Bluetooth® qualification process for nRF5 modules

Bluetooth Low Energy

Application note

Abstract

This application note outlines the declaration process for end-products incorporating u-blox Bluetooth Low Energy modules based on Nordic Semiconductor nRF5 chipsets.

www.u-blox.com
UBX-20009220 - R01

Document information

Title	**Bluetooth® qualification process for nRF5 modules**	
Subtitle	Bluetooth Low Energy	
Document type	Application note	
Document number	UBX-20009220	
Revision and date	R01	4-Mar-2020
Disclosure restriction		

This document applies to the following products:

Product name
ANNA-B1
BMD-3
NINA-B1
NINA-B3
NINA-B4

u-blox or third parties may hold intellectual property rights in the products, names, logos and designs included in this document. Copying, reproduction, modification or disclosure to third parties of this document or any part thereof is only permitted with the express written permission of u-blox.
The information contained herein is provided “as is” and u-blox assumes no liability for its use. No warranty, either express or implied, is given, including but not limited to, with respect to the accuracy, correctness, reliability and fitness for a particular purpose of the information. This document may be revised by u-blox at any time without notice. For the most recent documents, visit www.u-blox.com.
Copyright © u-blox AG.

Contents

Document information **2**
Contents **3**
Disclaimer **4**
1 Bluetooth SIG **5**
1.1 Bluetooth SIG membership 5
1.2 Bluetooth specification 5
1.3 Bluetooth qualification 5
1.4 Launch Studio website 5
2 Declaration process **6**
2.1 QDID selection 6
2.1.1 End Product QDID for u-connect 7
2.1.2 End Product QDID for open CPU 7
2.1.3 Profile subsystem 10
2.2 Declaration process 13
2.2.1 Product basics 13
2.2.2 Product declaration 14
2.2.3 Declaration ID 16
2.2.4 Review and submission 16
Appendix **17**
A Glossary **17**
Related documents **18**
Revision history **19**
Contact **20**

Disclaimer

The information presented in this document is intended to provide a guide when generating Bluetooth SIG Declarations using u-blox Bluetooth Low Energy modules.

Final authority of these procedures falls within the Bluetooth SIG. A support request placed with the SIG may be required for specific declaration questions.

1 Bluetooth SIG

The Bluetooth Special Interest Group (SIG) is the standards organization that oversees the development of Bluetooth standards and the licensing of the Bluetooth technologies and trademarks to manufacturers. The organization cites the following mission statement [1]:

"In support of our vision and member companies, the Bluetooth SIG expands Bluetooth technology by fostering member collaboration to create new and improved specifications, drives global Bluetooth interoperability through a world class product qualification program, and grows the Bluetooth brand by increasing the awareness, understanding, and adoption of Bluetooth technology."

1.1 Bluetooth SIG membership

All companies that use Bluetooth technology are required to join the Bluetooth SIG. The Bluetooth SIG offers two membership levels – with varying benefits. The basic, or Adopter Membership, is free to join. Refer to the Bluetooth SIG website [1] for the latest membership information.

Membership is at a corporate level. But to use the procedures outlined in this document, even individual employees of a company organization can and should obtain unique login credentials under the company membership.

1.2 Bluetooth specification

Bluetooth Core specifications are consolidated into a single version, which means that all new product declarations fall under the same specification at the time of their submission. A product is not required to support all features within the specification, but those features that are included must properly identified.

You can download the latest version of the specification from the Bluetooth website [1] – without a login.

1.3 Bluetooth qualification

To use Bluetooth trademarks and market devices that employ Bluetooth technology, the Bluetooth SIG requires all products that enable Bluetooth technology to be properly qualified and declared. In this way, the Bluetooth SIG is able to protect the brand and ensure that users enjoy a consistent experience. For end-products that use u-blox Bluetooth Low Energy modules, based on Nordic Semiconductor nRF5 chipsets, the process of qualification and declaration is simple.

See [4] for a link to the Bluetooth SIG website indicating current declaration fees.

1.4 Launch Studio website

Product declarations are submitted through the Bluetooth SIG Launch Studio website [2]. Membership login is required using the same credentials given for the Bluetooth website.

2 Declaration process

2.1 Qualified design categories

A brief summary of the different Bluetooth Qualified Design categories featured in this chapter is given below. For further about the design categorization and qualification process generally, visit the Bluetooth website.

All commercial products, subsystems and components that use Bluetooth technology must be fully qualified and listed as such with the Bluetooth End Product SIG. Qualification is limited to designs for the following product types:

- **End Products.** Independently functional Bluetooth devices based on pre-qualified Host and Controller Subsystems are classified as End Products. They might also include subsystems that are related to Protocols/Services/Profiles, or based on pre-qualified tested components that cover the layers in a functional independent Bluetooth device. For example, several u-blox customers utilize the Bluetooth technology qualified in the u-blox ANNA-B1, ANNA-B1 End Product designs listed under QDID 119389.
- **Subsystems**. There are three subcategories for Subsystems:
    - **Controller Subsystems**. Designs that must be combined with a complementary Host Subsystem in order to create the complete Bluetooth core architecture required for operation. For example, a USB commercial Bluetooth Dongle containing the RF-PHY and Link layer implementations, normally below the standardized HCI software and hardware interface of the Bluetooth stack. Several u-blox customers utilize Bluetooth technology included in u-blox JODY-W163-05A Controller Subsystem designs listed under QDID 114915.
    - **Host Subsystems**. Designs that must be combined with a complementary Controller Subsystem. For example, a Bluetooth stack and application software running in an Operating System or third-party software. Several u-blox customers utilize Bluetooth technology included in u-blox ODIN-2 Host Subsystem designs listed under QDID 40911.
    - **Profile Subsystems**. Designs that must be combined with a complementary End Product or Host Subsystem. For example, a product enhancement application implementing one or more of the adopted Bluetooth GATT profiles such as HID (human interface device) and DIS (device information service). Reference [3] is the adopted GATT profile page.
- **Components**. Designs without minimum layer support, but can include any layer or combination of layers. Combined components, or components that are combined with one or more subsystems, are necessary parts for creating a new End Product or Subsystem qualified designs. Qualified Components are usually specific layers, for example Nordic Semiconductor nRF52840 RF-PHY layer. These qualified layers can be used in a design. Consecutive performing tests are not required; however, a test plan with references to the components must be submitted. Several u-blox customers utilize Bluetooth technology included in u-blox BMD-345 Component designs listed under QDID 114712

2.2 QDID selection

Based on the features made available by the end-product, the identities of one or more corresponding Qualified Designs (QDID) can be referenced. Use the Launch Studio product search in order to obtain the most recent listings.

