter 2 to third parties, permission of the Certification Body at BSI has to be obtained.

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 P5CD016/021/041/051 and P5Cx081V1A/ V1A(s) 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 developer⁷ of the product. The Certification Report may also be obtained in electronic form at the internet address stated above.

⁷ NXP Semiconductors Germany GmbH
Stresemannallee 101
22529 Hamburg

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 NXP Secure Smart Card Controllers P5CD016/021/041/051 and P5Cx081V1A/V1A(s) provide a hardware platform for the implementation of smart card operating systems including multiple applications. The hardware platform provides coprocessors for cryptographic algorithms Triple-DES with up to three keys and AES with different key lengths as well as a coprocessor for large integer arithmetic operations. In addition the hardware platform includes a True Random Number Generator suitable to generate cryptographic keys. The TOE supports the ISO/IEC 7816 contact interface with UART and the ISO/IEC 14443A contactless interface. The contactless interface together with IO3 can also be configured in S2C mode to support Near Field Communication (NFC). The implementation of multiple applications is supported by the CPU offering different CPU modes with gradual permissions and memory management control supporting the separation of different memory segments. The MIFARE FleX or MIFARE Classic as part of the IC Dedicated Software do not contribute to security mechanisms of the devices and were not subject of the evaluation. The hardware enforces a separation between the Security IC Embedded Software and the MIFARE Software and the associated memory areas.

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 5 augmented by ALC_DVS.2, ASE_TSS.2 and AVA_VAN.5.

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 Functionality:

TOE Security Functionality	Addressed issue
SS.RNG	Random Number Generator
SS.HW_DES	Triple-DES coprocessor
SS.HW_AES	AES coprocessor
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 Functionalities

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 3.1. 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 3.2, 3.3 and 3.4.

This certification covers the configurations of the TOE as outlined in chapter 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 P5CD016/021/041/051 and P5Cx081V1A/ V1A(s)

The following table outlines the TOE deliverables:

TOE deliverables for the TOE with MIFARE classic from SSMC
NXP BU S&C P5CD016/021/041/051 and P5Cx081V1A Secure Smart Card Controller, Release V1A (GDS 2 File: T046B_20090210.gds2) in form of wafer, modules and packages. The dice include reference T046B.
Test ROM Software for MIFARE Classic (part of the IC Dedicated Test Software) Version 87, February 25th, 2009, Test ROM on the chip (testrom_87_t046_plain_24k.ms3)
Boot ROM Software for MIFARE Classic (part of the IC Dedicated Support Software) Version 87, February 25th, 2009, Test ROM on the chip (testrom_87_t046_plain_24k.ms3)
MIFARE Classic Operating System (part of the IC Dedicated Support Software) Version 87, February 25th, 2009, Test ROM on the chip (testrom_87_t046_plain_24k.ms3)
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
Instruction Set, SmartMX-Family, Secure and PKI Smart Card Controller, Philips Semiconductors, Revision 1.1, Document Number: 084111, July 04, 2006
Guidance, Delivery and Operation Manual, NXP Secure Smart Card Controllers P5CD016/021/041/051 and P5Cx081, NXP Semiconductors, Version 1.8, Document Number: 171618, 18 December 2014
TOE deliverables for the TOE with MIFARE FLeX from SSMC
NXP BU S&C P5CD016/021/041/051 and P5Cx081V1A Secure Smart Card Controller Release V1A (GDS 2 File: T046B_20090210.gds2) in form of wafer, modules and packages. The dice include reference T046B.
Test ROM Software for MIFARE FLeX (the IC Dedicated Test Software) Version 103, April 27th, 2011, Test ROM on the chip (tmfos_103_collected.hex)
Boot ROM Software for MIFARE FLeX (part of the IC Dedicated Support Software) Version 103, April 27th, 2011, Test ROM on the chip (tmfos_103_collected.hex)
MIFARE FLeX Operating System (part of the IC Dedicated Support Software) Version 103, April 27th, 2011, Test ROM on the chip (tmfos_103_collected.hex)

