



Federal Office
for Information Security

BSI Technical Guideline TR-03121-1

Biometrics for Public Sector Applications

Part 1: Framework

Version 5.3



Federal Office for Information Security

P.O. Box 20 03 63

53133 Bonn

E-Mail: TRBiometrics@bsi.bund.de

Internet: <https://www.bsi.bund.de>

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1. Changelog

The following tables present the changes introduced to this Technical Guideline since version 5.2. The changelog lists the changes grouped per part of this Technical Guideline, and per building block (Application Profile (AP), Partial Application Process (PAP), Task, Function Module (FM)) or element (section, table, figure):

- *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 5.3-draft1

This chapter includes all changes between Version 5.2 and Version 5.3-draft1.

1.1.1. Changelog BSI TR-03121, General

Element Name	Type of Change	Change Description
Bibliography	Changed	Changed EES ICD Version to 00_07_00, 14th February 2022

Table 1.1 Changelog BSI TR-03121, General

1.1.2. Changelog BSI TR-03121, Part 1

Element Name	Type of Change	Change Description
LNK, REQ	Removed	Removed LNK (Linking) and REQ (Request) in Overview PAP ID Primary Information Items due to lack of existence.
CL, FP1P, FPP, FPR, TF, FP	Removed	Removed CL (Candidate List), FP1P (1 Plain Fingerprint), FPP (Plain Fingerprint), FPR (Rolled Fingerprint), TF (Traveller File) and FP (Fingerprint) in Overview PAP ID Optional Information Items due to lack of reference.
FP10R, ALL, AUTO, EES	Added	Added FP10R (Fingerprint 10 Finger Rolled), ALL (Overall), AUTO (Automated) and EES (Entry-Exit-System) in Overview PAP ID Optional Information Items due to existing reference.
Overview FM Categories Optional Information Items	Added	Added a new table.

Table 1.2 Changelog BSI TR-03121, Part 1

1.1.3. Changelog BSI TR-03121, Part 2, Volume HLBS

Element Name	Type of Change	Change Description
Service Definition "Fingerprint Acquisition"	Changed	Changed type of Feedback-parameter "ExpectedFingers" from Iso19794FingerCode to BiometricCodeList.
Service Definition "Fingerprint Acquisition"	Changed	Marked Configuration-parameter "MissingFingers" as deprecated.
Service Definition "Fingerprint Acquisition"	Changed	Added new User Command "SelectMissingFingers" to enable more dynamic selection of missing fingers instead of static configuration.
Service Definition "Fingerprint Acquisition"	Changed	Added new value "SelectMissingFingers" to LiveStatus Feedback.
Service Definition "Fingerprint Acquisition"	Changed	Added new User Command "Capture" (e.g. in case fingerprint acquisition system does not trigger automatically due to insufficient quality during pre-qualification).

Table 1.3 Changelog BSI TR-03121, Part 2

1.1.4. Changelog BSI TR-03121, Part 3

TR Volume	Block / Section / Type	Name	Type of Change	Change Description
GID	AP	Facial Images Cloud	Changed	Replaced word "photographer" by "service provider".
BCL, GID, ARE, IMA	FM	AS-FI-DC	Changed	Moved already existing recommendations regarding image formats to designated subsection. Deleted the list of uncompressed image formats.
GID	Basics	Basics for German Identity Documents	Added	Rearrangement of the first three APs from former version.
GID	AP	Scan-of-Photograph	Added	Rearrangement of the first three APs from former version.
GID	AP	Unsupervised Self-Service Facial Image Live Enrolment	Added	Rearrangement of the first three APs from former version.
GID	AP	Supervised Facial Image Live Enrolment	Added	Rearrangement of the first three APs from former version.

TR Volume	Block / Section / Type	Name	Type of Change	Change Description
GID	AP	Facial Image Digital-Transmission via De-Mail (BSI TR-03136)	Added	Rearrangement of the first three APs from former version.
GID	AP	Facial Image Digital-Transmission via Cloud (BSI TR-03170)	Changed	Title changed.
GID	AP	Supervised Fingerprint Live Enrolment Process	Added	Rearrangement of the first three APs from former version.
GID	AP	Unsupervised Self-Service Fingerprint Live Enrolment	Added	Rearrangement of the first three APs from former version.
GID	AP	German Identity Card	Removed	Rearrangement of the first three APs from former version.
GID	AP	German Electronic Passport	Removed	Rearrangement of the first three APs from former version.
GID	AP	German Residence Permit	Removed	Rearrangement of the first three APs from former version.
GID	AP	Scan-of-Photograph	Changed	Added Deadline
GID	PAP	ACQ-FI-SV-1	Changed	Added Deadline
BCL, IMA	FM	COD-FI-EES	Changed	Max. and min. image resolution added.
BCL, GID, ARE, IMA	FM	AH-FI-DC	Changed	Colour image requirement added.
BCL, GID	FM	AS-FP-SF	Changed	Added documentation of pre-qualification threshold.
GID	FM	EVA-ALL-GID	Changed	Added annual report time period definition

TR Volume	Block / Section / Type	Name	Type of Change	Change Description
ARE	PAP	ACQ-FI-SV-2	Changed	Added identification and pre-selection of best image and updated display settings for the operator.
BCL	FM	AH-FI-BCL	Changed	New definition for distance between camera system and biometric subject.
GID	FM	AH-FI-SSS2	Changed	New definition for distance between camera system and biometric subject.
BCL, GID	FM	AS-FP-SF	Changed	Timeout moved to PAP
BCL, GID, IMA, ARE	FM	AS-FP-MF	Changed	Timeout moved to PAP
GID	FM	COD-FI-GID2	Changed	Removed one requirement.
GID	FM	BIP-FI-GID	Changed	Modified one requirement.
BCL	FM	CMP-FI-VER	Changed	Modified one Requirement on the Algorithm Performance.
BCL, GID	FM	CMP-FP-VER	Changed	Modified one Requirement on the Algorithm Performance.
GID			Changed	Volume title changed from <i>Enrolment Scenarios for Identity Documents</i> to <i>German Identity Documents</i>
GID	PAP Task	ACQ-FPP-USV-1	Changed	Removed one bullet point
GID	AP	Biometric Data Selection	Changed	Modified text (third and fifth bullet point) and figure regarding Facial Image Selection Procedure to better map the process
BCL, GID, IMA	FM	COD-FI-GENERIC	Changed	Modified Requirements
BCL, GID, ARE, IMA	FM	LOG-ALL-GENERIC	Changed	UUIDs SHALL be logged for enrolments, verifications and identifications (only scheme version 4v7)
BCL, GID, ARE, IMA	FM	LOG-FI-GENERIC	Changed	UUID SHALL be logged for the acquisition (only scheme version 4v7)
BCL, GID, ARE, IMA	FM	LOG-FP-GENERIC	Changed	UUID SHALL be logged for the acquisition (only scheme version 4v7)
GID	PAP	ACQ-FP2P-USV-1	Changed	Only index fingers with sufficient quality are recorded unsupervised.
GID	PAP	ACQ-FP2P-USV-2	Changed	Only index fingers with sufficient quality are recorded unsupervised.
GID	PAP	ACQ-FP2P-USV-2	removed	Brackets referring to self service systems removed. The whole chapter is written in context of self service systems.
GID	FM	AH-FI-SSS2	Changed	Modified Requirements
GID	-	-	Added	Added overview process section to chapter "Basics for German Identity Documents" which briefly explains the relation between the application profiles of the GID volume.

