Certification Report

MF0AES(H)x0, NT2H2xy1G and NT2H2xy1S, Release B0

Sponsor and developer: ***NXP Semiconductors Germany GmbH***
Troplowitzstrasse 20
22529 Hamburg
Germany

Evaluation facility: ***SGS Brightsight B.V.***
Brassersplein 2
2612 CT Delft
The Netherlands

Report number: **NSCIB-CC-0138361-CR**

Report version: **1**

Project number: **0138361**

Author(s): **Jordi Mujal**

Date: **01 February 2022**

Number of pages: **11**

Number of appendices: **0**

Head Office:
Westervoortsedijk 73
NL-6827 AV Arnhem

P.O. Box 2220
NL-6802 CE Arnhem
The Netherlands

Location Leek:
Eiberkamp 10
NL-9351 VT Leek

P.O. Box 37
NL-9350 AA Leek
The Netherlands

info@nl.tuv.com
www.tuv.com/nl

Tel. +31 (0)88 888 7 888
Fax +31 (0)88 888 7 879

TÜV Rheinland Nederland B.V. is a registered company at the Netherlands Chamber of Commerce (KVK), under number 27288788.

VAT number: NL815820380B01
IBAN: NL61DEUT0265155096

CONTENTS

Foreword

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

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

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

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

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

Reproduction of this report is authorised only if the report is reproduced in its entirety.

Recognition of the Certificate

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

International recognition

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

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

European recognition

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

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

1 Executive Summary

This Certification Report states the outcome of the Common Criteria security evaluation of the MF0AES(H)x0, NT2H2xy1G and NT2H2xy1S, Release B0. The developer of the MF0AES(H)x0, NT2H2xy1G and NT2H2xy1S, Release B0 is NXP Semiconductors Germany GmbH located in Hamburg, Germany and they also act as the sponsor of the evaluation and certification. A Certification Report is intended to assist prospective consumers when judging the suitability of the IT security properties of the product for their particular requirements.

The TOE is a Security IC comprising a dedicated hardware platform and a set of data elements stored in EEPROM. The TOE is primarily designed for secure applications such as public transportation, access, event ticketing, loyalty, smart packaging and brand protection. It fully complies with the requirements for fast and secure data transmission and interoperability with existing infrastructure.

The TOE has been evaluated by SGS Brightsight B.V. located in Delft, The Netherlands. The evaluation was completed on 01 February 2022 with the approval of the ETR. The certification procedure has been conducted in accordance with the provisions of the Netherlands Scheme for Certification in the Area of IT Security *[NSCIB]*.

The scope of the evaluation is defined by the security target *[ST]*, which identifies assumptions made during the evaluation, the intended environment for the MF0AES(H)x0, NT2H2xy1G and NT2H2xy1S, Release B0, the security requirements, and the level of confidence (evaluation assurance level) at which the product is intended to satisfy the security requirements. Consumers of the MF0AES(H)x0, NT2H2xy1G and NT2H2xy1S, Release B0 are advised to verify that their own environment is consistent with the security target, and to give due consideration to the comments, observations and recommendations in this certification report.

The results documented in the evaluation technical report *[ETR]* [1] for this product provide sufficient evidence that the TOE meets the EAL3 augmented (EAL3+) assurance requirements for the evaluated security functionality. This assurance level is augmented with ASE_TSS.2 (TOE Summary Specification).

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

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

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

2 Certification Results

2.1 Identification of Target of Evaluation

The Target of Evaluation (TOE) for this evaluation is the MF0AES(H)x0, NT2H2xy1G and NT2H2xy1S, Release B0 from NXP Semiconductors Germany GmbH located in Hamburg, Germany.

The TOE is comprised of the following main components:

Delivery item type	Identifier	Version
Hardware	MF0AES(H)x0, NT2H2xy1G and NT2H2xy1S	B0

To ensure secure usage a set of guidance documents is provided, together with the MF0AES(H)x0, NT2H2xy1G and NT2H2xy1S, Release B0. For details, see section 2.5 “Documentation” of this report.

For a detailed and precise description of the TOE lifecycle, see the *[ST]*, Chapter 1.4.3.

