


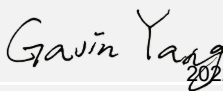


Test report No:

22A0777R-A332250010-A

Test Report

LoRa Alliance End Device Certification Requirements

Identification of item tested..... :	Ultrasonic Water Meter
Trademark	Bove
Model and/or type reference	BECO X
Final HW version..... :	V1.2
Final FW version..... :	V1.1.23
Final SW version..... :	NA
Features	LoRa Alliance End Device Certification Requirements for EU 868MHz ISM Band Devices
Manufacturer	Zhejiang Bove Intelligent Technology Co., Ltd Level 5, Building 5, No. 36, Changsheng South Road, Jiaxing, Zhejiang, China, 314000
Test method requested..... :	LoRa Alliance Certification
Standard	LoRa Alliance End Device Certification Requirements for EU 868MHz ISM Band Devices Ver.1.6
Test According LoRaWAN™ Spec	V1.0.2
Supported optional features..... :	YES
Adaptive Data Rate..... :	YES
→ SF7BW250	YES
→ FSK.....	YES
Test procedure(s)	TERD-WTS-TP-02 – LORA_TSSTP_PART_1_v1.0
Summary	IN COMPLIANCE
Approved by..... :	Jimmy Chang Manager  2022-11-18
Test Engineer	Gavin Yang Project Engineer  2022-11-18
ATH Identifier	DEKRA – TWN
Date of issue..... :	2022-11-18
Report Revision..... :	01

Index

Competences and guarantees	3
General conditions	3
Uncertainty	3
Usage of samples.....	3
Identification of the client	4
Testing period	4
Environmental conditions	4
Revision History.....	4
Means of testing identification	5
Test setup	5
Appendix A – Test result	6
Appendix B – ICS	8
Appendix C – IXIT	9
Appendix D – General Parameters	10
Appendix E - Photographs	11

Competences and guarantees

DEKRA Testing and Certification, Co., Ltd. is a testing laboratory competent to carry out the tests described in this report.

In order to assure the traceability to other national and international laboratories, DEKRA Testing and Certification, Co., Ltd. has a calibration and maintenance program for its measurement equipment.

DEKRA Testing and Certification, Co., Ltd. guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at DEKRA Testing and Certification, Co., Ltd. at the time of performance of the test.

DEKRA Testing and Certification, Co., Ltd. is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

IMPORTANT: No parts of this report may be reproduced or quoted out of context, in any form or by any means, except in full, without the previous written permission of DEKRA Testing and Certification, Co., Ltd.

General conditions

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA Testing and Certification, Co., Ltd.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA Testing and Certification, Co., Ltd. and the Accreditation Bodies.

Uncertainty

N/A

Usage of samples

Samples undergoing test have been selected by: Zhejiang Bove Intelligent Technology Co., Ltd

DUT Label ID	PSR-2029660
Model or type reference	BECO X
Serial number	NA
HW version	V1.2
SW version	NA
FW version	V1.1.23
Description of test sample	BECO X is a next-generation ultrasonic water meter. The MID certified BECO X provides IP68 protection and support wireless like MBus, NB, Sigfox and LoRaWAN communications. Working together with Alpace-ERemote Meter Reading & Control System, BECO X is able to collect and analyse millions of users' water-consuming data.
Date of reception	2022-11-14

Identification of the client

Company name	Zhejiang Bove Intelligent Technology Co., Ltd
Address	Level 5, Building 5, No. 36, Changsheng South Road, Jiaxing, Zhejiang, China, 314000

Testing period

Start Date	2022-10-31
Finish Date	2022-11-15

The tests have been performed at DEKRA Testing and Certification, Co., Ltd. (Taiwan)

Environmental conditions

The testing has been performed within the following limits:

