



IT CERTIFICATION SERVICES
PROCEDURE FOR CERTIFICATION OF INTEGRATED BIOMETRIC
DEVICES

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PROCEDURE FOR CERTIFICATION
OF
INTEGRATED BIOMETRIC DEVICES

STANDARDISATION TESTING AND QUALITY CERTIFICATION
DIRECTORATE

DEPARTMENT OF ELECTRONICS AND INFORMATION TECHNOLOGY
MINISTRY OF COMMUNICATIONS AND INFORMATION TECHNOLOGY
GOVERNMENT OF INDIA



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BACKGROUND

UIDAI programme of online Biometric Authentication of Indian residents (Aadhaar) has created many opportunities like Aadhaar E-KYC for SIM issuance, Aadhaar E-KYC for bank account opening, Aadhaar attendance for Govt. employees, Seeding of beneficiary databases, Aadhaar Demographic Update etc.

IRIS integrated in mobile (smartphone or tablet) device is one of the access device supported by online authentication which has many usage models like:

- Self service authentication
 - Mobile owner authenticates himself/herself for achieving a business transaction.
- Assisted authentication - Various scenarios
 - B2C usage model - Authentication with Assistance.
 - Authentication in secure premises over secure network
 - Authentication could be using public device model or registered device model

The use of model depend the level of transaction and risk associated with them.

Accordingly various government agencies are piloting Aadhaar authentication with IRIS devices. Today technology is available to build reliable simple Aadhaar authentication using low cost commodity hardware for IRIS integrated mobile phones. Everyday mobile phones and tablets can become Aadhaar compliant authentication devices with

- Commonly used and well understood camera and LED components
- Low BOM cost in consumer device quantities
- Multiple software vendor solutions can use H/W (No proprietary technology in H/W)
- Reasonable cost of S/W (multiple vendors for S/W)

With this now an assurance program is required to be in place so that reliable devices can be made available in the market.

1. DEFINITIONS

Capability Approval, defines a manufacturer's ability in respect of his manufacturing processes and quality control methods, (and may include design and development) covering a specific device technology to deliver range of products within a generic specification.

- a) Capability Approval of mobile phones / tablets manufactures is his ability to integrate STQC certified Iris authentication devices as per UIDAI specification and to variety of mobile phones enabling "anywhere – anytime" online authentication for various applications.



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- b) Capability Approval of Biometric solution provider is his ability to design, manufacture and deliver a biometric solution (in this case IRIS authentication device) as per UIDAI specification integrateable to mobile phones / tablets.

Host Device

A smartphone or tablet which has incorporated an iris recognition device by combining IRIS algorithm with hardware components available in the smart mobile device.

Critical Component

In Biometric solution (IRIS authentication device / system in mobile/tablet) the critical components are those that their failure could lead to a breach of safety, security and performance. These include:

- Sensor
- LED
- Lens/ Camera
- Kind 7 generator
- Image Acquisition & Control SW

Capability Qualifying Component

A representative mobile device/tablets which encompasses the technologies, processes, critical components and suppliers for which approval is sought.

Target of Evaluation (TOE)

The component/ product or system that is the subject of the evaluation (biometric solution integrated within the host device). The evaluation serves to validate claims made about the target. To be of practical use, the evaluation verifies the target's features/characteristics as per UIDAI specification.

Requirements

A document, created by UIDAI , which identifies requirements for a class of biometric solutions (for example IRIS authentication devices) relevant/in context of integration with host devices (in this case mobile/tablet) available to a user for a particular purpose (in this case online Aadhaar based authentication for availing government services).



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Suppliers

Product vendors (can be a mobile/tablet manufacturers) may choose to implement biometric solution (here IRIS based solution developed internally or available through a specialist contractor) that complies with UIDAI specification.

Suppliers shall ensure that integrated devices (here mobile with IRIS) comply with the requirements of functionality, ergonomics, safety, performance, durability and security.

