

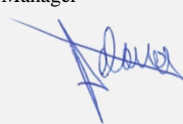


Test report No:

NIE: 420150600.002

Test Report

LoRa Alliance End Device Certification Requirements

Identification of item tested	LoRa module
Trademark.....	eWBM Co., Ltd.
DUT	420150600_DLS76_01K41
Model or type reference	DLS76_01K41
Final HW version	1.0
Final SW version	1.1.12
Final FW version.....	1.1.12
Standard	LoRaWAN specification V1.0.2 for South Korea 920-923 MHz ISM Band
Manufacturer	Device Design Co., Ltd.
Test method requested	LoRa Alliance End-Device Certification Requirements for South Korea 920-923 MHz ISM Band Devices ver1.2
Test procedure(s)	LoRaEndDeviceCertificationKR920V12
Summary.....	IN COMPLIANCE
Approved by (name / position & signature)	Miguel Delorme Manager 
Date of issue	2018-05-24
Report template No	FLO001_01

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Competences and guarantees

DEKRA 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 has a calibration and maintenance program for its measurement equipment.

DEKRA 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 at the time of performance of the test.

DEKRA 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.

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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
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA and the Accreditation Bodies.

Usage of samples

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

Sample M/01 is composed of the following elements:

CONTROL N°	DESCRIPTION	MODEL	HW VERSION	SW VERSION	FW VERSION	SERIAL N°	DATE OF RECEPTION
420150600/01	LoRa module	DLS76_01K41	1.0	1.1.12	1.1.12	DLS76_01K41_05	2018-05-15

Sample M/02 is composed of the following elements:

CONTROL N°	DESCRIPTION	MODEL	HW VERSION	SW VERSION	FW VERSION	SERIAL N°	DATE OF RECEPTION
420150600/02	LoRa module	DLS76_01K41	1.0	1.1.12	1.1.12	DLS76_01K41_41	2018-05-15

Test sample description

The test sample M/01 consists on 420150600/01 device programmed with FW version 1.1.12 and set to OTA activation.

The test sample M/02 consists on 420150600/02 device programmed with FW version 1.1.12 and set to ABP activation.

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.

Identification of the client

eWBM Co., Ltd.

14F,9 Teheran-ro 20-gil, Gangnam-gu, Seoul, Republic of Korea

06236 Republic of Korea

Testing period

The performed test started on 2018-05-16 and finished on 2018-05-17.

The tests have been performed at DEKRA Certification Japan.

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

The tests have been performed by the technical personnel:

Jose Enrique Serrano Comes

Testing verdicts

As detailed in Appendix A.

Means of testing identification

Following equipment was used to perform the testing:

ITEM	AS923 SETUP	
TEST SYSTEM	TACS4 LPWAN	
CONTROL NUMBER	DKJP-0001	
HARDWARE	Equipment	Serial N°
	ST Nucleo-F746ZG LoRa GW	2163200506
SOFTWARE	Equipment	
	TACS4 LPWAN GUI v1.10.0	
	TACS4 LPWAN Reporting Module v1.5.0	
	TACS4 LPWAN Technology Package v5.3.0_R1	
	TACS4 LPWAN ED Certification KR v1.2	

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).

0 test cases have been executed with SCR errors
 18 test cases selected of 18 executed
 18 test cases executed of 18 applicable

Test Case ID	Sample	Date	Conf	Verdict	Observations
TP_A_KR920_ED_MAC_BV_000 Test mode activation	Device ID	M/01	2018-05-17	Yes	PASS
	App ID	N/a			
	Fw ver	1.1.12			
	Hw ver	1.0			
TP_A_KR920_ED_MAC_BV_001 Over The Air activation	Device ID	M/01	2018-05-16	Yes	PASS
	App ID	N/a			
	Fw ver	1.1.12			
	Hw ver	1.0			
TP_A_KR920_ED_MAC_BV_002 Test application functionality	Device ID	M/01	2018-05-17	Yes	PASS
	App ID	N/a			
	Fw ver	1.1.12			
	Hw ver	1.0			
TP_A_KR920_ED_MAC_BV_003 AES encryption and message integrity	Device ID	M/01	2018-05-17	Yes	PASS
	App ID	N/a			
	Fw ver	1.1.12			
	Hw ver	1.0			
TP_A_KR920_ED_MAC_BV_004 Downlink error rate	Device ID	M/01	2018-05-17	Yes	PASS
	App ID	N/a			
	Fw ver	1.1.12			
	Hw ver	1.0			
TP_A_KR920_ED_MAC_BV_005 Downlink window timing	Device ID	M/02	2018-05-17	Yes	PASS
	App ID	N/a			
	Fw ver	1.1.12			
	Hw ver	1.0			

