

MULTI-CORE & MULTI-PROTOCOL – THE CAPABILITIES ARE ENDLESS



Laird Connectivity's newest edition to their Nordic Semiconductor based Bluetooth LE portfolio, is the most advanced, most secure and highest performing dual core MCU architecture wireless solution available. The BL5340 series of robust, tiny modules feature the **Nordic nRF5340 SoC**. It directly targets the highest performance with the lowest power budget, with variants featuring integrated Nordic **nRF21540 PA/LNA** for higher TX Power applications. Featuring Bluetooth 5.2 including Isochronous Channels and LE Audio, the BL5340 supports next generation Bluetooth audio for stereo streaming and broadcast audio.

The dual core **Arm® Cortex M33** microcontrollers enable you to run a low power core focused purely on wireless connectivity, with a second higher performance core targeted for the end application itself. This further extends the multi-protocol capabilities of the product: **Bluetooth LE, 802.15.4 (Thread / Zigbee) and NFC**. It's further enhanced with an ARM CryptoCell-312 including trusted execution, root-of-trust and secure key storage security features.

The BL5340 series brings out all nRF5340 hardware features and capabilities including **USB access**, up to **+10dBm** certified for PA version (+3 dBm from SoC) transmit power, from **1.7V to 5.5V** supply considerations, and a **true industrial operating range of -40 to 105°C**. Complete regulatory certifications enable faster time to market and reduced development risk completes Laird Connectivity's simplification of your next multi-protocol wireless design!

- **Nordic nRF5340** – 7x7 QFN with 48 GPIOs available.
- **Multi-protocol support:** Bluetooth 5.2 LE, 802.15.4 (Thread/Zigbee), NFC
- **Dual Cortex M33** microcontroller cores
 - Application processor - 128/64 MHZ M33 – 1MB Flash/512KB RAM (Including DSP Instructions)
 - Network processor - 64 MHZ M33 – 256KB Flash/64KB RAM
- **Most configurable interfaces:** - USB, UART, QSPI, SPI, I²S, I²C, PDM, PWM, ADC, GPIO, QDEC, Comparator, Low Power Comparator
- **Additional SoC Hardware Features** like RNG, WDT, temperature sensor, floating point unit, inter-processor communication, debug trace
- **Extended Industrial Temperature Rating** (-40° to +105 °C)
- **Module Choice:** Main module (BL5340 with nRF5340) or **Power Amplified** variant (BL5340 PA with nRF5340 + nRF21540)
- **Antenna choice** – integrated pre-certified **PCB or Trace pad** options
- **Small form factor:** as small as 15 x 10 x 2.2 mm (BL5340)
- **Development choice:** Zephyr RTOS or utilize Nordic nRF Connect SDK
- **Bluetooth LE:** Peripheral/Central, 2 Mbps (high throughput), LE Coded (long range), AoA / AoD, LE Audio / Isochronous Channels, Mesh
- **Advanced Security:** ARM TrustZone®, Root of Trust, ARM CryptoCell-312 & KMU, Access Control Lists, System Protection Unit, Encrypted QSPI
- **Firmware Over the Air (FOTA)** via MCUboot and Zephyr
- **Hostless operation** – Dual Core MCU reduces BOM
- Built on **decades of Nordic experience:** BL600/651/652/653/653μ/654
- **Fully featured development kits** to jump start Bluetooth LE development

FEATURES AT A GLANCE



SECURE, FLEXIBLE DUAL CORE M33 ARCHITECTURE

Dual cores supporting dedicated application and network processing all with secure trusted execution with Arm TrustZone and CryptoCell-312



SOFTWARE FLEXIBILITY AND SPEED TO MARKET

Develop yours with either Zephyr RTOS or the Nordic's nRF Connect SDK. Utilize our extensive sample apps and out of box demo to speed development



TRUE INDUSTRIAL OPERATING RANGE

Designed and certified to the highest industrial temperature range of -40 °C to +105 °C for every component utilised



GLOBAL APPROVALS – MAKE YOURSELF AT HOME

Carries FCC, ISCED, EU, RCM, MIC for Bluetooth and 802.15.4 and Bluetooth SIG approvals.



PERSONAL SUPPORT FROM DESIGN TO MANUFACTURE

Our industry-renowned support is passionate about helping you speed your design to market.



