

Wi-Fi Alliance Certification

nRF70 Series

White Paper

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Revision history

Date	Description
2023-03-02	<ul style="list-style-type: none">• Updated Nordic Semiconductor's accreditation as an Solution Test Laboratory (STL) on page 9• Updated test laboratory requirements in the following chapters:<ul style="list-style-type: none">• Wi-Fi Alliance recognized test laboratories on page 6• Wi-Fi certification paths on page 7• Product Certification paths with the nRF70 Series on page 10
2023-01-31	First release

1 Introduction

Nordic Semiconductor will support programs and paths to create *Qualified Solutions* that can be used by customers to accelerate the Wi-Fi[®] certification of their *End Products*.

The Wi-Fi Alliance[®] is a worldwide network of companies that drives global Wi-Fi evolution, spectrum advocacy, and industry-wide collaboration. Its work includes the development of innovative technologies, requirements, and test programs, so that Wi-Fi solutions provide the highest levels of interoperability, security, and reliability. Since 2000, Wi-Fi Alliance[®] has developed certification programs to ensure that Wi-Fi products from multiple manufacturers work well together.

This document lists the certification programs for which the nRF70 Series devices will be certified and gives an overview of the certification process. It describes Nordic Semiconductor's chosen programs and paths to streamline the process of delivering Wi-Fi CERTIFIED 6[™] solutions and guides customers through accelerated Wi-Fi CERTIFIED[™] End Product design.

2 Supported Wi-Fi Alliance certification programs

The nRF70 Series devices will be certified for Wi-Fi Alliance certification programs in the Connectivity, Security, and Optimization categories.

Category	Wi-Fi Alliance certification program
Connectivity	Wi-Fi CERTIFIED 6™ Wi-Fi CERTIFIED™ ac Wi-Fi CERTIFIED™ n
Security	Wi-Fi CERTIFIED WPA3™ Wi-Fi CERTIFIED WPA2™ WPA2™ Security Improvements Wi-Fi CERTIFIED Enhanced Open™
Optimization	Wi-Fi CERTIFIED Agile Multiband™ Wi-Fi CERTIFIED WMM™

Table 1: Wi-Fi Alliance certification programs for nRF70 Series devices

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Wi-Fi Alliance recognized test laboratories

Wi-Fi Alliance certification activities are carried out at three types of test laboratory, in accordance with published guidelines.

The three types of test laboratory are described in the following section.

Authorized Test Laboratories (ATL)

Independent testing laboratories authorized by the Wi-Fi Alliance to perform *FlexTrack* and *QuickTrack* certification testing. Any member company can avail of their services.

For a list of ATLs see [Authorized Test Laboratories](#)

Solution Test Laboratory (STL)

A *Solution Provider* that has been accredited by Wi-Fi Alliance to create, test and validate *Qualified Solution* candidates and Wi-Fi CERTIFIED products. An STL can perform *Core and Conformance* testing on their products and their *Variants*.

Member Conformance Test Laboratory (MCTL)

A Wi-Fi Alliance member's internal laboratory that uses the QuickTrack Test Tool to test their own End Product.

4 Wi-Fi certification paths

An *End Product* can achieve Wi-Fi certification through the *Derivative*, *QuickTrack*, or *FlexTrack* paths.

Derivative

Tailored to product portfolios where multiple End Products use identical Wi-Fi designs, such as multiple television models with the same Wi-Fi module, or appliances designed by one vendor for distribution under other vendors’ brands. Members apply for certification of derivative products without the requirement to complete testing.

QuickTrack

QuickTrack is tailored to *End Product* based on Qualified Solutions that have already completed Wi-Fi *Core and Conformance* testing.

QuickTrack is the latest certification path launched by the Wi-Fi Alliance designed to lower certification costs and to reduce the time to complete certification testing. It allows targeted modifications to Wi-Fi components and functionality. A subset of tests is required and can be completed at a customer's *MCTL*, a customer's *STL*, or an *ATL*.

FlexTrack

Tailored to highly differentiated products designed from the ground up. FlexTrack allows extensive flexibility in product design, including customization and optimization of Wi-Fi functionality. This track is not required for End Products based on Qualified Solutions.

