

LOW POWER IoT CONNECTIVITY MODULES WITH WPA3



*Wi-Fi 5 and Bluetooth 5.2 embeddable module
(MHF & Chip Antenna)*



Wi-Fi 5 and Bluetooth v5.2 embeddable SiP

Laird Connectivity's new Sterling-LWB+ Wi-Fi 4 with Bluetooth 5.2 module, based upon the Infineon AIROC™ CYW43439 chipset, is the latest member of the successful Sterling-LWB radio family. This new modules series is available as a System-in-Package (SiP) and two certified module versions, supporting either an on-board chip antenna or a MHF connector for an external antenna. It is designed to meet the demands of medical and industrial IoT connectivity.

The Sterling-LWB+ contains a fully featured Wi-Fi 4 radio, enabled with our industry-leading software drivers and support. The secure, high performance SDIO solution provides easy integration with any Linux or Android based system. It is designed for IoT from the start: fully certified, easy to integrate, and is the fastest route to the market for wireless IoT applications.

- **Compatible:** Our **Linux Backports** package supports many Linux kernels.
- **Reliable:** High quality drivers and extended product life support.
- **Robust:** Rich feature-set including 802.11b/g/n Wi-Fi and Dual-Mode Bluetooth.
- **Secure:** Supports the latest WPA3 security standards.

- **1x1 Wi-Fi 4** (802.11b/g/n)
- **Host Interface:**
 - Wi-Fi: SDIO v2.0
 - BT: HS-UART
- **Antenna options:**
 - On-board chip antenna
 - MHF4 connector
 - RF Pad
- **Bluetooth 5** Bluetooth Low Energy (LE)
- **Advanced Wi-Fi + Bluetooth coexistence** for seamless connectivity
- **Extended Operating Temperature Range** (-40°C to +85°C)
- **Global Certifications/Registrations** – FCC, ISCED, CE, MIC, RCM & Bluetooth SIG
- **Linux, Linux Backports** for broad kernel support

FEATURES AT A GLANCE



RELIABLE CONNECTIVITY

802.11b/g/n Wi-Fi with integrated PA and LNA.



SOFTWARE FLEXIBILITY AND SPEED TO MARKET

Open-Sourced software and Linux Backports ensure compatibility with a wide variety of Linux kernels.



EXTENDED OPERATING RANGE

Designed with an extended temperature range of -40°C to +85°C for every component utilized.



GLOBAL APPROVALS

Broad regulatory coverage including FCC, ISCED, CE, RCM, MIC and Bluetooth SIG registration.



PERSONAL SUPPORT FROM DESIGN TO MANUFACTURE.

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



APPLICATION AREAS



Rugged Handheld Devices



Industrial IoT Connectivity



Medical Devices



Industrial IoT Sensors

KEY SPECIFICATIONS

CATEGORY	FEATURE	SPECIFICATION
Wireless Specification	Wi-Fi	Wi-Fi 4 (802.11b/g/n)
	Bluetooth®	v5.2, Class 1/2
	Frequency	2.4 GHz (Single band)
	Transmit Power	802.11b: +18 dBm (11 Mbps)
		802.11g: +16 dBm (54 Mbps)
		802.11n: +15 dBm (HT20, MCS7)
	Receive Sensitivity	802.11b: -94 dBm (1 Mbps)
		802.11g: -90 dBm (6 Mbps)
		802.11n: -89 dBm (HT20, MCS0)
Host Interface and Peripherals	Antenna	MHF4, Integrated on-board chip antenna, or RF Pin
	PHY Link Rate (Air)	Up to 65Mbps – MCS7 OFDM (n)
	WLAN Interface	SDIO V2.0
Key Wi-Fi Features	Bluetooth Interface	HCI HS-UART (up to 4Mb/s), PCM (BT Audio)
	Wi-Fi 5 (802.11b/g/n)	<ul style="list-style-type: none"> • 20/40Hz wide channels • 1x1 antenna • Integrated PA/LNA • WPA/WPA2/WPA3™ Personal and Enterprise support • Station and SoftAP
Key Bluetooth Features	Bluetooth Low Energy	<ul style="list-style-type: none"> • Basic Rate, Enhanced Data Rate and BLE • Bluetooth 5.0 LE Secure Connections • Supports eSCO for enhanced voice quality • Multiple simultaneous A2DP streams • Adaptive frequency hopping (AFH)
Power Supply		3.3VDC (+/- 10%)
Power Consumption	Estimated Current (Wi-Fi)	<ul style="list-style-type: none"> • Typical Operating Power: 301 mA (11b, 1 Mbps @ +18 dBm Tx power) • Typical Standby Power: 773 µA (VBAT 3.3VDC, DTIM3) • Typical Deep Sleep Mode: 5.5 µA (VBAT 3.3VDC)
Physical	Dimensions (LxWxH)	SIP: 12mm x 12mm x 3mm MHF4/Chip Antenna: 21mm x 15.5mm x 4mm
Environmental	Temp Range	-40°C to +85°C
Miscellaneous	Lead Free	Lead-free and RoHS-compliant
Qualifications	Bluetooth® SIG	Bluetooth v5.2
Software	Driver OS Support	Laird Linux Backport v9.0.0.X and later
	Bluetooth Stack	N/A
Regulatory	Approvals	FCC/ISED/CE/MIC/RCM (Pending)

