Federal Office
for Information Security

Technical Guideline TR-03122-1

Conformance Test Specification for BSI-TR 03121 Biometrics for Public Sector Applications

Part 1: Framework

Version 5.2

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1. Changelog

The following tables present the changes introduced to this Technical Guideline since version 5.1. The changelog lists the changes grouped per part (test cases) of this Technical Guideline:

- *Added* for new features
- *Changed* for changes in existing functionality
- *Deprecated* for soon-to-be removed features
- *Removed* for now removed features
- *Fixed* for any bug fixes
- *Security* in case of vulnerabilities

1.1. Changelog Version 5.2-draft2

This chapter includes all changes between Version 5.1 and Version 5.2-draft2.

1.1.1. Changelog BSI TR-03122, Part 1

Name	Type of Change	Change Description
-	-	*No Changes*

Table 1.1 Changelog BSI TR-03122, Part 1

1.1.2. Changelog BSI TR-03122, Part 3

Name	Type of Change	Change Description
TC-QA-FP-APP-003	Fixed	Fix expected result to contain an error code (instead of previously 'quality value') according to requirement in TR-03121.
TC-COD-FP-GID-001	Fixed	Fix expected word width of field 'Image acquisition level' (2 byte word) in order to match TR-03121, respectively CBEFF specification.
TC-COM-FI-JPG-001, TC-COM-FI-JP2-001	Added	Handling of multiple lossy image compression
TC-BIP-FP-APP-001, TC-BIP-FP-APP-002, TC-BIP-FP-APP-003	Added	Possibility of manual initiation of capturing process in case of strongly rotated fingerprints; Manual verification of correctness of vertical fingerprint alignment
TC-UI-FI-BSJ-001	Removed	Removal of CTS-support
TC-COM-FP-WSQR-001	Fixed	Expected file size for fingerprint image compression with WSQ
TC-AS-FP-MF-001, AS-FP-MF-002	Added	Expected file format for fingerprint images added
TC-PAP-ACQ-FP442-SV-1	Fixed	Fix of a copy/paste error
TC-QA-FP-APP-003	Fixed	Change of wording
TC-PAP-ACQ-FP4141-SV-1	Added	No error message expected in step 4
TC-LOG-FP-GENERIC-001	Fixed	Focus of Scope/Precondition, availability of uniqueness check information

Name	Type of Change	Change Description
AH-FI-SSS-001	Added	Added testcase
COD-FP-GSAT3-001	Fixed	Error in XML structure
TC-PAP-ACQ-FI-SV-2-001	Fixed	Detailed expected result
TC-CMP-FP-VID	Removed	Is now known as TC-CMP-FP-VER
TC-COD-FP-GSAT3	Fixed	Error in XML structure and typos
TC-AS-FP-MF	Removed	PNG as possible return format
TC-AH-FP-OPT	Changed	Formatting of testcase
TC-AS-FP-MF	Changed	Formatting of testcase
TC-BIP-FP-APP	Changed	Formatting of testcase
TC-QA-FP-APP	Changed	Formatting of testcase
TC-UI-FP-OP	Changed	Formatting of testcase
TC-PAD-FP-APP1	Changed	Formatting of testcase
TC-AH-ALL-SSS	Added	Added testcase
TC-CMP-FP-VER	Added	Added testcase
TC-UI-FP-VER	Added	Added testcase
TC-AS-FP-SLP	Added	Added testcase
TC-COM-FP-WSQ	Added	Added testcase

Table 1.2 Changelog BSI TR-03122, Part 3

1.1.3. Changelog BSI TR-03122, Part 4

Name	Type of Change	Change Description
Entire Document	Added	Added revised BSI TR-03122 Part 4

Table 1.3 Changelog BSI TR-03122, Part 4

1.2. Changelog Version 5.2-draft3

This chapter includes all changes between Version 5.2-draft2 and Version 5.2-draft3.

1.2.1. Changelog BSI TR-03122, Part 1

Name	Type of Change	Change Description
-	-	*No Changes*

Table 1.4 Changelog BSI TR-03122, Part 1

1.2.2. Changelog BSI TR-03122, Part 3

Name	Type of Change	Change Description
TC-PAP-ACQ-FP2P-SV-1_001	Changed	Specificy testing requirements for single-finger acquisition process (steps 8, 9 and 10).