Capability Abstract

A document prepared by supplier describing his range of capabilities in terms of integration/embedment of biometric authentication solution, chipset, platform in the host device consultation with these specialist contractors and agreed by STQC. This document will be a part of scope of approval which will be listed at STQC website

2. REFERENCES

- IS 16333 (Part 1) Mobile phone hand set safety Requirements
- QM-333/ISSUE-2/MARCH-2010: Specification for environmental testing of telecommunication, BSNL – TELECOM QUALITY ASSURANCE CIRCLE

3. SCOPE OF THE DOCUMENT

Scope of this document is to define Capability Approval Methodology for IRIS in Mobile. This includes criteria for certification.

4. PURPOSE

Provide opportunity for UIDAI's device ecosystem partners to test and get certified their latest innovations in the areas of Iris capture hardware, software, and Iris cameras integrated into small form factor devices.

This will facilitate availability of Quality Assets devices to user's agency.

Purpose of certification is:

- a) To make purchase decision easy and fast from buyer perspective as certified devices are technically compliant with UIDAI specification.
- b) Reducing overall cost of demonstrative compliance to different buyers repeatedly tender wise, as certification is continuous activity.
- c) Enhancing Quality benchmarks systematically in a well structured way though a consultation process with stakeholders.
- d) To provide a platform to stakeholders in regard to "Quality" of the devices.



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5. OBJECTIVE

To develop a methodology of testing and certification of IRIS in mobile/tab. The methodology provide confidence that certified devices will be confirming UIDAI specification and ensure meeting of following high level objective.

6.1 Biometric Image quality and performance

To provide value through services with seamless and comfort user experience for IRIS authentication to be used as a daily transaction authentication mechanism in mobile phones, it is imperative that the methodology ensures only image that qualifies as “high quality” is captured and sent to the backend

6.2 Security

Consumer of technology, often, may not be aware of the repercussions due to compromise, therefore, should be managed as invisibly and seamlessly within the technology chain as possible.

6.3 Safety

Protection of Eye safety from any hazard of radiation from LED therefore ensuring that LEDs used are compliant with international standard

6.4 Ergonomics

For good user experience and proliferation human centric, usable product for early adoption and success of online authentication.

6. ROLES AND RESPONSIBILITIES

Mobile handset manufacturer’s work towards bringing latest consumer technologies focused on mobile handset/tablets from other spheres.

STQC-UIDAI work directly with Biometric vendors for module certification.

Biometric vendors offers Biometric solution/module to any mobile phone manufacturer as a standard certified component.



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7. APPROACH

7.1 The objective of certification as specified in clause 6 above is centric around online IRIS authentication and not certification of mobile device per se but since mobile device is, the critical host, plays an equally critical role for online authentication and transaction process. Therefore the approach envisaged is that it should be flexible enough to permit mobile manufacturer to bring out innovation/new models within the scope of approvals without repeated testing for certification.

The process is to **certify the capability of mobile manufacturer** with exercising sufficient control on chip set manufacturer **and bio-metric solution provider** to deliver quality assessed IRIS integrated mobile devices.

The control objectives are safety, security and performance of Biometric solution which mobile manufacturer through supply chain management on chipset designer, biometric solution provider and vendors of critical components ensures that control objectives are achieved. The demonstration of this achievement will be through range of visibility, contractual agreement and evidence of compliance. Mobile manufacturer shall make a quality plan to address the above.

STQC audit and certification will be based upon:

- a) The completeness and the adequacy of the plan.
- b) Testing of a CQC (capability qualifying components) in independent test lab (as per UIDAI specification).
- c) Field testing for operational performance
- d) Complete compliance demonstration in technical construction file, annexure 3 of BDCS (A-I-03-02).

7.2 Most of the devices submitted for this certification will be either Prototypes or Reference Designs. These are known as CQC (capability qualifying components). The final product which will be released in the market may be different from these devices under the concept of capability approval. The released devices shall be structurally similar to the subject devices which were offered for Capability Demonstration and deemed as certified devices.

The released devices which are manufactured under the ambit of capability approval will undergo the Delta Certification Process consisting of:

- a) A declaration to STQC that there is no change in the five critical components of the biometric solution.
- b) A quality plan in a summarized way demonstrating the structural similarity of that model for the purpose of biometric solution.



