

TEST REPORT ON B METERS HYDRODIGIT-S1 for AS923 MHz Band

Test Report Reference: VDE_BMETERS_2302

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1 Administrative Data

1.1 Project Information

Project Name: VDE_BMETERS_2302
Responsible for Testing and Report: Mohamed El-Fikri
Date of Report: 2023-11-30
Testing Time Frame: 2023-11-27 - 2023-11-27

1.2 Applicant Information

Company Name: B METERS S.R.L.
Address: VIA FRIULI 3 33050 ITALY
Contact Person: MARIO PARONI
Phone: +39 0432 931415
Email: mario.paroni@bmetrics.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)
Mohamed El-Fikri

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: HYDRODIGIT-S1

Description: HYDRODIGIT-S1 is a single jet, IP68, SMART water meter with LoRaWAN integrated transmission module. User friendly “Plug & Play” installation. In addition to information on current consumption, it allows to detect different types of attempted fraud, backflow, prolonged operation at maximum flow rate (Q4) and the presence of a potential water leakage.

Type / Model: S1

Manufacturer:

Company Name: B METERS S.R.L.
Address: VIA FRIULI 3 33050 ITALY
Contact Person: MARIO PARONI
Phone: +39 0432 931415
Email: mario.paroni@bmetrics.com
Address: VIA FRIULI 3 33050 ITALY

For further details see Annex.

2.2 Sample Description(s)

Sample Name: DE1413003aa01

Object Under Test:	HYDRODIGIT-S1
Description:	OTA Variant of the LoRaWAN based HYDRODIGIT-S1 water meter
Serial Number:	87130001
Hardware Version:	V02
Software Version:	V03
Firmware Version:	Combo_03
Code:	aa01

Sample Name: DE1413003ab01

Object Under Test:	HYDRODIGIT-S1
Description:	ABP Variant of the LoRaWAN based HYDRODIGIT-S1 water meter
Serial Number:	87130000
Hardware Version:	V02
Software Version:	V03
Firmware Version:	Combo_03
Code:	ab01

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 AS923MHz ISM Band Devices
Date / Version:	October 2019/ v1.1.1
Description:	LoRa Alliance® End-Device Certification Requirements for AS923MHz ISM Band Devices, v1.1.1 (LoRaWAN™ core spec. 1.0.2 & LoRaWAN™ Regional Parameters Version 1.0.2rB)

3.3 Result Statistics

Test Specification	Total	Result Verdict			Pass
		Pass	Fail	Declaration	Ratio
LoRa End Device Certification EU v1.6	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 Case ID	Sample	Date	Verdict	Observations
TP_A_AS923_ED_MAC_BV_000 / "Test Mode Activation: (OTAA)"	DE1413003aa01	2023-11-28	PASS	
TP_A_AS923_ED_MAC_BV_000 / "Test Mode Activation: (ABP)"	DE1413003ab01	2023-11-29	PASS	
TP_A_AS923_ED_MAC_BV_001 / "Test application functionality"	DE1413003aa01	2023-11-28	PASS	
TP_A_AS923_ED_MAC_BV_002 / "Over the air activation"	DE1413003ab01	2023-11-28	PASS	
TP_A_AS923_ED_MAC_BV_003 / "Downlink error rate"	DE1413003aa01	2023-11-28	PASS	
TP_A_AS923_ED_MAC_BV_004 / "Cryptography"	DE1413003aa01	2023-11-28	PASS	
TP_A_AS923_ED_MAC_BV_005 / "Downlink window timing"	DE1413003aa01	2023-11-28	PASS	
TP_A_AS923_ED_MAC_BV_006 / "Frame sequence number"	DE1413003aa01	2023-11-28	PASS	
TP_A_AS923_ED_MAC_BV_007 / "DevStatusReq MAC command"	DE1413003aa01	2023-11-28	PASS	
TP_A_AS923_ED_MAC_BV_008 / "MAC commands"	DE1413003aa01	2023-11-28	PASS	
TP_A_AS923_ED_MAC_BV_009 / "NewChannelReq MAC command"	DE1413003aa01	2023-11-28	PASS	
TP_A_AS923_ED_MAC_BV_010 / "DIChannelReq MAC command"	DE1413003aa01	2023-11-28	PASS	
TP_A_AS923_ED_MAC_BV_011 / "Confirmed packets"	DE1413003aa01	2023-11-28	PASS	

Test Case ID	Sample	Date	Verdict	Observations
TP_A_AS923_ED_MAC_BV_012 / "RXParamSetupReq MAC command"	DE1413003aa01	2023-11-28	PASS	
TP_A_AS923_ED_MAC_BV_013 / "RXTimingSetupReq MAC command"	DE1413003aa01	2023-11-28	PASS	
TP_A_AS923_ED_MAC_BV_014_A / "LinkADDRReq MAC command (Part 1)"	DE1413003aa01	2023-11-28	PASS	
TP_A_AS923_ED_MAC_BV_014_B / "LinkADDRReq MAC command (Part 2)"	DE1413003aa01	2023-11-28	PASS	
TP_A_AS923_ED_MAC_BV_015 / "Packet Error Rate RX1"	DE1413003aa01	2023-11-28	PASS	
TP_A_AS923_ED_MAC_BV_016 / "Packet Error Rate RX2"	DE1413003aa01	2023-11-29	PASS	
TP_A_AS923_ED_MAC_BV_017 / "TxParamSetupReq MAC command"	DE1413003aa01	2023-11-28	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 v2.6		
LCTT Technology Package v3.11.0_R1	2023-01-26	

