UIDAI Specifications

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1. Specification: Authentication Device

1.1. Fingerprint Scanner (FPS)

Sr. No.	Parameters	Specification
01	**Minimum Platen Area**	**Optical/ Multispectral / Capacitance technology** **1. If platen area is 15.24 mm x 20.32 mm ormore:** **1.1.** Provisional certificate would be issued without any fieldtesting; **1.2.** Final certification would be subject to sensor-extractor meeting <2% FRR in Aadhaar authentication system (at FAR of 0.01%) for which detailed guidelines will be published bySTQC. **2. If platen area is 12.8 mm x 16.5 mm but less than 15.24 mm x 20.32 mm,** Certification would be subject to sensor-extractor meeting <2% FRR in Aadhaar authentication system (at FAR of 0.01%) for which detailed guidelines will be published bySTQC. **3. Any other Technologies** <2% FRR in Aadhaar authentication set up (at FAR of 0.01%) would need to be demonstrated. Detailed guidelines and other requirements specific to the technology will published separately bySTQC.
02	**Image quality**	Must be listed on "IAFIS Certified Product List" posted onhttps//www.fbibiospecs.org/IAFIS/Default.aspx under "PIV Single Finger Capture Devices" **OR** Lab Test conformance report showing compliance to ISO 19794-4 Annexure A **OR** any other equivalent conformance report (to be approved for equivalence by expert committee appointed by Competent Authority
03	**Extractor Quality**	• MINEXcompliance • Number of Minutiae generated by extractor to be in conformance to ISO Specification. Tested for at least 12 Minutiae points generated under testconditions.

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04	**NFIQ Quality Software**	Inbuilt NFIQ quality software either at device level or extractor level.
05	**Resolution**	Minimum 500 DPI with 5% margin on the lower side
06	**Grey scale/ Image type**	8 bit, 256 levels
07	**Extractor & Image Template Standard**	ISO 19794-2 for fingerprint minutiae template and ISO 19794-4 for Fingerprint Image Template
08	**Maximum Acquisition time(Placement to Template)**	< 2 secs
09	**Audio/Visual indication**	A/V indication either at device level or at application level for indicating various events like: a) Indication for placing finger b) Start of capturing c) End of capturing
10	**Liveness Detection**	Preferable
11	**Latent detection**	Preferable
12	**Platen**	Rugged, minimum IP 54 rating preferable Prefer scratch resistant features
13	**Preferred Operating Temperature**	0 to 45 degree Centigrade
14	**Preferred Storage Temperature**	0 to 50 degree Centigrade
15	**Preferred Humidity**	10 to 90%
16	**ESD**	>= 8Kv
17	**Environment, health and safety**	ROHS certification
18	**Safety**	UL or IEC60950 compliance

19	**EMC compliance**	FCC class A or equivalent
20	**Operating system environment**	Vendor needs to declare the compatible operating system
21	**Connectivity**	1. Standard USB connectivity for PC based application. 2. Connectivity for POS devices.

Note: These specifications are subject to change based on field findings.

1.2. IRIS Scanner

1.2.1. Revised Iris sensor Specifications-

The Iris sensor for discrete and integrated Authentication Devices should have following specifications:-

