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

“M8 and caltos E ”

for the Customer

“ZENNER Int. GmbH & Co. KG ”

Dietmar Krebs
Yavuz Turan

17th December, 2019
**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:**  
ZENNER Int. GmbH & Co. KG  
Römerstadt 6  
66121 Saarbrücken  
Germany  
**Tested Device:** M8 and caltos E  
**Firmware version:** 1.8.0  
**Hardware version:** 3.2  
**End-device identifier:** 04B648000000FEFE  
**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:** December 17th, 2019

The Test Report, No. 6191558 has the following conclusion:

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

**Responsibility:**  
Yavuz Turan  
Test Engineer  
Dietmar Krebs  
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>M8 and caltos E</td>
</tr>
<tr>
<td>Kind of product</td>
<td>Heat cost allocator</td>
</tr>
<tr>
<td>Series (if any)</td>
<td>Superstatic / Supercal</td>
</tr>
<tr>
<td>Hardware Version</td>
<td>3.2</td>
</tr>
<tr>
<td>Firmware Version</td>
<td>1.8.0</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)</td>
<td>Yes, No, None</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>14dBm</td>
</tr>
<tr>
<td>Number / Type of Antenna(s)</td>
<td>N/A</td>
</tr>
<tr>
<td>Antenna Gain</td>
<td>N/A</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): No
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.