

# NX040

## Regulatory Information

v1.1

### 1 CURRENT REGULATORY CERTIFICATIONS

The NX040 (P/N 453-00174, 453-00175) holds current certifications in the following countries:

Country/Region	Regulatory ID
USA (FCC)	SQG-SERANX040
EU	N/A (No ID number required)
Canada (ISED)	3147A-SERANX040
UK (UKCA)	N/A (No ID number required)
Japan (MIC)	<i>pending</i>
Korea (KC)	<i>pending</i>
Australia	<i>pending</i>
New Zealand	<i>pending</i>

### 2 CERTIFIED ANTENNAS

The antennas listed below were tested for use with the NX040. The OEM can choose a different manufacturer's antenna but must make sure it is of same type and that the gain is less than or equal to the antenna that is approved for use.\*

**\*Note:** Japan (MIC) lists applicable antennas on its certificates. If your antenna is not on the approved list, regardless of whether it is comparative, it must be added to the certificate before it can be used in Japan.

Model	Type	Connector	Frequencies / Peak Gain (dBi)
Laird Connectivity NanoBlue EBL2400A1-10MH4L	PCB Dipole	IPEX MHF4	2400 – 2500 MHz / 2 dBi
Laird Connectivity FlexPIFA 001-0022	PIFA	IPEX MHF4	2400 – 2480 MHz / 2 dBi
Mag Layers EDA-8709-2G4C1-B27 0600-00057	Dipole	IPEX MHF4	2400 – 2480 MHz / 2 dBi
Laird Connectivity mFlexPIFA EFA2400A3S-10MH4L	PIFA	IPEX MHF4	2400 – 2480 MHz / 2 dBi
Laird Connectivity EFG2400A3S-10MH4L	PIFA	IPEX MHF4L	2400 – 2500 MHz / 3.1 dBi
Laird Connectivity Onboard PCB printed BLE antenna <sup>1</sup>	Printed PCB	N/A	2400 – 2480 MHz / 0.73 dBi
Laird Connectivity NanoUWB EUB5850A3S-10MHL4	PCB Monopole	IPEX MHF4L	5850 – 8250 MHz / 3.5 dBi
Laird Connectivity Onboard PCB printed UWB antenna <sup>1</sup>	Printed PCB	N/A	6250 – 8250 MHz / 3.5 dBi
Laird Connectivity NFC 0600-00061	NFC spiral	N/A	-

**Note 1:** NX040 PCB printed antennas are only certified for NX040 part number 453-00175.

### 3 DOCUMENTATION REQUIREMENTS

To ensure regulatory compliance, when integrating the NX040 into a host device, it is necessary to meet the documentation requirements set forth by the applicable regulatory agencies. The following sections (FCC, ISED Canada, European Union, and others) outline the information that may be included in the user’s guide and external labels for the host devices into which the NX040 is integrated.

### 4 FCC REGULATORY

Applicable FCC Rule Parts 15.247 and 15.519

Model	Part #	US/FCC
Sera NX040	453-00174	SQG-SERANX040
Sera NX040	453-00175	SQG-SERANX040

The 453-00174 and the 453-00175 hold full modular approvals. The OEM must follow the regulatory guidelines and warnings listed below and the installation guidance in section 12 to inherit the modular approval.

Part #	Form Factor	BLE Tx Outputs	UWB TX Outputs	Antenna
453-00174	Surface Mount	8 dBm	-41.3dBm/MHz	IPEX MHF4L
453-00175	Surface Mount	8 dBm	-41.3dBm/MHz	PCB Trace

#### 4.1 Antenna Information

The NX040 family has been designed to operate with the antennas listed below with a maximum gain of 3.1 dBi in the 2400 – 2500 MHz frequency band and a maximum gain of 3.5 dBi in the 6250 – 8250 MHz frequency band. The required antenna impedance is 50 ohms.

Model	Type	Connector	Peak Gain (dBi)
Laird Connectivity NanoBlue EBL2400A1-10MH4L <sup>2</sup>	PCB Dipole	IPEX MHF4	2400 – 2500 MHz 2 dBi
Laird Connectivity FlexPIFA 001-0022 <sup>2</sup>	PIFA	IPEX MHF4	2400 – 2480 MHz 2 dBi
Mag Layers EDA-8709-2G4C1-B27 0600-00057 <sup>2</sup>	Dipole	IPEX MHF4	2400 – 2480 MHz 2 dBi
Laird Connectivity mFlexPIFA EFA2400A3S-10MH4L <sup>2</sup>	PIFA	IPEX MHF4	2400 – 2480 MHz 2 dBi
Laird Connectivity EFG2400A3S-10MH4L <sup>2</sup>	PIFA	IPEX MHF4L	2400 – 2500 MHz 3.1 dBi
Laird Connectivity Onboard PCB printed BLE antenna <sup>1</sup>	Printed PCB	N/A	2400 – 2480 MHz 0.73 dBi
Laird Connectivity NanoUWB EUB5850A3S-10MHL4 <sup>2</sup>	PCB Monopole	IPEX MHF4L	5850 – 8250 MHz 3.5 dBi
Laird Connectivity Onboard PCB printed UWB antenna <sup>1</sup>	Printed PCB	N/A	6250 – 8250 MHz 3.5 dBi
Laird Connectivity NFC 0600-00061 <sup>2</sup>	NFC spiral	N/A	-

**Note 1:** NX040 PCB printed antennas are only certified for NX040 part number 453-00175. Refer to [Section 12](#) for implementation requirements that must be followed when using this antenna.

