

EDSA-206

ISA Security Compliance Institute — Embedded Device Security Assurance — ISASecure EDSA CRT laboratory operations and accreditation

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Revision history

version	date	changes
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Foreword

NOTE This is one of a series of documents that defines ISASecure certification for embedded devices, which is developed and managed by the industry consortium ISA Security Compliance Institute (ISCI). A description of this program and the current list of documents related to ISASecure embedded device security assurance can be found on the web site <http://www.ISASecure.org>.

1 Scope

The ISASecure certification program has been developed by an industry consortium called the ISA Security Compliance Institute (ISCI) with a goal to accelerate industry wide improvement of cyber security for Industrial Automation and Control Systems (IACS). ISASecure EDSA (Embedded Device Security Assurance) is a certification program for embedded devices, where a product is considered to be an embedded device if it satisfies the definition provided in 3.1.8. ISASecure certification of embedded devices has three elements:

- Communication robustness testing (CRT);
- Functional Security Assessment (FSA); and
- Software Development Security Assessment (SDSA).

An organization that performs evaluations for all three of these elements and grants certifications under the ISASecure EDSA program for embedded devices is referred to as a *ISASecure EDSA chartered laboratory*, or (more briefly) a *chartered laboratory*. A separate organization that is authorized to perform CRT, as input to the certification decision subsequently made by a chartered laboratory, is referred to as an ISASecure EDSA CRT laboratory, or a *CRT laboratory*. This document specifies the criteria and processes that define:

- Requirements on the operations of a CRT laboratory (Section 6); and
- How a CRT laboratory is accredited to begin and continue ISASecure device CRT operations (Section 7).

The requirements in this document apply to operations of a CRT laboratory that develop input to ISASecure EDSA certification. Thus the laboratory may perform other tests that would not be subject to these requirements if they do not support an ISASecure EDSA certification. However, at the outset of testing, a vendor client of the CRT laboratory may be unsure of whether it will employ evidence from these tests to apply for ISASecure EDSA certification. CRT laboratory processes must ensure that if the test evidence is ultimately submitted toward ISASecure EDSA certification, that the requirements of this document were followed.

ISCI has based its certification program approach on:

- International standards for conformity assessment programs
- General specifications for operation of ISA compliance programs
- Specifications developed for the ISASecure EDSA program.

This document provides a complete reference to these sources, and interprets applicable general specifications and standards for the ISASecure EDSA program, as they apply to CRT laboratories. The document [EDSA-200] provides this interpretation for chartered laboratories.

2 Normative references

[EDSA-200] *ISCI Embedded Device Security Assurance – ISASecure EDSA Chartered laboratory operations and accreditation*, as specified at <http://www.ISASecure.org>

[EDSA-201] *ISCI Embedded Device Security Assurance –Recognition process for communication robustness testing tools*, as specified at <http://www.ISASecure.org>

[EDSA-204] *ISCI Embedded Device Security Assurance – Instructions and Policies for Use of the ISASecure Symbol and Certificates*, as specified at <http://www.ISASecure.org>

[EDSA-207] *ISCI Embedded Device Security Assurance – Application and Contract for CRT Laboratories*, internal ISCI document

NOTE The following document is the overarching technical specification for ISASecure EDSA certification.

[EDSA-300] *ISCI Embedded Device Security Assurance – ISASecure certification requirements*, as specified at <http://www.ISASecure.org>

[EDSA-301] *ISCI Embedded Device Security Assurance – Maintenance of ISASecure certification*, as specified at <http://www.ISASecure.org>

[EDSA-303] ISASecure EDSA Sample Report, internal ISCI document

NOTE The following document is the overarching technical specification for ISASecure EDSA CRT (communication robustness testing). The UDP-specific specification that follows it is also explicitly referenced in the present document. The list of all protocol-specific ISASecure EDSA technical test specifications is maintained in the normative references clause of [EDSA-300].

[EDSA-310] *ISCI Embedded Device Security Assurance – Common requirements for communication robustness testing of IP based protocol implementations*, as specified at <http://www.ISASecure.org>

[EDSA-405] *ISCI Embedded Device Security Assurance – Testing the robustness of implementations of the IETF UDP transport protocol over IPv4 or IPv6*, as specified at <http://www.ISASecure.org>

NOTE The following document applies to all ISA compliance testing programs.