TR Volume	Block / Section / Type	Name	Type of Change	Change Description
GID	FM	AH-FI-DC	Removed	
GID	FM	AH-FI-DC2	Added	
GID	FM	AH-FI-ICS	Removed	
GID	FM	AH-FI-ICS2	Added	
GID	FM	AS-FI-DC	Removed	
GID	FM	AS-FI-DC2	Added	
BCL, GID, ARE, IMA	FM	UI-FP-OP	Changed	Clarified: Fingers involved in the unexpected successful comparisons SHALL be pictorially displayed.
GID	FM	BIP-FI-GID	Changed	Updated image size and added inter eye distance.
GID	AP	Facial Image Digital-Transmission via Cloud (BSI TR-03170)	Changed	QA and further processing of the facial image(s) within the facial images cloud is now optional. However, in the end the facial image(s) for transmission to the counter at the agency have to comply to COD-FI-GID2.
GID	FM	QA-FI-GID	Changed	Updated image size and inter eye distance.
BCL, GID, ARE, GIS	FM	QA-FP-APP	Modified	The error code and result value are now specified in a more understandable fashion.
GID	FM	COM-FI-JPG	Changed	Updated image size.
GID	FM	COD-FI-GID2	Changed	Updated image size.
GID	FM	COD-ALL-GID	Changed	Increased Schema-Version to 5v0, changed root element to gid-log.
GID	FM	LOG-ALL-GENERIC	Changed	Adapted logging to new Schema-Version 5v0.
GID	FM	LOG-FI-GENERIC	Changed	Adapted logging to new Schema-Version 5v0.
GID	FM	LOG-FP-GENERIC	Changed	Adapted logging to new Schema-Version 5v0.
GID	FM	LOG-FI-GID	Changed	Adapted logging to new Schema-Version 5v0.
GID	FM	LOG-FP-GID	Changed	Adapted logging to new Schema-Version 5v0.
GID	FM	LOG-ALL-GID	Changed	Adapted logging to new Schema-Version 5v0.
GID	FM	COD-FI-EXIF	Removed	Will be covered implicit within this TR within the AP of biometric data Selection at the counter

TR Volume	Block / Section / Type	Name	Type of Change	Change Description
GID	AP	Processing for Document Production	Added	
BCL, GID	FM	AS-FP-SF	Changed	Modified requirements regarding timeout
BCL, GID, ARE, IMA	FM	AS-FP-MF	Changed	Modified requirements regarding timeout
BCL, GID, ARE, IMA	FM	COD-FI-GENERIC	Changed	Adapted logging to new Schema-Version 5v0 for GID.
GID	AP	Biometric Data Selection	Changed	Precised process and added annotations at the process.
GID	FM	REF-FI-GID	Changed	FM COM-FI-JPG removed to be applied on the facial image for reference storage. In case image originates from facial images cloud additional information from the log-file has to be extracted to the reference storage.
GID	FM	COD-FI-GID	Changed	Removed section about reference storage, removed information about TR-03121 logging nodes (definitions are placed in the LOG FMs).
GID	FM	COD-FI-GID	Changed	Removed information about TR-03121 logging nodes (definitions are placed in the LOG FMs).
GID	FM	LOG-FI-GID2	Added	Added information on how to log facial images and further information relating to the facial images for GID.
GID	FM	LOG-FP-GID2	Added	Added information on how to log fingerprint images for GID.
BCL,GID	PAP Task	ACQ-FPS-USV-1	Modified	Distinguished between two different timeouts and therefore changed BPMN model as well as describing text.
GID	PAP Task	ACQ-FPP-USV-1	Modified	Distinguished between two different timeouts and therefore changed BPMN model as well as describing text.
BCL, GID, ARE, IMA	FM	UI-FI-BSJ	Modified	Added information about Presentation Attack Detection (PAD).
	FM	PAD-FP/FI-APP/APP1	Changed	Show Presentation Attack Detection result in any case.

Table 1.4 Changelog BSI TR-03121, Part 3

1.2. Changelog Version 5.3-draft2

This chapter includes all changes between Version 5.3-draft1 and Version 5.3-draft2.

1.2.1. Changelog BSI TR-03121, General

Element Name	Type of Change	Change Description
Bibliography	Changed	Updated [BIB_ISO_19795-1:2006] to [BIB_ISO_19795-1:2021]

Table 1.5 Changelog BSI TR-03121, General

1.2.2. Changelog BSI TR-03121, Part 1

Element Name	Type of Change	Change Description
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Table 1.6 Changelog BSI TR-03121, Part 1

1.2.3. Changelog BSI TR-03121, Part 2, Volume HLBS

Element Name	Type of Change	Change Description
Data Type "Application-Profile"	Changed	Updated GID Application Profiles.
ServiceInformation	Changed	Added Parameter Version.