Name	Type of Change	Change Description
TC-PAP-ACQ-FP442-SV-1_001	Changed	Removed steps 8-10
TC-PAP-ACQ-FP4141-SV-1_001	Changed	Removed steps 9-11
TC-PAP-ACQ-FI-M-1	Renamed	The test case was renamed from TC-PAP ACQ-FI-M-1 "Manual Facial Image Acqusition System" to TC-PAP ACQ-FI-SV-5 "Supervised Facial Image Acqusition System".
TC-LOG-ALL-AAD	Renamed	Test case was renamed from TC-LOG-ALL-AAD to TC-LOG-ALL-ARE.
TC-COD-ALL-AAD	Renamed	Test case was renamed from TC-COD-ALL-AAD to TC-COD-ALL-ARE.
TC-P-PH-AAD	Renamed	Test case was renamed from TC-P-PH-AAD to TC-P-PH-ARE.
TC-PAD-FI-APP	Changed	Specifications concerning the artifact classes and added the evaluation description.
TC-BIP-FI-BCL	Changed	Test case was renamed from TC-BIP-FI-BCL to TC-BIP-FI-APP.
TC-BIP-FP-APP	Added	Test if fingerprint images are upscaled.
TC-PAD-FI-APP	Removed	Removed references to volume specific fundtion modules.
TC-COM-CCTV-JPG	Removed	Removed references to volume specific fundtion modules.
TC-AH-FP-SSS	Added	Added testcase TC-AH-FP-SSS.
TC-CMP-FI-VER	Added	Added testcase TC-CMP-FI-VER.
TC-COM-FI-BCL	Added	Added testcase TC-COM-FI-BCL.
TC-COM-FP-BCL	Added	Added testcase TC-COM-FP-BCL.
TC-COD-FI-VER	Added	Added testcase TC-COD-FI-VER.
TC-COD-FP-VER	Added	Added testcase TC-COD-FP-VER.
UI-FI-BSJ	Added	Added display of PAD result.
UI-FP-BSJ	Added	Added display of PAD result.
TC-UI-FP-OP	Changed	Generalisation of testcase.
TC-UI-FP-VER	Changed	Generalisation of testcase.
PAD-FP-APP	Removed	Display of PAD result.
BIP-FP-APP	Added	Requirement of no up-scaling.
AH-FI-BCL	Removed	Requirement of background blurring.
AS-FI-DC	Added	Check of requirement of color depth and image resolution.
AH-FI-ICS	Added	Check requirement on high quality acquisitions independently from the environmental light situation.
ACQ-FI-AUTO-1-001	Changed	Generalisation of testcase.
LOG-FP-GENERIC-001	Removed	"e.g." removed in "results from the control verification process for each finger (e.g. when comparing a rolled image against a finger extracted from a control slap)".

Table 1.5 Changelog BSI TR-03122, Part 3

1.2.3. Changelog BSI TR-03122, Part 4

Name	Type of Change	Change Description
-	-	*No Changes*

Table 1.6 Changelog BSI TR-03122, Part 4

1.3. Changelog Version 5.2

This chapter includes all changes between Version 5.2-draft3 and Version 5.2.

1.3.1. Changelog BSI TR-03122, Part 1

Name	Type of Change	Change Description
-	-	*No Changes*

Table 1.7 Changelog BSI TR-03122, Part 1

1.3.2. Changelog BSI TR-03122, Part 3

Name	Type of Change	Change Description
TC-AH-FI-FBS	Added	Initial release of test case.
TC-AH-FI-SSS2	Added	Initial release of test case.
TC-AS-FI-FBS	Added	Initial release of test case.
TC-AS-FP-SF	Added	Initial release of test case.
TC-BIP-FI-FBS	Added	Initial release of test case.
TC-BIP-FI-GID	Added	Initial release of test case.
TC-QA-FI-SB	Changed, Renamed	Removed volume specific information (threshold requirements) and renamed TC-QA-FI-SB to TC-QA-FI-GENERIC.
TC-QA-FI-ARE	Added	Initial release of test case.
TC-QA-FI-BCL	Added	Initial release of test case.
TC-QA-FI-IMA	Added	Initial release of test case.
TC-QA-FI-GID	Added	Initial release of test case.
TC-COM-FI-IMA	Added	Initial release of test case.
TC-COM-FI-JP2	Changed	Add CTS-Support.
TC-COM-FP-IMA	Added	Initial release of test case.
TC-COM-FP-WSQE	Fixed	Error in formatting of testcase.
TC-COM-FP-WSQR	Added	Initial release of test case.
TC-UI-FP-BSJ	Added	Initial release of test case.
TC-LOG-FI-GENERIC	Changed	Schema version 4v7 is relevant for volumes BCL and IMA. Schema version 4v6 is relevant for volumes GID and ARE.
TC-LOG-ALL-BCL	Changed	Removed purpose result, added application profile-element to be filled valid as result.
TC-LOG-ALL-IMA	Added	Initial release of test case.