Sr. No.	Device Characteristics	Recommended Specifications
01	Spatial Resolution	> 50% at 1 LP/mm.
02	Pixel Resolution	> 10 pixels/mm
03	Image Margins	Left & right >= 0.6x iris radius. Top & bottom >=0.2x iris radius
04	Imaging Wavelength	Approximately 700-900 nm
05	Pixel Depth	Minimum of 8 bits/pixel
06	Sensor Signal to Noise Ratio	Noise should not be observable in the captured Image
07	Scan Type	Progressive
08	Output Image	IMAGE_TYPE_CROPPED_AND_MASKED withJPEG2000 compression; needs to comply with the ISO standard for Iris Image Record (IIR) i.e.ISO/IEC: 19794-6:2011, Section 6.1, 6.4.
09	Contrast	The iris image should have good grey level separation between the iris and sclera and between the iris and pupil and should have sufficientcontrast to reveal the iris texture.
10	Optical Distortion	The iris image should not exhibit effects of optical distortion including spherical aberration, chromaticaberration, astigmatism and coma consistent with standard optical design practices
11	Noise	No image resizing. No image manipulation other than recommended by IMAGE_TYPE_CROPPED_AND_MASKED. Single pass JPEG 2000.
12	Capture Mode	Auto capture with built-in quality check
13	Capture time	<5 sec
14	Capture Distance (in mm)	>= 150
15	Safety (Optical)	Exempt Group per IEC 62471:2006-07
16	Operational Performance	• FRR < 1% at FAR of 1 in 1,00,000 with images conforming to IMAGE_TYPE_CROPPED_AND_MASKED ofsize 3.5KB

		• 20 persons for provisional certification & 5000 for Final certification

1.2.2. Non-Optical Parameters, Environmental Test Specifications andother parameters for Discrete Iris AuthenticationDevices

Sr. No.	Device Characteristics	Environment Test Specification
01	Operating temperature	0…50 C (IEC 68-2-2)
02	Storage Temperature	0…50 C (IEC 68-2-2)
03	Dry Heat Test as per 60068-2-2	Temp: 50deg ± 2 C Recovery Period: 1 to 2 Hours
04	Damp Heat Cyclic Test (First Cycle) as per 60068- 2-30	Temp: 40 C ± 2C Humidity(RH): 90% ± 2% Duration of Test: 1 cycle of 24Hrs.(12h+12h) Recovery Period: 1 to 2 Hours
05	Cold test as per 60068-2-1	Temp: -10 C ± 2 C Duration: 16 Hrs. Recovery Period : 1 to 2 Hrs.
06	Damp heat Cyclic Test(Five Cycles) as per 60068- 2-30	Temp: 40 C ± 2 C Humidity(RH): 90% ± 2% Duration of test: 5 cycles of 24 Hrs each (12 h + 12h) Recovery Period: 1 to 2 Hours
07	Durability Test(IP 54) as per IEC 60529	Dust Test Duration: 8 Hrs. Recovery Period: 1 to 2 Hrs
		Water Splash test: Test Duration: 10 Minutes Recovery Period: 1 to 2 Hrs.
08	Drop test as per 60068-2-31	No. of drops: Six drops (one drop on each face) Height of fall: 1000 mm unpacked Condition.
09	Vibration Test as per IEC60068 2-6	Frequency: 10…150 Hz, 0.15mm or 2.0g No. of Sweeps: 10 in each axis Condition: in Packed Condition

1.2.3. Other Parameters:

Sr. No.	Device Characteristics	Specification
1	Occupational Health Safety	RoHS Compliant
2	Electro-Magnetic Compatibility	
2.1	ESD Test as per IEC61000-4-2	Type of discharge: contact Type, Test Voltage: Air discharge ± 8 KV,contacttype ± 4KV
2.2	Radiated Emission	FCC part15B/IEC:CISPR 22 CLASS B standard
2.3	Radiated Immunity	As per IEC/EN 61000-4-3:2006+A2:2010
3	Software API	Compliant with UIDAI APISpecification
4	Connectivity	USB 2 And / Or USB-IF compliant Exempted for sensors embedded inForm factor designs such as POS terminals, Tablets etc
05	Operating System Support	The minimum operating system support for device drivers is Windows 8.1.