2.2.1 End Product QDID for u-connect

All end-products reference a single modular or CPU End Product QDID.

The u-blox ANNA and NINA series of modules are declared as modular End Products. For designs that use u-connect wireless connectivity software to integrate Bluetooth connectivity into new and existing end-products, include the u-blox End Product QDID under the Qualified Design section of the declaration. Figure 1 shows the QDID declaration details for the NINA-B3.

Declaration Details

Listing Details

Declaration ID	D041004
Referenced Qualified Designs	
Company	u-blox AG
Listing Date	2018-09-14
Specification Name	5.0
Wi-Fi Certification ID	
Reference Integration Notes (RIN)	No Files Uploaded

Product List

Product Name	Product Website	Product Category	Publish Date	Archive Date	Model Number	Subset ID	Description
NINA-B30 series		Unique Products	2018-09-14		NINA-B30 series		The NINA-B30 series are open CPU modules that enable customer ...
NINA-B31 series		Unique Products	2018-09-14		NINA-B31 series		The NINA-B31 series modules includes u-blox connectivity software which provides ...

Note: Products that have not yet completed the Bluetooth Qualification Process will not appear in public search results.

Qualified Design:

QDID	118016
TCRL Version	TCRL 2017-2
Product Type	End Product
Combined Designs	104470 (Component (Tested)) ,106843 (Component (Tested)) ,111593 (Component (Tested))
Design Name	NINA-B3 series
Design Model Number	NINA-B3
Design Description	The NINA-B3 series modules are small stand-alone Bluetooth 5 low energy modules featuring full Bluetooth 5 support, a powerful Arm® Cortex®-M4 with FPU, and state-of-the-art power performance. The embedded low power crystal improves power consumption by enabling optimal power save modes.
Hardware Version Number	03 / 05
Software Version Number	RF5_SDK_15.0.0_a53641a
Core Specification	5.0
Other References	

View ICS Details Export ICSs

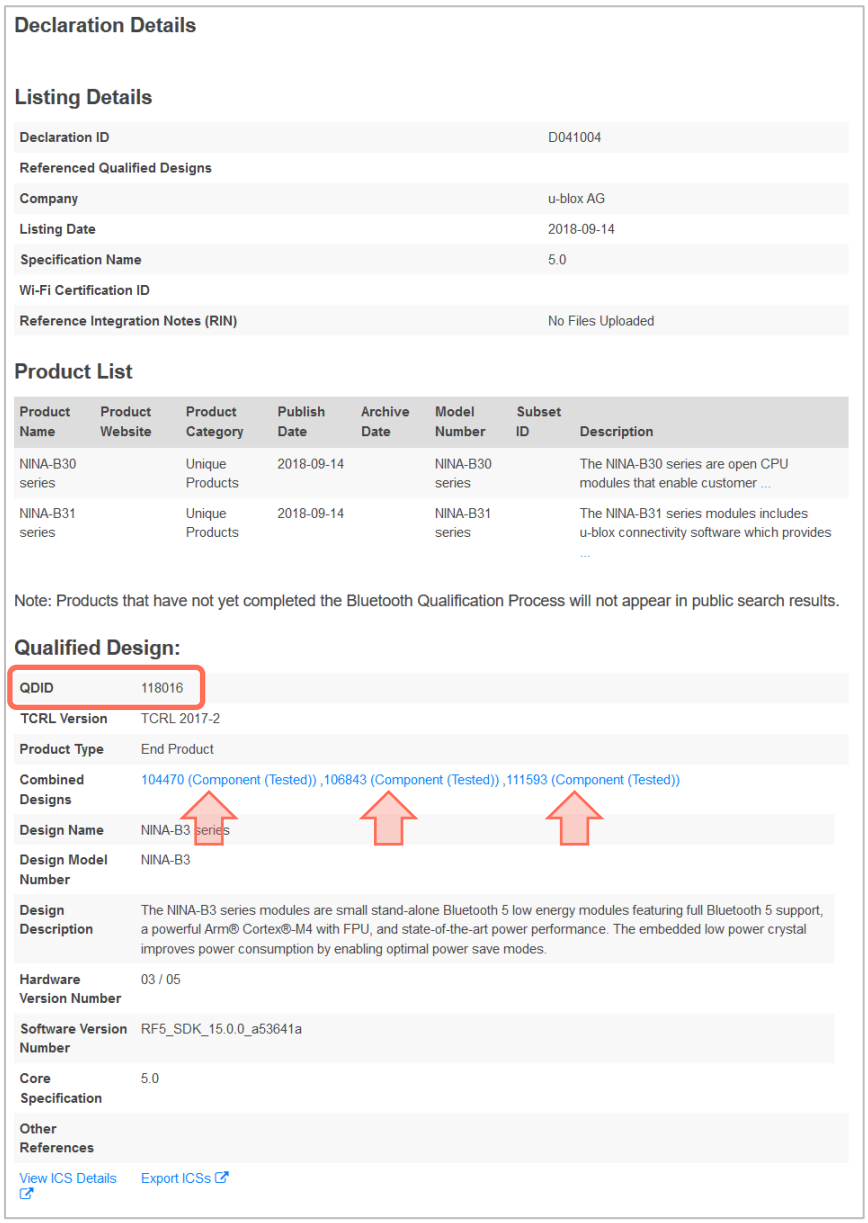
Figure 1: NINA-B3 QDID listing

2.2.2 End Product QDID for open CPU

The declaration for an end-product incorporating an open CPU module must refer to an End Product QDID that refers to the same version of the SoftDevice. This is checked by looking under the “Combined Designs” section of the QDID.

