Instruction

Z-Wave Certification Overview

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Description:	This document describes how manufacturers get their product Z Wave certified in order to ensure interoperability.
Written By:	NOBRIOT;BRO
Date:	
Reviewed By:	BRO
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Approved by:

REVISION RECORD

Doc. Rev	Date	By	Pages affected	Brief description of changes
1	20060224	BGR	All	Created based on doc that was a combination of an overview of the certification and the certification forms. Extended to add Verification Test step to Z-Wave Certification program
2	20060420	BGR	All	Minor editorial / formatting changes
3	20061222	BGR	All	Removed text related to rollout of revised certification process. Added text to encourage OEMs to file drafts of certification forms for (early) review. Clarified maximum time for delivery of products for ad-hoc problem resolution. Clarified that same test partner MUST be used in case of ad-hoc resolution and for resolution in case of limited issues found in verification testing.
3	20070105	JFR	References	Document numbers updated
4	20070509	JFR	All	Confidential in footer removed
5	20070731	BGR	All	Updates per in section 1.3 of this document
6	20071022	SBD	All	Minor clarifications.
7	20090817	HCS	All	Change Zensys to Sigma Designs Inc. Added new certification fee
7	20090922	HCS	All	Added new invoice process
7	20091007	HCS	All	Added new services and removed old pricing
7	20091007	HCS	All	Added clarification on services fee
8	20091112	HCS	All	Payment
9	20100520	HCS	All	The 400 series chip SD3402 have been added and 100 and 200 series have been removed
10	20110531	HCS	All	Full rework of original doc
10	20110826	HCS	All	Mandated Fees rates
11	20111123	DKING	2.4.2	Clarification of fee for testing custom integration
12	20120622	DKING	All	Full rework of previous version
13	20130829	DKING	Section 2.4 Section 2.2 Section 3.2 References All Section 0 Section 2.5 #5 All	Updated section to refer to separate fee schedule INS12578 Updated description of Hardware Platform Revised requirements for updateable devices Updated document numbers and added new ones Revised to include Z-Wave Plus Replaced flow chart with updated version Added information regarding Market Certification Added individual TOCs for each section Deleted redundant section on purpose of testing (was section 2.6)
14	20160610	DKING	All	Updated & rewritten to correspond with new online process for Z-Wave Plus
15	20171213	DKING	All	Updated to correspond with Z-Wave Plus requirements for mandatory use of SDK v6.71.xx or newer starting on April 2, 2017 and elimination of certification for new Classic devices.
16	20180306	BBR	All	Added Silicon Labs template

REVISION RECORD

Doc. Rev	Date	By	Pages affected	Brief description of changes
17		DKING	All	Added Z-Wave Plus v2 program information; Obsoleted Classic certification program
18		BRO	All	Z-Wave Alliance Certification site link now updated
19		BRO	All section 3.5 section 3.1.6 section 2.7	Replacing ASIC with CHIP Changing the requirement of full new cert to new QFN cert if replacing chipset Adding release schedule Fig. 2 and updated “Change in SDK used” Added Program change log Added Fig. 1 Certification Process
20		BRO	Sec 2.4, 2.6.1, 2.6.3 Sec 3.1.6	The execution of the separate S2 testing, has moved from Silicon Labs to Pepper One Updated SDK lifecycle description
21		BRO	Sec 3.1.6	SRN is source for Cert requirement if SDK upgrade

Table of Contents

1 INTRODUCTION

Section 1 Contents

1.1 Overview

This document covers Z-Wave Plus Certification for 500 series devices and QFN Certification for custom chip implementations and the Z-wave Plus v2 Certification program which is optional for 500 series devices but mandatory for 700 series devices. The terms “Z-Wave” and “Z-Wave Certification” apply to both Z-Wave Plus and Z-Wave Plus v2 in the context of this document. Z-Wave Plus and Z-Wave Plus v2 will be addressed separately where differences occur.

1.2 Purpose

The purpose of this document is to instruct OEM customers how to certify their Z-Wave enabled products and to help guide and document the certification process for individual products.

Z-Wave Plus and Z-Wave Plus v2 devices MUST be submitted for certification in an interactive, web-based process. A company and a user account will be needed to access the portal. Requests for new accounts MUST be submitted via the online support system and include the company name, company location (country) user’s first & last name and their e-mail address.

Please refer to section 3.1 of this document for details regarding modifications to certified devices and certification maintenance.

1.3 Audience and Prerequisites

The audience of this document is primarily Z-Wave OEM customers. Furthermore, this document is used by Silicon Labs Inc. and authorized Verification Test Partners and others which are part of the Z-Wave Certification process.

Silicon Labs' **Licensing agreements** for Z-Wave require that developers certify the products they develop prior to manufacturing and selling them. The proper use of logos is also required by the licensing agreements. SDKs, technical materials and additional information regarding certification can be downloaded from the Silicon Labs' tech support website after registering and accepting an **Evaluation License** (https://www.silabs.com/support/z-wave). The Silicon Labs' **Trademark and Distribution License** (TDL) MUST be accepted to certify devices and software utilizing Z-Wave technology. Acceptance of the TDL is done on the web-based Certification Portal as part of a device certification submission.