Name	Type of Change	Change Description
TC-COD-ALL-BCL	Changed	Specified XML validation scheme and version.
TC-COD-ALL-GID	Changed	Specified XML validation scheme and version.
TC-COD-ALL-ARE	Changed	Specified XML validation scheme and version.
TC-COD-FI-GID	Changed	Examination of the XML encoding.
TC-COD-FP-GID	Changed	Examination of the XML encoding.
TC-PAP-ACQ-FI-SV-4	Added	Initial release of test case.
TC-PAP-ACQ-FP442-SV-1	Changed	Remove redundancy and expect passing of test case TC-PAP-ACQ-FPS-SV-1.
TC-PAP-ACQ-FP4141-SV-1	Changed	Remove redundancy and expect passing of test case TC-PAP-ACQ-FPS-SV-1.
TC-PAP-ACQ-FPS-USV-1	Added	Initial release of test case.
TC-PAP-ACQ-FPS-SV-1	Added	Initial release of test case.

Table 1.8 Changelog BSI TR-03122, Part 3

1.3.3. Changelog BSI TR-03122, Part 4

Name	Type of Change	Change Description
-	-	*No Changes*

Table 1.9 Changelog BSI TR-03122, Part 4

2. Introduction

This document is part one of the Conformance Test Specification (BSI TR-03122). It is the counterpart of BSI TR-03121-1 describing the framework of the conformance test documents for BSI TR-03121.

2.1. Motivation and Objectives of the Conformance Test Specification

The Technical Guideline Biometrics for Public Sector Applications (BSI TR-03121) specifies requirements and recommendations for the use of biometric data within the scope public sector applications. The requirements on specific Function Modules, as defined in BSI TR-03121-3, can be implemented for different public sector applications through hardware and software components from various vendors.

The objective of this Technical Guideline is to offer a base for consistent and comparable quality assurance regarding the different components that will be applied in order to fulfil these requirements. This conformance test specification

- specifies tests for the Software Architecture (in particular in regard to conformance testing),
- defines all test cases being relevant to verify the conformance for the different requirements described in the Function Modules.

2.2. Target Audience

Audience for this guideline are institutions that are dealing with projects using biometrics in public sector applications that require certified modules, hardware, and/or software. These include:

- Vendors of hardware or software products that want to present their solutions for conformance test and acquire to be compliant to this Technical Guideline.
- Evaluation laboratories that check the conformance of hardware and/or software modules that are used within the scope of biometrics and electronic identity documents in public sector applications.

2.3. Structure of the Conformance Test Specification

The Conformance Test Specification consists of the following parts:

- Part 1: Framework (BSI TR-03122-1)

  TR-03122-1 is the framework document of the conformance test specification.

- Part 3: Test Cases for Function Modules and Processes (BSI TR-03122-3)

  The third part defines test cases for hardware and software components as well as processes according to their specification in TR-03121-3.

- Part 4: Additional Test Cases (BSI TR-03122-4)

  The forth part defines additional test cases for evaluating specific criteria in-depth (e.g. performance of biometric acquisition systems and the quality of their output). This part is currently out of scope for certifications.

2.4. Test Case Specification for Function Modules

1. The requirements for an electronic identity document and the connected public sector application are combined in several Function Modules within BSI TR-03121-3. If the conformance to one or more specific

Function Modules has to be checked the reader has to identify at first the relevant Function Modules with the according abbreviation e.g. P-FP-GID.

2. As a result the corresponding test cases can be selected in BSI TR-03122-3 under the same identification while the prefix 'TC-' indicates the according test case. Depending on the number of defined test cases the abbreviation is followed by an ascending numbering e.g. TC#P#FP-GID-001.
3. In general, a test case in BSI TR-03122-3 is structured in three parts as shown in ▸Table 2.1.

Test Case ID: TC-P-FP-GID-001	
Scope	
Short overview of the test case	
Precondition	
Requirements that need to be fulfilled before the test case can be executed	
Description	
1. Listing of every single test step	
Expected Result	Description of the expected result for the corresponding test step

Table 2.1 Example of the Structure of a Test Case

Conformance to the specification of a Function Module can be established if all test cases for that Function Module are completed successfully and the requirements of the test methodology are satisfied.

Several test cases can be assigned to one Function Module each containing one or multiple test steps.

Note, that the Conformance Test Specification does not define requirements for the object to be tested except the interfaces for conformance testing.

2.5. Conformance Test Interfaces

Conformance testing in the context of BSI TR-03121 is based on an interface compliant to Representational State Transfer (REST). This interface is described in the following sections.

The Implementation Under Test (IUT) must provide an external interface as REST service accessible to the Conformance Test Suite (CTS), through which conformance testing is performed. Using this interface, the IUT is able to output generated data to the CTS during the test execution of the regular process which is performed by the operator of the evaluation laboratory.