2.2.2.1 Example 1: u-blox NINA-B30, SoftDevice S140 v6.1.0

Using the same listing as above, select each of the Component QDIDs listed in the Combined Designs line as shown in Figure 2.



Declaration Details

Listing Details

Declaration ID	D041004
Referenced Qualified Designs	
Company	u-blox AG
Listing Date	2018-09-14
Specification Name	5.0
Wi-Fi Certification ID	
Reference Integration Notes (RIN)	No Files Uploaded

Product List

Product Name	Product Website	Product Category	Publish Date	Archive Date	Model Number	Subset ID	Description
NINA-B30 series		Unique Products	2018-09-14		NINA-B30 series		The NINA-B30 series are open CPU modules that enable customer ...
NINA-B31 series		Unique Products	2018-09-14		NINA-B31 series		The NINA-B31 series modules includes u-blox connectivity software which provides ...

Note: Products that have not yet completed the Bluetooth Qualification Process will not appear in public search results.

Qualified Design:

QDID	118016
TCRL Version	TCRL 2017-2
Product Type	End Product
Combined Designs	104470 (Component (Tested)) ,106843 (Component (Tested)) ,111593 (Component (Tested))
Design Name	NINA-B3 series
Design Model Number	NINA-B3
Design Description	The NINA-B3 series modules are small stand-alone Bluetooth 5 low energy modules featuring full Bluetooth 5 support, a powerful Arm® Cortex®-M4 with FPU, and state-of-the-art power performance. The embedded low power crystal improves power consumption by enabling optimal power save modes.
Hardware Version Number	03 / 05
Software Version Number	RF5_SDK_15.0.0_a53641a
Core Specification	5.0
Other References	

View ICS Details Export ICSs

Figure 2: NINA-B30 open CPU example

Inspect each one to find the referenced SoftDevice. In this case, the SoftDevice version is v6.1.x.

Product List

Product Name	Product Website	Product Category	Publish Date	Archive Date	Model Number	Subset ID	Description
Host layer for SoftDevice S140	www.nordicsemi.no	Software	2018-07-06		nRF52 Host v6.1.0		Host layer portion of the Nordic S140 SoftDevice. Designed to ...

Product List

Product Name	Product Website	Product Category	Publish Date	Archive Date	Model Number	Subset ID	Description
S140 Link Layer Component	www.nordicsemi.no	Software	2018-07-18		S140 Link Layer 6.1.x		Link Layer for the S140 SoftDevice Bluetooth Stack. The S140 ...

Product List

Product Name	Product Website	Product Category	Publish Date	Archive Date	Model Number	Subset ID	Description
nRF52840	www.nordicsemi.com	Unique Products	2018-02-01		nRF52840 AQFN73		The nRF52840 is an advanced, highly flexible single chip solution ...

Figure 3: SoftDevice version inspection

☞ The Host and Link Layers should reference the same version. The RF PHY QDID is not critical.

Since the end-product is incorporating this combination the u-blox QDID 118016 is used.

2.2.2.2 Example 2: NINA-B30 or BMD-34, SoftDevice S140 v7.0.1

If the NINA-B30 or BMD-34 is used in conjunction with S140 v7.0.1, the Nordic Semiconductor QDID must be used. Perform an advanced search with “Nordic Semiconductor ASA” in the company field, “S140” in the search box, and select “End Product” for product type:

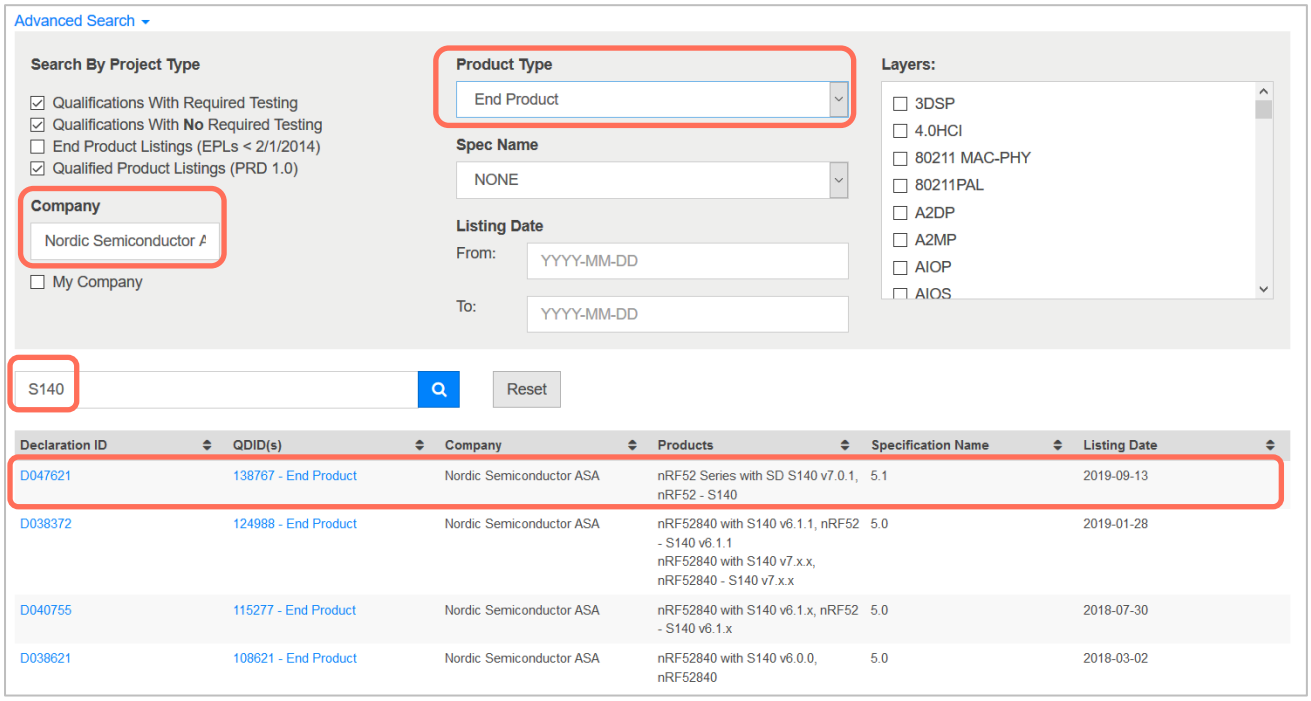


Figure 4: QDID search

The end-product declaration then uses QDID 138767.

☞ When more than one entry matches, use the most recent one.

Table 1 lists the possible combinations of module, nRF5 CPU, and SoftDevices. Only one combination is valid for the final end-product declaration.

u-blox module	nRF5 CPU	Possible SoftDevices (* most common selection)
ANNA-B1	nRF52832	S112, S132*
BMD-30	nRF52832	S112, S132*
BMD-33	nRF52810	S112*, S132
BMD-34	nRF52840	S112, S132, S140*
BMD-35	nRF52832	S112, S132*
BMD-36	nRF52811	S112, S113*, S140
BMD-38	nRF52840	S112, S132, S140*
NINA-B10	nRF52832	S112, S132*
NINA-B30	nRF52840	S112, S132, S140*
NINA-B40	nRF52833	S113, S140

Table 1: u-blox module, nRF5 CPU, and SoftDevices

☞ Nordic Semiconductor uses Subsystem declarations for the Host and Link Layers based on the same code base. The underlying Component QDIDs may all refer to S140.

If no additional features beyond those available in the SoftDevice are included, only the module or CPU End Product QDID is needed.

2.2.3 Profile subsystem

If the end-product includes an adopted Generic Attribute (GATT) profiles or services, such as the HID (human interface device) and DIS (device information service), then one or more profile subsystems must also be selected for the end-product submission. A list of current GATT profiles is maintained at the Bluetooth SIG website [3].

To find the correct profile subsystem, select an advanced search and limit the listings to profile subsystems for Nordic Semiconductor, as shown in Figure 5.

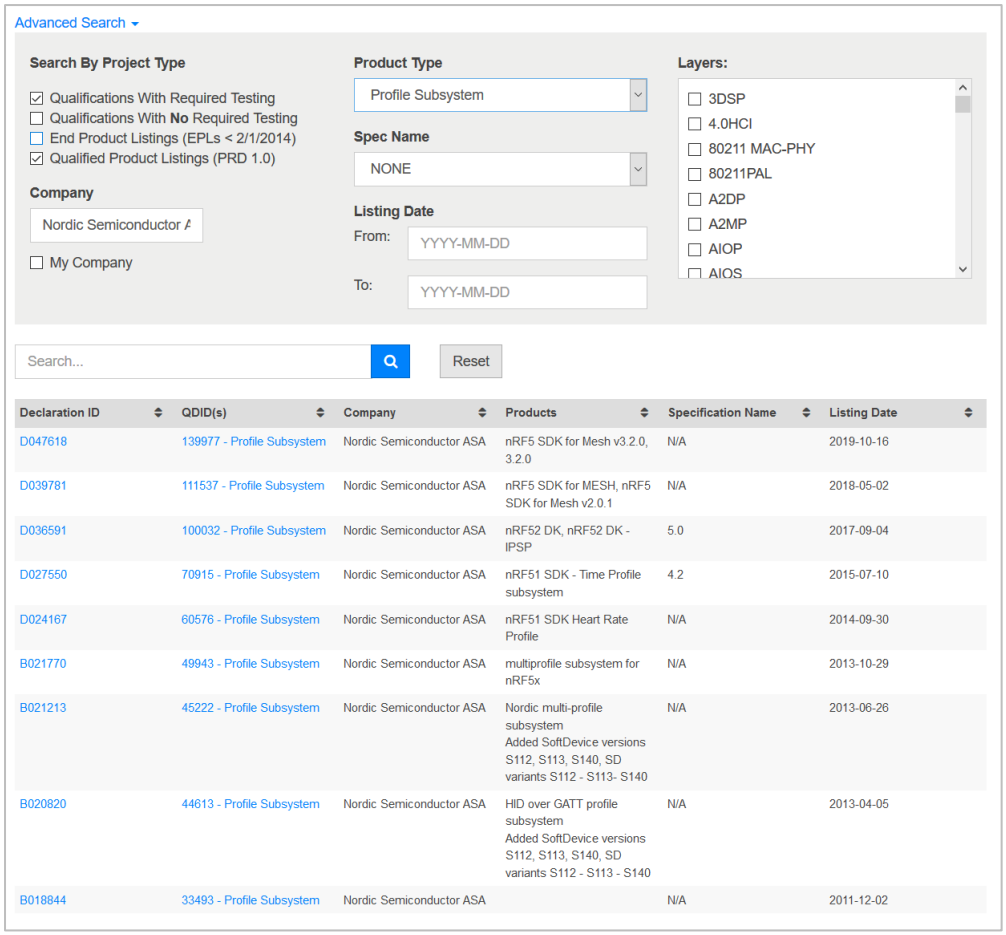
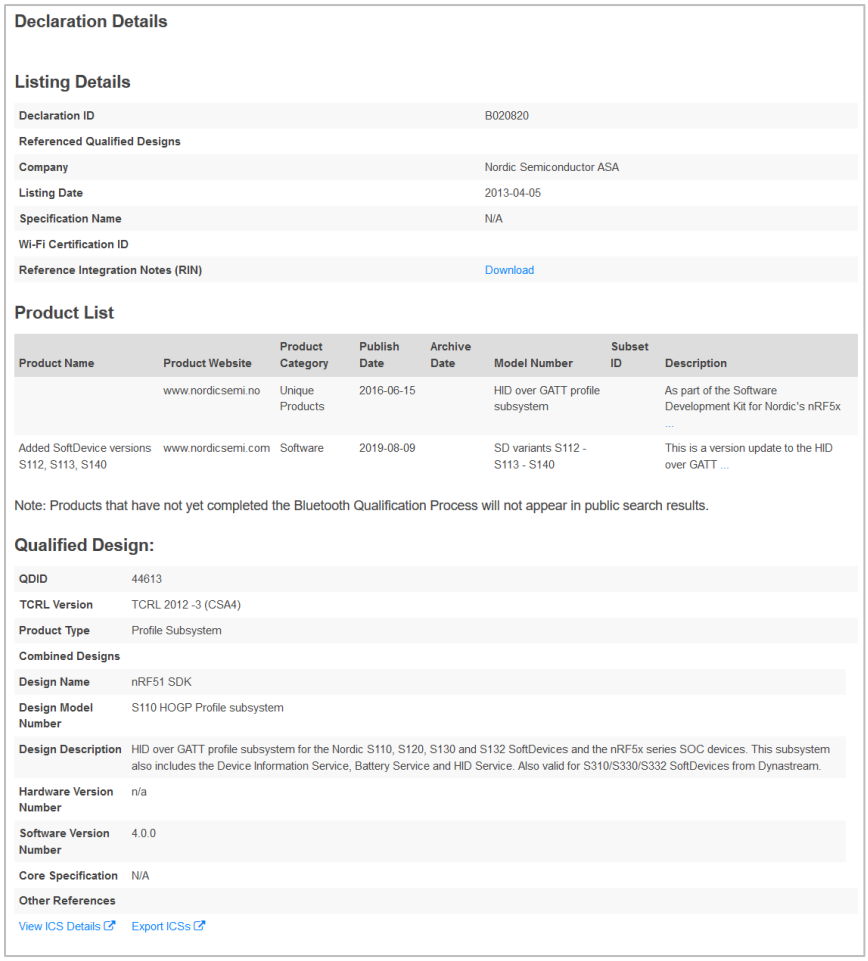