APPLICATION AREAS



Smart Building



Asset Tracking



Secure Medical Peripherals



Industrial Automation

KEY SPECIFICATIONS

CATEGORY	FEATURE	SPECIFICATION
Wireless Specification	Bluetooth®	v5.2
	802.15.4	Thread and Zigbee
	NFC	Type 2 / 4 Tags
	TX Power (radiated – inc. 2dBi antenna gain)	BL5340 Up to + 5 dBm. Configurable down to -38 dBm BL5340 PA Up to + 10 dBm. Configurable down to -41 dBm
	Receive Sensitivity	BL5340 -98.0 dBm (typical @ BLE 1 Mbps), -104 dBm (typical @ BLE 125 kbps) BL5340 PA TBD
	Link Budget	BL5340 101.0 dB (@ BLE 1 Mbps), 107 dB (@ BLE 125 kbps) BL5340 PA TBD
	Antenna Options	Integrated PCB trace antenna or RF trace pin for external antennas
	Raw Data Rates (Air)	1 Mbps, 2 Mbps, 500kbps, 125 kbps
Host Interface and Peripherals	UART Interface	TX, RX, CTS, RTS, DTR, DSR, DCD, RI (GPIO). Default: 115200, N, 8, 1. Configurable from 1200 bps to 1 Mbps
	USB Interface	2 pins – USB 2.0 slave, up to 12Mbps
	Other	Up to 48 multifunction GPIO's that can provide: - Up to 4 UART (4 GPIO pins each) 8 ADC channels (1 pin each) - Up to 4 I2C (2 GPIO pins each) - Up to 5 SPI Master (4 GPIO pins including CS each) 1 PDM (2 GPIO pins)
		1 I2S (5 GPIO pins) 2 GPIO pins for 32.768 kHz crystal 2 GPIO pins for NFC - PWM output on 16 pins - QSPI
Key BLE Features	Bluetooth Low Energy	- GATT client/server – Any adopted/custom services - Central/Peripheral roles - Bluetooth mesh 2M PHY - LE Coded PHY - LE Audio w/ Isochronous streams (BT v5.2)
		- AoA / AoD - LE Advertising Extensions - LE secure connections - Data packet length extensions - LE privacy v1.2 - DTM Firmware (Test Modes)
Programming Options	Nordic nRF Connect SDK	Software/Support available from Nordic directly https://devzone.nordicsemi.com/
	Zephyr RTOS	Software/Support available from https://www.zephyrproject.org/
FW upgrade		Via UART, SWD or BLE – nRF Connect SDK Via UART, SWD or BLE – Zephyr
Supply Voltage		1.7V – 5.5V – BL5340 variants 3.0V – 3.6V – BL5340 PA variants
Power Consumption	Current - BL5340 only	Max Peak Radio Current (@ +3 dBm TX) – 5.3 mA (DCDC at 3V) Max Peak Radio Current (@ 0 dBm TX) – 4.1 mA (DCDC at 3V) System ON – 1.3 µA (wake on any event) System OFF – 0.9 µA (wake on reset)
Physical	Dimensions	15 mm x 10 mm x 2.2 mm - BL5340 variants 21 mm x 10 mm x 2.2 mm – BL5340 PA variants
Environmental	Temp Range	-40°C to +105°C
Miscellaneous	Lead Free	Lead-free and RoHS-compliant
	Development Kit	Development board and free software tools
Development Tools	Utilities	Nordic nRF Connect - Android and iOS applications
Qualifications	Bluetooth®	Complete Declaration ID
Regulatory	Approvals	FCC/ISED/EU/MIC/RCM - All BL5340 Series. Bluetooth and 802.15.4 certified

For full specifications on BL5340 modules, please see the appropriate datasheet.