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- c) Functional test report on 100 subjects to STQC. No additional testing is required. Here it is again emphasized that the scheme is about capability approval of manufacturer to deliver UIDAI specification compliant integrated IRIS on mobile devices / tablets and not the device itself.

7.3 Candidate for certification

Supply chain generally consists of 4 different entities: Chipset vendor (Typically provides a complete Reference Design) a Design House (Modifies Reference Design to Final Product Design) a ODM/SI (Actual manufacturer/assembler of the device) a OEM (Company that is branding and selling the device) apart from a vendor for Biometric Solution provider.

- a) OEM which is putting the product into the market is a prime candidate for the certification. Through trusted supply chain management. The applicant for certification shall demonstrate to STQC that sufficient controls are exercised to ensure that integrity of the authentication devices are maintained through contractual agreements indicating reasonable visibility.
- b) Biometric solution provider are the candidates for certification, they have to provide CQC (prototype) for FRR testing as well as laboratory testing. This will facilitate mobile / tablet manufactures to get compliant devices (compliant with UIDAI specification) and then they can demonstrate their capability to indicate these devices into the final product as stated in 8.3(a) and 8.2(c).

8. CAPABILITY APPROVAL

- An approval granted to manufacturer of mobile with integrated IRIS devices, when it has been established that processes and practices are in place to manufacture integrated devices as per UIDAI specification.
- This approval will ensure capability to manufacturer mobile with integrated IRIS devices of various forms factor with consistent quality with Aadhaar based authentication.
- Approval is not a certification of mobile device per se, it's a certification for IRIS device integrated in a mobile, focus is on Aadhaar based authentication and service delivery through it.
- The Biometric solution will be part of scope of capability approval. Hence, same solution can be used in various models without need of further testing and certification for a vendor A of a mobile manufacturer.
- The vendor B who uses the approved Biometric solution may have to undergo functional testing on 100 subjects which should be part of its quality plan.

9. Procedure for Capability Approval

- Manufacturer (Designer/Developer) has established Quality Management System (ISO 9001)



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- Implements a quality plan for candidate mobile with IRIS device as specified in ISO 10005
- Committed to meet “UIDAI specification for IRIS in Mobile”
- Designates Management Representation (MR) who is knowledgeable to Certification requirements and responsible for the implementation of the above processes and quality plan.
- Manufacturer enters into a contract with STQC to provide all necessary information required for certification and demonstrate his capability as defined in capability manual.

- If the applicant demonstrates that all the requirements are complied with, a capability certificate will be granted to the manufacturer with scope of capability listed on STQC website including capability abstract.

The scope of capability remains valid with any models/form factor if there is no change in the critical component.

10. SCOPE OF THE CAPABILITY APPROVAL

A range of mobile phones incorporating a specific biometric solution, subject to following:

- Any mobile phones supporting Iris Authentication should have the specification for Iris Sensor” as recommended by UIDAI
- The Iris device characteristic “Output Image” needs to comply with the ISO standard for Iris Image Record (IIR) i.e. **ISO/IEC: 19794-6:2011**, Section 6.1, 6.4.
- The host mobile devices/tablets should support standard data encryption i.e. encryption of Personal Identity Data (PID) with dynamic session key using AES-256 symmetric algorithm (AES/ECB/PKCS7Padding) and session key, in turn is encrypted with 2048-bit service provider public key using asymmetric algorithm (RSA/ECB/PKCS1Padding).(**In case of Registered Device**)*

11. APPLICATION FOR CAPABILITY APPROVAL (CA)

Application needs to be submitted along with Capability Manual

Capability Manual is a document which describes the range of capabilities which manufacturer wish to demonstrate its compliance to UIDAI requirements to certification body for obtaining the certification. The requirements of capability manual are to have:

- Controlled document – quality plan (Annexure 1)
 - Separate for each model of mobile
- Scope of Capability Approval
 - Chipset design as a variant
 - Biometric Solution as a variant