Figure 5: Profile subsystem search for Nordic Semiconductor ASA

☞ Each of these listings cover different subsystems. Ensure the correct one is selected. For example, the DIS service mentioned earlier uses profile subsystem QDID 44613, as shown in Figure 6. Again, make sure that the correct SoftDevice is referenced.



Declaration Details

Listing Details

Declaration ID	B020820
Referenced Qualified Designs	
Company	Nordic Semiconductor ASA
Listing Date	2013-04-05
Specification Name	N/A
Wi-Fi Certification ID	
Reference Integration Notes (RIN)	Download

Product List

Product Name	Product Website	Product Category	Publish Date	Archive Date	Model Number	Subset ID	Description
	www.nordicsemi.no	Unique Products	2016-06-15		HID over GATT profile subsystem		As part of the Software Development Kit for Nordic's nRF5x ...
Added SoftDevice versions S112, S113, S140	www.nordicsemi.com	Software	2019-08-09		SD variants S112 - S113 - S140		This is a version update to the HID over GATT ...

Note: Products that have not yet completed the Bluetooth Qualification Process will not appear in public search results.

Qualified Design:

QDID	44613
TCRL Version	TCRL 2012 -3 (CSA4)
Product Type	Profile Subsystem
Combined Designs	
Design Name	nRF51 SDK
Design Model Number	S110 HOGP Profile subsystem
Design Description	HID over GATT profile subsystem for the Nordic S110, S120, S130 and S132 SoftDevices and the nRF5x series SOC devices. This subsystem also includes the Device Information Service, Battery Service and HID Service. Also valid for S310/S330/S332 SoftDevices from Dynastream.
Hardware Version Number	n/a
Software Version Number	4.0.0
Core Specification	N/A
Other References	

View ICS Details Export ICSs

Figure 6: Profile subsystem QDID for DIS

2.3 Declaration process

With the QDIDs selected, the declaration process can be started. From the “Getting Started” tab of the Launch Studio main page, select the “No Required Testing” path, as shown in Figure 7.

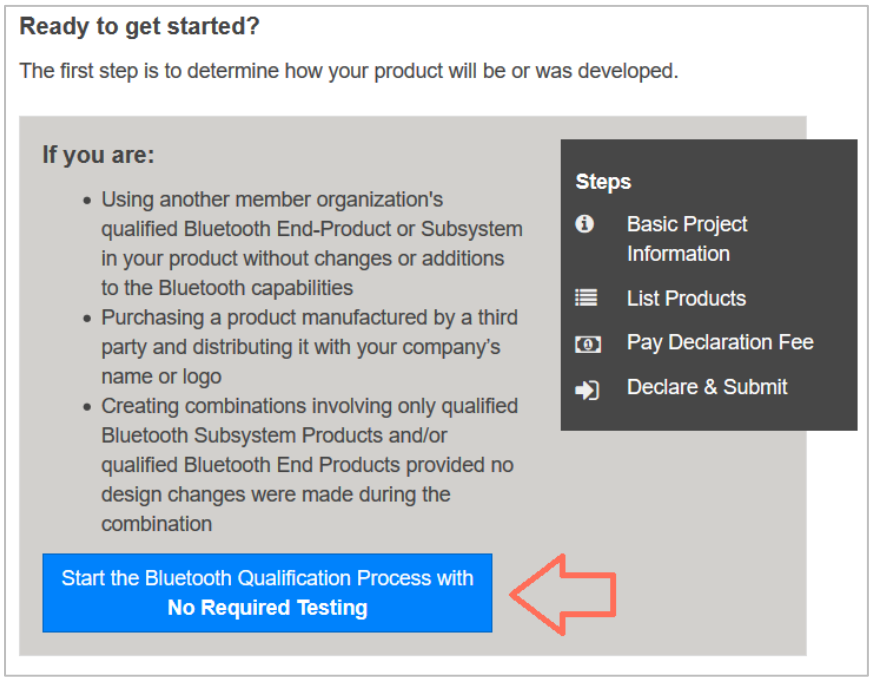


Figure 7: Launch Studio "No Required Testing"