		(Though mainstream support for Windows 8 has been stopped by Microsoft,however many computer systems are still operational in Windows 8 operating system)
06	Usability andergonomics	As specified below

1.2.4. Usability and ergonomics

Device usability and form factor have a significant impact on image quality and matching accuracy. Following Usability requirements shall be adhered:

Ease of Use

- It is easy and quick to position/align the resident's eye, within the capture volume of thedevice
- It encourages the resident to sufficiently open their eyes and look (gaze) in a specificdirection
- It should quickly and automatically capture theirises
- It gracefully handles effects from the motion of the camera in respect to the eye (linear and angular)
- It should be easy to use by residents with special conditions such as squint eyes, blindness, droppy eyes, lazy eyes and otherhandicaps

Usability Design

The features of iris devices required in improving device usability in the Indian context are classified into three categories:

- Capture aid: this refers to all the assistance provided tothe resident in encouraging correct and quick usage of thedevice
- Actionablefeedback:thisreferstoallthefeedbackprovidedtotheoperatortoenabletheoperator to take a physical or verbal action during the iriscapture
- Informative feedback: This refers to all the feedback provided to resident about thecapture process.

The device design shall incorporate these features.

Capture Aid (for resident)

At least one of the below capture aids to be provided to the resident for ease-of use:

- **Physical (removed due to covid-19):**
  Physical aids can be provided to make it intuitive for the resident to align the iris camera to their eye(s). The resident can get tactile feedback and intuitively position the device correctly. The examples are eye cup, eye guard, goggles, etc. The physical structure can assist alignment in z and/or restrict the x and y alignment by utilizing position of the eyes and/ornose

- **Visual:**
  Visual aid can be implemented in a number of ways, for example, by providing a viewfinder for the resident to look through, or look at the reflection of their own eyes in a mirror, or by changing colors of LEDs to convey some predetermined messages such as too far or too close, or a display such as LCD showing the resident and operator what to do for enabling quickcapture.

- **Audio:**
  Audio instructions can be provided to the resident by the device or host to aid the alignment and capture. Due to large diversity of languages in India, this is not expected to be very effective, except in case of blind/handicap residents.

Actionable Feedback (for operator)

At least one of the below methods of actionable feedback be provided to the operator for ease-of-use:

Visual: visual feedback may be provided to the operator to take an action to assist the resident in iris capture.

- A viewfinder can be used by the operator to bring the iris camera to the eye level of the resident,
- LEDs of predetermined color and meaning can provide feedback to the operator if the resident is too far or too close to the iris capture device, or a display such as LCD can show in large icons or video.
- Note that it is better to have this feature on the device itself so that the feedback and the resident are both inthe line of sight of the operator and the operator does not have to look at visual feedback that is in a different direction than the resident. If a cell phone or tablet is used as the host device to the iris camera, the host display can be used for showing actionable feedback since the operator can hold the host in the hand and have it in the same line of sight as theresident.

Audio: audio can be used to provide actionable feedback to the operator. The operator then takes a physical action or provides a verbal instruction to the resident.The actionable feedback to include the following:

- How to correct alignment in x, y, andz
- Open eyes wider (in case of occlusion fromeyelids)
- Look straight or look at "object" (in case of incorrect gaze); the object can be reflection of one's own eye, light source, or some otherobject
- Hold steady (in case of motionblur)
- Improve focus by moving closer orfarther

Informative Feedback (for resident)

- **Visual**: LED/light is on when capturing and turn off when capture isfinished; and/or
- **Audio or tactile**: a beep/click and/or vibration of the device can be used to indicate thatcaptureis done.

The following informative feedback to the resident is required:

- Iris capture is inprogress
- Capturecomplete

Actionable feedback streamlines the process, improves speed and avoids confusion.

Notes:

1. Per ISO/IEC 19794-6:2011, Annex B.1 measured by MTF using a sinewave target. In addition, upper limit of 1.05 on MTF is required at all frequencies to discourage

image processing that produces excessive edge sharpening, which can add false details to an image. The output image of sine wave target shall not exhibit any significant amount of aliasing. Aliasing will be investigated by quantitative analysis and from visual observation of the softcopy-displayedimage.

2. Per ISO/IEC 19794-6:2011, annex B.6, the image should have a dynamic range spanning 256 grey levels, allocating one byte (8 bits) per intensity value, and providing at least 7 bits of useful intensity information.