**Note 2:** The OEM is free to choose another vendor’s antenna of like type and equal or lesser gain as an antenna appearing in the table and still maintain compliance. Reference FCC Part 15.204(c)(4) for further information on this topic.

To reduce potential radio interference to other users, the antenna type and gain should be chosen so that the equivalent isotropic radiated power (EIRP) is not more than that permitted for successful communication.

If you desire to increase antenna gain and either change antenna type or use same antenna type certified, a Class II permissive change application is required to be filed by us, or the host manufacturer can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application.

## 4.2 FCC Documentation Requirements

This modular transmitter is only FCC authorized for the specific rule parts listed on our grant. The host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification.

### Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. The host manufacturer in any case shall ensure that the host product which is installed and operating with the module is compliant with Part 15B requirements.

However, there is no guarantee that interference will not occur in an installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

**FCC Caution:** Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference; and
2. This device must accept any interference received, including interference that may cause undesired operation.

### FCC Radiation Exposure Statement

This product complies with the US portable RF exposure limit set forth for an uncontrolled environment and is safe for intended operation as described in this manual. Further RF exposure reduction can be achieved if the product is kept as far as possible from the user body or is set to a lower output power if such function is available.

This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

This device is intended only for OEM integrators under the following condition:

1. The transmitter module may not be co-located with any other transmitter or antenna,

If the condition above is met, further transmitter testing is not required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this installed module.

### **IMPORTANT NOTE:**

If this condition cannot be met (for example, certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID **cannot** be used on the final product. In these circumstances, the OEM integrator is responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

### FCC Use statements applicable to UWB devices

Per §15.521(a) UWB devices may not be employed for the operation of toys. Operation onboard an aircraft, a ship, or a satellite is prohibited.

Per §15.519(a)(2) the use of antennas mounted on outdoor structures, e.g. antennas mounted on the outside of a building or on a telephone pole, or any fixed outdoor infrastructure is prohibited. Antennas may be mounted only on the hand held UWB device.

### End-Product Labeling

The end product must be labeled in accordance with FCC KDB guidance 784748 in a visible area with the following: **Contains FCC ID: SQG-SERANX040**

CFR §15.19 labelling requirements shall be compiled on the end user device.

### Manual Information to the End User

The OEM integrator must be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

As set out in §15.105, the end user manual shall include all required regulatory information/warnings as shown in this manual.

### Limited Module Procedures

-Not applicable

## 5 ISED (CANADA) STATEMENT

Applicable ISED Rule Parts: RSS-247 and RSS-220

Model	Part #	ISED Canada
Sera NX040	453-00174	3147A-SERANX040
Sera NX040	453-00175	3147A-SERANX040

### 5.1 Antenna Information

*This radio transmitter (IC: 3147A-SERANX040) has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.*

*Le présent émetteur radio (IC: 3147A-SERANX040) a été approuvé par Innovation, Sciences et Développement économique Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal. Les types d'antenne non inclus dans cette liste, et dont le gain est supérieur au gain maximal indiqué pour tout type figurant sur la liste, sont strictement interdits pour l'exploitation de l'émetteur.*

Model	Type	Connector	Peak Gain (dBi)
Laird Connectivity NanoBlue EBL2400A1-10MH4L	PCB Dipole	IPEX MHF4	2400 – 2500 MHz 2 dBi
Laird Connectivity FlexPIFA 001-0022	PIFA	IPEX MHF4	2400 – 2480 MHz 2 dBi
Mag Layers EDA-8709-2G4C1-B27 0600-00057	Dipole	IPEX MHF4	2400 – 2480 MHz 2 dBi
Laird Connectivity mFlexPIFA EFA2400A3S-10MH4L	PIFA	IPEX MHF4	2400 – 2480 MHz 2 dBi
Laird Connectivity EFG2400A3S-10MH4L	PIFA	IPEX MHF4L	2400 – 2500 MHz 3.1 dBi
Laird Connectivity Onboard PCB printed BLE antenna <sup>1</sup>	Printed PCB	N/A	2400 – 2480 MHz 0.73 dBi
Laird Connectivity NanoUWB EUB5850A3S-10MHL4	PCB Monopole	IPEX MHF4L	5850 – 8250 MHz 3.5 dBi
Laird Connectivity Onboard PCB printed UWB antenna <sup>1</sup>	Printed PCB	N/A	6250 – 8250 MHz 3.5 dBi

Model	Type	Connector	Peak Gain (dBi)
Laird Connectivity NFC 0600-00061	NFC spiral	N/A	-

**Note 1:** NX040 PCB printed antenna is only certified for NX040 part number 453-00175.

## 5.2 ISED Canada Statement

The end user manual shall include all required regulatory information/warning as shown in this manual.