2.3.1 Product basics

Give the end-product a name and enter the QDIDs selected in Section 2.1. Figure 8 shows the example entries selected above for use with a NINA-B30 using SoftDevice v7.0.1 and the DIS profile.

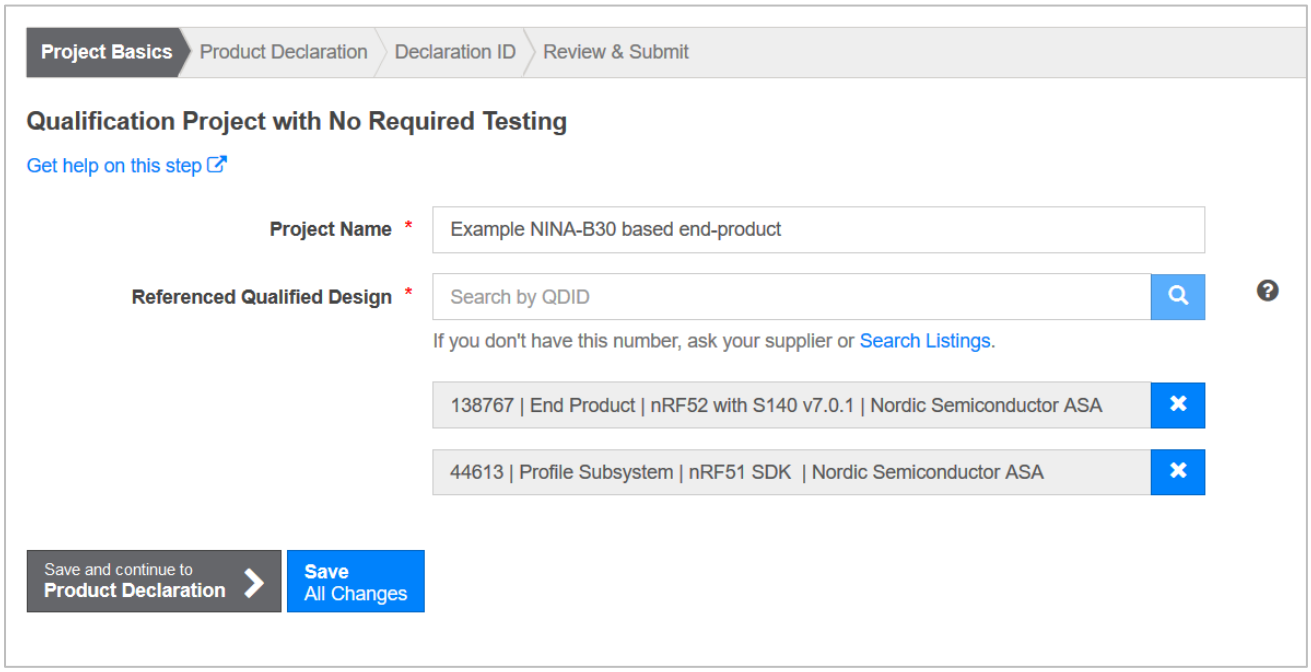


Figure 8: New project with QDIDs entered

Select the “Save and continue to Product Declaration” button to continue the process.

