

Test Report on

IAQoverLoRa (MVP)

Test Report Reference: MDE_LCIE_1903_LORA_02

Date: 2019-11-19

Test Laboratory:

7layers GmbH
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40880 Ratingen
Germany

Note:

The following test results relate only to the devices specified in this document. This report shall not be reproduced in parts without the written approval of the test laboratory.

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1 Administrative Data

1.1 Project Information

Project Name: MDE_LCIE_1903#LORA
Responsible for Testing and Report: Abdellah Ahakki
Date of Report: 2019-11-19
Testing Time Frame: 2019-10-09 - 2019-09-11

1.2 Applicant Information

Company Name: Schneider Electric
Address: 28 Rue Henri Tarze
38000 Grenoble - FRANCE
Contact Person: Maxime LOIDREAU
Phone: +33 4 76 57 7467
Email: maxime.loidreau@se.com
Contact Person: Maxime LOIDREAU

1.3 Test Laboratory Information

The following list shows all Locations and Test Resources involved in the generation of test results:

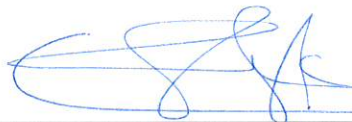
7layers DE, Ratingen, Germany

Company Name	7layers GmbH
Address	Borsigstr. 11 40880 Ratingen NRW Germany
Contact	Michael Albert
Phone	+49 2102 749 201
Email	Michael.Albert@7layers.com
Laboratory accreditation no.	DAkKS D-PL-12140-01-00

List of Test Resources

ID	Name	Responsible	Accreditation Info
1	7layers LoRa Compliance Test Environment	Constantine Nfor	

1.4 Signature of the Testing Responsible



(Responsible for Testing and Report)
Abdellah Ahakki

1.5 Signature of the Accreditation Responsible(s)



(Responsible Accreditation Scope)
Michael Albert

2 Test Object Data

2.1 Object Under Test (OUT) Description(s)

The following section lists all Objects Under Test (OUTs) involved during testing.

Object Under Test: IAQoverLoRa (MVP)

Description: Ambient Temperature, relative humidity and CO2 concentration

Type / Model: IAQoverLoRa (MVP)

Manufacturer:

Company Name: Schneider Electric
Address: 28 Rue Henri Tarze
38000 Grenoble - FRANCE

Contact Person: Maxime LOIDREAU
Phone: +33 4 76 57 7467
Email: maxime.loidreau@se.com
Address: 28 Rue Henri Tarze
38000 Grenoble - FRANCE

For further details see Annex.

2.2 Sample Description(s)

Sample Name: DE1058017ba01

Object Under Test: IAQoverLoRa (MVP)
Description: IAQoverLoRa (MVP) US902-928
Serial Number: 1866377231313535
Hardware Version: V4-US
Firmware Version: IAQoverLoRa_v4_Certification_US915_20191001
Code: ba01

For further details see Annex.

3 Results

3.1 General

Documentation of tested devices: Available at the test laboratory.

Interpretation of the test results: The results of the inspection are described on the following pages, where 'Conformity' or 'Passed' means that the certification criteria were verified and that the tested device is conform to the applied standard.

In cases where 'Declaration' is stated, the required documents are available in the manufacturer's product documentation.

In cases where 'not applicable' is stated, the test case requirements are not relevant to the specific equipment implementation.

- Notes:**
1. This report contains the abbreviated information content pertaining to services rendered. Supporting documentation not included herein is maintained and available at the test laboratory.
 2. All tests are performed under environmental conditions within the requirements of the specifications. Environmental condition records are available at the test laboratory.

3.2 Applicable Test Specification(s)

Test Specification:	LoRa Alliance® End Device Certification Requirements for US and Canada 902-928 MHz ISM Band
Date / Version:	2019/10/04 - Revision 1.4
Description:	LoRa Alliance® End Device Certification Requirements for US and Canada 902-928 MHz ISM Band (LoRaWAN™ core spec. 1.0.2 & LoRaWAN™ Regional Parameters Version 1.0.2rB) Please note that there was an editorial test specification update from version v1.3 to v1.4 in order to Remove the language that requires "alternatively" sending a join request on 125khz and 500khz channels. Instead just check that both 125kHz and 500kHz are used.

