Application Note: AN1200.110

LR2021 Evaluation Guide

LR2021 Evaluation Guide

Rev. 1.0

AN1200.110　　　**October 2025**　　www.semtech.com

1 of 29

Semtech Corporation

Proprietary & Confidential

Table Of Contents

Table Of Tables

LR2021 Evaluation Guide

AN1200.110   **Rev. 1.0**

                                   October 2025   www.semtech.com

3 of 29

Semtech Corporation

Proprietary & Confidential

Table Of Figures

1 Introduction

The LR2021 is Semtech's first chip in the LoRa Plus™ family. Incorporating a fourth-generation LoRa® IP, the transceiver supports both terrestrial and satellite networks in the Sub-GHz, 2.4GHz ISM bands, and licensed S-Band. The LR2021 features an advanced RF and analog architecture that supports a multi-region, single-SKU design, reducing external BOM costs, PCB footprint, and power consumption, while offering superior performance compared to previous LoRa transceivers. It additionally features expanded physical layer modulations for fast long-range communication (FLRC) and is compatible with various low-power wireless protocols including Amazon Sidewalk, W-MBUS, Wi-SUN FSK, and Z-Wave when integrated with third-party stack offerings.

This application note provides comprehensive guidance for evaluating the LR2021 using Semtech's evaluation tools. It covers:
- Hardware platforms - Detailed descriptions of LoRa Plus evaluation kit
- Practical usage - Step-by-step instructions for LoRa Studio™ evaluation software
- Software ecosystem - Complete overview of drivers, SDK, and evaluation tools

Please refer to the LR2021 Datasheet for a complete description of the device features and functionality.

LR2021 Evaluation Guide

AN1200.110　　　　　　**Rev. 1.0**

October 2025　　www.semtech.com

5 of 29

Semtech Corporation

Proprietary & Confidential

2 LoRa Plus™ Evaluation Kit

The LoRa Plus™ Evaluation Kit (EVK) demonstrates miniaturized integration possibilities while maintaining full functionality. This platform showcases the LR2021's suitability for space-constrained IoT applications, as well as simplified solutions for prototyping and application development.

The LoRa Plus EVK is fully compliant with Seeed Studio's Xiao ecosystem of small sized radio and MCU module solutions:

More information can be found under: https://wiki.seeedstudio.com/SeeedStudio_XIAO_Series_Introduction/

LR2021 Evaluation Guide

AN1200.110

Rev. 1.0

October 2025   www.semtech.com

6 of 29

Semtech Corporation

Proprietary & Confidential

2.1 LoRa Plus Xiao EVK Contents

The LoRa Plus Xiao EVK enables the LR2021 to be hosted on a nRF54L15 controller providing opportunities for power measurement, greater debug control, and expanded IOs.

It features a carrier board, " LoRa Plus Expansion Board", onto which 2 modules can be plugged:

- Wio-LR2021 radio module
- Xiao nRF54L15 MCU module.

The Expansion board also features an OLED display, I2C connections for easy prototyping, and numerous debug and test connectors for software development. It can also plug directly onto various host MCUs that provide an Arduino Uno connection.

The assembled LoRa Plus EVK is shown in Figure 1, with the Wio-LR2021 and Xiao nRF54L15 modules plugged onto the Expansion board.
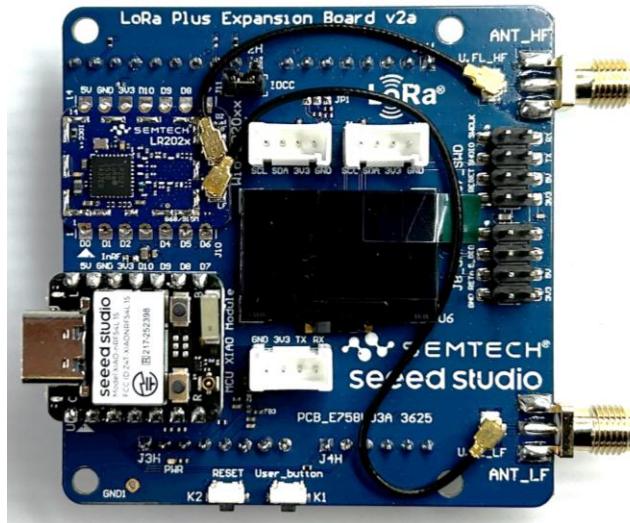
Figure 1: LoRa Plus Evaluation Kit

The LoRa Plus EVK package contains:

- **2x Wio-LR2021 modules (Wio-LR2021 PCB):** Highly integrated LR2021 implementations
- **2x XIAO nRF54L15 modules (Xiao-NRF54 PCB):** Nordic Semiconductor nRF54L15-based processing units
- **2x Expansion boards (Xiao-LR-Expansion PCB):** Feature-rich carrier boards with display and connectivity
- **2x 2.4GHz antennas with SMA connection**
- **2x region specific sub-GHz antennas with SMA connection (915MHz, 868MHz or 490MHz frequency bands)**
- **2x 2.4GHz antennas with UFL connection**
- **2x region specific sub-GHz antenna with UFL connection (915MHz, 868MHz or 490MHz frequency bands)**
- **USB cables:** For programming and power
- **Documentation:** Quick-start guide and assembly instructions

2.1.1 Wio-LR2021

The Wio-LR2021 module provides a highly integrated implementation of the LR2021 device inside a radio module for quick prototyping, in a 18x21.4mm form factor.
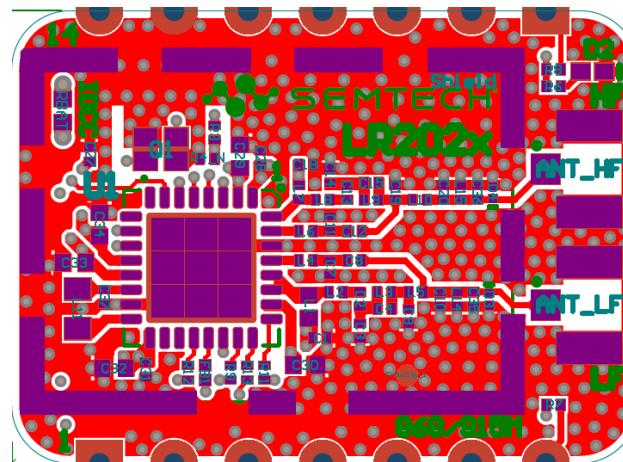
Figure 2:Wio-LR2021 Module

2.1.1.1 Wio-LR2021 System

The Wio-LR2021 module contains all the necessary components to operate the LR2021 with the highest level of performance, as shown in Figure 3:

- Complete RF implementation – Integrates all necessary components for optimal LR2021 performance
- Dual-band Sub-GHz and 2.4 GHz matching - Optimized for both Sub-GHz and 2.4GHz operation
- Compact form factor - Seeed Studio Wio standard footprint
- High-performance design - Maintains full LR2021 specifications
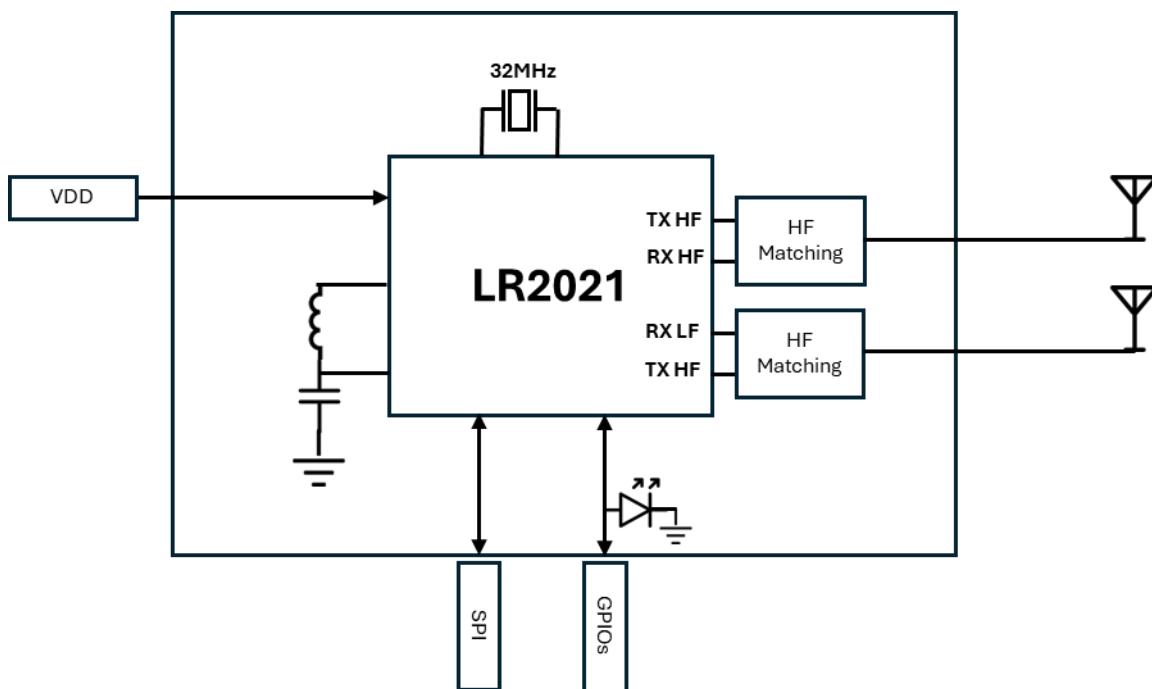
Figure 3: Wio-LR2021 Block Diagram