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
Instruction Set, SmartMX-Family, Secure and PKI Smart Card Controller, Philips Semiconductors, Revision 1.1, Document Number: 084111, July 04, 2006
Guidance, Delivery and Operation Manual, NXP Secure Smart Card Controllers P5CD016/021/041/051 and P5Cx081, NXP Semiconductors, Version 1.8, Document Number: 171618, 18 December 2014
TOE deliverables for the TOE with MIFARE classic from Globalfoundries
NXP BU S&C P5CD016/021/041/051 and P5Cx081V1(s) Secure Smart Card Controller, Release V1A (GDS 2 File: s046B_20120419.gds2) in form of wafer, modules and packages. The dice include reference s046B.
Test ROM Software for MIFARE Classic (part of the IC Dedicated Test Software) Version 87, February 25 th, 2009, Test ROM on the chip (testrom_87_t046_plain_24k.ms3)
Boot ROM Software for MIFARE Classic (part of the IC Dedicated Support Software) thVersion 87, February 25 , 2009, Test ROM on the chip (testrom_87_t046_plain_24k.ms3)
MIFARE Classic Operating System (part of the IC Dedicated Support Software) Version 87, February 25 th, 2009, Test ROM on the chip (testrom_87_t046_plain_24k.ms3)
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
Instruction Set, SmartMX-Family, Secure and PKI Smart Card Controller, Philips Semiconductors, Revision 1.1, Document Number: 084111, July 04, 2006
Guidance, Delivery and Operation Manual, NXP Secure Smart Card Controllers P5CD016/021/041/051 and P5Cx081, NXP Semiconductors, Version 1.8, Document Number: 171618, 18 December 2014
TOE deliverables for the TOE with MIFARE FLeX from Globalfoundries
NXP BU S&C P5CD016/021/041/051 and P5Cx081V1A(s) Secure Smart Card Controller Release V1A (GDS 2 File: s046B_20120419.gds2) in form of wafer, modules and packages. The dice include reference s046B.
Test ROM Software for MIFARE FLeX (the IC Dedicated Test Software) Version 103, April 27th, 2011, Test ROM on the chip (tmfos_103_collected.hex)
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MIFARE FLeX Operating System (part of the IC Dedicated Support Software) Version 103, April 27th, 2011, Test ROM on the chip (tmfos_103_collected.hex)
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
Instruction Set, SmartMX-Family, Secure and PKI Smart Card Controller, Philips Semiconductors, Revision 1.1, Document Number: 084111, July 04, 2006
Guidance, Delivery and Operation Manual, NXP Secure Smart Card Controllers P5CD016/021/041/051 and P5Cx081, NXP Semiconductors, Version 1.8, Document Number: 171618, 18 December 2014

Table 2: Deliverables of the TOE

Note that only 4 items (the hardware platform and three 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. All documents are delivered in electronic form.

The TOE hardware is available in different package formats as listed in the third column of the next table. The following package types are supported in this evaluation:

P5CD016V1A	P5CD021V1A	P5CD041V1A	P5CD051V1A	P5CD081V1A	P5CC081V1A	P5CN081V1A	
Ux	Ux	Ux	Ux	Ux	Ux	Ux	Wafer not thinner than 75µm (The letter “x” in “Ux” stands for a capital letter or a number, which identifies the wafer type)
Xn	Xn	Xn	Xn	Xn	Xn	Xn	Module (The letter “n” in “Xn” stands for a capital letter or a number, which identifies the module type)
Ay		Ay	Ay	Ay			Contactless Module (The letter “y” in “Ay” stands for a number, which identifies the module type)
		Ai		Ai			Inlay (The letter “i” in “Ai” stands for a capital letter, which identifies both, the inlay type and the package type inside the inlay)

Tabelle 3: Supported package types

The package type does not influence the security functionality of the TOE. It does only define which pads are connected in the package and for what purpose the chip (with the appropriate package) can be used. Note that the security of the TOE is not dependent on which pad is connected or not. The connections just define how the product can be used. If the TOE is delivered as wafer, the customer can choose the connection on his own.

The requirements for the delivery of the TOE are described in Chapter 2 of the Guidance, Delivery and Operation Manual, NXP Secure Smart Card Controllers P5CD016/021/041/051 and P5Cx081. For each delivery form NXP BU S&C offers two ways of delivery of the TOE:

1. The customer collects the product himself at the NXP BU S&C site.
2. The product is sent to the customer by NXP BU S&C with special protective measures.

These methods are also described in the Guidance, Delivery and Operation Manual, NXP Secure Smart Card Controllers P5CD016/021/041/051 and P5Cx081, Chapter 2, as part of the requirements for delivery. The TOE documentation is delivered in electronic form.