[ASCI Lab] *ASCI Chartered Testing Laboratory 2009 Approval Process*, as specified at <http://www.ISASecure.org>

NOTE The following international standard applies to the ISASecure EDSA CRT testing process.

[ISO/IEC 17025] ISO/IEC 17025, “*General requirements for the competence of testing and calibration laboratories*”, 15 May 2005

NOTE The following international standard applies to the ISASecure EDSA CRT laboratory accreditation processes.

[ISO/IEC 17011] ISO/IEC 17011, “*Conformity assessment – General requirements for accreditation bodies accrediting conformity assessment bodies*”, 01 September 2004

3 Definitions and abbreviations

3.1 Definitions

3.1.1

accreditation

assessment and recognition process via which an organization is granted CRT laboratory status

3.1.2

accreditation body

third party that performs attestation, related to a conformity assessment body, conveying a formal demonstration of its competence to carry out specific conformity assessment

3.1.3

applicant

device vendor that has submitted an embedded device to a CRT laboratory for testing

3.1.4

conformity assessment body

body that performs conformity assessment services and that can be the object of accreditation

NOTE Examples are a laboratory, inspection body, product certification body, management system certification body and personnel certification body. This is an ISO/IEC term and concept.

3.1.5

chartered laboratory

organization chartered by ASCI to evaluate devices under the ISASecure EDSA certification program and to grant certifications

NOTE A chartered laboratory is the conformity assessment body for the ISASecure EDSA program.

3.1.6

CRT laboratory

organization authorized by ASCI to perform EDSA communication robustness testing and submit test evidence to a chartered laboratory toward certification

3.1.7

CRT evidence submission

the set of test evidence for an embedded device submitted by a CRT laboratory to a chartered laboratory on behalf of a device vendor, toward ISASecure EDSA certification

NOTE The requirements for a CRT evidence submission are detailed in Section 6.9 of this document.

3.1.8

embedded device

special purpose device running embedded software designed to directly monitor, control or actuate an industrial process

NOTE Attributes of an embedded device are: no rotating media, limited number of exposed services, programmed through an external interface, embedded OS or firmware equivalent, real-time scheduler, may have an attached control panel, may have a communications interface. Examples are: PLC, field sensor devices, SIS controller, DCS controller.

3.1.9

symbol

graphic affixed or displayed to designate that ISASecure certification has been achieved

NOTE An earlier term for symbol is "mark."

3.2 Abbreviations

The following abbreviations are used in this document.

ASCI	Automation Standards Compliance Institute
ARP	address resolution protocol
BS	Bachelor of Science
CE	computer engineering
CISA	Certified Information Systems Auditor
CISSP	Certified Information Systems Security Professional
CRT	communication robustness testing
CS	computer science
EDSA	embedded device security assurance
FSA	functional security assessment
IACS	industrial automation and control system(s)
IETF	Internet engineering task force
IAF	International Accreditation Forum
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronic Engineers
ILAC	International Laboratory Accreditation Cooperation
ISA	International Society of Automation
ISCI	ISA Security Compliance Institute
ISO	International Organization for Standardization
SDSA	software development security assessment
NA	not applicable

4 Background

4.1 Technical ISASecure EDSA certification elements

The ISASecure EDSA program offers three certification levels for a device, offering increasing levels of device security assurance. Whereas FSA and SDSA criteria differ for these levels, the same CRT pass criteria apply for all levels.

CRT examines the capability of the device to adequately maintain essential services while being subjected to normal and erroneous network protocol traffic at normal to extremely high traffic rates (flood conditions). These tests include specific tests for susceptibility to known network attacks.

In addition to requirements for initial certification, ISASecure EDSA specifies requirements for maintaining certification when a certified device and/or ISASecure criteria are modified, as described in [EDSA-301].

4.2 ISASecure EDSA certification program implementation

ISCI is organized as an interest area within ASCI (Automation Standards Compliance Institute), a not-for-profit 503 (c) (6) corporation owned by ISA. Descriptions of the governance and organizational structure for ASCI are found on the ISASecure website: <http://www.ISASecure.org>.

FSA and SDSA evaluations are conducted directly by a chartered laboratory or its subcontractors. At the option of the device vendor, CRT may be conducted by a CRT laboratory, which is a separate accredited organization that submits CRT evidence to a chartered laboratory upon request of the device vendor.

The lists of ASCI chartered laboratories and CRT laboratories are posted on the ISCI website at <http://www.ISASecure.org>.

