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 LoRaWAN™ V1.0.2 Asia

for the Device

"ELT Lite"

for the Customer

"**ELSYS**"

Jens Lerner
Yavuz Turan

23rd April, 2020

Administrative Summary

Location: IMST GmbH, Test Centre, Kamp-Lintfort, Germany
Responsible Test Engineer: Yavuz Turan, Jens Lerner

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

Company and Contact Information:
ELSYS
Johannes Karlsson
Industrivägen 12
90130, Umea
Sweden
Tested Device: ELT Lite
Firmware version: 2
Hardware version: RevC
End-device identifier: feff00feff5817a8
LoRa Device Class: A
LoRaWAN Specification version: V1.0.2
Certification requirements: LoRa End Device Certification Asia Version 1.1.1
Frequency band(s) tested: 923 MHz
Test Equipment: Test Software Version: 1.1.16
IMST LGW (iC880A + Raspberry Pi): Gateway software version 4.1.3
Packet forwarder software version 3.1.0

Test Result: PASS

Quality Engineer: Jens Lerner

Date: April 23rd, 2020

The Test Report, No. 6200369 has the following conclusion:

The device has PASSED the tests hereunder.

Responsibility: Yavuz Turan, Test Engineer

Approved: Jens Lerner, Quality Engineer

1 Description of the Device Under Test (DUT)

1.1 General

Item	Value
Product name	ELT Lite
Kind of product	LoRaWAN sensor
Series (if any)	ELT
Hardware Version	RevC
Firmware Version	2
Type of DUT	☒ Module / End Device ☐ Gateway / Concentrator
Geographical area of operation	☐ Europe ☐ USA ☒Asia
Operating frequency	☐ 433 MHz ☒ 923 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
Output Power	0-14 dBm
Number / Type of Antenna(s)	1 pcs, external ½ wave antenna, SMA
Antenna Gain	3 dBi

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 AS923MHz ISM Band Devices 1.1.1” Chapter 3

1.3 DUT Setup

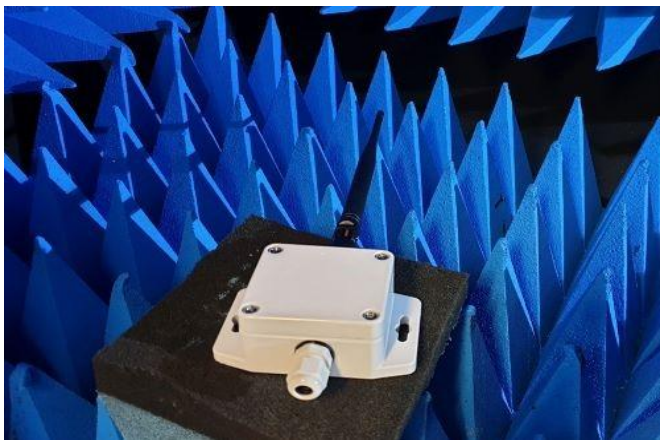

Figure 1 DUT Setup

Applied Methods of Measurement

1.4 Protocol Testing according to LoRaWAN™ specification V1.0.2 Asia

Detailed Test Results:

Device Activation (Activation by Personalization): **PASS**
Test Mode Activation (Over the Air Activation): **PASS**
Test Application Functionality: **PASS**
Channel Plan Usage: **PASS**
Packet Error Rate RX2 SF10: **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**
Maximum Allowed Payload: **PASS**
Rx Oversized Payload: **PASS**
Mac Commands: **PASS**
Packet Error Rate Rx1 MaxSize: **PASS**
Packet Error Rate Rx1 MaxSize: **PASS**
Txparamsetup Max Command: **PASS**

Supported Optional Features:

Adaptive Data Rate (ADR):	Yes
DR6 (SF7BW250):	Yes
DR7 (FSK50):	No
Link ADR Request Block:	No
Di Channel Request:	No
Range 6dB	Yes

Remarks: None.

Result: The device passed the test without limitations.