Certification	Solution type	Customization allowed	Test requirements
Derivative	Copy of a Wi-Fi CERTIFIED device source product	No changes to Wi-Fi functionality	Apply for certification without additional testing
QuickTrack	Based on a <i>Qualified Solution</i>	Targeted changes to Wi-Fi functionality	Testing can be done at customer's <i>MCTL</i> , customer's <i>STL</i> , or <i>ATL</i>
FlexTrack	Built from the ground up	Extensive flexibility in Wi-Fi customization, including Wi-Fi functionality customization and optimization	Testing must be completed at an <i>ATL</i>

Table 2: Wi-Fi certification path comparison table

5 Qualified Solution

Nordic Semiconductor, as a *Solution Provider*, plans to create *Qualified Solutions* and *Qualified Solution Variants* for its product evaluation platforms based on nRF70 Series devices and the nRF Connect SDK. This enables customers to use the QuickTrack Wi-Fi certification process.

A Solution Provider creates a Qualified Solution by determining the *Wi-Fi Component Combination (Wi-Fi CC)* and Wi-Fi capabilities of the *Product*.

The Wi-Fi CC is a unique combination of hardware and software that provides the Wi-Fi capabilities within a product. The following list contains Wi-Fi CC components tracked by the Wi-Fi Alliance:

- Chipset
- RF architecture
- Firmware
- Driver
- Operating System
- Physical interface
- RF components
- Antenna

A Qualified Solution can contain additional components, but the Wi-Fi Alliance only records the listed Wi-Fi components as a Wi-Fi CC in the Certification System. Solution Providers can choose to create Qualified Solution Variants for their own products or to provide their customers a choice between different Wi-Fi components and provide a choice of Wi-Fi capabilities from a single Qualified Solution.

An End Product developer can use any Qualified Solution Variant available in the Certification System. If a change to the Wi-Fi CERTIFIED End Product is needed, an End Product Variant can be created.

6 Solution Test Laboratory (STL)

Nordic Semiconductor has established an *STL*.

As an STL, Nordic Semiconductor produces *Qualified Solutions* and *Qualified Solution Variants* for all nRF70 Series evaluation platforms and support the Wi-Fi certification of customer *End Product* through the QuickTrack path.

The Nordic Semiconductor STL is equipped with the latest Wi-Fi Alliance recommended testbed equipment, requisite Wi-Fi test and measurement equipment, and RF chambers/boxes required to successfully complete all the *Wi-Fi Core and Conformance* testing.

7 Product Certification paths with the nRF70 Series

An *End Product* based on an nRF70 Series device can achieve Wi-Fi certification via the *QuickTrack* or *Derivative* paths.

The QuickTrack certification path is applicable for all End Products designed from either the Nordic Semiconductor *Qualified Solutions* or *Qualified Solution Variant* evaluation platforms, where limited modifications are allowed.

Derivative certification is applicable for End Products based on third-party Wi-Fi CERTIFIED modules containing an nRF70 Series IC without any modification.

The following figure shows the steps for a customer to complete certification process. The scope of the testing depends on the extent of changes to the *Wi-Fi CC*.

