

Test Report on

The Lacroix Impulse SOFREL T° Indoor temperature sensor

Test Report Reference: MDE_LACRO_2001#LoRa01

Date: 2021-05-04

Test Laboratory:

7layers GmbH
Borsigstraße 11
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.

7layers GmbH
Borsigstraße 11
40880 Ratingen, Germany
T +49 (0) 2102 749 0
F +49 (0) 2102 749 350
www.7layers.com

Geschäftsführer /
Managing Directors:
Frank Spiller
Bernhard Retka
Alexandre Norré-Oudard

Registergericht registered in:
Düsseldorf, HRB 75554
USt-IdNr VAT No.:
DE203159652
TAX No. 147/5869/0385
A Bureau Veritas Group Company

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1 Administrative Data

1.1 Project Information

Project Name: MDE_LACRO_2001
Responsible for Testing and Report: Mohamed El-Fikri
Date of Report: 2021-05-04
Testing Time Frame: 2021-04-29 - 2021-04-30

1.2 Applicant Information

Company Name: Lacroix Impulse
Address: 13 Rue Claude Chappe
35 510 CESSON SEVIGNE
France
Contact Person: Jean-Luc LE CORRE
Phone: +332 98 10 30 25
Email: jl.lecorre@lacroix-electronics.com

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

List of Test Resources

ID	Name	Responsible	Accreditation Info
1	LCTT LoRa Compliance Test Tool	Mohamed El-Fikri	

1.4 Signature of the Testing Responsible



(Responsible for Testing and Report)
Mohamed El-Fikri

1.5 Signature of the Accreditation Responsible(s)



(Responsible Accreditation Scope)
Constantine Nfor

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: SOFREL T° Indoor

Description: SOFREL T° Indoor temperature sensor
Type / Model: End Device

Manufacturer:

Company Name: Lacroix Impulse
Address: 13 Rue Claude Chappe
35 510 CESSON SEVIGNE
France

Contact Person: Jean-Luc LE CORRE
Phone: +33 2 98 10 30 25
Email: jl.lecorre@lacroix-electronics.com
Address: 13 Rue Claude Chappe
35 510 CESSON SEVIGNE
France

For further details see Annex.

2.2 Sample Description(s)

Sample Name: DE1456000aa01

Object Under Test:	SOFREL T° Indoor
Description:	SOFREL T° Indoor temperature sensor
Serial Number:	00000055DEADBEEF
Hardware Version:	Rev 3.1
Firmware Version:	1.6
Code:	aa01

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 End Device Certification EU v1.6
Date / Version:	March, 2020 / v1.6
Description:	LoRa Alliance End Device Certification Requirements for EU 863-870 MHz ISM Band devices, v1.6 (LoRaWAN™ core spec. 1.0.2 & LoRaWAN™ Regional Parameters Version 1.0.2rB)

3.3 Result Statistics

Test Specification	Total	Result Verdict			Pass Ratio
		Pass	Fail	Declaration	
LoRa End Device Certification EU v1.6	24	24	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 Case ID	Sample	Date	Verdict	Comments
TP_A_EU868_ED_MAC_BV_000 / "Device Activation (OTAA)"	DE1456000aa01	2021-04-30	PASS	
TP_A_EU868_ED_MAC_BV_001_A / "Over the air activation"	DE1456000aa01	2021-04-30	PASS	
TP_A_EU868_ED_MAC_BV_001_B / "Activation By Personalization"	DE1456000aa01	-	N. A	Not applicable
TP_A_EU868_ED_MAC_BV_002 / "Test application functionality"	DE1456000aa01	2021-04-29	PASS	
TP_A_EU868_ED_MAC_BV_003 / "AES encryption and message integrity"	DE1456000aa01	2021-04-29	PASS	
TP_A_EU868_ED_MAC_BV_004 / "Downlink error rate"	DE1456000aa01	2021-04-29	PASS	
TP_A_EU868_ED_MAC_BV_005 / "Downlink window timing"	DE1456000aa01	2021-04-29	PASS	
TP_A_EU868_ED_MAC_BV_006 / "Frame sequence number"	DE1456000aa01	2021-04-29	PASS	
TP_A_EU868_ED_MAC_BV_007 / "DevStatusReq MAC command"	DE1456000aa01	2021-04-29	PASS	
TP_A_EU868_ED_MAC_BV_008 / "MAC commands"	DE1456000aa01	2021-04-29	PASS	
TP_A_EU868_ED_MAC_BV_009 / "NewChannelReq MAC command"	DE1456000aa01	2021-04-30	PASS	Tested with following 16-different frequencies in MHz: 865.100; 865.300; 865.500; 865.700; 865.900; 867.900; 867.700; 867.500; 867.300; 867.100; 866.500; 866.300; 866.100; 868.100; 868.300; 868.500 (see also attached Logs)

