

Authorized Test Lab Requirements

Version 3.1.04

2026-11-04

[LABREQS]

Copyright © 2012 - 2026 NFC Forum

Contents

1 Introduction 1
1.1 Background 1
1.2 Objective 1
1.3 References 1
1.3.1 Normative References 1
1.3.2 Informative References 2
1.4 Glossary 2
1.5 Administration 2
1.6 Special Word Usage 3

2 Application Process 4
2.1 Submission 4
2.2 Fees 4

3 Authorized Test Lab Requirements 5
3.1 Business Requirements 5
3.1.1 NFC Forum Membership 5
3.1.2 NFC Forum Member Meeting Attendance 5
3.1.3 Compliance with NFC Forum Specifications and Policy 5
3.1.4 Insurance Coverage 6
3.1.5 Lab Accreditation 6
3.1.6 Lab Facilities 6
3.1.7 Certification Testing 6
3.1.8 Surveys 6
3.2 Capabilities Requirements 6
3.2.1 Test Tools 6
3.2.2 Test Plan Generation 7
3.2.3 Disclosure of Test Results 7
3.2.4 Analog Requirements 7
3.2.5 Certification Release and Device Class Requirements 7
3.3 Administrative Requirements 8
3.3.1 Laboratory Authorization 8
3.3.2 Listing 10
3.3.3 Laboratory Authorization Renewal 10
3.3.4 Remediation 11
3.3.5 Revocation 11
3.3.6 Delisting 11

4 Inter-Lab Comparison Test (ILCT) Requirements 12
4.1 Preparation 12
4.2 ILCT 12
4.3 Issues Resolutions 13
4.4 Re-evaluation of the Test Results 13
4.5 Cooperation Termination 14
4.6 Tolerances 14

A. Requirements Summary 15

B. Required ISO/IEC 17025:2017 Clauses for First-Party ATLs 17

C. Required ISO/IEC 17025:2017 Clauses for Third-Party ATLs 18

D. General Requirements 23

D.1.1 Digital Protocol Testing 23
D.1.2 Type 2/3/4/5 Tag Testing 24
D.1.3 Logical Link Layer Control Protocol (LLCP) Testing 24
D.1.4 Simple NDEF Exchange Protocol Testing 25
D.1.5 Analog Testing 25
D.1.6 Tag Performance Testing 26
D.1.7 Wireless Charging Testing 27
D.1.8 Wireless charging Analog Testing 27
D.1.9 Wireless Charging Digital and Application Testing 28

E. Inter-Lab Comparison Testing Procedure 29

E.1.1 Requirements 29
E.1.2 General Rules 29
E.1.3 Process 29
E.1.4 Positioning System Verification 29
E.1.5 Reference Equipment Verification 29
E.1.6 Reference Measurements 30
E.1.7 Discrepancies resolution 31

F. Revision History 32

Tables

Table 1: Requirements Summary 16
Table 2: ISO/IEC 17025:2017 Clauses for First-party ATLs 17
Table 3: ISO/IEC 17025:2017 Clauses for Third Party ATLs 22
Table 4: Analog Tool ILCT Test Cases and Tolerances 30
Table 5 WLC Analog Tool ILCT Test Cases and ILCT Tolerances 31
Table 6: Revision History 32

1 Introduction

1.1 Background

The NFC Forum was formed to advance the use of Near Field Communication technology by developing specifications, ensuring interoperability among devices and services, and educating the market about NFC technology.

The NFC Forum Certification Program confirms that a device is compliant with NFC Forum specifications. Conformance to the specifications provides consistency of behavior across NFC implementations and sets the foundation for interoperability. The [CERT_POL] defines the policies that govern the operation of the NFC Forum Certification Program, including what can be certified, what it means to be certified, and the process for achieving and maintaining certification.

1.2 Objective

This document is intended for candidate and existing NFC Forum Test Laboratories (Test Labs) and sets forth the requirements that SHALL be satisfied in order to qualify for and maintain NFC Forum authorization. This document, in conjunction with the [CERT_POL], constitutes the set of requirements and obligations for Authorized Test Labs.

1.3 References

1.3.1 Normative References

[ANALOG]	Analog Technical Specification, Applicable version as identified by a Certification Release, NFC Forum
[DEVREQ]	Devices Requirements, Applicable version as identified by a Certification Release, NFC Forum
[CERT_POL]	Certification Policy Applicable version as identified by Compliance Program, NFC Forum
[ISO/IEC_17025:2017]	ISO/IEC 17025 General requirements for the competence of testing and calibration laboratories 2017 ISO/IEC
[RFC2119]	Key words for use in RFCs to Indicate Requirement Levels, RFC 2119, S. Bradner, March 1997, Internet Engineering Task Force
[TPG]	Test Plan Generator (https://nfc-forum-itp.com) NFC Forum

[TCCL] NFC Forum Test Case Category List
Applicable version as identified by a Certification Release,
NFC Forum

[TLATCLA] Test Lab Authorization And Test Case License Agreement
Applicable version as identified by Compliance Program,
NFC Forum

[TC_ANA] Test Cases for Analog
Applicable version as identified by Compliance Program,
NFC Forum

[TC_WLC] Test Cases for Wireless Charging
Applicable version as identified by Compliance Program,
NFC Forum

[TLAC] Test Lab Audit Checklist
Applicable version as identified by Compliance Program,
NFC Forum

[WLC] Wireless Charging Technical Specification
Applicable version as identified by Compliance Program,
NFC Forum

1.3.2 Informative References

[GLOSS_CC] Compliance Committee Glossary
Latest version
NFC Forum

[NCIRP] NCIRP (NFC Forum Issue Resolution Panel) Guide,
Latest version of the NCIRP Guide available to NFC Forum members,
NFC Forum

[REVT] Reference Equipment Verification Tests
Latest version of the REVT available to NFC Forum members.
NFC Forum

1.4 Glossary

For definitions of the test case terms see [GLOSS_CC].

1.5 Administration

The Authorized Test LAB Requirements document is supported and maintained by the Near Field Communication Forum, Inc., located at:

401 Edgewater Place, Suite 600
Wakefield, MA, 01880

Tel.: +1 781-876-8955
Fax: +1 781-610-9864

http://www.nfc-forum.org/

Certification Administrator may be contacted at : cert-admin@nfc-forum.org

1.6 Special Word Usage

The key words “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described in [RFC2119]

2 Application Process

To be considered for NFC Forum Authorization, prospective test laboratories (labs) SHALL apply in writing. All application materials and the signed agreement SHALL be submitted in English. The agreement is binding in English even if the agreement was translated and reviewed in another language. All other documentation provided to the NFC Forum in a language other than English SHALL be accompanied by a certified English translation (for example, accreditation certificates or proof of insurance).

2.1 Submission

All application packages SHALL include a signed agreement and all other documentation. All application materials SHALL be submitted electronically. Applicants should submit their request to Certification Administrator.

2.2 Fees

The NFC Forum reserves the right to charge, introduce or change a fee of its choosing, as described in [TLATCLA].

- **Application and Annual Fees**

At this time, there is no application or annual lab fees payable, but all authorized labs must be NFC Forum members in good standing – see Section 3.1.1- NFC Forum Membership.

- **Testing Service Fees**

In addition to any obligations arising from its status as an NFC Forum member, a Test Lab is required to sign the "NFC Forum Test Lab Authorization And Test Case License Agreement" to record, report and pay to the NFC Forum testing service fees. This "NFC Forum Test Lab Authorization And Test Case License Agreement" is available on demand to laboratories interested in becoming an Authorized Test Lab, by sending a request to Certification Administrator.

