



ioLINK Series outdoor LoRaWAN® Gateway

ioLINKGTW-LRV1

Datasheet

Document Version:

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1. Brief Description

ioLINKGTW-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 182*238*60mm , is housed in an Metal Enclosure and comprises a Semtech SX1301 Based-band Processor along with a pair of SX1257, a highly integrated RF Front End with Multi-PHY Mode & I/Q Modem on Chip transceiver. The ioLINKGTW-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, Automatic Fallback to 4G LTE
- Range up-to to 15 km Line of Sight
- Ambient operating Temperature -20 to 75 °C
- Suitable for large scale Private LoRaWAN® Network

1.2 Applications

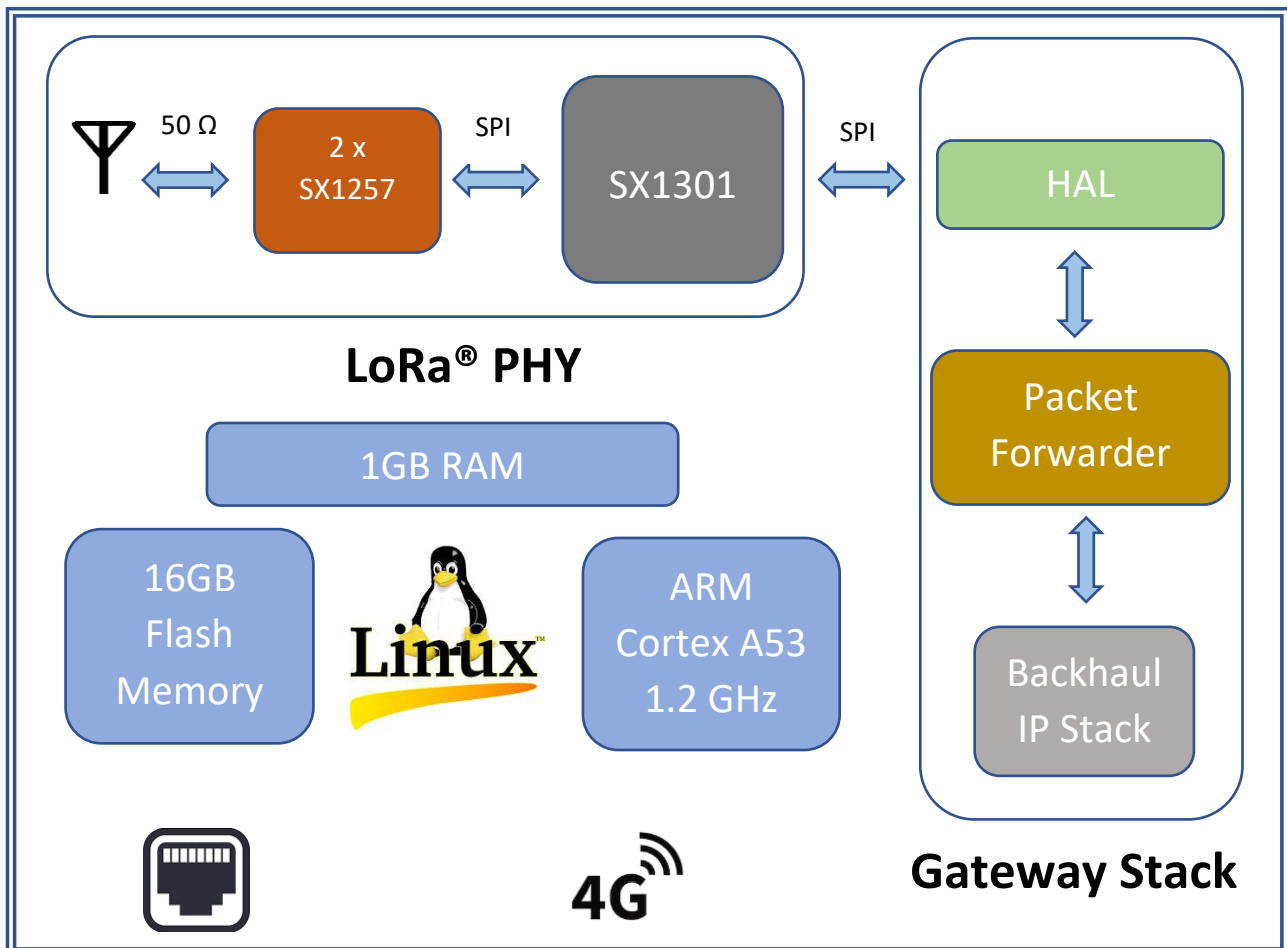
Typical applications for this Gateway include smart metering, wearables, tracking, M2M and internet of things (IoT) edge nodes.

