

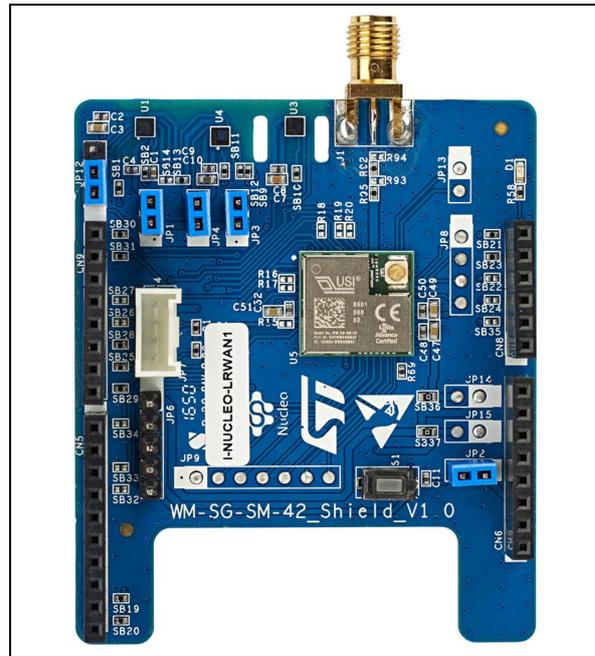
### Features

- USI<sup>®</sup> low-cost, LPWAN module supporting LoRa<sup>®</sup> technology:
  - ST ultra-low-power STM32L052T8Y6 MCU, Cortex<sup>®</sup>-M0+ based with 64 Kbytes of Flash memory, 8 Kbytes of RAM, 2 Kbytes of EEPROM, T-RNG
  - Semtech SX1272 radio transceiver supporting LoRa<sup>®</sup>, FSK, GFSK, MSK, GMSK and OOK modulation
  - High sensitivity down to -137 dBm
  - 860 MHz to 1020 MHz frequency range
  - 14 dBm to 20 dBm output power
  - 2.0 V to 3.6 V voltage range
  - -40°C to +85°C temperature range
  - Embedded 32 kHz and 32 MHz crystals
  - USART communication interface
- ST accelerometer and magnetometer sensor (LSM303AGR)
- ST relative humidity and temperature sensor (HTS221)
- ST pressure sensor (LPS22HB)
- Arduino<sup>™</sup> connectors
- SMA connector (antenna included in the kit)

### Description

USI<sup>®</sup> in partnership with STMicroelectronics developed the LoRa<sup>®</sup> expansion board for STM32 Nucleo (I-NUCLEO-LRWAN1). This board is an integrated solution allowing anyone to learn and develop solutions using LoRa<sup>®</sup> and/or FSK/OOK technologies.

The I-NUCLEO-LRWAN1 features the USI<sup>®</sup> LoRaWAN<sup>™</sup> technology module, addressing low-cost and low-power wide area network (LPWAN), which comes with the embedded AT-command stack pre-loaded.



1. Picture is not contractual.

The I-NUCLEO-LRWAN1 can be controlled from an external host such as NUCLEO-L053 boards, running the I-CUBE-LRWAN embedded software. This software provides the means to set up a complete LoRaWAN<sup>™</sup> node.

The I-NUCLEO-LRWAN1 is LoRaWAN<sup>™</sup> class A certified and sustains the class C.

