Test Report on

MLR003

Test Report Reference: VDE_MICROPELT_2201_LoRa01

Date: 2022-02-17

Test Laboratory:
7layers GmbH
Borsigstraße 11
40880 Ratingen
Germany

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1 Administrative Data

1.1 Project Information

Project Name:	VDE_MICROPELT_2201#LORA
Responsible for Testing and Report:	Mohamed El-Fikri
Date of Report:	2022-02-17
Testing Time Frame:	2022-02-14 - 2022-02-14

1.2 Applicant Information

Company Name:	EH4 GmbH
Address:	Am Gansacker 10A, 79224 Umkirch, Germany
Contact Person:	Becky Couzens
Phone:	+49 7665 9321830
Email:	becky@micropelt.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)
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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: MLR003

Description:	**Micropelt smart heating radiator thermostat**
Type / Model:	**MLR003**

Manufacturer:

Company Name:	EH4 GmbH
Address:	Am Gansacker 10A, 79224 Umkirch, Germany
Contact Person:	Becky Couzens
Phone:	+41 43 222 57 26
Email:	becky@micropelt.com
Address:	Am Gansacker 10A, 79224 Umkirch, Germany

For further details see Annex.

2.2 Sample Description(s)

Sample Name: DE1469000aa01

Object Under Test:	**MLR003**
Description:	**Micropelt smart heating radiator thermostat**
Serial Number:	B191E90101010101
Hardware Version:	PCB v1.3
Firmware Version:	2022.02.01.04
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	16	16	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	Observations
TP_A_EU868_ED_MAC_BV_000 / "Device Activation (OTAA)"	DE1469000aa01	2020-02-14	**PASS**	
TP_A_EU868_ED_MAC_BV_001_A / "Over the air activation"	DE1469000aa01	2020-02-14	**PASS**	
TP_A_EU868_ED_MAC_BV_001_B / "Activation By Personalization"	DE1469000aa01	2020-02-14	**N.A**	**Not applicable**
TP_A_EU868_ED_MAC_BV_002 / "Test application functionality"	DE1469000aa01	2020-02-14	**PASS**	
TP_A_EU868_ED_MAC_BV_003 / "AES encryption and message integrity"	DE1469000aa01	2020-02-14	**PASS**	
TP_A_EU868_ED_MAC_BV_004 / "Downlink error rate"	DE1469000aa01	2020-02-14	**PASS**	
TP_A_EU868_ED_MAC_BV_005 / "Downlink window timing"	DE1469000aa01	2020-02-14	**PASS**	
TP_A_EU868_ED_MAC_BV_006 / "Frame sequence number"	DE1469000aa01	2020-02-14	**PASS**	
TP_A_EU868_ED_MAC_BV_007 / "DevStatusReq MAC command"	DE1469000aa01	2020-02-14	**PASS**	
TP_A_EU868_ED_MAC_BV_008 / "MAC commands"	DE1469000aa01	2020-02-14	**PASS**	
TP_A_EU868_ED_MAC_BV_009 / "NewChannelReq MAC command"	DE1469000aa01	2020-02-14	**PASS**	
TP_A_EU868_ED_MAC_BV_010 / "DlChannelReq MAC command"	DE1469000aa01	2020-02-14	**N.A**	**Not Applicable**
TP_A_EU868_ED_MAC_BV_011 / "Confirmed packets"	DE1469000aa01	2020-02-14	**PASS**	
TP_A_EU868_ED_MAC_BV_012 / "RXParamSetupReq MAC command"	DE1469000aa01	2020-02-14	**N.A**	**Not Applicable**

Test Case ID	Sample	Date	Verdict	Observations
TP_A_EU868_ED_MAC_BV_013 / "RXTimingSetupReq MAC command"	DE1469000aa01	2020-02-14	**PASS**	
TP_A_EU868_ED_MAC_BV_014_A / "LinkADRReq MAC command (Part 1)"	DE1469000aa01	2020-02-14	**N.A**	**Not Applicable**
TP_A_EU868_ED_MAC_BV_014_B / "LinkADRReq MAC command (Part 2)"	DE1469000aa01	2020-02-14	**N.A**	**Not Applicable**
TP_A_EU868_ED_MAC_BV_015_A / "RX1 Receive windows test (Part 1)"	DE1469000aa01	2022-02-14	**N.A**	**Not Applicable**
TP_A_EU868_ED_MAC_BV_015_B / "RX1 Receive windows test (Part 2)"	DE1469000aa01	2020-02-14	**N.A**	**Not Applicable**
TP_A_EU868_ED_MAC_BV_016 / "RX2 Receive window test"	DE1469000aa01	2020-02-14	**PASS**	
TP_A_EU868_ED_MAC_BV_017 / "RX1 and RX2 simultaneous frames"	DE1469000aa01	2020-02-14	**PASS**	
TP_A_EU868_ED_MAC_BV_018 / "TXParamSetupReq MAC command"	DE1469000aa01	2020-02-14	**PASS**	
TP_A_EU868_ED_MAC_BV_019 / "LinkCheckReq MAC command"	DE1469000aa01	2020-02-14	**PASS**	
TP_A_EU868_ED_MAC_BV_020 / RX "Oversized payload"	DE1469000aa01	2020-02-14	**N.A**	**Not Applicable**
TP_A_EU868_ED_MAC_BV_021 / "Maximum Allowed payload"	DE1469000aa01	2020-02-14	**N.A**	**Not Applicable**

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 v1.10		
LCTT Technology Package v3.4.0_R2	2022-01-04	

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	
	Software Version	*Start Date*	*End Date*
	Lora Gateway SW (Driver HAL) v3.2.0; Packet forwarder v2.2.0	2017-01-01	
Kerlink Wirnet iBTS compact LoRa 16-Channel Gateway for EU 868MHz	703BCc030016	Kerlink	
	Software Version	*Start Date*	*End Date*
	pkt_forwarder 3.3.1-klk3 +hal_libloragw2-3.5.0-klk5	2017-01-01	

5 Annex

5.1 Object Under Test (OUT) Features

Supported Features for Object Under Test: **MLR003**

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
data rate SF7BW250 (DR6)	No
data rate FSK (DR7)	No
OTAA	Support of optional over-the-air feature
ABP	No support of optional activation-by-personalization
ADR	No support of Adaptive Data Rate
JOIN	allow to trigger join request on port 224
DIChannelReq	No
Block of LinkADRReq command processing	No
Data Rate Decay	No
uplink re-transmissions for Confirmed frames	No
Output Power	Support 14dBm

5.2 Sample DE1469000aa01 Extra Information Parameters

Sample Name: DE1469000aa01	
Object Under Test:	MLR003
Description:	Micropelt smart heating radiator thermostat
Serial Number:	B191E90101010101
Code:	aa01
End Device Identifier (DevEUI)	B191E90101010101
Application Identifier (AppEUI)	31C209E170312003
Application key (AppKey)	2B7E151628AED2A6ABF7158809CF4F1D
Maximum number of uplinks re-transmission	0
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: MLR003

Sample Name: DE1469000aa01

Front view:

End of Test Report