For full specifications on the integrated Sterling-LWB+ module, please see the appropriate datasheet.

PART #	DESCRIPTION
453-00083R	Module, Sterling LWB+ (Infineon 43439), SIP, Tape & Reel
453-00083C	Module, Sterling LWB+ (Infineon 43439), SIP, Cut Tape
453-00084R	Module, Sterling LWB+ (Infineon 43439), MHF4, Tape & Reel
453-00084C	Module, Sterling LWB+ (Infineon 43439), Cut Tape
453-00085R	Module, Sterling LWB+ (Infineon 43439), Chip Antenna, Tape & Reel
453-00085C	Module, Sterling LWB+ (Infineon 43439), Cut Tape
453-00084-K1	Development Kit, Sterling LWB+ (Infineon 43439), MHF4
453-00085-K1	Development Kit, Sterling LWB+ (Infineon 43439), Chip Antenna

REGULATORY

Regulatory IDs Summary

MODEL	US/FCC	CANADA/IC	JAPAN
Sterling LWB+	SQG-LWBPLUS	3147A-LWBPLUS	201-210737

Certified Antennas

MODEL	TYPE	CONNECTOR	PEAK GAIN AND OPERATING FREQUENCY
Laird/2.4GHz Dipole Antenna 001-0001	Dipole	RP-SMA	2.0 dBi@2.4GHz
Laird/FlexPIFA 001-0022	PIFA	IPEX MHF4L	2.0 dBi@2.4 GHz
Laird/FlexNotch 001-0023	PCB Dipole	IPEX MHF4L	2.0 dBi@2.4GHz
Laird/mFlexPIFA EFA2400A3S-10MH4L	PIFA	IPEX MHF4L	2.0 dBi@2.4GHz
Laird/Waterproof Dipole Antenna 001-0012	Dipole	RP-SMA	2.0 dBi@2.4 GHz, 2.0 dBi@5 GHz
Laird/ Phantom 800MHz - 5.8GHz TRA24003P/TRAB24003P	Monopole	N-Female	3.0dBi@2400-2500
ACX/AT3216-A2R4PAAT/LF	Chip Antenna	N/A	1.5dBi@2.4GHz

FCC AND IC REGULATORY

MODEL	US/FCC	CANADA/IC
Sterling LWB+	SQG-LWBPLUS	3147A-LWBPLUS

The LWB-Plus series wireless module is designed to pass certification with the antenna listed below. The required antenna impedance is 50 ohms.

