



The Testcenter facility 'LoRa<sup>®</sup> Test Lab' within IMST GmbH is recognized by the LoRa<sup>™</sup> Alliance for testing in accordance to the LoRaWAN<sup>®</sup> Specification V1.0.2

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# Report for Test of Conformance LoRaWAN<sup>®</sup> V1.0.2 (EU868)

for the Device

**“T45-LR-EXT”**

for the Customer

**“Landis+Gyr GmbH”**

Jens Lerner

Yavuz Turan

23<sup>th</sup> January, 2023

## Administrative Summary

Location: IMST GmbH, Test Centre, Kamp-Lintfort, Germany

Responsible Test Engineer: Yavuz Turan, Jens Lerner

Subject: Test of Conformance to LoRaWAN® Specification V1.0.2 (EU868)

### Company and Contact Information:

Landis+Gyr GmbH

Johannes Koch

Humboldtstr. 64

90459 Nuremberg

Germany

Tested Device: T45-LR-EXT

Hardware version: P000398000d (external Antenna)

Firmware version: 1.1

End-device identifier: 6401FB000100001B

LoRa Device Class: A

LoRaWAN Specification version: V1.0.2

Certification requirements: LoRa End Device Certification EU Version 1.6

Frequency band(s) tested: 868 MHz

Test Equipment: LCTT v3.8.0\_R1

IMST LGW (iC880A + Raspberry Pi): Gateway software version 5.0.1

Packet forwarder software version 4.0.1


Test Result: PASS


Quality Engineer: Jens Lerner

Date: January 23<sup>rd</sup>, 2023

The Test Report, No. 6230040 has the following conclusion:

**The device has PASSED the tests hereunder.**

Responsibility:   
Yavuz Turan  
Test Engineer

Approved:   
Jens Lerner  
Quality Engineer

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# 1 Description of the Device Under Test (DUT)

## 1.1 General

Item	Value
Product name	T45-LR-EXT
Product Vertical(s)	Utilities
Series (if any)	
Hardware Version	P000398000d (external Antenna)
Firmware Version	1.1
Type of DUT	<input checked="" type="checkbox"/> Module <input type="checkbox"/> End Device/Sensor <input type="checkbox"/> others
Geographical area of operation	<input checked="" type="checkbox"/> Europe <input type="checkbox"/> USA
Operating frequency	<input type="checkbox"/> 433 MHz <input checked="" type="checkbox"/> 868 MHz <input type="checkbox"/> 915 MHz
Adaptive Data Rate (ADR) supported?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Optional data rates supported?	<input type="checkbox"/> DR6 <input type="checkbox"/> DR7
Activation possibilities	<input type="checkbox"/> Over the air <input type="checkbox"/> by personalization <input checked="" type="checkbox"/> both
Test According LoRaWAN® Spec	<input type="checkbox"/> V1.0.1 <input checked="" type="checkbox"/> V1.0.2
Output Power	14dBm
Number / Type of Antenna(s)	1 / external intenna
Antenna Gain	-0.7 and -1.7 dBi

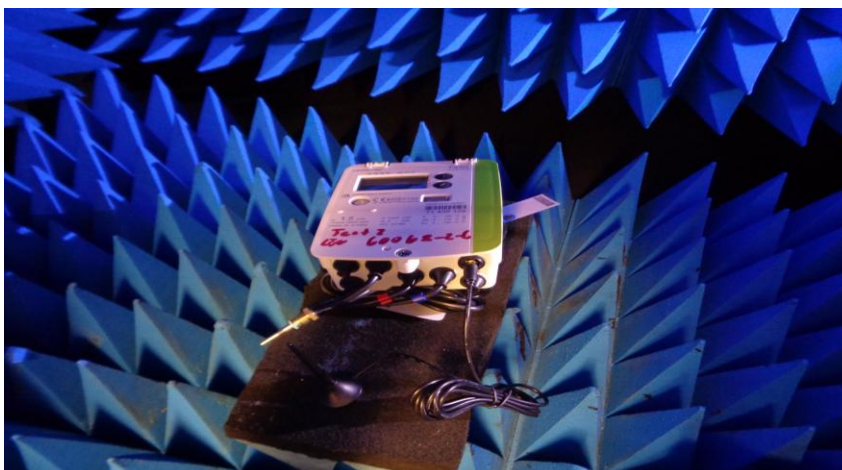
**Table 1 Device Information**

## 1.2 DUT Modes of Operation

During the tests the device operated in the following modes:

- Test mode according to document “LoRa Alliance End Device certification Requirements for EU863-870 MHz Version 1.6” Chapter 2.

## 1.3 DUT Setup



**Figure 1 DUT Setup**

Applied Methods of Measurement

## 1.4 Protocol Testing according to LoRaWAN® specification V1.0.2 (EU868)

### Detailed Test Results:

Device Activation: **PASS**  
Over the Air Activation: **PASS**  
Activation by Personalization: **PASS**  
Test Application Functionality: **PASS**  
AES Encryption and Message Integrity: **PASS**  
Downlink Error Rate: **PASS**  
Receive Window Timing: **PASS**  
Frame Sequence Number: **PASS**  
Device Status Request: **PASS**  
Mac Commands: **PASS**  
New Channel Request: **PASS**  
Di Channel Request: **PASS**  
Confirmed Packets: **PASS**  
RX Parameter Setup Request: **PASS**  
RX Timing Setup Request: **PASS**  
Link ADR Request: **PASS**  
RX1 Receive Window: **PASS**  
RX2 Receive Window: **PASS**  
RX1 and RX2 Simultaneous Frames: **PASS**  
TX Parameter Setup Request: **PASS**  
Link Check Request: **PASS**  
RX Oversized Payload: **PASS**  
Maximum Allowed Payload: **PASS**

### Supported Optional Features:

Adaptive Data Rate (ADR):	Yes
DR6 (SF7BW250):	No
DR7 (FSK50):	No
Link ADR Request Block:	Yes
Di Channel Request:	Yes
Join Synch DevNonce:	No
Confirmed Re-transmissions	Yes (Max retries 2)

Remarks: None

**Result: The device passed the test without limitations.**