This device complies with Industry Canada's license-exempt RSSs. Operation is subject to the following two conditions:

1. This device may not cause interference; and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

*Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:*

- 1. l'appareil ne doit pas produire de brouillage;*
- 2. l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.*

### Radiation Exposure Statement

The product complies with the Canada portable RF exposure limit set forth for an uncontrolled environment and are safe for intended operation as described in this manual. The minimum separation distance for portable use is limited to 20 mm assuming use of antenna with 3.5 dBi of gain. The further RF exposure reduction can be achieved if the product can be kept as far as possible from the user body or set the device to lower output power if such function is available.

### Déclaration d'exposition aux radiations:

Le produit est conforme aux limites d'exposition pour les appareils portables RF pour les Etats-Unis et le Canada établies pour un environnement non contrôlé. La distance de séparation minimale pour l'utilisation portative est limitée à 20 mm en supposant l'utilisation de l'antenne avec 3.5 dBi de gain. Le produit est sûr pour un fonctionnement tel que décrit dans ce manuel. La réduction aux expositions RF peut être augmentée si l'appareil peut être conservé aussi loin que possible du corps de l'utilisateur ou que le dispositif est réglé sur la puissance de sortie la plus faible si une telle fonction est disponible.

This device is intended only for OEM integrators under the following conditions:

1. The transmitter module may not be co-located with any other transmitter or antenna.

If the condition above is met, further transmitter testing is not required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

Cet appareil est conçu uniquement pour les intégrateurs OEM dans les conditions suivantes:

- 1. Le module émetteur peut ne pas être coïmplanté avec un autre émetteur ou antenne.*

*Tant que les 1 condition ci-dessus sont remplies, des essais supplémentaires sur l'émetteur ne seront pas nécessaires. Toutefois, l'intégrateur OEM est toujours responsable des essais sur son produit final pour toutes exigences de conformité supplémentaires requis pour ce module installé.*

### IMPORTANT NOTE:

If this condition cannot be met (for example, certain laptop configurations or co-location with another transmitter), then the Canada authorization is no longer considered valid and the IC ID **cannot** be used on the final product. In these circumstances, the OEM integrator is responsible for re-evaluating the end product (including the transmitter) and obtaining a separate Canada authorization.

**NOTE IMPORTANTE:**

*Dans le cas où ces conditions ne peuvent être satisfaites (par exemple pour certaines configurations d'ordinateur portable ou de certaines co-localisation avec un autre émetteur), l'autorisation du Canada n'est plus considéré comme valide et l'ID IC ne peut pas être utilisé sur le produit final. Dans ces circonstances, l'intégrateur OEM sera chargé de réévaluer le produit final (y compris l'émetteur) et l'obtention d'une autorisation distincte au Canada.*

**End-Product Labeling**

The final end product must be labeled in a visible area with the following: **Contains IC: 3147A-SERANX040**

**Plaque signalétique du produit final**

*Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: **Contient des IC: 3147A-SERANX040***

**Manual Information to the End User**

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

**Manuel d'information à l'utilisateur final**

*L'intégrateur OEM doit être conscient de ne pas fournir des informations à l'utilisateur final quant à la façon d'installer ou de supprimer ce module RF dans le manuel de l'utilisateur du produit final qui intègre ce module.*

*Le manuel de l'utilisateur final doit inclure toutes les informations réglementaires requises et avertissements comme indiqué dans ce manuel.*

**5.3 ISED ICES-003 Issue 7 Compliance Declaration**

This device was originally tested to the requirements of ICES-003 Issue 6, Information Technology Equipment (Including Digital Apparatus) — Limits and Methods of Measurement; and evaluated to the updates published in ICES-003, Issue 7, Information Technology Equipment (Including Digital Apparatus). Based on this evaluation, this product continues to observe compliance to the requirements set forth by The Innovation, Science and Economic Development Canada (ISED), and complies with the updates published in ICES-003, Issue 7, Information Technology Equipment (Including Digital Apparatus).

**6 JAPAN (MIC) REGULATORY**

The NX040 is pending approval for use in the Japanese market. The part numbers listed below hold WW type certification. Refer to **ARIB-STD-T66** for further guidance on OEM's responsibilities.

Model	Part #	Certificate Number	Antenna
Sera NX040	453-00174		IPEX MHF4
Sera NX040	453-00175		PCB Trace

**6.1 Antenna Information**

The NX040 was tested with antennas listed below. The OEM can choose a different manufacturers antenna but must make sure it is of same type and that the gain is lesser than or equal to the antenna that is approved for use.