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- Capability Abstract - a document owned by mobile manufacture in agreement with chipset designer and biometric solution provider.
- Combination for approval (a, a+b, a+b+c or anything else) as below:
 - a) Basic integration of IRIS with mobile
 - b) IRIS meeting liveness testing *
 - c) IRIS with Registered device*
- Technologies/Range of Technologies
- Subcontracting use of specialist service providers
 - Mobile and/or Chipset designer
 - Biometric Solution provider
 - Contract Manufacturing
- Limits of Capability
 - Variance of chipset designer
 - Variance of Biometric Solution
 - Variance of Contract Manufacturing
- Design/Development to customer interface
 - Ergonomics from user interface perspective
- Design Rules for
 - Safety
 - Security
 - Ergonomics
 - Performance
 - Durability
- Process compliance
 - Reference to internal process
 - Control of critical components
- Demonstration of Capability – use of CQC (capability qualifying components)
 - Description of capability qualifying components
 - Target of Evaluation is IRIS Biometric authentication solution (mobile/tablet is only host device, for proving and demonstrating Image Quality, durability, reliability, safety and performance of IRIS Biometric solution. The host devices shall be selected appropriately. Organization shall have a process to ensure that these principles are adhered in production of various models and variables.
- Test Programme for CA
 - Test programme as per UIDAI specification
- Maintenance of CA
- Modification to CA
- Test Method



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- Test methods for test demonstrating compliance with UIDAI specification
- Process Flow chart
- Release
 - Release procedure for authorization ensuring compliance of release lots as per UIDAI specifications

The manual should be a comprehensive referring to internal procedures.

*Note: * Not covered under the scheme at present.*

Critical Components:

Critical Components are those components which influence authentication quality and requires stringent control through control of their specification, vendor, incoming inspection and release of mobile device. The following are identified as critical component.

- Sensor
- LED
- Lens/ Camera
- Kind 7 generator
- Image Acquisition & Control SW

As the certification is really for the biometric solution which is the target of evaluation consisting of critical components (Sensor, Lens, LED, Capture and Control SW), the supply chain documentation should be focused only on those components. The rest of the components (Display, memory, other sensors) have no bearing or impact on the Iris certification process. Considering this the applicant should focus on building documentation around this concept.

12. BINDING MECHANISM

Control of mobile devices with IRIS capability

A generic mobile device with IRIS capability but without certification & approvals should not be able to connect to Aadhaar backend because of reasons specified in clause 6 of this document.

This is achievable through several means which includes

- AUA develops a client application for Aadhaar authentication which can be downloaded from play store/app store.
- Once downloaded, the application would require activation – the rules for activation can be set by AUA/UID – approved make/model, OS version, security policies and so on.

- AUA can maintain a white list of devices whose request would be accepted for UIDAI authentication. Such controls could be mandated by UIDAI/STQC or can become part of AUA/KUA agreement.

13. USE OF SPECIALIST CONTRACTORS AND SUBCONTRACTING

To ensure flexibility in the certification process without compromising the principles of quality assessment MR has to ensure that controls on **critical components** are exercised in the whole Supply Chain Management to the extent of visibility through a chain of verifiable contractual agreements.

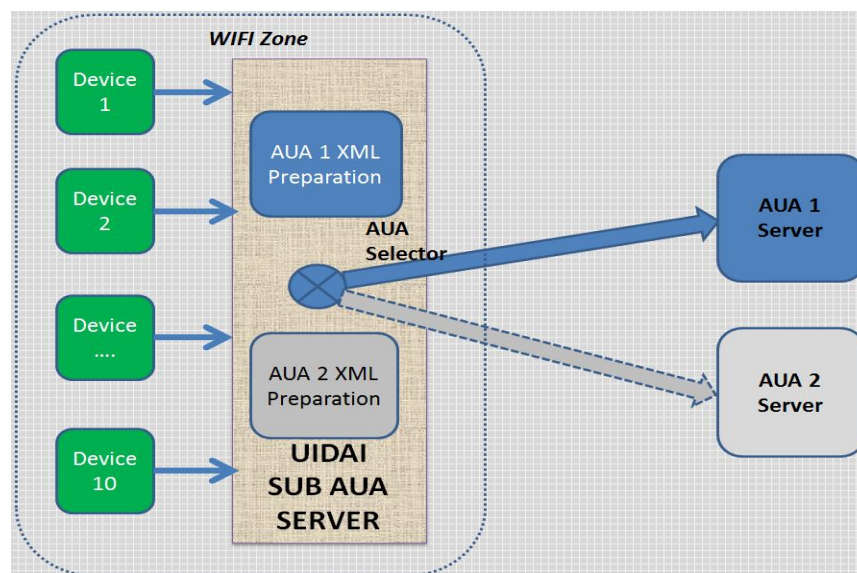
The applicant (MR) is able to demonstrate to the certification body that processes concerned are.