The ISASecure EDSA certification program requires the use of test tools for communication robustness testing. These tools are used by chartered laboratories and CRT laboratories to perform CRT and by device vendors in preparation for certification. Test tools must be evaluated for consistency and fairness to ensure that they are appropriate for use by ISASecure test laboratories. ISCI operates a test tool recognition program to support these objectives. The program is described in document [EDSA-201].

5 Summary of operations and accreditation requirements

ISASecure EDSA will operate as an internationally recognized certification program. To meet this standard, the CRT laboratory operations and accreditation requirements are designed to support program compliance with accepted international standards for product certification and testing.

The operations of ISASecure EDSA chartered test laboratories shall be in compliance with the applicable requirements in:

- ASCI Chartered Testing Laboratory 2009 Approval Process [ASCI Lab]
- ISO/IEC 17025 [ISO/IEC 17025]

The first document applies to ISCI (and all interest area groups that are organized under ASCI). The second document is an international standard that applies generally to organizations that perform testing.

This document organizes the requirements from the above documents into a unified set of categories. Where required, it interprets those requirements for ISASecure EDSA and adds additional requirements. Of particular note are interpretations for:

- Qualifications for CRT laboratory personnel (6.3.2);
- Requirements on the CRT application process (6.6.2); and
- Complaint appeals (6.5.2).

Accreditation of a CRT laboratory consists of an assessment of the organization against the general requirements in the above documents and the specific requirements in Section 6 of this document, together with an assessment of technical readiness for performing ISASecure EDSA CRT as described in 7.2. Technical readiness assessment is based upon review of laboratory processes and procedures as well as review of artifacts from CRT as carried out by the laboratory on a device. To be recognized as a CRT laboratory for the ISASecure EDSA program, a laboratory shall attain the following accreditation, performed by an IAF/ILAC accreditation body:

- Accredited to ISO/IEC 17025, with technology scope of accreditation covering testing to ISASecure EDSA CRT specifications

Once an organization has attained CRT laboratory status, ASCI grants this organization the right to:

- Execute CRT on embedded devices on ASCI's behalf
- Submit test evidence to any chartered laboratory toward initial certification of a device
- Submit test evidence to any chartered laboratory toward maintenance of certification for a revised device.

NOTE The same requirements apply to the CRT laboratory whether testing toward an initial or subsequent certification of a device.

The following functions are always performed by chartered laboratories and thus are not part of the role of a CRT laboratory:

- Assessment as to whether new CRT tests are required for a new device version, where a prior version was previously tested or certified
- Interpretation of CRT results as pass/fail relative to ISASecure requirements
- Granting of ISASecure certifications.

6 Requirements on operations of CRT laboratories

6.1 Overview

This section specifies all requirements on the operation of CRT laboratories. It provides specific interpretations for some of the general requirements in the source references listed in Section 5, and defines additional requirements that are specific to the ISASecure EDSA program. It should be noted that there are duplicate requirements as well as unique requirement contributions in [ISO/IEC 17025] and [ASCI Lab].

The requirements on laboratory operations listed in [ASCI Lab] apply to CRT laboratories as specified in this document. However, the application process described in [ASCI Lab] is not used for ISASecure EDSA CRT laboratories. A candidate organization CRT laboratory status shall follow the application process in [EDSA-207] in order to apply to ASCI for CRT laboratory status, and in addition shall follow the application process specified by the ISO/IEC 17025 accreditation body.

6.2 Management system elements

6.2.1 General requirements

The following requirements shall be implemented by a CRT laboratory. The CRT laboratory may subcontract as defined in these requirements.

- ✓ *ASCI Chartered Testing Laboratory 2009 Approval Process I. Capability E. Quality Assurance and F. Records, also III Independence*, with the following modifications:
 - References to “ACTL” are replaced by “CRT Laboratory”
 - References to “certification” in Section F. item 3 are replaced by “test”
 - In Section III, “products that an ACTL must certify” is replaced by “products that a CRT laboratory tests”
- ✓ ISO/IEC 17025 Section 4

6.2.2 ISASecure EDSA specific requirements

The CRT laboratory shall consider all information regarding planned test activity, progress or results as confidential unless otherwise stated by the customer. In particular, neither ASCI, ISCI nor a chartered laboratory shall have access this information, except by permission of the device vendor.