Model	Type	Connector	Peak Gain (dBi)
Laird Connectivity NanoBlue EBL2400A1-10MH4L	PCB Dipole	IPEX MHF4	2400 – 2500 MHz 2 dBi
Laird Connectivity FlexPIFA 001-0022	PIFA	IPEX MHF4	2400 – 2480 MHz 2 dBi
Mag Layers EDA-8709-2G4C1-B27 0600-00057	Dipole	IPEX MHF4	2400 – 2480 MHz 2 dBi
Laird Connectivity mFlexPIFA EFA2400A3S-10MH4L	PIFA	IPEX MHF4	2400 – 2480 MHz 2 dBi

Model	Type	Connector	Peak Gain (dBi)
Laird Connectivity EFG2400A3S-10MH4L	PIFA	IPEX MHF4L	2400 – 2500 MHz 3.1 dBi
Laird Connectivity Onboard PCB printed BLE antenna <sup>1</sup>	Printed PCB	N/A	2400 – 2480 MHz 0.73 dBi
Laird Connectivity NanoUWB EUB5850A3S-10MHL4	PCB Monopole	IPEX MHF4L	5850 – 8250 MHz 3.5 dBi
Laird Connectivity Onboard PCB printed UWB antenna <sup>1</sup>	Printed PCB	N/A	6250 – 8250 MHz 3.5 dBi
Laird Connectivity NFC 0600-00061	NFC spiral	N/A	-

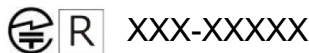
**Note 1:** NX040 PCB printed antenna is only certified for NX040 part number 453-00175.

## 6.2 Labeling Requirements

It is recommended that the host device bears a label showing the Japanese “GITEKI” mark and the certification number accompanied by the following statement:

当該機器には電波法に基づく、技術基準適合証明等を受けた特定無線設備を装着している

Translation: *This equipment contains specified radio equipment that has been certified to the Technical Regulation Conformity Certification under the Radio Law.*



## 7 KOREA (KC) REGULATORY

The NX040 is pending approval for use in the Korean market.

Model	Certificate Number
Sera NX040	R-C-L8C-SERANX040



R-C-L8C-SERANX040

## 8 AUSTRALIA AND NEW ZEALAND REGULATORY

RCM: Pending Compliant to standards EN 300 328 V1.9.1, AS/NZS 4268: 2012-A1:2013, and EN 55022:2010/AC:2011

If this device is used in a product, the OEM has responsibility to verify compliance of the final end product to the Australia/New Zealand (RCM) Standards. All end-products require their own certification (SDoc). You will not be able to leverage the module certification and ship product into the country.

## 9 UK (UKCA)

<b>Manufacturer</b>	Laird Connectivity
<b>Products</b>	453-00174, 453-00175
<b>Product Description</b>	Bluetooth v5.4 + 802.15.4/4z + NFC
<b>UK Legislation</b>	Radio Equipment Regulations 2017 Electromagnetic Compatibility Regulations 2016 Electrical Equipment (Safety) Regulations 2016

### Reference standards used for conformity:

Legislation	Requirement	Reference standard(s)	
Safety	Low voltage equipment safety	EN 62368-1: 2014	
	RF Exposure	EN 62311:2008 EN 62479: 2010	
EMC	Protection requirements – Electromagnetic compatibility	EN 301 489-1 v2.2.3 (2019-11) (Draft) EN 301 489-3 v2.1.1 (2019-03) EN 301 489-17 v3.1.1 (2017-02)	
Radio Equipment	Means of the efficient use of the radio frequency spectrum (ERM)	EN 300 328 v2.2.2 (2019-07)	Means of the efficient use of the radio frequency spectrum (ERM)
		EN 300 330 v2.1.1 (2017-02)	Short Range Devices (SRD)

**Declaration:**

We, Laird Connectivity, declare under our sole responsibility that the essential test suites have been carried out and that the above product to which this declaration relates is in conformity with all the applicable requirements outlined above, when used for its intended purpose.

The minimum distance between the user and/or any bystander and the radiating structure of the transmitter is 20 cm.

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Place of Issue: Laird Connectivity  
W66N220 Commerce Court, Cedarburg, WI 53012 USA  
tel: +1-262-375-4400 fax: +1-262-364-2649

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Date of Issue:

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Name of Authorized Person: Brian Petted, Technology Leader

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Signature of Authorized Person:

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## 10 EU REGULATORY

The 453-00174/453-00175 have been tested for compliance with relevant standards for the EU market. The 453-00174 module was tested with a 3.1 dBi BLE antenna and a 3.5dBi UWB antenna. The OEM can operate the 453-00174 module with any other type of antenna but must ensure that the gain does not exceed 3.1 dBi to maintain the Laird approval.

The OEM should consult with a qualified test house before entering their device into an EU member country to make sure all regulatory requirements have been met for their complete device.