ORDERING INFORMATION

PART #	DESCRIPTION
453-00052R	BL5340 series - Multi-Core / Protocol - Bluetooth® + 802.15.4 + NFC Module (Nordic nRF5340) – Integrated antenna (Tape/Reel)
453-00053R	BL5340 series - Multi-Core / Protocol - Bluetooth® + 802.15.4 + NFC Module (Nordic nRF5340) – Trace pin (Tape/Reel)
453-00052C	BL5340 series - Multi-Core / Protocol - Bluetooth® + 802.15.4 + NFC Module (Nordic nRF5340) – Integrated antenna (Cut Tape)
453-00053C	BL5340 series - Multi-Core / Protocol - Bluetooth® + 802.15.4 + NFC Module (Nordic nRF5340) – Trace pin (Cut Tape)
453-00052-K1	Development kit for BL5340 Multi-Core / Protocol - Bluetooth® + 802.15.4 + NFC Module (Nordic nRF5340) – Integrated antenna
453-00053-K1	Development kit for BL5340 Multi-Core / Protocol - Bluetooth® + 802.15.4 + NFC Module (Nordic nRF5340) - Trace pin (Ext antenna)
453-00068R	BL5340 PA - Multi-Core / Protocol - Bluetooth® + 802.15.4 + NFC Module (Nordic nRF5340) – Integrated antenna (Tape/Reel)
453-00069R	BL5340 PA - Multi-Core / Protocol - Bluetooth® + 802.15.4 + NFC Module (Nordic nRF5340) – Trace pin (Tape/Reel)
453-00068C	BL5340 PA - Multi-Core / Protocol - Bluetooth® + 802.15.4 + NFC Module (Nordic nRF5340) – Integrated antenna (Cut Tape)
453-00069C	BL5340 PA - Multi-Core / Protocol - Bluetooth® + 802.15.4 + NFC Module (Nordic nRF5340) – Trace pin (Cut Tape)
453-00068-K1	DVK for BL5340 PA - Multi-Core / Protocol - Bluetooth® + 802.15.4 + NFC Module (Nordic nRF5340) – Integrated antenna