The requirement 4.1.4 of ISO/IEC 17025 regarding conflicts of interest, shall be interpreted to mean that:

- No representations shall be made that compliance with advice or consulting services provided by the CRT laboratory organization guarantees passing of the ISASecure CRT certification element.

- No representations shall be made that the submission of CRT results to a chartered laboratory that in the opinion of the CRT laboratory indicate a test pass, guarantees passing of the ISASecure certification element.

The requirement in 4.2.1 of ISO/IEC 17025 for adequate documentation of procedures instructions, etc. shall be interpreted as follows for CRT: Laboratory documentation that provides guidance for CRT shall provide sufficient detail to ensure compliance with the requirements of [EDSA-310] and of the protocol-specific CRT specifications, when used in conjunction with a recognized CRT tool.

A CRT laboratory shall comply with [EDSA-204] regarding its use of the ISASecure symbol to represent its own status as an accredited CRT laboratory under the ISASecure EDSA program. Per the required contract verbiage defined in Section 6.6.2, the CRT lab’s clients may not use the ISASecure symbol solely based upon the CRT lab activities. A device vendor may only use this symbol if they receive an ISASecure certification from a chartered laboratory.

6.3 Personnel

6.3.1 General requirements

Chartered laboratory procedures shall address the general requirements as specified in:

- ✓ *ASCI Chartered Testing Laboratory 2009 Approval Process Section I. Capability G. Personnel*
- ✓ ISO/IEC 17025 Section 5.2

6.3.2 ISASecure EDSA specific requirements

A CRT laboratory shall require at a minimum the qualifications specified in Table 1 for individuals that oversee the technical aspects of CRT testing, and that oversee the judgment that test evidence meets technical requirements for submission toward ISASecure certification:

Table 1 - CRT tester qualifications

Category of qualification / experience	CRT tester
Formal education	<ul style="list-style-type: none"> • BS Electrical Engineering OR • BS Computer Engineering OR • BS Computer Science OR • BS Chemical Engineering with CE or CS minor OR • Equivalent science or engineering degree OR • 4 years work experience in testing of IACS may be substituted for degree
Work experience post BS degree	<ul style="list-style-type: none"> • Min 5 years experience
Relevant development work experience	<ul style="list-style-type: none"> • Min 4 year detailed system level product development involvement for IACS OR • Min 4 years of Systems Integration experience for IACS OR • Min 3 years System Level Product Test for IACS • Experience includes 1 year with software security-related responsibilities • Experience includes 2 years involvement with networking technologies
Relevant test work experience	<ul style="list-style-type: none"> • Min 1 year experience performing testing on IACS
Relevant industry specific knowledge	<ul style="list-style-type: none"> • Successful completion of training class or 1 year experience in job demonstrating proficiency with CRT tool to be used AND • General knowledge of at least two different IACS OR detailed knowledge of one

Category of qualification / experience	CRT tester
	IACS AND <ul style="list-style-type: none"> • Moderate level knowledge of networking and communication protocols AND • Able to independently read and understand user installation and configuration documents for IACS Products AND • Knowledge of methods used to protect communications and detect / prevent communication attacks
Knowledge of security standards	ISA S99 Standard plus at least one of: <ul style="list-style-type: none"> • Common Criteria • ISO/IEC 27001

6.4 Changes to certification requirements

6.4.1 General requirements

- ✓ None

6.4.2 ISASecure EDSA specific requirements

For ISASecure, changes in technical CRT requirements may be initiated by ISCI. The CRT laboratory shall have a process for keeping its test program up-to-date.

6.5 Appeals, complaints and disputes

6.5.1 General requirements

CRT laboratory procedures shall address the requirements as specified in

- ✓ *ASCI Chartered Testing Laboratory 2009 Approval Process Section IV. Report and Complaint Procedures B. Complaints*
- ✓ ISO/IEC 17025 Section 4.8

6.5.2 ISASecure EDSA specific requirements

The published CRT laboratory procedure for handling complaints shall include the provision that complaints may be appealed to ISCI by the party bringing the complaint, if the internal laboratory resolution procedure does not offer a resolution satisfactory to them. Appealed complaints first go to the ISCI Technical Steering Committee. They may be further appealed to the ISCI governing board, then to ASCI board of directors.