### 10.1 Antenna Information

Model	Type	Connector	Peak Gain (dBi)
Laird Connectivity NanoBlue EBL2400A1-10MH4L	PCB Dipole	IPEX MHF4	2400 – 2500 MHz 2 dBi
Laird Connectivity FlexPIFA 001-0022	PIFA	IPEX MHF4	2400 – 2480 MHz 2 dBi
Mag Layers EDA-8709-2G4C1-B27 0600-00057	Dipole	IPEX MHF4	2400 – 2480 MHz 2 dBi
Laird Connectivity mFlexPIFA EFA2400A3S-10MH4L	PIFA	IPEX MHF4	2400 – 2480 MHz 2 dBi
Laird Connectivity EFG2400A3S-10MH4L	PIFA	IPEX MHF4L	2400 – 2500 MHz 3.1 dBi
Laird Connectivity Onboard PCB printed BLE antenna <sup>1</sup>	Printed PCB	N/A	2400 – 2480 MHz 0.73 dBi
Laird Connectivity NanoUWB EUB5850A3S-10MHL4	PCB Monopole	IPEX MHF4L	5850 – 8250 MHz 3.5 dBi
Laird Connectivity Onboard PCB printed UWB antenna <sup>1</sup>	Printed PCB	N/A	6250 – 8250 MHz 3.5 dBi
Laird Connectivity NFC 0600-00061	NFC spiral	N/A	-

**Note 1:** NX040 PCB printed antenna is only certified for NX040 part number 453-00175.

**Note 2:** The BLE RX transmit power CANNOT be set higher than +5 dBm during operation to meet the BLE RF transmit EIRP requirement of +10dBm.

**Note 3:** The NX040 module internal chipset IC pins are rated 2 kV (ESD HBM). ESD can find its way through the external JTAG connector (if used on the customer's design), if discharge is applied directly. Customer should ensure adequate protection against ESD on their end product design (using the NX040 module) to meet relevant ESD standard (for CE, this is EN301-489).

### 10.2 User's Guide Requirements

The integrator must include specific information in the user's guide for the device into which the NX040 is integrated. In addition to the required FCC and IC statements outlined above, the following Radio Equipment Directive (RED) statements must be added in their entirety and without modification into a prominent place in the user's guide for the device into which the NX040 is integrated:

This device complies with the essential requirements of the 2014/53/EU – Radio Equipment Directive (RED). The following test methods have been applied in order to prove presumption of conformity with the essential requirements of the 2014/53/EU – Radio Equipment Directive (RED):

- **EN 62368-1:2014/A11:2017**  
Safety requirements for audio/video, information, and technology equipment
- **EN 300 328 v2.2.2 (2019-07)**  
Electromagnetic compatibility and Radio Spectrum Matters (ERM); Wideband Transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using spread spectrum modulation techniques; Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive
- **EN 62311:2008 | EN 50665:2017 | EN 50385:2017**

RF exposure

- **EN 301 489-1 v2.2.0 (2017-03)**  
Electromagnetic compatibility and Radio Spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements
- **EN 301 489-17 V3.2.0 (2017-03)**  
Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for 2,4 GHz wideband transmission systems and 5 GHz high performance RLAN equipment
- **EU 2015/863 (RoHS 3)**  
Declaration of Compliance – EU Directive 2015/863; Reduction of Hazardous Substances (RoHS)

This device is a 2.4 GHz wideband transmission system (transceiver), intended for use in all EU member states and EFTA countries, except in France and Italy where restrictive use applies.

In Italy the end-user should apply for a license at the national spectrum authorities in order to obtain authorization to use the device for setting up outdoor radio links and/or for supplying public access to telecommunications and/or network services.

This device may not be used for setting up outdoor radio links in France and in some areas the RF output power may be limited to 10 mW EIRP in the frequency range of 2454 – 2483.5 MHz. For detailed information the end-user should contact the national spectrum authority in France.

<b>Български [Bulgarian]</b>	С настоящото [име на производителя] декларира, че това устройство [вид оборудване] е в съответствие със съществените изисквания и други приложими разпоредби на Директиви 2014/53/EC
<b>Hrvatski [Croatian]</b>	[naziv proizvođača] ovim putem izjavljuje da je ovaj uređaj [vrsta opreme] sukladan osnovnim zahtjevima i ostalim bitnim odredbama Direktiva 2014/53/EU
<b>Česky [Czech]</b>	[Jméno výrobce] tímto prohlašuje, že tento [typ zařízení] je ve shodě se základními požadavky a dalšími příslušnými ustanoveními směrnice 2014/53/EU.
<b>Dansk [Danish]</b>	Undertegnede [fabrikantens navn] erklærer herved, at følgende udstyr [udstyrets typebetegnelse] overholder de væsentlige krav og øvrige relevante krav i direktiv 2014/53/EU.
<b>Deutsch [German]</b>	Hiermit erkläre [Name des Herstellers], dass sich das Gerät [Gerätetyp] in Übereinstimmung mit den grundlegenden Anforderungen und den übrigen einschlägigen Bestimmungen der Richtlinie 2014/53/EU befindet.
<b>Eesti [Estonian]</b>	Käesolevaga kinnitab [tootja nimi] seadme [seadme tüüp] vastavust direktiivi 2014/53/EL põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele.
<b>English</b>	Hereby, [name of manufacturer], declares that this [type of equipment] is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU.
<b>Español [Spanish]</b>	Por medio de la presente [nombre del fabricante] declara que el [clase de equipo] cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 2014/53/UE.
<b>Ελληνική [Greek]</b>	ΜΕ ΤΗΝ ΠΑΡΟΥΣΑ [όνομα του κατασκευαστή] ΔΗΛΩΝΕΙ ΟΤΙ [εξοπλισμού] ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 2014/53/ΕΕ.
<b>Français [French]</b>	Par la présente [nom du fabricant] déclare que l'appareil [type d'appareil] est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 2014/53/UE.
<b>Íslenska [Icelandic]</b>	Hér, [Nafn framleiðanda], því yfir að þetta [gerð búnaðar] tæki er í samræmi við grunnkröfur og önnur viðeigandi ákvæði tilskipana 2014/53/ ESB
<b>Italiano [Italian]</b>	Con la presente [nome del costruttore] dichiara che questo [tipo di apparecchio] è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 2014/53/UE.
<b>Latviešu valoda [Latvian]</b>	Ar šo [izgatavotājanosaukums] deklarē, ka [iekārtas tips] atbilst Direktīvas 2014/53/ES būtiskajām prasībām un citiem ar to saistītajiem noteikumiem.
<b>Lietuvių kalba [Lithuanian]</b>	Šiuo [gamintojo pavadinimas] deklaruoją, kad šis [įrangos tipas] atitinka esminius reikalavimus ir kitas 2014/53/ES Direktyvos nuostatas.