3.3 Result Statistics

Test Specification	Total	Result Verdict			Pass Ratio
		Pass	Fail	Declaration	
LoRa Alliance® End Device Certification Requirements for US and Canada 902-928 MHz ISM Band - Revision 1.4	19	19	0	0	100.00 %

Note: Pass, Declaration, Fail and Inconclusive results are regarded for the Pass Ratio calculation. Pass and Declaration are summarized as Pass results. Fail and Inconclusive are summarized as Fail results. All are summarized as Total count (Pass + Declaration + Fail + Inconclusive). The Pass Ratio is calculated by the number of Pass results divided by the number of Total results. All other results like Error or Not Tested are not regarded for the calculation.

3.4 Result Summary

Test Specification: LoRa LoRa Alliance® End Device Certification Requirements for US and Canada 902-928 MHz ISM Band - Revision 1.4

Test Case Name	Test Specification Reference	Setup	Date
TC_MAC_US_001: Cert-ApplicationActivation (TestModeActivation) (Activation-by-Personalization)	LoRa Alliance® End Device Certification Requirements for US and Canada 902-928 MHz ISM Band v1.4 (Clauses 2.1.1 & 3.1)	DE1058017 ba01	2019-10-09
TC_MAC_US_001: Cert-ApplicationActivation (TestModeActivation) (Over- the-Air activation)	LoRa Alliance® End Device Certification Requirements for US and Canada 902-928 MHz ISM Band v1.4 (Clauses 2.1.1 & 3.1)	DE1058017 ba01	2019-10-09
TC_MAC_US_002: Over- the-Air activation	LoRa Alliance® End Device Certification Requirements for US and Canada 902-928 MHz ISM Band v1.4 (Clauses 2.1.2 & 3.2)	DE1058017 ba01	2019-10-09
TC_MAC_US_003_P1: Certification Application Functionality Test a: Channel Plan and Usage	LoRa Alliance® End Device Certification Requirements for US and Canada 902-928 MHz ISM Band v1.4 (Clauses 2.2.1a & 3.3.1)	DE1058017 ba01	2019-10-10
TC_MAC_US_003_P2&P3: Certification Application Functionality Test b: Cryptography	LoRa Alliance® End Device Certification Requirements for US and Canada 902-928 MHz ISM Band v1.4 (Clauses 2.2.1bI, 2.21bII, 3.3.2 & 3.3.3)	DE1058017 ba01	2019-10-09
TC_MAC_US_003_P4: Certification Application Functionality Test c: 'Downlink Error Rate	LoRa Alliance® End Device Certification Requirements for US and Canada 902-928 MHz ISM Band v1.4 (Clauses 2.2.1c & 3.3.4)	DE1058017 ba01	2019-10-09
TC_MAC_US_003_P5: Certification Application Functionality Test d: Downlink Window Timing Test	LoRa Alliance® End Device Certification Requirements for US and Canada 902-928 MHz ISM Band v1.4 (Clauses 2.2.1d & 3.3.5)	DE1058017 ba01	2019-10-09
TC_MAC_US_003_P6&P7&P8: Certification Application Functionality Test e: Frame Sequence Number	LoRa Alliance® End Device Certification Requirements for US and Canada 902-928 MHz ISM Band v1.4 (Clauses 2.2.1eI, 2.2.1eII, 2.2.1eIII, 3.3.6, 3.3.7 & 3.3.8)	DE1058017 ba01	2019-10-09
TC_MAC_US_004: Confirmed Frames	LoRa Alliance® End Device Certification Requirements for US and Canada 902-928 MHz ISM Band v1.4 (Clauses 2.2.2 & 3.4)	DE1058017 ba01	2019-10-09
TC_MAC_US_005: Device Status Request	LoRa Alliance® End Device Certification Requirements for US and Canada 902-928 MHz ISM Band v1.4 (Clauses 2.3.1 & 3.5)	DE1058017 ba01	2019-10-09
TC_MAC_US_006: New Channel Request	LoRa Alliance® End Device Certification Requirements for US and Canada 902-928 MHz ISM Band v1.4 (Clauses 2.3.2 & 3.6)	DE1058017 ba01	2019-10-09