HARDWARE SPECIFICATIONS

Block Diagram and Pin-out

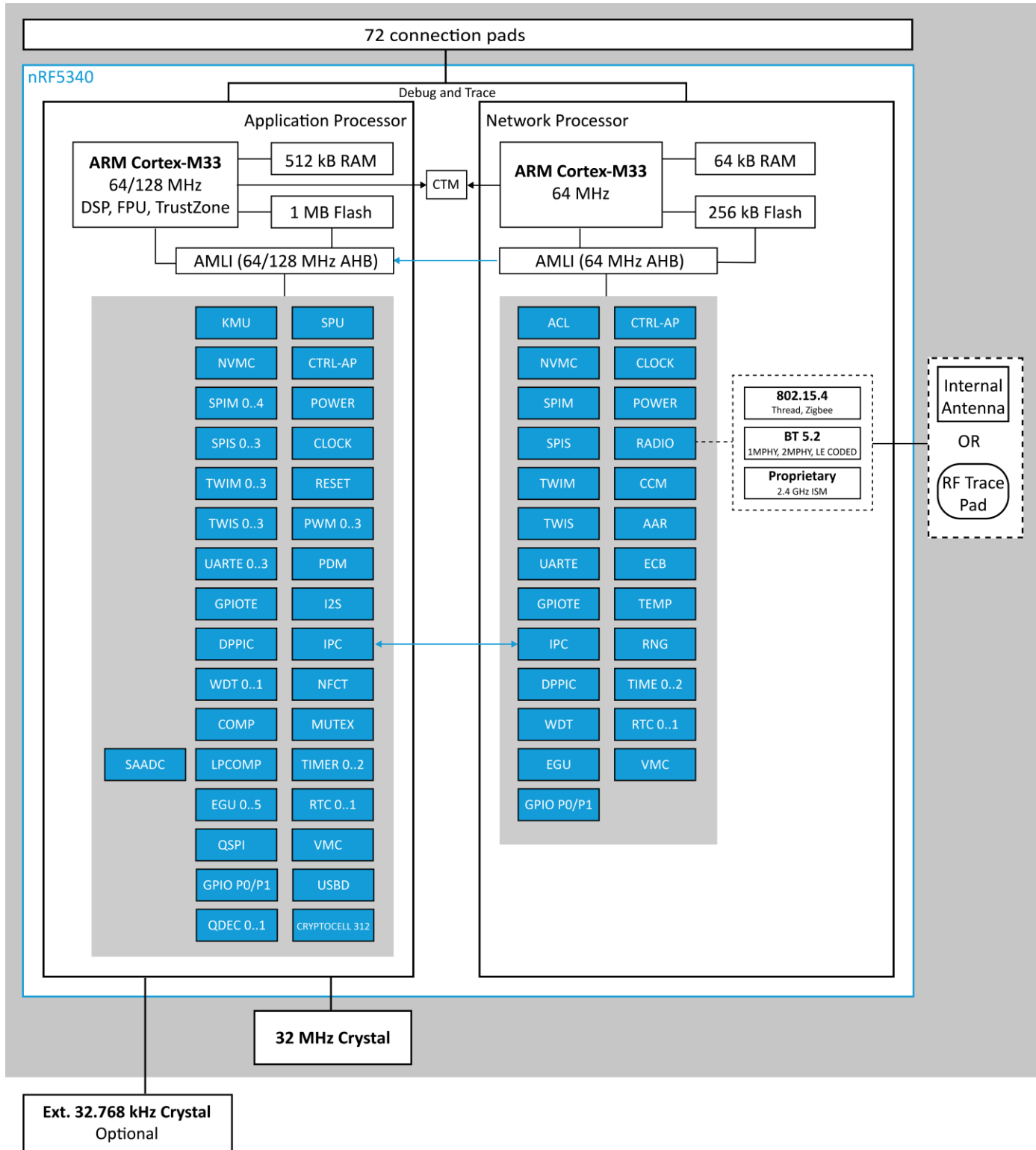


Figure 1: BL5340 HW block diagram

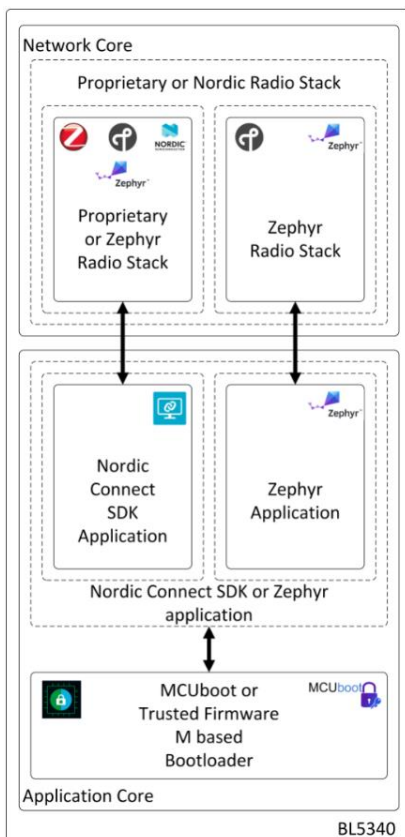


Figure 2: Functional SW block diagram for BL5340 series BLE module

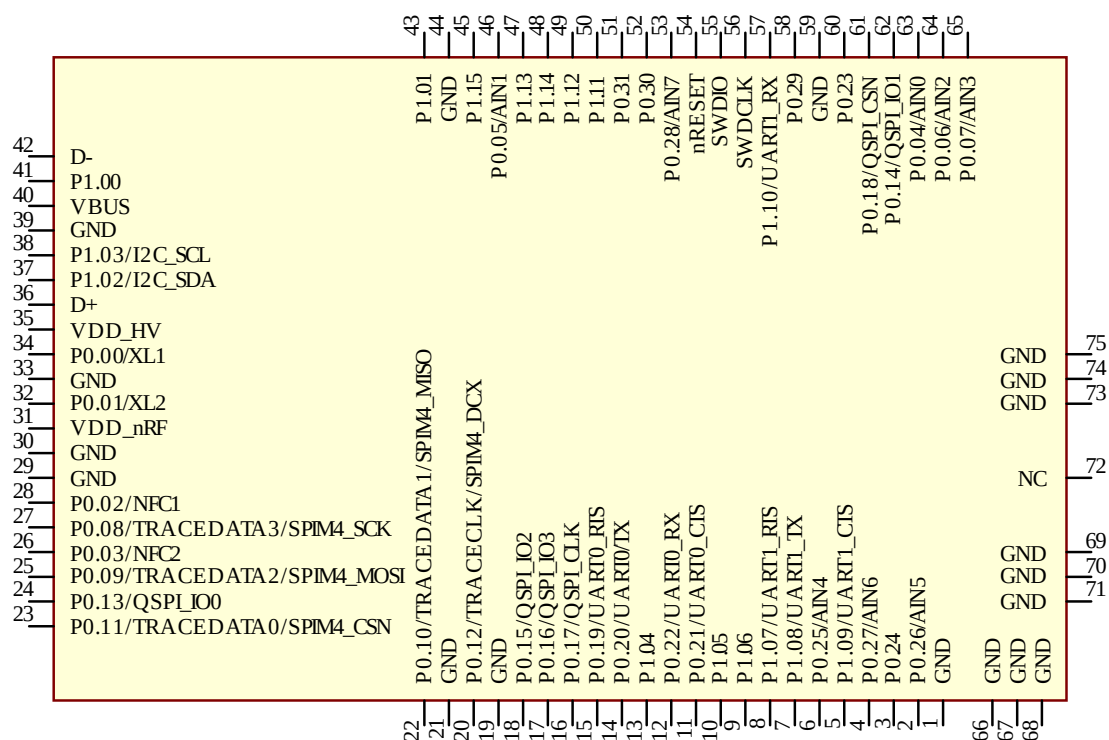


Figure 3: Top view - Schematic symbol for 453-00052 BL5340 Multi-Core/Protocol -Bluetooth +802.15.4+NFC Module (Nordic nRF5340) -Integrated Antenna.

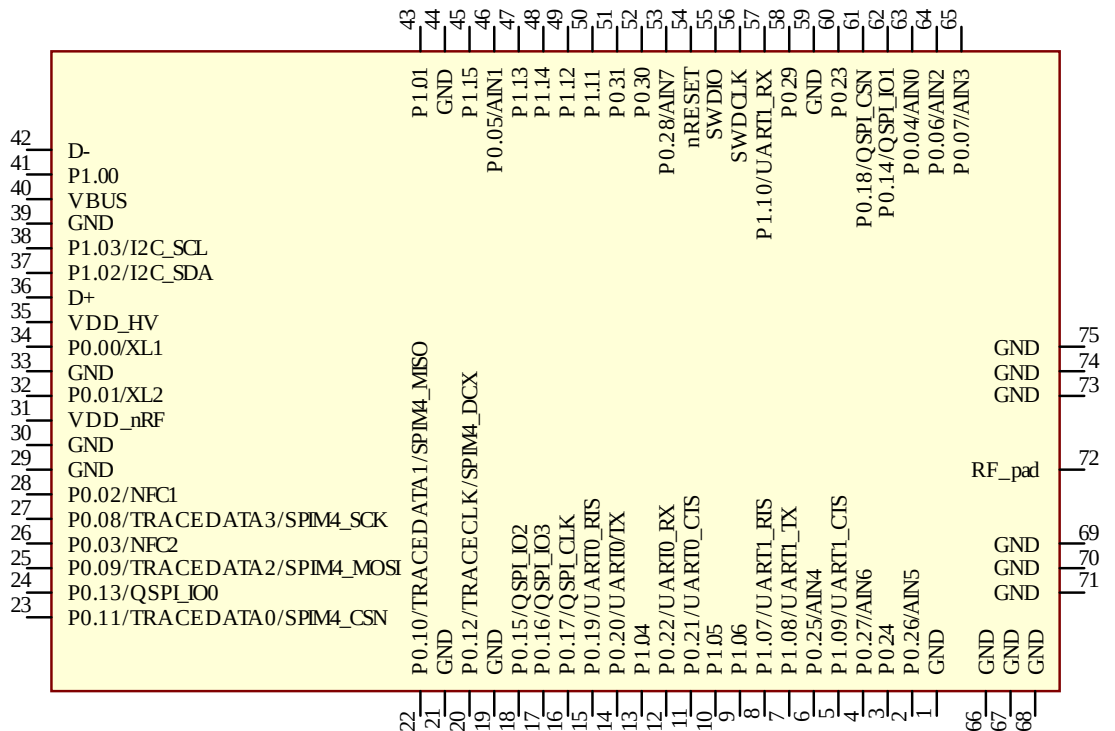


Figure 4: Top view - Schematic symbol for 453-00053 BL5340 Multi-Core/Protocol -Bluetooth +802.15.4+NFC Module (Nordic nRF5340) -Trace pin.

FCC REGULATORY

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. However, there is no guarantee that interference will not occur in a particular 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.

IMPORTANT NOTE:

FCC Radiation Exposure Statement:

The product comply with the US portable RF exposure limit set forth for an uncontrolled environment and are safe for intended operation as described in this manual. 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.

