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

“IOTSU L2 AQ01"

for the Customer

“Small Data Garden Oy”

Jens Lerner
Yavuz Turan

30th March, 2020
**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:**  
Small Data Garden Oy  
Markus Madetoja  
Paloheimonkatu 2  
11130, Riihimäki  
Finland  
**Tested Device:** IOTSU L2 AQ01

**Firmware version:** v1.2.0  
**Hardware version:** v7  
**End-device identifier:** 70B3D556800003AB  
**LoRa Device Class:** A  
**LoRaWAN Specification version:** V1.0.2  
**Certification requirements:** LoRa End Device Certification EU Version 1.5  
**Frequency band(s) tested:** 868 MHz  
**Test Equipment:** Test Software Version: 1.1.11  
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:** March 30th, 2020

The Test Report, No. 6200330 has the following conclusion:

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

**Responsibility:**  
Yavuz Turan  
Approved:  
Jens Lerner  
Test Engineer  
Quality Engineer

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1 Description of the Device Under Test (DUT)

1.1 General

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product name</td>
<td>IOTSU L2 AQ01</td>
</tr>
<tr>
<td>Kind of product</td>
<td>Indoor air quality measurement device</td>
</tr>
<tr>
<td>Series (if any)</td>
<td>L2</td>
</tr>
<tr>
<td>Hardware Version</td>
<td>V7</td>
</tr>
<tr>
<td>Firmware Version</td>
<td>v1.2.0</td>
</tr>
<tr>
<td>Type of DUT</td>
<td>Module / End Device, Gateway / Concentrator</td>
</tr>
<tr>
<td>Geographical area of operation</td>
<td>Europe, USA</td>
</tr>
<tr>
<td>Operating frequency</td>
<td>☑ 433 MHz, ☑ 868 MHz, ☑ 915 MHz</td>
</tr>
<tr>
<td>Adaptive Data Rate (ADR) supported?</td>
<td>☑ Yes, ☑ No</td>
</tr>
<tr>
<td>Optional data rates supported?</td>
<td>☑ DR6, ☑ DR7</td>
</tr>
<tr>
<td>Activation possibilities</td>
<td>☑ Over the air, ☑ by personalization, ☑ both</td>
</tr>
<tr>
<td>Test According LoRaWAN™ Spec</td>
<td>☑ V1.0.1, ☑ V1.0.2</td>
</tr>
<tr>
<td>Output Power</td>
<td>16-2dBm</td>
</tr>
<tr>
<td>Number / Type of Antenna(s)</td>
<td>1 / Internal</td>
</tr>
<tr>
<td>Antenna Gain</td>
<td></td>
</tr>
</tbody>
</table>

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 End Device Certification EU V1_5” Chapter 3.

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**
Packet Error Rate RX2 SF12: **PASS**
Cryptography: **PASS**
Downlink Window Timing: **PASS**
Frame Sequence Number: **PASS**
Device Status Request: **PASS**
Mac Commands: **PASS**
New Channel Request: **PASS**
Di Channel Request Mac Command: **PASS**
Confirmed Packets: **PASS**
RX Parameter Setup Request: **PASS**
RX Timing Setup Request: **PASS**
Link ADR Request: **PASS**
Packet Error Rate RX1 Window: **PASS**
Packet Error Rate RX2 Window: **PASS**

Supported Optional Features:

Adaptive Data Rate (ADR): Yes
DR6 (SF7BW250): Yes
DR7 (FSK50): Yes
Link ADR Request Block: Yes
Di Channel Request: Yes
Range 6dB: Yes

Remarks: None.

Result: The device passed the test without limitations.