1.2.5. Non-Optical parameters, Environmental Test Specifications for IntegratedIrisAuthenticationDevices

Sr. No.	Characteristics	Environment Test Specification (for mobile devices incorporating IRIS Devices)
01	Operating temperature	0…50 C (IEC 68-2-2)
02	Storage temperature	0…50 C (IEC 68-2-2)
03	Dry Heat Test as per IEC 60068-2-2	Temp: 50deg±2 C Recovery period: 1to 2 Hours
04	Damp Heat Cyclic Test (First Cycle) as per IEC 60068-2-30	Temp: 40 C ± 2 C Humidity (RH): 90% ± 2% Duration of Test: 1 cycle of 24Hrs. (12h + 12h) Recovery Period: 1 to 2 hours
05	Cold test as per IEC 60068-2-1	Temp: -10 C ± 2C Duration: 16 Hrs Recovery Period: 1 to 2 Hrs
06	Damp heat Cyclic Test (five Cycles) as per IEC 60068-2-30	Temp: -10 C ± 2 C Humidity (RH): 90% ± 2% Duration of Test: 5 cycle of 24Hrs each(12h+12h) Recovery Period: 1 to 2 hours
07	Drop/Topple Test as per IEC 60068-2-31	One topple each on four bottom edges In unpacked condition
08	Vibration Test as per IEC 60068-2-6	Frequency: 10…150 Hz, 0.15mm or 2.0g No. of Sweeps: 10 in each axis In packed condition

For API compliance, refer “Other Parameters” under Section 1.2.3. Other tests specified under “Other Parameters” are not applicable for Integrated Iris Devices as these are governed by the host device (Mobile / Tablet) and as such the measurement on IRIS authentication device is not possible in isolation. The “Usability and ergonomics” for the Integrated Iris Devices would be the same as specified in “Other Parameters” under Section 1.2.3.

1.3. Registered Device Service

1.3.1. L0 Devices

Aadhaar Registered Devices - Technical Specifications published by UIDAI
https://uidai.gov.in/images/resource/Aadhaar_Registered_Devices_2_0_4.pdf

1.3.2. L1 Devices

Aadhaar Registered Devices - Technical Specifications published by UIDAI,

https://uidai.gov.in/images/resource/Aadhaar_Registered_Devices_2_0_4.pdf

L1 traceability matrix document
http://www.stqc.gov.in/sites/upload_files/stqc/files/L1%20traceability%20matrix%20document.pdf

2. Specification: Pre-Certified Hardware (PCH)

Aadhaar Registered Devices - Technical Specifications published by UIDAI

https://uidai.gov.in/images/resource/Aadhaar_Registered_Devices_2_0_4.pdf

L1 traceability matrix document
http://www.stqc.gov.in/sites/upload_files/stqc/files/L1%20traceability%20matrix%20document.pdf

3. Specification: Enrolment Device

3.1. Fingerprint Scanner (FPS)

Sr. No	Device Characteristics	Values
01	Capture mode	Plain live scan capture
02	Image Acquisition Requirements	Setting level 31 or higher (Section 9.1 of Biometric Design Standards for UIDApplications V1.0)
03	Image evaluation frame rate	> 3 frames/sec, continuous image capture
04	Capture mode	Auto capture with built-in quality check (incorporates NIST qualityconsiderations)
05	Capture area	> 76mm x 80mm
06	Connectivity[1]	USB 2, USB-IF certified
07	Power	Through USB
08	Dimension (W X H X D)	< 160mm x 160mm x 160mm
09	Weight	Maximum 2.5 Kg.
10	Operating temperature	0 – 50 C
11	Humidity	10 – 90% non-condensing

12	Durability/Shock	IP 54
13	Standards	UL certified (if applicable). Meets ISO 19794-4:2005 Section 7 and Annex Acertification requirements (IAFIS Appendix F certified).
14	Software API	Compliant with UIDAI Device Capture API specification V1.0 RC 3

[1]Total of only 1 USB port available for connectivity and power.