2.1.1.2 Wio-LR2021 Pin Assignment

The Wio-LR2021 connects with two 7-pin headers, providing the following connections, as shown in Figure 4:

- Power & Control:
  - VDD (3.3V)
  - GND (Ground reference)
  - Digital I/O pins (DIO7, DIO8, DIO11)
  - Control signals (BUSY, NRESET)
- Communication Interface:
  - SPI Interface (MOSI, MISO, SCK, NSS)
  - UART Interface (TX, RX) - for MCU communication
  - I2C Interface (SDA, SCL) - for MCU communication
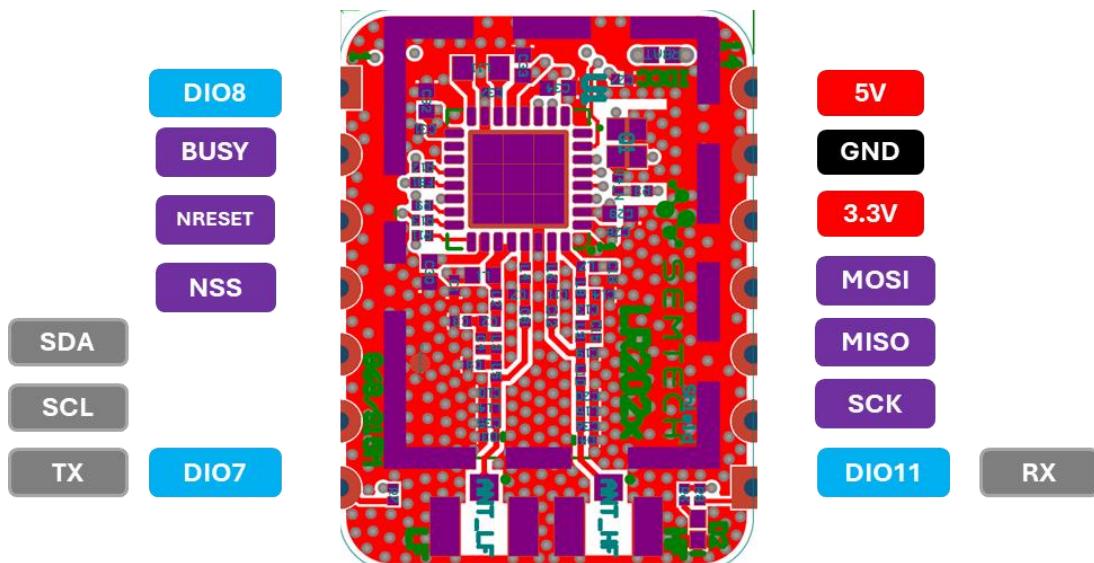
Figure 4: Wio-LR2021 Top view and Pin Connections

Note 1: UART (TX, RX) and I2C (SDA, SCL) signals represent inter-module communication paths available as standard Xiao pins. They are not available as LR2021 peripheral interfaces.

Note 2: 5V supply is a standard Xiao pin. It is not connected to the LR2021 Wio module.

Pin Number	Pin name	Pin Function
1	DIO8	LR2021 GPIO
2	BUSY	Host MCU Interface
3	NRESET	Host MCU Interface
4	NSS	Host MCU Interface
5	NC	SDA
6	NC	SCL
7	DIO7	LR2021 GPIO / TX
8	DIO11	LR2021 GPIO / RX
9	SCK	Host MCU Interface
10	MISO	Host MCU Interface
11	MOSI	Host MCU Interface

LR2021 Evaluation Guide

AN1200.110   **Rev. 1.0**

October 2025   www.semtech.com

9 of 29

Semtech Corporation

Proprietary & Confidential

12	3.3V	Supply
13	GND	GND
14	5V	Supply (NC)

Table 1: Wio-LR2021 Module Pins

An IDCC jumper on the Expansion board allows current consumption measurements of the LR2021 radio itself, as shown in Figure 9.
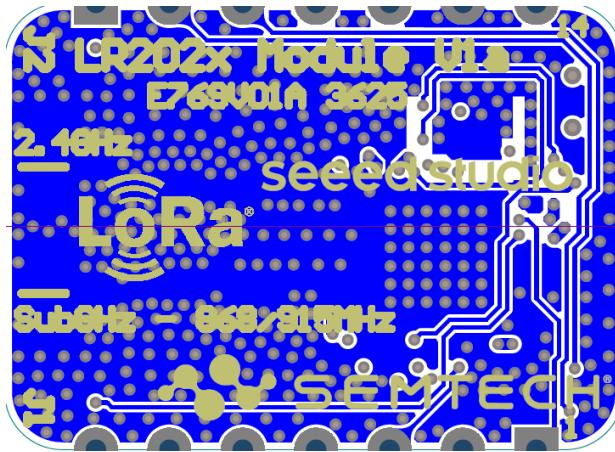
Figure 5: Wio-LR2021 Bottom View

The schematic and PCB layout can be found on the LoRa Plus product page on Semtech website: https://www.semtech.com/products/wireless-rf/lora-plus/lr2021

LR2021 Evaluation Guide

AN1200.110   Rev. 1.0

October 2025   www.semtech.com

10 of 29

Semtech Corporation

**Proprietary & Confidential**

2.1.2 Xiao nRF54L15

The Xiao nRF54L15 delivers the full capabilities of the nRF54L15 MCU in a compact Xiao form factor module.

Figure 6: Xiao nRF54L15

2.1.2.1 Xiao nRF54L15 System

The Xiao nRF54L15 module integrates multiple subsystems:

- nRF54L15 Processor - ARM Cortex-M33 with advanced peripherals
- Power Management - USB-C charging with battery support
- Development Interface - USB-D+/D- for programming
- Wireless Capability - NFC support for configuration
- Sensor Integration - IMU and PDM microphone (Sense variant)

The Xiao nRF54L15 has two distinct configurations to address different application requirements and use cases:

- The Standard Configuration provides comprehensive GPIO access through its pin headers, delivering maximum flexibility for prototyping and custom interface development while maintaining full compatibility with the extensive Xiao ecosystem of expansion boards and accessories.
- The Sense Configuration takes a more specialized approach by integrating high-performance sensors directly onto the module, including a precision IMU (Inertial Measurement Unit) for motion sensing and spatial orientation detection, as well as a PDM microphone optimized for audio capture and voice-activated applications. While this variant features a reduced GPIO count due to the pins allocated for sensor integration, it delivers a complete sensing solution that is specifically optimized for IoT applications requiring environmental awareness and audio processing capabilities, eliminating the need for external sensor modules and reducing overall system complexity.

The block diagram of the Xiao nRF54L15 is shown in Figure 7.