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:

ioLINKGTW-LRV1 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.



ioLINKGTW-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.

ioLINKGTW-LRV1 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

ioLINKGTW-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 SX1301 and 2 RF Front End SX1257 along with SSTPL 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. ioLINKGTW-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 | Cortex-A53 64-bit |
| | Clock Frequency | 1.2 GHz |
| | RAM | 1GB SDRAM |
| | Flash | 16 GB Flash |
| LoRaWAN® | Baseband | SX1301 |
| | RF Front End | SX1257 |
| | Max RF Transmit Power | +29 dBm |
| | Receive Sensitivity | Down up to -145 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 N-Type Female |
| Internet Backhaul | Wired | Ethernet 10/100 |
| | WiFi | N/A |
| | Cellular | 4G LTE |
| | Cellular Antenna Port | 1 × 50 Ω SMA Female |
| Power Supply | Default | 12V DC |
| | Optional | PoE 56V DC |
| | Power Consumption | 5W Typical, MAX 6.5W |
| Enclosure | Ingress Protection Level | TBD |
| | Dimensions | 182x238x60 mm |
| | Weight | TBD |
| | 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 | Typ. | Max | Unit |
| Frequency Range | | 865 | - | 867 | MHz |
| RF Output Power - 865 MHz Band | | 27 | 28 | 29 | 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: - PoE 56V DC

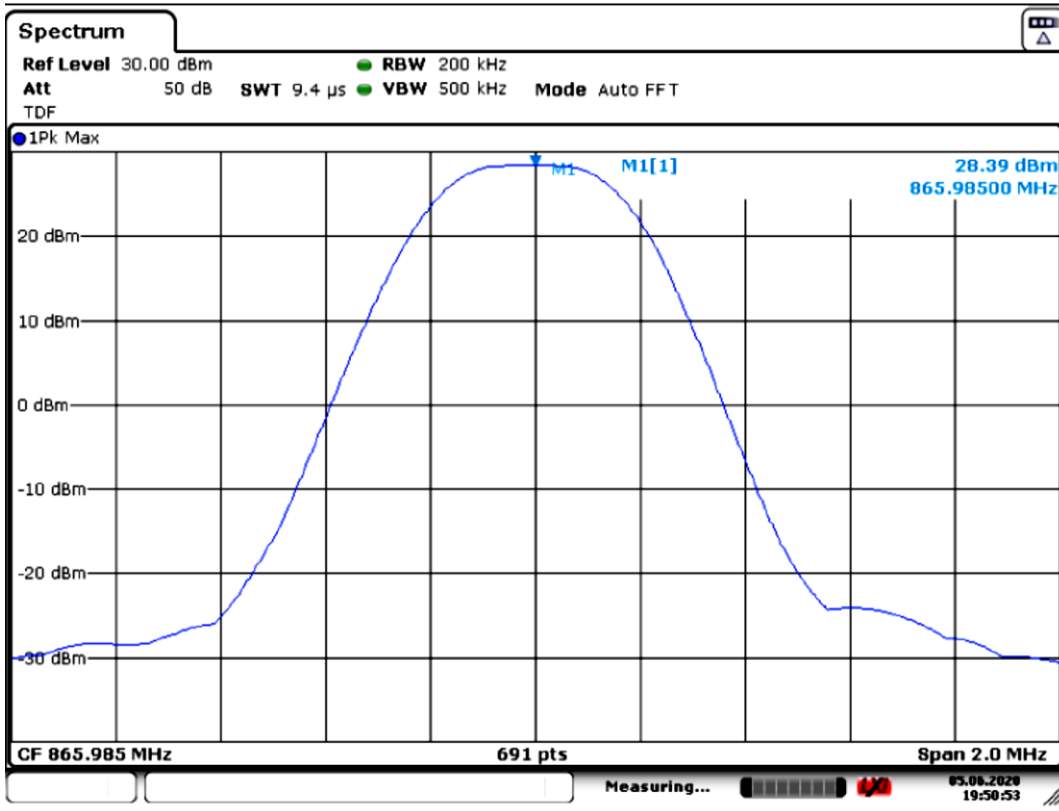
EUT antenna port connected to RF connector.