3 Authorized Test Lab Requirements

An NFC Forum Authorized Test Lab (ATL) is a laboratory that has satisfied and continues to satisfy all requirements set for in the [CERT_POL] and these Authorized Test Lab Requirements, and is thereby authorized to provide certification testing services to product manufacturers.

3.1 Business Requirements

3.1.1 NFC Forum Membership

All Test Labs that perform Certification Testing for NFC Forum Certification SHALL be members of the NFC Forum (as defined in the NFC Forum By-laws and described below). Membership and all associated fees SHALL be current.

The NFC Forum has two types of ATLs:

- **First-party Test Labs**. In-house test facilities owned and controlled by the manufacturer of the products being tested. This includes products that are manufactured and/or that are assembled to implement NFC Forum Specifications by or for the member company or any of its other subsidiaries, all of which may be tested by the affiliated First-party Test Lab. A First-party Test Lab SHALL be a Sponsor or Principal member of NFC Forum.
- **Third-party Test Labs**. Independent laboratories that provide testing services to manufacturers for the purpose of verifying that implementations conform to the NFC Forum specifications. A Third-party Test Lab SHALL be an NFC Forum member at the Associate level or higher.

3.1.2 NFC Forum Member Meeting Attendance

All Test Labs SHALL be contributing members of NFC Forum and attend NFC Forum meetings.

- Test Labs initially applying to become an ATL SHALL have attended the preceding two (2) NFC Forum face-to-face member meetings. Applications will be considered after the Test Labs have attended the second consecutive NFC Forum face-to-face member meeting.
- In order to retain the NFC Forum Authorized status, all Test Labs are required to attend two (2) NFC Forum lab webinar sessions annually and at least one (1) face-to-face member meeting every 24 months participating in the Compliance Committee sessions.
- Any Test Lab missing two (2) consecutive NFC Forum lab webinar sessions SHALL lose their ATL status.
- A single representative who SHALL be ATL technical personnel and irrespective of other responsibilities can represent all labs within its company membership, at the NFC Forum members' meetings. A webinar meeting attendance requirement SHALL be done by all affiliate Labs, however.

3.1.3 Compliance with NFC Forum Specifications and Policy

The ATL will utilize agreements of its choice with its customers and SHALL be free to establish its own terms and conditions for testing, including pricing, priorities, indemnities, etc., provided that such terms and conditions are not inconsistent with its obligations under the [CERT_POL].

3.1.4 Insurance Coverage

At all times that the Test Lab is listed as an ATL, it will maintain sufficient insurance that the NFC Forum reasonably requests to adequately ensure that the ATL is covered for its obligations and liabilities regarding NFC Forum certification testing, including without limitation its indemnification obligations.

Currently, the NFC Forum requires a minimum of US$1 million per occurrence.

This requirement is not applicable to First-party Labs.

3.1.5 Lab Accreditation

To perform testing for NFC Forum certification:

- Third-party Test Labs SHALL have all the testing scopes corresponding to each Device Class supported within their ISO/IEC_17025:2017 accreditation in accordance with the principles therein.
- First-party Test Labs can have all the testing scopes corresponding to each Device Class supported within their ISO/IEC_17025:2017 accreditation in accordance with the principles therein; or minimally, SHALL follow the principles of ISO/IEC_17025:2017.

In case of addition of new testing scopes for existing ATL, it is acceptable to include them in the next validation cycle.

3.1.6 Lab Facilities

ATLs SHALL provide information as to the Test Lab's location and a description of the Test Lab facilities.

3.1.7 Certification Testing

ATLs SHALL perform certification testing based on [CERT_POL].

3.1.8 Surveys

ATLs will periodically receive requests from the NFC Forum to provide statistical information about products being tested or scheduled for testing, in order to obtain an overall view of market trends and the adoption of NFC technology. Surveys are distributed at a minimum prior to each Member meeting and it is mandatory for all ATLs to complete and submit a response to each survey.

3.2 Capabilities Requirements

This section outlines the technical capabilities that SHALL be supported by a Test Lab.

3.2.1 Test Tools

Use only the validated Test Tools listed at Approved Test Tools or as long as they remain listed. NFC Forum reserves the sole right to add and delete Test Tools from the list and SHALL have no obligation or liability to any Test Lab for deleting a Test Tool from the list after Test Lab has purchased or licensed the same.

Test Labs are required to have a robot as part of their Analog Tool and/or WLC Analog Tool for executing certification testing.

At the time of application, the Test Lab SHALL provide proof of the tools installed for NFC Certification Testing.

3.2.2 Test Plan Generation

ATLs shall use the NFC Forum Test Plan Generation tool (TPG tool) when creating an Implementation Test Plan (ITP) for a DUT. and shall use this test plan as input to the test tool.

3.2.3 Disclosure of Test Results

The ATL SHALL promptly communicate all test results (interim or final, as the case may be) to the IUT manufacturer. Under no circumstances SHALL ATL communicate or disclose to any third party, including to any other manufacturer or other NFC Forum member, any test results including that a IUT has or has not been approved by NFC Forum.

All final certification testing records (e.g., documents submitted by the manufacturer) and test results (e.g., reports generated during the evaluation) SHALL be maintained and made available to NFC Forum upon request for at least three (3) years from the date they are created, (a) provided that NFC Forum SHALL only be entitled to request such records in connection with enforcing or investigating matters relating to the NFC Forum Certification Program or (b) in connection with legal proceedings.

At the time of application, the Test Lab SHALL provide a description of the data retention processes and controls it has put into place.

3.2.4 Analog Requirements

3.2.4.1 Inter-Lab Comparison Testing (ILCT).

Applicants who apply for ATL SHALL participate in Inter-Lab Comparison Testing (ILCT) for accreditation as a pre-condition and then later as accreditation maintenance.

All new Test Labs entering the program are required to successfully complete the ILCT for accreditation before being listed as an ATL.

Upon reasonable notice, and not more often than once every 12 months, the ATLs SHALL participate in ILCT, if requested by the NFC Forum, by performing the ILCT for accreditation maintenance (see Section 4). The NFC Forum will provide the samples, will define the test cases to be run, and will collate the results. Test Labs are responsible for any costs associated with cross-testing. Test Labs need to complete the ILCT exercise for each approved tool they use for Analog and WLC Analog certification testing.

3.2.4.2 Pre-scan service for finding reference position on IUT.

The ICS and IXIT information for the [TPG] SHALL be provided by the applicant. However, if an applicant requests assistance in locating the reference position on the IUT, the ATL should provide pre-scan service to identify the optimal reference position on IUT so that the applicant can define the value for IXIT parameter in the [TPG].

3.2.5 Certification Release and Device Class Requirements

The ATL SHALL support certification testing for at least one Active Certification Release.

The ATL SHALL support certification testing for at least one Device Class.

3.3 Administrative Requirements

This section describes the process followed for Test Lab authorization, including information submission, compliance assessment, and listing, as well as subsequent annual requalification requirements and revocation provisions.

3.3.1 Laboratory Authorization

Information Submission

Test Labs applying for approval as an ATL SHALL ensure that they qualify according to Section 3.1, Business Requirements, and Section 3.3, Capability Requirements, before making a submission to the NFC Forum.