<b>Nederlands [Dutch]</b>	Hierbij verklaart <i>[naam van de fabrikant]</i> dat het toestel <i>[type van toestel]</i> in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 2014/53/EU.
<b>Malti [Maltese]</b>	Hawnhekk, <i>[isem tal-manifattur]</i> , jiddikjara li dan <i>[il-mudel tal-prodott]</i> jikkonforma mal-htigijiet essenzjali u ma provvedimenti oħrajn relevanti li hemm fid-Dirrettiva 2014/53/UE.
<b>Magyar [Hungarian]</b>	Alulírott, <i>[gyártó neve]</i> nyilatkozom, hogy a <i>[... típus]</i> megfelel a vonatkozó alapvető követelményeknek és az 2014/53/EU irányelv egyéb előírásainak.
<b>Norsk [Norwegian]</b>	Herved <i>[navnet på produsenten]</i> , erklærer at denne <i>[type utstyr]</i> enheten, er i samsvar med de grunnleggende kravene og andre relevante bestemmelser i direktivene 2014/53/EU
<b>Polski [Polish]</b>	Niniejszym <i>[nazwa producenta]</i> oświadczam, że <i>[nazwa wyrobu]</i> jest zgodny z zasadniczymi wymogami oraz pozostałymi stosownymi postanowieniami Dyrektywy 2014/53/UE.
<b>Português [Portuguese]</b>	<i>[Nome do fabricante]</i> declara que este <i>[tipo de equipamento]</i> está conforme com os requisitos essenciais e outras disposições da Directiva 2014/53/UE.
<b>Română [Romanian]</b>	Prin prezenta, <i>[numele producătorului]</i> declară că acest dispozitiv <i>[tipul de echipament]</i> este în conformitate cu cerințele esențiale și alte prevederi relevante ale Directivei 2014/53/UE
<b>Slovenščina [Slovenian]</b>	<i>[Ime proizvajalca]</i> izjavlja, da je ta <i>[tip opreme]</i> v skladu z bistvenimi zahtevami in ostalimi relevantnimi določili direktive 2014/53/EU.
<b>Slovenčina [Slovak]</b>	<i>[Menovýrobcu]</i> týmto vyhlasuje, že <i>[typ zariadenia]</i> spĺňa základné požiadavky a všetky príslušné ustanovenia Smernice 2014/53/EU.
<b>Suomi [Finnish]</b>	<i>[Valmistaja]</i> vakuuttaa täten että <i>[laitteen tyyppimerkintä]</i> tyyppinen laite on direktiivin 2014/53/EU oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.
<b>Svenska [Swedish]</b>	Härmed intygar <i>[företag]</i> att denna <i>[utrustningstyp]</i> står i överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 2014/53/EU.

### 10.3 EU Declarations of Conformity

<b>Manufacturer</b>	Laird Connectivity
<b>Products</b>	453-00174, 453-00175
<b>Product Description</b>	Bluetooth v5.4 + 802.15.4/4z + NFC
<b>EU Directives</b>	2014/53/EU – Radio Equipment Directive (RED)

Reference standards used for presumption of conformity:

Article Number	Requirement	Reference standard(s)
3.1a	Low voltage equipment safety	EN 62368-1: 2014
	RF Exposure	EN 62311:2008 EN 62479: 2010
3.1b	Protection requirements – Electromagnetic compatibility	EN 301 489-1 v2.2.3 (2019-11) (Draft) EN 301 489-3 v2.1.1 (2019-03) EN 301 489-17 v3.1.1 (2017-02)
3.2	Means of the efficient use of the radio frequency spectrum (ERM)	EN 300 328 v2.2.2 (2019-07)      Wide-band transmission systems
		EN 300 330 v2.1.1 (2017-02)      Short Range Devices (SRD)

**Declaration:**

We, Laird Connectivity, declare under our sole responsibility that the essential radio test suites have been carried out and that the above product to which this declaration relates is in conformity with all the applicable essential requirements of Article 3 of the EU Radio Equipment Directive 2014/53/EU, when used for its intended purpose.