LR2021 Evaluation Guide

AN1200.110

Rev. 1.0

October 2025   www.semtech.com

11 of 29

Semtech Corporation

Proprietary & Confidential
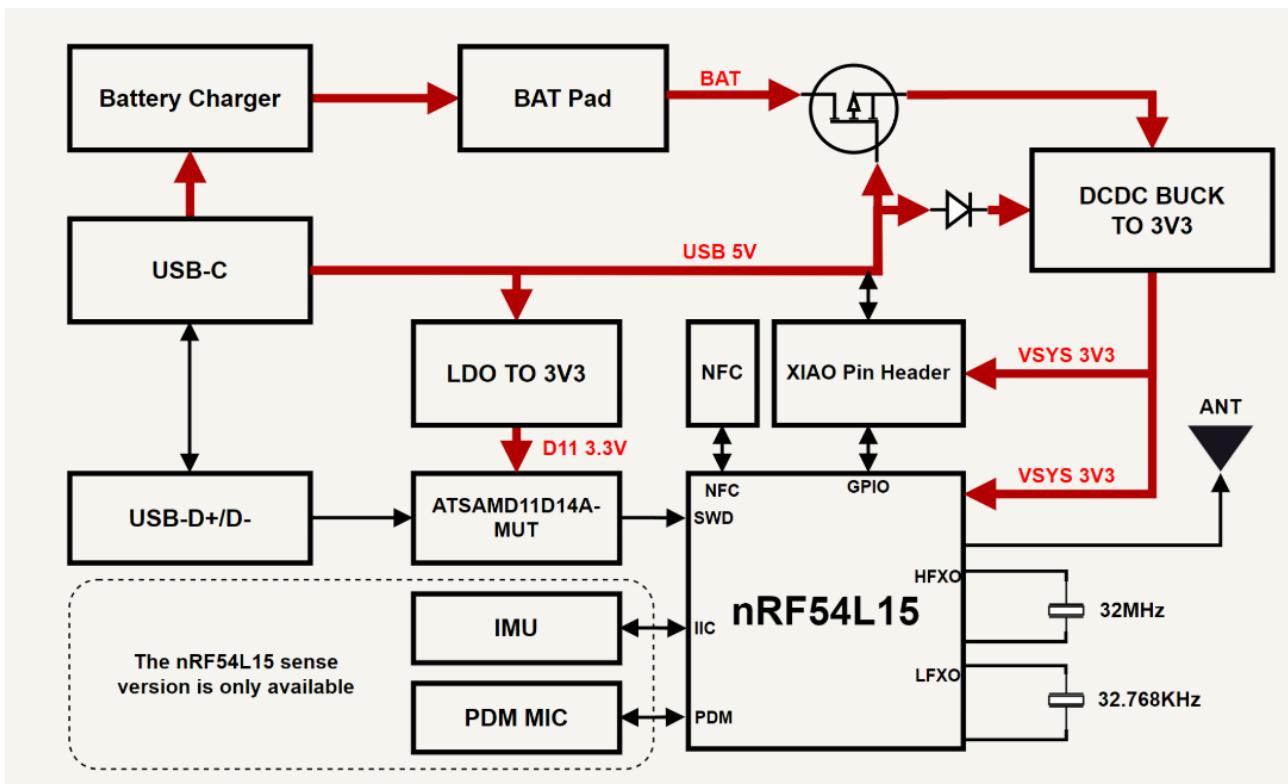
Figure 7: Xiao nRF54L15 Block Diagram

2.1.2.2   Xiao nRF54L15 Pin Assignments

The module provides comprehensive I/O through its two 7-pin headers:

- Power Pins:
    - 3V3 - 3.3V regulated output
    - 5V - USB power passthrough
    - GND - Ground reference
    - BAT - Battery connection
- Digital I/O:
    - GPIO pins with configurable functions
    - SPI, I2C, UART interfaces
    - ADC-capable pins for sensor inputs
    - PWM outputs for actuator control
- Programming Interface:
    - SWDIO, SWCLK - Serial Wire Debug interface
    - RESET - System reset control

The Xiao nRF4L15 pin layout is shown in Figure 8.

LR2021 Evaluation Guide

AN1200.110

Rev. 1.0

October 2025

www.semtech.com

12 of 29

Semtech Corporation

Proprietary & Confidential
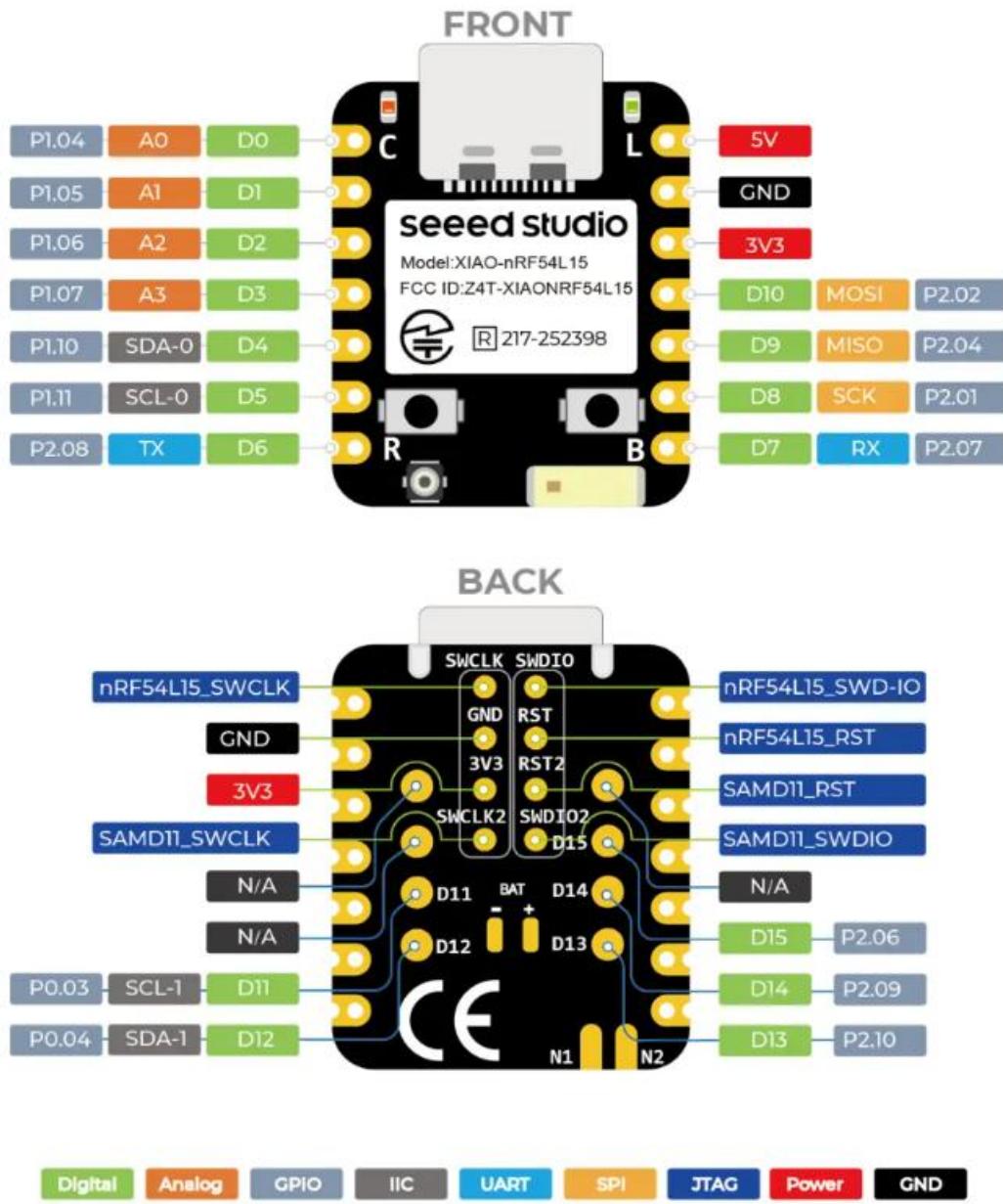
Figure 8: Xiao nRF54L15 Pin Definition