1.4 Precedence of Definitions

In terms of reviewing products for Z-Wave Compliance, definitions are valid based on the following precedence of documents ("1" has highest precedence):

1.4.1 Z-Wave Plus Devices

1. The online Z-Wave Plus Certification Form [4]
2. This document: Z-Wave Certification Overview, INS10638
3. Z-Wave Plus Device Type specification [8]
4. Z-Wave Plus Role Type Specification [7]
5. Z-Wave Command Class Specifications [2]
    a. Application CCs
    b. Management CCs
    c. Transport Encapsulation CCs
    d. Network Protocol CCs
6. Z-Wave 500 Series Application Programming Guides [2]

1.4.2 Z-Wave Plus v2 Devices

1. The online Z-Wave Plus v2 Certification Form [4]
2. This document: Z-Wave Certification Overview
3. Z-Wave Plus v2 Device Type specification, SDS14224 [9]
4. Z-Wave Plus Role Type Specification, SDS11846 [7]
5. Z-Wave Command Class Specifications [2]
    a. Application CCs
    b. Management CCs
    c. Transport Encapsulation CCs
    d. Network Protocol CCs
6. Z-Wave Plus v2 Command Class Control Specification, [10]
7. Z-Wave 700 Series Application Programming Guides [2]

1.5 Terms Used in the Z-Wave Certification Program

This document describes mandatory and optional aspects of the required compliance of a product to the Z-Wave Plus and Z-Wave Plus v2 standards.

The words “SHALL” and “MUST” specify aspects that are mandatory for compliance. Equally, “MUST NOT” has to be adhered to for compliance. Products that are in violation of any such statement are ***not*** Z-Wave compliant.

The words “MAY” “COULD”, and “MAY NOT” leave the choice to the implementer. “RECOMMENDED” also leaves the choice formally to the OEM but provides additional guidance. Future versions of Z-Wave MAY make aspects that are recommended at this time mandatory.

Throughout the Z-Wave Certification Program, the following terms are used:

Interoperability	Interoperability is the successful interworking of multiple products of various types from multiple manufacturers. These products MAY be based on multiple versions of Z-Wave. Interoperability always describes the interworking of two or more products, while Compliance relates to the conformity to the Z-Wave standard.
Z-Wave Plus and Z-Wave Plus v2 Compliance	Adherence to the Z-Wave standards is mandatory. The term “conformance” is used equivalently to the term “compliance”
Z-Wave Plus and Z-Wave Plus v2 Certification	Process of testing and verifying compliance to Z-Wave standards.
Self-certification	Developers/OEMs conduct testing to verify compliance to the Z-Wave Plus or Z-Wave Plus v2 standards before submitting the device for certification.
Verification	Confirmation of the Self-certification tests and compliance to the Z-Wave Plus or Z-Wave Plus v2 standards by the independent test houses.
Certification Fees	Fees paid by the developer/OEM to the test house for their services. These cover the costs for administration, review and verification testing in the test houses.

2 Z-WAVE CERTIFICATION OVERVIEW

Section 2 Contents

2.1 General Requirements

All products that use Z-Wave Technology MUST be certified. This includes software applications.

- Devices based on the 500 series chipset MUST be Z-Wave Plus or Z-Wave Plus v2 certified.
- Software applications based on a Z-Wave SDK MUST be certified to the appropriate Z-Wave Plus or Z-Wave Plus v2 standards.
- New devices can only be certified if they are based on active or maintained SDKs published by Silicon Labs. Recertifications of existing devices can be based on active or maintained SDKs published by Silicon Labs, unless specifically prohibited. Review only recertifications can be based on active, maintained, monitored or obsolete SDKs published by Silicon Labs, unless specifically prohibited.
- Full membership in the Z-Wave Alliance is required to certify devices to the Z-Wave standards. More information on https://z-wavealliance.org/
- Z-Wave Certification consists of two distinct parts; Technical Device Certification and Market Certification. BOTH are mandatory and device certifications cannot be issued until the device passes technical testing and the Z-Wave Alliance has approved the corresponding Market Certification.
    - Technical certification is managed by Silicon Labs and covers the device in regard to implementation and compliance to the Z-Wave standards and specifications.
    - Market Certification is managed by the Z-Wave Alliance and covers brand and logo usage, user manuals, etc.
- Certifications MUST be maintained. Any change to a certified device is subject to the maintenance requirements identified in Section 3 of this document. Failure to maintain device certifications will result in the revocation of the device's certification.

The certification process is designed to help OEM customers ensure that products have been correctly and robustly implemented and that the product will interoperate with other certified Z-Wave products from the same and other vendors, for the same and other applications.

The certification process is in its core a "self-certification" process. The OEM customer is responsible for ensuring that products are certified and remain certified during the product life cycle. This document defines the steps to follow and describes the detailed specification points that MUST be implemented as a minimum.

Silicon Labs Inc. will issue the Z-Wave Certification Number upon successful completion of the process.

2.2 Types of Products

General Products:

Devices combining the Z-Wave hardware interface and the software/application to provide full Z-Wave functionality. The Z-Wave hardware interface can be either integrated or a separate add-on module designed specifically for use with the device and sold with it. Examples include but are not limited to:

- Self-contained devices like light switches, thermostats & door locks.
- Static controllers, bridges, gateways or security panels with integrated Z-Wave CHIPs/modules and either integrated or cloud based UI software. **The final end-user interface MUST be verified as compliant to the applicable Z-Wave Plus or Z-Wave Plus v2 standards.**
- Static controllers, bridges, gateways or security panels relying on a separate Z-Wave hardware device like a USB stick for the RF functionality and interface to the Serial API. The Z-Wave hardware device can already be certified, or it can be certified as part of the General Product. If it is certified as part of the product then it cannot be sold separately. These devices can have either integrated or cloud based UI software. **The final end-user interface MUST be verified as compliant with the applicable Z-Wave Plus or Z-Wave Plus v2 standards.**

Software Application:

This is a software program that is designed to access a separate Z-Wave certified hardware interface/platform and provides the UI for control of the Z-Wave network devices. It MUST be capable of working with any certified hardware device that utilizes the same hardware interface and OS. All software applications are considered updatable products.

- Older software certified to the Classic Z-Wave standards MAY be used with hardware devices certified to either Classic Z-Wave, Z-Wave Plus or Z-Wave Plus v2 standards.
- Software certified to the Z-Wave Plus standards MUST be used with Z-Wave Plus or Z-wave Plus v2 certified hardware devices for full functionality.
- **The final end-user interface MUST be verified as compliant with the applicable Z-Wave Plus or Z-Wave Plus v2 standards.**

Hardware Platform:

This type of device utilizes a standard interface like USB or Serial to provide RF functionality and a Z-Wave hardware interface via the standard Z-Wave Serial API. Although it can be sold as a stand-alone device like a USB stick, it cannot be shipped and/or sold with uncertified software.