3. Security Policy

The Security Policy is expressed by the set of Security Functional Requirements and implemented by the TOE. It covers the following issues:

As the TOE is a hardware security platform, the security policy of the TOE provides countermeasures against: leakage of information, physical probing, malfunctions, physical manipulations, access to code, access to data memory, abuse of functionality.

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:

Name	Title
OE.Process-Sec-IC	Protection during Packaging, Finishing and Personalization
OE.Plat-Appl	Usage of Hardware Platform
OE.Resp-Appl	Treatment of User Data
OE.Check-Init	Check of initialization data by the Security IC Embedded Software

Tabelle 4: Objectives for the TOE-Environment

Details can be found in the Security Target [6] and [8], chapter 4.2 and 4.3.

5. Architectural Information

The hardware platform comprises the following components: 8-bit CPU, Special Function Registers, Triple-DES coprocessor, AES coprocessor, FameXE coprocessor and a Random Number Generator (RNG). Further on the hardware platform implements a contact-based interface and a contactless interface with power module including security sensors and filters. The CPU is equipped with a Memory Management Unit and provides different CPU Modes in order to support the separation of different applications running on the TOE. Security features for physical protection are realized within the layout of the whole circuitry.

The Special Function Registers provide an interface to the TOE security functionality that can be controlled by the Security IC Embedded Software. The P5CD016/021/041/051 and P5Cx081V1A/V1A(s) provides different levels of access control to the Special Function Register with the different CPU Modes including configurable access control to Special Function Registers for the User Mode and the Mifare 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. After the start-up is finished and the CPU Mode changed to System Mode it is not possible to re-enter the Boot Mode without forcing a reset.

The MIFARE Operating System supports the functions to exchange data in the contact-less mode with other MIFARE components. The MIFARE Operating System is executed in the MIFARE Mode to ensure a strict separation between IC Dedicated Support Software and Security IC Embedded Software. Note, that the term MIFARE Operating System as being used in the Security Target does refer to both, the MIFARE classic and the MIFARE FLeX variety available for the TOE. Based on the partitioning of the memories the MIFARE Operating System is not able to access the Security IC Embedded Software and the data stored in the EEPROM area that is not reserved for the MIFARE Operating System. In the same way the access to the program and the data of the MIFARE Operating System is denied for the Security IC Embedded Software. A limited memory

area for the data exchange (between Security IC Embedded Software and MIFARE Operating System) and the access to components of the hardware (by the MIFARE Operating System) must be configured by the Security IC Embedded Software. The MIFARE FLeX variety introduced with the preceding maintenance process of the TOE does base on the identical hardware and differs only in the embedded Test-ROM software.

The contact based interface and the contactless interface of the hardware platform can be used independent from each other. Depending on the major configuration the contactless interface is disabled, or configured as S2C interface. Based on a specific minor configuration and an associated clock configuration both interfaces could be used simultaneously.

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

1. tests which are performed in a simulation environment with different tools for the analogue circuitries and for the digital parts of the TOE;
2. functional tests which are performed with special software
3. characterisation and verification tests to release the hardware platform for production including tests with different operating conditions as well as special verification tests for security services and security features of the hardware
4. functional tests at the end of the production process using IC Dedicated Test Software. These tests are executed for every chip to check its correct functionality as last step of phase 3.

The developer tests cover all TSFIs as identified in the functional specification as well as in the test documentation.

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.

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 including information that can be gathered by reverse engineering to support other attacks. Further on attacks that do not modify the hardware platform physically such as side channel analysis for the coprocessors (AES, Triple-DES) and perturbation attacks were performed. 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.

8. Evaluated Configuration

This certification covers the following configurations of the TOE:

The P5CD016/021/041/051 and P5Cx081V1A/ V1A(s) can be delivered in different configurations, specifically it is delivered with different MIFARE versions. The term “MIFARE Operating System” denotes the TOE with MIFARE classic and MIFARE FLeX option according to the ST. All configurations listed in the following table are covered by the evaluation. Due to the naming conventions of the SMX family the configured TOEs have different names.

