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

“TX TEMP INS 600-031 ”

for the Customer

“Enless Wireless”

Dietmar Krebs
Yavuz Turan

3rd February, 2020
Administrative Summary

Location: IMST GmbH, Test Centre, Kamp-Lintfort, Germany
Responsible Test Engineer: Yavuz Turan, Dietmar Krebs

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

Company and Contact Information:
Enless Wireless
45 ter avenue de Verdun
33520 Bruges
FRANCE

Tested Device: TX TEMP INS 600-031
Firmware version: Rev 1.01
Hardware version: Rev 2.20
End-device identifier: 70B3D54FDFF001
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

Chief Test Engineer: Dietmar Krebs
Dept. Test Center

Date: February 3rd, 2020

The Test Report, No. 6200028 has the following conclusion:

The device has PASSED the tests hereunder.

Responsibility: Approved:
Yavuz Turan Dietmar Krebs
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>TX TEMP INS 600-031</td>
</tr>
<tr>
<td>Kind of product</td>
<td>Temperature measurement device transmitting periodically on LoRaWAN</td>
</tr>
<tr>
<td>Series (if any)</td>
<td></td>
</tr>
<tr>
<td>Hardware Version</td>
<td>Rev 2.20</td>
</tr>
<tr>
<td>Firmware Version</td>
<td>Rev 1.01</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 dBm</td>
</tr>
<tr>
<td>Number / Type of Antenna(s)</td>
<td>1</td>
</tr>
<tr>
<td>Antenna Gain</td>
<td>0 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
1.4 Protocol Testing according to LoRaWAN™ specification V1.0.2

**Detailed Test Results:**

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

**Remarks:** None.

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