- USB-HID and proprietary interfaces cannot be certified as hardware platforms.
- Hardware platforms **MUST NOT** provide any functionalities other than the RF and interface to the Serial API.

2.3 Types of Certifications

General Products, Software and Hardware Devices:

- New Certification: This includes new products, modified products where Z-Wave functionality is affected and resubmissions where the same product failed earlier certification attempts.
- Re-certification: This includes limited product modifications and limited issues in earlier certification attempts of the same product.
- Review Only: For non-technical product modifications and technical changes that do not affect the product's Z-Wave network behavior. This includes frequency-only changes.

Custom CHIP implementations / QFN Certifications:

A certification [5] is required for custom integration of 500 series SD3502 and SD3503 Z-Wave CHIPs. Custom integration of the 700 series CHIP (EFR32ZG14) does NOT require a separate certification. This certification involves comprehensive RF testing and is in addition to the standard certifications listed above. This testing is conducted at Silicon Labs' facilities in Singapore and fees are paid to Silicon Labs.

The device can be an OEM's implementation of the standard Z-Wave module or a direct integration of the Z-Wave CHIP into a device's circuitry.

- A certification for a direct integration of the CHIP into a device's circuitry is only valid for that specific device. **The device MUST also undergo a full Z-Wave Plus or Z-Wave Plus v2 certification.**
- A certified custom module MAY be used in multiple devices. **Each device the module is used in MUST undergo a full Z-Wave Plus or Z-Wave Plus v2 device certification.**
  A certified custom module is only for that manufacturer's use and cannot be sold as a stand-alone device or to other manufacturers for use in their products. It can, however, be used in private label devices manufactured for other companies by the owner of the certification.
- This type of certification is not required if a standard Z-Wave module from Silicon Labs is used in the device.
- Any change to a certified custom CHIP implementation MUST be reviewed by Silicon Labs Engineering to determine whether a new certification is required.

2.4 Review/Testing Requirements

General Products

- Document review and inspection
- Review of Market Certification data (Z-Wave Alliance)
- Hardware / Software testing
- Controllers:
    - **The end user interface MUST be tested and verified compliant**
    - **Network management functions MUST be made available to the end user if the end user owns the device.**
    - Custom S2 implementations based only on libs2 require significantly more testing than those based on Z/IP GW SDK v2.11 or newer. It is a separate test done only by Pepper One in Germany, it is mandatory and comes with an additional fee. The additional fee must be paid to Pepper One, but the normal fees are still paid to the independent test house for their services.

Software Applications

- Document review and inspection
- Review of Market Certification data (Z-Wave Alliance)
- Software testing (with certified hardware)
- Controller Software:
    - **The end user interface MUST be tested and verified compliant**
    - **Network management functions MUST be made available to the end user**

Hardware Platform

- Hardware testing (with certified application software or Silicon Labs' PC Controller software)
- Review of Market Certification data (Z-Wave Alliance)

Custom Z-Wave Chip implementation

- Review of design, components and materials utilized in the production of the device/module
- Comprehensive RF testing

2.5 Certification Forms

- Z-Wave Plus and Z-Wave Plus v2 utilize an online web-based certification form for technical compliance testing. Access to the Certification Portal https://z-wavecertification.silabs.com/ requires a company and user account. Multiple user accounts MAY be created for a company and requests MUST be submitted via the online support request system and include the company name, user's name (first & last) and the user's e-mail address.
- Market Certifications utilize a form on the Z-Wave Alliance certification site, https://marketcert.z-wavealliance.org. Login credentials are the same as those used for the Z-Wave Alliance member site.
- Certifications for custom CHIP implementations utilize Word document-based forms [5]
- Z-Wave is an evolving technology and the certification forms are updated periodically to stay in sync with the changes. The developer MUST use the latest version of the appropriate form when submitting a device for certification.
    - The latest version of the Word document form for custom CHIP implementations can be found on the Z-Wave Technical Services website at https://www.silabs.com/support/z-wave
    - Z-Wave Plus and Z-Wave Plus v2: Only the current form will be available on the Portal when creating new submissions however; there is a grace period during which a submission created before a form is updated MAY still be accepted. The Portal will warn a user when the form they are using is outdated and can no longer be accepted.
- The vast majority of form changes are to clarify requirements, simplify the form or add/update Command Class Specifications and/or Role and Device Type Specifications. The Portal only provides a basic revision record in the wiki so the revision records in the Command Class, Role Type and Device Type specification documents should be used as a reference.

2.6 Certification Fees

2.6.1 Types of Fees

New/Full Certifications

- This includes documentation review and technical testing.
    - Form and document review – Verification that end user instructions include required information and meet certification requirements. Verify that if needed, special instructions required for testing the device has been provided. Quick test to verify DUT's NIF matches information in certification form.
    - Tests performed include but are not limited to network management (inclusion, exclusion, replication, rediscovery, etc.), Device/Role Type, Command Class, CTT (Compliance Test Tool) and RF tests according to the certification form.

Recertifications

- Tests performed depend on changes being made. Random spot checks of other functionalities are also performed.

Custom S2 implementation based only on libs2

- Technical testing only

Custom integrated CHIP; SD3502, SD3503 (500 series) or EFR14ZG (700 Series)

- Requirements and tests are identified in the certification form for custom CHIP implementations [5].

2.6.2 Fee Schedule

Certification fees are listed in a separate schedule, INS12578-x [6] where "x" refers to the latest version. This document covers new certifications as well as maintenance/re-certifications and QFN certifications. This document is available for download from the technical support website. https://www.silabs.com/support/z-wave

2.6.3 Invoicing and Payment of Fees

All fees for Documentation and Hardware/Software Application testing are invoiced by and paid to the selected test partner for their services.