MODEL	TYPE	CONNECTOR	PEAK GAIN AND OPERATING FREQUENCY
Laird/2.4GHz Dipole Antenna 001-0001	Dipole	RP-SMA	2.0 dBi@2.4GHz
Laird/FlexPIFA 001-0022	PIFA	IPEX MHF4L	2.0 dBi@2.4 GHz
Laird/FlexNotch 001-0023	PCB Dipole	IPEX MHF4L	2.0 dBi@2.4GHz
Laird/mFlexPIFA EFA2400A3S-10MH4L	PIFA	IPEX MHF4L	2.0 dBi@2.4GHz
Laird/Waterproof Dipole Antenna 001-0012	Dipole	RP-SMA	2.0 dBi@2.4 GHz, 2.0 dBi@5 GHz
Laird/ Phantom 800MHz - 5.8GHz TRA24003P/TRAB24003P	Monopole	N-Female	3.0dBi@2400-2500
ACX/AT3216-A2R4PAAT/LF	Chip Antenna	N/A	1.5dBi@2.4GHz

FCC 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:

Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

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

Applicable FCC rules to module

FCC Part 15.247

Summarize the specific operational use conditions

The module is must be installed in mobile device.

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

- 1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and
- 2) The transmitter module may not be co-located with any other transmitter or antenna
- 3) 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 3 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

20 cm separation distance and 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

“This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.”

Antenna Information

MODEL	TYPE	CONNECTOR	PEAK GAIN AND OPERATING FREQUENCY
Laird/2.4GHz Dipole Antenna 001-0001	Dipole	RP-SMA	2.0 dBi@2.4GHz
Laird/FlexPIFA 001-0022	PIFA	IPEX MHF4L	2.0 dBi@2.4 GHz
Laird/FlexNotch 001-0023	PCB Dipole	IPEX MHF4L	2.0 dBi@2.4GHz
Laird/mFlexPIFA EFA2400A3S-10MH4L	PIFA	IPEX MHF4L	2.0 dBi@2.4GHz
Laird/Waterproof Dipole Antenna 001-0012	Dipole	RP-SMA	2.0 dBi@2.4 GHz, 2.0 dBi@5 GHz
Laird/ Phantom 800MHz - 5.8GHz TRA24003P/TRAB24003P	Monopole	N-Female	3.0dBi@2400-2500
ACX/AT3216-A2R4PAAT/LF	Chip Antenna	N/A	1.5dBi@2.4GHz

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

“Contains FCC ID: SQG-LWBPLUS” with finished product

Information on Test Modes and Additional Testing Requirements

Test tool: Infineon wl tool shall be used to set the module to transmit continuously for Wi-Fi mode and Laird btlru shall be used to set the module to transmit continuously for Bluetooth mode.

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\

Professional installation instruction

Please be advised that due to the unique function supplied by this product, the device is intended for use with our interactive entertainment software and licensed third-party only. The product will be distributed through controlled distribution channel and installed by trained professional and will not be sold directly to the general public through retail store.

1. Installation personal

This product is designed for specific application and needs to be installed by a qualified personal who has RF and related rule knowledge. The general user shall not attempt to install or change the setting.

2. Installation location

The product shall be installed at a location where the radiating antenna can be kept 40cm from nearby person in normal operation condition to meet regulatory RF exposure requirement.

3. External antenna

Use only the antennas which have been approved by the applicant. The non-approved antenna(s) may produce unwanted spurious or excessive RF transmitting power which may lead to the violation of FCC/IC limit and is prohibited.

4. Installation procedure

Please refer to user's manual for the detail.

5. Warning

Please carefully select the installation position and make sure that the final output power does not exceed the limit set force in **relevant rules**. The violation of the rule could lead to serious federal penalty.

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*
- (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.*

(For transmitters equipped with detachable antennas)

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

Antenna Information

MODEL	TYPE	CONNECTOR	PEAK GAIN AND OPERATING FREQUENCY
Laird/2.4GHz Dipole Antenna 001-0001	Dipole	RP-SMA	2.0 dBi@2.4GHz
Laird/FlexPIFA 001-0022	PIFA	IPEX MHF4L	2.0 dBi@2.4 GHz
Laird/FlexNotch 001-0023	PCB Dipole	IPEX MHF4L	2.0 dBi@2.4GHz
Laird/mFlexPIFA EFA2400A3S-10MH4L	PIFA	IPEX MHF4L	2.0 dBi@2.4GHz
Laird/Waterproof Dipole Antenna 001-0012	Dipole	RP-SMA	2.0 dBi@2.4 GHz, 2.0 dBi@5 GHz
Laird/ Phantom 800MHz - 5.8GHz TRA24003P/TRAB24003P	Monopole	N-Female	3.0dBi@2400-2500
ACX/AT3216-A2R4PAAT/LF	Chip Antenna	N/A	1.5dBi@2.4GHz

Instructions d'installation professionnelle

Veillez noter que l'appareil étant dédié à une fonction unique, il doit être utilisé avec notre logiciel propriétaire de divertissement interactif. Ce produit sera proposé par un réseau de distribution contrôlé et installé par des professionnels; il ne sera pas proposé au grand public par le réseau de la grande distribution.