Table 1.7 Changelog BSI TR-03121, Part 2

1.2.4. Changelog BSI TR-03121, Part 3

TR Volume	Block / Section / Type	Name	Type of Change	Change Description
GID	PAP	ACQ-FP2P-SV-1	Changed	New Layout
GID	PAP	ACQ-FP2P-SV-2	Changed	New Layout
BCL, GID, IMA	PAP Task	ACQ-FPS-SV-1	Changed	Added option for the operator regarding manual conduct of capture
BCL, GID, IMA	PAP Task	ACQ-FPS-SV-1	Changed	Added case in which a comparison of each finger print of the current slap with any other finger print of the current slap is being conducted.
BCL, GID, IMA	PAP Task	ACQ-FPS-SV-1	Changed	Added 'Perform PAD' to the description. Figure and description now match.
BCL, GID, IMA	PAP Task	ACQ-FPS-SV-1	Changed	Added step 6 to the description. Information displayed at the end of the process now explicitly include PAD and QA information.
ARE	PAP Task	ACQ-FPS-SV-2	Changed	Added option for the operator regarding manual conduct of capture
BCL, GID, IMA	PAP Task	ACQ-FPP-SV-2	Changed	Added option for the operator regarding manual conduct of capture
BCL, GID, IMA	PAP Task	ACQ-FPS-SV-2	Added	Added step 6 to the description. Information displayed at the end of the process now explicitly include PAD and QA information.
BCL, GID, IMA	PAP Task	ACQ-FPS-SV-2	Changed	Changed step 4 (sequence check) such that a PAD warning also occurs if fingers are matching within the currently acquired slap.
BCL, GID	PAP Task	ACQ-FI-1	Changed	Changed BPMN. Description of FM for PAD is now generic.
GID	AP	Unsupervised Self-Service Facial Image Live Enrollment	Changed	Added mandatory PAP ACQ-FI-AUTO-1.

TR Volume	Block / Section / Type	Name	Type of Change	Change Description
GID	AP	Biometric Data Selection	Changed	Merged three sub-chapters with mostly the same text into one
GID	AP	Processing for Document Production	Added	Quality assessments added to mandatory FM's
BCL, GID, ARE, IMA	FM	COM-FI-GENERIC	Added	Added new chapter and assigned a generic COM requirement to it.
GID	FM	LOG-ALL-GID	Changed	Added ApplicationProfile-Element table
GID	PAP Task	ACQ-FPS-USV-1	Changed	Discard all captured images after first sequence error.
GID	PAP Task	ACQ-FPP-USV-1	Changed	Discard all captured images after first sequence error.
GID	AP	Application Profile Processing for Document Production	Removed	Removed requirement regarding holograms in pass production.
GID, BCL, ARE, IMA	FM	QA-FP-APP	Changed	Images of 500 ppi shall be used for NFIQ 2.0.
GID, BCL	FM	PAD-FI-APP	Changed	Further specification of PAD results included via reference. Technical information shall now be stored if available.
GID	AP	Processing for Document Production	Changed	Changed Melderegister to Pass- und Ausweisregister in all BPMNs and texts.
GID	FM	AS-FI-ICS2	Created	New FM
GID	FM	AH-FI-ICS2	Changed	Added requirement regarding background for capturing facial images
GID	AP	Unsupervised Self-Service Facial Image Live Enrollment	Changed	In Mandatory Function Modules: Replaced FM AS-FI-DC2 with FM AS-FI-ICS2
GID	AP	Processing for Document Production	Changed	Removed process for Register of Residents and removed FM COM-FI-JPG and FM REF-FI-GID and FM COD-FI-GID2
GID	AP	Biometric Data Selection	Changed	Added process for Register of Residents and added FM COM-FI-JPG and FM REF-FI-GID
GID	FM	LOG-FP-GID2	Changed	Introduced Finger Element.

TR Volume	Block / Section / Type	Name	Type of Change	Change Description
GID	AP	Biometric Data Selection	Changed	Added Evaluation of PAD Alarm
GID	FM	AH-FI-SSS2	Changed	Minimum distance fixed to 70 cm
GID	FM	COD-FI-PRD	Created	Coding requirements for document production
GID	AP	Processing for Document Production	Changed	Added FM COD-FI-PRD
GID	FM	COD-FI-ROR	Added	Coding requirements for Register of Residence
GID	AP	Biometric Data Selection	Changed	Added FM COD-FI-ROR
GID, ARE	FM	O-ALL	Added	Added further requirements to the organisational requirements.
GID, ARE	FM	COM-FI-JPG	Added	Added and Updated requirements regarding compression rates of images.
GID	FM	LOG-FP-GID2	Changed	Added instructions for FingerprintCaptureAllowed
BCL	FM	COD-FI-VER	Changed	Changed the references from outdated ones to bcl-log.
BCL, GID, ARE, IMA	FM	QA-FI-GENERIC	Changed	Added '0' as error code for criteria 7.5
GID, BCL	FM	PAD-FI-APP	Removed	Removed a case, where the omission of the PAD alarm is allowed.
GID, BCL	FM	PAD-FI-APP1	Removed	Removed a case, where the omission of the PAD alarm is allowed.
GID, BCL	FM	PAD-FI-APP_5_0	Removed	Removed a case, where the omission of the PAD alarm is allowed.
GID, BCL	FM	PAD-FI-APP1	Changed	Transition rules now specify a new date. The FM has to be applied until May 2025.
GID	FM	COM-FI-JP2	Changed	Changed the constant file size from 15kB to 18kB.
GID, BCL	FM	PAD-FP-APP	Changed	Removed the requirement to test complete hands as massive artifacts
GID, BCL	FM	PAD-FP-APP1	Changed	Removed the requirement to test complete hands as massive artifacts
GID, BCL	FM	AS-FP-SF	Changed	Thresholds for pre-qualification configurable, image data format
BCL, GID, ARE, IMA	FM	LOG-FP-GENERIC	Changed	Added logging instructions for control verifications.
BCL, GID, ARE, IMA	FM	COM-FI-JPG	Changed	Added medium image size
GID	FM	LOG-FP-GID2	Changed	Introduced tradd:BinaryData

TR Volume	Block / Section / Type	Name	Type of Change	Change Description
GID	FM	AS-FI-DC2	Changed	Info added: If necessary, downscaling of the facial image MAY be done before cropping.
GID, BCL	FM	PAD-FP-APP	Changed	Provided additional information over how the overall PAD result differs from the result of individual fingers.
BCL	FM	LOG-FP-BCL	Removed	Removed the FM.
ARE, BCL, GID, IMA	FM	LOG-FP-GENERIC	Added	Added the requirements prior included in LOG-FP-BCL.
GID	FM	COM-FI-JPG	Removed	Removed from GID.
BCL	FM	LOG-FP-BCL	Removed	Removed FM from BCL.
GID, ARE	FM	LOG-FP-GENERIC	Added	Added LOG-FP-BCL requirements.
ARE	FM	AH-FP-ALL	Added	Added an alternative set of requirements for certification processes. This includes the requirements for the certification of capacitive fingerprint scanners.
GID	AP	Supervised Facial Image Acquisition System	Added	Added application profile for supervised facial image acquisition with an integrated camera system.
GID	FM	AH-FI-ICS2	Changed	Added requirement for body height range.
GID	FM	REF-FI-GID	Changed	XML for AdditionalInformation is placed within Value-element.
GID	FM	LOG-FI-GID2	Changed	XML for AdditionalInformation is placed within Value-element.
GID	AP	Supervised Facial Image Acquisition Live Enrollment	Changed	Added PAP ACQ-FI-SV-4.
GID	AP	Biometric Data Selection	Changed	Added description for fingerprint selection procedure.
GID	AP	Biometric Data Selection	Changed	Added post-processing step for operator
GID	AP	Facial Image Digital-Transmission via Cloud	Changed	Added FM LOG-FI-GID2