- a) Performed in a manner which satisfies the appropriate requirements of the applicable standards and the scheme
- b) Carried out satisfactorily (including the relationships, dependencies and controls exercised are defined adequately).
- c) MR shall ensure that Capability Approval testing will be performed under his control including validation by an independent Laboratory.
- d) Biometric solution vendor and chipset manufacturer could be specialist sub contractor

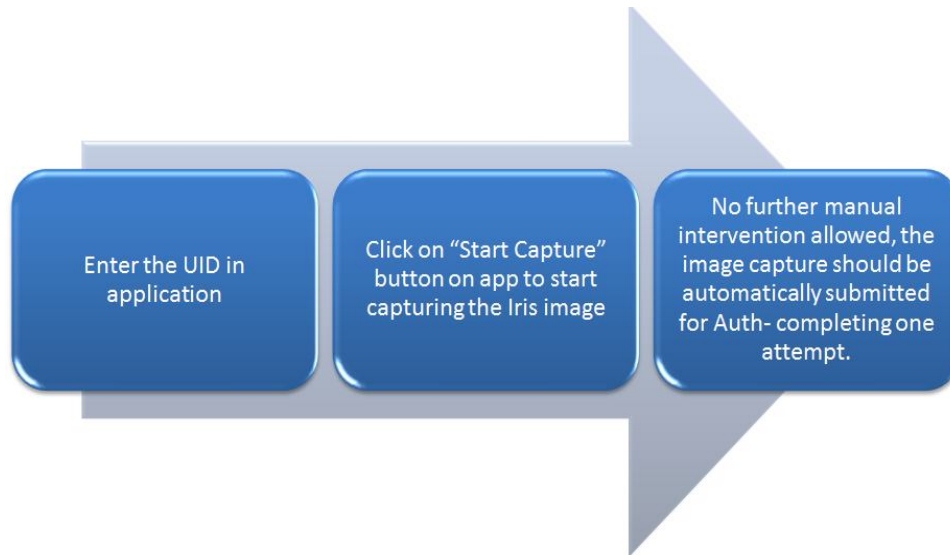
14. TEST METHOD

Testing covers test in

- Controlled laboratories environment and
- Testing in the field for operational performance (FRR). The schematic for which is given below



Client Workflow



15. PROVISIONAL CERTIFICATE

A provisional certificate can be provided to the applicant based on his request for the same subject to following conditions

- An additional functional test will be conducted on candidate devices with 100 test subjects with acceptance criteria of one failure for IRIS with 3 attempts. This will not be replacement of FRR since the population size is not statistically significant.
- Provisional certificate will be granted subject to successful compliance with UIDAI specifications except FRR.
- Then validity of the provisional certificate will be maximum one year. The risk to obtain provisional certificate lies with the applicant of the candidate device.
- Provisionally certified vendors who shall clear the FRR shall be provided with the final certification.

17. In case, any device gets failed in field FRR testing, vendor will have to take necessary action on the devices deployed in the field. The related cost and loss will be borne by the concerned device vendor.

"In case the Device fails the FRR test and supplier disagrees with the results, he can appeal to the Head Certification Body (DG STQC), who refers the case to an expert committee. Supplier to re-conduct FRR testing, under STQC's supervision, following STQC approved procedure, at his own cost and present the results to the committee for revaluation.



