

# Indoor LoRaWAN® Gateway

**LWIG2-V1**

**Datasheet**

**Document Version:**

**LINK-LOGIX/HW/GTW/LWIG2-V1/v1.0**

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# 1. Brief Description

LWIG2-V1 is a compact, low cost, low power wide area network (LPWAN) wireless Gateway which supports Semtech LoRaWAN® long range wireless protocol.

This high performance indoor IoT Gateway measures 113\*106\*50mm, is housed in a Metal 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 LWIG2-V1 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, Automatic Fallback to 4G LTE
- Range up-to to 5 km Line of Sight tested, not suitable for outdoor
- Ambient operating Temperature -20 to 75 °C
- Suitable for large scale Private LoRaWAN® Network

## 1.2 Applications

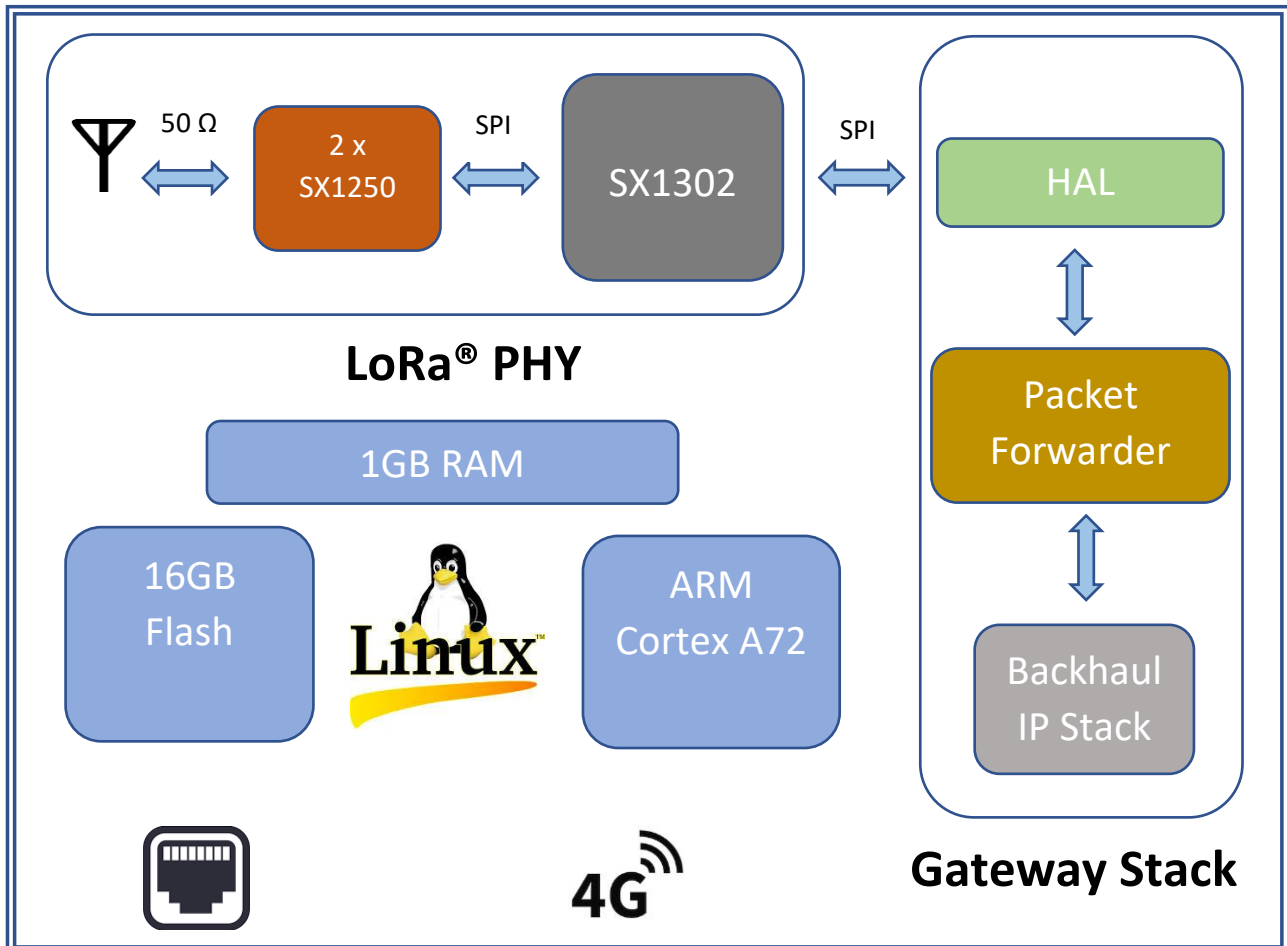
Typical applications for this Gateway include smart metering, wearables, tracking, M2M and internet of things (IoT) edge nodes.