TR Volume	Block / Section / Type	Name	Type of Change	Change Description
GID	AP	Facial Image Digital-Transmission via De-Mail	Changed	Added FM LOG-FI-GID2
GID	AP	Unsupervised Self-Service Facial Image Live Enrolment	Changed	Removed FM UI-FI-OP
GID	AP	Unsupervised Self-Service Fingerprint Live Enrolment	Changed	Removed FM REF-FP-CHIP
GID	AP	Supervised Fingerprint Live Enrolment	Changed	Removed FM REF-FP-CHIP
GID	AP	Biometric Data Selection	Changed	Updated selection process concerning quality and veto decisions
GID	PAP	Capture Slap Unsupervised	Changed	Rearranged and changed the workflow for the capture of unsupervised slaps
GID	Basics	Basics for German Identity Documents	Changed	Mentions now biometric data selection and quality assessment at the counter. The AP Facial image acquisition at the counter is now mandatory.
GID	AP	Facial Image Digital-Transmission via De-Mail (BSI TR-03136)	Changed	Renamed AP to Facial Image Digital Transmission via De-Mail (BSI TR-03136)
GID	AP	Facial Image Digital-Transmission via Cloud (BSI TR-03170)	Changed	Renamed AP to Facial Image Digital Transmission via Cloud (BSI TR-03170)

TR Volume	Block / Section / Type	Name	Type of Change	Change Description
GID	PAP	ACQ-FI-AUTO	Changed	Renamed hardware with capture system and counter with calling application for clarification.
GID	PAP	ACQ-FPP-SV	Changed	Alerts replaced errors in this PAP.
GID	FM	AS-FI-ICS2	Changed	Requirement removed: The integrated camera system SHALL have the diffuse lighting activated within software.
GID	AP	Unsupervised Self-Service Facial Image Live Enrolment	Changed	Renamed to Unsupervised Self-Service Facial Image Acquisition System
GID	AP	Supervised Facial Image Live Enrolment	Changed	Renamed to Supervised Facial Image Acquisition with Digital Camera
GID	AP	Facial Image Digital Transmission via De-Mail (BSI TR-03146)	Changed	Renamed to Facial Image Digital Delivery via De-Mail (BSI TR-03146)
GID	AP	Facial Image Digital Transmission via Cloud (BSI TR-03170)	Changed	Renamed to Facial Image Digital Delivery via Cloud (BSI TR-03170)
GID	AP	Supervised Fingerprint Live Enrolment	Changed	Renamed to Supervised Fingerprint Acquisition
GID	AP	Unsupervised Self-Service Fingerprint Live Enrolment	Changed	Renamed to Unsupervised Self-Service Fingerprint Acquisition System
GID	FM	AH-FI-DC2	Changed	Moved no (minimal) compression recommendations to requirements.

Table 1.8 Changelog BSI TR-03121, Part 3

1.3. Changelog Version 5.3

This chapter includes all changes between Version 5.3-draft2 and Version 5.3.

1.3.1. Changelog BSI TR-03121, General

Element Name	Type of Change	Change Description
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Table 1.9 Changelog BSI TR-03121, General

1.3.2. Changelog BSI TR-03121, Part 1

Element Name	Type of Change	Change Description
-	-	-

Table 1.10 Changelog BSI TR-03121, Part 1

1.3.3. Changelog BSI TR-03121, Part 2, Volume HLBS

Element Name	Type of Change	Change Description
SlapClassifier	Changed	Chapter "Service Definition for Self-Service System", sub-chapter "Automated Acquisition of Slap Fingerprints", sub-sub-chapter "Configuration", table "Automated Acquisition of Slap Fingerprints Configuration": Changed Parameter ID "SlapClassifier" from Mandatory (M) to Optional (O).
Service Definition Facial Image Acquisition System, User Command "Rotate Manually"	Changed	Added information about rotation value.
Service Definition Basic Facial Image Acquisition System, User Command "Rotate Manually"	Changed	Added information about rotation value.
Service Definition Facial Image Acquisition System, User Command "SetManualFocusPoint"	Changed	Added (parameter) name "Focus"
Service Definition Facial Image Acquisition System, User Command "SetVerticalPosition"	Changed	Added (parameter) name "Position"
Service Definition Facial Image Acquisition System, User Command "IncrementVerticalPosition"	Changed	Added (parameter) name "Step"
Service Definition Facial Image Acquisition System, User Command "DecrementVerticalPosition"	Changed	Added (parameter) name "Step"
Service Definition Facial Image Acquisition System, User Command "SetAbsoluteIlluminationLevel"	Changed	Added (parameter) name "Level"

Element Name	Type of Change	Change Description
Service Definition Facial Image Acquisition System, User Command "IncrementIlluminationLevel"	Changed	Added (parameter) name "Step"
Service Definition Facial Image Acquisition System, User Command "DecrementIlluminationLevel"	Changed	Added (parameter) name "Step"
Service Definition Facial Image Acquisition System, User Command "CropManually"	Changed	Added (parameter) name "Region"
Service Definition Facial Image Acquisition System, User Command "RotateManually"	Changed	Added (parameter) name "Angle"
Service Definition Basic Facial Image Acquisition System, User Command "CropManually"	Changed	Added (parameter) name "Region"
Service Definition Basic Facial Image Acquisition System, User Command "RotateManually"	Changed	Added (parameter) name "Angle"
Service Definition Rolled Fingerprint Acquisition	Added	Added new service definition.

