GSA U.S General Services Administration

Biometric Authentication Reader Test Procedure

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1 Overview

Homeland Security Presidential Directive-12 (HSPD-12) - "*Policy for a Common Identification Standard for Federal Employees and Contractors*" directed the promulgation of a new Federal standard for a secure and reliable form of identification issued by all Federal Agencies to their employees and contractors.

In addition to derived test requirements developed to test conformance to the NIST standard, GSA has established interoperability and performance metrics to further determine product suitability. Vendors whose products and services are deemed to be conformant with NIST standards and the GSA interoperability and performance criteria will be eligible to sell their products and services to the Federal Government.

1.1 Identification

This document provides the detailed test procedure that needs to be executed by the Lab in order to evaluate the Biometric Authentication Reader (henceforth referred to as the Product) against the subset of applicable requirements that need to be electronically tested for this category.

2 Testing Process

As previously mentioned, this document prescribes detailed test steps that need to be executed in order to test the requirements applicable for this category. Please note that conformance to the tests specified in this document will not result in the Product being compliant to the applicable requirements of FIPS 201. The Product must undergo an evaluation using all the evaluation criteria listed for that category prior to being deemed as compliant. Only products and services that have successfully completed the entire Approval Process will be designated as conformant to the Standard. To this effect, this document only provides details for the evaluation using the Lab Test Data Report approval mechanism.

A Lab Engineer follows the steps outlined below in order to test those requirements that have been identified to be electronically tested. The end result is a compilation of the observed behavior of the Product in the Lab Test Data Report.

Section 1 provides the test procedures that need to be executed for evaluating the Product as conformant to the requirements of FIPS 201.

3 Test Procedure for Biometric Authentication Reader

3.1 Requirements

The following table provides a reference to the requirements that need to be electronically tested within the Lab as outlined in the Approval Procedures document for the Product. The different test cases that are used to check compliance to the requirements is also cross-referenced in the table below.

Identifier #	Requirement Description	Source	Test Case #
R-BIO.4	The contact interface of the reader shall support both the T=0 and T=1 transmission protocols as defined in ISO/IEC 7816-3:1997.	Card /Card Reader Interoperability Requirements, Section 2.2.2.2 Para 1 pg.3	R-BIO-TP.3
R-BIO.12	{The reader shall be able to read data from the CHUID buffer on the PIV Card.}	FIPS 201-1, Section 6.2.2 Para 1 pg.48	R-BIO-TP.1
R-BIO.13	{The reader shall be able to compare the CHUID expiration date to the current date and determine card expiry.}	FIPS 201-1, Section 6.2.2 Para 1 pg.48	R-BIO-TP.4
R-BIO.14	{The reader shall be able to parse the FASC-N from the CHUID.}	FIPS 201-1, Section 6.2.3.1 Para 1 pg.48	R-BIO-TP.1
R-BIO-A.16	The digital signature on the biometric is checked {based on signature algorithms and key sizes specified in Table 3-3 of SP 800-78-2} to ensure the biometric was signed by a trusted source and is unaltered.	FIPS 201-1, Section 6.2.2 Para 1 pg.48	R-BIO-TP.6
R-BIO.17	{The reader shall be able to compare the} FASC-N in the CHUID {to the} FASC-N in the Signed {Attributes field of the biometric signature block.}	FIPS 201-1, Section 6.2.3.1 Para 1 pg.48	R-BIO-TP.5
R-BIO.18	One or more of the CHUID data elements (e.g., FASC-N, Agency Code, DUNS) are used as input to the	FIPS 201-1, Section 6.2.3.1 Para 1 pg.48	R-BIO-TP.7

	authorization check to determine whether the cardholder should be granted access.		
R-BIO.19	The biometric sample matches the biometric read from the card, the cardholder is authenticated to be the owner of the card {(i.e. the reader performs a 1:1 biometric match).}	FIPS 201-1, Section 6.2.3.1 Para 1 pg.48	R-BIO-TP.2

Table 1 - Applicable Requirements

3.2 Test Components

Table 2 provides the details of all the components required by the Lab to execute this test procedure. Based on the different test cases, different components may be required to execute different test cases.

