DEKRA Testing and Certification, S.A.U.
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C.I.F. A29 507 456

LoRa Accredited Test Lab

Test report No:
NIE: 65978RLR.009

Test report
LoRa Alliance End Device Certification Requirements

(*) Identification of item tested	STM32WLE5
(*) Model and /or type reference tested	STM32WL
Other identification of the product	Final HW version: NUCLEO-WL55JC1 Final FW Version: STM32CubeWLv1.0.0
(*) Features	Long-range wireless STM32WL microcontroller
Manufacturer	STMicroelectronics Zone industrielle, 190 Avenue Coq 13106 Rousset France
Test method requested, standard Standard……..: Test Specification……...: LoRa_Certification_Questionnaire……..: Test procedure(s)……...:	Lora Alliance Certification Program LoRaWAN v.1.0.2 LoRa Alliance End-Device Certification Requirements for South Korea 920-923MHz ISM Band Devices v1.2.1 LoRaWAN Certification Customer Questionnaire V2.1 PELR000_00 LoRa Alliance Testing Procedure
Supported Optional Features Adaptive Data Rate (ADR)……..: SF7BW250…….....: FSK50 ……..……..:	 Yes Yes Yes
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Noemi Perez IoT Lab. Manager Noemi Perez Dans Firmado digitalmente por Noemi Perez Dans Fecha: 2020.12.17 19:55:18 +01'00'
Date of issue	2020-12-15
Report template No	FLR001_04 (*) “Data provided by the client”

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Competences and guarantees

DEKRA Testing and Certification S.A.U is a LoRa Alliance accredited Test Lab 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 S.A.U. has a calibration and maintenance program for its measurement equipment.

DEKRA Testing and Certification S.A.U. 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 at the time of performance of the test.

DEKRA Testing and Certification S.A.U. 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.

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.
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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 S.A.U. and the Accreditation Bodies.

Uncertainty

N/A

Data provided by the client

The following data has been provided by the client:

1. Information relating to the description of the sample ("Identification of the item tested", "Trademark", "Model and/or type reference tested").

2. The ICS provided by the customer via the LoRaWAN Certification Customer Questionnaire V2.1 and used for testing are indicated in Annex B.

DEKRA Testing and Certification S.A.U. declines any responsibility with respect to the information provided by the client and that may affect the validity of results.

Usage of samples

Samples undergoing test have been selected by: STMicroelectronics

Sample M/01 is composed of the following elements:

Control Nº	Description	Model	Serial Nº	Date of reception
65978/001	Board (microcontroller)	STM32WL	-	2020-22-09

1. Sample M/01 has undergone the test(s) specified in subclause “Test method requested”.

Test sample description

Long-range wireless STM32WL microcontroller.

Identification of the client

STMicroelectronics

Zone industrielle, 190 Avenue Coq

13106 Rousset

France

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2020-09-23
Date (finish)	2020-09-24

Document history

Report number	Date	Description
65978RLR.009	2020-12-15	First release (test report without logs to be uploaded to the public area of LoRa Alliance website).
65978RLR.010	2020-12-15	Identical test report as '65978RLR.009' with the addition of the test logs.

Environmental conditions

The following limits were not exceed during the test:

Relative temperature	Min= 15 ºC Max= 35 ºC
Relative humidity	Min= 25 % Max= 75 %

Remarks and comments

Testing was performed by: Jose Francisco González Castellary y Daniel Ríos Toca.

Control PC with Technology Packet Version LORA v5.20.0_R1 was used for the following tests: TP_A_KR920ED_MAC_BV_011 to fix minor bugs found on the tool, not affecting the previous testing. Rest of tests were run using Technology Packet Version LORA v5.19.0_R1.