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 20 % Max. = 80 %

Revision History

Revision	Modification Date	Description
01	NA	Initial Report

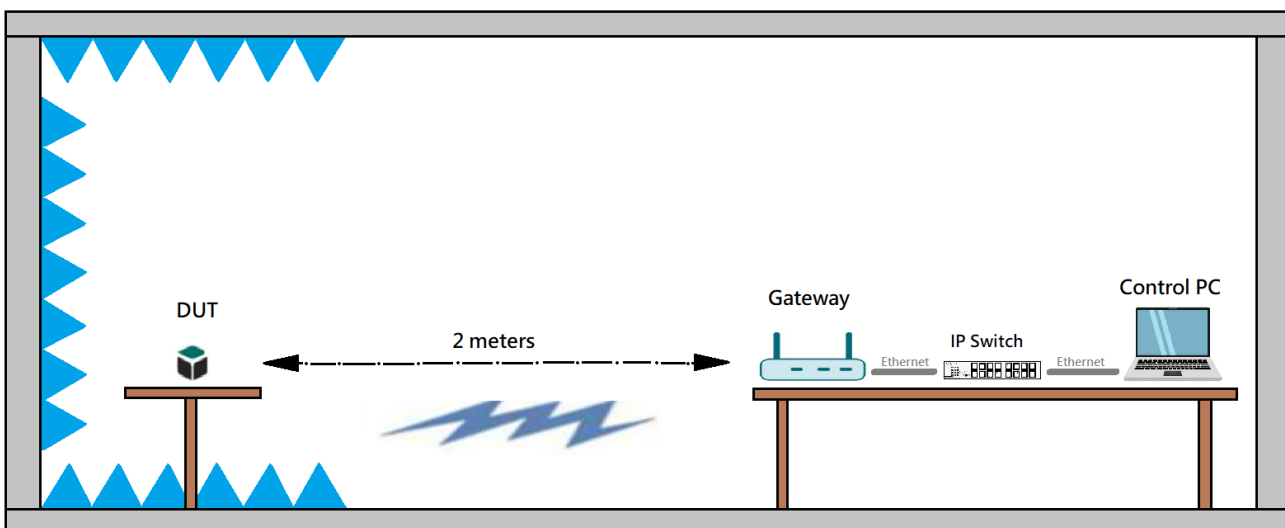
Means of testing identification

Following equipment was used to perform the testing:

EU868 SETUP			
Test System	LoRaWAN Certification Test System		
Hardware:	Control No.	Equipment	Serial No.
	0742	Control PC with LCTT installed	GANXCV193086433
	0741	CoreCell Gateway	-
Software:	0559	LoRaWAN LCTT - UI version: 2.3.0 - Reporting Module v1.5.0	
	0560	Technology Package: LCTT v3.8.0_R1	

Test setup

The configuration used for Test Cases in nominal temperature conditions was the following one:



Appendix A – Test result

The abbreviations used in the header row of the test campaign report tables are:

- Test Case ID: Test case identifier, as it can be found on the referred standard.
- Sample: Sample details.
- Description: Test case description, as it can be found on the referred standard.
- Date: Date of the beginning of the execution.
- Conformance: YES/NO. If the test case has been executed in accordance to the standard.
- Verdict: Records the verdict assigned to each Test case run to completion. Following verdicts are possible:
 - PASS:** If the Test case passed.
 - FAIL:** If the Test case failed.
 - INCONC:** Inconclusive. The test case did not reach a PASS or FAIL verdict.
 - NA:** Not applicable.
 - NM:** Not measured.

Observations: Provides a reference to additional information relevant to the test (when required).