	Contact-less interface	Mifare OS	S2C interface	accessible EEPROM
P5CD081V1A	available	available	not available	80kByte
P5CC081V1A	not available	not available	not available	80kByte
P5CN081V1A	not available	available	available	80kByte
P5CD051V1A	available	available	not available	52kByte
P5CD041V1A	available	available	not available	40kByte
P5CD021V1A	available	available	not available	20kByte
P5CD016V1A	available	available	not available	16kByte

Tabelle 5: Overview of major configurations

The P5CD081V1A and its major configurations were all tested during the evaluation. All configurations are available to the evaluator. Beside the differences listed in table 5 there are no other differences between the configurations (note that the MIFARE Operating System is only available for the configurations with either contact-less interface or S2C interface). The term “MIFARE Operating System” in this context according to the ST covers both varieties of the additional IC Dedicated Software the MIFARE Classic option and the MIFARE FLeX option. The MIFARE configuration does not have dependencies to security features and does not implement Security Functional Requirements. Therefore the results for the P5CD081V1A described in this document are also applicable for the P5CC081V1A, P5CN081V1A, P5CD051V1A, P5CD041V1A, P5CD021V1A and the P5CD016V1A.

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 Smartcards*

(iii) Guidance, Smartcard Evaluation

(see [4], AIS 25, AIS 37).

For RNG assessment the scheme interpretations AIS 31 was used (see [4]).

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.

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

All components of the EAL 5 package including the class ASE as defined in the CC (see also part C of this report)

The components ALC_DVS.2, ASE_TSS.2 and AVA_VAN.5 augmented for this TOE evaluation.

As the evaluation work performed for this certification procedure was carried out as a re-evaluation based on the certificate BSI-DSZ-CC-0857-2013, re-use of specific evaluation tasks was possible. The focus of this re-evaluation was on side channel analysis as well as fault analysis.

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 5 augmented by ALC_DVS.2, ASE_TSS.2 and AVA_VAN.5

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 strength of the cryptographic algorithms was not rated in the course of this certification procedure (see BSIG Section 9, Para. 4, Clause 2). But Cryptographic Functionalities with a security level of lower than 100 bits can no longer be regarded as secure without considering the application context. Therefore, for these functionalities 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>).

Any Cryptographic Functionality that is marked in column '*Security Level above 100 Bits*' of the following table with '*no*' achieves a security level of lower than 100 Bits (in general context).

No.	Purpose	Cryptographic Mechanism	Standard of Implementation	Key Size in Bits	Security Level above 100 Bits
1	Cryptographic Primitives	Two-key TDES	[FIPS-46-3] (DES)	K = 112	no
2		Three-key TDES	[FIPS-46-3] (DES)	K = 168	yes

No.	Purpose	Cryptographic Mechanism	Standard of Implementation	Key Size in Bits	Security Level above 100 Bits
3		AES	[FIPS-197] (AES)	K = 128, 192, 256	yes

Table 6: TOE cryptographic functionality

The strength of the cryptographic algorithms was not rated in the course of this certification procedure (see BSIG Section 9, Para. 4, Clause 2).

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.

The limited validity for the usage of cryptographic algorithms as outlined in chapter 9 has to be considered by the user and his system risk management process.

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

For this reason the TOE includes guidance documentation (see table 2) which contains guidelines for the developer of the Security IC 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].

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

AIS	Application Notes and Interpretations of the Scheme
AES	Advanced Encryption Standard
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
cPP	Collaborative Protection Profile
CPU	Central Processing Unit
DES	Data Encryption Standard
EAL	Evaluation Assurance Level
ETR	Evaluation Technical Report
IC	Integrated Circuit
IT	Information Technology
ITSEF	Information Technology Security Evaluation Facility
PP	Protection Profile
RNG	Random Number Generator
ROM	Read Only Memory
S2C	Smart card interface standard complying with ISO/IEC 18092
SAR	Security Assurance Requirement
SFP	Security Function Policy
SFR	Security Functional Requirement
ST	Security Target
TOE	Target of Evaluation
TSF	TOE Security Functionality
UART	Universal Asynchronous Receiver Transmitter

12.2. Glossary

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

Collaborative Protection Profile - A Protection Profile collaboratively developed by an International Technical Community endorsed by the Management Committee.

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

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

Informal - Expressed in natural language.

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

Package - named set of either security functional or security assurance requirements

Protection Profile - A formal document defined in CC, expressing an implementation independent set of security requirements for a category of IT Products that meet specific consumer needs.

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 - An IT Product and its associated administrator and user guidance documentation that is the subject of an Evaluation.

