The Testcenter facility ‘LoRa® Test Lab’ within IMST GmbH is recognized by the LoRa™ Alliance for testing in accordance to the LoRaWAN™ Specification V1.0.1

Report for Test of Conformance to LoRaWAN™ V1.0.1

for the Device

“Viloc Lora Tag"

for the Customer

Viloc

Markus Ridder
Yavuz Turan

Administrative Summary

Location: IMST GmbH, Test Centre, Kamp-Lintfort, Germany

Responsible Test Engineer: Yavuz Turan, Markus Ridder

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

Company and Contact Information:

Viloc
Mr. Jeroen Spinnewyn
Langestraat 211, 2240 Zandhoven
Belgium

Tested Device: Viloc Lora Tag
Firmware version: 8
Hardware version: 8
End-device identifier: a41163c0000000200

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: February 21st, 2017

The Test Report, No. 6170056 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>Viloc Lora Tag</td>
</tr>
<tr>
<td>Kind of product</td>
<td>Asset tracking Tag</td>
</tr>
<tr>
<td>Series (if any)</td>
<td></td>
</tr>
<tr>
<td>Hardware Version</td>
<td>8</td>
</tr>
<tr>
<td>Firmware Version</td>
<td>8</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 ☒ V1.0.1 (m/o June 2016 earliest)</td>
</tr>
<tr>
<td>Output Power</td>
<td>14 dBm</td>
</tr>
<tr>
<td>Number / Type of Antenna(s)</td>
<td>1</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_2” Chapter 3.

1.3 DUT Setup

![DUT Setup](image)

**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 (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**
Confirmed packets: **PASS**
RX Parameter Setup Request: **PASS**
RX TimingSetup 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

**Remarks:** None.

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