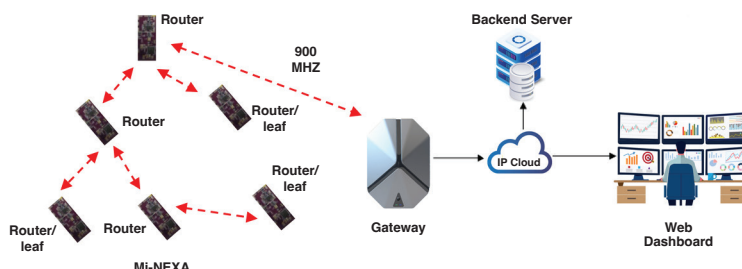


Mi-NEXA

Mi-NEXA is a communication modem that implements sub-GHz (919-923MHz) wireless mesh networking features that can be used by third party developers in their IoT products/ devices to connect them to their backend server over the internet.



Technology Overview

Sub-GHz mesh networking has emerged as a promising solution for long-range, low-power IoT applications, particularly in industrial, agricultural, and environmental domains. Leveraging open standards such as IEEE 802.15.4g/e, 6LoWPAN, and RPL, these networks offer scalable and energy-efficient communication over unlicensed frequency bands. However, existing sub-GHz solutions often lack standardised AT command interfaces, limiting accessibility for developers and hindering rapid prototyping. To address this gap, Mi-NEXA, a modular sub-GHz wireless mesh AT modem, is designed for intuitive integration and standards-compliant operation in a practical and extensible platform for long-range mesh networking in constrained environments.

Mi-NEXA is a low bandwidth, low data rate and low power wireless AT modem that can be used to connect sensors and transducers to the Internet to facilitate implementation of various IoT use cases and applications. It comes with two form factors, which are the PCBA module that connects to an external host system via mikroBUSTM interface, and USB dongle that connects to USB host via USB-C cable.

Mi-NEXA complies with 802.15.4 specifications on sub-GHz ISM radio band (919-923MHz), allowing for longer communication range with less RF interference compared to 2.4GHz band. Meanwhile, its networking layer uses 6LoWPAN, which is a low-power wireless network technology where each node has its own IP address. This allows the node to easily exchange data with remote hosts over the Internet or wireless local area network through the gateway. The 6LoWPAN network stack also supports mesh capability, allowing each MI-NEXA node to route data from and to other nodes, effectively extending the network communication range even further while also making the network more robust to any node failure. MI-NEXA supports MQTT protocol for data transfer between node and backend server, as well as over-the-air (OTA) firmware update.

Key Features

- **USB-C or mikroBUSTM Interface**
MI-NEXA AT modem communicates with external host system via USB serial communication or mikroBUSTM interface.
- **SMA or U.FL Antenna Connector**
Choice of SMA female or U.FL for connecting external antenna.

Technology Benefits

- **Long Range Communication**
MI-NEXA operates at sub-GHz frequency where signal absorption by the environment is less compared to its higher frequency counterpart. Thus, long-range communication over difficult terrain and non-LoS condition is possible.
- **Less RF Interference**
Compared to the 2.4GHz ISM band, the sub-GHz band is less crowded and relatively interference-free.
- **IP-based Low Power Wireless Mesh Network**
MI-NEXA is a low power embedded device that can form an ad-hoc wireless mesh network and able to communicate over the Internet via the gateway. This allows the device to send and receive data with remote hosts using standard IP networking, as well as eases OTA firmware update.

Applications

The use of Mi-NEXA in the form of standalone dongle or integrated module in IOT platforms allows the use cases in:-

- **Industrial Sensors**
Real-time analysis of various sensor data through wireless means and long range such as power analysis, environmental sensor, pressure sensor.
- **Residential monitoring and control**
Adaptive home appliances switch control.
- **Off-grid communication**
One to one or multi-mesh communication that works off the grid.