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: Technical information on the IT security certification of products,
protection profiles and sites (BSI 7138) and Requirements regarding the Evaluation
Facility for the Evaluation of Products, Protection Profiles and Sites under the CC
and ITSEC (BSI 7125)
- [4] Application Notes and Interpretations of the Scheme (AIS) as relevant for the TOE⁸.
- [5] German IT Security Certificates (BSI 7148), periodically updated list published also
in the BSI Website
- [6] Security Target BSI-DSZ-CC-0857-V2-2015, Version 1.9, 3 June 2013, NXP Secure
Smart Card Controllers P5CD016/021/041/051 and P5Cx081 V1A/ V1A(s) Security
Target, NXP Semiconductors (confidential document)
- [7] Security IC Platform Protection Profile, Version 1.0, 15 June 2007,
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- [8] Security Target Lite BSI-DSZ-CC-0857-V2-2015, Version 1.9, 3 June 2013, NXP
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Security Target Lite, NXP Semiconductors (sanitised public document)
- [9] Evaluation Technical Report, Version 2.0, 31 March 2015, Evaluation Technical
Report BSI-DSZ-CC-0857-V2, T-Systems GEI GmbH, (confidential document)
- [10] ETR for composite evaluation according to AIS 36, Version 1.7, 29 January 2015,
ETR for composition, T-Systems GEI GmbH (confidential document)
- [11] Configuration lists:
 - Configuration List P5CD016/021/041/051 and P5Cx081V1A/ V1A(s), NXP
Semiconductors, Business Unit Identification, Rev. 1.8, 03.06.2013 (confidential
document)

⁸specifically

- AIS 25, Version 8, Anwendung der CC auf Integrierte Schaltungen including JIL Document and CC Supporting Document
- AIS 26, Version 9, Evaluationsmethodologie für in Hardware integrierte Schaltungen including JIL Document and CC Supporting Document
- AIS 31, Version 3, Funktionalitätsklassen und Evaluationsmethodologie für physikalische Zufallszahlengeneratoren
- AIS 34, Version 3, Evaluation Methodology for CC Assurance Classes for EAL 5+ (CCv2.3 & CCv3.1) and EAL 6 (CCv3.1)
- AIS 35, Version 2, Öffentliche Fassung des Security Targets (ST-Lite) including JIL Document and CC Supporting Document and CCRA policies
- AIS 38, Version 2, Reuse of evaluation results

- Configuration List for composite evaluation P5CD016/021/041V1A/051 and P5Cx081V1A/ V1A(s), NXP Semiconductors, Business Unit Identification, Rev. 1.9, 03.06.2013 (confidential document)
- Customer-specific appendix of the Configuration List P5CD016/021/041/051 and P5C081V1A/ V1A(s), NXP Semiconductors, Business Unit Identification, Rev. 1.6, 13.05.2013 (confidential document)

[12] Guidance documentation for the TOE

- Guidance, Delivery and Operation Manual, NXP Secure Smart Card Controllers P5CD016/021/041/051 and P5Cx081, NXP Semiconductors, Version 1.8, Document Number: 171618, 18 December 2014
- 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
- Instruction Set, SmartMX-Family, Secure and PKI Smart Card Controller, Philips Semiconductors, Revision 1.1, Document Number: 084111, July 04, 2006

C. Excerpts from the Criteria

CC Part 1:

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
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

Assurance Class	Assurance Components
	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_COV.1 Evidence of coverage ATE_COV.2 Analysis of coverage ATE_COV.3 Rigorous analysis of coverage
ATE: Tests	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.

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

“Objectives

EAL 1 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.

EAL 1 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.

EAL 1 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 EAL 1 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 (EAL 2) - structurally tested (chapter 8.4)

“Objectives

EAL 2 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.

EAL 2 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 (EAL 3) - methodically tested and checked (chapter 8.5)

“Objectives

EAL 3 permits a conscientious developer to gain maximum assurance from positive security engineering at the design stage without substantial alteration of existing sound development practises.

EAL 3 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 (EAL 4) - methodically designed, tested, and reviewed (chapter 8.6)

“Objectives

EAL 4 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. EAL 4 is the highest level at which it is likely to be economically feasible to retrofit to an existing product line.

EAL 4 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 (EAL 5) - semiformally designed and tested (chapter 8.7)

“Objectives

EAL 5 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 EAL 5 assurance. It is likely that the additional costs attributable to the EAL 5 requirements, relative to rigorous development without the application of specialised techniques, will not be large.