LR2021 Evaluation Guide

AN1200.110

Rev. 1.0

October 2025

www.semtech.com

13 of 29

Semtech Corporation

Proprietary & Confidential

Pin Number	Pin name	Pin Function (s)	
1	P1.04	A0	D0
2	P1.05	A1	D1
3	P1.06	A2	D2
4	P1.07	A3	D3
5	P1.10	SDA-0	D4
6	P1.11	SCL-0	D5
7	P2.08	TX	D6
8	P2.07	RX	D7
9	P2.01	SCK	D8
10	P2.04	MISO	D9
11	P2.02	MOSI	D10
12	3V3	3V3	
13	GND	GND	
14	5V	5V	
15	NC		
16	NC		
17	P0.03	SCL-1	D11
18	P0.04	SDA-1	D12
19	P2.10		D13
20	P2.09		D14
21	P2.06		D15
22	NC		
23	SWCLK	nRF54L15_SWCLK	
24	GND	GND	
25	3V3	3v3	
26	SWCLK2	SAMD11_SWCLK	
27	SWDIO2	SAMD11_SWDIO	
28	RST2	SAMD11_RST	
29	RST	nRF54L15_RST	
30	SWDIO	nRF54L15_SWD-IO	

Table 2: Xiao nRF54L15 Module Pin

LR2021 Evaluation Guide
AN1200.110   Rev. 1.0

October 2025   www.semtech.com

14 of 29
Semtech Corporation
Proprietary & Confidential

2.1.3 LoRa Plus Expansion Board

The LoRa Plus Expansion Board serves as the system's foundation, providing advanced features and connectivity options
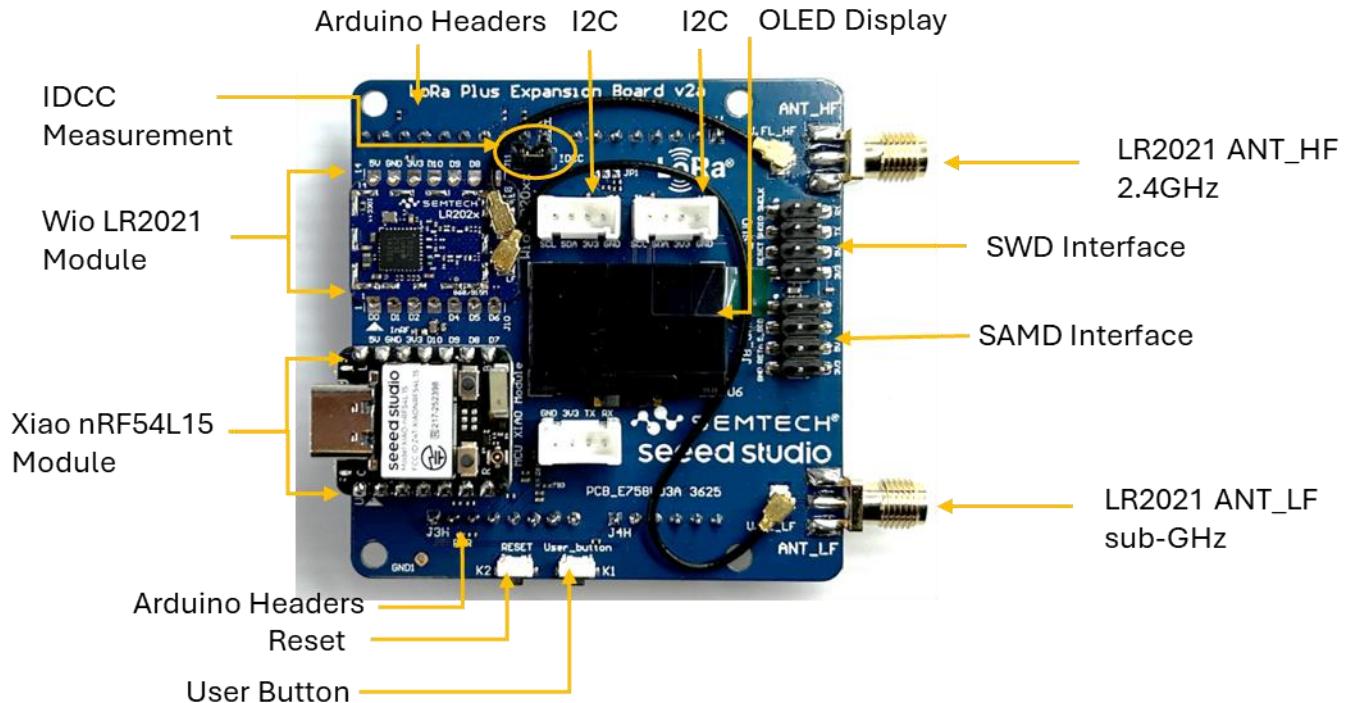

Figure 9: LoRa Plus™ Expansion Board

The Expansion Board provides the following features:

- Display System:
  - 0.96" OLED Display - 128x64 pixel resolution for status and debugging information
  - I2C Interface - Simple integration with minimal pin usage
  - Real-time Updates - Display RF parameters, packet statistics, and system status
- User Interface:
  - User Button - Configurable input for application control
  - Reset Button - Hardware reset capability
  - LED Indicators - Visual status feedback
- Connectivity & Expansion:
  - Arduino Uno Headers - Standard expansion interface
  - I2C Expansion Port - Easy sensor and peripheral connection
  - SWD Programming Interface - Direct debugging access (through pogo pins underneath nRF54L module)
  - Test Points - Signal monitoring and measurement points
- Power System:
  - USB-C Power Input - Modern connector standard

The schematic and PCB layout can be found on the LoRa Plus ™ product page on Semtech website:
https://www.semtech.com/products/wireless-rf/lora-plus/lr2021

2.2   Assembly

The kit components should be assembled as two separate EVKs.

Each individual EVK is composed of the Wio-LR2021 and Xiao nRf54L15 modules assembled on the Expansion board, as follows:

Figure 10: LoRa Plus Expansion Board equipped with Wio-LR2021 and Xiao nRF54L15 modules

UFL connectors allow to link the LR2021 2.4GHz and sub-GHz RF ports to the edge-mounted SMA connectors, on which the suitable SMA antennas can be mounted for radiated measurements or tests in the field.

2.3   Expansion

The modular design supports various expansion configurations for different use cases.
The LoRa Plus EVK can alternatively be used with either:

- nRF54L DK board
- Arduino Uno host.

2.3.1   nRF54L15 DK

Nordic Semiconductor's nRF54L15 Development Kit (DK) allows advanced debugging and development, giving access to all nRF54L15 GPIOs and peripherals, as well as Nordic semiconductor's debugging tools.

To use the LoRa Plus EVK with the nRF54L15 DK an additional adaptor board is required. Please contact your Semtech representative for this.

1. Remove the Xiao nRF54L15 from the EVK.
2. Attach the nRF54L15 DK adaptor board (available separately) to the bottom Arduino Uno headers of the Expansion board.
3. Attach the nRF54L15 DK adaptor board to the nRF54L15 DK as illustrated below.
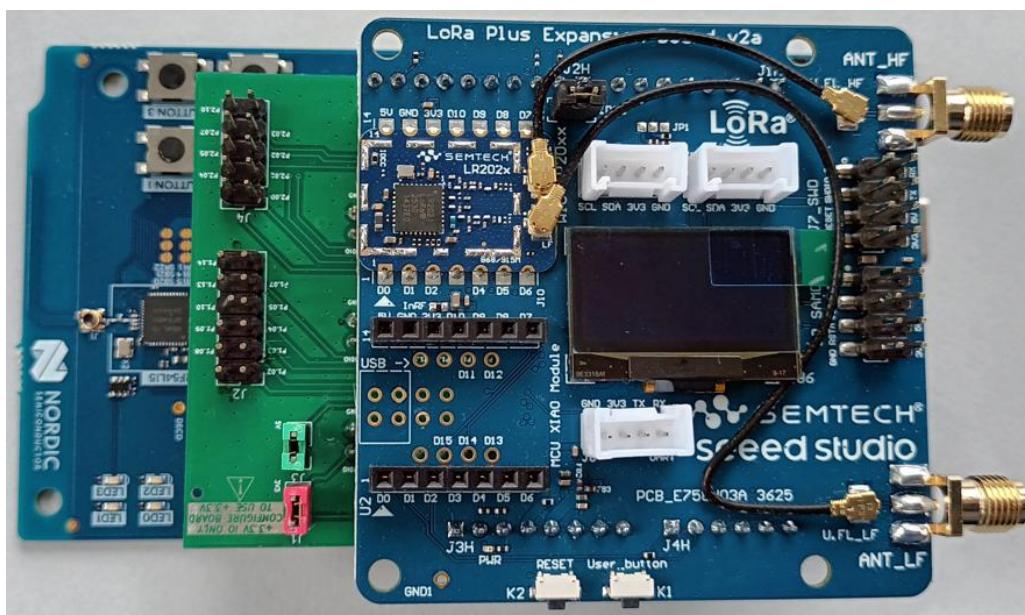
Figure 11: LoRa Plus EVK expansion onto an adaptor board and an nRF54L15 DK

2.3.2   Arduino Uno

The Expansion board is also equipped with Arduino compatible headers, which can leverage the Arduino ecosystem:
To use the LoRa Plus EVK with an Arduino Uno host, like an STM32L476 Nucleo board, perform the following.
1. Remove the Xiao nRF54L15 from the EVK.
2. Plug the Expansion board onto the Arduino Uno host as shown.