Fees for Custom S2 implementation testing is invoiced by and paid to Pepper One.

Fees for testing of custom CHIP implementations are invoiced by and paid to Silicon Labs.

All taxes, money transfer fees, currency exchange fees and shipment costs are paid by customer.

2.7 Steps in the Device Certification Process

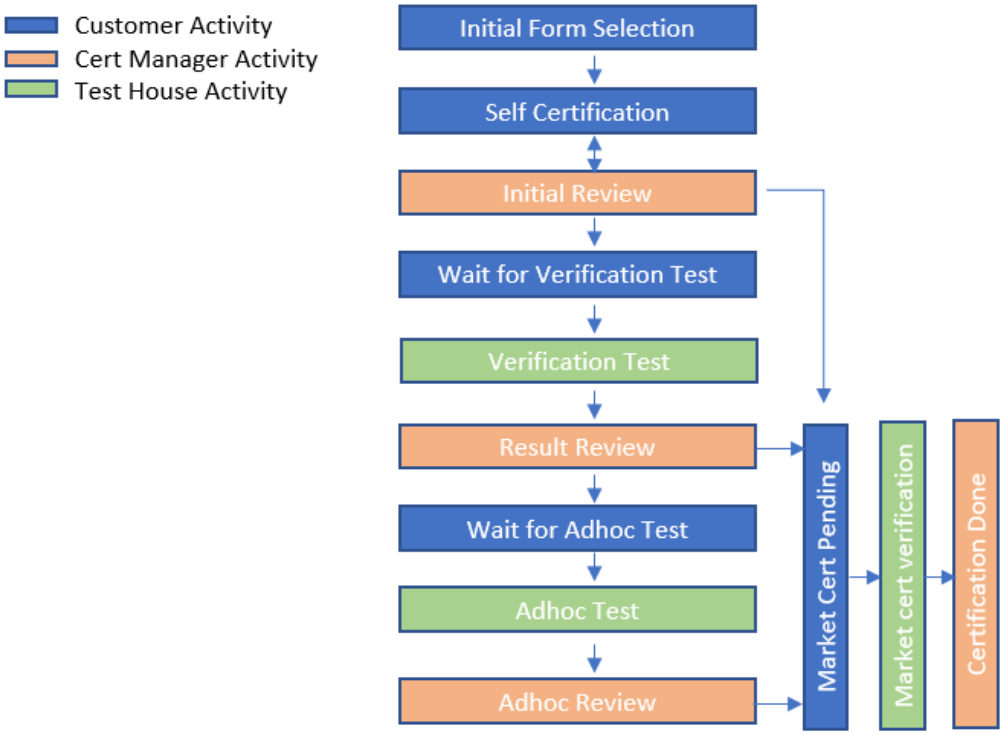

Figure 1, Steps in the Device Certification Process

1. The OEM customer designs and develops the product. Z-Wave design recommendations, reference designs, and other materials are available in the SDK or on the tech support website to aid in this process.

    a. The OEM decides which CHIP will be used and the desired Z-Wave functionalities of the device during the definition stage of product development. Depending on this direction, the next step is to choose which Device & Role Types and Command Classes are to be implemented. ***The Z-Wave Plus or Z-Wave Plus v2 Technical Certification Form should be used in this step to help identify protocol implementation requirements as well as record detailed aspects of the targeted Z-Wave compliance.***

    b. New developers will need to have a Manufacturer's ID number assigned. Send a request via the online support request system https://www.silabs.com/support/z-wave to obtain a Manufacturer's ID number. All requests MUST include the full company address and a primary contact for certification issues. Once their first device is certified the ID will be published within the Z-Wave developers' community.

c. Optionally, the OEM MAY request a preliminary review of the certification form during the design and/or development phase of a product. This is strongly encouraged if there are any questions regarding the interpretation of the requirements for compliance. A review of the certification form is free of charge for the OEM. Just send a request for a preliminary review to the certification mailbox z-wavecertification@silabs.com and reference the online form/device.

2. The OEM conducts the Self-certification and submits the Certification Form

   a. As part of the Self-certification, the OEM conducts tests to confirm functionality and compliance to Z-Wave specifications. Tests shall be conducted for all aspects of the implementation where compliance is claimed in the Certification Form. Z-Wave Plus and Z-wave Plus v2 testing guidelines are provided online in the wiki pages accessed through the "**?**" links in the online certification form. The Compliance Test Tool (CTT) MAY be used in Command Class related tests for both Z-Wave Plus and Z-wave Plus v2 devices.

   b. The latest version of the appropriate certification form MUST be used when submitting a new device for certification.

      i. The Custom CHIP Implementation form can be downloaded from the Z-Wave Technical Services Website at https://www.silabs.com/products/wireless/mesh-networking/z-wave/certification.

      ii. Only the latest version of the online form will be available on the certification portal for new devices.

   c. Certifications are issued to the company submitting the online Z-Wave Plus or Z-Wave Plus v2 form.

   d. Custom CHIP Implementation Certification form submissions: The OEM submits a copy of the completed certification form along with a signed copy of the signature page (pdf or standard image file). If multiple devices are being certified they **MUST** be submitted in separate e-mail messages.

   e. Z-Wave Plus and Z-Wave Plus v2 submissions are done online at the end of the self-certification phase. Each variation of a device be certified separately. The type of certification required depends on the differences between the devices. Refer to Section 3 for details.

3. The certification system automatically assigns a case number to the device.

    a. Custom CHIP Implementation certifications: When the OEM's submission with attachments (certification form and signature page) is received and processed.

    b. Z-Wave Plus and Z-Wave Plus v2: when the online certification form is submitted. Prior to submission, all cases are labeled "Pre-Cert".

    This case number is used to track the device through the entire testing and certification process. All communications regarding this device MUST reference this case number in the subject line of the e-mail message.