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:

LWIG2-V1 is an ultra-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.



LWIG2-V1 is an ultra-compact LoRaWAN® Gateway and creates LoRaWAN® network in few minutes. It is designed to work in indoors and can be used as a Data Aggregator for open landscapes and large campus with proper enclosures. It comes with a simple User Interface for configuring IP/URL for your choice of LoRa® Network Server.

LWIG2-V1 comprises 3 major parts on hardware side:

1. LoRaWAN® Gateway RF Board with Power Supply Section
2. Linux Host Processor with Memory & RAM
3. Connectivity Options of Fast Ethernet & 4G LTE

LWIG2-V1 is a commercial class device and qualifies major requirements of a Commercial indoor IoT Gateway. LoRaWAN® Gateway RF Board used in this product is based on AVAGURU 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 AVAGURU own high-performance RF design comprising PA, LNA and ETSI compliant Harmonics Filter.

The Host processor is a 64-bit mini PC and gives virtually no strain in running LoRaWAN® Gateway Stack in Linux environment. LWIG2-V1 is meant for Indoor use with Low Latency Ethernet backhaul, with an option to connect LoRa® Network Server on 4G internet.

### 3. Hardware Specifications

Specs Group	Key Item	Detailed Specs
System Configuration	Core	Cortex-A72 64-Bit
	Clock Frequency	1.8 GHz
	RAM	LPDDR4-3200 SDRAM
	On Board Memory	16 GB Flash
LoRaWAN®	Baseband	SX1302
	RF Front End	SX1250
	Max RF Transmit Power	Up to +27 dBm
	Receive Sensitivity	Down up to -141 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	1 × 50 Ω SMA Female
Power Supply	Default	12V DC
	Optional	N/A
	Power Consumption	5W Typical, MAX 6.5W
Enclosure	Ingress Protection Level	IP54
	Dimensions	113*106*50mm
	Weight	950 gm
	Mounting Option	Wall Mount/Table Top
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		26	26.5	27	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 1<sup>st</sup>, Mid and Last channel in each 15 minutes.

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

**Voltage:** - 12V DC

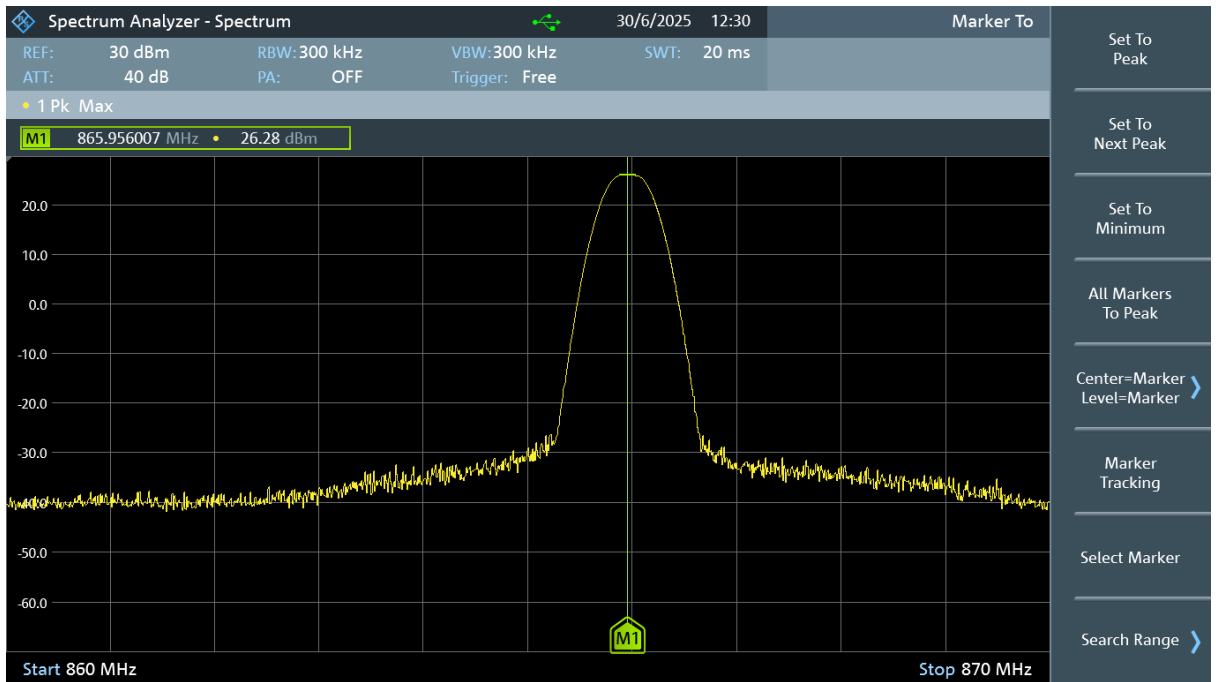
EUT antenna port connected to RF connector.

