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 AS923-1 (Class A & Class C)

for the Device

"iM891A-XL"

for the Customer

"IMST GmbH"

Jens Lerner

Yavuz Turan

29th May, 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 (AS923-1)

Company and Contact Information:

IMST GmbH

Heinz Syrzisko

Carl-Friedrich-Gauss-Str. 2-4

47475 Kamp-Lintfort

Germany

Tested Device: iM891A-XL

Hardware version: A

Firmware version: V1.0

End-device identifier: 70B3D58FF003EBFF

LoRa Device Class: A & C

LoRaWAN Specification version: V1.0.4

Certification requirements:

LW1.0.4 End Device Certification V1.6.1

Frequency band(s) tested: 923 MHz

Test Equipment: LCTT v3.12.0_R1

2x IMST LGW (iC980A + Raspberry Pi): Gateway software version 4.1.3

Packet forwarder software version 3.1.0

Test Result: PASS

Quality Engineer: Jens Lerner

Date: May 29th, 2024

The Test Report, No. 6240409 has the following conclusion:

The device has PASSED the tests hereunder.

Responsibility: Approved:

Yavuz Turan   Jens Lerner

Test Engineer   Quality Engineer

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1 Description of the Device Under Test (DUT)

1.1 General

Item	Value
Product name	iM891A-XL
Product Vertical(s)	Agriculture, Buildings, Cities, Environment, Home/Consumer, Industry, Infostructure, Industrial/Hazardouz, Utilities, Transport/Logistics
Series (if any)	N/A
Hardware Version	A
Software Version	N/A
Firmware Version	V1.0
Type of DUT	☒ Module ☐ End Device/Sensor ☐ others
Geographical area of operation	☐ Europe ☐ USA ☐ Australia ☒ AS923-1
Operating frequency	☐ 433 MHz ☒ 923 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	max. 21 dBm (EIRP)
Number / Type of Antenna(s)	External antenna (50 Ohm Pad or u.fl connector)
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.
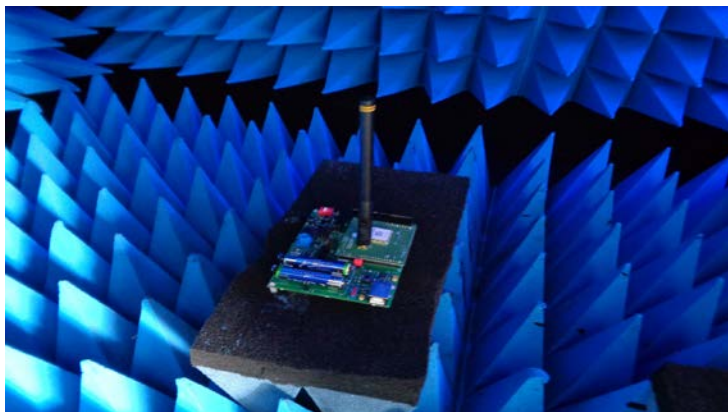
1.3 DUT Setup

Figure 1 DUT Setup

LoRa® Alliance

Applied Methods of Measurement

1.4 Protocol Testing according to LoRaWAN® specification V1.0.4 (AS923-1)

Detailed Test Results Class A & Class C:

Test Case ID	Description	Verdict	Date
TP_A_AS923_ED_MAC_104_BV_000	Activation Pre-test	PASS	2024-05-27
TP_A_AS923_ED_MAC_104_BV_001_A	Over the Air Activation	PASS	2024-05-27
TP_A_AS923_ED_MAC_104_BV_002	Cryptography	PASS	2024-05-27
TP_A_AS923_ED_MAC_104_BV_003	Downlink Sequence Number	PASS	2024-05-27
TP_A_AS923_ED_MAC_104_BV_004	Confirmed Frames	PASS	2024-05-27
TP_A_AS923_ED_MAC_104_BV_005	DevStausReq MAC Command	PASS	2024-05-27
TP_A_AS923_ED_MAC_104_BV_006	NewChannelReq MAC Command for Dynamic Channel plan devices only	PASS	2024-05-27
TP_A_AS923_ED_MAC_104_BV_007	DIChannelReq for Dynamic Channel plan devices only	PASS	2024-05-27
TP_A_AS923_ED_MAC_104_BV_008	RXParameterSetupReq MAC Command	PASS	2024-05-27
TP_A_AS923_ED_MAC_104_BV_009	RXTimingSetupReq MAC Command	PASS	2024-05-27
TP_A_AS923_ED_MAC_104_BV_010	TXParamSetupReq MAC Command	PASS	2024-05-27
TP_A_AS923_ED_MAC_104_BV_011	LinkCheckReq MAC Command	PASS	2024-05-27
TP_A_AS923_ED_MAC_104_BV_012A	LinkADRReq MAC Command (Part 1)	PASS	2024-05-27
TP_A_AS923_ED_MAC_104_BV_012B	LinkADRReq MAC Command (Part 2)	PASS	2024-05-27
TP_A_AS923_ED_MAC_104_BV_013	DutyCycleReq MAC Command	PASS	2024-05-27
TP_A_AS923_ED_MAC_104_BV_014	DeviceTimeReq MAC Command	PASS	2024-05-27
TP_A_AS923_ED_MAC_104_BV_015A	RX1 Receive Window Test (Part 1)	PASS	2024-05-27
TP_A_AS923_ED_MAC_104_BV_015B	RX1 Receive Window Test (Part 2)	PASS	2024-05-27
TP_A_AS923_ED_MAC_104_BV_016	RX2 Receive Window Test	PASS	2024-05-27
TP_A_AS923_ED_MAC_104_BV_017	RX1 and RX2 simultaneous frames	PASS	2024-05-27
TP_A_AS923_ED_MAC_104_BV_018	RX Oversized Payload	PASS	2024-05-27
TP_A_AS923_ED_MAC_104_BV_019A	Maximum Allowed Payload (Part 1)	PASS	2024-05-27
TP_A_AS923_ED_MAC_104_BV_019B	Maximum Allowed Payload (Part 2)	PASS	2024-05-27
TP_A_AS923_ED_MAC_104_BV_020	MAC Command(s) in App-Payload and/or Frame Options	PASS	2024-05-27
TP_A_AS923_ED_MAC_104_BV_021	Multiple MAC Commands prioritization	PASS	2024-05-27
TP_A_AS923_ED_MAC_104_BV_022	FPort 224 Deactivation	PASS	2024-05-28
TP_C_AS923_ED_MAC_104_BV_000	Activation and Usage	PASS	2024-05-27
TP_A_AS923_ED_MAC_104_BV_RETRANSMISSION_BACKOFF	Retransmission back-off tests for power-up of device	PASS	2024-05-27

Supported Optional Features:

Adaptive Data Rate (ADR):	Yes
SF7BW250 (DR6)	Yes
FSK50 (DR7)	Yes
Class C	Yes

Remarks: None

Result: The device passed the test without limitations.