



Appion Inc. Phone: 303-937-1580 Fax: 1599  
2800 South Tejon St. Englewood, CO 80110 USA

[www.AppionTools.com](http://www.AppionTools.com)

# Bluetooth Low Energy BLE 4.2 Module Model Number: LR2188/LR2188-uFL Manual



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## Description

LR2188/LR2188-uFL BLE module houses the Nordic nRF52832 SoC with an on-board chip or external antenna tuning for great performance and low power consumption.

LR2188/LR2188-uFL offers all Bluetooth low energy features: radio, stack, profiles and application space for customer applications, so no external processor is needed.

For the nRF52832 SoC, refers to the nRF52832 Product Specification and the SDK is available from the Nordic Semiconductor website.

## Main Features

- Complete Bluetooth® low energy SoC (4.2 specification)
- 32-bit ARM Cortex-M4F processor @ 64MHz
- Size : 15 X 12 X 2 mm
- Operating Frequency : 2,402MHz ~ 2,480MHz
- FPU, DSP
- Up to 64 KB SRAM and 512 KB Flash
- Certified for CE, FCC and Bluetooth
- Rx sensitivity : Typical -93dBm
- Storage Temperature range : -20°C~55°C

## Applications

- Sports and leisure equipment
- Heart rate collector
- Pedometer
- Watches
- Cycling and cadence sensor
- Consumer electronics
- Human Interface Devices (Keyboard, Mouse)
- Consumer medical
- Smart energy
- Security finder
- Proximity and presence
- Home and building automation



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The (Family model **LR2188/LR2188-uFL**) two models of Main Board share the same PCB layout.

The only difference is the LR2188 uses a SMT Chip Antenna whereas the LR2188-uFL has a u.FL connector to attached to an external antenna.

- **LR2188 uses a SMT Chip Antenna**
- **LR2188-uFL has a u.FL connector for external antenna use.**

| Model                  | Item Description                                                      | Placement | Type/<br>Model      | Manufacturer<br>Name   | Manufacturers.<br>Part Number | Remark |
|------------------------|-----------------------------------------------------------------------|-----------|---------------------|------------------------|-------------------------------|--------|
| <b>LR2188</b>          | Bluetooth module with SMT Chip Antenna                                | <b>A1</b> | SMT Chip<br>Antenna | Johanson<br>Technology | 2450AT43B100E                 | N/A    |
| <b>LR2188-<br/>uFL</b> | Bluetooth module with u.FL connector for<br>use with external antenna | <b>J1</b> | u.FL connector      | Hirose                 | U.FL-R-SMT-1                  | N/A    |

Antenna Approved for use with LR2188/LR2188-uFL

| Part Number | Gain (dBi) | Supplier            | Notes                |
|-------------|------------|---------------------|----------------------|
| Chip        | 1.3        | JOHANSON TECHNOLOGY | 2450AT43B100-1       |
| Dipole      | 4.9        | Laird TECHNOLOGIES  | ANT-DS-IN24-5RD 0711 |
| Whip        | 3.0        | Anaren, Inc.        | 66089-2406           |

Since this module is not sold to general end users directly, there is no user manual of module.

For the details about this module, please refer to the specification sheet of module.

This module should be installed in the host device according to the interface specification (installation procedure).



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### **Federal Communication Commission Interference Statement**

This equipment was 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 a minimum distance of 20 centimeters between the radiator and your body.

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

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

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

- 1.The antenna must be installed such that 20 centimeters 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 must limit the operation channels in CH0 to CH39 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.

If the conditions above are met, further transmitter test are not 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 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

### **End Product Labeling**

This transmitter module is authorized only for use in a device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: Contains FCC ID: 2ABH9-LR2188

### **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.



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## 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:

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

Cet appareil contient des émetteurs / récepteurs exempts de licence qui sont conformes au (x) RSS (s) exemptés de licence d'Innovation, Sciences et Développement économique Canada. L'opération est soumise aux deux conditions suivantes:

- Cet appareil ne doit pas causer d'interférences
- Cet appareil doit accepter toute interférence, y compris les interférences pouvant provoquer un fonctionnement indésirable de l'appareil

This radio transmitter (IC: 11615A-LR2188) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Le présent émetteur radio (IC: 11615A-LR2188) a été approuvé par Industrie 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, sont strictement interdits pour l'exploitation de l'émetteur..

| Part Number | Gain (dBi) | Supplier            | Notes                |
|-------------|------------|---------------------|----------------------|
| Chip        | 1.3        | JOHANSON TECHNOLOGY | 2450AT43B100-1       |
| Dipole      | 4.9        | Laird TECHNOLOGIES  | ANT-DS-IN24-5RD 0711 |
| Whip        | 3.0        | Anaren, Inc.        | 66089-2406           |

## Radiation Exposure Statement

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

## Déclaration d'exposition aux radiations

Cet équipement est conforme Canada limites d'exposition aux radiations dans un environnement non contrôlé. Cet équipement doit être installé et utilisé à distance minimum de 20cm entre le radiateur et votre corps.

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

- The transmitter module may not be co-located with any other transmitter or antenna.  
As long as the condition above is 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:

- 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 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: 11615A-LR2188

## Plaque signalétique du produit final

Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: Contient des IC: 11615A-LR2188



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#### **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.

#### **EU Declarations of Conformity**



Manufacturer: Appion Incorporated

Products: LR2188

EU Directives: 2014/35/EU, 2014/30/EU and 2014/53/EU

Conformity Assessment: Annex IV

#### **Declaration:**

We, Appion Incorporated, 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 2014/53/EU, when used for its intended purpose.

Place of Issue: 2800 South Tejon Street Englewood, CO 80110

Name of Authorized Person: Frank Roberts II

Title: Chief Technical Officer

Signature of Authorized Person:

A handwritten signature in blue ink that reads "Frank Roberts II".