The minimum distance between the user and/or any bystander and the radiating structure of the transmitter is 20 cm.

Place of Issue:	Laird Connectivity W66N220 Commerce Court, Cedarburg, WI 53012 USA tel: +1-262-375-4400      fax: +1-262-364-2649
Date of Issue:	
Name of Authorized Person:	
Signature of Authorized Person:	

## 11 REGULATORY DOMAIN SUPPORT

Domain support but not currently certified for – TBD

## 12 MODULE INSTALLATION GUIDANCE

### 12.1 PCB Layout on Host PCB - General

#### Checklist (for PCB):

- MUST locate NX040 module close to the edge of PCB (mandatory for the 453-00175 for on-board PCB trace antenna to radiate properly).
- Use solid GND plane on inner layer (for best EMC and RF performance).
- All module GND pins MUST be connected to host PCB GND.
- Place GND vias close to module GND pads as possible.
- Unused PCB area on surface layer can be flooded with copper but place GND vias regularly to connect the copper flood to the inner GND plane. If GND flood copper is on the bottom of the module, then connect it with GND vias to the inner GND plane.
- Route traces to avoid noise being picked up on VBAT, VLIM, VBUS supply and AIN (analog) and SIO (digital) traces.
- Ensure no exposed copper is on the underside of the module (refer to land pattern of NX040 development board).

### 12.2 PCB Layout on Host PCB for the 453-00175

#### 12.2.1 Antenna Keep-Out on Host PCB

The 453-00175 has integrated PCB trace antennas and their performance is sensitive to host PCB. It is critical to locate the 453-00175 on the edge of the host PCB (or corner) to allow the antennas to radiate properly. Refer to guidelines in section **PCB land pattern and antenna keep-out area for the 453-00175**. Some of those guidelines are repeated below.

- Ensure there is no copper in the antenna keep-out area on any layers of the host PCB. Keep all mounting hardware and metal clear of the area to allow proper antenna radiation.
- For best antenna performance, place the 453-00175 module on the edge of the host PCB, preferably in the edge center.
- The NX040 development board has the 453-00175 module on the edge of the board (not in the corner). The antenna keep-out area is defined by the NX040 development board which was used for module development and antenna performance evaluation is shown in [Figure 1](#), where the antenna keep-out area is 10.5 mm high, 53.5 mm wide; with PCB dielectric (no copper) height 1.6 mm sitting under the 453-00175 PCB trace antenna.
- The 453-00175 module on-board PCB trace antennas are tuned when the 453-00175 is sitting on development board (host PCB) with size of 85.6 mm x 53.5 mm x 1.6 mm. The development board PCB extends 3.1 mm beyond the edge of the 453-00175 module. This PCB extension is not required and removal will have a small effect on the antenna.
- A different host PCB thickness dielectric will have small effect on antenna.



