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 “Temperatursensor TSL-A-002”

for the Customer “Aartesys AG”

Markus Ridder
Yavuz Turan

9. April 2019
Administrative Summary

Location: IMST GmbH, Test Centre, Kamp-Lintfort, Germany
Responsible Test Engineer: Yavuz Turan, Markus Ridder

Subject: Test of Conformance to LoRaWAN™ Specification V1.0.2

Company and Contact Information:
Aartesys AG
Mr. Patrick Gerber
Silbergasse 32, 2501 Biel
Switzerland
Tested Device: Temperatursensor TSL-A-002
Firmware version: 6.441.115
Hardware version: TSL-A-002 Rev. 1.1
End-device identifier: 2f020003006b77e4
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
Semtech IOT SX1301 Starter Kit: Gateway software version 3.1.0
Packet forwarder software version 2.1.0

Test Result: PASS

Chief Test Engineer: Markus Ridder
Dept. Test Center

Date: April 9th, 2019

The Test Report, No. 6190416 has the following conclusion:

The device has PASSED the tests hereunder.

Responsibility: Approved:
Yavuz Turan Markus Ridder
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>Temperatursensor TSL-A-002</td>
</tr>
<tr>
<td>Kind of product</td>
<td>Lora temperatur sensor</td>
</tr>
<tr>
<td>Series (if any)</td>
<td></td>
</tr>
<tr>
<td>Hardware Version</td>
<td>TSL-A-002 Rev. 1.1</td>
</tr>
<tr>
<td>Firmware Version</td>
<td>6.441.115</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></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>+7 - +14 dBm</td>
</tr>
<tr>
<td>Number / Type of Antenna(s)</td>
<td>1 / Wire</td>
</tr>
<tr>
<td>Antenna Gain</td>
<td>+ 2 dB</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:

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): No
Link ADR Request Block: Yes
Di Channel Request: Yes
Range 6dB: Yes

Remarks: None.

Result: The device passed the test without limitations.