Figure 12: LoRa Plus EVK expansion on Arduino host (STM32 Nucleo)

2.4   Order Codes

The LoRa Plus™ Evaluation Kit is available through Semtech's sales channels under the following order codes:

- LR2021EVK1XBS1: LoRa Plus™ Evaluation Kit, LR2021, 868MHz for Europe
- LR2021EVK1XCS1: LoRa Plus™ Evaluation Kit, LR2021, 915MHz for North America
- LR2021EVK1XGS1: LoRa Plus™ Evaluation Kit, LR2021, 490MHz for China and Asia

It is also available directly at Seeed Studio's e-shop: https://www.seeedstudio.com/

Please contact your Semtech representative for the nRF54L15 DK adapter board.

LR2021 Evaluation Guide

AN1200.110   Rev. 1.0

October 2025   www.semtech.com

18 of 29

Semtech Corporation

Proprietary & Confidential

3 LR2021 Evaluation

Semtech provides a comprehensive software and documentation library supporting the LR2021 LoRa Plus™ across multiple development phases, from initial evaluation to production deployment. The LoRa Plus product page of Semtech provides information and links to documentation (device datasheet, Application Notes) and user software (device drivers, SDK, ExpLoRa evaluation Tools).

Additionally, the LR2021 software is available on https://github.com/Lora-net/

3.1 LoRa Studio™

LoRa Studio™ provides a comprehensive graphical interface for LR2021 evaluation, testing, and demonstration. It is available for download on LoRa Plus webpage on https://www.semtech.com/products/wireless-rf/lora-plus/lr2021.

3.1.1 System Architecture

LoRa Studio consists of three main components working together, as shown Figure 13:

- PC-Based Front-End: The graphic user interface component provides an intuitive Windows application with user friendly graphical interface design that simplifies complex RF parameter configuration and live test execution logs. It runs on both Windows and Linux platforms.
- Python Back-End Engine: its communication protocol management handles the interface protocols, command queuing, response parsing and data pipeline processing that coordinate between the GUI front-end and embedded firmware. Test sequence orchestration coordinates complex multi-step test procedures, while maintaining system synchronization and error handling. It also offers a command-line interface allowing the Back-End engine to be directly controlled by automated measurement tools.
- Embedded Firmware: The embedded component runs on the LoRa Plus Evaluation Kit host MCU. It provides command processing through a serial command interface implementation that handles parameter configuration, test execution, and status queries with error checking and validation. Real-time control delivers direct LR2021 hardware control with microsecond-level timing precision for critical RF operations and synchronized multi-device control. It also implements on-chip signal analysis and statistics collection including RSSI monitoring, packet counting, and logging. A Standalone mode allows autonomous execution and logging of a given test application, without the need of being connected to a PC.
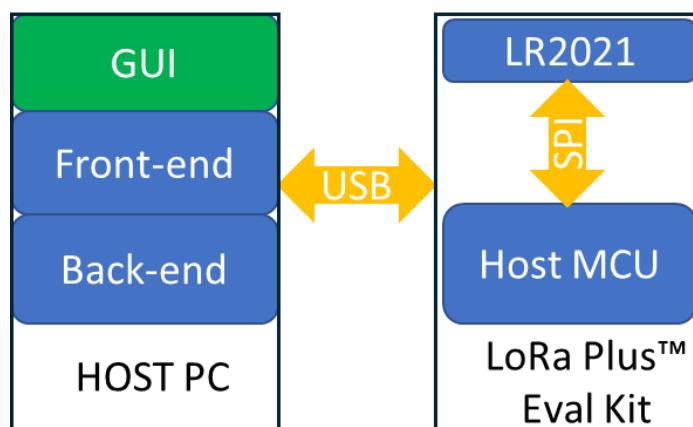

Figure 13: LoRa Studio System Architecture

LR2021 Evaluation Guide
AN1200.110   Rev. 1.0
                             October 2025   www.semtech.com

19 of 29
Semtech Corporation
Proprietary & Confidential

3.1.2   Getting Started with LoRa Studio

3.1.2.1   Prerequisites and Installation

LoRa Studio installation and execution has the following system requirements

- Windows 10 or later (64-bit recommended) or Linux (Ubuntu 22 or later)
- USB 2.0 or higher port

On your PC: Directly download LoRa Studio installer from Semtech LoRa Plus™ product page and run the installer with the administrator rights.

On your board: LoRa Studio binary file for the embedded firmware is available inside the folder `LoRaStudio\binary`.

- nRf54L15 MCU:Connect the USB C cable on the Xiao nRF54L15 module and use PyoCD to load the .hex file, issuing the following command: `pyocd load path/to/file/file_name.hex --target=nrf54l –probe 12345678`

  the `–probe` option allows to ensure to flash the right target in case multiple EVKs are connected. To get the probe number, type the command `pyocd list`

- STM32 Nucleo boards, simply drag and drop the binary file into the EVK enumerated as a mass storage media.

3.1.2.2   LoRa Studio Execution

Once both LoRa Plus Evaluation Kits are connected to your PC, launch LoRa Studio from the PC applications menu. Scan for the connected devices and select your evaluation kits from the device list, as shown in Figure 14 and Figure 15.
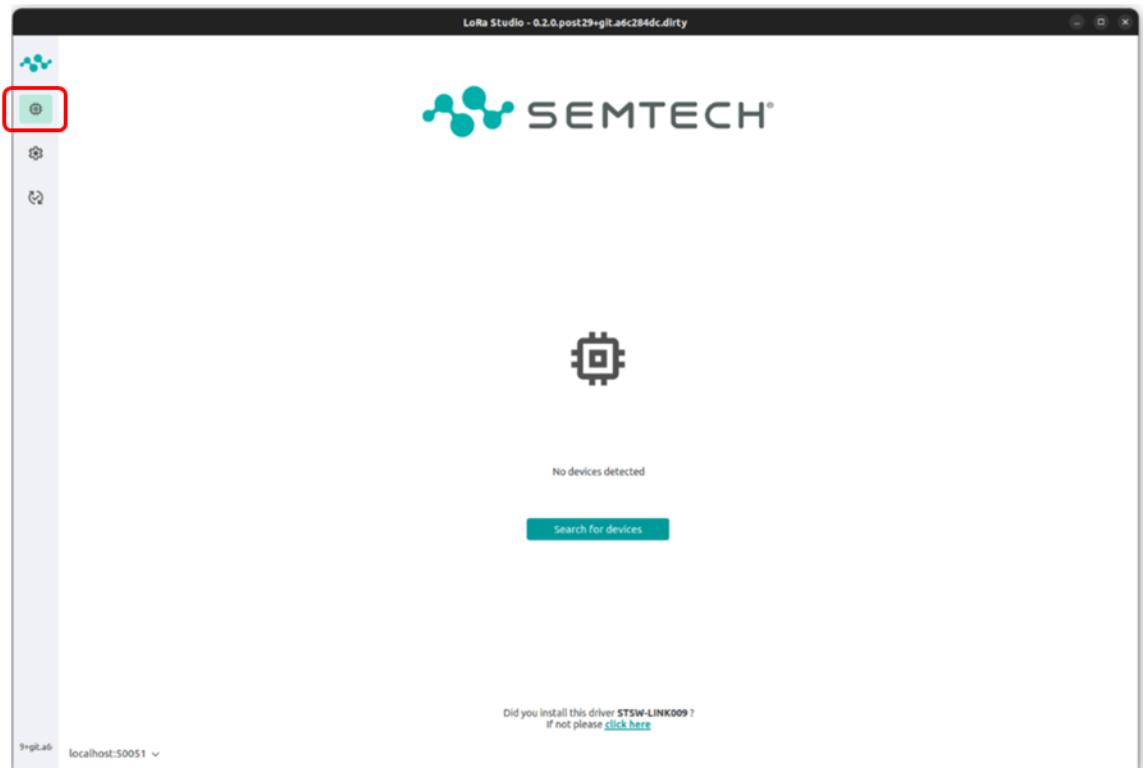