Table 1.11 Changelog BSI TR-03121, Part 2

1.3.4. Changelog BSI TR-03121, Part 3

TR Volume	Block / Section / Type	Name	Type of Change	Change Description
GID	FM	COM-FI-JP2	Changed	Changed filesize from 18kb (+/-5%) to 17kB (+0/-5%).
ARE	AP	Arrival Attestation Document	Removed	Prior to removing all Function Modules regarding Evaluation from ARE-Volume, in Table "Required Function Modules Application Profile Arrival Attestation Document" for "Evaluation" removed all 3 references: FM EVA-ALL-ARE, FM EVA-FI-ARE as well as FM-EVA-FP-ARE.
ARE	FM	EVA-ALL-ARE	Removed	Removed FM from ARE-Volume
ARE	FM	EVA-ALL-GENERIC	Removed	Removed FM from ARE-Volume
ARE	FM	EVA-ALL-PROCESS	Removed	Removed FM from ARE-Volume
ARE	FM	EVA-FI-ARE	Removed	Removed FM from ARE-Volume

TR Volume	Block / Section / Type	Name	Type of Change	Change Description
ARE	FM	EVA-FI-CENTRAL	Removed	Removed FM from ARE-Volume
ARE	FM	EVA-FI-GENERIC	Removed	Removed FM from ARE-Volume
ARE	FM	EVA-FP-ARE	Removed	Removed FM from ARE-Volume
ARE	FM	EVA-FP-CENTRAL	Removed	Removed FM from ARE-Volume
ARE	FM	EVA-FP-GENERIC	Removed	Removed FM from ARE-Volume
ARE	FM	EVA-FP-PAD	Removed	Removed FM from ARE-Volume
ARE	FM	QA-FI-ARE	Changed	Added criterion "Colour space" (ID 7.5) to table in FM QA-FI-ARE including further information about the possible existence of greyscale images.
IMA	FM	LOG-ALL-IMA	Changed	Modified recommendations on FM LOG-ALL-IMA in order to specify the case of separated records.
ARE	PAP Task	ACQ-FPR-1	Changed	Added comment for successful comparison.
ARE	FM	LOG-ALL-ARE	Changed	Added more precise information regarding "Issuance status of Arrival Attestation Document"
GID, ARE, IMA, BCL	FM	QA-FI-GENERIC	Changed	Changed the description of the process when more than one image fulfills the most mandatory criteria.
ARE, BCL	PAP	ACQ-FPR-1	Added	Added the Uniqueness Check to the Capture Rolled Finger process and the respective process overview.
GID	FM	LOG-ALL-GID	Changed	Changed AP names in ApplicationProfile-Element table
ARE	FM	COD-ALL-ARE	Changed	Biometric information embedded in the XML log can now either be saved as an XML or a base64 encoded XML.
ARE	AP	Arrival Attestation Document in Special Situations	Added	Added Application Profile for the Arrival Attestation Document in Special Situations which differs from the standard Application Profile Arrival Attestation Document.
ARE	FM	CMP-FP-CV	Changed	Changed all occurrences of cross-comparison to control-verification including the titel (now ends with CV, was CC)
BCL	FM	COM-FP-BCL	Changed	File size
IMA	FM	COM-FP-IMA	Changed	File size
GID	AP	Supervised Facial Image Acquisition with Digital Camera	Changed	Added FM UI-FI-OP as a Mandatory Function Module

TR Volume	Block / Section / Type	Name	Type of Change	Change Description
GID	AP	Biometric Data Selection	Changed	Added AP Supervised Facial Image Acquisition System to possible sources in Facial Image Selection Procedure within AP Biometric Data Selection.
GID	AP	Unsupervised Self-Service Facial Image Acquisition System	Changed	Added FM COM-FI-GENERIC as a Mandatory Function Module.
GID	AP	Supervised Facial Image Acquisition with Digital Camera	Changed	Added FM COM-FI-GENERIC as a Mandatory Function Module.
BCL	FM	AS-FI-BCL	Changed	Renamed FM AS-FI-BCL to FM AS-FI-ICS3
GID	AP	Unsupervised Self-Service Facial Image Acquisition System	Changed	Added FM AS-FI-ICS3 as a Mandatory Function Module
GID	AP	Supervised Facial Image Acquisition System	Changed	Added FM AS-FI-ICS3 as a Mandatory Function Module
GID	AP	Biometric Data Selection	Changed	Added footnote regarding redundant operations in an application
GID, ARE, BCL	Basics	GSAT3	Changed	Changed all references to state conformance to the current/ most recent version of GSAT3 to ensure compatibility despite the different production cycles for this guideline and the GSAT3 standard.
ARE	AP	Arrival Attestation Document	Changed	Changed FM AS-FP-SLP from requirement to recommendation.
BCL, GID, ARE, IMA	PAP Task	ACQ-FPS-SV-2	Changed	Added footnote that slap classification is only a recommendation for volume ARE.
ARE	FM	BIP-FI-DC-HQ	Changed	Added information that the resolution requirement of GSAT overwrite the mentioned one in the TR
BCL, GID	FM	Presentation Attack Detection for facial images	Changed	Added certification according to technical guideline as alternative to certification under Common Criteria.

TR Volume	Block / Section / Type	Name	Type of Change	Change Description
BCL, GID	FM	Presentation Attack Detection for facial images	Changed	Added new Protection Profile "Biometric Mechanisms" as possible Common Criteria certification.
BCL, GID, ARE, IMA	FM	Presentation Attack Detection for fingerprints	Changed	Added certification according to technical guideline as alternative to certification under Common Criteria.
BCL, GID, ARE, IMA	FM	Presentation Attack Detection for fingerprints	Changed	Added new Protection Profile "Biometric Mechanisms" as possible Common Criteria certification.
ARE	FM	Hardware certification of additional fingerprint scanner types	Added	Alternatively to the certification of optical fingerprint scanners according to AH-FP-OPT, the new Function Module AH-FP-ALL allows for the usage of FBI-certifications instead. Via AH-FP-ALL, additional fingerprint scanner types such as capacitive scanners may be used in the context of ARE.
BCL, GID, ARE, IMA	FM	QA-FP-APP	Changed	The quality requirements for fingerprints allow for NFIQ2 in general instead of NFIQ 2.0 only.

Table 1.12 Changelog BSI TR-03121, Part 3

2. Introduction

2.1. Motivation and Objectives of Technical Guideline Biometrics

Biometric methods are used in many different areas of applications. The solutions and systems available on the market are able to serve a broad range regarding performance, security, usability and standard conformance. For public sector applications, it is necessary to define precise requirements and general conditions. Furthermore, the systems have to be defined in a way which allows for extension in future developments.

The objective of this Technical Guideline (TR Biometrics) is to offer a basis for a consistent and comparable quality of public sector applications and for building a common architecture.

