# TLM655 LoRa Based Gateway

with 2 × 10/100Base-T(x) Ports,
1 × RS232 and 1 × RS485 Serial Ports
and BPL (Broadband Power Line Link)

TLM Series LoRa Based RF Gateways are designed for industrial-grade Radio Frequency (RF) communication and particularly for facilities of rugged industry and infrastructure

Modbus Master Slave Link

Modbus TCP or RTU Master Device

Modbus TCP or RTU Slave Device

Modbus TCP or RTU Slave Device

Modbus TCP or RTU Slave Device

LoRa Network

····· Serial or TCP

—— LoRa

TLM Series LoRa Based RF Gateways are tailored to perform various features such as wide temperature range, wide power input range and several connectivity ports. Thus, TLM Series LoRa Based RF Gateways are the best choice for facility management, sewage treatment, power utility, telecommunication, transportation and all other applications that require industrial Radio Frequency (RF) connectivity.

REDZ Broadband Power Line (BPL) link allows device to communicate with full transparent TCP/IP standard over Low Voltage power lines and
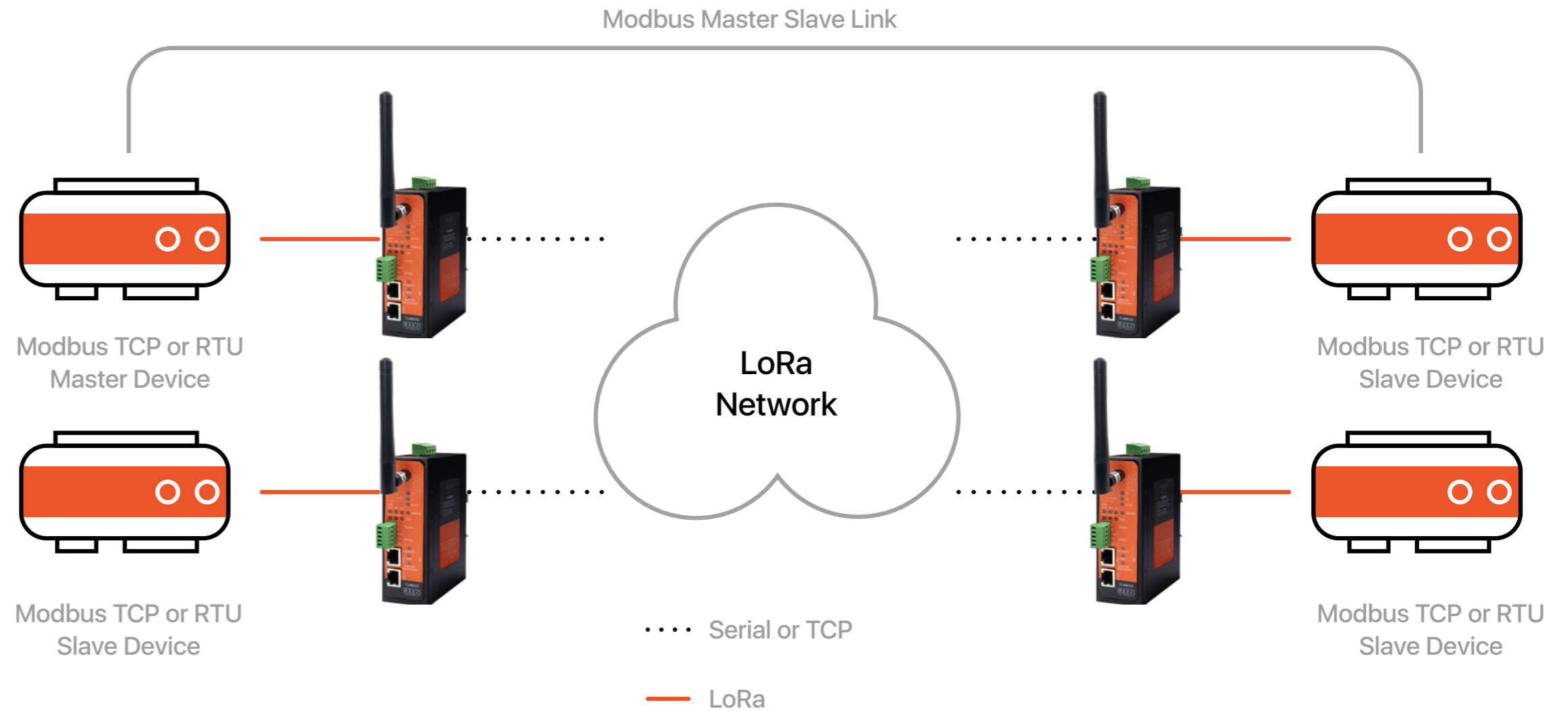
allows easy connection between TCP/IP based terminals without use of extra cables.