4. The Z-Wave Certification Manager conducts the Initial Review of the Certification form. Custom CHIP Implementation Certification forms are forwarded to the test house via e-mail when they are approved. The online system automatically notifies the developer and test house when Z-Wave forms are approved. The developer can start communicating with the test house regarding payment of the fees and sample/documentation submissions as soon as the form has been approved.

    a. The Custom CHIP Implementation Word document certification forms are re-named during the initial review process to "CEFxxxxx" where "xxxxx" is the case number.

    b. If the Initial Certification Review fails:

        i. Custom CHIP Implementation - The Certification Form is returned via email to the developer with a description of the failure. The developer MUST submit a corrected form under the same case number.

        ii. Z-Wave Plus and Z-Wave Plus v2 - The developer is automatically notified by the system that the online form needs to be corrected/updated and then re-submitted.

5. Z-Wave Plus and Z-Wave Plus v2 require Market Certification which is managed by the Z-Wave Alliance. The developer will need the case number assigned in number 3 above to access and complete the required product information form on the alliance website. This **SHOULD** be started as soon as a case number is assigned and **MUST** be completed before a certification can be issued. Details regarding Market Certification can be found in the Members section of the Z-Wave Alliance's website.

    Failure to complete the Market Certification and receive the alliance's approval of it will result in the case being closed without a device certification being issued. This is considered a certification failure and the device will have to be resubmitted as a new certification with new fees.

6. A product enters the test queue when everything has been received by the test house. This includes payment, samples and product instructions/documentation. The number of products in this queue varies and information regarding queue length can only be provided when the test house has received everything.

    a. **Everything required to enter the test queue MUST be received by the test house within 60 days of the initial review. Failure to meet this requirement will result in the case being closed. The developer will have to re-submit as a new case if this occurs.**

        i. Devices having to be resubmitted MUST be compliant with the specifications in place at the time of resubmission and utilize the latest version of the certification form.

    b. Two test samples of a submitted device are required. Samples submitted to the test partner are not returned to the Developer/OEM. These are retained by the test partner for reference in case of issues and for use during interoperability testing.

7. The Z-Wave Test Partner conducts the Verification Tests.

    a. The Verification Tests cover all aspects of Z-Wave Plus or Z-Wave Plus v2 compliance as defined in the specification documents and certification form. Depending on the type of device and whether it is a Z-Wave Plus or Z-Wave Plus v2 device this MAY include but is not limited to the examples listed below.

        i. Use of the proper software libraries for the intended market.

        ii. General compliance requirements like use of a production release SDK, selected Device Class or Device & Role Type is appropriate for the intended application/use of the device, implementation of all mandatory Command Classes for the device being submitted and tolerance toward unexpected frame lengths.

        iii. Verification of the programmed values in the Manufacturer Specific CC, Version CC, Z-Wave Plus Info CC and NVR flash page.

        iv. Common device requirements like Node Information Frame format, use of Explorer Frames, Inclusion/Exclusion into/from existing networks, use of Normal Power Mode and Network Wide Inclusion.

        v. Specific requirements based on the applicable Device Class or Device & Role Type. These are listed in the applicable specification document.

        vi. Controllers are tested to verify their ability to include all certified devices, the ability to be included into existing networks, network management functionality, and that a minimum level of control as defined in the specifications is provided for all devices regardless of brand/manufacturer. **The end-user interface MUST be submitted and verified as compliant.**

vii. All implemented Command Classes MUST provide appropriate and correct functionality.

1. Supported Command Classes MUST implement all commands in the CC.
2. Z-Wave Plus: When Command Class control is mandated by the Device Type, a controlling node MUST implement the ability to interview, read and set other nodes using the given Command Class and the controlling node MUST be able to use all commands of the controlled Command Class.
3. Z-Wave Plus v2: Mandatory Command Class control is identified in the SDS14233 Command Class Control Specification [10].

viii. End user documentation is reviewed to ensure all mandatory requirements are met. The certification form is also reviewed to ensure all implemented functionalities are correctly identified.

b. If questions arise during the Verification Test, the Test Partner contacts the OEM directly.

c. The goal is to complete testing within two weeks of the device entering the test queue. The actual amount of time it takes depends on the type of device, its complexity, how thorough the OEM's self-certification preparation & testing was and how many devices are already in the queue.

d. Upon completion of the tests, the test house forwards the Custom CHIP Implementation certification form with test results to the Z-Wave Certification Manager. Automatic notifications regarding completion of testing for Z-Wave Plus and Z-Wave Plus v2 devices are sent to the Certification Manager.

8. The Z-Wave Certification Manager reviews the Verification Test results.

a. If the device passes all of the tests, a certification number will be issued and the OEM can move forward.

Z-Wave Plus and Z-wave Plus v2:

i. Prior to submission for review, the developer MUST read and accept the Trademark and Distribution License as specified on the online portal.

ii. The corresponding Market Certification MUST have been approved. Full membership in the Z-Wave Alliance is also required in order to certify devices to the Z-Wave Plus or Z-wave Plus v2 standards.

b. If the device fails due to a few minor issues*, the OEM will be notified that it is going into Ad Hoc review and the OEM will be granted 30 days to work directly with the test partner to fix the issues and pass the tests. OEM is not allowed to change functionality of the device during Ad Hoc.

   i. ***Ad Hoc is NOT an approval to produce or sell the device while issues are being resolved.***

   ii. ***Ad Hoc testing includes one re-submission to fix the issues identified in the test report. Additional charges will apply if more than one re-submission is required to fix all issues. Please refer to the Certification Fee Schedule [5] for the cost of each additional re-submission.***

   iii. ***Failure to resolve the issues within this time frame will result in the case being closed without certification. The OEM will have to submit new documents and start the process over. <u>This includes new fees.</u>***

c. If the device fails with limited issues*, the OEM will be notified that it failed and that they will have to submit new documents and start the process over. This includes new, reduced fees (re-certification).

d. If the device fails due to major issues*, the OEM will be notified that it failed and that they will have to submit new documents and start the process over. This includes full new fees.