Activation Mode: ABP

Test Case ID	Description	Verdict	Date	Observations
TP_A_EU868_ED_MAC_BV_000	Device activation	Pass	2022-11-15	
TP_A_EU868_ED_MAC_BV_001_B	Activation by Personalization	Pass	2022-11-15	
TP_A_EU868_ED_MAC_BV_002	Test application functionality	Pass	2022-11-15	
TP_A_EU868_ED_MAC_BV_003	AES encryption and message integrity	Pass	2022-11-15	
TP_A_EU868_ED_MAC_BV_004	Downlink Error Rate	Pass	2022-11-15	
TP_A_EU868_ED_MAC_BV_005	Downlink window timing	Pass	2022-11-15	
TP_A_EU868_ED_MAC_BV_006	Frame sequence number	Pass	2022-11-15	
TP_A_EU868_ED_MAC_BV_007	DevStatusReq MAC command	Pass	2022-11-15	
TP_A_EU868_ED_MAC_BV_008	MAC commands	Pass	2022-11-15	
TP_A_EU868_ED_MAC_BV_009	NewChannelReq MAC command	Pass	2022-11-15	
TP_A_EU868_ED_MAC_BV_010	DIChannelReq MAC command	Pass	2022-11-15	
TP_A_EU868_ED_MAC_BV_011	Confirmed packets	Pass	2022-11-15	
TP_A_EU868_ED_MAC_BV_012	RXParamSetupReq MAC command	Pass	2022-11-15	
TP_A_EU868_ED_MAC_BV_013	RXTimingSetupReq MAC command	Pass	2022-11-15	
TP_A_EU868_ED_MAC_BV_014_A	LinkADRReq MAC command (part 1)	Pass	2022-11-15	
TP_A_EU868_ED_MAC_BV_014_B	LinkADRReq MAC command (part 2)	Pass	2022-11-15	
TP_A_EU868_ED_MAC_BV_015_A	RX1 Receive window test (part 1)	Pass	2022-11-15	
TP_A_EU868_ED_MAC_BV_015_B	RX1 Receive window test (part 2)	Pass	2022-11-15	
TP_A_EU868_ED_MAC_BV_016	RX2 Receive window test	Pass	2022-11-15	
TP_A_EU868_ED_MAC_BV_017	RX1 and RX2 simultaneous frames	Pass	2022-11-15	
TP_A_EU868_ED_MAC_BV_018	TXParamSetupReq MAC command	Pass	2022-11-15	
TP_A_EU868_ED_MAC_BV_019	LinkCheckReq MAC command	Pass	2022-11-15	
TP_A_EU868_ED_MAC_BV_020	RX Oversize payload	Pass	2022-11-15	
TP_A_EU868_ED_MAC_BV_021	Maximum allowed payload	Pass	2022-11-15	

Activation Mode: OTAA

Test Case ID	Description	Verdict	Date	Observations
TP_A_EU868_ED_MAC_BV_000	Device activation	Pass	2022-11-14	
TP_A_EU868_ED_MAC_BV_001_A	Over the Air activation	Pass	2022-11-14	
TP_A_EU868_ED_MAC_BV_002	Test application functionality	Pass	2022-11-14	
TP_A_EU868_ED_MAC_BV_003	AES encryption and message integrity	Pass	2022-11-14	
TP_A_EU868_ED_MAC_BV_004	Downlink Error Rate	Pass	2022-11-14	
TP_A_EU868_ED_MAC_BV_005	Downlink window timing	Pass	2022-11-14	
TP_A_EU868_ED_MAC_BV_006	Frame sequence number	Pass	2022-11-14	
TP_A_EU868_ED_MAC_BV_007	DevStatusReq MAC command	Pass	2022-11-14	
TP_A_EU868_ED_MAC_BV_008	MAC commands	Pass	2022-11-14	
TP_A_EU868_ED_MAC_BV_009	NewChannelReq MAC command	Pass	2022-11-14	
TP_A_EU868_ED_MAC_BV_010	DIChannelReq MAC command	Pass	2022-11-14	
TP_A_EU868_ED_MAC_BV_011	Confirmed packets	Pass	2022-11-14	
TP_A_EU868_ED_MAC_BV_012	RXParamSetupReq MAC command	Pass	2022-11-14	
TP_A_EU868_ED_MAC_BV_013	RXTimingSetupReq MAC command	Pass	2022-11-14	
TP_A_EU868_ED_MAC_BV_014_A	LinkADRReq MAC command (part 1)	Pass	2022-11-14	
TP_A_EU868_ED_MAC_BV_014_B	LinkADRReq MAC command (part 2)	Pass	2022-11-14	
TP_A_EU868_ED_MAC_BV_015_A	RX1 Receive window test (part 1)	Pass	2022-11-15	
TP_A_EU868_ED_MAC_BV_015_B	RX1 Receive window test (part 2)	Pass	2022-11-15	
TP_A_EU868_ED_MAC_BV_016	RX2 Receive window test	Pass	2022-11-14	
TP_A_EU868_ED_MAC_BV_017	RX1 and RX2 simultaneous frames	Pass	2022-11-14	
TP_A_EU868_ED_MAC_BV_018	TXParamSetupReq MAC command	Pass	2022-11-14	
TP_A_EU868_ED_MAC_BV_019	LinkCheckReq MAC command	Pass	2022-11-14	
TP_A_EU868_ED_MAC_BV_020	RX Oversize payload	Pass	2022-11-14	
TP_A_EU868_ED_MAC_BV_021	Maximum allowed payload	Pass	2022-11-14	

