Test report No:

NIE: 420114800RLO.002

Test Report
LoRa Alliance End Device Certification Requirements

Identification of item tested	LPWAN Module
Trademark	Kiwi Technology Inc.
DUT	420114800_Sample1_ABP /420114800_Sample2_OTAA
Model or type reference	TLM922S
Final HW version	V1.2
Final SW version	N/A
Final FW version	V2.0
Features	LoRa Alliance End-Device Certification Requirements for EU868MHz ISM Band Devices
Manufacturer	Kiwi Technology Inc.
Test method requested	LoRaWAN specification V1.0.2 for EU 868MHz ISM Band
Standard	LoRa Alliance End-Device Certification Requirements for EU868MHz ISM Band Devices ver1.3
Test Spec Errata(s)	v1.3/2016-12-14
Test procedure(s)	LoRaEndDeviceCertificationEUv13_1605_1
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Miguel Delorme Manager
Date of issue	2017-05-23
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.

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Usage of samples

Samples undergoing test have been selected and supplied by: Kiwi Technology Inc.

Sample M/01 is composed of the following elements:

CONTROL Nº	DESCRIPTION	MODEL	HW VERSION	SW VERSION	FW VERSION	SERIAL Nº	DATE OF RECEPTION
420114800/01	ADB922_ABP	TLM922	V1.2	N/A	V2.0	117032700769	2017-04-28

Sample M/02 is composed of the following elements:

CONTROL Nº	DESCRIPTION	MODEL	HW VERSION	SW VERSION	FW VERSION	SERIAL Nº	DATE OF RECEPTION
420114800/02	ADB922_OTAA	TLM922	V1.2	N/A	V2.0	117032700573	2017-04-28

Test sample description

The test sample M/01 consists on 420114800/01 device programmed with FW labeled as:

TLM922S_cert_V1.3_EU868_abp_20170508.hex

The test sample M/02 consists on 420114800/02 device programmed with FW labeled as:

TLM922S_cert_V1.3_EU868_otaa_20170508.hex

TLM922S adopts LoRa technology. It was developed on the basis of Semtech SX1272 and a 32-bit Cortex M0 CPU, and it can support frequency range from 862MHz to 932MHz. In our distance test, the data can be received 10Km away from transmission point in the urban. UART interface and in line command are offered to simplify the development effort for developers. Besides, TLM922S is a tiny but powerful module and easy for users to integrate it into their system for different applications, especially IoT and M2M. It also could be the infrastructure of a smart city.

Identification of the client

Kiwi technology Inc.
4F,. No.158, Sec.1, Wenxing Rd.
302, Zhubei City
Hsinchu County, Taiwan

Testing period

The performed test started on 2017-04-28 and finished on 2017-05-09.

The tests have been performed by DEKRA Certification Japan.

Environmental conditions

The testing has been performed within the following limits:

TEMPERATURE	Min. = 15 ºC Max. = 35 ºC
RELATIVE HUMIDITY	Min. = 20 % Max. = 80 %

Remarks and comments

The tests have been performed by the technical personnel:

James Pan

Jose Enrique Serrano Comes

Testing verdicts

As detailed in Appendix A.

Means of testing identification

Following equipment was used to perform the testing:

ITEM	EU868 SETUP	
TEST SYSTEM	TACS4 LORA	
CONTROL NUMBER	0531	
	Equipment	Serial Nº
HARDWARE	Semtech GW IOT SX1301 Starter Kit	50811DC
	Equipment	
SOFTWARE	TACS4 LORA GUI v1.8.0 TACS4 LORA Reporting Module v1.5.0 TACS4 LORA Technology Package v4.0.0_R1 TACS4 LORA ED Certification EU v1.3	

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).

18 test cases selected of 18 executed
18 test cases executed of 18 applicable

Test Case ID	Sample		Date	Conf	Verdict	Observations
TP_A_EU868_ED_MAC_BV_000 **Device activation**	**Device ID**	M/01	2017-04-28	Yes	**PASS**	
	App ID	0000				
	Fw ver	2.0				
	Hw ver	1.2				
TP_A_EU868_ED_MAC_BV_001 **Test application functionality**	**Device ID**	M/01	2017-04-28	Yes	**PASS**	
	App ID	0000				
	Fw ver	2.0				
	Hw ver	1.2				
TP_A_EU868_ED_MAC_BV_002 **Over The Air activation**	**Device ID**	M/02	2017-05-08	Yes	**PASS**	
	App ID	0000				
	Fw ver	2.0				
	Hw ver	1.2				
TP_A_EU868_ED_MAC_BV_003 **Packet Error Rate Part 1**	**Device ID**	M/01	2017-04-28	Yes	**PASS**	
	App ID	0000				
	Fw ver	2.0				
	Hw ver	1.2				
TP_A_EU868_ED_MAC_BV_004 **AES encryption and message integrity**	**Device ID**	M/01	2017-04-28	Yes	**PASS**	
	App ID	0000				
	Fw ver	2.0				
	Hw ver	1.2				
TP_A_EU868_ED_MAC_BV_005 **Downlink window timing**	**Device ID**	M/01	2017-04-28	Yes	**PASS**	
	App ID	0000				
	Fw ver	2.0				
	Hw ver	1.2				