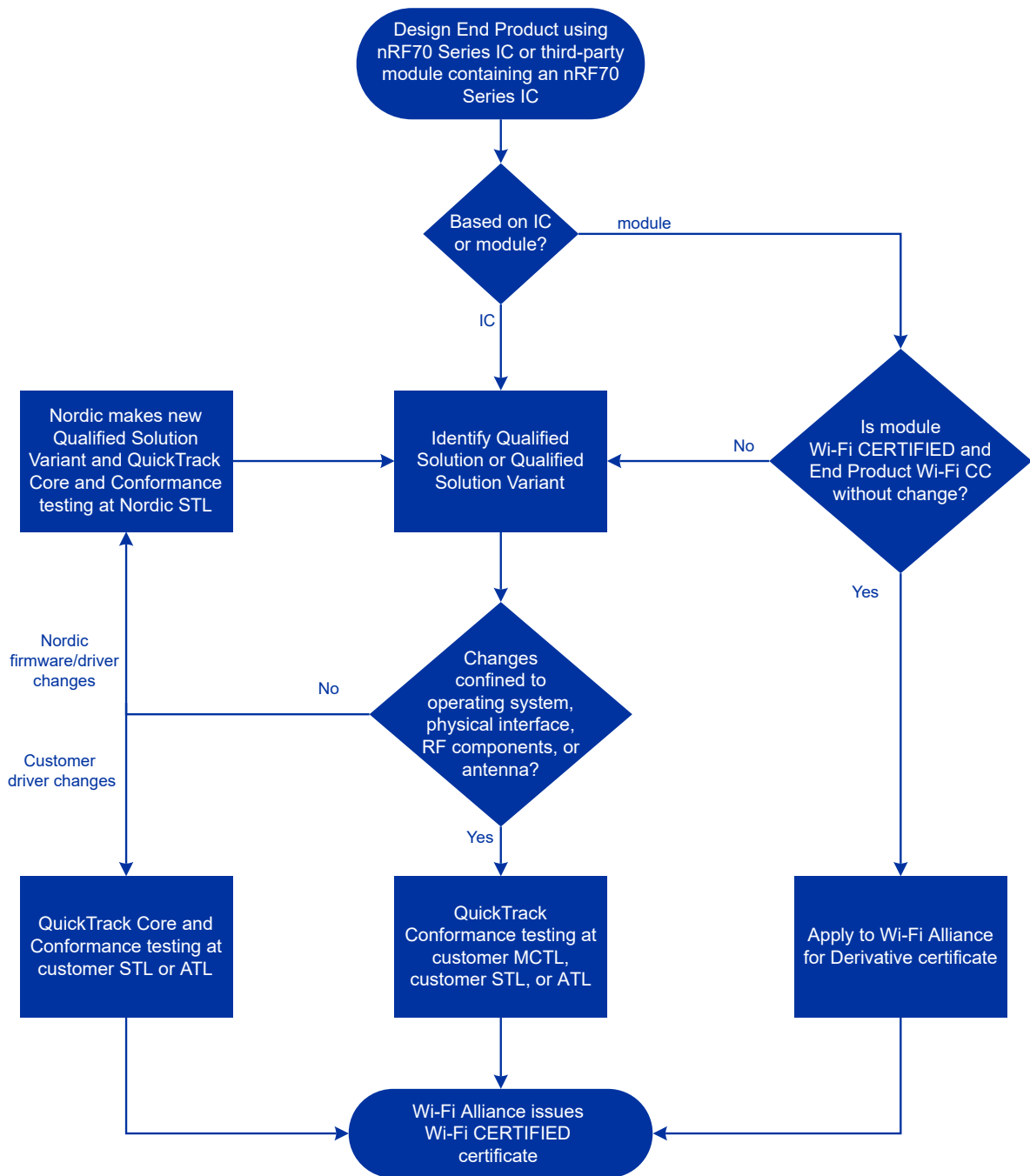


Figure 1: A summary of the certification paths for a Nordic Semiconductor customer

7.1 Derivative certification path

If there is no change to the *Wi-Fi CC* and *Wi-Fi capabilities* of an *End Product* based on another *Wi-Fi CERTIFIED End Product*, a *Derivative certificate* can be created.

This is typically the case for *End Products* created using *Wi-Fi CERTIFIED nRF70 Series modules* from third-party module vendors. This path could also apply to an *End Product adaptation* of an existing *Wi-Fi CERTIFIED Product*, where the *Wi-Fi CC* and capabilities are unchanged.

No certification testing is required. The *End Product* will receive a derivative certification on application by referencing the *Wi-Fi CERTIFIED third-party module* (or adapted *End Product*).

7.2 QuickTrack certification path

If the *End Product* requires changes to the Qualified Solution's *Wi-Fi CC* or *Wi-Fi* capabilities, *QuickTrack* testing is required.

If the changes are confined to the following components, QuickTrack Conformance testing is sufficient.

- Operating system
- Physical interface
- RF components
- Antenna

QuickTrack Conformance testing can be conducted at the customer's *MCTL*, the customer's *STL*, or an *ATL*.

If the changes include the following components, QuickTrack *Core and Conformance* testing is required.

- Firmware
- Driver

Core and Conformance testing must be done at the customer's *STL* or an *ATL*. Depending on the extent of the driver or firmware changes, only a subset of the Core testing may be applicable.

The firmware component is the software executing on the nRF70 Series device, while the driver component consists of the Wi-Fi specific layers executing on the host device, including the supplicant. Both components are provided in the nRF Connect SDK. Nordic Semiconductor will generate *Qualified Solution Variants* for each released version of the nRF Connect SDK, which means the End Product can be certified using only QuickTrack Conformance testing by selecting the appropriate Qualified Solution Variant as the basis for the testing.