Once a lab deems itself ready:

- Submit a document package to the NFC Forum containing the following:
- For First-party ATL
  - [TLATCLA]
  - ISO/IEC_17025:2017 accreditation certificate including the scope of accreditation, issued by a recognized Accrediting Body, or self-attestation of scope
  - Unambiguous description and layout of Test Lab facilities and equipment
  - Evidence of approved test tool, as listed on the Approved Test Tools, installed at the Test Lab including a valid ISO/IEC_17025:2017 or manufacture calibration report
  - Evidence of a robot as part of the Analog Tool and/or WLC Analog Tool for certification testing including a valid test tool vendor verification report
  - Evidence of participation under the two (2) consecutive NFC Forum face-to-face member meeting based on NFC Forum meeting attendance requirement on Section 3.1.2
- For Third-party ATL
  - [TLATCLA]
  - ISO/IEC_17025:2017 accreditation certificate including the scope of accreditation, issued by a recognized Accrediting Body
  - Evidence of liability insurance as US$1 million per occurrence
  - Unambiguous description and layout of Test Lab facilities and equipment
  - Evidence of approved test tool, as listed on the Approved Test Tools, installed at the Test Lab including a valid ISO/IEC_17025:2017 or manufacture calibration report
  - Evidence of a robot as part of the Analog and/or WLC Analog Tool for certification testing including a valid test tool vendor verification report
  - Evidence of participation under the two (2) consecutive NFC Forum face-to-face member meeting based on NFC Forum meeting attendance requirement on Section 3.1.2
- For GCF (Global Certification Forum) RTO (Recognized Test Organization)
  - Fill the "RTO Test Specification License Agreement" document available by sending a request to the Certification Administrator

- ISO/IEC_17025:2017 accreditation certificate including the scope of accreditation, issued by a recognized Accrediting Body
- Evidence of liability insurance as US$1 million per occurrence
- Unambiguous description and layout of Test Lab facilities and equipment
- Evidence of approved test tool, as listed on the Approved Test Tools, installed at the Test Lab including a valid ISO/IEC_17025:2017 or manufacture calibration report
- Evidence of a robot as part of the Analog Tool for certification testing including a valid test tool vendor verification report

- Provide the contact information for the responsible laboratory person

The NFC Forum SHALL receive a complete application to determine if the Test Lab is ready for ILCT testing (see Section 3.2.4 and [ANALOG] and/or [WLC],) and an on-site audit. Upon approval of the application package, scheduling for the ILCT testing and on-site audit will occur.

Compliance Assessment

ATLs or applicants for NFC Forum authorized status SHALL permit an auditor authorized by NFC Forum (see list of Qualified Auditors) to assess the laboratory's compliance with [CERT_POL]. The Authorized Test Lab Requirements provides high level requirements, while the Test Lab Audit Checklist [TLAC] provides a detailed list of items for the audit.

Audits must be conducted and audit packages submitted to the NFC Forum prior to initial authorization as an ATL, and then every 24 months thereafter. The ATL is responsible for all costs associated with the assessment (audit fee, travel expenses, travel time, and any additional assessor hours) and will be invoiced directly by the Auditor. The NFC Forum Auditor may request an initial payment prior to scheduling an onsite audit, while the remaining amount that is owed will become payable upon completion of the audit. The NFC Forum will withhold initial Test Lab authorization or requalification until all monies associated with the Test Lab are paid to the auditor.

The NFC Forum will, as a courtesy, notify the Test Lab when an audit is required. The Test Labs are responsible for contacting a Qualified Auditor and requesting an assessment. The auditor will contact the Test Lab to schedule the audit on a mutually agreed date(s). The auditors will also request from the Test Lab all NFC-specific processes, organization charts, and equipment lists for their review prior to the visit.

The auditor will send a checklist that will be used during the assessment for review by the Test Lab. This checklist is a working copy of the [TLAC] questions based on requirements in this document. The Test Lab will be requested to fill in applicable references on the checklist to aid the assessor during their review. The auditor will conduct the assessment, completing their checklists and noting any deficiencies. The auditor will provide a list of any deficiencies observed as well as copies of the completed [TLAC] during the closeout meeting at completion of the audit.

The Test Lab will address any deficiencies using their corrective action processes. The Test Lab SHALL respond back to the auditor within thirty (30) calendar days, and SHALL, at a minimum, list the plans for all required corrective actions. The Test Lab has a further sixty (60) calendar days to complete and close all corrective actions so that the auditor can submit the assessment package to the NFC Forum. Failure to do so may result in removal of "Authorized Test Lab" status or withholding of authorization in the case of a new Test Lab applicant, until all actions are complete.

The assessment package will only be seen by the NFC Forum staff and will not be made available to the general membership to avoid any conflict of interest or confidentiality issues.

Regarding the first audit, it SHALL be required 3 days audit and later on from second audit, if there is not any change from test engineer, tool, facility, it SHALL not be exceeded 1.5 days.

3.3.2 Listing

Once the Test Lab has met all the requirements as specified in this document, the Test Lab will be added to the NFC Forum Authorized Test Laboratory list at Authorized Test Labs. Once listed, the laboratory will be allowed to perform NFC Forum certification testing.

The following contact information SHALL be provided to the NFC Forum.

- Name
- Title
- Address
- Phone number
- Fax number
- Email address

For Third-party ATLs, provide the requested information for the Technical Manager, the primary business contact, and the commercial contact. For First-party ATLs, only provide the Technical Manager information.

The commercial contact information will be posted on the NFC Forum Authorized Test Laboratory List, available at Authorized Test Labs. The laboratory is responsible for ensuring that all contact information is current and SHALL notify the NFC Forum of any changes.

3.3.3 Laboratory Authorization Renewal

All Test Labs SHALL re-qualify on an annual basis, based on the original re-qualification date.

The authorization renewal SHALL be based on proof of accreditation, insurance coverage, member in good standing, and feedback from audit assessments. All ATL SHALL provide following required documents for Authorization renewal application.

- The latest version of ISO17025 certificate for Third-party ATL and GCF RTO.
- The latest version of insurance certificate for Third-party ATL and GCF RTO.
- The latest version of audit report for First-party and Third-party ATL and GCF RTO.

- The NFC Forum will ask for the execution of an ILCT no more frequently than every 12 months. The ILCT tests SHALL be performed and a copy of comparison tests report SHALL be sent to the NFC Forum (NCIRP chair).

The requalification paperwork SHALL be received no later than thirty (30) days from the expiry date of the current listing. The Test Lab will be automatically delisted thirty (30) days after the expiry date if all applicable paperwork has not been submitted.

When the Laboratory fails to meet the requirements in sections 3.1.2, 3.3.1 and 3.3.3, the Laboratory will lose ATL accreditation status.

NFC Forum will notify the Test Labs either of the remediation or the revocation.

3.3.4 Remediation

When a Test Lab fails to meet the requirements specified in the NFC Forum Certification Program, it may be put in remediation.

During remediation, Test Labs are permitted to perform NFC Forum Certification testing. As part of remediation, the Test Lab SHALL submit a plan acceptable to the NFC Forum detailing how the Test Lab plans to address the violations within fourteen (14) days of being notified and respond with a twelve (12)-week plan to again fulfill all of the requirements. The Test Lab will be revoked (see 3.3.5) if it fails to fulfill all requirements within twelve (12) weeks. The NFC Forum may also require the Test Lab to undergo an audit of their NFC Forum Certification testing services, at the sole expense of the Test Lab.

3.3.5 Revocation

The NFC Forum reserves the right to revoke the NFC Forum Authorized Test Laboratory status if the NFC Forum determines that the Test Lab is not performing NFC Forum Certification testing in accordance with the requirements of the NFC Forum Certification Program.

The NFC Forum will notify the Test Lab of the violations attributed to the revocation.

The revoked Test Lab may appeal the revocation but SHALL meet all qualification requirements prior to reinstatement.