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

Country Code selection feature to be disabled for products marketed to the US/CANADA

Integration instructions for host product manufacturers

For documentation, software, sample apps and more visit:
<https://www.lairdconnect.com/BL5340-Series>

BL5340 Series

Applicable FCC rules to module
FCC Part 15.247

Summarize the specific operational use conditions

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
- 2) For all products market in US, OEM has to limit the operation channels in CH1 to CH11 for 2.4G band by supplied firmware programming tool. OEM shall not supply any tool or info to the end-user regarding to Regulatory Domain change.

As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

IMPORTANT NOTE: In the event that these conditions can not 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 can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization. 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. Limited module procedures

Not applicable

Trace antenna designs

Not applicable

RF exposure considerations

Co-located issue shall be met as mentioned in "Summarize the specific operational use conditions".

Product manufacturer shall provide below text in end-product manual

"Radiation Exposure Statement:

The product comply with the US portable RF exposure limit set forth for an uncontrolled environment and are safe for intended operation as described in this manual. 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.."

Antennas

MANUFACTURER	MODEL	LAIRD CONNECTIVITY PART NUMBER	TYPE	CONNECTOR	PEAK GAIN	
					2400-2500 MHZ	2400-2480 MHZ
Laird Connectivity	NanoBlue	EBL2400A1-10MH4L	PCB Dipole	IPEX MHF4	2 dBi	-
Laird Connectivity	FlexPIFA	001-0022	PIFA	IPEX MHF4	-	2 dBi
Mag.Layers	EDA-8709-2G4C1-B27-CY	0600-00057	Dipole	IPEX MHF4	2 dBi	-
Laird Connectivity	mFlexPIFA	EFA2400A3S-10MH4L	PIFA	IPEX MHF4	-	2 dBi
Laird Connectivity	Laird Connectivity NFC	0600-00061	spiral	N/A	-	-
Laird Connectivity	BL5340 PCB printed antenna	NA	Printed PCB	N/A	1.49 dBi	-

Label and Compliance Information

Product manufacturers need to provide a physical or e-label stating

"Contains FCC ID: SQGBL5340" with finished product

Information on Test Modes and Additional Testing Requirements

Test tool: nRFConnect DTM tool shall be used to set the module to transmit continuously in BLE mode (when DUT loaded with DTM FW) and Terminal program like PuTTY shall be used to set the module to transmit continuously in 802.15.4 mode (when DUT loaded with 802.15.4 PHY radio test FW which presents a CLI – command line interface – on a terminal program).

Additional Testing, Part 15 Subpart B Disclaimer

The module is only FCC authorized for the specific rule parts listed on the grant, and that 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. The final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed

ISED REGULATORY

Industry Canada Statement

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

- (1) This device may not cause interference

For documentation, software, sample apps and more visit:
<https://www.lairdconnect.com/BL5340-Series>

(2) This device must accept any interference, including interference that may cause undesired operation of the device

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique 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'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

This radio transmitter [IC: 3147A-BL5340] 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-BL5340] 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.

MANUFACTURER	MODEL	LAIRD CONNECTIVITY PART NUMBER	TYPE	CONNECTOR	PEAK GAIN	
					2400-2500 MHZ	2400-2480 MHZ
Laird Connectivity	NanoBlue	EBL2400A1-10MH4L	PCB Dipole	IPEX MHF4	2 dBi	-
Laird Connectivity	FlexPIFA	001-0022	PIFA	IPEX MHF4	-	2 dBi
Mag.Layers	EDA-8709-2G4C1-B27-CY	0600-00057	Dipole	IPEX MHF4	2 dBi	-
Laird Connectivity	mFlexPIFA	EFA2400A3S-10MH4L	PIFA	IPEX MHF4	-	2 dBi
Laird Connectivity	Laird Connectivity NFC	0600-00061	spiral	N/A	-	-
Laird Connectivity	BL5340 PCB printed antenna	NA	Printed PCB	N/A	1.49 dBi	-

Radiation Exposure Statement

The product comply 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 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. 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.

As long as 1 condition above are met, further transmitter test will not be 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:

In the event that these conditions 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 will be 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.

For documentation, software, sample apps and more visit:
<https://www.lairdconnect.com/BL5340-Series>

End Product Labeling

The final end product must be labeled in a visible area with the following: "Contains IC: 3147A-BL5340".

Plaque signalétique du produit final

Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: "Contient des IC: 3147A-BL5340".

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.