



Test report No:

1940108R-WLR001

## Test Report

### LoRa Alliance End Device Requirements

Identification of item tested .....	LoRa module
Trademark.....	eWBM
Model or type reference .....	eLR100-UL-00
Final HW version.....	1.0
Final FW version .....	0.07
Final SW version.....	0.07
Features .....	LoRa Alliance End Device Certification Requirements for US/Canada 915MHz ISM Band Devices
Manufacturer .....	eWBM Co., Ltd. 14F,9 Teheran-ro 20-gil, Gangnam-gu, Seoul, Republic of Korea
Test method requested .....	LoRa Alliance Certification
Standard .....	LoRa Alliance End Device Certification Requirements for US/Canada 915MHz ISM Band Devices Ver.1.3
Test According LoRaWAN™ Spec .....	V1.0.2
Supported optional features .....	YES
Test procedure(s).....	TERD-WTS-TP-02 – LORA_TSSTP_PART_1_v1.0
Summary .....	IN COMPLIANCE
Approved by (name / position & signature) .....	Jimmy Chang Project Manager
Date of issue.....	2019-04-22
Report template No .....	FLO001_01

## Index

Competences and guarantees .....	3
General conditions .....	3
Usage of samples.....	3
Identification of the client .....	4
Testing period .....	4
Environmental conditions .....	4
Remarks and comments .....	4
Change History.....	4
Means of testing identification .....	5
Appendix A – Test result .....	6
Appendix B – ICS .....	8
Appendix C – IXIT .....	9
Appendix D – General Parameters.....	10

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## Usage of samples

Samples undergoing test have been selected by: eWBM Co., Ltd.

Sample M/01, is composed of the following elements:

Control N° M/01	DUT Label ID	PSR-1605434 & PSR-1605435
	Model and/or type reference	eLR100-UL-00
	Serial number	NA
	HW version	1.0
	FW version	0.07
	SW version	0.07
	Description of test sample	This is a secure LoRa module powered by the MS500 from eWBM, who provides powerful security SoC products. eWBM delivers total solutions for LoRa communication in the device level, including hardware security accelerators for all of the industry's security needs.
	Date of reception	2019-04-12

The sample used for each test case is specified in the "Observations" field of the results annex

## Identification of the client

Company name	eWBM Co., Ltd
Address	14F,9 Teheran-ro 20-gil, Gangnam-gu, Seoul, Republic of Korea

## Testing period

Start Date	2019-04-15
Finish Date	2019-04-19

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 %

## Remarks and comments

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## Change History

Version	Description
01	Initial issued

## Means of testing identification

Following equipment was used to perform the testing:

US915 SETUP			
<b>Test System</b>	<b>CN. 556</b>	<b>TACS4 LPWAN Testing, Approvals &amp; Certification System</b>	
<b>Hardware:</b>	Control No.	Equipment	Serial No.
	0584	LoRa 64Ch Gateway TEKTELIC - MACO2LUS915	T0004537
<b>Software:</b>	0559	TACS4 LORA GUI v1.11.0 TACS4 LORA Reporting Module v1.5.0	
	0560	TACS4 LORA Technology Package v5.9.0_R2	

# Appendix A – Test result

## Test campaign report

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).

Test Case ID	Description	Verdict	Date	Observations
TP_A_US915_MAC_BV_000	Test Mode Activation	Pass	2019-04-19	ABP
TP_A_US915_MAC_BV_002	Test Application functionality	Pass	2019-04-19	ABP
TP_A_US915_MAC_BV_003	AES Encryption and Message Integrity	Pass	2019-04-19	ABP
TP_A_US915_MAC_BV_004	Downlink Error Rate	Pass	2019-04-19	ABP
TP_A_US915_MAC_BV_005	Downlink Window Timing	Pass	2019-04-19	ABP
TP_A_US915_MAC_BV_006A	Frame Sequence Number	Pass	2019-04-19	ABP
TP_A_US915_MAC_BV_006B	Downlink Sequence Number Roller	Pass	2019-04-19	ABP
TP_A_US915_MAC_BV_007	DevstatusReq Mac Command	Pass	2019-04-19	ABP
TP_A_US915_MAC_BV_008A	Mac Commands	Pass	2019-04-19	ABP
TP_A_US915_MAC_BV_008B	Mac Commands in App-Payload & Fopts	Pass	2019-04-19	ABP
TP_A_US915_MAC_BV_009	NewChannelReq Mac Command	Pass	2019-04-19	ABP
TP_A_US915_MAC_BV_010	Confirm Packets	Pass	2019-04-19	ABP
TP_A_US915_MAC_BV_011	RXParamSetupReq Mac Command	Pass	2019-04-19	ABP
TP_A_US915_MAC_BV_012	RX1 Receive Window Test	Pass	2019-04-19	ABP
TP_A_US915_MAC_BV_013	RX2 Receive Window Test	Pass	2019-04-19	ABP
TP_A_US915_MAC_BV_014	RX TimingSetupReq Mac Command	Pass	2019-04-19	ABP
TP_A_US915_MAC_BV_015A	LinkADRReq Mac Command	Pass	2019-04-19	ABP
TP_A_US915_MAC_BV_015B	LinkADRReq Mac Command	Pass	2019-04-19	ABP
TP_A_US915_MAC_BV_016	RX Oversized Payload	Pass	2019-04-19	ABP
TP_A_US915_MAC_BV_017	Maximum Allowed Payload	Pass	2019-04-19	ABP