A Test Lab may apply to be reinstated as an ATL after revocation. The Test Lab has up to one (1) year from date of revocation to apply for reinstatement.

3.3.6 Delisting

When an ATL status is revoked, the Test Lab will be removed from the NFC Forum Test Laboratory list. Once the ATL status is revoked, the Test Lab is no longer permitted to perform NFC Forum Certification Testing.

4 Inter-Lab Comparison Test (ILCT) Requirements

The objective of the ILCT Requirements is to ensure that every Approved NFC Forum Test Lab yields similar results for analog parameters measured on the same device.

The procedures in the following sections are to specify the authorization process for Test Labs so the total time required for its authorization is kept within an acceptable time frame allowing a smooth rotation of the ILCT reference samples. Test Labs SHALL return the ILCT reference samples to the NFC Forum when it has completed the ILCT or upon the request of the NFC Forum.

The rules defined in this document are only for the part related with the technical competencies' demonstration, namely the ILCT exercise and applicable for both Third-party ATLs as well as First-party ATLs wishing to be authorized for certification testing.

4.1 Preparation

Before the ILCT can take place, several criteria SHALL be fulfilled by the NFC Forum and the Test Lab.

The NFC Forum responsibilities are to:

- Organize an ILCT not more often than once per year
- Distribute and control the NFC Forum certified ILCT sample
- Measure an ILCT sample for the ILCT with a test tool equal to the one used by the Test Lab
- Ship the ILCT sample to the Test Lab as soon as it is available
- Inform the ATL that an ILCT for accreditation is needed to proceed
- Send the template that SHALL be used
- Send instructions on how to operate the reference sample

The Test Lab responsibilities are to:

- Inform the NFC Forum that they are ready for the ILCT
- Learn about the NFC Forum analog specifications and test specifications, from either within the NFC Forum or other subject matter experts
- Ensure that they have competence regarding their Analog Tool setup and operations
- Learn about the NFC Forum wireless charging specifications and test specifications, from either within the NFC Forum or other subject matter experts
- Ensure that they have competence regarding their WLC Analog Tool setup and operations
- Perform the test tool maintenance and calibration as specified by the manufacturer.

4.2 ILCT

The Test Lab responsibilities are:

- On reception of the ILCT sample, the Test Lab SHALL execute the ILCT test cases within two weeks and deliver a test report.
- The Test Lab SHALL follow all the maintenance, calibrations, and testing setup as specified by the manufacturer and NFC Forum Analog test specifications and/or WLC test specifications.
- The Test Lab SHALL submit the test results when ready to the NFC Forum (NCIRP staff member).
- If the Test Lab does not respect the time period, the sample will be recalled and the Test Lab will be put last in the queue.

The NFC Forum responsibilities are:

- Acknowledge that the test report has been received.
- The NFC Forum NCIRP staff member SHALL remove any Test Lab identification text or signs from the report and submit the results to NCIRP.
- The NCIRP SHALL provide a response within five (5) working days.

4.3 Issues Resolutions

NFC Forum Responsibilities

The NFC Forum will provide to the Test Lab:

- The test cases where the results are out of tolerance.
- Any potential cause for failure that might be visible on the test results.

The NFC Forum will NOT provide to the Test Lab:

- Any values, differences, or any type of quantification of the deviation.
- Any information that can pinpoint the exact points of failure.

Test Lab Responsibilities

The Test Lab, upon receiving a negative ILCT exercise result and its information, SHALL contact its test tool manufacturer and assure their availability to support the Test Lab measurements capability improvements.

The Test Lab SHALL repeat the test cases reported with problems and return the new results to the NFC Forum with a description of the improvements made within 1 week.

4.4 Re-evaluation of the Test Results

NFC Forum Responsibilities

The NFC Forum staff should submit the test results “anonymized” to NCIRP that needs to analyze them within a week, and, if not satisfactory, needs to evaluate why the improvements reported did not result in a pass.

NCIRP SHALL reply to Test Lab within four (4) working days with the assessment of the improvements previously reported by the Test Lab.

Test Lab Responsibilities

Within a week, schedule a videoconference call or a face-to-face meeting with the validation house, test tool manufacturer, and Test Lab to analyze the testing methods of the Test Labs and to discover anything that is not being properly measured. The improvements made by the Test Lab SHALL be distributed to the meeting / call participants and to the NFC Forum (NCIRP staff member).

Within two weeks of receiving a new negative answer, the Test Lab SHALL repeat the execution of the test cases with problems and return the new results.

4.5 Cooperation Termination

The Test Lab can repeat this cycle of improvements (namely new execution of the test cases, new evaluation by NCIRP, and reaction to their suggestions for improvements) several times.

After two months of the reception of the test sample, the lab SHALL return the sample even if the test results are not good enough to pass the ILCT exercise.

If still interested in becoming an ATL, the Test Lab SHALL review its internal procedures, test tools, and competencies and request a new ILCT sample to perform a second attempt. They will be put at the bottom of the exiting ILCT samples requests queue.

4.6 Tolerances

When doing the ILCT, the Test Lab results SHALL be equal to the Validation House results with the tolerance as defined for the ILCT exercise (see appendix E).

A. Requirements Summary

	Test Labs		Period
	Third (3rd) party	**First (1st) party**	
Membership Level	Associate or higher	Principle or Sponsor only	yearly
Agreement			
Test Lab Authorization And Test Case License Agreement signature	required	required	once
Initial application meeting Attendance			
Shall consecutively have attended the two previous face-to-face meetings of the members of the NFC Forum	required	required	once
Maintenance meeting Attendance			
Shall have attended two (2) NFC Forum webinar lab sessions per year	required	required	meeting
Shall have attended at least one face-to-face member per 24 months.	required	required	meeting
Shall have attended at least 1 compliance committee meeting	required	required	yearly
Shall have missed less than 2 consecutive Forum meeting lab sessions.	required	required	meeting
Compliance to NFC Forum Policies			
Testing SHALL be conducted in a manner consistent with [CERT_POL]	required	required	once
Insurance	US$1 million per occurrence	not required	yearly
Accreditation			
ISO/IEC_17025:2017; including all the testing scopes corresponding to each Device Class supported	required		audit
Minimally SHALL follow ISO/IEC_17025:2017 principles		required	audit
Contact Information			
Technical manager	required	required	change

primary business contact	required	required	change
commercial contact	required		change
Initial application Audits			
Audit report prior to authorized status being assigned	required	required	once
Maintenance Audits			
Audit report every 24 months	required	required	24 months
Initial application ILCT			
ILCT report prior to authorized status being assigned	required	required	once
Maintenance ILCT	Upon request	Upon request	request
Audit payment acknowledge	required	required	audit

Table 1 summarizes the requirements.