A CRT laboratory shall be responsible for the resolution of complaints related to any aspect of CRT for a device it has tested that has not been evaluated by a chartered laboratory under the ISASecure CRT element as of the time of the complaint. It shall be responsible for cooperating fully with the responsible chartered laboratory regarding complaints related to compliance with CRT where the chartered laboratory has performed or is performing a CRT evaluation based upon CRT evidence from the CRT laboratory as of the time of the complaint.

If a device vendor reports a complaint to a chartered laboratory that relates to CRT requirements, where CRT was performed by a CRT laboratory, then the chartered laboratory shall inform the CRT laboratory of this complaint.

An appealed complaint may request a ruling on whether the ISASecure specifications were correctly applied in a specific instance. Such a complaint shall not be escalated to the ASCI board of directors, but is resolved within ISCI. This ruling could impact:

- Whether or not CRT was determined to pass by the chartered laboratory based upon the CRT laboratory evidence
- Adequacy of the CRT process as performed by the CRT laboratory.

ISCI or ASCI does not accept applications for certification or CRT test or test evidence, nor does it process, grant or revoke certifications. A CRT laboratory accepts applications for testing to ISASecure EDSA CRT and submits test evidence to a chartered laboratory at request of a device vendor. A chartered laboratory accepts applications for certification from device vendors and CRT evidence from CRT laboratories. It grants or revokes certifications. ISCI can assist in interpretation of the ISASecure EDSA specifications toward these ends.

6.6 Application for CRT testing

6.6.1 General requirements

The CRT laboratory procedures shall address the requirements as specified in:

- ✓ *ASCI Chartered Testing Laboratory 2009 Approval Process Section I. Capability C. Testing, evaluation and processing, item C7*, where the term “certification” is replaced by “testing.”
- ✓ ISO/IEC 17025 Section 4.4, Contract Review of Testing Services

6.6.2 ISASecure EDSA specific requirements

The ISASecure specification [EDSA-300] contains requirements that device vendors must meet in order to apply for ISASecure EDSA certification for a device. That document is intended as a reference for vendors applying for certification of a device. Although an applicant for CRT testing is not by that action applying for an ISASecure certification, there are supporting requirements when applying for CRT testing if evidence from those tests is to be submitted toward ISASecure EDSA certification.

- Items specified as follows SHALL be submitted to the CRT test lab by an applicant for CRT test:
 - a) technical items as required by the CRT specifications listed in Clause 2 of [EDSA-300]; and
 - b) administrative and potentially additional technical items defined by the CRT laboratory.

Note that the items under a) above that apply for CRT will ultimately be submitted to both the CRT laboratory and the chartered laboratory that will receive the test evidence.

The following terms SHALL be part of the agreement between a CRT laboratory and its customer:

- The device vendor acknowledges its understanding that that in order to apply CRT evidence performed by a CRT laboratory to an ISASecure EDSA certification, either (1) this testing must have been performed on the same device version as will be evaluated by the chartered laboratory for FSA and SDSA or (2) the chartered laboratory accepts testing on the prior version based upon its assessment of device changes in accordance with [EDSA-301].
- The device vendor SHALL NOT represent a device that in the opinion of a CRT laboratory has passed CRT, as an ISASecure certified or partially certified device, nor use the ISASecure symbol or terminology in any manner in connection with that device, unless certification has been granted by an accredited ISASecure EDSA chartered laboratory.

6.7 Preparation for evaluation/testing

6.7.1 General requirements

CRT laboratory procedures shall address the requirements as specified in:

- ✓ *ASCI Chartered Testing Laboratory 2009 Approval Process Section I. Capability C. Testing, evaluation and processing, item C8, where the term “certification” is replaced by “testing.”*
- ✓ ISO/IEC 17025 Section 4.4

6.7.2 ISASecure EDSA specific requirements

None.

6.8 Evaluation

6.8.1 General requirements

Chartered laboratory procedures shall address the requirements as specified in:

- ✓ *ASCI Chartered Testing Laboratory 2009 Approval Process Section I. Capability A. Testing facilities, B. Testing equipment and C. Testing, evaluation and processing procedures, except for C7-C8, and where the term “certification” is removed from C6.*
- ✓ ISO/IEC 17025 Section 5 – Technical Requirements

6.8.2 ISASecure EDSA specific requirements

6.8.2.1 General

CRT test for an embedded device shall be carried out in accordance with all technical specifications for CRT as listed in Clause 2 of [EDSA-300]. In particular, test evidence must cover all CRT tests executed on the same device version.