Additionally, the interface can be used to provide pre-defined input from the CTS to the IUT in order to be able to verify its output in a defined state.

In opposite to the standard workflow, this request is used as an alternative point of entry so that the standard steps for the acquisition of the biometric image (e.g. facial image or fingerprint image), further processing of the image and/or compression of the image can be skipped.

In case pre-defined input data is required for a test case, the IUT is provided with external test data through the interface by the CTS. The input data is provided as XML data with root element “`biocts-testsetup`” as defined in the XML schemata of BSI TR-03121. The schema definition can be found in the file “`biocts4v7.xsd`”. An example can be found in the file “`biocts-testsetup.xml`”.

2.5.1. Interface description

In the conformance test scenario, a client-server architecture is at hand. The IUT represents the server providing a HTTP-based REST-interface to the CTS which acts as the client.

A test case is triggered by an HTTP request sent by the CTS to the IUT . The path as part of the requestUniform Recourse Identifier (URI)specifies the test case ID as defined in part 3 of this guideline:

```
/TR03122/{testcase-id}/{version}
```

The version indicates the revision of the specification for this test case and is typically incremented when the test case's interface requirements are changed.

The HTTP request method (relevant are GET and POST) depends on whether the test case requires input data. As described above, any input data for the IUT must be embedded in XML data (`biocts-testsetup`) within the request.

The result generated by the IUT must also be returned as XML data to the CTS. Depending on the test case at hand, the result consists of XML data conforming to BSI TR-03121, which further may include an embedded, application specific format (e.g. German Standard for AFIS Transactions (GSAT) XML). The specific data format andURIfor test case initiation is described further in each test case definition of BSI TR-03122 Part 3.

Since performing a test case may comprise manual interaction within the IUT and hence can take accordingly long, the communication timeout has to be considered and set adequately high.

2.5.1.1. Test Cases Not Requiring Pre-Defined Input Data

In case a test case does not require any input data a priori, the CTS sends a GET request to the IUT . The IUT is triggered upon receiving the request and performs the test case (e.g. facial image capture and encoding).

Subsequently, the result data is returned to the CTS within the response body. The response header must be set to "`Content-Type: application/xml; charset=utf-8`" and include the message length of the response body.

Example:

Request (CTS → IUT):

```
GET /TR03122/TC-COD-PH-GSAT3-001/1 HTTP/1.1

Content-Type: application/xml; charset=utf-8
```

Response (IUT → CTS):

```
HTTP/1.1 200 OK

Content-Type: application/xml; charset=utf-8

Content-Length: 12345

<are:aad-app [...]

<bio:Records>

<bio:XMLRecord type="gsat-xml" purpose="enrolment" id="id_1234" size="5687">

[...]

</are:aad-app>
```

2.5.1.2. Test Cases Requiring Pre-Defined Input Data

Should a test case require initial provision of data, the CTS sends a POST request to the IUT including this data. The request header must be set to "`Content-Type: application/xml; charset=utf-8`" and include the content length. Any input data is provided within the message body as XML (UTF-8 encoded).

The result data is returned to the CTS within the response body including a response header set to "`Content-Type: application/xml; charset=utf-8`" and respective content length.

Example:

Request (CTS → IUT):

```
POST /TR03122/TC-QA-PH-SB-001/1 HTTP/1.1

Content-Type: application/xml; charset=utf-8
```

```
Content-Length: 12345

<?xml version="1.0" encoding="UTF-8"?>

[...]

<biocts:Parameter type="face" format="bmp">

VghpcyBmaWVQLg==</biocts:Parameter>

</biocts:biocts-testsetup>
```

Response (IUT → CTS):

```
HTTP/1.1 200 OK

Content-Type: application/xml; charset=utf-8

Content-Length: 67890

<?xml version="1.0" encoding="UTF-8"?>

<FaceQuality [...]
```

2.5.1.3. Response Codes

▸Table 2.2 lists the possible HTTP status codes which must be returned by the IUT to indicate the status to the CTS.

Status Code	Status Message	Description
200	OK	The request was successfully processed. Test case result data is included in the response body.
400	Bad Request	The IUT could not process the request due to defective input data.
404	Not Found	The IUT cannot perform the test case, e.g. due to missing implementation.
500	Internal Server Error	An internal, technical error occurred in the IUT during processing the request.

Table 2.2 Possible Status Codes Used by the IUT

List of Abbreviations

Abbreviation	Description
CTS	Conformance Test Suite
GSAT	German Standard for AFIS Transactions
IUT	Implementation Under Test
REST	Representational State Transfer
URI	Uniform Recourse Identifier

Bibliography