EAL 5 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 (EAL 6) - semiformally verified design and tested (chapter 8.8)

“Objectives

EAL 6 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.

EAL 6 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 (EAL 7) - formally verified design and tested (chapter 8.9)

“Objectives

EAL 7 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 EAL 7 is currently limited to TOEs with tightly focused security functionality that is amenable to extensive formal analysis.”

Assurance Class	Assurance Family	Assurance Components by Evaluation Assurance Level						
		EAL 1	EAL 2	EAL 3	EAL 4	EAL 5	EAL 6	EAL 7
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”

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.”

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-0857-V2-2015

Evaluation results regarding development and production environment



The IT product NXP Secure Smart Card Controllers P5CD016/021/041/051 and P5Cx081V1A/ V1A(s) (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 5 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 27 April 2015, 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.5, ALC_DEL.1, ALC_DVS.2, ALC_LCD.1, ALC_TAT.2) are fulfilled for the development and production sites of the TOE listed below:

The target of evaluation (TOE) is developed by:

NXP Semiconductors Germany GmbH
Business Unit Security and Connectivity
Stresemannallee 101
D-22529 Hamburg

This site provides also customer support.

The evaluation deliverables are provided by:

NXP Semiconductors Germany GmbH
Business Unit Security and Connectivity
Stresemannallee 101
D-22529 Hamburg

or

NXP Semiconductors (Thailand)
Assembly Plant Bangkok, Thailand (APB)
303 Moo 3 Chaengwattana Rd.
Laksi, Bangkok 10210 Thailand

for the hardware platform and

NXP Semiconductors GmbH
Business Unit Security and Connectivity
Document Control Office
Mikron-Weg 1
A-8101 Gratkorn

for the documentation of the TOE.

Following sites are involved for the production of the TOE wafer fab and associated mask shops:

Semiconductor Factory (chipfinishing and wafer production):
Systems on Silicon Manufacturing Co. Pte. Ltd. (SSMC)
70 Pasir Ris Drive 1
Singapore 519527
Singapore

Mask Shop for SSMC:
Toppan Photomasks Korea Ltd.
345-1, Sooha-Ri ShinDoon-Myon
467-840 Ichon
South Korea

Semiconductor Factory (chipfinishing):
GLOBALFOUNDRIES Singapore Pte Ltd.
60 Woodlands Industrial Park D, Street 2
Singapore, 738406

Semiconductor Factory (wafer production):
GLOBALFOUNDRIES Singapore (Tampines) Pte Ltd
1 Tampines Industrial Avenue 5
Singapore 528830

Mask Shop for Globalfoundries:
Photronics Singapore Pte. Ltd.
6 Loyang Industrial Park
Singapore 507099

Mask Shop for Globalfoundries:
Photronics Semiconductors Mask Corp. (PSMC)
1F, No.2, Li-Hsin Rd.
Science-Based Industrial Park
Hsin-Chu City
Taiwan R.O.C.

In addition, the following sites are involved for the bumping, testing, module inlay assembly of the TOE:

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

Test Centre:
NXP Semiconductors GmbH
IC Manufacturing Operations - Test Center Hamburg (IMO TeCH)
Stresemannallee 101
D-22529 Hamburg

Test Centre:
Assembly Plant Kaohsiung
NXP Semiconductors Taiwan Ltd

#10, Jing 5th Road, N.E.P.Z, Kaohsiung 81170
Taiwan, R.O.C

Test Center and Module Assembly:
NXP Semiconductors (Thailand)
Assembly Plant Bangkok, Thailand (APB)
303 Moo 3 Chaengwattana Rd.
Laksi, Bangkok 10210 Thailand

Module Assembly:
NedCard B.V.
Bijsterhuizen 25-29
6604 LM Wijchen
The Netherlands

Module Assembly:
Chipbond Technology Corporation
No. 1, Dàhuá 1st Rd.
Kaohsiung City
Taiwan 806, R.O.C.

Inlay assembly:
HID Global Galway
Paic Tionscail na Tulaigh
Balle na hAbhann
Co. Galway
Ireland

Inlay assembly:
Smartrac Technology Ltd.
142 Moo, Hi-Tech Industrial Estate
Tambon Ban Laean, Amphor Bang-Pa-In
13160 Ayutthaya
Thailand

For the sites listed above, the requirements have been specifically applied in accordance with the Security Target [6]. 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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