

ioNODE Series LoRa End Device RF Module

MicroMOD-22

Datasheet

Document Version:

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1. Brief Description

uMOD-22 is a compact, low cost, low power wide area network (LPWAN) wireless module. This new Standalone module measure 21.4*18.7mm, is constructed in a metal shielded package

This LoRa® module communicate on a long range of upto 15Km (urban areas). As uMod-22 is low power module, it enables long battery life. uMod-22 provides flexibility to connect and control sensors via UART, SPI, I2C, D I/O. This module has output Power of 22dBm.

Data transmission through this node is completely safe as data is encrypted by 128-bit AES encryption algorithm. It operates over the license free ISM frequency bands (865-867MHz) and serves as the end device in the Lora network infrastructure. This module complies with the latest LoRaWAN® class A & C protocol specifications.

1.1 Features

- ❖ RF output power up-to +22 dBm.
- ❖ It supports LoRa® Point to Point communications as well as LoRaWAN® protocol. Different Firmware required.
- ❖ Built-in EEPROM, data kept unchanged even powered off.
- ❖ Wide range of working voltage 3V to 3.7 V
- ❖ Sensitivity -137dBm
- ❖ Wide range of temperatures -40°C to +85°C.

1.2 Applications

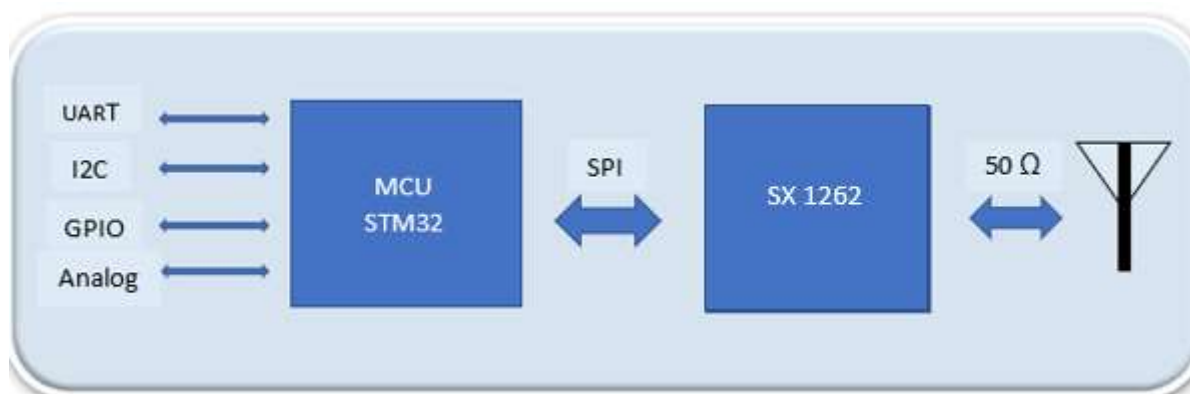
Typical applications for this module include smart metering, wearables, tracking, M2M and internet of things (IoT) edge nodes.

The module's applications are as following –

- ❖ Automated Meters Reading
- ❖ Wireless Alarm and Security Systems
- ❖ Industrial Monitoring and Control
- ❖ Long Range Irrigation Systems
- ❖ Home and Building Automation

2. MODULE OVERVIEW

MicroMOD-22 is an ultra-long range, high-performance, RF module for wireless communication. It operates in the license free 865-867 MHz ISM frequency band and includes all necessary passive components for wireless communication as depicted in the following figure.