* Parameters for minor, limited and major issues are defined below.

1. Five (5) document issues count as one (1) command class/protocol issue:
2. Minor Issues: Technical issues in up to 4 command classes/protocol items
3. Limited issues: Technical issues in 5-6 command classes/protocol items
4. Major issues: Technical issues in 7 or more command classes/protocol items

e. Failure to complete the Market Certification and receive the alliance's approval of it will result in the case being closed without a device certification being issued. This is considered a certification failure and the device will have to be resubmitted as a new certification with new fees.

9. The OEM manufactures and ships Z-Wave products **after** certification testing has been successfully completed and the certification has been issued.

    a. The OEM monitors manufacturing and ensures that the guidelines of the Z-Wave Certification Maintenance are followed before any relevant product change is introduced.

    b. Manufacturing and shipping/selling non-compliant and/or non-certified devices is in direct violation of the Z-Wave licensing agreements.

    c. Brand/logo usage

        i. Z-Wave Plus and Z-Wave Plus v2: Use of the logos is administered by the Z-Wave Alliance. Please contact the alliance for materials and usage guidelines: certification@z-wavealliance.org

        ii. The use of Z-Wave and/or Z-Wave Plus logos in the promotion of uncertified devices will be referred to Silicon Labs' legal department for action.

2.8 Z-Wave Certification Number Formats

A Z-Wave certification number is assigned to each certified product. The purpose of certification number is to allow that each Z-Wave certified product type can be identified and tracked in the market. A new number is assigned whenever a product is recertified.

1. The original certification number format was:

    "ZC" <2-digit year> <2-digit months> <4 digit number>
    Example: ***ZC06050024***

2. The certification number format corresponding to version 8.x of the **Z-Wave** Certification Form (Classic Z-Wave Certification) is:

    "ZC08" dash <2-digit year> <2-digit months> <4 digit number>
    Example: ***ZC08-13050024***

3. The certification number format corresponding to **Z-Wave Plus** certifications is:

    "ZC10" dash <2-digit year> <2-digit months> <4 digit number>
    Example: ***ZC10-17010024***

    *This format is used for both the old Word document based certifications and the new web-based certifications however; the last four digits for web-based certifications start with "5" instead of "0". Example: Old system: ZC10-1601**0**xxx; new system: ZC10-1601**5**xxx*

4. The certification number format corresponding to **Z-Wave Plus v2** certifications is the same as Z-Wave Plus however, the prefix is ZC12 instead of ZC10:

    "ZC12" dash <2-digit year> <2-digit months> <4 digit number>
    Example: ***ZC12-1901xxxx***

5. The certification number format corresponding to **Custom CHIP Implementation** certifications is:

   "ZC09" dash <2-digit year> <2-digit months> <4 digit number>
   Example: ***ZC09-13080024***

2.9 Certification Contact Information

All communication regarding Z-Wave certification and any questions you MAY have concerning the contents or interpretations of this Certification document can be directed to the Certification Manager via the online support system https://www.silabs.com/support/z-wave

Address of Z-Wave Certification Unit

Silicon Labs
Emdrupvej 28 B
DK-2100 Copenhagen O
Denmark
Tel: +45 39 13 00 00

2.10 Test Partners

There are currently three independent test partners; BuLogics in Philadelphia, Pennsylvania USA, Pepper-One in Zwickau, Germany and the Institute of Digital Guangdong (IDG) in Guangzhou, China. Contact information is available in the Z-Wave Certification Form on the Certification Portal. It MAY also be obtained through an Internet search.

BuLogics and Pepper-One will handle all testing of controllers.

3 Z-WAVE CERTIFICATION MAINTENANCE

This section defines the rule for maintenance of the Z-Wave Certification of a product. Furthermore, it defines how exceptions in the regular certification process are handled.

Section 3 Contents

3.1 Changes and Modifications of Z-Wave Certified Products

If at any time after the issuing of the Certification the OEM plans to make any revisions or modifications to the product, the OEM MUST follow the rules for Certification Maintenance described in this section.

The general rule is that any such change is considered to create a new product for which the regular Z-Wave certification process described in this document applies. A Z-Wave Plus or Z-Wave Plus v2 Certification Form MUST be submitted for each product affected.

Failure to maintain certifications and/or comply with the requirements identified in this section for certification maintenance will result in revocation of the original certification.

3.1.1 "Different Products" with Regard to Z-Wave Certification

An OEM MAY create a new product by modifying an existing certified product. Such "different products" MUST be certified like any other Z-Wave product.

A Z-Wave product is considered a "different product" if at least one of the following conditions applies:

- Differences in the product's Z-Wave network and/or application behavior
- Different SDK or protocol library used. This includes situations where for example, an EU library MUST be changed to a Chinese library for a 500 series device even though the base frequency is the same for both regions (868.42 MHz).
- Differences in the product's RF performance or frequency, e.g. caused by changes to the electronics, the RF PCB layout, the antenna type / position, and/or change of subassemblies, the form and/or material of the product's enclosure, etc.
- Different product name and/or different part number
- Different manufacturer and/or brand name

Changes in the color of a product are not considered to create a different product, provided that such change does not affect the RF performance of a product (e.g. by changing the enclosure material, type of paint etc.). This is also the case if the product's part numbers differ, provided that all color variants share a common portion of the part number.

The following categories have been established to identify various degrees of change, the conditions to qualify for each category and the corresponding certification requirements. If the conditions are not fully met, the regular Certification process MUST be followed.

3.1.2 Non-technical Product Modifications

Changes to product names, changes in part numbers, changes in brand names, and changes in the manufacturer name are examples of modifications that are considered non-technical in nature in the Z-Wave Certification process. While such changes also require changing the values for the Manufacturer Specific command class, they are still considered non-technical product modifications as long as no other changes to Z-Wave functionality are being made.

