

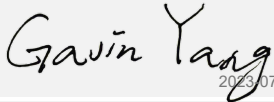



Test report No:

2350385R-A332250010S-B

# Test Report

## LoRa Alliance End Device Certification Requirements

|                                   |  |
|-----------------------------------|--|
| Product Name .....                | LoRaWAN Module   |
| Type of DUT .....                 | <input checked="" type="checkbox"/> Module <input type="checkbox"/> End Device/Sensor <input type="checkbox"/> others        |
| Model Name .....                  | LBAA0QB1SJ-977   |
| Activation possibilities .....    | <input type="checkbox"/> Over the air <input type="checkbox"/> by personalization <input checked="" type="checkbox"/> both   |
| Hardware Version .....            | MP   |
| Software Version .....            | 1.0.03   |
| Firmware version .....            | 1.0.00   |
| Manufacturer .....                | Murata Manufacturing Co., Ltd.<br>10-1, Higashikotari 1-chome, Nagaokakyo-shi, Kyoto 617-8555, Japan                         |
| Test Method Request: .....        | Lora Alliance Certification Program  |
| Test Frequency Bands: .....       | EU868  |
| LoRaWAN Spec. Version .....       | <input type="checkbox"/> V1.0.2 <input checked="" type="checkbox"/> V1.0.4   |
| Test Spec .....                   | LoRaWAN 1.0.4 End Device Certification Requirements for All Regions - Version 1.6  |
| Supported optional features ..... | <input checked="" type="checkbox"/> Adaptive Data Rate (ADR)   |
|                                   | <input checked="" type="checkbox"/> SF7BW250   |
|                                   | <input checked="" type="checkbox"/> FSK50  |
| Summary .....                     | IN COMPLIANCE  |
| ATH Identifier .....              | DEKRA – TWN  |
| Test Engineer .....               | Gavin Yang<br><br>2023-07-12             |
| Approved by .....                 | Jimmy Chang<br>Manager<br><br>2023-07-12 |
| Date of issue .....               | 2023-07-12   |
| Report Revision .....             | 01   |

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## Competences and guarantees

DEKRA Testing and Certification, Co., Ltd. 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 Testing and Certification, Co., Ltd. has a calibration and maintenance program for its measurement equipment.

DEKRA Testing and Certification, Co., Ltd. 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, Co., Ltd. at the time of performance of the test.

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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, Co., Ltd. and the Accreditation Bodies.

## Uncertainty

N/A

## Usage of samples

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

|                       |  |
|-----------------------|--|
| DUT Control ID        | PSR-2043831  |
| Model Name            | LBAA0QB1SJ-977   |
| Serial number         | NA   |
| Hardware Version      | MP   |
| Software Version      | 1.0.03   |
| Firmware Version      | 1.0.00   |
| Description           | The module, part number LBAA0QB1SJ-977, has been designed to support for operation in 868MHz (EU), 915MHz (USA) and 920MHz (APAC) with a single modem firmware. Modem firmware is pre-flashed, so the module can be utilized as small size modem and require the application to run on an external host. |
| Date of DUT reception | 2023-05-15   |

## Details of Company requesting LoRaWAN Certification

|                |  |
|----------------|--|
| Company name   | Murata Electronics Europe  |
| Contact Person | Samir Hennaoui   |
| Address        | 18-22, avenue Edouard Herriot - Copernic-6, 92356 Le Plessis-Robinson Cedex,<br>France |

## Testing period

|             |            |
|-------------|------------|
| Start Date  | 2023-06-06 |
| Finish Date | 2023-07-05 |

The tests have been performed at DEKRA Testing and Certification, Co., Ltd. (Taiwan)

## Test Environmental conditions

The testing has been performed within the following limits:

|                   |                              |
|-------------------|------------------------------|
| Temperature       | Min. = 15 °C<br>Max. = 35 °C |
| Relative humidity | Min. = 20 %<br>Max. = 80 %   |

## Report Revision History

| Revision | Modification Date | Description    |
|----------|-------------------|----------------|
| 01       | NA                | Initial Report |