This guideline has the following objectives:

- *Modularity*: The complete guideline is built from several single guideline modules. For a single application area only the respective modules have to be taken into account. This is done in order to avoid side effects between different kinds of applications which would occur due to changes of special functions.
- *Clarity*: The concept of this guideline follows a well structured framework. With this framework it is easily understandable which kind of guideline modules are valid for the respective application scenario.
- *Expandability*: Modularity is the key component of expandability in the scope of this guideline. This is valid regarding new applications as well as new functional units.
- *Standard conformance*: The Technical Guideline takes national and international standards and guidelines into account and deploys them for governmental applications.
- *Conformance and certification*: The guideline modules are designed in such a way that requirements and conditions for single functional units are clearly separated from each other. Products for single functional units are clearly defined regarding the interfaces and the range of their functionality so that they can be tested for conformance with this guideline and certified.
- *Ability to reference*: The use of functional units allows to specify precise requirements for products that are used in according application scenarios. Therefore, this guideline can be used as a reference e.g. for tenders.
- *Market orientation*: The definition of functional units is related to the products that can be found on the market. Requirements of the guideline can be unambiguously assigned to the respective systems and components.

It should be noted that the content of this guideline is limited to the aspects of biometric characteristics. Interfaces to further technologies (e.g. connection of optical or electronic document readers) are out of scope of this document.

2.2. Target Audience and User

Audience for this guideline are institutions that are dealing with projects using biometric characteristics in public sector applications. These include:

- Agencies that are issuing identity documents or visas, e.g. passport agencies of the local authorities or missions abroad of the Federal Foreign Office.
- Public Authorities using biometric applications for identity verification of people, e.g. the German Federal Police (Polizei des Bundes) or the Police of the Federal States (Polizei der Länder), the German Customs Administration (Bundeszollverwaltung) or the Federal Administrative Office (Bundesverwaltungsamt).

Beside these users, this guideline also addresses vendors of biometric systems as well as integrators and application developers.

2.3. Terminology

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this Technical Guideline are to be interpreted as described in [BIB_RFC2119].

2.4. Business Process Modelling Notation (BPMN)

The processes in this Technical Guideline are modelled using the Business Process Modelling Notation (BPMN). ▶Figure 2.1 gives an overview over the relevant icons herein.

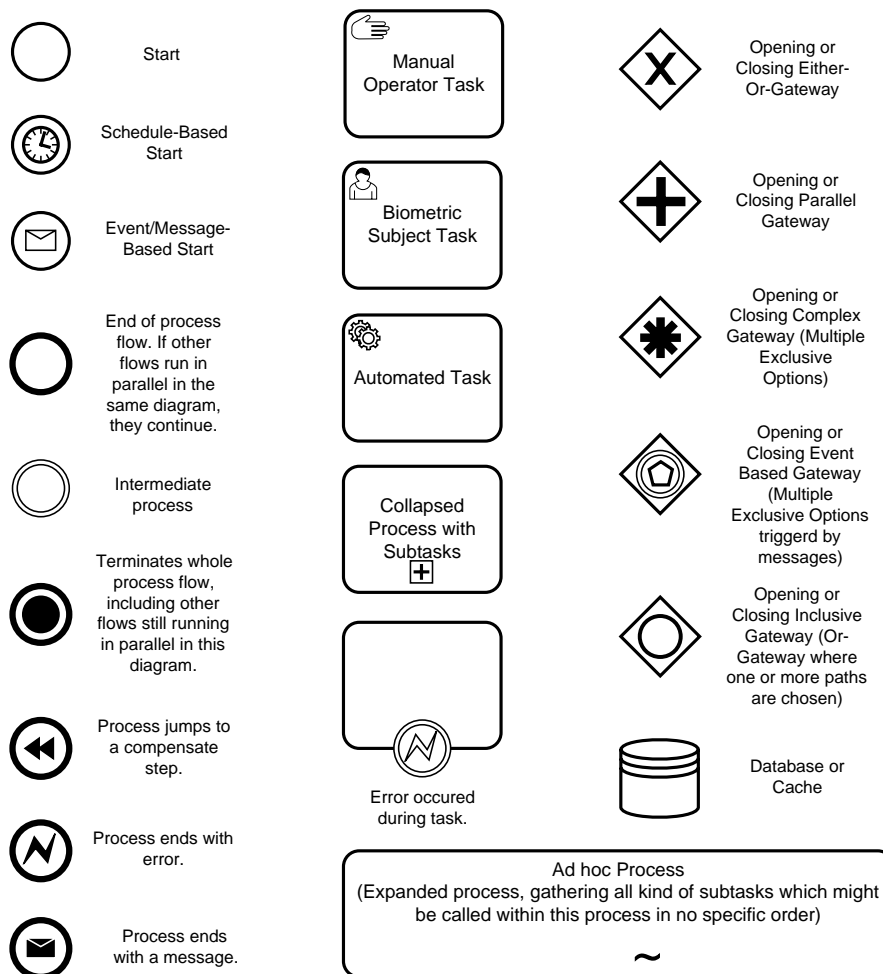


Figure 2.1. BPMN Symbols used for the Process Modelling

3. Structure of Technical Guideline Biometrics

This Technical Guideline consists of the following parts:

- Part 1: Framework (TR-03121-1)

TR-03121-1 is the framework document of the guideline. It explains the concept and the relation between the different parts.

- Part 2: Software Architecture (TR-03121-2)

The High Level Biometric Services (HLBS) as well as Service Definitions for specific use cases are specified here.

- Part 3: Application Profiles, Function Modules and Processes (TR-03121-3)

- In the third part, the different Application Profiles with corresponding Partial Application Processes and Function Modules are defined. These contain the detailed technical requirements for each of the components.

- Application Profiles may reference Function Modules, Partial Application Processes and Service Definitions (refer to Part 2).
- Partial Application Processes may refer to Function Module Categories and may be comprised of *Tasks*. Tasks are processes which are part of more than one Partial Application Process.
- For practical purposes, this part is split up in different volumes to serve different user groups.
 - Border Control (BCL)
 - German Identity Documents (GID)
 - Alien Register Enrolment (ARE)
 - Immigration Authorities (IMA)

Please refer to ▶Figure 3.1 for a class diagram of the structure described above.