### 4.1 Max Conducted RF Power

**Observation Table:** - Test Frequency (866.95 MHz)

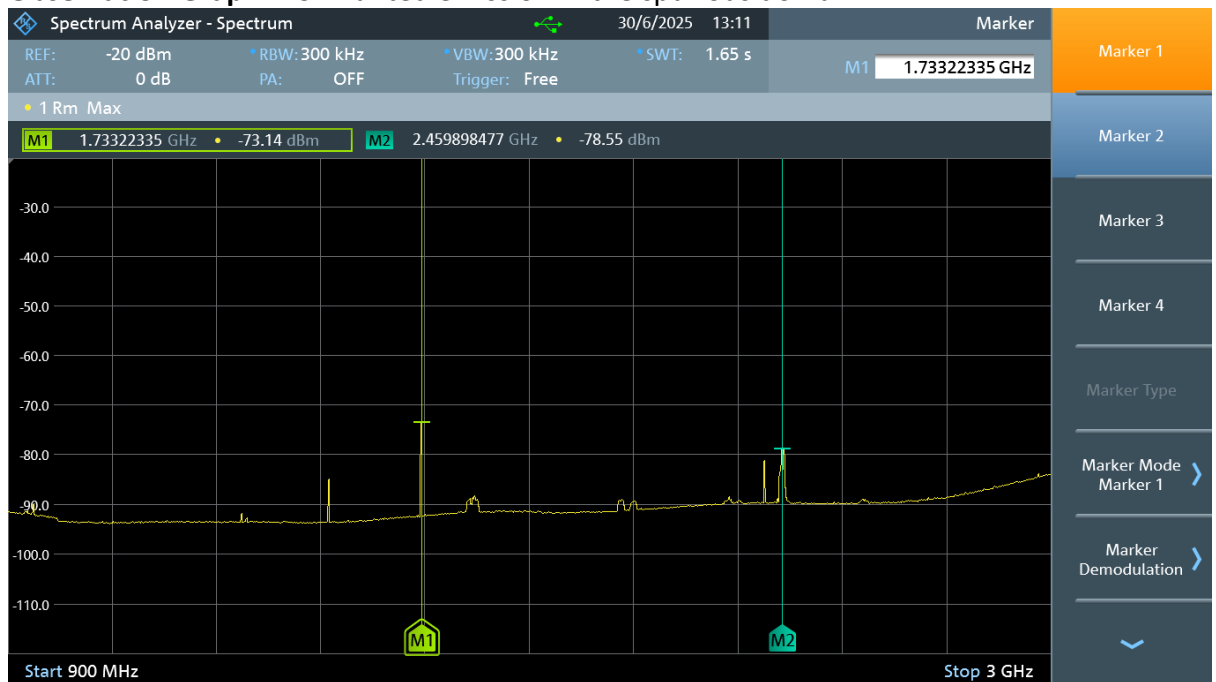
Channel Frequency (MHz)	Conducted Power Measured (dBm) (A)	Cable Loss (dB) (B)	Max Conducted Power (dBm) (A+B)	EIRP Test Status
866.000	26.28	0.3	26.58	Pass

**Observation Graph:** - Test Frequency (866.95 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)	Standard Limit (dBm)	Spurious level Including correction factors: A+B+C (dBm)	Result
1	2fc	-73.14	-2	30	-30	-45.14	Pass
2	3fc	-78.55	-2	30	-30	-50.55	Pass

### 4.3 Occupied Bandwidth



Test Frequency (MHz)	Occupied bandwidth Measured (KHz)	Standard Limit (KHz)	Result
866.55	123.096	< 200	Pass

## 5. Software & Stacks

### 5.1 LoRaWAN® Gateway Stack

LWIG2-V1 has highly optimized LoRaWAN® Gateway Software Stack developed by AVAGURU 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 Linux Host Processor to run and process packets in light Embedded Linux environment.

The Stack also have the intelligence to switch network between Ethernet / 4G LTE basis the availability of Internet and priority. 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)

LWIG2-V1 UI is quite simple and easy to use. A user can access the UI by connecting Ethernet on their computer. It is available thru hostname which is provided with the gateway packaging list.

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

### 5.1 Disclaimer

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## 7.2 Contact Information

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## 7.3 Document Revision History

**V1.0** First Version