	Test Labs		**Period**
	Third (3rd) party	**First (1st) party**	
Membership Level	Associate or higher	Principle or Sponsor only	yearly
Agreement			
Test Lab Authorization And Test Case License Agreement signature	required	required	once
Initial application meeting Attendance			
Shall consecutively have attended the two previous face-to-face meetings of the members of the NFC Forum	required	required	once
Maintenance meeting Attendance			
Shall have attended two (2) NFC Forum webinar lab sessions per year	required	required	meeting
Shall have attended at least one face-to-face member per 24 months.	required	required	meeting
Shall have attended at least 1 compliance committee meeting	required	required	yearly
Shall have missed less than 2 consecutive Forum meeting lab sessions.	required	required	meeting
Compliance to NFC Forum Policies			

Testing SHALL be conducted in a manner consistent with [CERT_POL]	required	required	once
Insurance	US$1 million per occurrence	not required	yearly
Accreditation			
ISO/IEC_17025:2017; including all the testing scopes corresponding to each Device Class supported	required		audit
Minimally SHALL follow ISO/IEC_17025:2017 principles		required	audit
Contact Information			
Technical manager	required	required	change
primary business contact	required	required	change
commercial contact	required		change
Initial application Audits			
Audit report prior to authorized status being assigned	required	required	once
Maintenance Audits			
Audit report every 24 months	required	required	24 months
Initial application ILCT			
ILCT report prior to authorized status being assigned	required	required	once
Maintenance ILCT	Upon request	Upon request	request
Audit payment acknowledge	required	required	audit

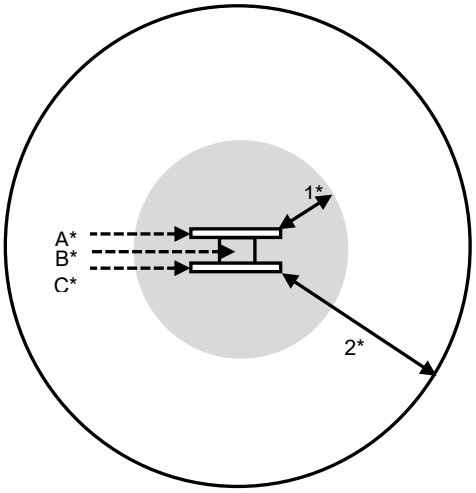
Table 1: Requirements Summary

B. Required ISO/IEC 17025:2017 Clauses for First-Party ATLs

[ISO/IEC_17025:2017] Section	Required Clauses
5 Structural Requirements	5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7
6 General	6.1, 6.2, 6.3, 6.4, 6.5, 6.6
7 Process Requirements	7.1, 7.2, 7.4, 7.5, 7.6, 7.7, 7.8, 7.9, 7.10, 7.11
8 Management System Requirements	8.1.2, 8.2, 8.3, 8.4, 8.5, 8.6, 8.7, 8.8, 8.9

Table 2: ISO/IEC 17025:2017 Clauses for First-party ATLs

C. Required ISO/IEC 17025:2017 Clauses for Third-Party ATLs

[ISO/IEC_17025:2017] Section	Required Clauses/Additions
5 Structural Requirements	No additions
6 Resource Requirements	
6.1 General	No additions
6.2 Personnel	No additions
6.3 Facilities and environmental conditions	a) NFC Forum Certification Testing should be performed under an environment that limits noise from 1MHz to 100MHz to avoid interference during testing. b) To avoid disturbing the magnetic field, the first free guard distance SHALL be observed around NFC Forum – Reference Equipment. This area SHALL not contain any other conductive materials than what is needed for NFC Forum certification testing c) In addition to the second free guard distance, no active electrical device, such as a cell phone, should be within 1 meter from the NFC Forum Reference Equipment, the DUT and the robot. d) There SHALL be controlled access to the Test Lab.  Key:

[ISO/IEC_17025:2017] Section	Required Clauses/Additions
	• A*: NFC Forum Reference Equipment • B*: Operating Volume • C*: DUT • 1*: The first free guard distance against conductive materials: 150mm • 2*: The second free guard distance against active devices: 1m
6.4 Equipment	a) NFC Forum Certification testing SHALL be performed using approved and validated test platforms as listed on the Approved Test Tools. b) Software Tool validation confirms that the software tools meet the specified requirements. Software tools SHALL be validated and documented, and should include the following objective evidence: • Custom software testing tools: Full validation effort. • Commercial off the Shelf (COTS) software tools used as is: Acceptance testing for each installed instance. • Modified off the Shelf (MOTS) software tools: Acceptance testing for each installed instance along with validation of the modification or tailoring. c) Each software test tool installation (or "instance") SHALL undergo a documented installation and operational qualification prior to use. d) Software test tools can be installed on many systems. Each instance of the test tool software SHALL be uniquely identified on each target environment and be under configuration management. e) There SHALL be documented evidence of the configuration and inventory of each specific installed software or system, and suitable tests should be performed to confirm functionality. f) The Test Lab SHALL perform a reference antenna verification testing based on NFC Forum Reference Equipment Verification Tests [REVT] before certification testing. g) When software test tools are used by others outside of the laboratory's control, configurations and adaptations SHALL be checked and possibly reset to ensure proper functioning. Note: For example, Test Labs should verify configurations and adaptations when another group

[ISO/IEC_17025:2017] Section	Required Clauses/Additions
	outside of the lab's control has access rights to the testing environment. h) Software test tool configurations SHALL be safeguarded by user roles or other appropriate means. i) Software test tools significant to testing are considered equipment and SHALL follow the appropriate clauses in ISO/IEC_17025:2017, Section 5.5. j) The equipment records requirements in ISO/IEC_17025:2017 are defined as follows: • Identity: Each instance of software / hardware • Manufacturer: Include manufacturer name, program name, and version number • Checks: Installation / operational qualifications • Location: Target system name or location • Manufacturer's instructions: User manuals • Calibrations: Applicable for Analog test equipment only (such as amplifier, waveform generator and Digital Sampling Oscilloscope) • Maintenance Plan: None normally required • Damage: Applicable
6.5 Metrological traceability	a) The quality control monitoring in this clause can be satisfied using "retained artifact", control charting or another recording method. This clause is applicable for ANALOG and WLC ANALOG testing only. Quality control efforts for DIGITAL, SNEP and LLCP testing is "where possible" by the Test Lab. b) NFC Forum Certification testing SHALL be performed using approved and validated test platforms as listed on the Approved Test Tools. c) NFC Forum Certification Testing SHALL be performed based on all NFC Forum procedures and the latest NFC Forum test specifications. d) NFC Forum Certification Testing SHALL be performed and executing in each applicable and available test specification by using the latest [TCCL] as a checklist. e) The Test Lab SHALL possess the procedure and solution to generate an Implementation Test Plan based on IUT's ICS values and applicable test specifications.
6.6 Externally provided products and services	No additions

[ISO/IEC_17025:2017] Section	Required Clauses/Additions
7 Process Requirements	
7.1 Review of requests, tenders and contracts	
7.1.1 The laboratory SHALL have a procedure for the review of requests, tenders and contracts.	The contract SHALL define which components of the test environment are being supplied by the Test Lab and which are being supplied by the client. This includes hardware and software. The test environment boundary interface points SHALL also be clearly defined
7.2 Selection, verification and validation of methods	
7.2.1 Selection and verification of methods	a) NFC Forum Certification Testing SHALL be performed based on all NFC Forum procedures and the latest NFC Forum test specifications. b) NFC Forum Certification Testing SHALL be performed and executing in each applicable and available test specification by using the latest [TCCL] as a checklist. c) The Test Lab SHALL possess the procedure and solution to generate an Implementation Test Plan based on IUT's ICS values and applicable test specifications. NOTE: It is highly recommended to use an automated process to avoid human errors.
7.2.2 Validation of methods	The Test Lab SHALL perform a reference antenna verification testing based on NFC Forum Reference Equipment Verification Tests [REVT] before certification testing.
7.3 Sampling	No additions
7.4 Handling of test or calibration items	No additions
7.5 Technical records	The quality control monitoring in this clause can be satisfied using "retained artifact", control charting or another recording method. This clause is applicable for ANALOG and WLC ANALOG testing only. Quality control efforts for DIGITAL, SNEP and LLCP testing is "where possible" by the Test Lab.
7.6 Evaluation of measurement uncertainty	The concept of Measurement Uncertainty (MU) is applicable to ANALOG and WLC ANALOG testing only. The concept of MU is not applicable to DIGITAL, SNEP or LLCP testing
7.7 Ensuring the validity of results	There are no commercial proficiency testing providers for NFC testing. However, the NFC Forum may commission Inter Lab Comparison Testing (ILCT) at its discretion.