4.1 Max Conducted RF Power

Observation Table: - Channel 5 (865.98500 MHz)

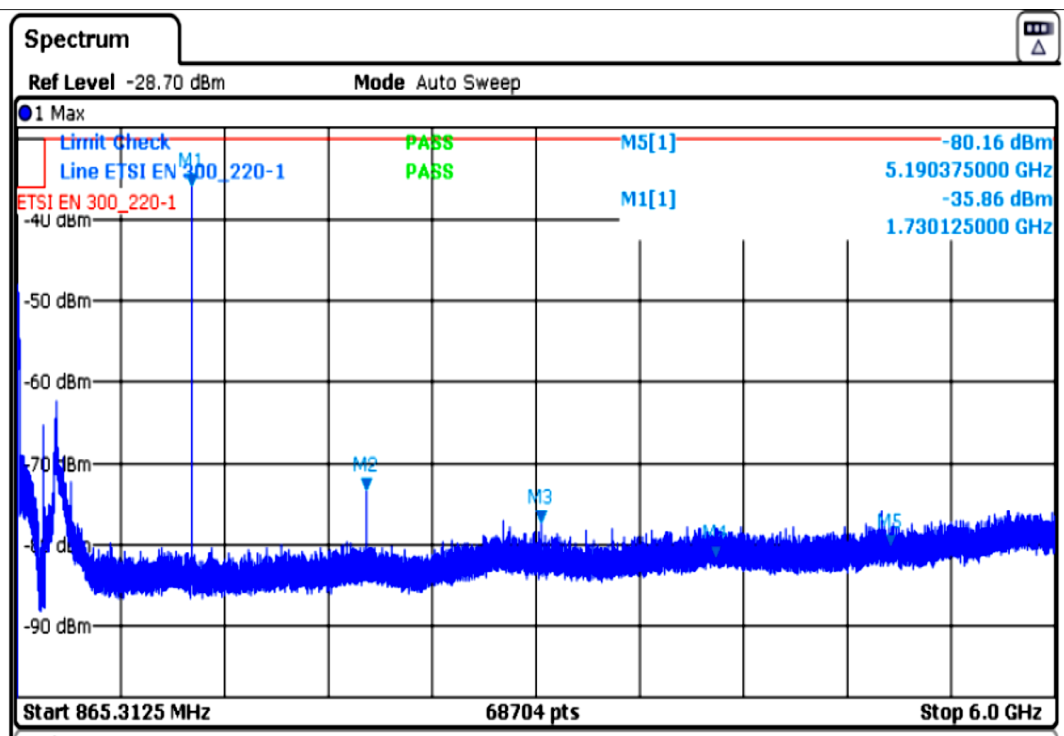
| Channel Frequency (MHz) | Conducted Power Measured (dBm) (A) | Correction Factor (dB) (B) | Max Conducted Power (dBm) | EIRP Test Status |
|-------------------------|------------------------------------|----------------------------|---------------------------|------------------|
| 865.98500 | 28.39 | 0.18 | 28.57 | Pass |

Observation Graph: - Channel 5 (865.98500 MHz)