#	Component	Component Details	Identifier
1	Biometric Reader under test	-	PROD
2	A PIV Card that supports the T=0 transmission protocol only	SafesITe FIPS 201 applet on Gemalto GemCombi'Xpresso R4 E72K Card[1]	PCARD-T0
3	A PIV Card that supports the T=1 transmission protocol only	PIV EP v.108 Java Card Applet on Oberthur ID-One Cosmo 64 v5 Smart Card[1]	PCARD-T1
4	Data Populator Tool	For randomly generating and loading PIV Card containers	DPT

Table 2 - Test Procedure: Components

3.3 Test Cases

This section discusses the various test cases that are needed to test the Product against the requirements mentioned above. Vendors submitting such Products may be required to demonstrate in the Lab that the Product meets the same requirements mentioned in Section 3.1.

Vendors will be provided with an eight foot (8') table and four (4) 120 volt AC outlets. Vendor shall be given one (1) Lab workday to demonstrate products ability to meet the

[1] An appropriate PIV Card from the Approved Products List (APL) can be used as a substitute.

said requirements. Upon completion, Vendor is required to print the results of testing for each requirement, which will be incorporated into the Lab Test Data Report.

3.3.1 Test Case R-BIO-TP.1

3.3.1.1 Purpose

The purpose of this test is to verify that:

i. The contact interface of the reader supports the T=0 transmission protocol as defined in ISO/IEC 7816-3:1997.
ii. The reader shall be able to read data from the CHUID buffer on the PIV Card.
iii. The reader shall be able to parse the FASC-N from the CHUID.

3.3.1.2 Test Setup

Equipment :	The following components are necessary for executing this test case: ▪ PCARD-T0 ▪ PROD
Preparation	▪ Populate PCARD-T0 with a CHUID and a biometric fingerprint. The FASC-N in the CHUID needs to be the same as that in the Signed Attributes of the biometric signature. ▪ Configure PROD to allow access if presented with this CHUID[2]. (Note: The Product is to be configured such that that the certificate that signed the Biometric is trusted by the PROD and access is granted based on certain fields within the CHUID.) All fields in the CHUID should be in accordance to the Standard.

3.3.1.3 Test Process

Test Steps:	1. Insert PCARD-T0 into PROD. 2. Using PROD, attempt to perform the biometric authentication use case. (The live authentication fingerprint needs to be provided by the individual whose fingerprint is placed on the PCARD-T0.) 3. The test should complete successfully and access should be granted[3]. 4. Verify that the tests were completed by reviewing the results on the PROD. Document observed results.
Expected Result(s):	1. The test verifies that the reader is able to support the T=0 transmission protocol as defined in ISO/IEC 7816-3:1997 and read and parse the CHUID.

[2] This step is only applicable if the PROD has the ability to maintain an Access Control List (ACL) internally. If the PROD sends information (e.g. FASC-N) to PACS, then the Suppliers must be able to identify the information sent during the test to the Lab Engineer.

[3] If the PROD is capable of making access control decisions internally.

3.3.2 Test Case R-BIO-TP.2

3.3.2.1 Purpose

The purpose of this test is to verify that the reader performs a 1:1 biometric match in order to authenticate the cardholder.

3.3.2.2 Test Setup

Equipment :	The following components are necessary for executing this test case: ▪ PCARD-T0 ▪ PROD
Preparation	▪ No further preparation than that in R-BIO-TP.1

3.3.2.3 Test Process

Test Steps:	1. Insert PCARD-T0 into PROD. 2. Using PROD, attempt to perform the biometric authentication use case. (The live authentication fingerprint needs to be provided by the individual whose fingerprint is not the one that is placed on the PCARD-T0.) 3. The test should complete successfully and access should not be granted[4]. The Product should indicate a failure, return an error and/or notify the user of an incorrect biometric match. 4. Verify that the tests were completed by reviewing the results on the PROD. Document observed results.
Expected Result(s):	1. The test completes successfully showing that the Product performs a 1:1 biometric match in order to authenticate the cardholder.