0 test cases have been executed with SCR errors  
 20 test cases selected of 20 executed  
 20 test cases executed of 20 applicable

Test Case ID	Description	Verdict	Date	Observations
TP_A_US915_MAC_BV_000	Test Mode Activation	Pass	2019-04-18	OTAA
TP_A_US915_MAC_BV_001	Over The Air Activation	Pass	2019-04-18	OTAA
TP_A_US915_MAC_BV_002	Test Application functionality	Pass	2019-04-18	OTAA
TP_A_US915_MAC_BV_003	AES Encrption and Message Integrity	Pass	2019-04-18	OTAA
TP_A_US915_MAC_BV_004	Downlink Error Rate	Pass	2019-04-18	OTAA
TP_A_US915_MAC_BV_005	Downlink Window Timing	Pass	2019-04-18	OTAA
TP_A_US915_MAC_BV_006A	Frame Sequence Number	Pass	2019-04-18	OTAA
TP_A_US915_MAC_BV_006B	Downlink Sequence Number Roller	Pass	2019-04-18	OTAA
TP_A_US915_MAC_BV_007	DevstatusReq Mac Command	Pass	2019-04-18	OTAA
TP_A_US915_MAC_BV_008A	Mac Commands	Pass	2019-04-18	OTAA
TP_A_US915_MAC_BV_008B	Mac Commands in App-Payload & Fopts	Pass	2019-04-18	OTAA
TP_A_US915_MAC_BV_009	NewChannelReq Mac Command	Pass	2019-04-18	OTAA
TP_A_US915_MAC_BV_010	Confirm Packets	Pass	2019-04-18	OTAA
TP_A_US915_MAC_BV_011	RXParamSetupReq Mac Command	Pass	2019-04-18	OTAA
TP_A_US915_MAC_BV_012	RX1 Receive Window Test	Pass	2019-04-18	OTAA
TP_A_US915_MAC_BV_013	RX2 Receive Window Test	Pass	2019-04-18	OTAA
TP_A_US915_MAC_BV_014	RX TimingSetupReq Mac Command	Pass	2019-04-18	OTAA
TP_A_US915_MAC_BV_015A	LinkADRReq Mac Command	Pass	2019-04-18	OTAA
TP_A_US915_MAC_BV_015B	LinkADRReq Mac Command	Pass	2019-04-18	OTAA
TP_A_US915_MAC_BV_016	RX Oversized Payload	Pass	2019-04-18	OTAA
TP_A_US915_MAC_BV_017	Maximum Allowed Payload	Pass	2019-04-18	OTAA

0 test cases have been executed with SCR errors

21 test cases selected of 21 executed

21 test cases executed of 21 applicable

## Appendix B – ICS

Item	Name	Value
1	DUT works in USA 915MHz ISM Band	TRUE
2	DUT implements LoRaWAN v1.0.1 certification requirements	FALSE
3	DUT implements LoRaWAN v1.0.2rB certification requirements	TRUE
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 LinkADRReq block	TRUE
9	DUT supports Continuous Wave command	TRUE
10	DUT supports Over-The-Air Activation (OTAA) mechanism	TRUE
11	DUT needs a reset after deactivating Test Mode	TRUE
12	DUT supports Trigger Join Request command in Test Mode	TRUE



## Appendix C – IXIT

Item	Name	Value
1	End-Device Address (DvAddr)	00000001
2	Application Session Key (AppSKey)	00000000000000000000000000000000b
3	Network Session Key (NwkSKey)	00000000000000000000000000000000c
4	Application Identifier (AppEUI)	0000000000000001
5	Maximum Transmission Power	14 dBm
6	Minumum Transmission Power	10 dBm
7	Application Key (AppKey)	00000000000000000000000000000000a
11	Device Identifier (DevEUI)	50f8a50000010024

## Appendix D – General Parameters

Item	Name	Value
GW	Default TX Antenna	0
	Gateway IP Address	192.168.32.3
	Gateway Model	Tektelic
	Default TX Power	14 dBm
	Gateway Socket Port	1780
TM – US915	US915 Join_Accept_Delay1	5.0 s
	US915 Join_Accept_Delay2	6.0 s
	US915 Receive_Delay1	1.0 s
	US915 Receive_Delay2	2.0 s
	US915 RX2 Receive Window DR	SF12BW500
	US915 RX2 Receive Window Frequency	923.3 MHz
	General Timer	60 s