TP_A_KR920_ED_MAC_BV_006 Frame sequence number	Device ID	M/02	2018-05-17	Yes	PASS	
	App ID	N/a				
	Fw ver	1.1.12				
	Hw ver	1.0				
TP_A_KR920_ED_MAC_BV_007 DevStatusReq MAC command	Device ID	M/01	2018-05-16	Yes	PASS	
	App ID	N/a				
	Fw ver	1.1.12				
	Hw ver	1.0				
TP_A_KR920_ED_MAC_BV_008 MAC Commands	Device ID	M/01	2018-05-16	Yes	PASS	
	App ID	N/a				
	Fw ver	1.1.12				
	Hw ver	1.0				
TP_A_KR920_ED_MAC_BV_009 NewChannelReq MAC command	Device ID	M/01	2018-05-16	Yes	PASS	
	App ID	N/a				
	Fw ver	1.1.12				
	Hw ver	1.0				
TP_A_KR920_ED_MAC_BV_010 DIChannelReq MAC command	Device ID	M/01	2018-05-16	Yes	PASS	
	App ID	N/a				
	Fw ver	1.1.12				
	Hw ver	1.0				
TP_A_KR920_ED_MAC_BV_011 Confirmed packets	Device ID	M/01	2018-05-16	Yes	PASS	
	App ID	N/a				
	Fw ver	1.1.12				
	Hw ver	1.0				
TP_A_KR920_ED_MAC_BV_012 RXParamSetupReq MAC command	Device ID	M/01	2018-05-17	Yes	PASS	
	App ID	N/a				
	Fw ver	1.1.12				
	Hw ver	1.0				
TP_A_KR920_ED_MAC_BV_013 Packet Error Rate RX1	Device ID	M/01	2018-05-16	Yes	PASS	
	App ID	N/a				
	Fw ver	1.1.12				
	Hw ver	1.0				
TP_A_KR920_ED_MAC_BV_014 Packet Error Rate RX2	Device ID	M/01	2018-05-16	Yes	PASS	
	App ID	N/a				
	Fw ver	1.1.12				
	Hw ver	1.0				
TP_A_KR920_ED_MAC_BV_015 RXTimingSetupReq MAC command	Device ID	M/02	2018-05-17	Yes	PASS	
	App ID	N/a				
	Fw ver	1.1.12				
	Hw ver	1.0				
TP_A_KR920_ED_MAC_BV_016_A LinkADRReq MAC command	Device ID	M/01	2018-05-16	Yes	PASS	
	App ID	N/a				
	Fw ver	1.1.12				
	Hw ver	1.0				
TP_A_KR920_ED_MAC_BV_016_B LinkADRReq MAC command	Device ID	M/01	2018-05-16	Yes	PASS	
	App ID	N/a				
	Fw ver	1.1.12				
	Hw ver	1.0				

Appendix B – ICS

NAME	VALUE
DUT is a Class A Device (All End Devices)	TRUE
DUT works in South Korea 920MHz ISM Band	TRUE
DUT supports Over-The-Air Activation (OTAA) mechanism	TRUE
DUT supports Adaptive Data Rate (ADR) feature	TRUE
DUT supports Trigger Join Request command in Test Mode	TRUE
DUT supports DChannelReq MAC command	TRUE
DUT supports LinkADRReq block	TRUE
DUT implements LoRaWAN v1.0.2rB certification requirements	TRUE

Appendix C – IXIT

NAME	VALUE
Minimum transmission power	0
Maximum transmission power	14 dBm
End-device identifier (DevEUI)	'0000000000000001'O
Application session key (AppSKey)	'00000000000000000000000000000000B'O
Network session key (NwkSKey)	'00000000000000000000000000000000A'O
Application key (AppKey)	'00000000000000000000000000000005'O
Application identifier (AppEUI)	'0000000000000001'O
End-device Address (DevAddr)	'00000001'O

Appendix D – General Parameters

NAME	VALUE
General Timer	60
KR920 RECEIVE_DELAY1 (s)	1.0
KR920 RECEIVE_DELAY2 (s)	2.0
KR920 JOIN_ACCEPT_DELAY1(s)	5.0
KR920 JOIN_ACCEPT_DELAY2(s)	6.0
KR920 RX2 Receive window frequency	921.9
KR920 RX2 Receive window DR	SF12BW125
Gateway IP Address	192.168.1.100
Gateway socket port	1780
Default Tx Power (dBm)	14
Default Tx Antenna	0