Figure 14: LoRa Studio Startup Screen

LR2021 Evaluation Guide

AN1200.110　　　　　**Rev. 1.0**

October 2025　　　www.semtech.com

**20 of 29**

Semtech Corporation

Proprietary & Confidential
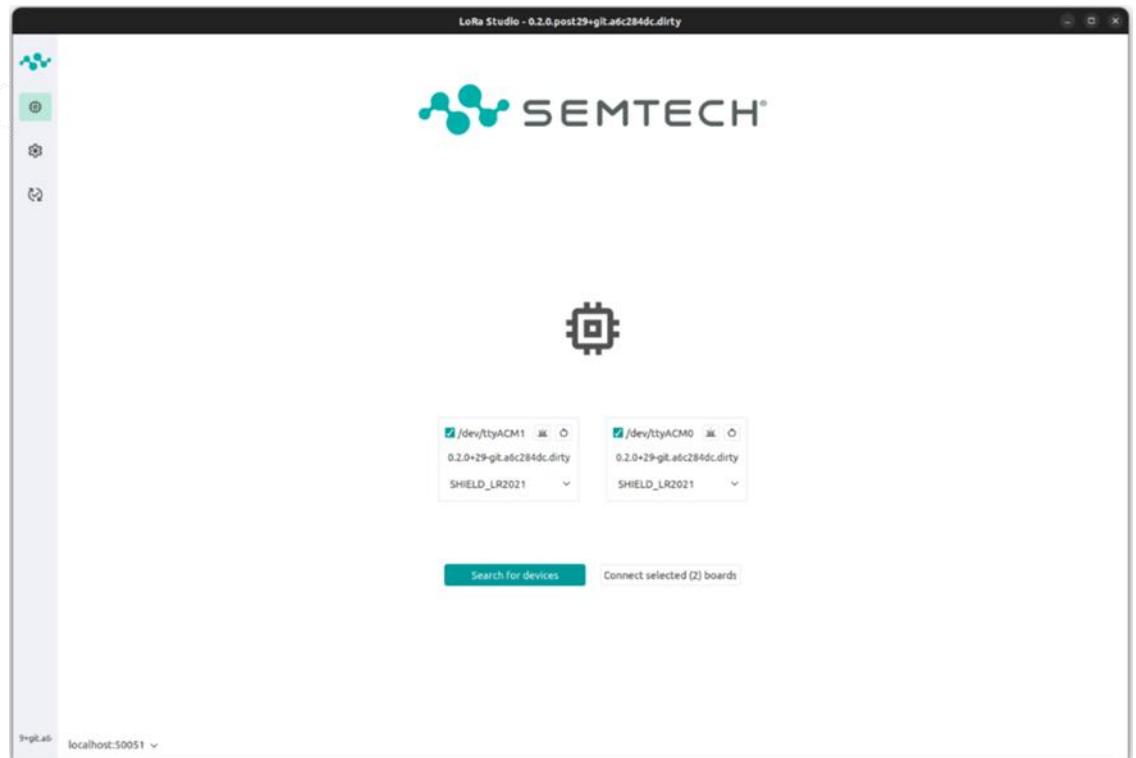
Figure 15: LoRa Studio Detected Devices

The Common radio settings view allows to select and configure the radio parameters: Frequency, power, and modulation settings.
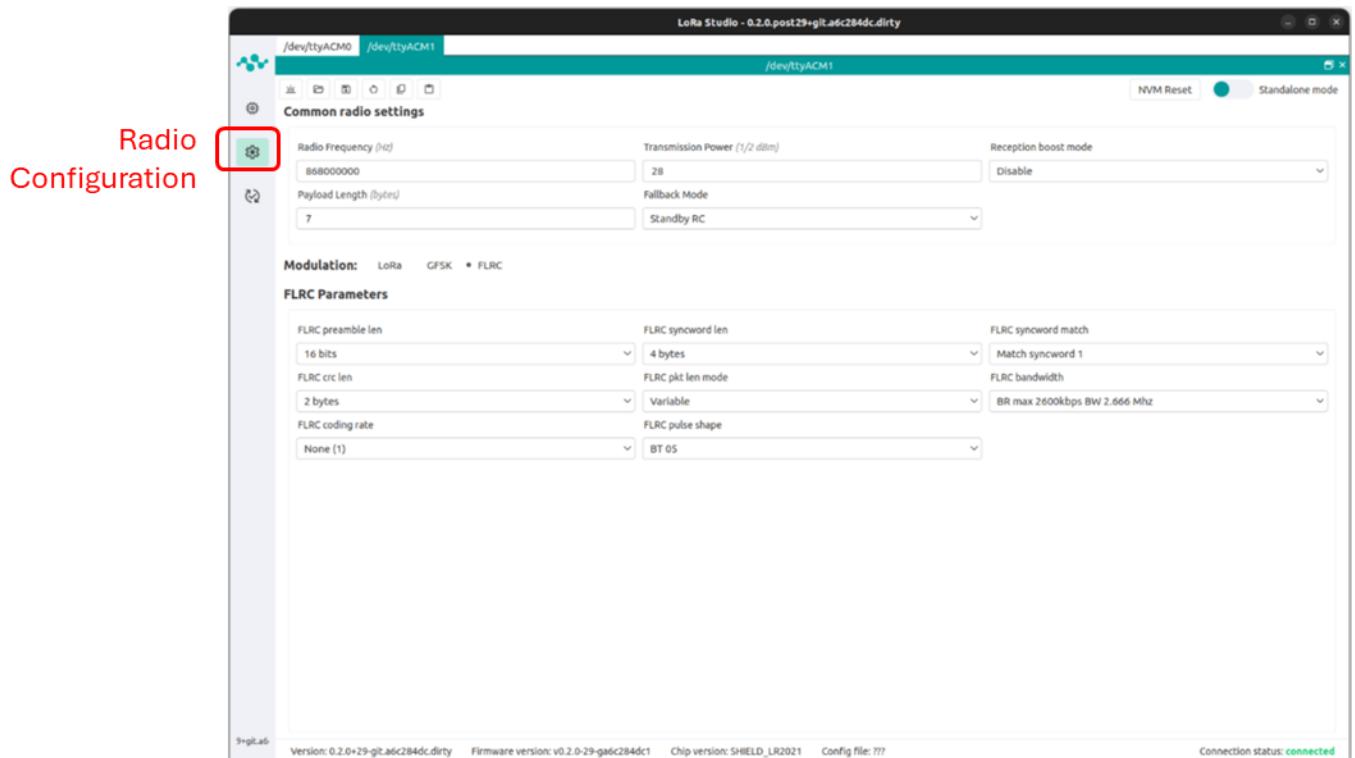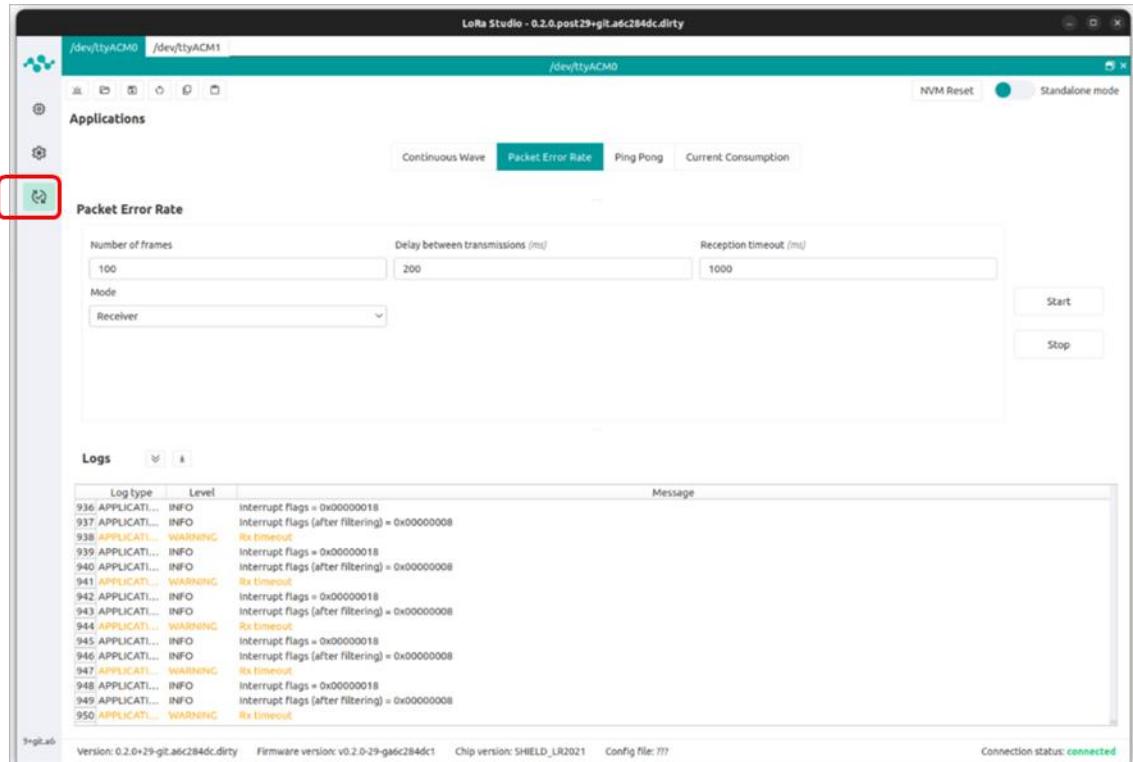