Non-technical changes are processed free of Certification Fees. The OEM MUST submit updated Certification Forms for each product and will receive the Certification Number after review and approval of the new Market Certification. A Verification Test is typically not being conducted.

Example:

- A manufacturer currently sells a certified device under their company's brand name. They want to sell a private label version to a new customer under that customer's brand name. Product labeling, model number, packaging and at least one of the Manufacturer Specific values will be different; however, there are no other changes to the device or instructions, so this is considered a non-technical product modification. A new certification form MUST be submitted however, this will qualify for a review only re-certification. A Market Certification will be needed for the new device (Z-Wave Alliance).

3.1.3 Technical Changes that do not Affect Z-Wave Network Behavior

In case of technical changes that do not affect Z-Wave behavior; the OEM needs to submit a new Certification Form. The form MUST contain a brief explanation on the change including a clarification why that change does not affect Z-Wave behavior.

After completion of the review and approval of the new Market Certification, the Z-Wave Certification can be re-issued for the modified product. There is no Certification Fee in these cases.

Examples:

- Design changes are made in the AC circuitry of a certified lighting control device to comply with revised UL or CE standards and the manufacturer changes the hardware version number of the device for tracking purposes. The device utilizes a standard Z-Wave module from Silicon Labs and based on the developer's self-testing, the design change has no effect on Z-Wave RF performance/range. There are no other changes to the device so this is considered a technical change that does not affect network behavior. A certification form with new range test data MUST be submitted however, this will qualify for a review only re-certification as long as the range and CER is still within acceptable limits.
- A plug-in dimmer certified for the EU frequency and marketed in France is modified for sale in Germany. Product labeling, model number, packaging and at least one of the Manufacturer Specific values is changing for the new market and the only technical change to the product is the style of plug. The device utilizes a standard Z-Wave module from Silicon Labs and based on the developer's self-testing, the design change has no effect on Z-Wave RF performance/range. There are no other changes to the device so this is considered a technical change that does not affect network behavior. A new certification form with new range test data MUST be submitted however, this will qualify for a review only re-certification as long as the range and CER is still within acceptable limits.

3.1.4 Limited Product Modifications and Product Modifications

The following parameters will apply to Z-Wave Plus devices based on SDKs v6.71.xx, v6.81.xx or newer and Z-wave Plus v2 devices.

Limited product modifications are considered all changes to a product where the number of added, removed, or modified "Standard" command classes is up to 4. Product Modifications encompass all changes exceeding those allowed for Limited Product Modifications.

Each "Advanced" command class counts as 4 command classes due to the comprehensive testing that is required for verification of Z-Wave compliance. Any change besides documentation and one "Advanced" command class will require a full certification.

- "Advanced" Command Classes include Security, Multi-Channel, Multi-Channel Association, Firmware Meta Data and Multi-Command Command Classes.

Examples:

- Limited Product Modifications: Recertification
  - Changes in up to & including four (4) Standard command classes; no other changes
- Product Modifications: Full certification is required.
  - Changes to one (1) Advanced command class and one (1) Standard command class

3.1.5 Frequency-Only changes

The change in operating frequency of a product – e.g. creating an EU variant from a US product – will qualify as a Limited Product Modification and a frequency-only re-certification as long as this is the only change to the device that affects Z-Wave functionality. The 700 series CHIPs & modules are universal in that with the use of an applicable SAW filter, the same CHIP/module can be used for any frequency. Due to this, all frequency-only recertifications including those for 500 series devices will now be handled as review-only recertifications.

Frequency-only re-certifications will be accepted even if the SDK version used in the original device is obsolete, however the Certification Form – e.g. Z-Wave Plus or Z-Wave Plus v2 Certification – MUST be the same as the one used when submitting the original device.

Any changes in addition to the RF change will require testing and either a recertification or full new certification. This will be determined by the number and scope of additional changes being made.

Important Note: Changing the type of protocol library requires a full new certification. An example of this would be changing from the Slave_Routing library to the Slave_Enhanced_232 library.

3.1.6 Change in SDK Used

A change in the Z-Wave software development kit utilized for a specific device does require re-certification however, the level of certification required, the amount of testing needed, and the associated fees depend on the scope of the change.

The level of certification required can be read in the corresponding Software Release Note (SRN) and only applies If the only product change is an upgrade of the SDK and no other capabilities are modified.

A new SDK Branch (e.g. 7.**12**.x, 7.**13**.x) is launched every 6 months based upon the Z-Wave Specification releases 6 months prior.
A Branch is certifiable a year from first release so if the Branch is launched with SDK version 7.13.1 on 6/30 2020, the Branch and all its related SDK maintenance versions will be discontinued on 6/30 2021.

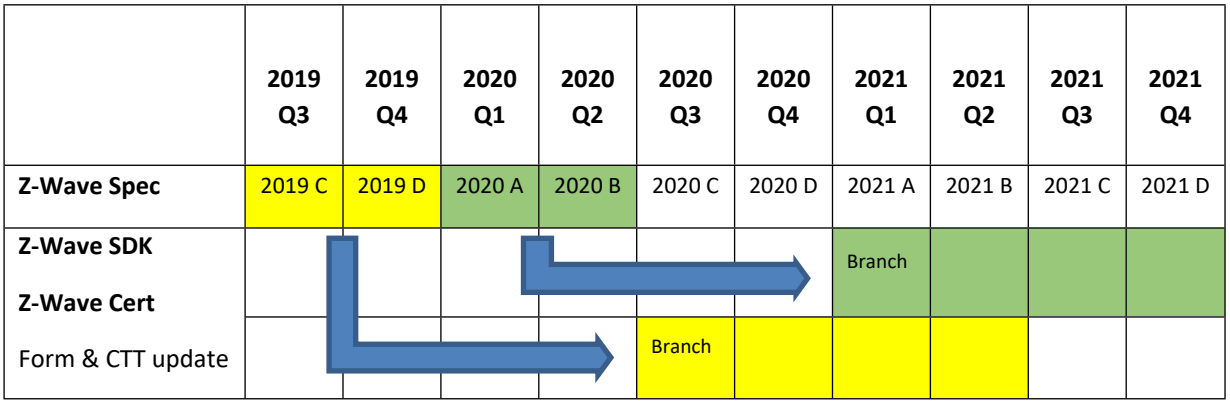

Figure 2, Z-Wave Release Schedule

3.1.7 Any Other Product Modification

If the conditions for the “limited product modification”, “change that does not affect Z-Wave behavior”, and the “non-technical product modification” are not met, the regular Z-Wave Certification process and full fees apply.

