NanoLINK Series outdoor LoRaWAN® Gateway

NanoLINKGTW-LRV1

Datasheet

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1. Brief Description

NanoLINKGTW-LRV1 is a compact, low cost, low power wide area network (LPWAN) wireless Gateway which supports Semtech LoRaWAN® long range wireless protocol.

This high performance outdoor IoT Gateway measures 115*125*50mm, is housed in Polycarbonate Enclosure and comprises a Semtech SX1302 Based-band Processor along with a pair of SX1250, a highly integrated RF Front End with Multi-PHY Mode & I/Q Modem on Chip transceiver. The NanoLINKGTW-LRV1 complies with the latest LoRaWAN® Class A & C protocol specifications and it made it quite simple to access LoRaWAN® IoT platforms.

1.1 Features

- Commercial Grade Outdoor LoRaWAN® Network Gateway
- Works on Semtech LoRa® Packet Forwarder
- Default Ethernet Back-haul, also works on 4G LTE in standalone mode
- Range up-to to 4.5 km Line of Sight
- Ambient operating Temperature -20 to 75 °C
- Suitable for large scale Private LoRaWAN® Network

1.2 Applications

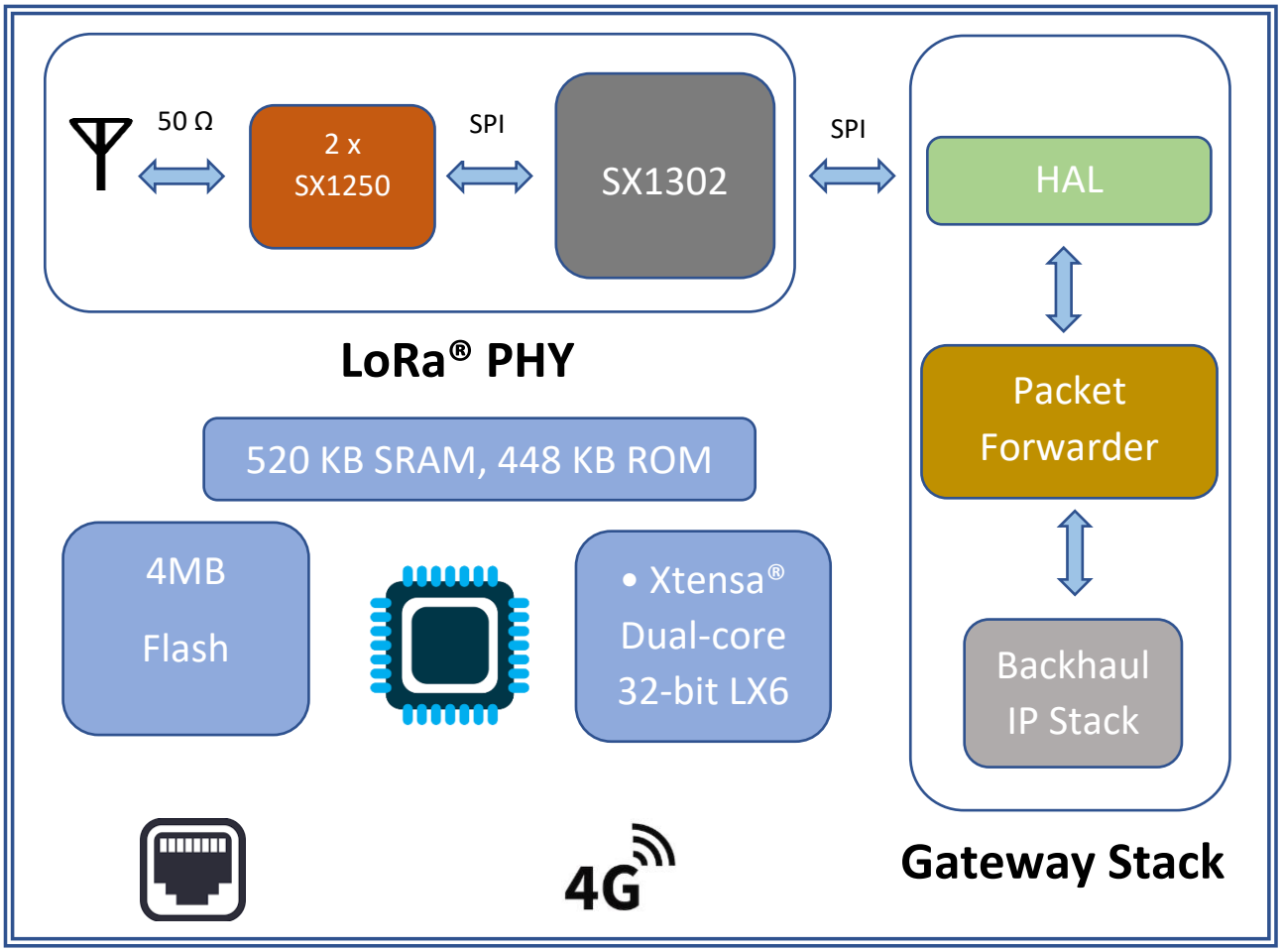
Typical applications for this Gateway include smart metering, wearables, tracking, M2M and internet of things (IoT) edge nodes.