4.2 Unwanted emissions in the spurious domain for Tx mode

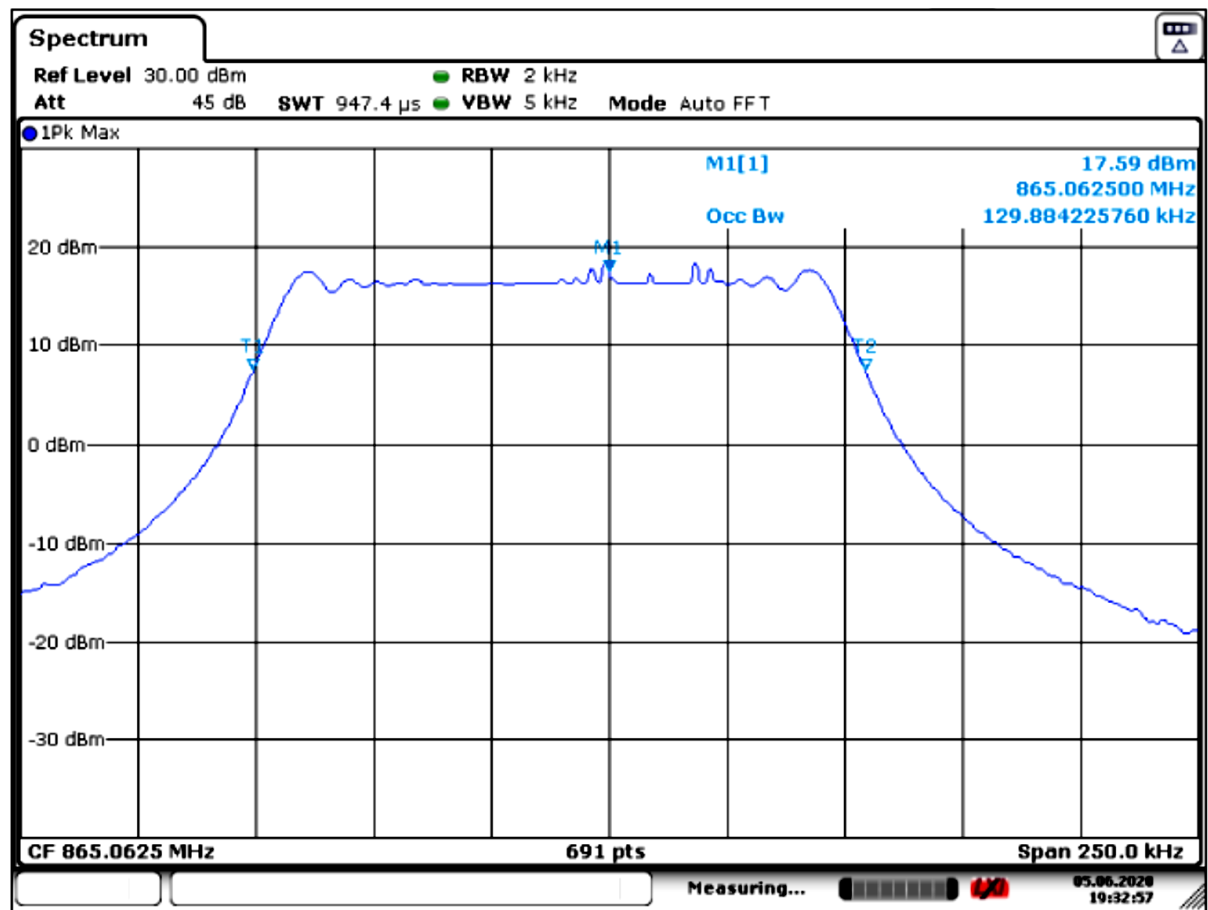
Observation Graph: - Unwanted emission in the spurious domain (865.06250 MHz)



Observation Table:

| Serial No. | Frequency (MHz) | Spurious Level Measured(A) (dBm) | Correction Factors(B) (dB) | Standard Limit (dBm) | Spurious level Including correction factors: A+B+C (dBm) | Result |
|------------|-----------------|----------------------------------|----------------------------|----------------------|--|--------|
| 1 | 1730.125 | -35.86 | 0.94 | -30 | -34.92 | Pass |
| 2 | 2595.187 | -73.34 | 9.3 | -30 | -64.04 | Pass |
| 3 | 3460.250 | -77.22 | 4.51 | -30 | -72.71 | Pass |
| 4 | 4325.312 | -81.63 | 16.30 | -30 | -65.33 | Pass |
| 5 | 5190.375 | -80.16 | 5.95 | -30 | -74.21 | Pass |

4.3 Occupied Bandwidth



| Channel Frequency (MHz) | Occupied bandwidth Measured (KHz) | Standard Limit (KHz) | Result |
|-------------------------|-----------------------------------|----------------------|--------|
| 866.06250 | 129.8842 | < 200 | Pass |

5. Software & Stacks

5.1 LoRaWAN® Gateway Stack

ioLINKGTW-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 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)

ioLINKGTW-LRV1 UI is quite simple and easy to use. A user can access the UI by connecting Ethernet on their computer. It is available on 192.168.1.20. Before accessing the UI please modify your computer ethernet settings as below

IP : 192.168.1.XXX (Except 192.168.1.20)
Gateway : 192.168.7.1
Subnet : 255.255.255.0
DNS : 8.8.8.8

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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