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ANNEXURE I

REQUIREMENTS FOR QUALITY PLAN

1. Scope

The purpose of this quality plan is to identify the quality management methods being applied to demonstrate adequacy of control by the organization (applicant) and the certification body (STQC) for an IRIS in mobile/tablet.

a) Inclusions

Quality plan applies to the development, manufacturing and release of the IRIS in mobile/tablet it includes concession management and marketing subsystems.

b) Exclusions

The development work if undertaken by the subcontractor is covered by the purchase order and vendor control system, is not included in detail in this plan. The financial management systems are the subject of a subcontract with the subcontractor and so the quality plan is concerned solely with the subcontract management aspects of that part of the project.

2. Quality objectives

The client/buyer has made no specific demands in terms of quantified quality objectives. Accordingly, the organization shall align its quality objectives with the UIDAI IRIS in mobile specification.

3. Responsibilities

The Project Manager/MR has overall responsibility for the successful execution of the project, including conformity with the applicants QMS and meeting the above objectives.

4. Documentation

Documents used in this project should be referred appropriately into the organization quality management system. The existing references shall be retained. In all other respects, the QMS applies. It is not expected manufacturer to have two parallel QMS.

5. Records

The technical construction file and associated records are to be retained for a period of not less than three years after the warranty period has expired of the released lot of devices. Disposition at that time shall be by agreement with the client. In accordance with the company policy, the client may view any contract-related records at any reasonable time.



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6. Resources.

All of the development team shall be employees of the company. Appropriately qualified individuals shall be made available by the responsible Human Resources Manager/equivalent position as per organization policy

7. Project inputs

The primary input is the UIDAI specification and STQC certification requirement

8. Customer and Stakeholders communications

Any queries with the specification are to be raised with the stakeholders through the Project Manager/MR at relevant meetings. Inputs for improvement of the UIDAI ecosystem through may be given to STQC or UIDAI

9. Design and development

The design and development team should be well aware of

- a) UIDAI specification for IRIS in mobile, registered device and liveness requirements etc
- b) STQC certification requirement and preparation of technical construction file.
- c) Close interaction with chipset designers and biometric solution provider and ensuring control of critical components through contractual agreement using supply chain management principles.
- d) Design procedure/rules for ensuring safety (eye safety – IEC62471), security (registered device and other security measures), ergonomics and performance to ensure compliance with UIDAI specification.

10. Purchasing

Purchase of modules, sub modules through the vendors of modules incorporating critical components shall be control by rugged processes as approved by company management.

11. Special processes

Special processes are control of critical components and are design for safety, security, ergonomics and performance.

12. Configuration management

Document identifiers shall conform to the version of the Quality Manual and quality plan in place at the start of the project, except for those documents already identified beforehand.

Current company approved configuration management tools shall be used.



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13. Product handling and how to use

Specific instruction for product handling and how to use should be available to the user.

14. Nonconformities

Any non-conformities with the UIDAI specification should be resolve before release of the log.



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ANNEXURE II

A summary of quality plan to be submitted to STQC

Activity	Description	Document/ Procedure	Area/ Dept.
Scope	This quality plan is applicable to the processes of production and distribution of mobile/tablet with IRIS as per UDIAI specification		
Quality objectives	<ul style="list-style-type: none">• Biometric image quality and Performance• Safety• Security• Ergonomics• Durability		
Management responsibilities	<ul style="list-style-type: none">• Job descriptions and organization charts of the responsibilities of personnel involved in the planning, executing, controlling and monitoring the progress of the activities covered by this plan are to be found in referenced documents.• Designated MR to be communicated to STQC		
Documentation	There are no special document control requirements. Contractual documents will be retained for a minimum of five years. Company procedure as part of ISO 9001 certification should be followed.		
Records	Identifiable and retrievable records will be maintained to furnish evidence of activities affecting quality. Records will be retained for a minimum of 3 years. Technical construction file should also available with certification buddy.		
Resources	The requirements for storage, process and transportation of raw materials and critical components should specified.		
	All staff are required to have successfully completed training on the handling of the materials specified in the contract and / or as per company policy		
	No special infrastructure or work environment conditions apply.		



