



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

Report for Test of Conformance to LoRaWAN™ V1.0.2

for the Device

“Teneo Filling Level Sensor”

for the Customer

“Teneo IoT B.V.”

Jens Lerner

Yavuz Turan

21st May, 2021

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

Company and Contact Information:

Teneo IoT B.V.

Inou Heideman

Landbouwstraat 5-06

7101 EK Winterswijk

Netherlands

Tested Device: Teneo Filling Level Sensor

Hardware version: id1987984_D

Firmware version: V1.12 (commit: 22f5b29dc1)

End-device identifier: TBV-01DST-01LR

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: Test Software Version: 1.1.16

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: May 21st, 2021

The Test Report, No. 6210387 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	Teneo Filling Level Sensor
Product Vertical(s)	Cities
Series (if any)	
Hardware Version	id1987984_D
Firmware Version	V1.12 (commit: 22f5b29dc1)
Type of DUT	<input type="checkbox"/> Module <input checked="" 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 checked="" type="checkbox"/> DR6 <input type="checkbox"/> DR7
Activation possibilities	<input checked="" type="checkbox"/> Over the air <input type="checkbox"/> by personalization <input type="checkbox"/> both
Test According LoRaWAN™ Spec	<input type="checkbox"/> V1.0.1 <input checked="" type="checkbox"/> V1.0.2
Output Power	14 dBm
Number / Type of Antenna(s)	1/ PCB antenna
Antenna Gain	-7.3 dBd

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

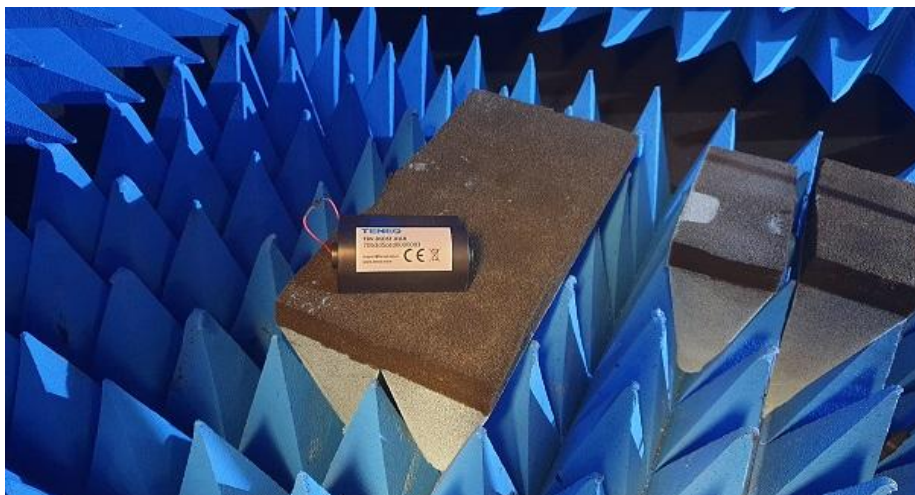


Figure 1 DUT Setup

Applied Methods of Measurement

1.4 Protocol Testing according to LoRaWAN™ specification V1.0.2

Detailed Test Results:

Device Activation (Activation by Personalization): **PASS**
 Test Mode Activation (Over the Air Activation): **PASS**
 Test Application Functionality: **PASS**
 New Channel Request: **PASS**
 Channel Plan Usage: **PASS**
 Cryptography: **PASS**
 Packet Error Rate RX2 SF12: **PASS**
 Downlink Window Timing: **PASS**
 Frame Sequence Number: **PASS**
 Confirmed Packets: **PASS**
 Device Status Request: **PASS**
 Di Channel Request Mac Command: **PASS**
 RX Parameter Setup Request: **PASS**
 RX Timing Setup Request: **PASS**
 TX Parameter Setup Request: **PASS**
 Link Check Request: **PASS**
 Link ADR Request: **PASS**
 Uplink Datarate RX1 DR Offset Mapping: **PASS**
 Packet Error Rate Rx1 MaxSize: **PASS**
 Packet Error Rate Rx1 MaxSize: **PASS**
 RX1 And RX2 Simultaneous Frames: **PASS**
 RX Oversized Payload: **PASS**
 Maximum Allowed Payload: **PASS**
 Mac Commands: **PASS**
 Device Deactivation: **PASS**

Supported Optional Features:

Adaptive Data Rate (ADR):	Yes
DR6 (SF7BW250):	Yes
DR7 (FSK50):	No
Link ADR Request Block:	No
Di Channel Request:	Yes
Range 6dB:	Yes
Join Synch DevNonce:	No
Confirmed Re-transmissions	Yes (Max retries 7)

Remarks: None

Result: The device passed the test without limitations.