[ISO/IEC_17025:2017] Section	Required Clauses/Additions
7.8 Reporting of results	The reported results will be covered by Certification Policy documents and the requirements in this document.
7.8.3 Specific requirements for test reports	The reporting of results shall conform to the Certification Policy Documents and the requirements in this document.
7.9 Complaints	No additions
7.10 Nonconforming work	No additions
7.11 Control of data and information management	No additions
8 Management Requirements	
8.1.2 Option A	No additions
8.1.3 Option B	Not applicable
8.2 Management system documentation (option A)	No additions
8.3 Control of management system documents (option A)	No additions
8.4 Control of records (option A)	No additions
8.5 Actions to address risks and opportunities (option A)	No additions
8.6 Improvement (option A)	No additions
8.7 Corrective actions (option A)	No additions
8.8 Internal audits (option A)	No additions
8.9 Management reviews (option A)	No additions

Table 3: ISO/IEC 17025:2017 Clauses for Third Party ATLs

D. General Requirements

It is mandatory for a Test Lab to support at least one Active Certification Release.

It is mandatory for a Test Lab to support at least one Device Class, but it is not mandatory to support all Device Classes.

a) Does the Test Lab's ISO/IEC_17025:2017 accreditation Test Methods include the NFC Test Cases Documents relevant for the Device Class(es) supported? A complete list is shown below:

- ANALOG
- DIGITAL Protocol
- Test Cases for Type 2 Tag and Type 2 Tag operation
- Test Cases for Type 3 Tag and Type 3 Tag operation
- Test Cases for Type 4 Tag and Type 4 Tag operation
- Test Cases for Type 5 Tag and Type 5 Tag operation*
- Tag Performance*
- LLCP*
- SNEP*
- Wireless Charging

* Tag Performance, LLCP, SNEP are not applicable for RTOs.

b) Does the Test Lab know whether to check if the IUT supports the DTA or not?

c) Does the Test Lab have the ability and supporting evidence for performing Pre-scan testing service to locate the reference position on the IUT?

d) Does the Test Lab know how to generate a Implementation Test Plan (ITP) for a DUT through the NFC Forum Test Plan Generator (TPG) website?

e) Does the Test Lab know how to load the TPG generated ITP into the Test Tool?

f) Is the Test Lab aware it needs to provide the XML version of the ITP to the Device Manufacturer for submission to NFC Forum?

D.1.1 Digital Protocol Testing

Only those parts of the Digital Protocol Testing relevant for the Device Class(es) supported by the Test Lab are mandatory for that Third-party Test Lab, including RTOs.

a) Is the Test Lab familiar with NFC Forum NFC Digital Protocol Specification and NFC Forum test cases for Digital Protocol?

b) Does the Test Lab know the default environmental test conditions?

c) Does the Test Lab know the default protocol test conditions?

d) Does the Test Lab know the pre- and post-processing default timings?

e) Does the Test Lab know the types of frames in the Scenarios?

f) Does the Test Lab know the definitions for sequences timings application and measurement?

g) Does the Test Lab know the parameters Values?

h) Can the Test Lab perform and verify all the DP test cases?

i) Is the Test Lab able to provide failed test case data and comments to the client to enable failure resolution?

D.1.2 Type 2/3/4/5 Tag Testing

Only those Tag Types and Tag Type Operations Testing relevant for the Device Class(es) supported by the Test Lab are mandatory for Third-party Test Labs, including RTOs.

Is the test lab familiar with NFC-Forum Type 2/3/4/5 Tag Specification and NFC-Forum Test Cases for Type 2/3/4/5 Tag testing?

j) Does the Test Lab know the default environmental test conditions?

k) Does the Test Lab know the default protocol test conditions?

l) Does the Test Lab know the default timings?

m) Does the Test Lab know the types of frames in the Scenarios?

n) Does the Test Lab know the definitions for sequences timings application and measurement?

o) Does the Test Lab know the T2T/T3T/T4T/T5T Memory Layouts?

p) Does the Test Lab know the ICS and IXIT parameters and options?

q) Can the Test Lab perform the manipulation of the IUT before and during the testing?

r) Does the Test Lab know the Type 2/3/4/5 Tag Command/Response Exchanges?

s) Does the Test Lab know the parameters Values?

t) Can the Test Lab perform and verify all the T2T/T3T/T4T/T5T test cases?

u) Is the Test Lab able to provide failed test case data and comments to the client to enable failure resolution?

D.1.3 Logical Link Layer Control Protocol (LLCP) Testing

LLCP Testing is mandatory for Third-party Test Labs supporting a Device Class which contains the P2P mode. This section is not applicable for RTOs.

a) Is the Test Lab familiar with NFC-Forum Logical Link Control Protocol Specification and NFC-Forum Test Cases for LLCP?

b) Does the Test Lab know the default environmental test conditions?

c) Does the Test Lab know the default test conditions for LT as target?

d) Does the Test Lab know the default test conditions for LT as initiator?

e) Does the Test Lab know the pre-and post-processing?

f) Does the Test Lab know the default timing?

g) Does the Test Lab know the parameters Values?

h) Does the Test Lab know the definitions for sequences timings application and measurement?

i) Can the Test Lab perform and verify all the LLCP test cases?

j) Is the Test Lab able to provide failed test case data and comments to the client to enable failure resolution?

D.1.4 Simple NDEF Exchange Protocol Testing

SNEP Testing is mandatory for Third-party Test Labs supporting a Device Class which contains the P2P mode. This section is not applicable for RTOs.

a) Is the Test Lab familiar with NFC-Forum Simple NDEF Exchange Protocol Specification and NFC-Forum Test Cases for SNEP?

b) Does the Test Lab know the default environmental test conditions?

c) Does the Test Lab know the default protocol test conditions?

d) Does the Test Lab know the pre-and post-processing?

e) Does the Test Lab know the default timing?

f) Does the Test Lab know the parameters Values?

g) Does the Test Lab know the definitions for sequences timings application and measurement?

h) Can the Test Lab perform and verify all the SNEP test cases?

i) Is the Test Lab able to provide failed test case data and comments to the client to enable failure resolution?

D.1.5 Analog Testing

Only those Technologies relevant for the Device Class(es) supported by the Test Lab are mandatory for Third-party Test Labs, including RTOs.

a) Is the Test Lab familiar with NFC-Forum ANALOG Technical Specification and NFC-Forum Test Cases for ANALOG?

b) Does the Test Lab know the default environmental test conditions?

c) Does the Test Lab know NFC Forum Reference Equipment Verification Tests and has process and required facilities also verification records?

d) The Test Lab SHALL perform a reference antenna verification based on calibration procedures defined in [ANALOG], Annex B.4 and B.5, before certification testing.

e) The Test Lab SHALL perform an 8-shaped coil verification based on step 2.5 defined in [REVT] before certification testing.

f) Does the Test Lab know the default protocol values and test scenarios?

g) Does the Test Lab know the default timing?

h) Does the Test Lab know the positioning conventions and requirements?

i) Does the Test Lab know the geometrical naming conventions?

j) Does the Test Lab know the operating volume?

k) Does the Test Lab know the position of each test point?

l) Does the Test Lab have a verification process to control positioning deviation before testing?

m) Does the Test Lab have solution to control positioning accuracy within 95% confidence level?

n) Does the Test Lab know the signals description?

o) Does the Test Lab calculate the uncertainties? Is there the uncertainty evaluation process and document for the Analog Tool?

p) When a test case contains at least one position where the communication or where criteria are not met, can the Test Lab judge the test case?

q) Can the Test Lab perform the power level measurement?

r) Can the Test Lab perform the waveform characteristics measurement?

s) Can the Test Lab perform the load modulation measurement for NFC-A, B, F, V?

t) Can the Test Lab perform the carrier frequency measurement?

u) If the tool requires the 8-shape coil, can the Test Lab demonstrate how and when to use the 8-shape coil?

v) Can the Test Lab perform the power level adjustment?

w) Can the Test Lab perform the waveform characteristics adjustment?

x) Can the Test Lab perform the load modulation adjustment?

y) Can the Test Lab perform and verify all the analog test cases?

z) Is the Test Lab able to provide failed test case data and comments to the client for failure resolution?

