Report for Test of Conformance to LoRaWAN® V1.0.4 Class A (EU868)

for the Device

"ERS"

for the Customer

"Elektroniksystem i Umea AB (Elsys)"

Jens Lerner

Yavuz Turan

5th October, 2022

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 (Class A for EU868)

Company and Contact Information:
Elektroniksystem i Umea AB (Elsys)
Johannes Karlsson
Tvistevägen 48
90736 Umea
Sweden
Tested Device: ERS
Hardware version: 2
Firmware version: 3
End-device identifier: a81758fffe0820f1
LoRa Device Class: A
LoRaWAN Specification version: V1.0.4
Certification requirements: LoRaWAN 1.0.4 End Device Certification Requirements V1.6
Frequency band(s) tested: 868MHz
Test Equipment: LCTT v3.8.0_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: October 5th, 2022

The Test Report, No. 6220302 has the following conclusion:

The device has PASSED the tests hereunder.

Responsibility: _(signature)_   Approved: _(signature)_

Yavuz Turan   Jens Lerner
Test Engineer   Quality Engineer

1 Description of the Device Under Test (DUT)

1.1 General

Item	Value
Product name	ERS
Product Vertical(s)	Buildings, Cities, Environment
Series (if any)	ERS Lite, ERS CO2 Lite, ERS CO2, ERS Eye, ERS Sound, ERS Eco, ERS Eco CO2
Hardware Version	2
Firmware Version	3
Type of DUT	☐ Module ☒ End Device/Sensor ☐ others
Geographical area of operation	☒ Europe ☐ USA ☐ Australia
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	☐ V1.0.1 ☐ V1.0.2 ☒ V1.0.4
Output Power	-17 dBm to 14 dBm
Number / Type of Antenna(s)	1
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 Alliance End Device Certification Requirements for All Regions Version 1.6" Chapter 2.
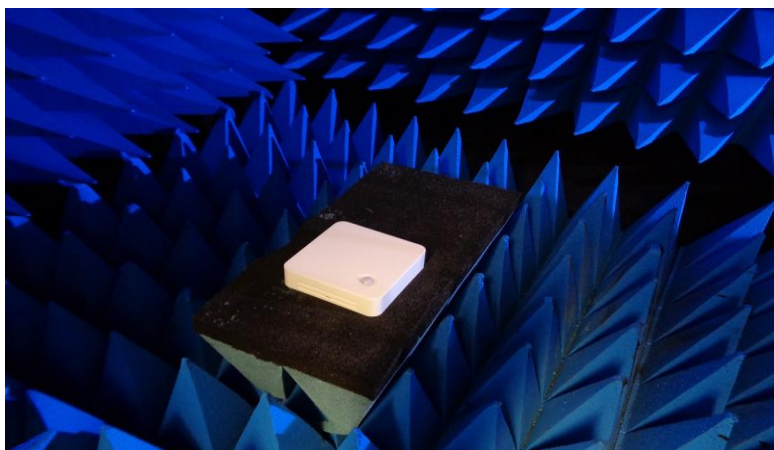
1.3 DUT Setup

Figure 1 DUT Setup

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![LoRa Alliance logo]

Applied Methods of Measurement

1.4 Protocol Testing according to LoRaWAN® specification V1.0.4 (Class A device for EU868)

Detailed Test Results:

Test Mode Activation: **PASS**
Over the Air Activation: **PASS**
Cryptography: **PASS**
Downlink Sequence Number: **PASS**
Confirmed Frames: **PASS**
Device Status Request: **PASS**
New Channel Request**: PASS**
Di Channel Request Mac Command: **PASS**
RX Parameter Setup Request: **PASS**
RX Timing Setup Request: **PASS**
TX Parameter Setup Request: **PASS**
Link Check Request: **PASS**
Link ADR Request: **PASS**
Duty Cycle Request: **PASS**
Device Time Request: **PASS**
RX1 Window Test: **PASS**
RX2 Window Test: **PASS**
RX1 and RX2 Simultaneous Frames: **PASS**
RX Oversized Payload: **PASS**
Maximum Allowed Payload: **PASS**
MAC Commands: **PASS**
Multiple MAC Commands Prioritization: **PASS**
Device Deactivation: **PASS**

Supported Optional Features:

Adaptive Data Rate (ADR):	Yes
SF7BW250 (DR6)	Yes
FSK50 (DR7)	Yes
Permanent Class C	No

Additional Tests By The Manufacturer:

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

Remarks: None

Result: The device passed the test without limitations.

LoRa® Alliance