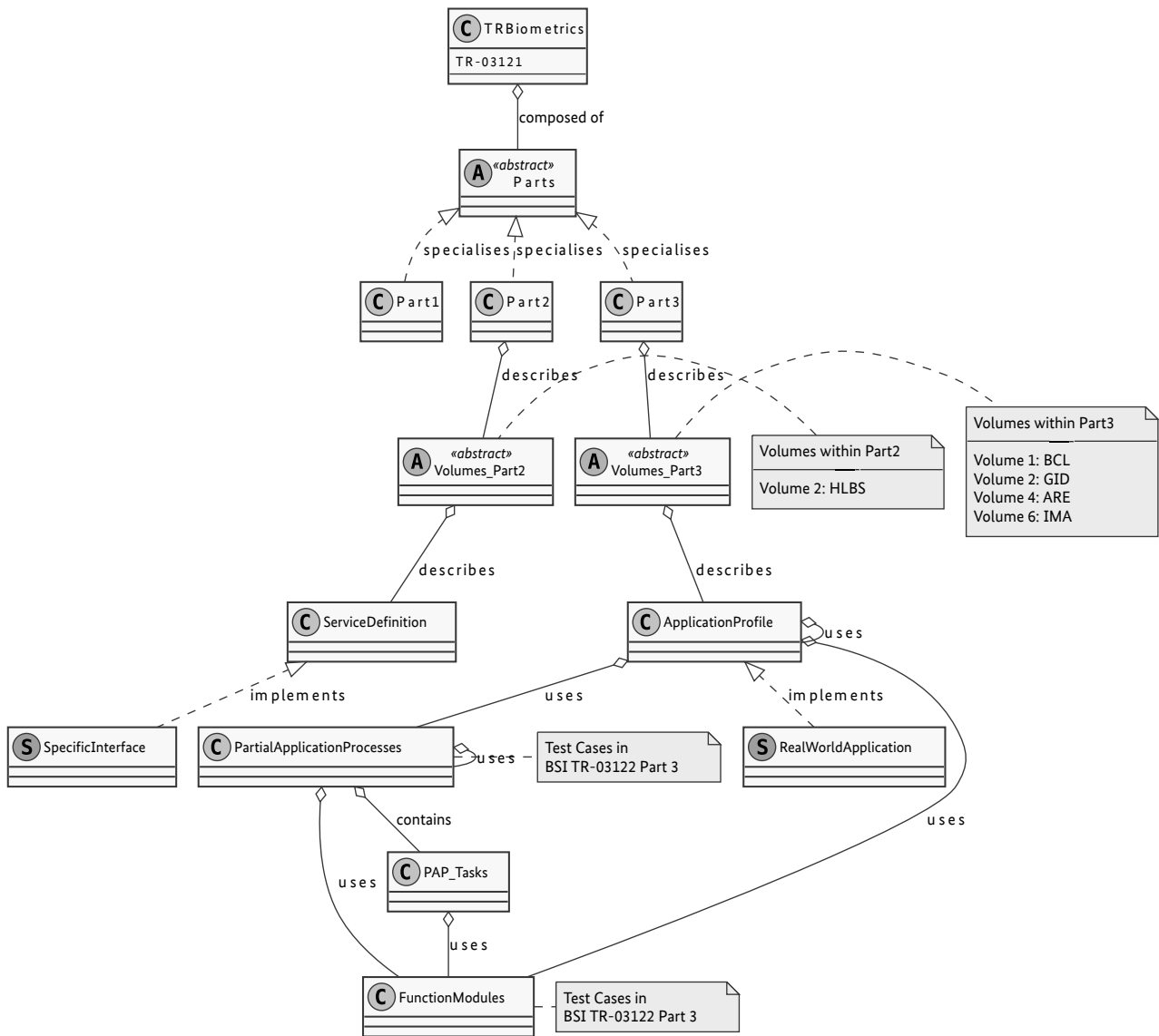


Figure 3.1. Class Diagram of the Technical Guidelines

Additionally, the Technical Guideline BSI-TR 03122 "Conformance Test Specification for Technical Guideline TR-03121 Biometrics for Public Sector Applications" describes the requirements that are essential to declare conformance or to declare the absence of conformance. It consists of the following parts:

- Part 1: Framework (TR-03122-1)
- Part 3: Test Cases for Function Modules and Processes (TR-03122-3)

4. How to use this Technical Guideline

This chapter gives a short overview how to read and apply this guideline step by step.

1. The user chooses the desired Application Profile. With the help of the Application Profile the user can get a deeper insight into the application, the required software architecture components and the described functionality. TR-03121-2 offers further information about the software architecture component model.
2. Based on the Application Profile, the mandatory Partial Application Processes and Function Modules are identified. One profile can link to several Partial Application Processes and Function Modules due to different kinds of underlying biometric characteristics or the fact that different technologies (e.g. scanners or digital cameras for the digitisation of a photo) are used.

Function Modules are referenced by an explicit identifier, e.g. AH-FP-GID. The first part identifies the requirement type (e.g. Hardware), the second part represents the biometric characteristic (e.g. fingerprint), and the last part denotes a further descriptor, typically the scope (e.g. German Identity Document).

Function Modules for different biometric characteristics are divided by a comma while a choice between different technologies is denoted by a slash (e.g. AH-FP-FTR, AH-PH-FBS/AH-PH-DC).

If a Function Module is denoted with a placeholder between a less-than and greater-than sign (< >) the actual referenced Function Module is dependant on the context in which the Function Module has been mentioned. For example the Function Module AH-FI-<VL> has been mentioned within a Partial Application Process used in the BCL volume, then the actual referenced Function Module is AH-FI-BCL. The same procedure holds for Application Profiles denoted as <AP> analogously. If no specific Function Module applies, then there are no further requirements defined for this context.

Partial Application Processes are referenced by an explicit identifier, refer to Partial Application Profile section.

3. On the basis of the identifier the according Function Module and Partial Application Processes can be examined. Every Function Module and Partial Application Process provides detailed technical requirements and recommendations. Note, each reference to a Function Module or Partial Application Processes is a link within the document.

5. Logging scheme

5.1. Use cases

This chapter specifies a logging scheme, which allows to document all technical activities performed. The schema files contain additional and mandatory information on technical requirements. Such a logging scheme SHALL be used to measure the quality of the biometric processes across different systems, regardless of the used hard- or software. This enables the possibility of an operational monitoring for technical as well as functional processes and evaluations.

5.2. XML schemas

The logging scheme is based on a transactional logging format which collects performance and evaluation results from the different application domains. The schema file `trbio4v7.xsd` imports all other schema files and as such the main file used for validation.

A separate XML schema definition exists for each volume of TR-03121-3, which SHALL be used within the respective application area. ▶Table 5.1 gives an overview of the different XML schema files.