Single Devices of Test System 7layers LoRa Compliance Test Environment

Name	Serial Number	Manufacturer
7Layers LoRa Control PC	DSCM004667	Fujitsu
2 x (Semtech SX1301 LoRa 8-Channel Gateway) for AS923 MHz	IOTSX1301	Semtech

Software Version	Start Date	End Date
Lora Gateway SW (Driver HAL) v5.0.1; Packet forwarder v4.0.1	2021-01-01	

5 Annex

5.1 Object Under Test (OUT) Features

Supported Features for Object Under Test: HYDRODIGIT-S1

NAME	VALUE
DUT is a Class A Device (All End Devices)	TRUE
DUT is a Class B Device (Beacon Mode)	FALSE
DUT is a Class C Device (Continuously Listening)	FALSE
DUT works in EU 868MHz ISM Band	FALSE
DUT works in EU 443MHz ISM Band	FALSE
DUT works in USA 915MHz ISM Band	FALSE
DUT works in Asia 923MHz ISM Band	TRUE
DUT works in South Korea 920MHz ISM Band	FALSE
DUT supports Over-The-Air Activation (OTAA) mechanism	TRUE
DUT supports Activation By Personalization (ABP) mechanism	TRUE
DUT supports Adaptive Data Rate (ADR) feature	TRUE
DUT supports data rate DR6 (SF7BW250)	FALSE
DUT supports data rate DR7 (FSK50)	FALSE
DUT supports Trigger Join Request command in Test Mode	TRUE
DUT supports DIChannelReq MAC command	TRUE
DUT needs a reset after deactivating Test Mode	FALSE
DUT supports LinkADRReq block	TRUE
DUT implements LoRaWAN v1.0.2rB certification requirements	TRUE
DUT implements LoRaWAN v1.1 certification requirements	FALSE
DUT works in India 865-867 MHz ISM Band	FALSE
DUT supports the Lorawan-1.0.x-join-synch-issues-remedies-v1.0.0	FALSE
DUT implements Data Rate Decay	TRUE
DUT implements LoRaWAN v1.0.4 certification requirements	FALSE
DUT supports uplink re-transmissions for Confirmed frames	TRUE
DUT works in Rusia 864MHz ISM Band	FALSE
DUT works in Australia 915MHz ISM Band	FALSE
DUT permanently enabled Class C	FALSE
DUT works in Asia 923MHz ISM Band Group 1	TRUE
DUT works in Asia 923MHz ISM Band Group 2	FALSE
DUT works in Asia 923MHz ISM Band Group 3	FALSE
DUT works in Asia 923MHz ISM Band Group 4	FALSE
DUT supports SCHC	FALSE
DUT Output Power	2 dBm to 10 dBm

5.2 OTAA Sample DE1413003aa01 Extra Information Parameters

NAME	VALUE
Object Under Test	HYDRODIGIT-S1
Serial Number	87130001
Code	aa01
Minimum transmission power	2dBm
Maximum transmission power	10dBm
End-device identifier (DevEUI)	'E41E0A90000040D6'O
End-device Address assigned during activation (DevAddr)	'00000001'O
Maximum number of uplinks re-transmission	7
Frame counter size	32
RuleIDx for SCHC messages	NA
RuleIDy for SCHC messages	NA
RuleIDz for SCHC messages	101
Maximum number of ACK Request	NA
FPortUp of the DUT for SCHC messages	NA
FPortDown of the DUT for SCHC messages	NA
Inactivity timer for SCHC messages	NA
retransmission timer for SCHC messages	NA
Application session key (AppSKey)	NA
Network session key (NwkSKey)	NA
Application key (AppKey)	'44A52CD429313A435834BA51B430F1EF'O
Application identifier (AppEUI)	'E41E0A90000FFFFF'O
End-device Address (DevAddr)	NA

5.3 ABP Sample DE1413003ab01 Extra Information Parameters

NAME	VALUE
Object Under Test	HYDRODIGIT-S1
Serial Number	87130000
Code	aa02
Minimum transmission power	2dBm
Maximum transmission power	10dBm
End-device identifier (DevEUI)	NA
End-device Address assigned during activation (DevAddr)	NA
Maximum number of uplinks re-transmission	7
Frame counter size	32
RuleIDx for SCHC messages	NA
RuleIDy for SCHC messages	NA
RuleIDz for SCHC messages	NA
Maximum number of ACK Request	NA
FPortUp of the DUT for SCHC messages	NA
FPortDown of the DUT for SCHC messages	NA
Inactivity timer for SCHC messages	NA
retransmission timer for SCHC messages	NA
Application session key (AppSKey)	'1926DD206FFB0A21FA6E923FECE661A5'O
Network session key (NwkSKey)	'4FF376AEC4E876FFDE6DD147BC56F996'O
Application key (AppKey)	NA
Application identifier (AppEUI)	NA
End-device Address (DevAddr)	'af92b230'O

5.4 Additional Documentation for Samples

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

Object Under Test: HYDRODIGIT-S1

Sample Name: DE1413003aa01

Front view:



Side view:



Rear view:



End of Test Report