1. Installation

Ce produit est destiné à un usage spécifique et doit être installé par un personnel qualifié maîtrisant les radiofréquences et les règles s'y rapportant. L'installation et les réglages ne doivent pas être modifiés par l'utilisateur final.

2. Emplacement d'installation

En usage normal, afin de respecter les exigences réglementaires concernant l'exposition aux radiofréquences, ce produit doit être installé de façon à respecter une distance de **40 cm** entre l'antenne émettrice et les personnes.

3. Antenne externe.

Utiliser uniquement les antennes approuvées par le fabricant. L'utilisation d'autres antennes peut conduire à un niveau de rayonnement essentiel ou non essentiel dépassant les niveaux limites définis par FCC/IC, ce qui est interdit.

4. Procédure d'installation

Consulter le manuel d'utilisation.

5. Avertissement

Choisir avec soin la position d'installation et s'assurer que la puissance de sortie ne dépasse pas les limites en vigueur. La violation de cette règle peut conduire à de sérieuses pénalités fédérales.

European Union Regulatory

The LWB-Plus series wireless module has been tested for compliance with relevant standards for the EU market. The LWB-Plus series wireless module was tested with antennas listed below.

MODEL	TYPE	CONNECTOR	PEAK GAIN AND OPERATING FREQUENCY
Laird/2.4GHz Dipole Antenna 001-0001	Dipole	RP-SMA	2.0 dBi@2.4GHz
Laird/FlexPIFA 001-0022	PIFA	IPEX MHF4L	2.0 dBi@2.4 GHz
Laird/FlexNotch 001-0023	PCB Dipole	IPEX MHF4L	2.0 dBi@2.4GHz
Laird/mFlexPIFA EFA2400A3S-10MH4L	PIFA	IPEX MHF4L	2.0 dBi@2.4GHz
Laird/Waterproof Dipole Antenna 001-0012	Dipole	RP-SMA	2.0 dBi@2.4 GHz, 2.0 dBi@5 GHz
Laird/ Phantom 800MHz - 5.8GHz TRA24003P/TRAB24003P	Monopole	N-Female	3.0dBi@2400-2500
ACX/AT3216-A2R4PAAT/LF	Chip Antenna	N/A	1.5dBi@2.4GHz

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.

Reference the Declaration of Conformities listed below for a full list of the standards that the modules were tested to. Test reports are available upon request.

EU Declarations of Conformity

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

Manufacturer:	Laird
Products:	Sterling LWB+ 802.11n 2.4GHz + BT5.2 Module
EU Directives:	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	IEC 62368-1:2014;and/or EN62368-1:2014+A11:2017
	RF Exposure	EN 62311:2020 EN 50285: 2017 EN 50665: 2017
3.1b	Protection requirements with respect to electromagnetic compatibility	EN 301 489-1 v2.2.3 EN 301 489-17 v3.2.4
3.2	Means of the efficient use of the radio frequency spectrum	EN 300 328 v2.2.2

Declaration:

We, Laird, 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 Directive 1999/5/EC, when used for its intended purpose.

Place of Issue:	Laird Connectivity LLC W66N220 Commerce Court, Cedarburg, WI 53012 USA tel: +1-262-375-4400 fax: +1-262-364-2649
Date of Issue:	May 2017
Name of Authorized Person:	Brian Petted, Technology Leader
Signature of Authorized Person:	

Maximum Output Power for Each Frequency

19.22 dBm, WLAN 2.4G
10.58 dBm, 2.4G: 2.402 GHz~2.480GHZ(BT EDR)
9.40 dBm, 2.4G: 2.412 GHz~2.472GHZ(BT LE)

Software Version for Testing

SW version: som60x2_lwb_mfg-laird-9.0.0.20

RF exposure statement

MPE

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