TP_A_EU868_ED_MAC_BV_006 **Frame sequence number**	**Device ID** **App ID** **Fw ver** **Hw ver**	M/01 0000 2.0 1.2	2017-04-28	Yes	**PASS**	
TP_A_EU868_ED_MAC_BV_007 **DevStatusReq MAC command**	**Device ID** **App ID** **Fw ver** **Hw ver**	M/01 0000 2.0 1.2	2017-04-28	Yes	**PASS**	
TP_A_EU868_ED_MAC_BV_008 **MAC Commands**	**Device ID** **App ID** **Fw ver** **Hw ver**	M/01 0000 2.0 1.2	2017-04-28	Yes	**PASS**	
TP_A_EU868_ED_MAC_BV_009 **NewChannelReq MAC command**	**Device ID** **App ID** **Fw ver** **Hw ver**	M/01 0000 2.0 1.2	2017-04-28	Yes	**PASS**	
TP_A_EU868_ED_MAC_BV_010 **DlChannelReq MAC command**	**Device ID** **App ID** **Fw ver** **Hw ver**	M/01 0000 2.0 1.2	2017-04-28	Yes	**PASS**	
TP_A_EU868_ED_MAC_BV_011 **Confirmed packets**	**Device ID** **App ID** **Fw ver** **Hw ver**	M/01 0000 2.0 1.2	2017-04-28	Yes	**PASS**	
TP_A_EU868_ED_MAC_BV_012 **RXParamSetupReq MAC command**	**Device ID** **App ID** **Fw ver** **Hw ver**	M/01 0000 2.0 1.2	2017-04-28	Yes	**PASS**	
TP_A_EU868_ED_MAC_BV_013 **RXTimingSetupReq MAC command**	**Device ID** **App ID** **Fw ver** **Hw ver**	M/01 0000 2.0 1.2	2017-04-28	Yes	**PASS**	
TP_A_EU868_ED_MAC_BV_014_A **LinkADRReq MAC command**	**Device ID** **App ID** **Fw ver** **Hw ver**	M/01 0000 2.0 1.2	2017-05-08	Yes	**PASS**	
TP_A_EU868_ED_MAC_BV_014_B **LinkADRReq MAC command**	**Device ID** **App ID** **Fw ver** **Hw ver**	M/01 0000 2.0 1.2	2017-05-09	Yes	**PASS**	
TP_A_EU868_ED_MAC_BV_015 **Packet Error Rate RX1**	**Device ID** **App ID** **Fw ver** **Hw ver**	M/01 0000 2.0 1.2	2017-05-08	Yes	**PASS**	
TP_A_EU868_ED_MAC_BV_016 **Packet Error Rate RX2**	**Device ID** **App ID** **Fw ver** **Hw ver**	M/01 0000 2.0 1.2	2017-05-08	Yes	**PASS**	

Appendix B – ICS

NAME	VALUE
DUT is a Class A Device (All End Devices)	TRUE
DUT works in EU 868MHz 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 DlChannelReq MAC command	TRUE

Appendix C – IXIT

NAME	VALUE
Minimum transmission power	2 dBm
Maximum transmission power	20 dBm
Application session key (AppSKey)	'2B7E151628AED2A6ABF7158809CF4F3C'O
Network session key (NwkSKey)	'2B7E151628AED2A6ABF7158809CF4F3C'O
Application key (AppKey)	'2B7E151628AED2A6ABF7158809CF4F3C'O
Application identifier (AppEUI)	'0000000000000000'O
End-device Address (DevAddr)	'78563412'O

Appendix D – General Parameters

NAME	VALUE
General Timer	60
Gateway IP Address	192.168.1.100
Socket port communication between Test Tool and Gateway	1780
Default Tx Power (dBm)	14
Default Tx Antenna	0
EU868 RECEIVE_DELAY1 (s)	1.0
EU868 RECEIVE_DELAY2 (s)	2.0
EU868 JOIN_ACCEPT_DELAY1 (s)	5.0
EU868 JOIN_ACCEPT_DELAY2(s)	6.0
EU868 RX2 Receive window frequency	869.525
EU868 RX2 Receive window DR	SF12BW125