LoRa Alliance

Test report No:

NIE: 420180100.001

Test Report
LoRa Alliance End Device Certification Requirements

Identification of item tested ....:	Module
Trademark...:	SMK Corporation
DUT ....:	420180100_LR01
Model or type reference ....:	LR01
Final HW version ....:	Ver1.0
Final SW version ....:	n/a
Final FW version ....:	Ver1.0
Standard..:	LoRaWAN specification V1.0.2 for AS 923MHz ISM Band
Manufacturer..:	SMK Corporation
Test method requested ....:	LoRa Alliance End-Device Certification Requirements for AS923MHz ISM Band Devices ver1.1
Test procedure(s) ....:	LoRaEndDeviceCertificationAS923v11
Summary..:	IN COMPLIANCE
Supported optional features ....:	YES
Adaptive Data Rate (ADR) ....:	YES
➔ SF7BW250	YES
➔ FSK	YES
Approved by (name / position & signature) ......:	Jose Enrique Serrano Comes Project Manager
Date of issue ....:	2019-03-25
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: SMK Corporation

Sample M/01 is composed of the following elements:

CONTROL Nº	DESCRIPTION	MODEL	HW VERSION	SW VERSION	FW VERSION	SERIAL Nº	DATE OF RECEPTION
420180100/01	Module	LR01	Ver1.0	n/a	Ver1.0	23	2019-02-21

Test sample description

The test sample M/01 consists on 420180100/01 device programmed with FW Ver1.0. Activation mode can be selected using the same FW version. In the test results, M/01a refers to sample M/01 with ABP activation setting, and M/01b refers to sample M/01 with OTA activation setting.

LR01 is a small package, low consumption and wide VDD range, wide temperature range, easy for use AT command module. For AS923 Japan only.

Identification of the client

SMK Corporation

6-5-5, Togoshi

Shinagawa-ku, Tokyo, Japan

Testing period

The performed test started on 2019-02-25 and finished on 2019-03-25.

The tests have been performed at 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:

Miguel Delorme

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-0002	
HARDWARE	Equipment	Serial Nº
	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 v5.9.0_R1	
	TACS4 LPWAN ED Certification AS v1.1	

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
19 test cases selected of 19 executed
19 test cases executed of 19 applicable

Test Case ID	Sample		Date	Conf	Verdict	Observations
TP_A_AS923_ED_MAC_BV_000 **Test mode activation**	**Device ID**	M/01a	2019-03-25	Yes	**PASS**	
	App ID	n/a				
	Fw ver	Ver1.0				
	Hw ver	Ver1.0				
TP_A_AS923_ED_MAC_BV_001 **Test application functionality**	**Device ID**	M/01a	2019-03-25	Yes	**PASS**	
	App ID	n/a				
	Fw ver	Ver1.0				
	Hw ver	Ver1.0				
TP_A_AS923_ED_MAC_BV_002 **Over the Air activation**	**Device ID**	M/01b	2019-02-25	Yes	**PASS**	
	App ID	n/a				
	Fw ver	Ver1.0				
	Hw ver	Ver1.0				
TP_A_AS923_ED_MAC_BV_003 **Downlink error rate**	**Device ID**	M/01b	2019-02-25	Yes	**PASS**	
	App ID	n/a				
	Fw ver	Ver1.0				
	Hw ver	Ver1.0				
TP_A_AS923_ED_MAC_BV_004 **AES encryption and message integrity**	**Device ID**	M/01b	2019-02-25	Yes	**PASS**	
	App ID	n/a				
	Fw ver	Ver1.0				
	Hw ver	Ver1.0				
TP_A_AS923_ED_MAC_BV_005 **Downlink window timing**	**Device ID**	M/01b	2019-02-25	Yes	**PASS**	
	App ID	n/a				
	Fw ver	Ver1.0				
	Hw ver	Ver1.0				