2.2 Security Policy

The TOE implements the following main security services:

- Secure mutual authentication to support authentication of authorized users and the TOE.
- Secure channel establishment and secure messaging to support integrity protected data transfer on the MIFARE Ultralight AES variant of the TOE.
- Secure user one-time programmable memory area.
- Secure read-only locking of the user memory.
- One or more secure monotonic counters.
- Secure dynamic messaging to allow secure export of data in unauthenticated state on NTAG 22x (StatusDetect) variants of the TOE.
- Supporting non-traceability of the TOE by providing the option to use random IDs during contactless protocol establishment on the MIFARE Ultralight AES variant of the TOE.
- Additional functionality to detect the status of tamper evidence provided by the NTAG 22x StatusDetect variant of the TOE.

2.3 Assumptions and Clarification of Scope

2.3.1 Assumptions

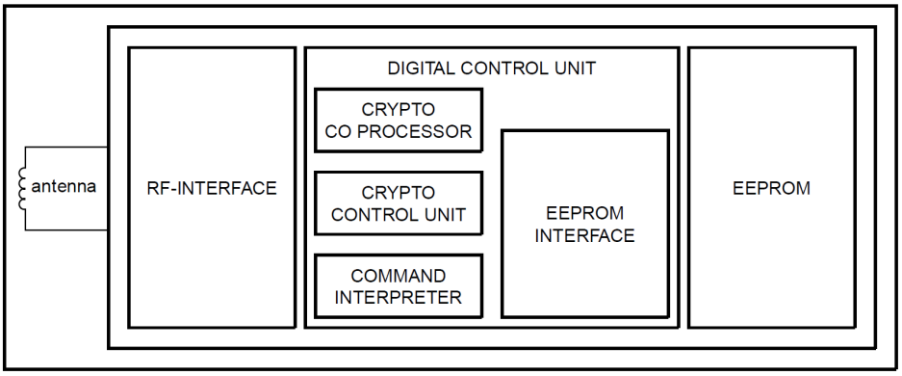
The assumptions defined in the Security Target are not covered by the TOE itself. These aspects lead to specific Security Objectives to be fulfilled by the TOE-Environment. For detailed information on the security objectives that must be fulfilled by the TOE environment, see section 4.2 of the *[ST]*.

2.3.2 Clarification of scope

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

2.4 Architectural Information

A block diagram of the IC hardware is depicted here:



2.5 Documentation

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

For the **MIFARE Ultralight AES**, the following guidance components are delivered.

Identifier	Version	Date
MF0AES(H)20, MIFARE Ultralight AES - Contactless ticket IC, Objective data sheet	1.1	20 December 2021
MF0AES(H)30, MIFARE Ultralight AES - Contactless ticket IC, Objective data sheet	1.1	20 December 2021
MIFARE Ultralight AES, Guidance and operation manual	1.2	18 January 2022

For the **NTAG 22x DNA**, the following guidance components are delivered.

Identifier	Version	Date
NT2H2331G0, NTAG 223 DNA - NFC T2T compliant IC, Objective data sheet	1.1	20 December 2021
NT2H2421G0, NTAG 224 DNA - NFC T2T compliant IC, Objective data sheet	1.1	20 December 2021
NTAG 22x DNA, Guidance and operation manual	1.2	18 January 2022

For the **NTAG 22x DNA StatusDetect**, the following guidance components are delivered.

Identifier	Version	Date
NT2H2331S0, NTAG 223 DNA StatusDetect - NFC T2T compliant IC with StatusDetect feature, Objective data sheet	1.1	20 December 2021
NT2H2421S0, NTAG 224 DNA StatusDetect - NFC T2T compliant IC with StatusDetect feature, Objective data sheet	1.1	20 December 2021
NTAG 22x DNA StatusDetect, Guidance and operation manual	1.2	18 January 2022

2.6 IT Product Testing

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

2.6.1 Testing approach and depth

The developer performed extensive testing on functional specification and subsystem level. All functionality of the TOE is defined with requirements and all requirements are directly traced to test cases. This was complemented by the code coverage figures produced by specific tools. The testing was largely automated using industry standard and proprietary test suites.

For the testing performed by the evaluators, the developer provided samples and a test environment. The evaluators reproduced a selection of the developer tests, as well as a small number of test cases designed by the evaluator.

