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

“iM980A"

for the Customer

“IMST GmbH”

Markus Ridder
Jens Lerner

February, 22nd 2018
Administrative Summary

Location: IMST GmbH, Test Centre, Jens Lerner, Markus Ridder

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

Company and Contact Information:
IMST GmbH
Heinz Syrzisko
Carl-Friedrich-Gauss-Str. 2-4
D-47475 Kamp-Lintfort
Germany
Tested Device: iM980A
Firmware version: 2.0
Hardware version: B1
End-device identifier: 212232425262728
LoRa Device Class: A
LoRaWAN Specification version: V1.0.2
Certification requirements: LoRa End Device Certification US Version 1.3
Frequency band(s) tested: 915 MHz
Test Equipment: Test Software Version: 1.1.12
8 IMST LGW (iC980A + Raspberry Pi): Gateway software version 4.1.3
Packet forwarder software version 3.1.0

Test Result: PASS

Chief Test Engineer: Markus Ridder
Dept. Test Centre

Date: February, 22nd 2018

The Test Report, No. 61840220 has the following conclusion:

The device has PASSED the tests hereunder.

Responsibility: 
Jens Lerner
Test Engineer

Approved: 
Markus Ridder
Quality Engineer
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>iM980A</td>
</tr>
<tr>
<td>Kind of product</td>
<td>Radio Module</td>
</tr>
<tr>
<td>Series (if any)</td>
<td>Starter Kit</td>
</tr>
<tr>
<td>Hardware Version</td>
<td>B1</td>
</tr>
<tr>
<td>Firmware Version</td>
<td>2.0</td>
</tr>
<tr>
<td>Type of DUT</td>
<td>Module / End Device</td>
</tr>
<tr>
<td>Geographical area of operation</td>
<td>Europe, USA</td>
</tr>
<tr>
<td>Operating frequency</td>
<td>433 MHz</td>
</tr>
<tr>
<td></td>
<td>868 MHz</td>
</tr>
<tr>
<td></td>
<td>915 MHz</td>
</tr>
<tr>
<td>Adaptive Data Rate (ADR) supported?</td>
<td>Yes</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, V1.0.2</td>
</tr>
<tr>
<td>Output Power</td>
<td>max 17.5 dBm</td>
</tr>
<tr>
<td>Number / Type of Antenna(s)</td>
<td>1 Dipole Antenna</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 US V1_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 (ABP): PASS  
Test Application Functionality: PASS  
Over The Air Activation: PASS  
Channel Plan Usage: PASS  
Packet Error Rate RX2 Default: PASS  
Cryptography: PASS  
Downlink Window Timing: PASS  
Frame Sequence Number: PASS  
Device Status Request: PASS  
New Channel Request: PASS  
Confirmed packets: PASS  
RX Parameter Setup Request: PASS  
RX Timing Setup Request: PASS  
Link ADR Request: PASS  
Maximum Allowed Payload: PASS  
Rx Oversized Payload: PASS  
Mac Commands: PASS  
Uplink Data Rate Rx1Droffset Mapping: PASS  
Packet Error Rate RX1 Window: PASS  
Packet Error Rate RX2 Window: PASS  

Supported Optional Features:

Adaptive Data Rate (ADR): Yes  
LinkADRReq Block Processing: Yes  
Frame Counter Size: 32 bits  
Max. Retransmission for Confirmed Uplinks: 7

Remarks: None

Result: The device passed the test without limitations.