[EDSA-200] defines complementary requirements allocated to the chartered laboratory that are related to the CRT component of an ISASecure EDSA certification, for the case when CRT has been performed by a CRT laboratory.

6.8.2.2 CRT methods and tools

The evaluation and testing process shall use an ISCI recognized test tool for CRT. The process for recognition of test tools is defined in [EDSA-201]. The CRT laboratory shall verify that the software version and hash of the tool software is as specified for the recognized tool on the ISASecure web site at <http://www.ISASecure.org>.

The CRT laboratory shall have a procedure to verify identical device configurations as required by [EDSA-310], if it carries out portions of CRT on different physical devices.

ISO/IEC 17025 5.4.2 on selection of test methods, specifies using the latest version of the standards upon which tests are based. The latest versions of ISASecure specifications shall be identified on the ISASecure web site.

ISO/IEC 17025 5.4.4 and 5.4.5 discuss the definition of procedures for and validation of non-standard test methods. The test methods and criteria for monitoring upward essential services for CRT are non-standard test methods that are agreed with each test applicant before the start of CRT. They are subject to the requirements in these ISO/IEC 17025 sub clauses.

ISO/IEC 17025 5.5 on the topic of accuracy, appropriate use, maintenance and calibration specifically applies to the CRT test tool, in particular the functional component of this tool that measures jitter.

6.8.2.3 Interface with chartered laboratory

After a CRT laboratory performs a CRT for a device, then at the request of the device vendor, the CRT laboratory shall submit test evidence as described in 6.9 to a chartered laboratory selected by the vendor.

Note that such evidence is accepted from a recognized CRT laboratory only and not directly from the device vendor.

The CRT laboratory shall cooperate with the chartered laboratory to resolve any issues related to the conformance of the CRT evidence with the ISASecure EDSA requirements.

There are some tests in Clause 7 of the CRT test specifications for individual protocols, where the “Result” is NOT designated as simply pass/fail. Some of these tests require vendor documentation of risks depending upon the result of the test. The CRT laboratory shall assess whether this documentation is present if required, and note in its test evidence submission whether it is present and where it is found.

6.9 CRT evidence submission

6.9.1 General requirements

The term “CRT evidence submission” refers to the set of test evidence for an embedded device submitted by a CRT laboratory to a chartered laboratory on behalf of a device vendor, toward an ISASecure EDSA certification. The CRT laboratory shall meet the following test report requirements for CRT evidence submissions:

- ✓ *ASCI Chartered Testing Laboratory 2009 Approval Process Section IV Reports and Complaint Procedures, A. Reports.*
- ✓ ISO/IEC 17025 Section 5.10 – Testing Report

6.9.2 ISASecure EDSA specific requirements

Upon request of a device vendor, a CRT evidence submission for this device shall be provided to a chartered laboratory selected by the vendor. The device vendor shall also receive a copy of the CRT evidence submission.

A CRT evidence submission shall:

- Include all submissions by the device vendor to the CRT laboratory and agreements reached with the CRT laboratory described in the [EDSA-310] sections noted:
 - 6.3 Testing parameters related to device essential services
 - 6.5 Device descriptive information
- Include the information in the following sections of the ISASecure EDSA sample report [EDSA-303]
 - 3.1 Products Included in Evaluation
 - 3.3 Accessible Interfaces
- Include a list of the accessible interfaces that were tested
- Meet the requirements on CRT reporting in all technical specifications for CRT as listed in Clause 2 of [EDSA-300]
- Include a list any test requirements for CRT that were not met by the CRT laboratory
- Provide an opinion as to whether the device passes CRT based on the evaluation performed and the CRT pass criteria defined in [EDSA-310] for initial CRT (regardless of whether this is actually an initial test or a test of a later version of a previously certified product).

A vendor would typically request a CRT evidence submission to a chartered laboratory only after the CRT laboratory had rendered the opinion that the tests had passed. However, a device vendor may request a test

evidence submission to a chartered laboratory where the CRT laboratory has not rendered the opinion that this evidence supports a pass.

A CRT laboratory shall cooperate with the chartered laboratory to deliver a CRT evidence submission in a convenient format. Specifically, the format should allow incorporation of this information into the chartered laboratory's complete certification report that shall meet program requirements for delivery of this report to its client.