Test Case Name	Test Specification Reference	Setup	Date
TC_MAC_US_007: RX Parameter Setup Request	LoRa Alliance® End Device Certification Requirements for US and Canada 902-928 MHz ISM Band v1.4 (Clauses 2.3.3 & 3.7)	DE1058017 ba01	2019-10-09
TC_MAC_US_008: RX Timing Setup Request	LoRa Alliance® End Device Certification Requirements for US and Canada 902-928 MHz ISM Band v1.4 (Clauses 2.3.4 & 3.8)	DE1058017 ba01	2019-10-09
TC_MAC_US_009: Link ADR Request	LoRa Alliance® End Device Certification Requirements for US and Canada 902-928 MHz ISM Band v1.4 (Clauses 2.3.5 & 3.9)	DE1058017 ba01	2019-10-09
TC_MAC_US_010: RX1 Receive Window Test (Packet Error Rate Rx1)	LoRa Alliance® End Device Certification Requirements for US and Canada 902-928 MHz ISM Band v1.4 (Clauses 2.3.6 & 3.10)	DE1058017 ba01	2019-10-10
TC_MAC_US_011: RX2 Receive Window Test (Packet Error Rate Rx2)	LoRa Alliance® End Device Certification Requirements for US and Canada 902-928 MHz ISM Band v1.4 915MHz ISM Band Devices v1.3 (Clauses 2.3.7 & 3.11)	DE1058017 ba01	2019-10-10
TC_MAC_US_012_P1&P2&P3: Maximum Allowed Payload-Test a	LoRa Alliance® End Device Certification Requirements for US and Canada 902-928 MHz ISM Band v1.4 (Clauses 2.3.9aI, 2.3.9aII, 2.3.9aIII 3.12.1 3.12.2 & 3.12.3)	DE1058017 ba01	2019-10-09
TC_MAC_US_012_P4: Maximum Allowed Payload-Downlink-RX1/RX2 Window Test Scenarios	LoRa Alliance® End Device Certification Requirements for US and Canada 902-928 MHz ISM Band v1.4 (Clauses 2.3.8 & 3.12.4)	DE1058017 ba01	2019-10-09
TC_MAC_US_013: MAC Commands in App-Payload(FRMPayload) & FOpts	LoRa Alliance® End Device Certification Requirements for US and Canada 902-928 MHz ISM Band v1.4 (Clauses 2.3.10 & 3.13)	DE1058017 ba01	2019-10-09

4 Test Equipment Details

4.1 List of Test Equipment

The calibration, hardware and software states are shown for the testing time frame of this test report.

7Layers LoRa Compliance Test Environment for LoRa Alliance End-Device Certification Requirements for US and Canada Version 1.4

Ref. No.	Device Name	Description
1.1	7Layers LoRa Control PC	<ul style="list-style-type: none"> 7Layers LoRa US US902-928MHz Compliance Test Suite SW v2.5 7Layers LoRa GW SW v2.5
1.2	KONA Macro IoT Gateway US915MHz 64-Channels Gateway	<ul style="list-style-type: none"> Packet forwarder v3.5.9 (<i>provided by TEKTELIC</i>)

5 Annex

5.1 Object Under Test (OUT) Features

Supported Features for Object Under Test: IAQoverLoRa (MVP)

Name	Mnemonic
LoRa Alliance® End Device Certification Requirements for US and Canada 902-928 MHz ISM Band v1.4	
Band 902-928 MHz	Support of Band 902-928 MHz
OTAA	Support of optional over-the-air feature
ADR	Support of Adaptive Data Rate
JOIN	allow to trigger join request on port 224 (Manually switch off/on)
Output Power	Support 0-14dBm

5.2 Sample DE1058017ba01 Extra Information Parameters

Sample Name: DE1058017ba01	
Object Under Test:	IAQoverLoRa (MVP)
Description:	Schneider Electric IAQoverLoRa (MVP) Module US902-928
Serial Number:	1866377231313535
Code:	ba01

Parameter Name	Value
End Device Identifier (DevEUI)	00 00 54 FF FF 00 72 2F
Application Identifier (AppEUI)	F0 3D 29 AC 71 00 00 04
Application key (AppKey)	9F 8F C9 30 6C 5E 09 DB B6 84 AB 06 92 03 BD 48

5.3 Additional Documentation for Samples

The following documents have been attached to Sample definitions as supporting documentation.

Sample Name: DE1058017ba01



Object Under Test

End of Test Report