2.6.2 Independent penetration testing

The vulnerability analysis was conducted along the following steps:

- When evaluating the evidence in the classes ASE, ADV and AGD the evaluator considered whether potential vulnerabilities could be identified due to the TOE type and/or specified behaviour in such an early stage of the evaluation.
- A testing approach was devised that allowed to determine which kinds of attacks and attack methods are in scope given the needed assurance level and protection against attackers with Basic attack potential. For this, the smartcard supportive documents [JIL-AM] and [JIL-AAPS] were used. This showed that most of the conventional smartcard TOE-type attacks are beyond the required attack potential.
- All potential vulnerabilities are analysed using the knowledge gained from all evaluation classes and information from the public domain. A judgment was made on how to assure that these potential vulnerabilities are not exploitable. The potential vulnerabilities are addressed by penetration testing, a guidance update or in other ways that are deemed appropriate.

The total test effort expended by the evaluators was 5.5 weeks. During that test campaign, 57% of the total time was spent on Perturbation attacks, and 43% on logical tests.

2.6.3 Test configuration

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

2.6.4 Test results

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

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

No exploitable vulnerabilities were found with the independent penetration tests.

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

2.7 Reused Evaluation Results

There is no reuse of evaluation results in this certification.

2.8 Evaluated Configuration

The TOE is defined uniquely by its name and version number MF0AES(H)x0, NT2H2xy1G and NT2H2xy1S, Release B0.

2.9 Evaluation Results

The evaluation lab documented their evaluation results in the *[ETR]*, which references an ASE Intermediate Report and other evaluator documents.

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

Based on the above evaluation results the evaluation lab concluded the MF0AES(H)x0, NT2H2xy1G and NT2H2xy1S, Release B0, to be **CC Part 2 extended, CC Part 3 conformant**, and to meet the requirements of **EAL 3 augmented with ASE_TSS.2**. This implies that the product satisfies the security requirements specified in Security Target *[ST]*.

2.10 Comments/Recommendations

The user guidance as outlined in section 2.5 “Documentation” contains necessary information about the usage of the TOE. Certain aspects of the TOE’s security functionality, in particular the countermeasures against attacks, depend on accurate conformance to the user guidance of the TOE. There are no particular obligations or recommendations for the user apart from following the user guidance. Please note that the documents contain relevant details concerning the resistance against certain attacks.

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

The customer or user of the product shall consider the results of the certification within his system risk management process. For the evolution of attack methods and techniques to be covered, the customer should define the period of time until a re-assessment for the TOE is required and thus requested from the sponsor of the certificate.

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

3 Security Target

The MF0AES(H)x0, NT2H2xy1G and NT2H2xy1S Security Target, Version 1.2, 18 January 2022 *[ST]* is included here by reference.

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

4 Definitions

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

AES	Advanced Encryption Standard
IC	Integrated Circuit
IT	Information Technology
ITSEF	IT Security Evaluation Facility
JIL	Joint Interpretation Library
NSCIB	Netherlands Scheme for Certification in the area of IT Security
PP	Protection Profile
TOE	Target of Evaluation

5 Bibliography

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

[CC]	Common Criteria for Information Technology Security Evaluation, Parts I, II and III, Version 3.1 Revision 5, April 2017
[CEM]	Common Methodology for Information Technology Security Evaluation, Version 3.1 Revision 5, April 2017
[ETR]	Evaluation Technical Report "MF0AES(H)x0, NT2H2xy1G and NT2H2xy1S" - EAL3+, 20-RPT-611, version 3.0, 01 February 2022.
[JIL-AAPS]	JIL Application of Attack Potential to Smartcards, Version 3.1, June 2020
[JIL-AM]	Attack Methods for Smartcards and Similar Devices, Version 2.4, January 2020 (sensitive with controlled distribution)
[NSCIB]	Netherlands Scheme for Certification in the Area of IT Security, Version 2.5, 28 March 2019
[ST]	MF0AES(H)x0, NT2H2xy1G and NT2H2xy1S Security Target, Version 1.2, 18 January 2022
[ST-lite]	MF0AES(H)x0, NT2H2xy1G and NT2H2xy1S Security Target Lite, Version 1.1, 18 January 2022
[ST-SAN]	ST sanitising for publication, CC Supporting Document CCDB-2006-04-004, April 2006

(This is the end of this report.)