Frequency Band	IN865/EU868
Modulation	LoRa® Spread-Spectrum
RF output power	Up to 22 dBm
Receiver sensitivity	-137 dBm (SF 12; SB 125 kHz, CR 4/6)
RF data rate	0.24 to 5 kbps
Operating voltage	3 V to 3.7 V
Current consumption	< 10 μ A (module in sleep, RTC running) 23 mA (Rx) 123 mA (Tx mode)
Interfaces	UART, I2C, LPUART
IO's	Digital IOs Analog Inputs
Dimension	21.4*18.7 mm
Operating temperature	-40°C to +85°C

3. Electrical Characteristics

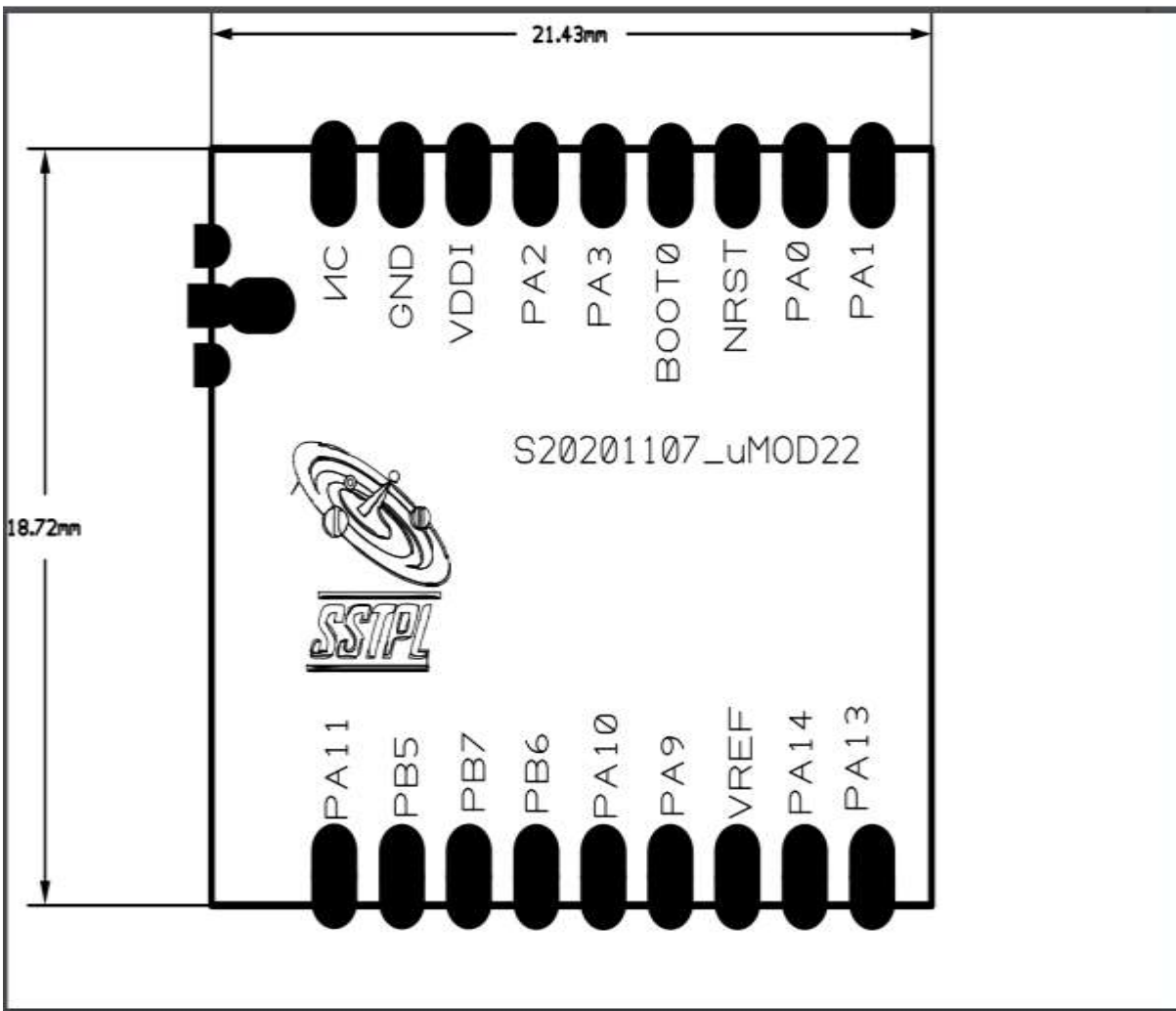
3.1 Maximum Ratings

Condition	Min	Typ.	Max	Unit
Supply Voltage (VDD)	3.0	3.5	3.7	V
Storage Temperature	-40	+25	+85	°C
Operating Temperature	-40	+25	+85	°C
RF Input Power	+10			dBm
ESD (Human Body Model)	2000			V
ESD (Charge Device Model)	500			V
Notes:				
1) Unless otherwise noted, all voltages are with respect to GND				

3.2 General Electrical Characteristics

T = 25°C, VDD = 3.5 V (typ.) if nothing else stated					
Parameter	Condition	Min	Typ.	Max	Unit
Supply Voltage (VDD)		3	3.5	3.7	V
Current Consumption System IDLE	RF idle mode, MCU idle mode		10		µA
Current Consumption RECEIVE LoRa	RF receive mode, MCU sleep mode		23		mA
Current Consumption TRANSMIT	RF transmit mode, MCU Active mode, all MCU units on, max. RF power level		123		mA
MCU operation frequency		32 MHz & 32.768 KHz			