7 Accreditation of CRT laboratories

7.1 Overview

Accreditation of a CRT laboratory involves an assessment of the organization against the requirements in the following documents, and an assessment of technical readiness for performing ISASecure EDSA CRT evaluations.

- ASCI Chartered Testing Laboratory 2009 Approval Process, to the extent indicated in Section 6 of this document [ASCI Lab]
- ISO/IEC 17025 [ISO/IEC 17025]
- Section 6 this document, all ISASecure specific requirements subsections

Technical readiness assessment is based upon review of documented laboratory processes and procedures as well as review of artifacts from a sample CRT evaluation carried out by the laboratory, as described in Section 7.2. To be recognized as a CRT laboratory for the ISASecure EDSA program, a laboratory shall attain the following accreditation, performed by an IAF/ILAC recognized accreditation body:

- Accredited to ISO/IEC 17025, with technology scope of accreditation covering testing to ISASecure EDSA CRT specifications

The device used for the technical readiness assessment can be an example performed before the laboratory has received the above accreditation, or the first device tested by the laboratory after receiving this accreditation. In the later case the evidence used in the technical readiness assessment may result in an actual CRT evidence submission.

7.2 Technical readiness assessment

The technical readiness assessment for CRT consists of assessment of evidence supplied by the candidate laboratory per the evaluation criteria in Table 2. The requirements numbered UDP.Rnn in this table are from [EDSA-405]. The requirements numbered CRT.Rnn are from [EDSA-310].

Table 2 - Evidence for technical readiness

ID	Evidence supplied by candidate laboratory	Evaluation criteria
1	Laboratory statement of test tools and versions in use for CRT, description of robustness testing methodology	<ul style="list-style-type: none"> • CRT tool and version for robustness test is recognized by ISCI • Appropriate tool is in place for interface surface test • Robustness testing methodology complies with UDP.R6,

ID	Evidence supplied by candidate laboratory	Evaluation criteria
		UDP.R8, UDP.R10 and similar requirements for other protocols
2	CRT processes/procedures	<ul style="list-style-type: none"> • Comply with coverage of various phases of testing per CRT.R50 • Comply with CRT.R2 on how protocols for test are selected; CRT.R3 on test order; CRT.R5 on criteria for pass; and CRT.R6 on use of multiple DUTs; • Comply with CRT.R25 on documentation and reporting of discussions with customers on anomalies; CRT.R26 on reporting conditional branches of test execution; • Comply with set up procedure for interface surface test per CRT.R29-31; and for individual protocol tests • Comply with CRT.R39 regarding requirement for TD measurement jitter relative to device cycle time and monitoring coverage for various device outputs • Comply with CRT.R51 on handling of redundant configuration devices • Comply with interface surface test requirements CRT.R32-37 and CRT.R41 • Comply with CRT.R59 regarding mixing types of PDUs • Comply with CRT.R60 for how pass of CRT is defined • Comply with CRT.R61 regarding repeating failures before giving failed status • Comply with CRT.R63 for setting pseudo random seed value if used • Instructions for CRT report creation comply with Section 6.9.2 of this document
3	Mapping that maps each interface surface test requirement in [EDSA-310] Sections 8.1-8.5 to a portion of a test procedure	<ul style="list-style-type: none"> • Mapping is complete and accurate
4	Mapping that maps each table in Section 7 of each CRT protocol-specific specification to a portion of test procedure	<ul style="list-style-type: none"> • Mapping is complete and accurate
5	Application form and instructions to be given to vendors submitting devices	<ul style="list-style-type: none"> • Application requests all items required per [EDSA-310] Section 6

ID	Evidence supplied by candidate laboratory	Evaluation criteria
		<ul style="list-style-type: none"> • Application requests information about proprietary protocol extensions per UDP.R4 and parallel requirements for other protocols
6	<p>Intermediate artifacts, paperwork and CRT evidence submission for an ISCI-designated sample device. Artifacts include procedure for non-standard tests created for the sample device to monitor upward essential services per ISO/IEC 17025 5.4.4 and validation of these tests per 5.4.5.</p>	<ul style="list-style-type: none"> • Results of interface surface test are as expected and indicate compliance with procedures • Results of robustness tests are as expected and indicate compliance with procedures • Report of test configurations for tests meet requirements CRT.R29-31 and CRT.R48-49 in appropriate protocol tests • Records of control signal generated for testing meet requirements of CRT.R39 • Check for reporting of pseudo random seed value per CRT.R63 • Artifacts that describe test method to monitor upward essential services comply with CRT.R40 • CRT evidence submission meets requirements per Section 6.9 of this document • Evaluation report complies with UDP.R12 and similar requirements for other protocols regarding protocol layers used for testing. • Evidence meets [ASCI Lab] IV.A.1, I.C.1, I.C.2
7	<p>Evidence demonstrating that interface surface test result and robustness test result requested by ISCI can be reproduced based on information in evaluation report; document steps used to reproduce these</p>	<ul style="list-style-type: none"> • Verify that steps for creation of reproduced result required only information in the CRT evidence submission; and that results are same as initial results
8	Chartered laboratory interface	<ul style="list-style-type: none"> • Verify that the requirements in 6.8.2.3 are reflected in the CRT laboratory processes and procedures.

