



**IT CERTIFICATION SERVICES**  
**Iris Authentication Device Specification**  
**(Discrete and Integrated device)**

Document : BDCS(A-I)-03-07  
Issue : 02 dated. 08.03.2016  
Revision 00 dated.  
Page 1 of 7

**Approval and Issue**

This document is the property of UIDAI and should not be reproduced in part or full without the written consent.

**Approved by** : \_\_\_\_\_  
Director General, UIDAI

**NOTE :**

1. Management Representative is responsible for issue and distribution of this document including amendments.
2. Holder of this copy is responsible for incorporation of all the amendments and currency of the document





**1. Revised Iris sensor Specifications -  
The Iris sensor for discrete and integrated Authentication Devices should have  
following specifications:-**

<b>Device Characteristics</b>	<b>Recommended Specifications</b>
Spatial Resolution	> 50% at 1 LP/mm.
Pixel Resolution	> 10 pixels/mm
Image Margins	Left & right $\geq 0.6x$ iris radius. Top & bottom $\geq 0.2x$ iris radius
Imaging Wavelength	Approximately 700-900 nm
Pixel Depth	Minimum of 8 bits/pixel
Sensor Signal to Noise Ratio	Noise should not be observable in the captured image
Scan Type	Progressive
Output Image	IMAGE_TYPE_CROPPED_AND_MASKED with JPEG2000 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.
Contrast	The iris image should have good grey level separation between the iris and sclera and between the iris and pupil and should have sufficient contrast to reveal the iris texture.
Optical Distortion	The iris image should not exhibit effects of optical distortion including spherical aberration, chromatic aberration, astigmatism and coma consistent with standard optical design practices
Noise	No image resizing. No image manipulation other than recommended by IMAGE_TYPE_CROPPED_AND_MASKED. Single pass JPEG 2000.
Capture Mode	Auto capture with built-in quality check
Capture time	<5 sec
Capture Distance (in mm)	$\geq 100$
Safety (Optical)	Exempt Group per IEC 62471:2006-07
<b>Operational Performance</b>	FRR < 1% at FAR of 1 in 1,00,000 with images conforming to IMAGE_TYPE_CROPPED_AND_MASKED of size 3.5KB



## 2. Non-Optical Parameters, Environmental Test Specifications and other parameters for Discrete Iris Authentication Devices

Device Characteristics	Environment Test Specification
Operating temperature	0...50 C (IEC 68-2-2)
Storage Temperature	0...50 C (IEC 68-2-2)
Dry Heat Test as per 60068-2-2	Temp: 50deg ± 2 C Recovery Period: 1 to 2 Hours
Damp Heat Cyclic Test (First Cycle) as per 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
Cold test as per 60068-2-1	Temp: -10 C ± 2 C Duration: 16 Hrs. Recovery Period : 1 to 2 Hrs.
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
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.
Drop test as per 60068-2-31	No. of drops: Six drops (one drop on each face) Height of fall: 1000 mm unpacked Condition.
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

### Other Parameters:

Device Characteristics	Specification
Occupational Health Safety	RoHS Compliant
<b>Electro-Magnetic compatibility</b>	
ESD Test as per IEC61000-4-2	Type of discharge: contact Type, Test Voltage: Air discharge+8 KV ,contact type+4Kv
Radiated Emission	FCC part15B/IEC:CISPR 22 CLASS B



**IT CERTIFICATION SERVICES**  
**Iris Authentication Device Specification**  
**(Discrete and Integrated device)**

Document : BDCS(A-I)-03-07  
Issue : 02 dated. 08.03.2016  
Revision 00 dated.  
Page 5 of 7

	standard
Radiated Immunity	As per IEC/EN 61000-4 3:2006+A2:2010
Software API	Compliant with UIDAI API Specification
Connectivity	USB 2 And / Or USB-IF compliant Exempted for sensors embedded in Form factor designs such as POS terminals, Tablets etc
Usability and ergonomics	As specified below
Operating System Support	Minimum support of device drivers for Windows XP onwards/Android / Linux. For purpose of certifications tests, drivers need to be windows XP and above compliant including Software API compliant to UIDAI API specifications as cited above.

**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 the device
- It encourages the resident to sufficiently open their eyes and look (gaze) in a specific direction
- It should quickly and automatically capture the irises
- 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, droopy eyes, lazy eyes and other handicaps

**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 to the resident in encouraging correct and quick usage of the device
- Actionable feedback: this refers to all the feedback provided to the operator to enable the operator to take a physical or verbal action during the iris capture
- Informative feedback: This refers to all the feedback provided to resident about the capture 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:** 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/or nose

- **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 quick capture.

- **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 in the 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 the resident.

- **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, and z
- Open eyes wider (in case of occlusion from eyelids)
- 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 other object
- Hold steady (in case of motion blur)
- Improve focus by moving closer or farther

### **Informative Feedback (for resident)**

- **Visual:** LED/light is on when capturing and turn off when capture is finished;  
and/or

- **Audio or tactile:** a beep/click and/or vibration of the device can be used to indicate that capture



**IT CERTIFICATION SERVICES**  
**Iris Authentication Device Specification**  
**(Discrete and Integrated device)**

Document : BDCS(A-I)-03-07  
Issue : 02 dated. 08.03.2016  
Revision 00 dated.  
Page 7 of 7

is done.

The following informative feedback to the resident is required:

- Iris capture is in progress
- Capture complete

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-displayed image.
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.

**3. Non-Optical parameters, Environmental Test Specifications for Integrated Iris Authentication Devices**

<b>Characteristics</b>	<b>Environment Test Specification (for mobile devices incorporating IRIS Devices)</b>
Operating temperature	0...50 C (IEC 68-2-2)
Storage temperature	0...50 C (IEC 68-2-2)
Dry Heat Test as per IEC 60068-2-2	Temp: 50deg±2 C Recovery period: 1to 2 Hours
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
Cold test as per IEC 60068-2-1	Temp: -10 C ± 2C Duration: 16 Hrs Recovery Period: 1 to 2 Hrs
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
Drop/Topple Test as per IEC 60068-2-31	One topple each on four bottom edges In unpacked condition
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 2 of Annexure-1. 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 2 of Annexure-1.