4. MODULE PACKAGE



PIN OUT

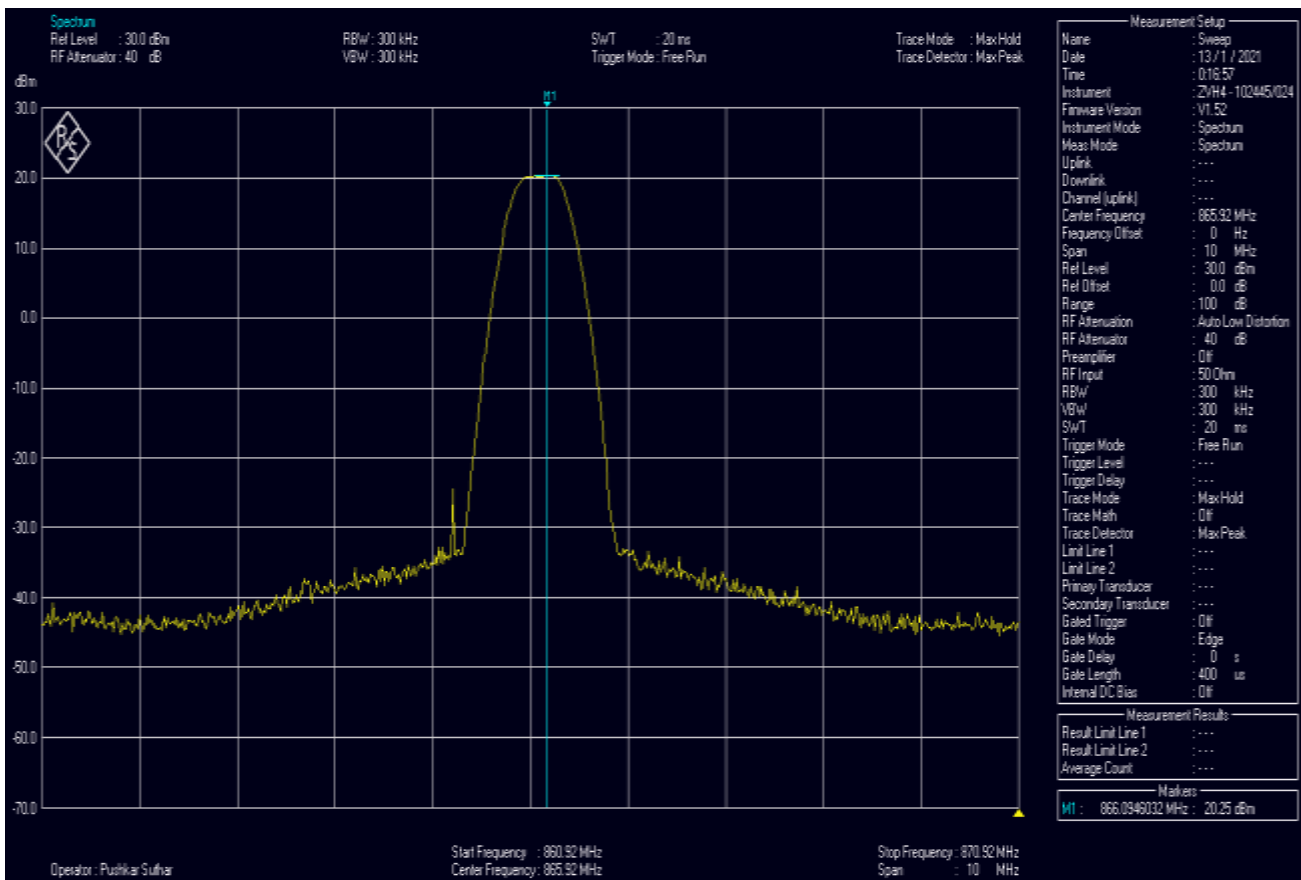
PIN	PIN Name	PIN Type	MCU Pin (number)	5 V Tolerance	Description
1	PA1	D I/O	PA1	Yes	ADC IN1
2	PA0	D I/O	PA0	Yes	ADC IN_0
3	nRst	D IN	NRST	NO	NReset, internally pulled-up by 47 kΩ
4	Boot	D IN	BOOT0	No	Bootloader Pin 0, internally pulled down by 47 kΩ
5	PA3	D I/O	PA3	Yes	UART Rx, ADC IN_3, LPUART Rx
6	PA2	D I/O	PA2	Yes	UART Tx, ADC IN_2, LPUART Tx
7	VDDI	Supply	VDDI	No	Main Supply
8	GND	Supply	Ground connection		GND
9	NC	-	-	-	Not Connected
10	PA11	D I/O	PA11	Yes	SPI_MISO
11	PB 5	D I/O	PB5	Yes	SPI_MOSI
12	PB7	D I/O	PB7	Yes	UART1_Rx, I2C1_SDA
13	PB6	D I/O	PB 6	Yes	UART1_Tx, I2C1_SCL
14	PA10	D I/O	PA10	Yes	UART1_Rx, I2C1_SDA
15	PA9	D I/O	PA9	Yes	UART1_Tx, I2C1_SCL
16	VDDO	Supply	-	-	3.3V out up-to 20 mA
17	PA14	D I/O	PA14	Yes	SWCLK
18	PA13	D I/O	PA13	Yes	SWDIO

5.RF Test Report

5.1 Maximum RF output power:

Frequency	Output Power (dBm)
866MHz	20.25*

*Note: Actual power is greater than this.



6. Antenna Mounting Options

To serve the propose of multiple antenna requirement, MicroMOD-22 comes with multiple options. Below are the MicroMOD-22 Antenna options:

1. Connect an external antenna thru the UFL connector mounted on PCB. It can be Simply connected thru a UFL Pigtail to antenna of your choice. Here 50 Ω impedance matched antenna will work.
2. Through Hole Spring Helical antenna can also be used if antenna needs to be integral part of module. Just unmount the UFL connector and used through hole beneath the UFL connector pad to connect Spring Helical or other wire antenna. The recommend thick ness of wire is 0.7 to 0.9 mm to get it mounted in the PCB hole.
3. MicroMOD-22 has edge half cut pads to extend the RF signals on Daughter Board PCB and antenna can be mounted separately on DB PCB. Here needs to take care the 50 Ω impedance characteristics of the RF track.

7. Important Notice

7.1 Disclaimer

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7.2 Contact Information

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