Annex A Mapping from sources for general requirements to this document

In this section we show the coverage of the 17025 international standard, and the ASCI chartered laboratory process, as called out in this document. Each mapping table is preceded by a summary statement regarding the coverage shown by that mapping.

A.1 ISO/IEC 17025 coverage

All requirements in ISO/IEC 17025 are referenced in this document. As shown in Table 3, the requirements clauses 4 and 5 of ISO/IEC 17025 are called out in their entirety in this document, respectively in 6.2 which covers management elements and in 6.8 which covers evaluation. In addition, some sub clauses of those clauses are called out in more specific sections as shown below.

Table 3 - Mapping from ISO/IEC 17025 to this document

	Reference in ISO/IEC 17025 document	Reference this document
4.	4. Management requirements	6.2
4.1	4.1 Organization	6.2
4.2	4.2 Management system	6.2
4.3	4.3 Document control	6.2
4.4	4.4 Review of requests, tenders and contracts	6.6, 6.7
4.5	4.5 Subcontracting	6.2
4.6	4.6 Purchasing	6.2
4.7	4.7 Service to clients	6.2
4.8	4.8 Complaints	6.5
4.9	4.9 Control of nonconforming work	6.2
4.10	4.10 Improvement	6.2
4.11	Corrective action	6.2
4.12	Preventive action	6.2
4.13	Control of records	6.2
4.14	Internal audit	6.2
4.15	Management review	6.2
5.	Technical	6.8
5.1	General	6.8
5.2	Personnel	6.3
5.3	Accommodation and environmental conditions	6.8
5.4	Test and calibration methods and method validation	6.8
5.5	Equipment	6.8
5.6	Measurement traceability	6.8
5.7	Sampling	6.8
5.8	Handling of test and calibration items	6.8
5.9	Assuring the quality of test and calibration results	6.8
5.10	Reporting the results	6.9

A.2 ASCI Chartered Testing Laboratory 2009 Approval Process coverage

As shown in Table 4, all sections of the ASCI Chartered Testing Laboratory 2009 Approval Process are called out as requirements in this document, with the exception of II.B Follow up and field inspections and I.D. Calibration Program, which do not apply to the ISASecure EDSA program, and II.A Control Programs – Listing and Labeling, which does not apply to CRT laboratories.

Table 4 - Mapping from ASCI Chartered Testing Laboratory 2009 Approval Process to this document

	Reference in ASCI Chartered Testing Laboratory 2009 Approval Process document	Reference this document	Comments
I.A.	Capability - Testing Facilities	6.8	
I.B.	Capability - Test Equipment	6.8	
I.C.	Capability - Testing, Evaluation and Processing Procedures	6.8	Except C7 and C8
I.C 7	Capability - Testing, Evaluation and Processing Procedures C7	6.6	
I.C.8	Capability - Testing, Evaluation and Processing Procedures C8	6.7	
I.D.	Capability - Calibration Program		No application seen for ISASecure EDSA.
I.E.	Capability - Quality Assurance	6.2	
I.F.	Capability - Records (including Specifications Library)	6.2	
I.G.	Capability - Personnel	6.3	
II.A.	Control Programs - Listing and Labeling		Not applicable to CRT laboratory - requirements regarding certification mark on products
II.B.	Control Programs - Follow up and Field Inspections		Not applicable to program. The initial assessment of the manufacturer (device vendor) described in this section is superseded by the SDSA done by a chartered laboratory.
III.	Independence	6.2	
IV.A.	Report and Complaint Procedures - Reports	6.9	
IV.B	Report and Complaint Procedures - Complaints	6.4	