Appendix B – ICS

Item	Name	Value
1	DUT works in EU 868MHz ISM Band	TRUE
2	DUT implements LoRaWAN v1.0.2rB certification requirements	TRUE
3	DUT implements LoRaWAN v1.0.4 certification requirements	FALSE
4	DUT is a Class A Device (All End Device)	TRUE
5	DUT is a Class B Device (Beacon Mode)	FALSE
6	DUT is a Class C Device (Continuously Listening)	FALSE
7	DUT supports Adaptive Data Rate (ADR) feature	TRUE
8	DUT supports LinkADRRReq block	TRUE
9	DUT supports uplink re-transmissions for Confirmed frames	TRUE
10	DUT supports DIChannelReq MAC command	TRUE
11	DUT supports the Lorawan-1.0.x-join-synch-issues-remedies-v1.0.0	FALSE
12	DUT supports Over-The-Air Activation (OTAA) mechanism	TRUE
13	DUT permanent enabled Class C	FALSE
14	DUT needs a reset after deactivating Test Mode	FALSE
15	DUT supports SCHC	FALSE
16	DUT supports Trigger Join Request command in Test Mode	TRUE

Appendix C – IXIT

Item	Name	Value
1	End-Device Address (DvAddr)	CBA20300
2	Application Session Key (AppSKey)	2B7E151628AED2A6ABF7158809CF4F3C
3	Network Session Key (NwkSKey)	2B7E151628AED2A6ABF7158809CF4F3C
4	Application Identifier (AppEUI)	8CF9572000000000
5	Frame counter size	32 bits
6	Max number of Confirmed re-transmissions	2
7	Maximum Transmission Power	16 dBm
8	Minumum Transmission Power	2 dBm
9	End-device Address assigned during activation (DevAddr)	CBA20300
10	Application Key (AppKey)	2B7E151628AED2A6ABF7158809CF4F3C
11	Device Identifier (DevEUI)	8CF957200003A2CB

Appendix D – General Parameters

Item	Name	Value
GW	Default TX Antenna	0
	List of IP address of the GWs	192.168.1.28;
	Gateway model	CoreCell
	Number of supported channels in Gateway	8 Channels
	Default TX Power	14 dBm
	Gateway Socket Port	1780
	Gateway supports LR-FHSS	FALSE
	Size of the reception window	100
	Number of GWs	1
TM	General Timer	90 min
	Network Server IP Address	192.168.1.111
	Testing Category	Certification Testing
	Verbosity level for Logs	TRUE
EU868	EU868 Beacon default frequency	869.525 MHz
	EU868 Beacon DR	SF9BW125
	EU868 Class B default pingSlot frequency	869.525 MHz
	EU868 Class C Response Timeout	8.0 s
	EU868 Join_Accept_Delay1	5.0 s
	EU868 Join_Accept_Delay2	6.0 s
	EU868 Receive_Delay1	1.0 s
	EU868 Receive_Delay2	2.0 s
	EU868 RX2 Receive Window DR	SF12BW125
	EU868 RX2 Receive Window Frequency	869.525 MHz

Appendix E - Photographs