2.3.2 Product declaration

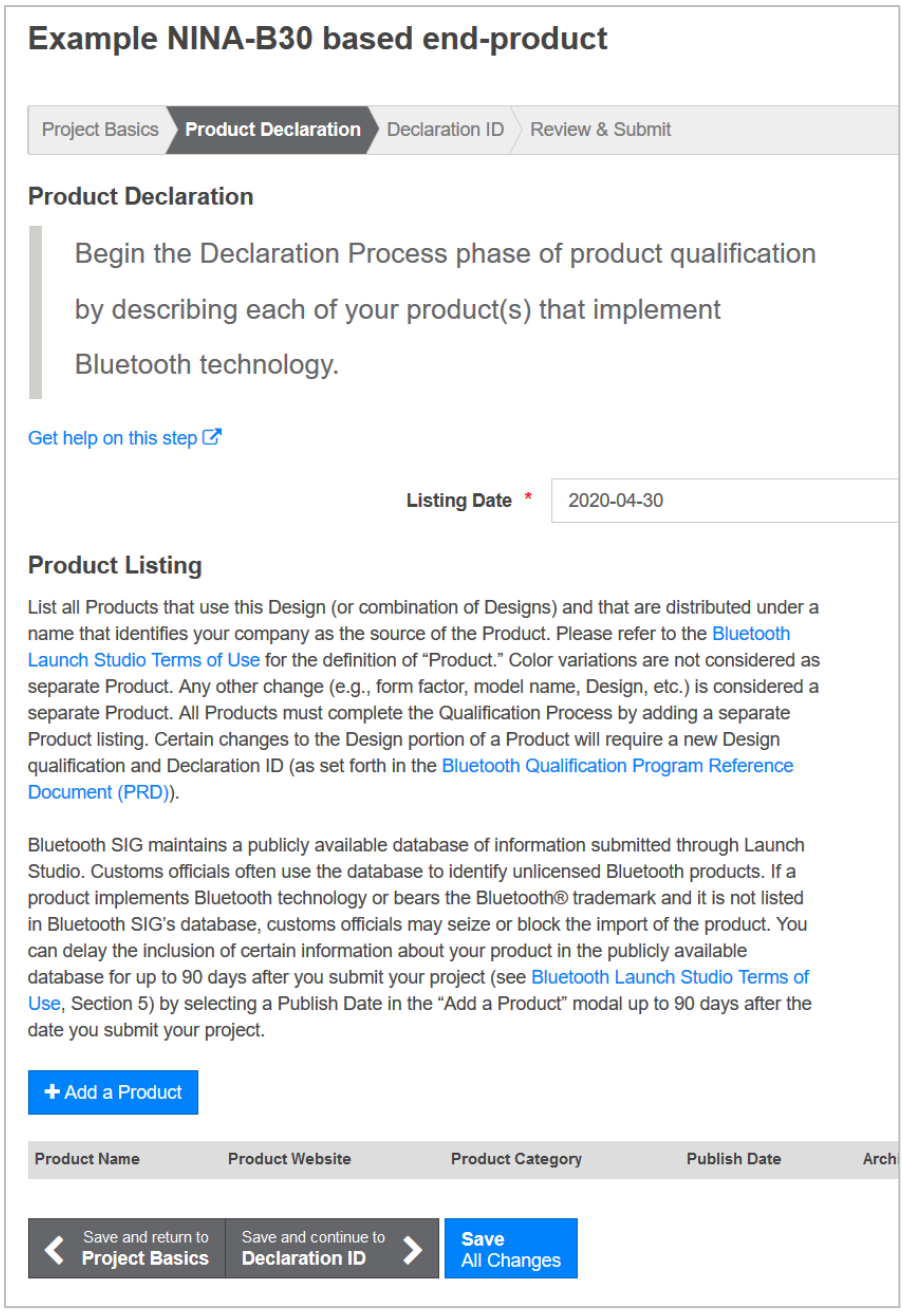


Figure 9: Product addition

Select “Add a Product” and complete the form.

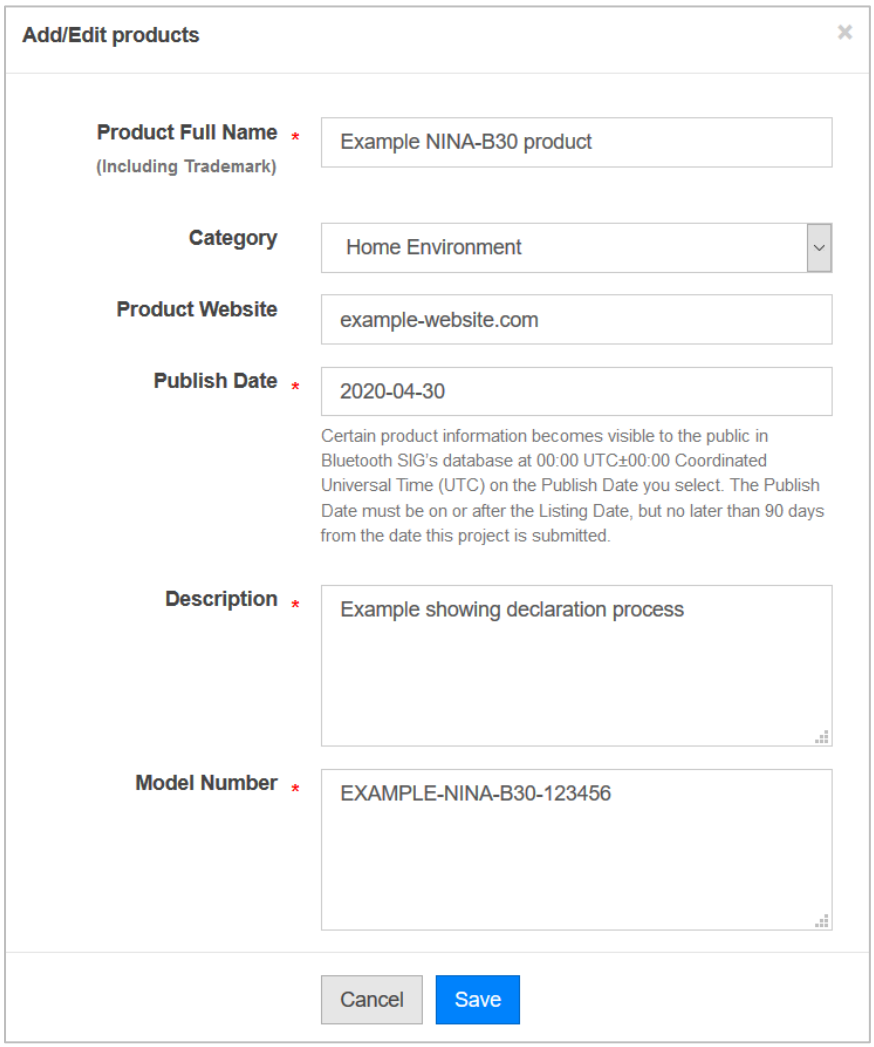


Figure 10: Product details

☞ On the Product Declaration page, enter a listing date. This may be up to 90 days in the future in order to prevent any public listing until that time.

Save the new product, then select “Save and continue to Declaration ID”.

2.3.3 Declaration ID

A Declaration ID is required to continue. Follow the link to purchase an ID. Pricing is dependent on the membership level. See the declaration fees page [4] for the latest information.