The Gateway's applications are as following -

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

2. Gateway Overview:

NanoLINKGTW-LRV1 is an long range, high-performance, LoRaWAN® Gateway for wireless communication. It operates in the license free 865-867 MHz ISM frequency band. Its key components are depicted in the following figure.



NanoLINKGTW-LRV1 is an ultra-compact LoRaWAN® Gateway and creates LoRaWAN® network in few minutes. It is designed to work in outdoors and can be used as a Data Aggregator for open landscapes and large campus. It comes with a simple User Interface for configuring IP/URL for your choice of LoRa® Network Server.

NanoLINKGTW-LRV1 comprises 3 major parts on hardware side:

1. LoRaWAN® Gateway RF Board with Power Supply Section

2. Host Microcontroller Unit with Memory & RAM

3. Connectivity Options of Fast Ethernet & 4G LTE with limited WiFi access

NanoLINKGTW-LRV1 is a commercial class device and qualifies major requirements of a Commercial outdoor IoT Gateway. LoRaWAN® Gateway RF Board used in this product is based on SSTPL own RF Design which have enhanced RF performance in Transmit as well as Receive Parameters. It uses Semtech Baseband Processor SX1302 and 2 RF Front End SX1250 along with SSTPL own high-performance RF design which is ETSI compliant for Harmonics Filters etc.

The Host Microcontroller Unit is a 32-bit MCU and gives virtually no strain in running LoRaWAN® Gateway Stack in Embedded environment. NanoLINKGTW-LRV1 is meant for outdoor as well as Indoor use with Low Latency Ethernet backhaul, for Outdoor it can be connected to LoRa® Network Server on 4G internet.

3. Hardware Specifications

Specs Group	Key Item	Detailed Specs
System Configuration	Core	Xtensa® Dual-core 32-bit LX6
	Clock Frequency	240 MHz x 2
	RAM	520 KB SRAM, 448 KB ROM
	On Board Memory	4 MB Flash
LoRaWAN®	Baseband	SX1302
	RF Front End	SX1250
	Max RF Transmit Power	Up to +22 dBm
	Receive Sensitivity	Down up to -130 dBm on SF12 & 125KHz Channel BW
	SNR Sensitivity	up to -20 dBm
	Frequency	865-867 MHz (ISM Band India)
	No. of Channels	8 Channels, 125 KHz per Channel
	Spread Factor	SF7-SF12
	Data Rate	250 - 5470 bits/sec
	LoRa Antenna Port	1 × 50 Ω SMA Female
Internet Backhaul	Wired	Ethernet 10/100 Mbps
	WiFi	Limited Coverage
	Cellular	4G LTE
	Cellular Antenna Port	Not Available (Internal Antenna Used)
Power Supply	Default	12V DC
	Optional	N/A
	Power Consumption	2.5W Typical, MAX 3W
Enclosure	Ingress Protection Level	IP68
	Dimensions	115*125*50mm
	Weight	390 gm
	Mounting Option	Pole Mount / Wall Mount
Environmental	Operating Temperature	-20°C to +70°C
	Storage Temperature	-20°C to +85°C
	Relative Humidity	0% to 90% (non-condensing) at 25°C

