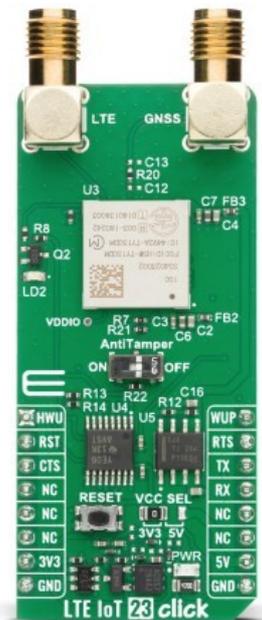


## LTE IoT 23 Click



PID: MIKROE-6682

**LTE IoT 23 Click** is a compact add-on board for low-power cellular connectivity in IoT applications. It is based on the [LBAD0XX1SC-151](#), the world's smallest globally certified Cat. M1/NB-IoT module from [muRata](#) built around the Altair ALT1250 chipset, providing LTE Cat. M1 and NB-IoT communication in applications that require extended coverage and long operational lifetime. The board supports a wide range of LTE bands, optimized Class 3 transmit power up to +23dBm, UART communication with AT command support, an AntiTamper switch for physical security detection, a micro SIM holder for 1.8V uSIM cards, and many other features. LTE IoT 23 Click is ideal for wearables, smart metering, healthcare monitoring, and asset-tracking applications.

For more information about **LTE IoT 23 Click** visit the official [product page](#).

### How does it work?

LTE IoT 23 Click is based on the LBAD0XX1SC-151, the world's smallest globally certified Cat. M1/NB-IoT module from muRata, designed for low-power cellular connectivity in IoT applications. Built around the Altair ALT1250 chipset combined with an integrated front-end module and external flash memory, this industrial-grade LTE-M module delivers robust wireless performance while maintaining exceptionally low energy consumption. It supports LTE Cat. M1 and NB-IoT Release 13 operation across an extensive set of global frequency bands, including low bands such as 5, 8, 12, 13, 14 (Cat M1 only), 17, 18, 19, 20, 26, and 28, mid bands 1, 2, 3, 4, and 25, as well as NTN bands 23, 255, and 256.

Mikroe produces entire development toolchains for all major microcontroller architectures.

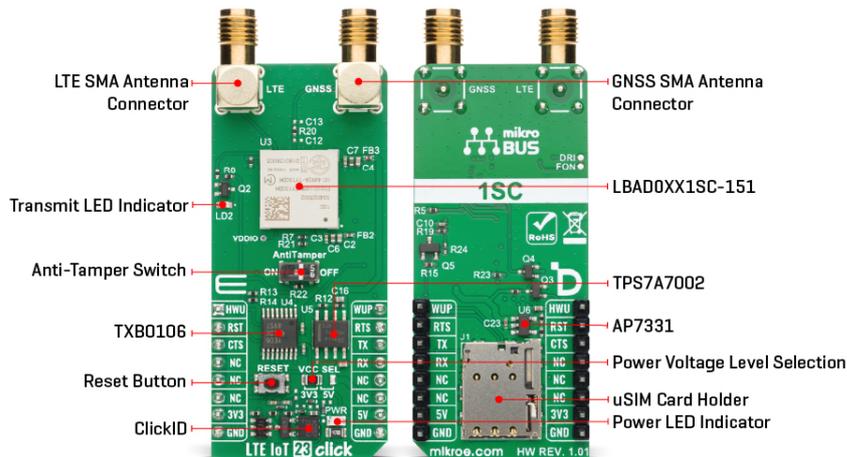
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ISO 27001: 2013 certification of informational security management system.  
 ISO 14001: 2015 certification of environmental management system.  
 OHSAS 18001: 2008 certification of occupational health and safety management system.



ISO 9001: 2015 certification of quality management system (QMS).



The LBAD0XX1SC-151 features optimized Class 3 LTE transmit power with a maximum output of +23dBm, providing stable uplink communication even in challenging conditions. By using the LTE-M protocol, this Click board achieves extended coverage, reduced latency, excellent mobility handling, and long operational lifetimes. LTE IoT 23 Click is ideally suited for modern IoT scenarios such as wearables, smart metering systems, healthcare and medical monitoring equipment, and asset-tracking devices.

Communication between the LBAD0XX1SC-151 module and the host MCU is performed over a UART interface using standard RX/TX pins and hardware flow control (CTS/RTS) for reliable data transfer. The module operates at a default baud rate of 115200bps and communicates through [AT commands](#). In addition to its primary interface pins, this Click board™ provides several auxiliary signals that improve control and monitoring of the LBAD0XX1SC-151 module. A RESET button enables quick manual resets, with the same function available digitally through the mikroBUS™ RST pin.

For low-power applications, the WUP and HWU pins allows the module and host MCU to be instantly awakened from Sleep Mode, ensuring fast response when communication or processing is needed. The board also features an AntiTamper switch, adding security by detecting unauthorized physical interaction, making it suitable for sensitive or remote installations where tamper protection is required. A blue LD2 indicator provides visual feedback of TX activity, making data transmission monitoring straightforward during development.

