



# **SPARK CONNECTED IOT – LOW POWER**

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## **LoRaWAN™**

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## **DEVICE GUIDELINES**

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# 1.0 SPARK CONNECTED IOT NETWORK

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Spark's Connected IoT Network – Powered by LoRaWAN™ is based on the LoRa Alliance™ LoRaWAN 1.0.2 specification.

LoRaWAN™ is a Low Power Wide Area Network with features that support low-cost, mobile, and secure bi-directional communication for Internet of Things (IoT), machine-to-machine (M2M), and smart city, and industrial applications. LoRaWAN is optimized for low power consumption and is designed to support large networks with millions and millions of devices.

We encourage LoRaWAN device developers to become a member of the LoRa alliance™, where they will receive access to the relevant specification documents and guidelines on getting their devices through the certification program and other benefits are detailed on their site, see URL below.

See the LoRa Alliance website for further details on becoming a member.

<https://www.lora-alliance.org/lorawan-for-developers>

Membership benefits are listed here.

<https://www.lora-alliance.org/membership-benefits>

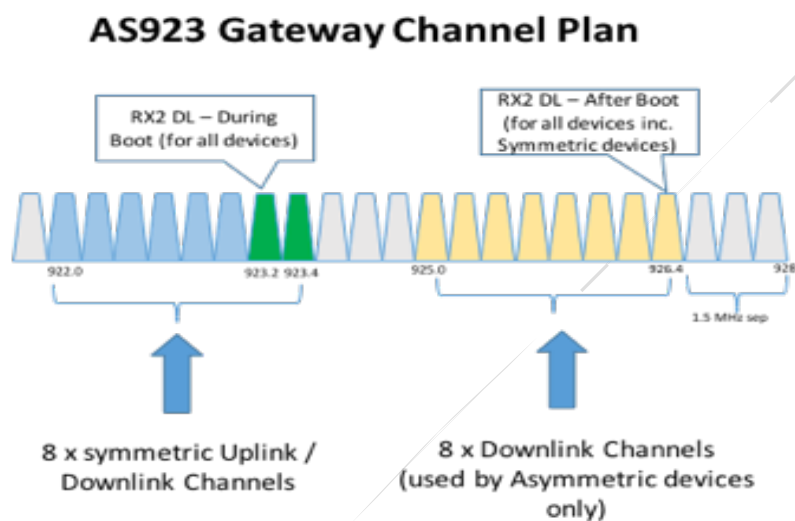
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## 2.0 CHANNEL PLAN

### 2.1 LoRaWAN AS923 Asia Pacific Channel Plan

Spark’s Connected IoT network powered by LoRaWAN™ uses the **AS923 LoRaWAN Channel Plan** for the Asia Pacific region.

All LoRaWAN sensors/module firmware must support the AS923 channel plan for successful provisioning and operation on our LoRaWAN network.



- All sensors try to join the NW using just the 923.2MHz or 923.4MHz channels, after which the NW further assigns the 8x asymmetric uplink & 8x downlink channels via a LoRaWAN 1.0.2 CFList MAC downlink frame. These are depicted in above image. This includes support for the new 1.0.2 LoRa MAC commands enabling greater NW-centric managed radio health. LoRa product resellers, distributors, or HW OEM’s building new sensors or retrofitting existing sensors should refer back to their LoRa module suppliers for compliance with this standard.
- See the LoRaWAN Alliance Regional Parameters Specification Document which details the operating parameters for AS923. This document is available at request from the LoRaWAN Alliance. <https://www.lora-alliance.org/for-developers>

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## 3.0 LORAWAN™ DEVICE CERTIFICATION REQUIREMENTS

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### 3.1 LoRaWAN™ Certification

The LoRa Alliance Certified™ product program ensures that products meet national frequency regulations as well as the LoRaWAN features required to ensure interoperability and compliance. The LoRa Alliance Certified™ product program also ensures LoRaWAN interoperability and compliance of network infrastructure, components and offerings according to national frequency regulations and the Alliance specification.