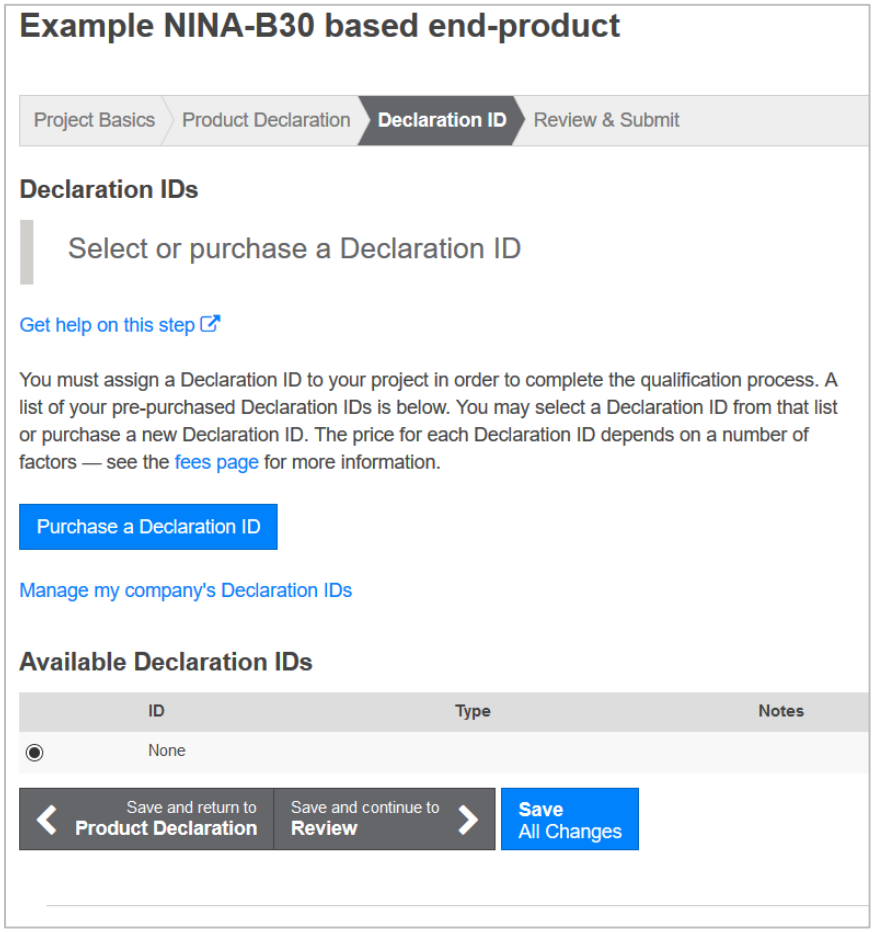


Figure 11: Declaration ID

After selecting an available Declaration ID, select “Save and continue to Review”.

2.3.4 Review and submission

At this point, all information required for the declaration is ready. Review the information to make sure it is correct and submit the declaration for listing.

Appendix

A Glossary

Abbreviation	Definition
Bluetooth SIG	Bluetooth Special Interest Group
CPU	Central Processing Unit
DIS	Device Information Service
End-product	The product being declared with the Bluetooth SIG
End Product QDID	The QDID listing associated with the u-blox module or nRF5 CPU The QDID that is the result of this process for the end-product
GATT	Generic Attribute Profile
QDID	Qualified Declaration Identification
SoftDevice	Nordic Semiconductor Bluetooth stack

Table 2: Explanation of the abbreviations and terms used

Related documents

[1] Bluetooth SIG website
[2] Bluetooth Launch Studio website (login required)
[3] Bluetooth GATT profiles
[4] Bluetooth SIG Declaration ID fees page

☞ For regular updates to u-blox documentation and product change notifications, register on our homepage (www.u-blox.com).

Revision history

Revision	Date	Comments
R01	04-Mar-2020	Initial release

Contact

For complete contact information, visit us at www.u-blox.com.

u-blox Offices

North, Central and South America

u-blox America, Inc.

Phone: +1 703 483 3180
E-mail: info_us@u-blox.com

Regional Office West Coast:

Phone: +1 408 573 3640
E-mail: info_us@u-blox.com

Technical Support:

Phone: +1 703 483 3185
E-mail: support@u-blox.com

Headquarters
Europe, Middle East, Africa

u-blox AG

Phone: +41 44 722 74 44
E-mail: info@u-blox.com
Support: support@u-blox.com

Asia, Australia, Pacific

u-blox Singapore Pte. Ltd.

Phone: +65 6734 3811
E-mail: info_ap@u-blox.com
Support: support_ap@u-blox.com

Regional Office Australia:

Phone: +61 2 8448 2016
E-mail: info_anz@u-blox.com
Support: support_ap@u-blox.com

Regional Office China (Beijing):

Phone: +86 10 68 133 545
E-mail: info_cn@u-blox.com
Support: support_cn@u-blox.com

Regional Office China (Chongqing):

Phone: +86 23 6815 1588
E-mail: info_cn@u-blox.com
Support: support_cn@u-blox.com

Regional Office China (Shanghai):

Phone: +86 21 6090 4832
E-mail: info_cn@u-blox.com
Support: support_cn@u-blox.com

Regional Office China (Shenzhen):

Phone: +86 755 8627 1083
E-mail: info_cn@u-blox.com
Support: support_cn@u-blox.com

Regional Office India:

Phone: +91 80 405 092 00
E-mail: info_in@u-blox.com
Support: support_in@u-blox.com

Regional Office Japan (Osaka):

Phone: +81 6 6941 3660
E-mail: info_jp@u-blox.com
Support: support_jp@u-blox.com

Regional Office Japan (Tokyo):

Phone: +81 3 5775 3850
E-mail: info_jp@u-blox.com
Support: support_jp@u-blox.com

Regional Office Korea:

Phone: +82 2 542 0861
E-mail: info_kr@u-blox.com
Support: support_kr@u-blox.com

Regional Office Taiwan:

Phone: +886 2 2657 1090
E-mail: info_tw@u-blox.com
Support: support_tw@u-blox.com