



The Testcenter facility 'LoRa[®] Test Lab' within IMST GmbH is recognized by the LoRa[®] Alliance for testing in accordance to the LoRaWAN[®] Specification V1.0.4

Report for Test of Conformance to LoRaWAN[®] V1.0.4 EU868

for the Device

“IOTSU L7 AQ09”

for the Customer

“Small Data Garden Oy”

Jens Lerner

Yavuz Turan

25th March, 2024

Administrative Summary

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

Responsible Test Engineer: Yavuz Turan, Jens Lerner

Subject: Test of Conformance to LoRaWAN® Specification V1.0.4 (EU868)

Company and Contact Information:

Small Data Garden Oy

Markus Madetoja

Maantie 1

11130 Riihimäki

Finland

Tested Device: IOTSU L7 AQ09

Hardware version: v1

Firmware version: v2.3

End-device identifier: SN: 656310

LoRa Device Class: A

LoRaWAN Specification version: V1.0.4

Certification requirements:

LW1.0.4 End Device Certification V1.6.1

Frequency band(s) tested: 868MHz

Test Equipment: LCTT v3.12.0_R1

2x IMST LGW (iC880A + Raspberry Pi): Gateway software version 5.0.1

Packet forwarder software version 4.0.1

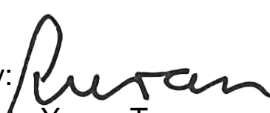
Test Result: PASS

Quality Engineer: Jens Lerner

Date: March 25th, 2024

The Test Report, No. 6240257 has the following conclusion:

The device has PASSED the tests hereunder.

Responsibility: 
Yavuz Turan
Test Engineer

Approved: 
Jens Lerner
Quality Engineer

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1 Description of the Device Under Test (DUT)

1.1 General

| Item | Value |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| Product name | IOTSU L7 AQ09 |
| Product Vertical(s) | Buildings |
| Series (if any) | IOTSU L7 |
| Hardware Version | v1 |
| Software Version | v2.3 |
| Firmware Version | |
| Type of DUT | <input type="checkbox"/> Module <input checked="" type="checkbox"/> End Device/Sensor <input type="checkbox"/> others |
| Geographical area of operation | <input checked="" type="checkbox"/> Europe <input type="checkbox"/> USA <input type="checkbox"/> Australia |
| Operating frequency | <input type="checkbox"/> 433 MHz <input checked="" type="checkbox"/> 868 MHz <input type="checkbox"/> 915 MHz |
| Adaptive Data Rate (ADR) supported? | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Optional data rates supported? | <input checked="" type="checkbox"/> DR6 <input checked="" type="checkbox"/> DR7 |
| Activation possibilities | <input checked="" type="checkbox"/> Over the air <input type="checkbox"/> by personalization <input type="checkbox"/> both |
| Test According LoRaWAN® Spec | <input type="checkbox"/> V1.0.1 <input type="checkbox"/> V1.0.2 <input checked="" type="checkbox"/> V1.0.4 |
| Output Power | N/A |
| Number / Type of Antenna(s) | N/A |
| Antenna Gain | N/A |

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 Alliance End Device Certification Requirements for All Regions Version 1.6.1” Chapter 2.

1.3 DUT Setup

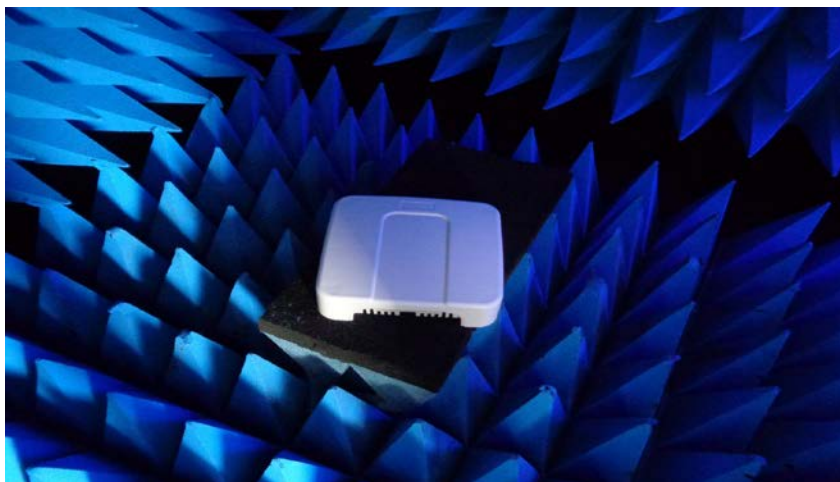


Figure 1 DUT Setup

Applied Methods of Measurement

1.4 Protocol Testing according to LoRaWAN® specification V1.0.4 (EU868)

Detailed Test Results Class A:

| Test Case ID | Description | Verdict | Date |
|--------------------------------|-----------------------------------------------------------------|---------|------------|
| TP_A_EU868_ED_MAC_104_BV_000 | Activation Pre-test | PASS | 2024-03-21 |
| TP_A_EU868_ED_MAC_104_BV_001_A | Over the Air Activation | PASS | 2024-03-21 |
| TP_A_EU868_ED_MAC_104_BV_002 | Cryptography | PASS | 2024-03-21 |
| TP_A_EU868_ED_MAC_104_BV_003 | Downlink Sequence Number | PASS | 2024-03-21 |
| TP_A_EU868_ED_MAC_104_BV_004 | Confirmed Frames | PASS | 2024-03-21 |
| TP_A_EU868_ED_MAC_104_BV_005 | DevStausReq MAC Command | PASS | 2024-03-21 |
| TP_A_EU868_ED_MAC_104_BV_006 | NewChannelReq MAC Command for Dynamic Channel plan devices only | PASS | 2024-03-21 |
| TP_A_EU868_ED_MAC_104_BV_007 | DIChannelReq for Dynamic Channel plan devices only | PASS | 2024-03-21 |
| TP_A_EU868_ED_MAC_104_BV_008 | RXParameterSetupReq MAC Command | PASS | 2024-03-21 |
| TP_A_EU868_ED_MAC_104_BV_009 | RXTimingSetupReq MAC Command | PASS | 2024-03-21 |
| TP_A_EU868_ED_MAC_104_BV_010 | TXParamSetupReq MAC Command | PASS | 2024-03-21 |
| TP_A_EU868_ED_MAC_104_BV_011 | LinkCheckReq MAC Command | PASS | 2024-03-21 |
| TP_A_EU868_ED_MAC_104_BV_012A | LinkADRReq MAC Command (Part 1) | PASS | 2024-03-21 |
| TP_A_EU868_ED_MAC_104_BV_012B | LinkADRReq MAC Command (Part 2) | PASS | 2024-03-25 |
| TP_A_EU868_ED_MAC_104_BV_013 | DutyCycleReq MAC Command | PASS | 2024-03-21 |
| TP_A_EU868_ED_MAC_104_BV_014 | DeviceTimeReq MAC Command | PASS | 2024-03-21 |
| TP_A_EU868_ED_MAC_104_BV_015A | RX1 Receive Window Test (Part 1) | PASS | 2024-03-21 |
| TP_A_EU868_ED_MAC_104_BV_015B | RX1 Receive Window Test (Part 2) | PASS | 2024-03-21 |
| TP_A_EU868_ED_MAC_104_BV_016 | RX2 Receive Window Test | PASS | 2024-03-21 |
| TP_A_EU868_ED_MAC_104_BV_017 | RX1 and RX2 simultaneous frames | PASS | 2024-03-21 |
| TP_A_EU868_ED_MAC_104_BV_018 | RX Oversized Payload | PASS | 2024-03-21 |
| TP_A_EU868_ED_MAC_104_BV_019A | Maximum Allowed Payload (Part 1) | PASS | 2024-03-21 |
| TP_A_EU868_ED_MAC_104_BV_019B | Maximum Allowed Payload (Part 2) | PASS | 2024-03-21 |
| TP_A_EU868_ED_MAC_104_BV_020 | MAC Command(s) in App-Payload and/or Frame Options | PASS | 2024-03-21 |
| TP_A_EU868_ED_MAC_104_BV_021 | Multiple MAC Commands prioritization | PASS | 2024-03-21 |
| TP_A_EU868_ED_MAC_104_BV_022 | FPort 224 Deactivation | PASS | 2024-03-21 |

Supported Optional Features:

| | |
|---------------------------|-----|
| Adaptive Data Rate (ADR): | Yes |
| SF7BW250 (DR6) | Yes |
| FSK50 (DR7) | Yes |

Additional Tests By The Manufacturer:

Retransmission Back-Off for OTA devices only: **PASS**

Remarks: None

Result: The device passed the test without limitations.