3.1 Transmitter RF Characteristics

T = 25°C, 866 MHz if nothing else stated					
Parameter	Condition	Min	Typical	Max	Unit
Frequency Range		865	-	867	MHz
RF Output Power - 865 MHz Band		21	21.5	22	dBm
Modulation Techniques			LoRa®		
TX Frequency Variation vs. Temperature	-40 to +85°C	-	±10	-	kHz
TX Power Variation vs. Temperature		-	±0.5	-	dB

4. RF Test Reports

EUT Test Configuration: - Transmit on Max power on each 125 KHz Channel, Transmission on 1st, Mid and Last channel in each 15 minutes.

EUT Height: - 0.8m from Ground (EUT placed on nonconductive table).

Voltage: - 12V DC

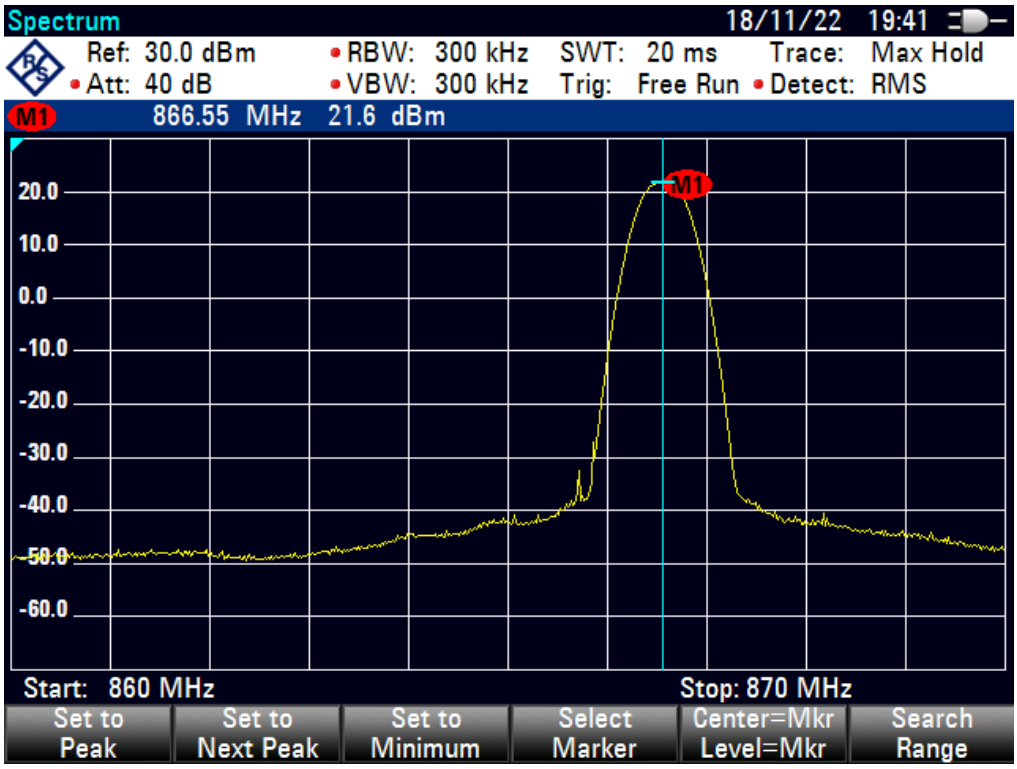
EUT antenna port connected to RF connector.