Application domain	Schemafilename	Namespace
Alien register enrolment	<code>aad4v6.xsd</code>	<code>http://trbio.bsi.bund.de/aad/4</code>
Border control log	<code>bcl4v7.xsd</code>	<code>http://trbio.bsi.bund.de/bcl/4</code>
Type definitions	<code>biotypes4v7.xsd</code>	<code>http://trbio.bsi.bund.de/base/4</code>
German identity documents	<code>gid4v6.xsd</code>	<code>http://trbio.bsi.bund.de/gid/4</code>
High level biometric services	<code>hlbs4v7.xsd</code>	<code>http://trbio.bsi.bund.de/hlbs/4</code>
Immigration authorities	<code>ima4v7.xsd</code>	<code>http://trbio.bsi.bund.de/ima/4</code>
Conformance test specification	<code>biocts4v7.xsd</code>	<code>http://trbio.bsi.bund.de/biocts/4</code>

Table 5.1 Overview XML schema files

6. Application Profiles

Different areas in which this guideline can be used are defined in separate Application Profiles. Application Profiles can have mandatory status, e.g. through published regulations and laws or by requirements given in tenders. Besides, such Application Profiles can also be considered as Best Practices. Thus, the certification process SHALL use one or more separate Application Profiles.

An Application Profile is described with the following items:

- Introduction (legal requirements)
- Process overview
 - Target audience
 - Users
- Relevant standards and conditions
- List of
 - mandatory Function Modules
 - mandatory Partial Application Processes

7. Organisation of the Function Modules

Specific technical requirements are structured in Function Modules. They contain detailed technical requirements for the respective component. Function Modules are aligned to the products on the market and to the targets of evaluation. Every Function Module is built of one or more subclauses which are assigned to unique identifiers. Within the subclauses requirements and recommendations are specified in detail.

Function Modules are referenced by their ID, which can contain up to three information items pointing to its contents. The basic structure of an ID is: "FM AAA-BBB-CCC".

Here, *AAA* is the primary information item, pointing to the main contents. *BBB* and *CCC* are optional information items, which can further specify the Function Module. These information items may be two to seven alphanumeric digits. ▶Table 7.1 gives an overview of the different primary information items used for Function Module categories. ▶Table 7.2 gives an overview of the different optional information items *BBB* used for Function Module categories.

Primary Information Item	Function Module Category	Description
AH	Acquisition Hardware	Devices that are used for digitising physical representable biometric characteristics are called Acquisition Hardware. Scanners for capturing photographs, digital cameras to capture facial images, fingerprint sensors, or signature tablets can be named as examples.
AS	Acquisition Software	Acquisition Software encapsulates all functionality regarding image processing except for biometric purposes. Therefore, this module usually contains device driver software for the Acquisition Hardware or in general software that is very close to the physical hardware. Furthermore, colour management and image enhancement mechanisms are often part of this software layer.
BIP	Biometric Image Processing	The module Biometric Image Processing provides the extraction of all relevant biometric information from the data, which is provided by the Acquisition Hardware or the Acquisition Software layer. Thus, a proprietary data block is transformed to a digital image of a biometric characteristic. In general, specific image processing for biometric characteristics is addressed here e.g. provision of full frontal images or segmentation of fingerprints.

Primary Information Item	Function Module Category	Description
CMP	Biometric Comparison	The module Biometric Comparison encloses the mechanisms and algorithms to verify or identify an identity based on a one-to-one or one-to-many biometric comparison between reference data and a current biometric sample (usually a live presented image) no matter where the reference is stored.
COD	Coding	This module contains the procedures to code logging data as well as biometric data in defined formats. Interoperability is provided by means of standard compliant coding.
COM	Compression	The objective of the module Compression is to keep the biometric data below a feasible size without losing too much quality for biometric verification or identification.
EVA	Evaluation	Methods and interfaces which are used in the scope of evaluation are the content of this module.
LOG	Logging	The module Logging contains requirements how and in which modality data has to be logged.
O	Operation	Within the module Operation, the working process is specified for the respective operator.
PAD	Presentation Attack Detection	The Presentation Attack Detection modules give requirements on fake detection. This encloses, among other things, functionality and certification requirements.
QA	Quality Assessment	This module contains all kinds of mechanisms and procedures to check the quality of the biometric data or to select the best quality data out of multiple instances. Quality Assessment is typically used in evaluation of an application's performance over time.
REF	Reference Storage	The objective of this module is to store biometric data in a way that it can be used for reference purposes later on.
UI	User Interface	The User Interface modules give requirements on visualization and user interaction. This encloses, among other things, functionality, quality assurance information, and veto messages.

Table 7.1 Overview FM Categories Primary Information Items

Optional Information Item	Function Module Category
ALL	Overall
CCTV	Closed Circuit Television (Surveillance Camera)

Optional Information Item	Function Module Category
FI	Facial Image
FP	Fingerprint

Table 7.2 Overview FM Categories Optional Information Items

8. Organisation of the Partial Application Processes

Partial Application Processes are referenced by their ID, which can contain up to three information items pointing to its contents. The basic structure of an ID is: "PAP (Task) AAA-BBB-CCC-#".

Here, "Task" is optional and is only used if the *PAP* is a task. *AAA* is the primary information item, pointing to the main contents. *BBB* and *CCC* are optional information items, which can further specify the *PAP*. These information items may be one to six alphanumeric digits. The abbreviations used for the *PAP* IDs are listed in ▶Table 8.1 and ▶Table 8.2. All *PAP* IDs end with a number #. This number is usually 1, unless multiple IDs with similar preceding information items exist. In this case, they are enumerated increasingly.

Primary Information Item	Description
ACQ	Acquisition
ASS	Assessment
EVA	Evaluation
ID	Identification
UPD	Update
VER	Verification

Table 8.1 Overview *PAP* ID Primary Information Items

Optional Information Item	Description
ALL	Overall
AUTO	Automated
B	Biometrics (fingerprints and facial images)
EES	Entry-Exit-System
FI	Facial Image
FP10R	Fingerprint 10 Finger Rolled
FP2P	2 Plain Fingerprints
FP4141	Fingerprint 4-1-4-1
FP442	Fingerprint 4-4-2
FPS	Single Slap Fingerprint Image
ID	Identification
nCIR	no Connected Identity Register
SV	Supervised
USV	Unsupervised
VER	Verification
wCIR	with Connected Identity Register

Table 8.2 Overview *PAP* ID Optional Information Items

List of Abbreviations

Abbreviation	Description
AP	Application Profile
ARE	Alien Register Enrolment
BCL	Border Control
FM	Function Module
GID	German Identity Documents
HLBS	High Level Biometric Services
IMA	Immigration Authorities
PAD	Presentation Attack Detection
PAP	Partial Application Process

Bibliography

[BIB_RFC2119] *RFC 2119: Key words for use in RFCs to Indicate Requirement Levels.*