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Requirements review/ Customer specifications	All quotations given and all customer specifications and orders received will be reviewed prior to acceptance, to ensure that the requirements are properly defined, all differences satisfactorily resolved, and the company has the capacity to meet the requirements involved.		
Customer communication	Customer feedback is collected through a procedure which is a part of approved quality management system.		
Design and development	The design and development should address procedure to comply <ul style="list-style-type: none">• UIDAI specification for IRIS in mobile, registered device and liveness requirements etc• STQC certification requirement and preparation of technical construction file.• Close interaction with chipset designers and biometric solution provider and ensuring control of critical components through contractual agreement using supply chain management principles.• Design procedure/rules for ensuring safety (eye safety – IEC62471), security (registered device and other security measures), ergonomics and performance to ensure compliance with UIDAI specification.		
Purchasing	All critical components purchased by the company are subject to receiving inspection and testing or any equivalent method which gives sufficient level of confidence that mobile/tablet integrated with IRIS will function as intent for successful real time Aadhaar based authentication..		
Production	Standard operating procedures apply.		
Identification and traceability	Standard operating procedures apply.		
Storage and handling	Purchased materials, intermediates and finished products will be stored in secure containers, Careful handling methods will be used to prevent damage,		



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	deterioration or contamination of the product. Bulk products will be shipped in dedicated tank cars.		
Nonconforming Products	Products failing to pass the Final Lot Acceptance Requirements shall be diverted to a special quarantine area. A nonconforming mobile/tablet as per company product specification can be accepted with different grade but non conformity as per company procedure but device should be confirming to UIDAI specification. A record to this effect should be maintained.		
Monitoring and measurement	Sampling and testing plans should exist which should factor UIDAI specification and test equipments should be calibrated for ensuring measurement integrity		
Inspection and testing equipment	The company shall maintain a range of measuring and testing equipment to cover the scope of its development, production and control activities. All required calibration should be done in-house or by the equipment manufacturer. Or by accredited calibration laboratory		
Audit	The manufacture shall conduct internal and statutory audit. as per company procedure.		



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ANNEXURE III

UIDAI Iris Authentication Device Specification

The iris authentication device specifications are derived primarily from ISO/IEC 19794-6-2011 with tailoring applied for the Indian context

For specification refer STQC website at following link-

http://www.stqc.gov.in/sites/upload_files/stqc/files/IRIS%20Auth%20Device_specification%20issue02%2008032016_BDCS_A-I_-03-07_0.pdf



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ANNEXURE IV

Workflow for Capability Approval

Entity 1: Mobile phone manufacturer

- a) Works closely with BSP and integrates certified biometric solution (as certified above) in final phone design
- b) Goes through limited tests with certification agency (i.e. functional tests – successful UID authentication)
 - Environmental not needed as they are covered in BIS guidelines (as BIS is mandatory for phone/tablet under CRS)
- c) Demonstrates quality plan (as per STQC guidelines) and would be responsible end to end interfacing with end-customer for all purposes (for sales, support, replacement, repair etc)
 - Phone manufacturer works seamlessly with BSP through contractual tie-up for issues related to Biometric solution (similar arrangement as with other important value chain partners)
- d) Receives Final certification from STQC-UIDAI for Phone model series (equivalent to BIS series formation guidelines for phones)
 - Intimates STQC when launching a new phone model with certified biometric solution
 - Phone model series is listed on STQC site (optional)
 - However, Phone mfg shall showcase STQC-UIDAI certificate on their website

Entity 2 (Primary entity assuming responsibility) for solution: Biometric Solution Provider-BSP (including all critical components)

- a) Engages with Mobile phone manufacturer for integration of their solution
- b) Ensures Performance, Biometric Image quality, Ergonomics, (Eye) Safety and other quality parameters affecting authentication
- c) Participates in Lab tests, FRR field tests to establish compliance to UID Iris specifications
- d) BSP receives certification from STQC-UIDAI for the Biometric solution (including all critical components)
- e) Any phone brand should be able to use this certified solution in their target device.