Means of testing identification

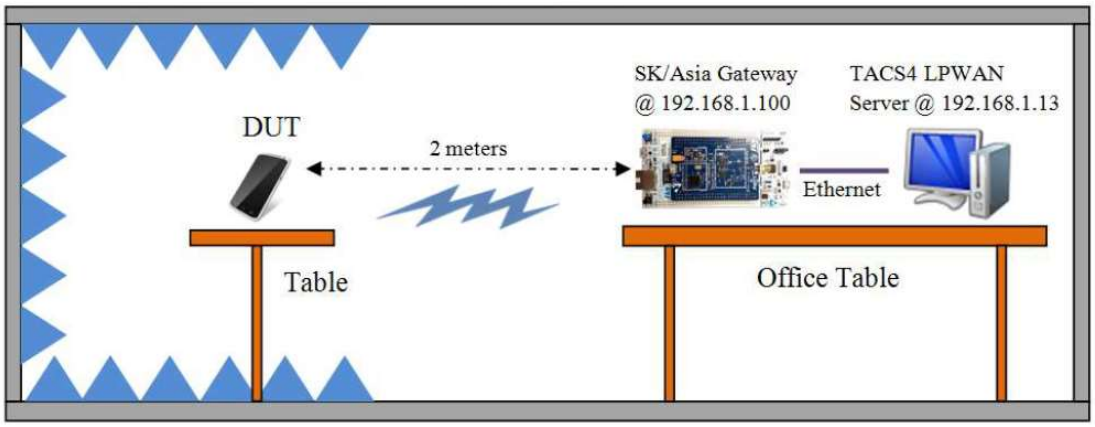
TEST SYSTEM	BANCO LORA ASIA		
Control Number	7212		
Control PC	Control No.	Equipment	Serial No.
	7218	Control PC with TACS4 version v2.0.0_R1 and Technology Packet Version LORA v5.19.0_R1*	-
LoRa Gateway	6762	Multiband ST Nucleo LoRa GW	-
RF Shielded box	5387	RF Shielded Test Enclosure	0001114
Test Setup:	See “Test Setup” section.		

* See Remarks and Comments section.

Test setup

TS3: This Test Setup has been used for South Korea / Asia / India testing:

ST SOUTH KOREAN / ASIA / INDIA GATEWAY AND TACS4 LPWAN CONFIGURATION:



Testing verdicts

Not applicable :	N/A
Pass :	P
Fail :	F
Not measured :	N/M

Appendix A: Test results

Test campaign report

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

Test Case ID :	As it can be found on the standard
Verdict:	Records the verdict assigned to each Test Case run to completion (Testing verdicts)
Date:	Date of the beginning of the execution.
Observations:	Provides a reference to additional information relevant to the test presented in “Test Setup” section.
Logs:	See 65978RLR.008

Test Case ID	Description	Date	Verdict	Observations
TP_A_KR920ED_MAC_BV_000_A (ABP)	Test Mode Activation (ABP)	2020-09-23	P	
TP_A_KR920ED_MAC_BV_000_B (OTA)	Test Mode Activation (OTA)	2020-09-23	P	
TP_A_KR920ED_MAC_BV_001	Over The Air Activation	2020-09-24	P	
TP_A_KR920ED_MAC_BV_002	Test application functionality	2020-09-23	P	
TP_A_KR920ED_MAC_BV_003	AES encryption and message integrity	2020-09-23	P	
TP_A_KR920ED_MAC_BV_004	Downlink error rate	2020-09-24	P	
TP_A_KR920ED_MAC_BV_005	Downlink window timing	2020-09-23	P	
TP_A_KR920ED_MAC_BV_006	Frame sequence number	2020-09-23	P	
TP_A_KR920ED_MAC_BV_007	DevStatusReq MAC command	2020-09-23	P	
TP_A_KR920ED_MAC_BV_008	MAC commands	2020-09-23	P	
TP_A_KR920ED_MAC_BV_009	NewChannelReq MAC command	2020-09-23	P	
TP_A_KR920ED_MAC_BV_010	DlChannelReq MAC command	2020-09-23	P	
TP_A_KR920ED_MAC_BV_011	Confirmed packets	2020-09-24	P	See Remarks and Comments section.

TP_A_KR920ED_MAC_BV_012	RXParamSetupReq MAC command	2020-09-23	P	
TP_A_KR920ED_MAC_BV_013	RX1 Receive window test	2020-09-24	P	
TP_A_KR920ED_MAC_BV_014	RX2 Receive window test	2020-09-24	P	
TP_A_KR920ED_MAC_BV_015	RXTimingSetupReq MAC command	2020-09-23	P	
TP_A_KR920ED_MAC_BV_016_A	LinkADRReq MAC command	2020-09-23	P	
TP_A_KR920ED_MAC_BV_016_B	LinkADRReq MAC command	2020-09-24	P	