D.1.6 Tag Performance Testing

Tag Performance Testing is mandatory for Third-party Test Labs supporting the Tag Device Class, independent on the Tag Type. This section is not applicable for RTOs.

a) Is the Test Lab familiar with NFC Forum Tag Performance Test Cases?

b) Does the Test Lab know the default environmental test conditions?

c) Does the Test Lab know the default protocol values and test scenarios?

d) Does the Test Lab know the default timing?

e) Does the Test Lab know the default parameter values?

f) Does the Test Lab know the geometric naming conventions?

g) Does the Test Lab know the operating volume?

h) Does the Test Lab know the test position references?

i) Does the Test Lab know how to interpret the measurement results?

j) Can the Test Lab perform the power level adjustment?

k) Can the Test Lab perform the waveform characteristics adjustment?

l) Can the Test Lab perform the load modulation measurement?

m) Can the Test Lab perform and verify all the Tag Performance test cases?

n) Can the Test Lab judge whether a test case passes or fails?

o) Is the Test Lab able to provide failed test cases data and comments to the client to enable failure resolution?

D.1.7 Wireless Charging Testing

The Wireless Charging Testing is mandatory for Third-party Test Labs supporting a Device Class containing Wireless Charging as mandatory feature defined in [DEVREQ].

D.1.8 Wireless charging Analog Testing

a) Is the Test Lab familiar with analog specifications in [WLC] and [TC_WLC]?

b) Does the Test Lab know the default environmental test conditions?

c) Does the Test Lab know NFC Forum Reference Equipment Verification Tests and has process and required facilities also verification records?

d) The Test Lab SHALL perform a reference antenna verification based on calibration procedures defined in [WLC], Annex B.3 and B.4, before certification testing.

e) Does the Test Lab know the default protocol values and test scenarios?

f) Does the Test Lab know the default timing?

g) Does the Test Lab know the positioning conventions and requirements?

h) Does the Test Lab know the geometrical naming conventions?

i) Does the Test Lab know the operating volume?

j) Does the Test Lab know the position of each test point?

k) Does the Test Lab have a verification process to control positioning deviation before testing?

l) Does the Test Lab have solution to control positioning accuracy within 95% confidence level?

m) Does the Test Lab know the signals description?

n) Does the Test Lab calculate the uncertainties? Is there the uncertainty evaluation process and document for the WLC Analog Tool?

o) When a test case contains at least one position where the communication or where criteria are not met, can the Test Lab judge the test case?

p) Can the Test Lab perform the power level measurement during communication and wireless power transfer (WPT) phase?

q) Can the Test Lab perform the waveform characteristics measurement?

r) Can the Test Lab perform the load modulation measurement for NFC-A, B, F, V?

s) Can the Test Lab perform the impedance change measurement?

t) Can the Test Lab perform the power level adjustment?

u) Can the Test Lab perform the waveform characteristics adjustment?

v) Can the Test Lab perform the impedance change characteristics adjustment?

w) Can the Test Lab perform the load modulation adjustment?

x) Can the Test Lab perform and verify all the WLC analog test cases?

Is the Test Lab able to provide failed test case data and comments to the client for failure resolution?

D.1.9 Wireless Charging Digital and Application Testing

a) Is the test lab familiar with digital and application specifications in [WLC] and [TC_WLC]?

b) Does the Test Lab know the default environmental test conditions?

c) Does the Test Lab know the default protocol test conditions?

d) Does the Test Lab know the default timings?

e) Does the Test Lab know the types of frames in the Scenarios?

f) Does the Test Lab know the definitions for sequences timings application and measurement?

g) Does the Test Lab know the ICS and IXIT parameters and options?

h) Can the Test Lab perform the manipulation of the IUT before and during the testing?

i) Does the Test Lab know the WLC related NDEF Exchanges?

j) Does the Test Lab know the parameters Values?

k) Can the Test Lab perform and verify all the WLC test cases?

l) Is the Test Lab able to provide failed test case data and comments to the client to enable failure resolution?

E. Inter-Lab Comparison Testing Procedure

E.1.1 Requirements

The following requirements SHALL be met by the Test Lab before proceeding with this procedure:

- Test Tool SHALL be installed on its final location.

- Test Lab SHALL have a valid Test Tool calibration certificate in place.

- Test Lab SHALL have a proof that Reference Equipment has successfully completed [REVT].

E.1.2 General Rules

The following rules are applicable for this procedure:

- Any Test Lab SHALL successfully complete this procedure in order to get authorization for Analog testing or WLC Analog testing (if WLC Tool is in place) for the first time.

- NCIRP may request from time to time that all current Test Labs complete this procedure in order to maintain their authorization. Additionally, if an issue is identified by the NCIRP for a particular Test Lab, NCRIP may request the involved Test Lab to complete again this procedure.

- Test Tool SHALL remain of the same location during and after the execution of this procedure. If for any reason, the Test Tool has been moved, the Test Lab SHALL inform NCIRP and proceed with the verification of the positioning system.

- Test Labs SHALL verify at least every six months their Reference Equipment according to the procedures defined in [ANALOG] and/or [WLC] (if WLC Tool is in place).

- In case any Reference Equipment has been replaced, the Test Laboratory SHALL ensure that the new one has completed REVT, including the verification mentioned previously, prior to the execution of any testing session.

E.1.3 Process

The Test Lab SHALL complete the following stages and provide the NFC Forum (NCIRP staff member) with the outcome of each of them using the ILCT Results Template available on request to the Certification AdministratorCertification Administrator . For optimization purposes, Reference Measurements stage will not be started until both previous stages are successfully completed.

E.1.4 Positioning System Verification

The Test Lab SHALL provide a detailed verification demonstrating that the positioning tolerances defined in [TC_ANA] for the particular positioning system under use are met. In case the Test Lab has several positioning systems, the verification has to be provided for each of them.

E.1.5 Reference Equipment Verification

The Test Lab SHALL execute the calibration procedures as defined in [ANALOG] and/or [WLC] for each of the Reference Equipment to be used for testing purposes and provide the results obtained to the NFC Forum (NCIRP staff member).

E.1.6 Reference Measurements

The Test Lab SHALL execute the test cases listed in Table 4 for Analog and if supporting testing for the WLC feature Table for WLC Analog and provide the results to the NFC Forum (NCIRP staff member) for evaluation. The reference samples to be used will be provided by the Validation House and SHALL be returned by the Test Lab once the measurements have been performed.

The allowed tolerances are detailed in the following table. The reference values for each combination of test case and sample will be provided to the NFC Forum (NCIRP staff member) by the Validation House.