3.2 Modifications of Updatable Products

Many types of Z-Wave products MAY be modified relatively frequently by downloading new versions of the software or installing new firmware. Examples include Z-Wave applications that run on PCs or tablets, products that support the Firmware Update CC where the end-user can install new firmware versions, or product like static controllers, gateways, security panels or set-top boxes that can be updated either locally or automatically from a central service facility. Z-Wave devices including lighting controls, door locks and thermostats can also be easily updated if the Firmware Update Meta Data Command Class is supported.

The OEM MUST apply the following process for Certification and certification maintenance of updateable devices and software applications:

- The OEM conducts the full Z-Wave Certification process for the initial certification of the product.
- Subsequent updates are handled in the following manner:
    - Updates affecting Z-Wave functionality MUST be recertified. Please refer to the Certification Maintenance section of the Certification Fee Schedule, INS12578 [6] , to determine whether the changes require re-certification or full certification. Examples include but are not limited to:
        - Hardware change
        - Changes that affects the RF performance of the product
        - New major release / major revision of the OEM's product
        - Changes to the functional Z-Wave UI and/or Z-Wave functionality
        - Integration of a new major revision of the Z-Wave protocol
    - The one-page INS12627 Compliance Statement [11] MAY be used to maintain an existing certification if the changes are only for underlying firmware and do not affect Z-Wave functionality. This form can be downloaded from the Z-Wave tech support website.
    - Updates that create a new/additional device (different brand, model number, etc.) MUST be submitted on the appropriate Z-Wave certification form [4] regardless of whether Z-Wave functionality is affected. Each form MUST stand alone as a comprehensive record of what is being certified.

3.3 Updates required due to compliance issues being discovered after certification

As stated in Section 2.1, General Requirements, it is the responsibility of the developer/OEM to maintain their certifications. If compliance issues are discovered after a certification is issued when the developer/OEM MUST fix the problems and bring the device back into compliance. The scope of the issue(s) and required fixes will determine whether the existing certification can be maintained or if a recertification will be needed. Update of Z-Wave Chipset/Module

500 series devices MUST be certified under either the Z-Wave Plus or Z-wave Plus v2 Certification program. All 700 series devices MUST be certified under the Z-wave Plus v2 Certification program. If a device is updated from 200/300 series or 400 series to the 500 series, the device MUST be submitted as a full new Z-wave Plus or Z-Wave Plus v2 certification.

3.4 Grandfathering of Existing Products

All existing Z-Wave certifications for non-updatable products remain valid indefinitely regardless of the changes to certification criteria mentioned in this document. However, if re-certification of a product is required, the newest version of the relevant specifications and Z-Wave Certification documents MUST be used.

Certifications for updatable products are tied to the software/firmware version. If no changes are made, the certification will remain valid indefinitely. Please refer to Section 3.2 if changes are made.

3.5 Changes to Devices/Modules based on Custom chip Implementations

Any hardware change to a custom certified module or the RF section of a certified device with direct integration of the Z-Wave chip MUST be reviewed by the Silicon Labs' R&D team to determine whether a new QFN certification will be required.

Changing the chip or module in a certified device requires a new QFN certification. Examples of this would be changing from the ZM5101 to ZM5202, SD3502 to SD3503 or vice-versa.

3.6 Revocation of Certifications

Failure to fix a compliance issue MAY result in the device certification being revoked. Device certifications MAY also be revoked if it is determined that the certification was obtained based on incomplete, false or misleading data in the certification form submitted.

4 EXTRA SERVICES OFFERED BY TEST PARTNERS

Additional services are available from our test partners. Please contact them for details.

Please note that if “Test Partner A” is selected to assist in product development or pre-certification testing, one of the other test partners MUST be used for the actual certification.

REFERENCES

Please refer to the latest revision of the document.

[1] Silicon Labs Inc., INS12308, Z-Wave 500 Series Application Programming. Guide
Silicon Labs Inc., INS14258, Z-Wave 700 Series Application Programming Guides [1] Silicon Labs Inc., INS11787, OEM Integrated SD3402 certification tests

[2] Silicon Labs Inc., Z-Wave Command Class Specifications
SDS13781 Application CCs
SDS13782 Management CCs
SDS13783 Transport Encapsulation CCs
SDS13784 Network Protocol CCs

[3] Silicon Labs Inc., SDS10242, Z-Wave Device Class Specification

[4] Silicon Labs Inc., Z-Wave Plus and Z-Wave Plus v2 Online Certification Forms

[5] Silicon Labs Inc., INS12202, Z-Wave QFN Certification Form

[6] Silicon Labs Inc., INS12578, Z-Wave Certification Fee Schedule

[7] Silicon Labs Inc., SDS11846, Z-Wave Plus Role Types Specification

[8] Silicon Labs Inc., SDS11847, Z-Wave Plus Device Types Specification

[9] Silicon Labs Inc., SDS14224 Z-Wave Plus v2 Device Type Specification

[10] Silicon Labs Inc., SDS14223 Z-Wave Command Class Control Specification

[11] Silicon Labs Inc., INS12627, Compliance Statement for Updateable Devices