3.3.3 Test Case R-BIO-TP.3

3.3.3.1 Purpose

The purpose of this test is to verify that the contact interface of the reader supports the T=1 transmission protocol as defined in ISO/IEC 7816-3:1997.

3.3.3.2 Test Setup

Equipment :	The following components are necessary for executing this test case: ▪ PCARD-T1 ▪ PROD

[4] If the PROD is capable of making access control decisions internally.

Preparation	▪ Populate PCARD-T1 with a CHUID and a biometric fingerprint. The FASC-N in the CHUID needs to be the same as that in the Signed Attributes of the biometric signature. ▪ Configure PROD to allow access if presented with this CHUID[3] (Note: The Product is to be configured such that that the certificate that signed the Biometric is trusted by the PROD and access is granted based on certain fields within the CHUID.) All fields in the CHUID should be in accordance to the Standard

3.3.3.3 Test Process

Test Steps:	1. Insert PCARD-T1 into PROD. 2. Using the PROD, attempt to perform the biometric authentication use case. (The live authentication fingerprint needs to be provided by the individual whose fingerprint is placed on the PCARD-T1.) 3. Verify that the test was completed by reviewing the result on the Product. The test completes successfully and access is granted[5]. 4. Verify that the tests were completed by reviewing the results on the PROD. Document observed results.
Expected Result(s):	1. The test completes successfully showing that the contact interface of the reader supports the T=1 transmission protocol as defined in ISO/IEC 7816-3:1997.

3.3.4 Test Case R-BIO-TP.4

3.3.4.1 Purpose

The purpose of this test is to verify that the reader is able to compare the CHUID expiration date to the current date and determine card expiry.

3.3.4.2 Test Setup

Equipment:	The following components are necessary for executing this test case: ▪ PCARD-T1 ▪ PROD
Preparation:	▪ Populate PCARD-T1 with a CHUID and a biometric fingerprint. The FASC-N in the CHUID needs to be the same as that in the Signed Attributes of the biometric signature. The CHUID object on PCARD-T1 needs to have expired (i.e. it has an expiry date in the past). All other fields in the CHUID should be valid and in accordance to the Standard.

[5] If the PROD is capable of making access control decisions internally.

3.3.4.3 Test Process

Test Steps:	1. Insert PCARD-T1 into PROD. 2. Using the PROD, attempt to perform the Biometric authentication use case. (The live authentication fingerprint needs to be provided by the individual whose fingerprint is placed on the PCARD-T1.) 3. Verify that the test was completed by reviewing the result on the Product. The Product should indicate a failure, return an error and/or notify the user of an expired CHUID.
Expected Result(s):	1. The PCARD-T1 was denied access because of an expired CHUID. The Product indicates a failure, returns an error and/or notifies the user of the error reason.

3.3.5 Test Case R-BIO-TP.5

3.3.5.1 Purpose

The purpose of this test is to verify that the Reader is able to extract the FASC-N in the Signed Attributes field of the biometric signature block and compare to the FASC-N found in the CHUID.

3.3.5.2 Test Setup

Equipment:	The following components are necessary for executing this test case: ▪ PCARD-T1 ▪ PROD
Preparation:	▪ Populate PCARD-T1 with a CHUID and a biometric fingerprint. The FASC-N in the CHUID needs to be different than that in the Signed Attributes of the biometric signature. All other fields in the CHUID should be valid and in accordance to the Standard.

3.3.5.3 Test Process

Test Steps:	1. Insert PCARD-T1 into PROD. 2. Using the PROD, attempt to perform the Biometric authentication use case. (The live authentication fingerprint needs to be provided by the individual whose fingerprint is placed on the PCARD-T1.) 3. Verify that the test was completed by reviewing the result on the Product. The Product should indicate a failure, return an error and/or notify the user of a FASC-N mismatch.

Expected Result(s):	1. The PCARD-T1 was denied access because the FASC-N in the CHUID did not match the FASC-N in the Signed Attributes of the biometric signature.