Figure 16: Radio Configuration View

Select and configure the test modes from the Applications view (Figure 17): Continuous Wave, Packet Error Rate, Ping-Pong, Current consumption…


Figure 17: Applications View

Execution logs display the status of each of these demo applications. They can be saved into a text file.

The device configuration can be stored and restored locally.

3.1.2.3 Standalone Mode

LoRa Studio supports a standalone mode, where the software runs the desired application without control from the GUI. This allows the user to perform tests in the field, with the LR2021 Evaluation Kit only connected to a power supply.

For this purpose, the user has to configure the desired radio parameters, select the application, and activate the Standalone mode button to save their configuration locally in the Host MCU memory. At the end of the field test session, the application logs are automatically dumped from the Host MCU memory when the user plugs the Evaluation Kit into USB.

3.1.2.4 Feature Limitations:

3.1.2.4.1   Board Detection

If the device detection fails -as shown in Figure 18- please go through the following steps sequentially:

1. Perform a hardware reset of the kit (reset button of the kit and retry "search for devices".
2. If the issue persists, unplug and re-plug the evaluation kit.

LR2021 Evaluation Guide

AN1200.110

Rev. 1.0

October 2025   www.semtech.com

22 of 29

Semtech Corporation

Proprietary & Confidential
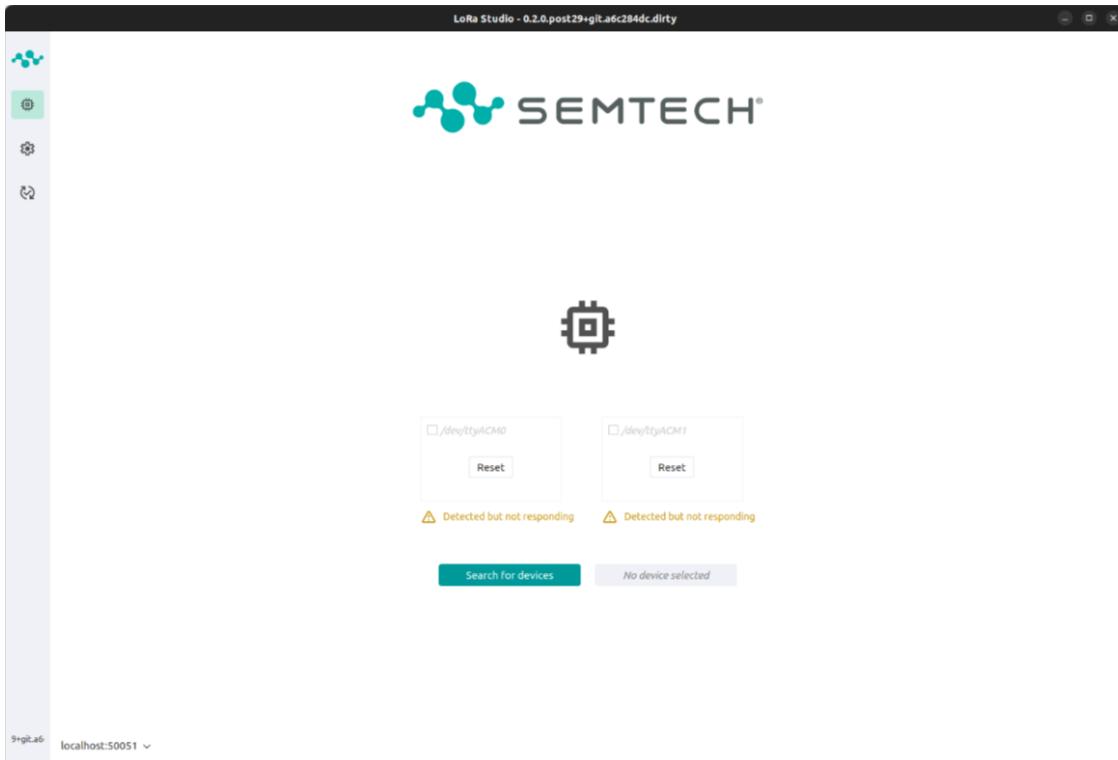
Figure 18: Board Detection

3.1.2.4.2   Serial Communication Loss under Widows 11.

Windows 11 might turn off the USB ports of the host PC unexpectedly, creating an interruption of serial communication between the LoRa Plus Kit running on STM32 Nucleo kit and the host PC on Windows 11, as shown in Figure 19 below:

```
2025-07-28 14:07:10,256 - __main__ - ERROR - Command 'get_version' failed: <_InactiveRpcError of RPC that terminated with:
    status = StatusCode.UNKNOWN
    details = "Unexpected <class 'explora_host_backend.serial_protocol.SerialProtocolNoAckReceivedException'>: No ack received in 1 seconds when sending datagram TAG: 01 LEN:
    2 DATA: 4200."
    debug_error_string = "UNKNOWN:Error received from peer  {grpc_message:"Unexpected <class \'explora_host_backend.serial_protocol.SerialProtocolNoAckReceivedException\'>: No
    ack received in 1 seconds when sending datagram TAG: 01 LEN: 2 DATA: 4200.", grpc_status:2, created_time:"2025-07-28T12:07:10.2275635+00:00"}"
>
```

Figure 19: Serial Communication Loss

In that case, please follow the following steps:

- uninstall all ST-link drivers and re-install the latest drivers
- update Nucleo ST-link using STM32CubeProgrammer application
- Uncheck "Allow the computer to turn off this device to save power" on all USB port" on windows System settings (Figure 20)
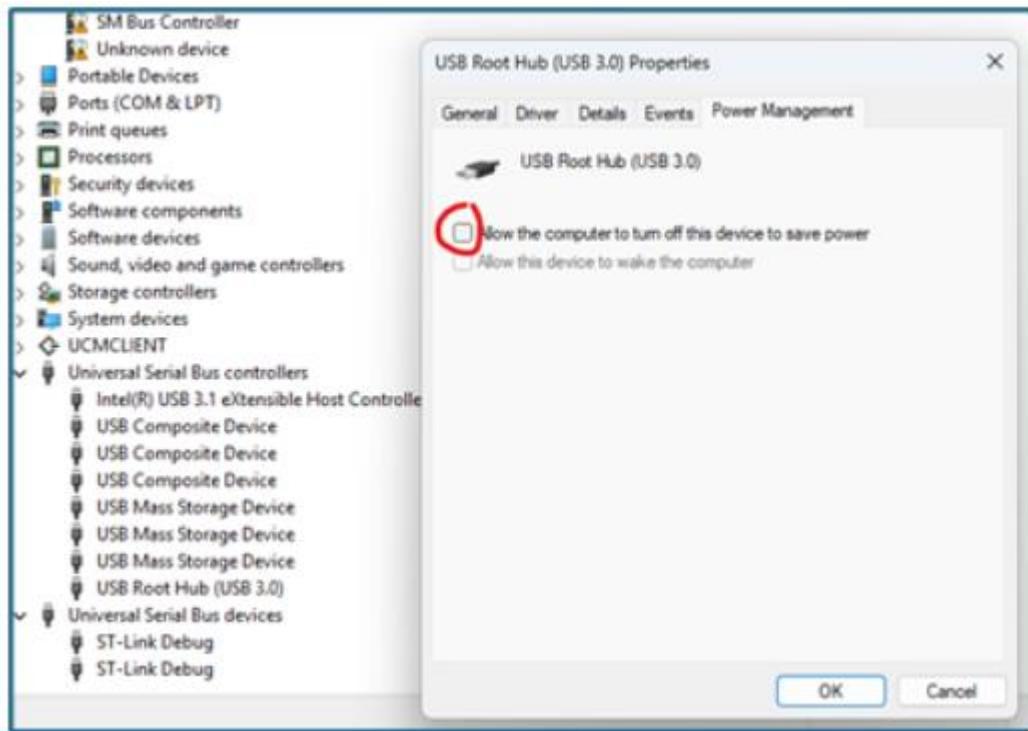
Figure 20: Windows 11 USB Power Management settings

3.1.2.4.3 Firmware Update.

The user can load or update the nRF54L15 host MCU firmware following the guidelines described in section Prerequisites and Installation 3.1.2.1.

However the user needs to wait until the board stops blinking and then perform a device search. The device will appear in a new box and the previous one will remain inaccessible. Unplug the device and then plug it back in once the search is done to avoid it appears as not responding.

3.2 LoRa Basics™ Modem™ and Unified Software Platform

Semtech's Unified Software Platform (USP) is a firmware platform designed to support Semtech's LR20xx multi-PHY radios. The platform offers a unified firmware library ecosystem, enabling multiprotocol operations across various MCU platforms through open-source environments such as Zephyr.

Semtech's USP provides various examples to support the evaluation, design, and certification of IoT products. Protocol stacks, including Semtech's LoRa Basics™ Modem, are available to facilitate protocol development. All applications and services utilize the Radio Access Controller (RAC), which enables deterministic, synchronized, and prioritized access to radio resources, enabling pseudo-concurrent multi-protocol environments.

Semtech's USP (https://github.com/Lora-net/USP) serves as the core component of this platform and provides a base for Bare Metal implementations. The USP_Zephyr (https://github.com/Lora-net/USP_ZEPHYR) builds upon the USP, utilizing the cross-platform and MCU abstraction features of the Zephyr ecosystem.

AN1200.110   **Rev. 1.0**   **25 of 29**

                                                        October 2025   www.semtech.com   **Semtech Corporation**

                                                                                                                                                                                Proprietary & Confidential

4 Glossary

Term	Description
ADC	Analog-to-Digital Converter
API	Application Programming Interface
BOM	Bill of Materials
CAD	Channel Activity Detection
DIO	Digital Input/Output
DK	Development Kit
EVK	Evaluation Kit
FLRC	Fast Long-Range Communication
GFSK	Gaussian Frequency Shift Keying
GND	Ground
GPIO	General Purpose Input/Output
HAL	Hardware Abstraction Layer
HF	High Frequency
I2C	Inter-Integrated Circuit
IDCC	Current Measurement Jumper
IMU	Inertial Measurement Unit
IP	Intellectual Property
ISM	Industrial, Scientific and Medical
JST	Japan Solderless Terminal (connector standard)
LED	Light Emitting Diode
LF	Low Frequency
LiPo	Lithium Polymer (battery)
LoRa®	Long Range Communication (registered trademark of Semtech Corporation)
LoRa Plus™	Fourth-generation LoRa® IP. Supports terrestrial and SATCOM networks in sub-GHz, 2.4 GHz ISM bands and licensed S-band
LoRa Studio®	Graphical interface software for LR2021 evaluation and testing
LoRaWAN®	LoRa Wide Area Network protocol
LR-FHSS	Long Range Frequency Hopping Spread Spectrum
MCU	Microcontroller Unit
MISO	Master In Slave Out (SPI interface signal)
MOSI	Master Out Slave In (SPI interface signal)
NFC	Near Field Communication
NSS	SPI Chip Select / Slave Select
OLED	Organic Light-Emitting Diode

LR2021 Evaluation Guide

AN1200.110　　　　　　　**Rev. 1.0**

October 2025　　　www.semtech.com

26 of 29

Semtech Corporation

Proprietary & Confidential

OOK	On-Off Keying
PCB	Printed Circuit Board
PDM	Pulse Density Modulation
PER	Packet Error Rate
PWM	Pulse Width Modulation
RF	Radio Frequency
RSSI	Received Signal Strength Indicator
RTTOF	Round Trip Time of Flight
RX	Reception / Receive
SAMD	Microchip ARM Cortex-M microcontroller family
SATCOM	Satellite Communications
SCK	Serial Clock
SCL	Serial Clock Line (I2C)
SDA	Serial Data Line (I2C)
SDK	Software Development Kit
Sigfox	Low-power wide-area network protocol
SKU	Stock-Keeping Unit
SMA	SubMiniature version A (RF connector type)
SPI	Serial Peripheral Interface
SWCLK	Serial Wire Clock
SWD	Serial Wire Debug
SWDIO	Serial Wire Debug Input/Output
TX	Transmission / Transmit
UART	Universal Asynchronous Receiver/Transmitter
U.FL	Miniature RF connector for high-frequency applications
USB	Universal Serial Bus
VDD	Voltage Supply (Power)
W-MBUS	Wireless Meter-Bus
Wi-SUN	Wireless Smart Utility Network
Z-Wave	Wireless communication protocol for home automation

5 Revision History

Version	ECO	Date	Changes and/or Modifications
1.0	076644	October 2025	Initial Release

LR2021 Evaluation Guide

AN1200.110

Rev. 1.0

October 2025

www.semtech.com

28 of 29

Semtech Corporation

Proprietary & Confidential

Important Notice

Information relating to this product and the application or design described herein is believed to be reliable, however such information is provided as a guide only and Semtech assumes   no liability for any errors in this document, or for the application or design described herein.

Semtech reserves the right to make changes to the product or this document at any time without notice. Buyers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. Semtech warrants performance   of its products to the specifications applicable at the time of sale, and all sales are made in accordance with Semtech's standard terms and conditions of sale.

SEMTECH PRODUCTS ARE NOT DESIGNED, INTENDED, AUTHORIZED OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT APPLICATIONS, DEVICES OR SYSTEMS, OR IN NUCLEAR APPLICATIONS IN WHICH THE FAILURE COULD BE REASONABLY EXPECTED TO RESULT IN PERSONAL INJURY, LOSS OF LIFE OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. INCLUSION OF SEMTECH PRODUCTS IN SUCH APPLICATIONS IS UNDERSTOOD TO BE UNDERTAKEN SOLELY AT THE CUSTOMER'S OWN RISK.

Should a customer purchase or use Semtech products for any such unauthorized application, the customer shall indemnify and hold Semtech and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs damages and attorney fees which could arise.

The Semtech name and logo are registered trademarks of the Semtech Corporation. All other trademarks and trade names mentioned may be marks and names of Semtech or their respective companies. Semtech reserves the right to make changes to, or discontinue any products described in this document without further notice. Semtech makes no warranty, representation or guarantee, express or implied, regarding the suitability of its products for any particular purpose. All rights reserved.

© Semtech 2025