TP_A_AS923_ED_MAC_BV_006 **Frame sequence number**	Device ID	M/01b	2019-02-25	Yes	**PASS**	
	App ID	n/a				
	Fw ver	Ver1.0				
	Hw ver	Ver1.0				
TP_A_AS923_ED_MAC_BV_007 **DevStatusReq MAC command**	Device ID	M/01b	2019-02-25	Yes	**PASS**	
	App ID	n/a				
	Fw ver	Ver1.0				
	Hw ver	Ver1.0				
TP_A_AS923_ED_MAC_BV_008 **MAC Commands**	Device ID	M/01b	2019-02-25	Yes	**PASS**	
	App ID	n/a				
	Fw ver	Ver1.0				
	Hw ver	Ver1.0				
TP_A_AS923_ED_MAC_BV_009 **NewChannelReq MAC command**	Device ID	M/01b	2019-02-25	Yes	**PASS**	
	App ID	n/a				
	Fw ver	Ver1.0				
	Hw ver	Ver1.0				
TP_A_AS923_ED_MAC_BV_010 **DlChannelReq MAC command**	Device ID	M/01b	2019-02-25	Yes	**PASS**	
	App ID	n/a				
	Fw ver	Ver1.0				
	Hw ver	Ver1.0				
TP_A_AS923_ED_MAC_BV_011 **Confirmed packets**	Device ID	M/01b	2019-02-25	Yes	**PASS**	
	App ID	n/a				
	Fw ver	Ver1.0				
	Hw ver	Ver1.0				
TP_A_AS923_ED_MAC_BV_012 **RXParamSetupReq MAC command**	Device ID	M/01b	2019-02-25	Yes	**PASS**	
	App ID	n/a				
	Fw ver	Ver1.0				
	Hw ver	Ver1.0				
TP_A_AS923_ED_MAC_BV_013 **RXTimingSetupReq MAC command**	Device ID	M/01b	2019-02-25	Yes	**PASS**	
	App ID	n/a				
	Fw ver	Ver1.0				
	Hw ver	Ver1.0				
TP_A_AS923_ED_MAC_BV_014_A **LinkADRReq MAC command**	Device ID	M/01b	2019-02-26	Yes	**PASS**	
	App ID	n/a				
	Fw ver	Ver1.0				
	Hw ver	Ver1.0				
TP_A_AS923_ED_MAC_BV_014_B **LinkADRReq MAC command**	Device ID	M/01b	2019-02-25	Yes	**PASS**	
	App ID	n/a				
	Fw ver	Ver1.0				
	Hw ver	Ver1.0				
TP_A_AS923_ED_MAC_BV_015 **Packet Error Rate RX1**	Device ID	M/01b	2019-02-25	Yes	**PASS**	
	App ID	n/a				
	Fw ver	Ver1.0				
	Hw ver	Ver1.0				
TP_A_AS923_ED_MAC_BV_016 **Packet Error Rate RX2**	Device ID	M/01b	2019-02-25	Yes	**PASS**	
	App ID	n/a				
	Fw ver	Ver1.0				
	Hw ver	Ver1.0				
TP_A_AS923_ED_MAC_BV_017 **TXParamSetupReq MAC command**	Device ID	M/01b	2019-02-27	Yes	**PASS**	
	App ID	n/a				
	Fw ver	Ver1.0				
	Hw ver	Ver1.0				

Appendix B – ICS

NAME	VALUE
DUT is a Class A Device (All End Devices)	TRUE
DUT works in Asia 923MHz 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
DUT supports LinkADRReq block	TRUE
DUT implements LoRaWAN v1.0.2rB certification requirements	TRUE

Appendix C – IXIT

NAME	VALUE
Minimum transmission power	0 dBm
Maximum transmission power	13 dBm
End-device identifier (DevEUI)	'000190FFFEF136A6'O
Application key (AppKey)	'00000000000000000000000000000006'O
Application identifier (AppEUI)	'0000000000000006'O
End-device identifier (DevEUI)	'000190FFFEF136A6'O
Application session key (AppSKey)	'004FD902AF505C709A9CF8ACED38381B'O
Network session key (NwkSKey)	'FC3322953A630DD6B8B9537163A7171C'O
End-device Address (DevAddr)	'000190FF'O

Appendix D – General Parameters

NAME	VALUE
General Timer	250
AS923 RECEIVE_DELAY1 (s)	1.0
AS923 RECEIVE_DELAY2 (s)	2.0
AS923 JOIN_ACCEPT_DELAY1 (s)	5
AS923 JOIN_ACCEPT_DELAY2 (s)	6
AS923 RX2 Receive window DR	SF10BW125
AS923 RX2 Receive window frequency	923.2
Gateway IP Address	192.168.1.100
Gateway socket port	1780
Default Tx Power (dBm)	14
Default Tx Antenna	0