The board features two SMA connectors for an LTE antenna ([LTE Flat Rotation Antenna](#)) offered by MIKROE and one for GNSS, ensuring efficient connectivity options, although GNSS functionality is currently not supported on this Click board™. It also incorporates a micro SIM card holder compatible exclusively with 1.8V uSIM cards, allowing users to choose the most suitable service provider for their application, while an additional VDDIO test point provides a 1.8V typical power output for evaluation and integration purposes.

This Click board™ can operate with both 3.3V and 5V logic voltage levels selected via the VCC SEL jumper. Since the Adrastea-I module operates at 4.07V and communicates at 1.8V, a logic-level translator, the [TXB0106](#) is also used for proper operation and an accurate signal-level translation. This way, both 3.3V and 5V capable MCUs can use the communication lines properly. Also, this Click board™ comes equipped with a library containing easy-to-use functions and an example code that can be used as a reference for further development.

## Specifications

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Type	LTE IoT
Applications	Ideal for wearables, smart metering, healthcare monitoring, and asset-tracking applications
On-board modules	LBAD0XX1SC-151 - Cat. M1/NB-IoT module with global certification from muRata
Key Features	Global LTE Cat. M1 and NB-IoT connectivity, optimized Class 3 transmit power, low-power operation with wake-up control, UART communication with AT command support, integrated AntiTamper switch, micro 1.8V SIM holder, and more
Interface	UART
Feature	ClickID
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V or 5V

## Pinout diagram

This table shows how the pinout on LTE IoT 23 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
Host Wake-Up	<b>HWU</b>	1	AN	PWM	16	<b>WUP</b>	Device Wake-Up
Reset / ID SEL	<b>RST</b>	2	RST	INT	15	<b>RST</b>	UART RTS
UART CTS / ID COMM	<b>CST</b>	3	CS	RX	14	<b>TX</b>	UART TX
	NC	4	SCK	TX	13	<b>RX</b>	UART RX
	NC	5	MISO	SCL	12	NC	
	NC	6	MOSI	SDA	11	NC	
Power Supply	<b>3.3V</b>	7	3.3V	5V	10	<b>5V</b>	Power Supply
Ground	<b>GND</b>	8	GND	GND	9	<b>GND</b>	Ground

## Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
LD2	LD2	-	Transmit LED Indicator
JP1	VCC SEL	Left	Power Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V
T1	RESET	-	Reset Button

## LTE IoT 23 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V

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Operating Frequency Range	699	-	2170	MHz
RX Sensitivity	-	-103	-	dBm
RF Transmit Power	-	+23	-	dBm

## Software Support

[LTE IoT 23 Click](#) demo application is developed using the [NECTO Studio](#), ensuring compatibility with [mikroSDK](#)'s open-source libraries and tools. Designed for plug-and-play implementation and testing, the demo is fully compatible with all development, starter, and mikromedia boards featuring a [mikroBUS™](#) socket.

## Example Description

Application example shows device capability of connecting to the network and sending SMS or TCP/UDP messages using standard "AT" commands.

### Key Functions

- `lteiot23_cfg_setup` This function initializes Click configuration structure to initial values.
- `lteiot23_init` This function initializes all necessary pins and peripherals used for this Click board.
- `lteiot23_set_sim_apn` This function sets APN for sim card.
- `lteiot23_send_sms_text` This function sends text message to a phone number.
- `lteiot23_cmd_run` This function sends a specified command to the Click module.

### Application Init

Initializes the driver and logger.

### Application Task

Application task is split in few stages:

- `LTEIOT23_POWER_UP:`  
Powers up the device, performs a factory reset and reads system information.
- `LTEIOT23_CONFIG_CONNECTION:`  
Sets configuration to device to be able to connect to the network.
- `LTEIOT23_CHECK_CONNECTION:`  
Waits for the network registration indicated via CEREQ command and then checks the signal quality report.
- `LTEIOT23_CONFIG_EXAMPLE:`  
Configures device for the selected example.

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- LTEIOT23\_EXAMPLE:

Depending on the selected demo example, it sends an SMS message (in PDU or TXT mode) or TCP/UDP message. By default, the TCP/UDP example is selected.

## Application Output

This Click board can be interfaced and monitored in two ways:

- Application Output - Use the "Application Output" window in Debug mode for real-time data monitoring. Set it up properly by following [this tutorial](#).
- UART Terminal - Monitor data via the UART Terminal using a [USB to UART converter](#). For detailed instructions, check out [this tutorial](#).

## Additional Notes and Information

The complete application code and a ready-to-use project are available through the NECTO Studio Package Manager for direct installation in the [NECTO Studio](#). The application code can also be found on the MIKROE [GitHub](#) account.

## Resources

[mikroBUS™](#)

[mikroSDK](#)

[Click board™ Catalog](#)

[Click boards™](#)

[ClickID](#)

## Downloads

[LTE IoT 23 click example package](#)

[LTE IoT 23 click 2D and 3D files v101](#)

[LTE IoT 23 click schematic v101](#)

[LBAD0XX1SC datasheet](#)

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