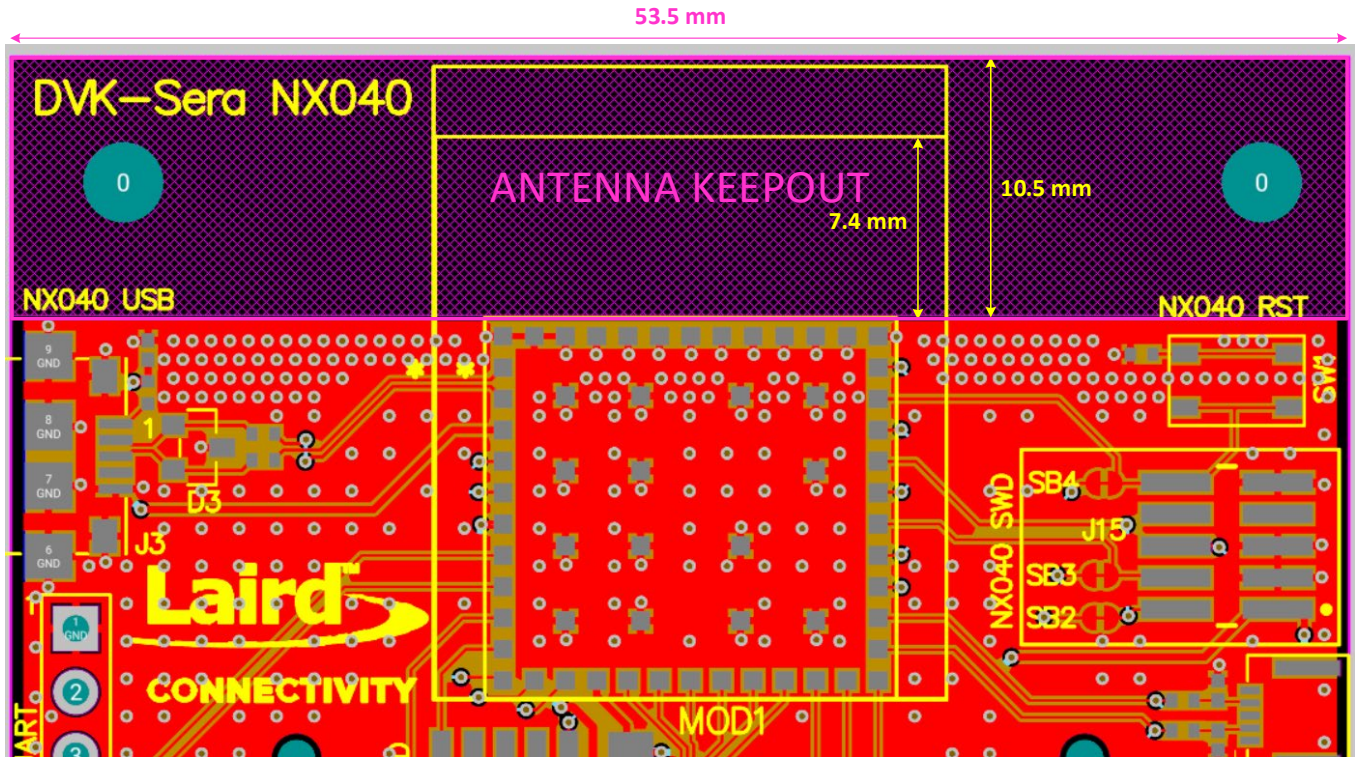


Figure 1: PCB trace Antenna keep-out area (cross-hatched), top edge of the NX040 development board for the 453-00175 module.

#### Host PCB Land Pattern and Antenna Keep-out for the 453-00175 Notes:

<b>Note 1</b>	Ensure there is no copper in the antenna 'keep out area' on any layers of the host PCB. Also keep all mounting hardware or any metal clear of the area (Refer to 12.2.2) to reduce effects of proximity detuning the antenna and to help antenna radiate properly.
<b>Note 2</b>	For the best on-board antenna performance, the module 453-00175 MUST be placed on the edge of the host PCB and preferably in the edge center of the host PCB with the antenna "Keep Out Area" is extended on the host board as done on the NX040 development board in Figure 1.
<b>Note 3</b>	Ensure that there is no exposed copper under the module on the host PCB.
<b>Note 4</b>	You may modify the PCB land pattern dimensions based on their experience and/or process capability.

## 12.2.2 Antenna Keep-Out and Proximity to Metal or Plastic

### Checklist (for metal /plastic enclosure):

- Minimum safe distance for metals without seriously compromising the antenna (tuning) is 40 mm top/bottom and 30 mm left or right.
- Metal close to the 453-00175 PCB trace antennas (bottom, top, left, right, any direction) will have degradation on the antenna performance. The amount of that degradation is entirely system dependent, meaning you will need to perform some testing with your host application.
- Any metal closer than 20 mm will begin to significantly degrade performance (S11, gain, radiation efficiency).
- It is best that you test the range with a mock-up (or actual prototype) of the product to assess effects of enclosure height (and materials, whether metal or plastic).

## 12.3 External Antenna Integration with 453-00174

Please refer to the regulatory sections for [FCC](#), [ISED](#), [EU](#), [RCM](#), [KC](#), and [Japan](#) for details of use of NX040-with external antennas in each regulatory region.

The NX040 family has been designed to operate with the below external antennas. The required antenna impedance is 50 ohms. See [Table 1](#). External antennas improve radiation efficiency.

**Table 1: External antennas for the NX040**

Model	Type	Connector	Frequencies / Peak Gain (dBi)
Laird Connectivity NanoBlue EBL2400A1-10MH4L	PCB Dipole	IPEX MHF4	2400 – 2500 MHz / 2 dBi
Laird Connectivity FlexPIFA 001-0022	PIFA	IPEX MHF4	2400 – 2480 MHz / 2 dBi
Mag Layers EDA-8709-2G4C1-B27 0600-00057	Dipole	IPEX MHF4	2400 – 2480 MHz / 2 dBi
Laird Connectivity mFlexPIFA EFA2400A3S-10MH4L	PIFA	IPEX MHF4	2400 – 2480 MHz / 2 dBi
Laird Connectivity EFG2400A3S-10MH4L	PIFA	IPEX MHF4L	2400 – 2500 MHz / 3.1 dBi
Laird Connectivity NanoUWB EUB5850A3S-10MHL4	PCB Monopole	IPEX MHF4L	5850 – 8250 MHz / 3.5 dBi
Laird Connectivity NFC 0600-00061	NFC spiral	N/A	-

## 13 REVISION HISTORY

Version	Date	Notes	Contributor(s)	Approver
1.0	13 October 2023	Initial version	Dave Neperud	
1.1	17 November 2023	Added installation instructions per KDB996369 D03 guidance	Dave Neperud	