3.2. IRIS Scanner

Sr. No.	Device Characteristics	Stationary (mounted: wall, tripod or stand)[2]	Hand-held[3]	Hand-held with alignment aid[4]
01	Iris Diameter (In pixel)	> 210		
02	Spatial Resolution Pixel Resolution	> 60% @ 4.0 Lp/mm > 16 Pixels/mm		
03	# of simultaneous captured eyes[5]	2		
04	Viewfinder	External	Internal	External or Internal
05	Capture distance	> 750 mm	> 50 mm	> 20 mm
06	Capture volume (width/height/depth)	> 250x500x500mm	> 20x15x12mm	> 20x15x12mm
07	Exposure time	< 15ms	< 33 ms	< 33 ms
08	Imaging wavelength	700-900 nm		
09	Spectral Spread	Power in any 100nm band > 35% of total power		
10	Scan type	Progressive		
11	Image margins	Left & right: 0.50x iris diameter, Top & bottom: 0.25x iris diameter		
12	Pixel depth	> 8 bits/pixel		
13	Image evaluation frame rate	> 5 frames/sec, continuous image capture		
14	Capture mode	Auto capture with built-in quality check (incorporates NIST quality considerations)		
15	Sensor signal to noise ratio	> 36 DB		
16	Connectivity[6]	USB 2, USB-IF certified Or Networked (TCP/IP)	USB 2, USB-IF certified	
17	Power	USB or independent PS		
18	Weight	NA	< 1 kg	< 1 kg
19	Dimension	<300x100x300mm	< 220x200x100mm	< 220x200x100mm
20	Operating temperature	0-49C		

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21	Humidity	10 – 90% non-condensing
22	Durability/Shock	IP54
23	Safety Standard	Exempt Group per IEC 62471:2006-07
24	Standards	FCC Class A, RoHS
25	Software API	Compliant with UIDAI Device Capture API specification V1.0 RC 3

[2]Stationary: Any capture process where the device is stationary and the subject is required to position and rest himself/herself.
[3]Hand-held: Operator operates and holds the camera and the subject is stationary.
[4]Alignment aid: Camera has mechanical fixture for alignment. Optical viewfinder is not considered alignment aid.
[5]Considered simultaneous if second eye is captured within 2 seconds of first eye done without moving the device.
[6] Total of only 1 USB port will be available for connectivity and power.

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4. Specification: QR Code Scanner

Sl.No.	Description	Specifications
01	Image Sensor (Pixels)	640 x 400 pixels
02	Symbologies	QR Code
03	Pitch/Skew	+/- 60^o, +/- 60^o
04	Scan Angle	Roll 0-360^o
05	Min. Symbol Contrast	<= 25%
06	Interface	USB
07	Dimensions	Ergonomically designed product
08	Weight	<250g
09	Indication	Buzzer, Indicator light LED
10	Operating Power	must be as per USB 2.0/3.0 standard requirement
11	Input Voltage	must be as per USB 2.0/3.0 standard requirement
12	Motion tolerance	Up to 5 in.(13 cm) per second for 13 mil UPC
13	Light Source	LED 350-770 nm
14	Operating Temperature	0^oC to 50^oC
15	Storage Temperature	-20^o to 70^o C
16	Humidity	5% to 95% non-condensing
17	ESD	+/- 4 kV contact discharge; +/- 8 kV air discharge
18	DROP	1m, Unpacked Condition, As per 60068-2-31
19	Environment Sealing	IP42, as per IEC 60529
20	Decode Range	1” to 10” for 20 mil QR Code
21	Service Center	Should Be Available in India
22	Safety Standards like LED safety	IEC 62471:2006 IEC 60950-1:2005 + A1 + A2 (optional) IS 13252(PART 1):2010