Test Case ID	Sample	Date	Verdict	Comments
TP_A_EU868_ED_MAC_BV_010 / "DIChannelReq MAC command"	DE1456000aa01	2021-04-29	PASS	
TP_A_EU868_ED_MAC_BV_011 / "Confirmed packets"	DE1456000aa01	2021-04-29	PASS	
TP_A_EU868_ED_MAC_BV_012 / "RXParamSetupReq MAC command"	DE1456000aa01	2021-04-29	PASS	
TP_A_EU868_ED_MAC_BV_013 / "RXTimingSetupReq MAC command"	DE1456000aa01	2021-04-29	PASS	
TP_A_EU868_ED_MAC_BV_014_A / "LinkADDRReq MAC command (Part 1)"	DE1456000aa01	2021-04-29	PASS	
TP_A_EU868_ED_MAC_BV_014_B / "LinkADDRReq MAC command (Part 2)"	DE1456000aa01	2021-04-30	PASS	
TP_A_EU868_ED_MAC_BV_015_A / "RX1 Receive windows test (Part 1)"	DE1456000aa01	2021-04-30	PASS	
TP_A_EU868_ED_MAC_BV_015_B / "RX1 Receive windows test (Part 2)"	DE1456000aa01	2021-04-30	PASS	
TP_A_EU868_ED_MAC_BV_016 / "RX2 Receive window test"	DE1456000aa01	2021-04-30	PASS	
TP_A_EU868_ED_MAC_BV_017 / "RX1 and RX2 simultaneous frames"	DE1456000aa01	2021-04-30	PASS	
TP_A_EU868_ED_MAC_BV_018 / "TXParamSetupReq MAC command"	DE1456000aa01	2021-04-30	PASS	
TP_A_EU868_ED_MAC_BV_019 / "LinkCheckReq MAC command"	DE1456000aa01	2021-04-30	PASS	
TP_A_EU868_ED_MAC_BV_020 / RX "Oversized payload"	DE1456000aa01	2021-04-30	PASS	
TP_A_EU868_ED_MAC_BV_021 / "Maximum Allowed payload"	DE1456000aa01	2021-04-30	PASS	

4 Test Equipment Details

4.1 List of Test Equipment

The information shown below is valid for the testing time frame of this test report.

Test Resource 1: LCTT LoRaWAN Compliance Test Tool

Description: for LoRaWAN Specification and LoRa Compliance Testspec

Test System LCTT LoRaWAN Compliance Test Environment of Test Resource LCTT LoRa Compliance Test Environment

Test System:	LCTT LoRaWAN Compliance Test Environment
Description:	Location: 7layers Conformance Lab
Manufacturer:	LoRa Alliance

Software Component and Version	Start Date	End Date
LCTT LoRa Compliance Test Tool User Interface v1.7		
LCTT Technology Package v3.1.0_R1	2020-12-16	

Single Devices of Test System 7layers LoRa Compliance Test Environment

Name	Serial Number	Manufacturer
7Layers LoRa Control PC	DSCM004667	Fujitsu
Semtech SX1301 LoRa 8-Channel Gateway for EU 868MHz	IOTSX1301	Semtech
	<i>Software Version</i>	<i>Start Date</i>
	Lora Gateway SW (Driver HAL) v5.0.1; Packet forwarder v4.0.1	2021-01-01
	<i>Software Version</i>	<i>Start Date</i>
	Semtech Packet Forwarder V2 v5.1.0-klk4 (June 2018); Semtech HALv2 v5.1.0-klk5 (June 2018)	2021-01-01
Kerlink Wirnet iBTS compact LoRa 16-Channel Gateway for EU 868MHz	703BCc030016	Kerlink
	<i>Software Version</i>	<i>Start Date</i>
	Semtech Packet Forwarder V2 v5.1.0-klk4 (June 2018); Semtech HALv2 v5.1.0-klk5 (June 2018)	2021-01-01

5 Annex

5.1 Object Under Test (OUT) Features

Supported Features for Object Under Test: SOFREL T° Indoor

Name	Mnemonic
LoRa End Device Certification EU v1.6	
Band 868 MHz	Yes
Band US902-928	No
Band EU433	No
Band AU915-928	No
Band CN470-510	No
Band AS923	No
Band KR920-923	No
Class A Device	Yes
Class C Device	No
LoRaWAN v1.0.2rB certification requirements	Yes
DUT supports the Lorawan-1.0.x-join-synch-issues-remedies-v1.0.0	No
data rate SF7BW250 (DR6)	Yes
data rate FSK (DR7)	No
OTAA	Support of optional over-the-air feature
ABP	No Support of optional activation-by-personalization
ADR	Support of Adaptive Data Rate
JOIN	Support of allow to trigger join request on port 224
DIChannelReq	Yes
Block of LinkADRReq command processing	Yes
Data Rate Decay	Yes
uplink re-transmissions for Confirmed frames	Yes
Output Power	Support 0dBm to 14dBm

5.2 Sample DE1456000aa01 Extra Information Parameters

Sample Name: DE1456000aa01	
Object Under Test:	SOFREL T° Indoor
Description:	SOFREL T° Indoor temperature sensor
Serial Number:	00000055DEADBEEF
Code:	aa01
End Device Identifier (DevEUI)	00-00-00-55-DE-AD-BE-EF
Application Identifier (AppEUI)	32-73-35-76-38-79-2F-43
Application key (AppKey)	2B-7E-15-16-28-AE-D2-A6-AB-F7-15-88-09-CF-4F-3E
Maximum number of uplinks re-transmission	7
Frame counter size	32

5.3 Additional Documentation for Samples

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

Object Under Test: SOFREL T° Indoor

Sample Name: DE1456000aa01

Front view:



End of Test Report