- LoRaWAN devices on the Spark Connected IoT network need to be LoRaWAN Alliance Certified™ for the 1.0.2 LoRaWAN standard on the AS923 Channel plan.
- LoRaWAN module suppliers certify their chip/modules in each region with the LoRaWAN Alliance. Each module per channel region i.e. USA US915, Europe EUR868, Asia/Pacific AS923 need to be certified.
- Only LoRa Alliance™ authorized test houses may perform testing for the LoRa Alliance Certified™ product program.
- LoRaWAN devices which utilise only the LoRaWAN radio chip with a custom MCU and firmware will be required to be tested by an accredited testing facility, to obtain LoRaWAN alliance certification.
- If the chipset/module has been previously used and certified in another product, then a Certification of Similarity can possibly be applied. This is detailed in Lora alliance certification guidelines.
- More about the certification process and testing houses, can be obtained from the LoRa Alliance website: <https://www.lora-alliance.org/certification-overview>
- Spark is working with local testing houses in NZ/AUS to establish LoRaWAN testing locally so devices don't have to be sent overseas, however this is in very early stages.

### 3.2 Actility ThingPark Certification

The LoRaWAN certification ensures interoperability and compliance with LoRaWAN networks. This certification doesn't cover radio performance. ThingPark tests your devices in real application software environment.

- For production class LoRa devices (e.g. finished product intended for volume sales), Spark encourage putting them through the Actility ThingPark Wireless certification program. Although not mandatory.
- This is about 800 Euro per major device class type, per test, and the reseller, distributor, or HW OEM should engage directly with Actility for this test completion. <https://partners.thingpark.com/en/thingpark-connected>  
<https://partners.thingpark.com/en/node/28>

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## 4.0 LORAWAN™ DEVICE OPERATION BEST PRACTICES

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### 4.1 Spark Mandatory LoRaWAN Device Operating Parameters

**The Following are LoRaWAN Parameters which should be enabled in Firmware.**

If a device does not support the following parameters, it will NOT be LoRaWAN 1.0.2 Spec compliant.

Spark reserves the right to modify/remove devices from our LoRaWAN network, that are not operating within specifications or are causing issues to the network and/or other devices.

- Over-the-Air Activation (OTAA) is the preferred and most secure way to connect with the Spark Connected IoT network. Devices perform a join-procedure with the network, during which a dynamic DevAddr is assigned and security keys are negotiated with the device.
- Adaptive Data Rate (ADR) should be enabled. ADR is a mechanism for optimizing data rates, airtime and energy consumption in the network.
- Devices should not operate at fixed SF11 and SF12 rates
- The device battery value should be sent in Upload MAC's
- 1.0.2 LoRaWAN Specification MAC Commands should be actioned/acknowledged

More information on the above operating parameters is available in the LoRaWAN 1.0.2 Specification document, available from the LoRa Alliance upon request.

### 4.2 Spark Recommended LoRaWAN Operating Best Practises

- Avoid High message rates
- OEM's should avoid re-using AppEUI and AppKEY values across multiple Device SKU's.
- Devices should be developed with clear and feasible Firmware update procedures, end customers should be able to follow these procedures easily without requiring to remove any PCB's or solder headers to the PCB board. If a custom cable is required this should be made available for purchase.
- LoRaWAN Device payload format should be made available (or under NDA), for decoding in conjunction with appropriate AppKeys.
- Device antenna gain and radiation specs should be made available from OEM's.

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## 5.0 NZ RADIO AND ELECTRICAL CERTIFICATION REQUIREMENTS

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### 5.1 Electric, Electronic or Radio Products

Any Electrical, Electronic or Radio Devices sold in NZ will require appropriate certification (i.e. AS/NZS, RCM, R-NZ). Product compliance may be obtained if devices are mutually certified products from Australia and China.

Information about the certification process can be obtained at the NZ Radiocommunications (EMC Standards) site linked below.

<https://www.rsm.govt.nz/compliance/supplier-requirements/how-to-ensure-your-products-comply>