8 Wi-Fi Test Tools

Wi-Fi Alliance offers members tools for certifying *End Products*. These tools can also be integrated into member product development and quality assurance processes.

nRF70 Series devices will use *QuickTrack* testing, which is described in the following section.

8.1 QuickTrack Test Tool

The *QuickTrack* Test Tool enables members to conduct QuickTrack Conformance testing at their *MCTL*.

The tool is primarily a combination of a Test Application component installed on a test laptop and a *Control Agent (CA)* component residing on the *Device Under Test (DUT)*. A *CA* port for the nRF70 Series devices will be available through the nRF Connect SDK.

The following links provide more information on the QuickTrack Test Tool found on the Wi-Fi Alliance members-only site.

- [QuickTrack Test Tool Getting Started Guide](#)
- [QuickTrack Test Tool User Manual](#)

Glossary

Application

The information provided by a member for both Qualified Solution and Wi-Fi CERTIFIED candidates. This includes new Products and Variants.

Authorized Test Laboratories (ATL)

Independent testing laboratories authorized by Wi-Fi Alliance to perform FlexTrack and QuickTrack Core and Conformance testing.

Certification Identification number (CID)

A unique tracking number that is assigned to a certification application for record keeping. A product has only one CID even though it can be certified at different times for different programs.

Control Agent (CA)

Controls and translates commands and responses between the *Unified CAPI Console (UCC)* and *Device Under Test Agent (DA)*.

Control App

Control software that is integrated into the *DUT* to allow testing with QuickTrack or FlexTrack.

Core and Conformance

Full suite of interoperability and conformance testing necessary for Qualified Solutions or Wi-Fi CERTIFIED products using FlexTrack.

Derivative

A new product that is replicated from a Source Product and has no changes to the Wi-Fi Component Combination or certifications.

Device Under Test Agent (DA)

Communicates with Control Agent and runs all the required *DUT* Wi-Fi test commands.

Device Under Test (DUT)

A manufactured product undergoing testing.

End Product

Products or devices that contain Wi-Fi functionality that are typically sold to consumers, integrators, service providers, and network deployers.

FlexTrack

Interoperability and conformance methodology to test and certify member's end products using Wi-Fi Alliance test plans and test beds.

Internet Systems Consortium (ISC)

A non-profit corporation that supports the infrastructure of the Internet by developing and maintaining core production-quality software, protocols, and operations

Member Conformance Test Laboratory (MCTL)

A Wi-Fi Alliance Member's internal laboratory that uses QuickTrack Test Tool to test their own End Product.

Product

For the purpose of the certification program, products are 802.11 devices, wireless products, or equipment that has or will test for Wi-Fi Alliance certification programs.

Qualified Solution

A product consisting of a collection of qualified components that serves as the basis for creating and certifying other products through the QuickTrack methodology and can also be certified itself.

Qualified Solution Variant

A new version of a Qualified Solution that includes a Solution Provider's change to the Wi-Fi component combination and/or certifications.

QuickTrack

Wi-Fi Alliance methodology to test and certify End Products when developed based on a Qualified Solution.

Real-time operating system (RTOS)

An operating system that reacts to input within a specific period of time. A real-time deadline can be so small that system reaction appears instantaneous.

Simultaneous Authentication of Equals (SAE)

A secure key establishment protocol between devices to provide stronger protection for users against password guessing attempts by third parties.

Station Under Test (STAUT)

A Wi-Fi Station undergoing testing.

Solution Provider

A company that has demonstrated the ability to produce and maintain a Qualified Solution.

Solution Test Laboratory (STL)

The laboratory of a Solution Provider that has been accredited by Wi-Fi Alliance to create, test, and validate Qualified Solutions and Wi-Fi CERTIFIED products.

Unified CAPI Console (UCC)

Central point of control for Wi-Fi Test Suite to run tests in an automated manner.

Variant

A new version of a previously Wi-Fi CERTIFIED product that includes a change to the Wi-Fi Component Combination or Wi-Fi capabilities and maintains Wi-Fi interoperability.

Wi-Fi Component Combination (Wi-Fi CC)

A unique combination of hardware and software that provides the Wi-Fi capabilities within a product.

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