Report for Test of Conformance to LoRaWAN™ V1.0.1

for the Device

“FMLORA-U-32L1”

for the Customer

Miromico AG

Markus Ridder
Annette Schramm.

Administrative Summary

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

Subject: Test of Conformance to LoRaWAN™ Specification V1.0.1

Company and Contact Information:
Miromico AG
Herr Marcel Wappler
Gallusstrasse 4
8006 Zürich
Switzerland

Tested Device: FMLORA-U-32L1
Firmware version: V1.5
Hardware version: Rev 2
End-device identifier: 0x236107B0
LoRa Device Class: A
LoRaWAN Specification version: V1.0.1
Certification requirements: LoRa End Device Certification EU Version 1.2
Frequency band(s) tested: 868 MHz
Test Equipment: Test Software Version: 1.1.7
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: August 25th, 2016

The Test Report, No. 6160366 has the following conclusion:

The device has PASSED the tests hereunder.

Responsibility: Markus Ridder
Approved: Annette Schramm
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>FMLORA-U-32L1</td>
</tr>
<tr>
<td>Kind of product</td>
<td>FMLORA</td>
</tr>
<tr>
<td>Series (if any)</td>
<td>FMLORA</td>
</tr>
<tr>
<td>Hardware Version</td>
<td>Rev 2</td>
</tr>
<tr>
<td>Firmware Version</td>
<td>V1.5</td>
</tr>
<tr>
<td>Type of DUT</td>
<td>Module / End Device</td>
</tr>
<tr>
<td>Geographical area of operation</td>
<td>Europe</td>
</tr>
<tr>
<td>Operating frequency</td>
<td>433 MHz</td>
</tr>
<tr>
<td>Adaptive Data Rate (ADR) supported?</td>
<td>Yes</td>
</tr>
<tr>
<td>Optional data rates supported?</td>
<td>DR6</td>
</tr>
<tr>
<td>Activation possibilities</td>
<td>Over the air</td>
</tr>
<tr>
<td>Test According LoRaWAN™ Spec</td>
<td>V1.0</td>
</tr>
<tr>
<td>Output Power</td>
<td>external or integrated</td>
</tr>
<tr>
<td>Number / Type of Antenna(s)</td>
<td>1 / 2</td>
</tr>
<tr>
<td>Antenna Gain</td>
<td>- / 0 dBi</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_1” Chapter 3.

1.3 DUT Setup

Figure 1 DUT Setup
Applied Methods of Measurement

1.4 Protocol Testing according to LoRaWAN™ specification V1.0.1

Detailed Test Results:

Test Mode Activation (Activation by Personalization): 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
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

Remarks: None.

Result: The device passed the test without limitations.