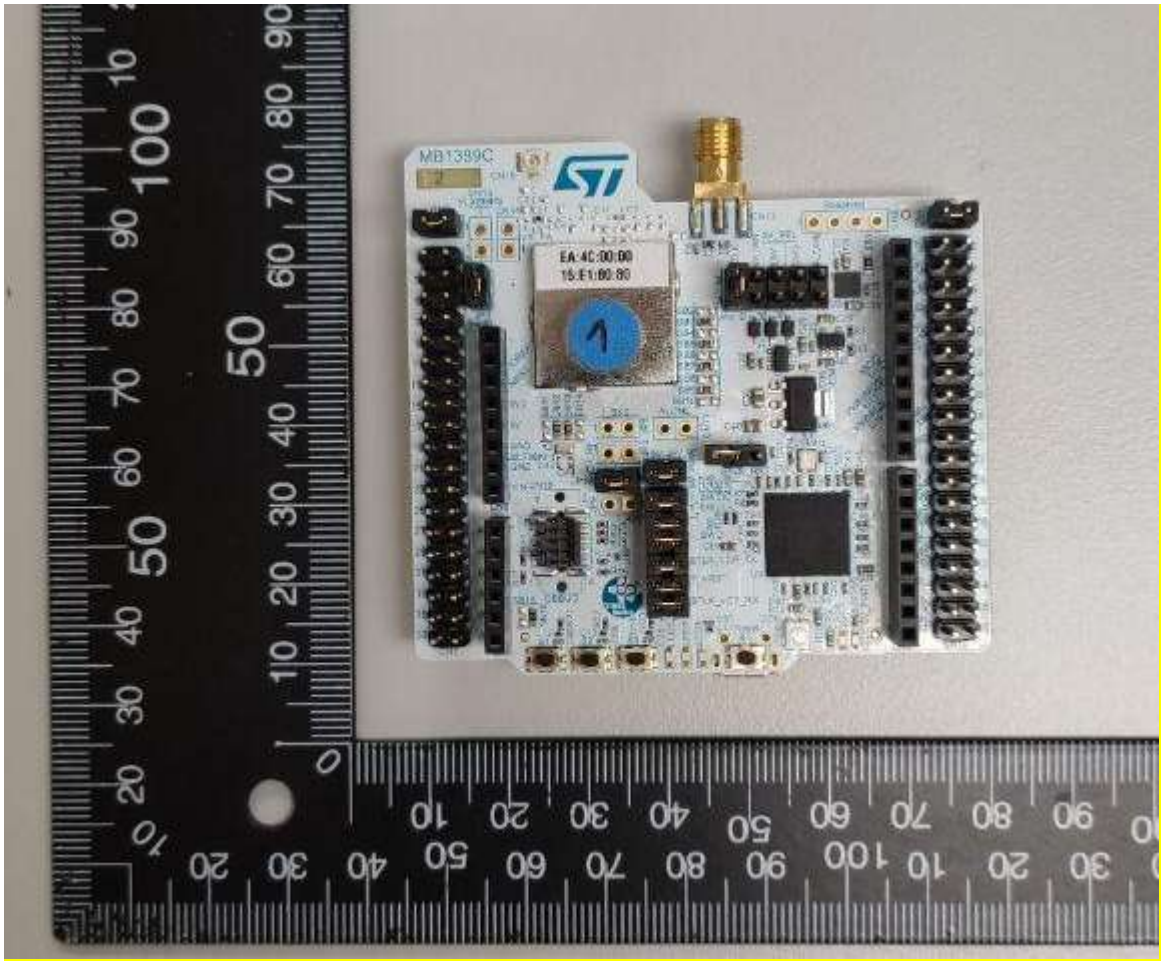
Appendix B: ICS

Implementation Conformance Statement (ICS)

Name	Title	Groupname	Mandatory	Value
C_ISM_AS923	DUT works in Asia 923MHz ISM Band	BAND	C	FALSE
C_ISM_EU868	DUT works in EU 868MHz ISM Band	BAND	C	FALSE
C_ISM_IN865	DUT works in India 865-867 MHz ISM Band	BAND	C	FALSE
C_ISM_KR920	DUT works in South Korea 920MHz ISM Band	BAND	C	TRUE
C_ISM_US915	DUT works in USA 915MHz ISM Band	BAND	C	FALSE
C_CERT_102rB	DUT implements LoRaWAN v1.0.2rB certification	CERT	C	TRUE
C_CLASS_A	DUT is a Class A Device (All End Devices)	CLASS	C	TRUE
C_CLASS_B	DUT is a Class B Device (Beacon Mode)	CLASS	C	FALSE
C_CLASS_C	DUT is a Class C Device (Continuously Listening)	CLASS	C	FALSE
C_ED_ADR	DUT supports Adaptive Data Rate (ADR) feature	ED	C	TRUE
C_ED_ADR_BLOCK	DUT supports LinkADRReq block	ED	C	TRUE
C_ED_CW	DUT supports Continuous Wave command	ED	C	TRUE
C_ED_DL_CHAN	DUT supports DlChannelReq MAC command	ED	C	FALSE
C_ED_OTAA	DUT supports Over-The-Air Activation (OTAA)	ED	C	TRUE
C_ED_RESET	DUT needs a reset after deactivating Test Mode	ED	C	TRUE
C_ED_TM_TRI	DUT supports Trigger Join Request command in Test	ED	C	TRUE

Appendix C: Photographs

Front view



Rear view