3.3.6 Test Case R-BIO-TP.6

The purpose of this test is to verify that the Product is capable of conducting a standards-compliant PKI path validation[6] on the biometric signer's certificate

3.3.6.1 Test Setup

Equipment:	The following components are necessary for executing this test case: ▪ PCARD-T0 (5 Nos.) ▪ PROD
Preparation:	▪ Populate PCARD-T0-1 with a biometric template that has been signed with a biometric signer's certificate that has expired. ▪ Populate PCARD-T0-2 with a biometric template that has been signed with a biometric signer's certificate that has been revoked. ▪ Populate PCARD-T0-3 with a biometric template that has been signed with a biometric signer's certificate for which a certificate path cannot be built successfully (e.g. intermediate certificate revoked, certificate policy OID incorrect, or cannot chain to a valid configured trust anchor etc.). ▪ Populate PCARD-T0-4 with a biometric template whose signature has been altered. ▪ Populate PCARD-T0-5[7] a biometric template that has been signed with a biometric signer's certificate for which certificate path can be built successfully to a valid configured trust anchor. All other fields in the Biometric Template should be valid and in accordance to the Standard.

3.3.6.2 Test Process

Test Steps:	1. Using PCARD-T0-1, attempt to perform the biometric authentication use case. 2. Using PCARD-T0-2, attempt to perform the biometric authentication use case. 3. Using PCARD-T0-3, attempt to perform the biometric

[6] Trust validation implies building a certification path from the Biometric signer's certificate to a known Trust Anchor and determining its revocation status. This can be obtained in several ways including (i) performing standards-complaint path validation internally by the PROD, (ii) interfacing with an approved certificate validator (an EP category), and (iii) interfacing with an approved cached status proxy (an EP category).

[7] It is assumed that the FASC-N contained in the biometric template/CHUID has the appropriate values set so as to be granted access and the 1:1 biometric match is completed successfully.

	authentication use case. 4. Using PCARD-T0-4, attempt to perform the biometric authentication use case. 5. Using PCARD-T0-5, attempt to perform the biometric authentication use case. 6. Verify that the tests were completed by reviewing the results on the PROD. Document observed results.
Expected Result(s):	The PCARD-T0-1 was denied access[8] because of an expired biometric signer's certificate. PCARD-T0-2 was denied access because of a revoked certificate. PCARD-T0-3 was denied access because the path validation failed. PCARD-T0-4 was denied access due to an invalid signature. The Product indicates a failure, returns an error and/or notifies the user of the error reason. PCARD-T0-5 was allowed access since the path validation completed successfully.

3.3.7 Test Case R-BIO-TP.7[9]

3.3.7.1 Purpose

The purpose of this test is to verify that one or more of the CHUID data elements are used as input to the authorization check.

3.3.7.2 Test Setup

Equipment:	The following components are necessary for executing this test case: ▪ PCARD-T1 ▪ PROD
Preparation:	▪ Populate PCARD-T1 with a CHUID and a biometric fingerprint. The FASC-N in the CHUID needs to be the same as that in the Signed Attributes of the biometric signature. The CHUID on PCARD-T1 shall be configured to have an incorrect data element on which the Product bases its access control decision on e.g. If access is granted for a particular agency code only, then the CHUID loaded on the PCARD-T1 must have another agency code. (Note: The Product may have to be configured such the signer of the biometrics is trusted by the PROD and that access is granted based on certain fields within the CHUID.) All fields in the CHUID should be in accordance to the Standard.

[8] If the PROD is capable of making access control decisions internally.

[9] This test needs to only be performed if the Reader is capable of making access control decisions internally.

3.3.7.3 Test Process

Test Steps:	1. Insert PCARD-T1 into PROD. 2. Using the PROD, attempt to perform the biometric authentication use case. (The live authentication fingerprint needs to be provided by the individual whose fingerprint is placed on the PCARD-T1.) 3. Repeat the test based on the various fields supported by the PROD in determining access control. 4. Verify that the test was completed by reviewing the result on the Product. The Product should deny access by indicating a failure or simply returning an error in cases where access was not granted.
Expected Result(s):	1. The Product is able to use one or more of the CHUID data elements as input for the authorization check.