Table 4: Analog Tool ILCT Test Cases and Tolerances

Test Case		Tolerances for Test Lab ILCT Results		Comment
No.	ID	Tolerance values	Unit	
1	TC_AN30_LIS_NFCA_07_OV5_P0_NPM_Vsovnom_A	7	%	NFC-A LMA TX
2	TC_AN30_LIS_NFCB_03_OV5_P3_NPM	N/A	N/A	NFC-B max power RX
3	TC_AN30_LIS_NFCF_07_212_OV5_P6_NPM_Vsovmax_B	7	%	NFC-F LMA TX
4	TC_AN30_LIS_NFCV_01_OV5_P0_NPM	N/A	N/A	NFC-V min power RX
5	TC_AN30_LIS_NFCV_07_OV5_P3_Vsovnom_T	7	%	NFC-V LMA TX
6	TC_AN30_LIS_UND_01_OV5_P6	4	%	Loading effect
7	TC_AN30_POL_UND_01_OV5_L1	4	%	Min power TX
8	TC_AN30_POL_NFCA_02_OV5_L6_Vslmamin	N/A	N/A	NFC-A LMA RX
9	TC_AN30_POL_NFCB_01_OV5_L6_Fres13	1	%	NFC-B waveform TX
10	TC_AN30_POL_NFCF_01_212_OV5_L1_Fres13	1	%	NFC-F waveform TX
11	TC_AN30_POL_UND_02_OV5_L3	4	%	Maximum power TX
12	TC_AN30_POL_UND_03_OV5_L1	100	Hz	Carrier frequency
13	TC_AN30_POL_UND_04_OV5	Timing: 1	%	Reset characteristics
		DFT: 0.16	mV (RMS)	
14	TC_AN30_POL_UND_06_OV5_L1	1	%	Field Activation
15	TC_AN30_POL_NFCV_01_OV5_L3_Fres16	1	%	NFC-V waveform TX
Verdict rule: A maximum of six (6) out-of-range measurements are allowed in total of the 197 positions				

Table 5 WLC Analog Tool ILCT Test Cases and ILCT Tolerances

Test Case		Reference Equipment	Tolerances for Test Lab ILCT Results		Comment
No.	ID		Tolerance values	Unit	
1	TCv1_WLC_POL_ANCOM_BV_1	Ref WLC-L7	4	%	Power transmission
2	TCv1_WLC_POL_ANCOM_BV_2_2	Ref WLC-L7	N/A	N/A	LMA RX – Only $V_{S,LMA,CL7,MAX}$
3	TCv1_WLC_POL_AN_BV_1_2	Ref WLC-L7	4	%	Power Transfer static
4	TCv1_WLC_POL_AN_BV_3_2	Ref WLC-L7	4	%	Power Transfer negotiated On the first $V_{RX,CURRENT,i}$ and $POWER_ADJ_REQ_{measured,i}$
5	TCv1_WLC_LIS_ANCOM_BV_1_2	Ref WLC-P7	7, with a minimum of ±1mV	%	LMA TX
6	TCv1_WLC_LIS_ANCOM_BV_2	Ref WLC-P7	4	%	Loading effect
7	TCv1_WLC_LIS_AN_BV_1_2_0	Ref WLC-P7	N/A	N/A	sustainability
Verdict rule: A maximum of three (3) out-of-range measurements are allowed in total of the 47 positions					

E.1.7 Discrepancies resolution

Whenever a discrepancy is identified, the Test Lab will be informed about the issue. The Test Lab will then make the necessary corrections and proceed again with the failing stage indicating the reason of those corrections along with the new results in the ILCT-2 template.

Based on the information provided, the NCIRP may decide at its own discretion whether any stage SHALL be repeated.

F. Revision History

Table 6 outlines the revision history.

Table 6: Revision History

Document Name	Revision and Release Date	Status	Change Notice	Supersedes
Inter-Lab Comparison Test (ILCT) Requirements	Version 1.0, Sept. 2012	Approved		
Inter-Lab Comparison Test (ILCT) Requirements	Version 1.0.1, Feb. 2013	Final Draft	Language changes to align definition of First-party Test Lab with the definition used in the legal.	Version 1.0, September 2012
Inter-Lab Comparison Test (ILCT) Requirements	Version 1.0.2, May 2014	Final		Version 1.0.1, February 2013
Inter-Lab Comparison Test (ILCT) Requirements	Version 1.1.01, May 2014	Approved	Approved by the CC. Corrected the version number.	Version 1.0, September 2012
Inter-Lab Comparison Test (ILCT) Requirements	Version 1.1.01, November 21, 2014	Approved	Added Section C, Required First Party ATL ISO/IEC 17025 Clauses	Version 1.1.01 September 2012
Inter-Lab Comparison Test (ILCT) Requirements	Version 1.1.02, November 15, 2015	Final	Added §3, NFC Forum Test Lab RF ILCT exercise description and test case names in §3.6 Replaced logos and default language.	Version 1.1.01, November 21, 2014
Inter-Lab Comparison Test (ILCT) Requirements	Version 1.1.03, March 16, 2016	Final	Updated §1.5.3, introducing quarterly Testing Service fees reporting and payment	Version 1.1.03, November 15, 2015
Inter-Lab Comparison Test (ILCT) Requirements	Version 1.1.04, 2017-05-18	Final	Added required documents for the initial and 2nd Lab authorization process on Section 2.3.1 and Section A.4 Closeenvironment requirement, rephrased document name from ATLR to TLR, technical requirement has been moved to CTR, updated and replaced by CC_Glossary_Terms on Section 1.3	Version 1.1.03, March 16, 2016

Test Lab Requirements	Version 1.1.05, 2017-10-12	Final	Changed exceeding limit from $200000 to $100000 Added new section *2.2.4 Certification Release and Device Class Requirements*	Version 1.1.04, 2017-05-18
Test Lab Requirements	Version 1.1.06, 2017-12-11	Final	Clarifications on supported testing scopes Rewording on information submission Annexes A and C removed	Version 1.1.05, 2017-10-12
Test Lab Requirements	Version 2.0.00 2018-02-28	Final	ISO/IEC 17025:2017 additions	Version 1.1.06 2017-12-11
Test Lab Requirements	Version 2.0.01 2018-03-21	Final	ILCT Procedure added	Version 2.0.00 2018-03-21
Authorized Test Lab Requirements	Version 2.1.00 2020-08-27	Final	Changed document name from TLR back to ATLR. General updates for CR12.	Version 2.0.01 2018-03-21
Authorized Test Lab Requirements	Version 2.2.00 2020-12-03	Final	Added requirement that labs SHALL perform an 8-shaped coil verification before certification testing.	Version 2.1.00 2020-08-27
Authorized Test Lab Requirements	Version 3.0.00 October, 2021	Final	-) mandate usage of TPG Tool -) add req. for WLC testing and ILCT -) maintenance and corrections	Version 2.2.00 2020-12-03
Authorized Test Lab Requirements	Version 3.1.00 September, 2023	Final	New web site links updates Change in the number of consecutive sessions of the LAB attendance	Version 3.0.00 October, 2021
Authorized Test Lab Requirements	Version 3.1.02 September, 2023	Final	Labs are required to participate in an NFC Forum member meeting at least once every 24 months.	Version 3.1.00 October, 2021
Authorized Test Lab Requirements	Version 3.1.03 January, 2025	Final	Logos updates Remove the "RTO Test Specification License Agreement" link and add request to the CA	Version 3.1.02 September, 2023

Authorized Test Lab Requirements	Version 3.1.04 November, 2026	Final	Analog test cases ID updated in table 4	Version 3.1.03 January, 2025