Report for Test of Conformance to LoRaWAN™ V1.0.1

for the Device

"ArrowWAN"

for the Customer

"Maddalena S.p.A"

Markus Ridder

Yavuz Turan

04. Sep. 2017

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:
Maddalena S.p.A.
Mr. Alessandro Budai
Via G.B. Maddalena 2/4, 33040 Povoletto
Italy
Tested Device: ArrowWAN
Firmware version: 1.0
Hardware version: 1.4.8
End-device identifier: 15008617b000d878
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: 1.1.11
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: September 4th , 2017

The Test Report, No. 6171298 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

Item	Value
Product name	ArrowWAN
Kind of product	Compact radio module for volumetric water meter
Series (if any)	ArrowWAN
Hardware Version	1.0
Firmware Version	1.4.8
Type of DUT	☒ Module / End Device ☐ Gateway / Concentrator
Geographical area of operation	☒ Europe ☐ USA
Operating frequency	☐ 433 MHz ☒ 868 MHz ☐ 915 MHz
Adaptive Data Rate (ADR) supported?	☒ Yes ☐ No
Optional data rates supported?	☐ DR6 ☐ DR7
Activation possibilities	☐ Over the air ☐ by personalization ☒ both
Test According LoRaWAN™ Spec	☐ V1.0 ☒ V1.0.1
Output Power	Up to 14 dBm
Number / Type of Antenna(s)	1 / Helix
Antenna Gain	

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.
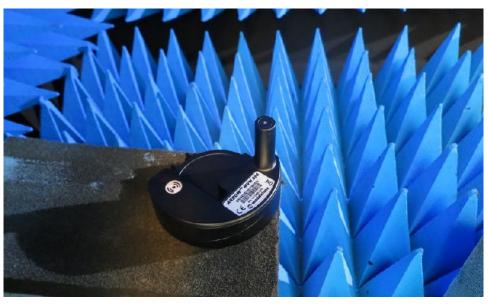
1.3 DUT Setup

Figure 1 DUT Setup

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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 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 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

Remarks: None.

Result: The device passed the test without limitations.

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