4.1 Max Conducted RF Power

Observation Table: - Test Frequency (866.5500 MHz)

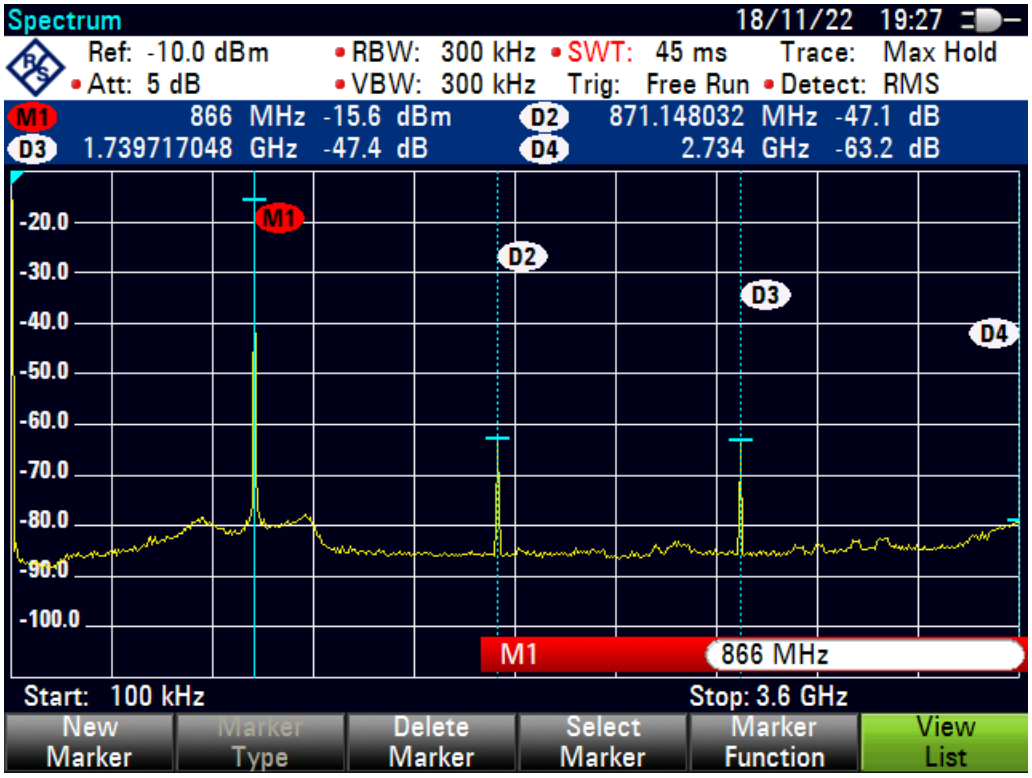
Channel Frequency (MHz)	Conducted Power Measured (dBm) (A)	Cable Loss (dB) (B)	Max Conducted Power (dBm) (A+B)	EIRP Test Status
866.5500	21.6	0.2	21.8	Pass

Observation Graph: - Test Frequency (866.5500 MHz)



