Narrowband Power-Line Communications Module

Rapid development solution of N-PLC modem

Features
- Power-line Communications over AC/DC lines of up to 275V
- Operates over FCC band: 155 kHz - 490 kHz
- Supports multiple N-PLC schemes:
  - Extremely robust/noise immunity (XXR)
  - Industry compatible, high-speed low latency OFDM (G3-PLC FCC)
- Simple control interface and pass-through modes
- SPI/UART micro-controller interface
- Low power consumption

Firmware Options
- G3-PLC FCC (PHY, MAC and command interface)
- XXR and Mesh Networking Stack
- UART Pass-through over XXR

Introduction
The SM2400A-MOD1-FCC is a complete solution for the rapid deployment of Narrowband Power-Line Communications (N-PLC) into various systems. Utilizing the highly versatile SM2400A modem, the module offers an OFDM-based communication scheme interoperable with industry standards (G3-PLC FCC) and proprietary mode (XXR) that balance high data rates with most robust communications in noisy conditions.

This module enables embedded systems to communicate over extended ranges up to several kilometers without any “new wires” utilizing the power-line network.

Block Diagram

![Block Diagram of SM2400A-MOD1-FCC](image-url)
APPLICATIONS

The SM2400A-MOD1-FCC is ideally suited for extending communications capability to the following applications:

- Street lighting control
- Industrial control and automation
- Serial to PLC adapter
- Smart home automation
- Solar and alternative energy management

XXR

- Extremely robust in noisy power line environments
  - Max data rate: 5 kbps (PHY)
  - Max payload size: 100 bytes
  - Max number of nodes: 250
  - Max peak-to-peak output voltage (14Vp-p)
  - Average module power consumption: 1815 mW with 10Ω load and 100 ms transmission gap
- Simple to manage as a point-to-point or mesh

G3-PLC/OFDM

- High data rates and low latencies
  - Max data rate: 400 kbps (PHY)
  - Max payload size: 1,280 bytes
  - Max number of nodes: 500
  - Max peak-to-peak output voltage (14Vp-p)
  - Average module power consumption: 495 mW with 10Ω load and 100 ms transmission gap

Ideal for small and simple networks
Ultimate robustness

High data rates, full networking capabilities and low latencies

SM2400A PLC Module & Connector Dimensions

- Overall dimensions of the SM2400A-MOD1-FCC: 45 mm x 45 mm.
- The connector (H7) is used to connect to a microcontroller and coupler interface.

Technical Specifications

- 15V DC input voltage
- 3.3V (5V) tolerant I/O
- Communication Line Voltage: up to 275VAC
- Sensitivity: 38dBμV
- Link Budget: -90dB