TLM Series RF Gateways can create a LoRa Based RF network and connect Serial and/or ETH based devices with each other. All communication can be done over Radio Frequency network, based on LoRa standard. TLM Series LoRa Based RF

Gateways can act as TCP to Lora Gateway as TCP Server, TCP to Lora Gateway as TCP Client or Serial to LoRa Gateway all in one device. Typical applications: Automated Meter reading, Wireless networks, Home – Building – Industrial Automation, Remote Control, Wireless Sensors, Telemetry, Wireless Alarm and Security Systems...

Main Features

- Supports 2 x 10/100Base-T(X) ports + 1 x BPL link
- Wide Range 3 phase input, 110V–240V/50-60Hz wide range power input
- Supports up to 30Mbps PHY rate on BPL with Up to 10 hops and 1000 nodes
- Up to 432 sub-carriers from 2 to 28MHz analog bandwidth on BPL
- Support LDPC-C FEC with 128-bit AES core on BPL
- Supports Full/Half-Duplex, auto MDI/MDI-X on each port
- Supports 1 x RS232 and 1 x RS485 Serial Connection up to 921600 Baud
- Embedded web interface for ease of use

- REDZ special design, plug and play Server-Client Operating Modes
- BPL Plug and play with Master/Slave BPL Operation Mode selection via web interface
- Instant switch between operating modes with buttons
- Up to 10 client connection in Server Mode
- DHCP Server Capability
- Easy to follow Device Status on web interface
- 868MHz LoRa based Radio Frequency (RF) Communication
- LoRa Rx Group Address and Device Address Configurable
- LoRa Tx Group Address and Device Address Configurable

- LoRa Signal Bandwidth Configurable: 125, 250, 500 kHz
- LoRa Radio Power Configurable between 5dBm (~3mW) to 20dBm (100mW)
- Easy to follow LoRa data packages on web interface
- Black List and White List based LoRa package filter
- Firmware Upgrade over Web
- 2 firmware storage capability on same device (1 active only)
- Wide operating temperature range from -40 to 85 °C
- Rugged Metal IP-40 housing design
- DIN-Rail mounting

Technical Specifications

Connectors and Ports

SMA Antenna Connector for LoRa	1 Standard SMA female interface, 50 ohm
Console Port	Micro USB connection for LOG in 115200 baud
10/100T(X) RJ45 Ports	Ethernet Connection on 2 ports
Serial Ports	5 pin wired Terminal Connection Tx, Rx, GND for RS232 A and B for RS485
Reset Buttons	Reset to Client and Reset to Server Operating modes buttons

LoRa Technology

Based on	STM32L151CxU6Axx Pre-Certified according to EN 300 220
Sensitivity	Down to -138 dBm
Output Power level	Up to 20 dBm
Link Budget	Up to 156 dB
Communication Distance	Up to 15 km (Line of Sight)
Typical Communication Distance Indoor/Urban	> 2 km
Frequency Range	Min 863 Mhz, Max 870 MHz

Ethernet Switch Technology

Ethernet Standards	IEEE 802.3 for 10Base-T
	IEEE 802.3u for 100Base-T(X)
	IEEE 802.3x Flow Control
Mac Table	1K MAC address entry
Processing	Store-and-Forward
Memory	448K bits packet buffer memory

Physical & Environmental Characteristics

Enclosure	Metal, IP 40
Dimensions	43 × 95 × 124 (w × d × h) mm
Weight	380 gr
Storage Temperature	– 65 to 150 ℃
Operating Temperature	– 40 to 85 ℃
Operating Humidity	5% to 95% Non-condensing

BPL (Broadband Powerline) Technology

PHY Data Rate	Up to 240 MHz
MAC Layer Protocol	CSMA/CA
Modulation Technology	OFDM-432
VLAN	IEEE802.1q/ IEEE802.1p/ IEEE802.3d

hi@redz-sc.com

Power

Input Range	3 phase input, 110 V – 240 V / 50 – 60 Hz
Power and Data	AC Power supply use L1-N only. Phase 2-3 connections are used to BPL signal transmission.

Led Indicators

Power indicator	Power LED
10/100T(X) Indicators	Activity LEDs: ETH1, ETH2 and CKL (Activity of device itself)
LoRa Indicators	Alive (Blinks during normal operation), Tx and Rx of data LEDs
Console Indicators	Tx and Rx of data LEDs
BPL LEDs	• BPL Activity • BPL Link • Master Indication (LED ON: Master, LED OFF: Slave)

Ordering Information

TLM655

868MHz LoRa based gateway,

2 × 10 / 100 T (x) ETH ports + 1 × BPL (Broadband Power Line)

Link, 1 × RS232 & 1 × RS485, 3 Phase AC Power Input,

110 V – 240 V / 50 – 60 Hz

Product Selection

Model	5 – 60V DC Power input	90 – 265V AC (100 – 370V DC), 47Hz to 63Hz AC Power Input	3 Phase AC Power input, 110 V – 240 V / 50 – 60 Hz AC Power Input	2 × 10/100 T(x) ETH ports	1 × RS232 and 1 × RS485 Serial Ports	Instant Switch to Client or Server Operating Modes with Button	BPL (Broadband Power Line) Link
TLM154	●			●	●	●	
TLM254		●		●	●	●	
TLM655			●	●	●	●	●