4.2 Unwanted emissions in the spurious domain for Tx mode

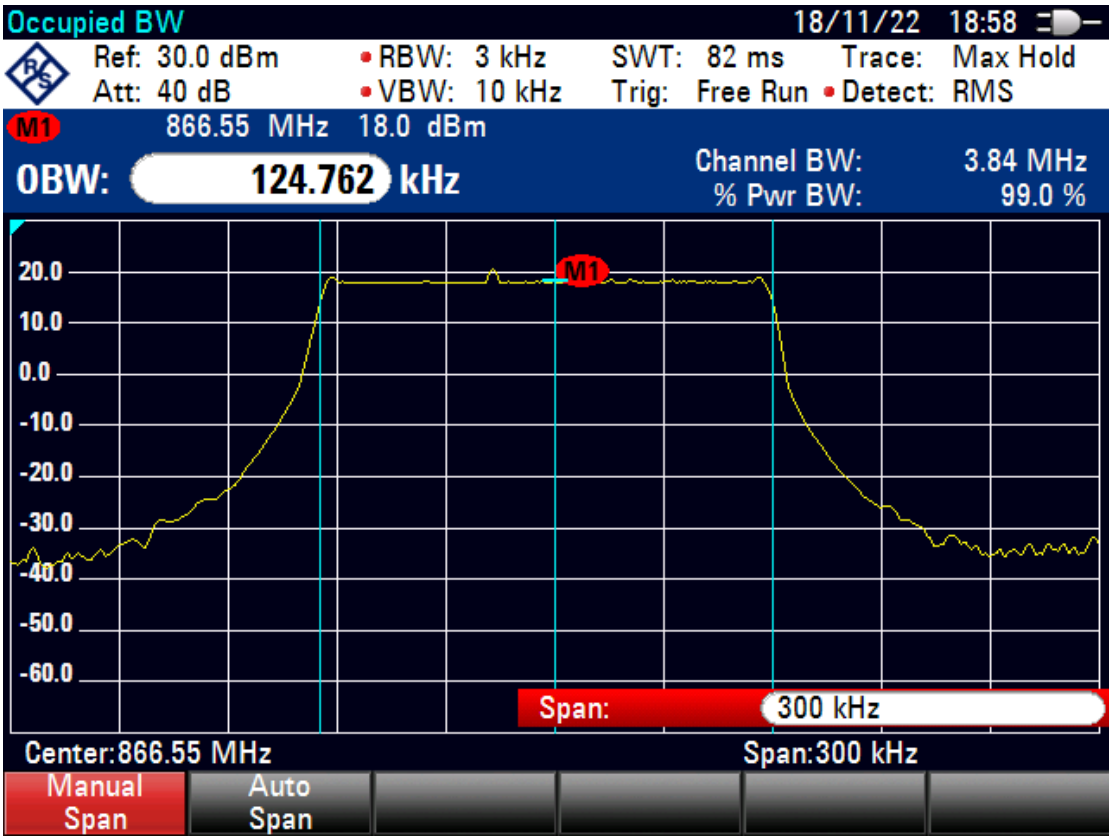
Observation Graph: - Unwanted emission in the spurious domain



Observation Table:

Sr. No.	Frequency (MHz)	Level Measured (A) (dBm)	Correction Factors (B) (dB)	Fix Attenuation (C) (dB)	Standa Limit (dBm)	Spurious level Including correction factors: A+B+C (dBm)	Result
1	2fc	-62.7	-1.1	20	-30	-43.8	Pass
2	3fc	-63	-1.4	20	-30	-44.4	Pass
3	4fc	-78.8	-0.4	20	-30	-59.2	Pass

4.3 Occupied Bandwidth



Test Frequency (MHz)	Occupied bandwidth Measured (KHz)	Standard Limit (KHz)	Result
866.5500	124.762	< 200	Pass

5. Software & Stacks

5.1 LoRaWAN® Gateway Stack

NanoLINKGTW-LRV1 has highly optimized LoRaWAN® Gateway Software Stack developed by SSTPL comprising LoRa® Physical Layer and LoRa® Packet Forwarder. LoRa® Physical Layer is responsible for handling LoRa® packets received & transmitted to remote LoRa® end node while LoRa® Packet Forwarder converts the packet into IP packets and send/receive them to/from LoRa® Network Server. Both the software used the host MCU to run and process packets in light Embedded C environment.

The Stack also have the intelligence to switch network between Ethernet / 4G LTE basis the availability of Internet and priority (Ethernet will be always priority 1). This Failover also integrates back with Web Socket between the LoRa® Packet Forwarder and LoRa® Network Server which is major advantage over many DIY or non-commercial LoRaWAN® Gateway available in the market.

5.2 User Interface (UI)

NanoLINKGTW-LRV1 UI is quite simple and easy to use. A user can access the UI by connecting NanoLINKGTW-LRV1 thru WiFi Hotspot mode. NanoLINKGTW-LRV1 will go in GUI mode automatically if no backhaul network in available and then you can connect its Hotspot. More details are available in the user manual.

A user can configure his choice of LoRa® Network Server by accessing the UI. Network configuration can also be done in quite simple steps. Please refer user manual for more details on UI.

6. Important Notice

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Revision History:

V1.01

1. Revised from “5W” to “2.5W” on page 5>> Power Supply >> Power Consumption
2. Added word “Mbps” on page 5 against Internet Backhaul >>Wired >>
3. Added “IP68” on page 5 against Enclosure >> Weight >> 380 gm
4. Replaced “Typ.” With “Typical” on page 6 against 3.1 >> Parameter