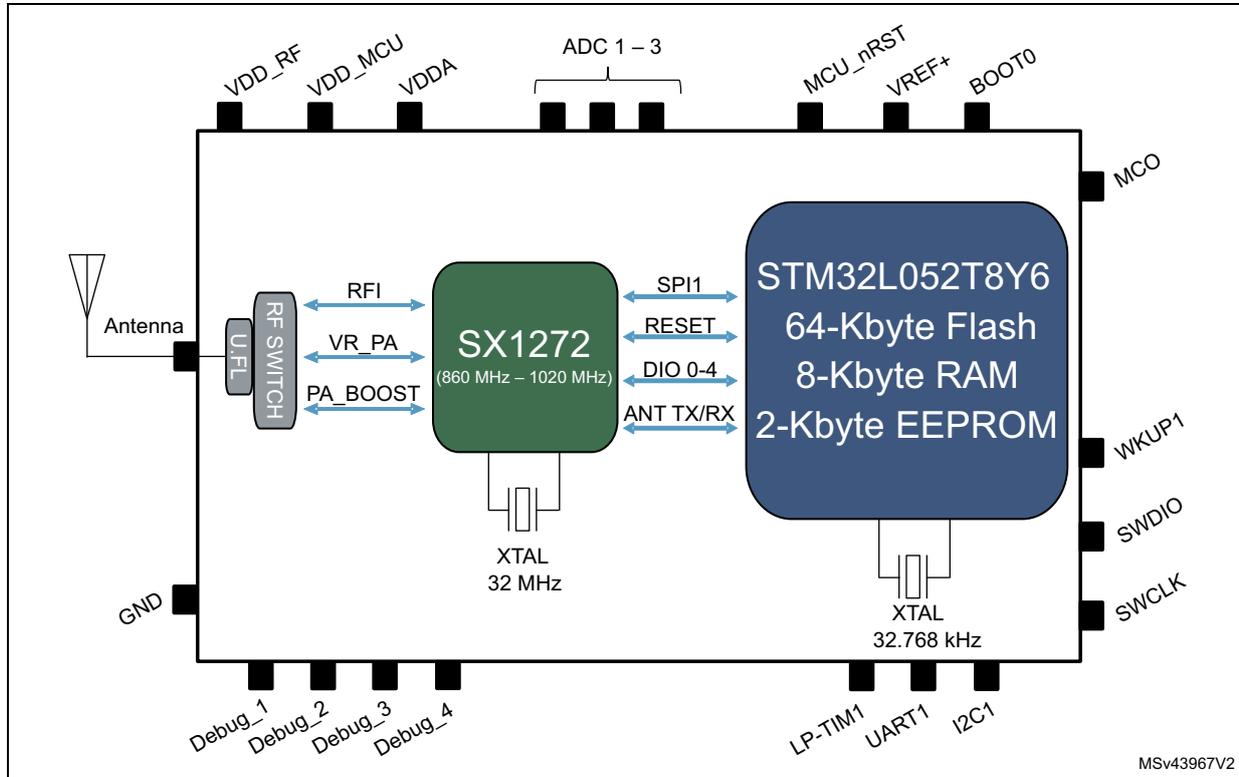
The I-NUCLEO-LRWAN1 includes the USI<sup>®</sup> LoRaWAN<sup>™</sup> module, Arduino<sup>™</sup> connectors, a SMA connector, a 50 Ω antenna and three ST environmental sensors.

For more details about all the components of the LoRa<sup>®</sup>-Middleware library, refer to the *STM32 LoRa<sup>®</sup> software expansion for STM32Cube* user manual (UM2073).

The I-NUCLEO-LRWAN1 is supplied by a third party not affiliated to ST. For complete and latest information, refer to the third party GitHub page [https://github.com/USIWP1Module/USI\\_I-NUCLEO-LRWAN1](https://github.com/USIWP1Module/USI_I-NUCLEO-LRWAN1).

# System architecture

Figure 1. I-NUCLEO-LRWAN1 architecture



## General information

The I-NUCLEO-LRWAN1 expansion board features an STMicroelectronics ultra-low-power Arm<sup>®(a)</sup> Cortex<sup>®</sup>-M0+ based microcontroller.



a. Arm is a registered trademark of Arm Limited (or its subsidiaries) in the US and/or elsewhere.



## Revision history

**Table 1. Document revision history**

Date	Revision	Changes
6-Feb-2017	1	Initial release.
14-Feb-2017	2	Updated title and description. Ordering information removed.
9-Aug-2017	3	Updated <i>Description</i> .
20-Mar-2018	4	Updated USI <sup>®</sup> GitHub link in <i>Description</i> . Updated <i>Figure 1</i> . Added the <i>General information</i> section.

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