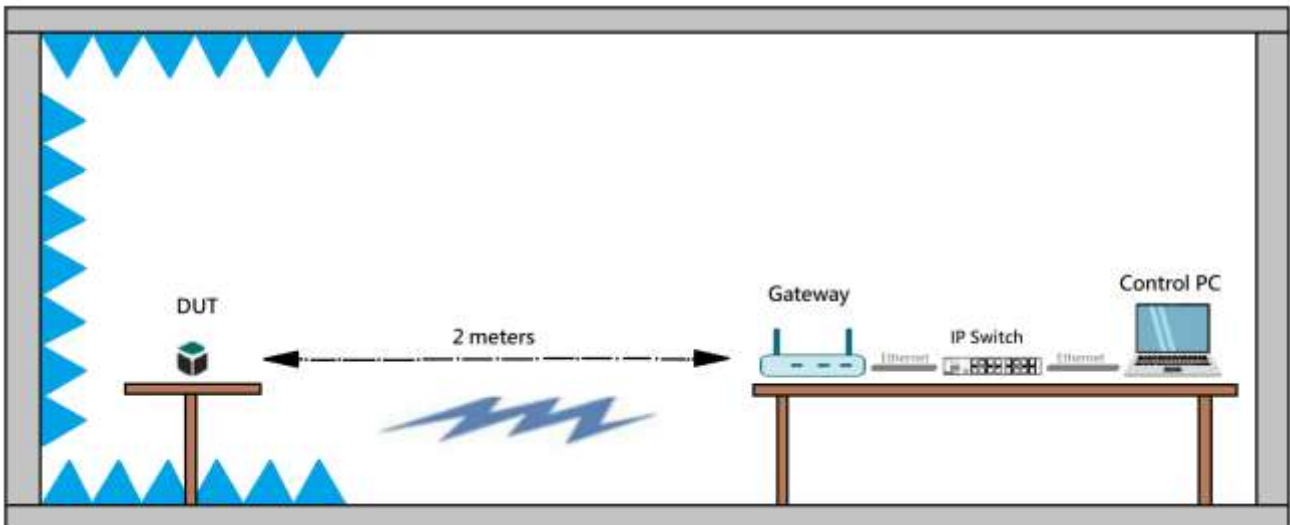
## Means of Testing Identification

Following equipment was used to perform the testing:

| Test System | LoRaWAN Certification Test System |                                     |                 |
|-------------|-----------------------------------|-------------------------------------|-----------------|
| Hardware:   | Control No.                       | Equipment                           | Serial No.      |
|             | 0742                              | Control PC with LCTT installed      | GANXCV193086433 |
|             | 0734                              | CoreCell Gateway                    | -               |
|             | 0735                              | CoreCell Gateway                    | -               |
| Software:   | 0559                              | LoRaWAN LCTT<br>- UI version: 2.5.0 |                 |
|             | 0560                              | Technology Package: LCTT v3.9.0_R1  |                 |

## Test setup

The configuration used for Test Cases in nominal temperature conditions was the following one:



## Appendix A – Test result

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

|                   |  |
|-------------------|--|
| Test Case ID:     | Test case identifier.  |
| Description:      | Test case description, as it can be found on the referred standard.  |
| Date:             | Date of the beginning of the execution.  |
| Verdict:          | Records the verdict assigned to each Test case run to completion. Following verdicts are possible:<br><b>Pass:</b> If the Test case passed.<br><b>Fail:</b> If the Test case failed.<br><b>NA:</b> Not applicable.<br><b>NM:</b> Not measured. |
| Additional Note.: | Provides a reference to additional information relevant to the test presented in “Test Setup” section.   |

| Test Case ID                   | Description  | Verdict | Date       | Additional Notes. |
|--------------------------------|--|---------|------------|-------------------|
| TP_A_EU868_ED_MAC_104_BV_000   | Activation Pre-test  | Pass    | 2023-07-04 |                   |
| TP_A_EU868_ED_MAC_104_BV_001_A | Over the Air Activation  | Pass    | 2023-07-05 |                   |
| TP_A_EU868_ED_MAC_104_BV_001_B | Activation by Personaization                                     | Pass    | 2023-07-04 |                   |
| TP_A_EU868_ED_MAC_104_BV_002   | Cryptograpy  | Pass    | 2023-07-05 |                   |
| TP_A_EU868_ED_MAC_104_BV_003   | Downlink Sequence Number   | Pass    | 2023-07-05 |                   |
| TP_A_EU868_ED_MAC_104_BV_004   | Confirmed Frames   | Pass    | 2023-07-05 |                   |
| TP_A_EU868_ED_MAC_104_BV_005   | DevStatusReq MAC Command   | Pass    | 2023-07-05 |                   |
| TP_A_EU868_ED_MAC_104_BV_006   | NewChannnelReq MAC command for Dynamic Channel plan devices only | Pass    | 2023-07-05 |                   |
| TP_A_EU868_ED_MAC_104_BV_007   | DIChannnelReq for Dynamic Channel plan devices only              | Pass    | 2023-07-05 |                   |
| TP_A_EU868_ED_MAC_104_BV_008   | RXParameterSetupReq MAC command                                  | Pass    | 2023-07-05 |                   |
| TP_A_EU868_ED_MAC_104_BV_009   | RXTimingSetupReq MAC Command                                     | Pass    | 2023-07-05 |                   |
| TP_A_EU868_ED_MAC_104_BV_010   | TXParamSetupReq MAC command                                      | Pass    | 2023-07-05 |                   |
| TP_A_EU868_ED_MAC_104_BV_011   | LinkCheckReq MAC Command   | Pass    | 2023-07-05 |                   |
| TP_A_EU868_ED_MAC_104_BV_012_A | LinkADRReq MAC Command (Part 1)                                  | Pass    | 2023-07-05 |                   |
| TP_A_EU868_ED_MAC_104_BV_012_B | LinkADRReq MAC Command (Part 2)                                  | Pass    | 2023-07-05 |                   |
| TP_A_EU868_ED_MAC_104_BV_013   | DutyCycleReq MAC command   | Pass    | 2023-07-05 |                   |
| TP_A_EU868_ED_MAC_104_BV_014   | Device TimeReq MAC Command                                       | Pass    | 2023-07-05 |                   |
| TP_A_EU868_ED_MAC_104_BV_015_A | RX1 Receive Window Test (Part 1)                                 | Pass    | 2023-07-05 |                   |
| TP_A_EU868_ED_MAC_104_BV_015_B | RX1 Receive Window Test (Part 2)                                 | Pass    | 2023-07-05 |                   |
| TP_A_EU868_ED_MAC_104_BV_016   | RX2 Receive Window Test  | Pass    | 2023-07-05 |                   |
| TP_A_EU868_ED_MAC_104_BV_017   | RX1 and RX2 simultaneous frames                                  | Pass    | 2023-07-05 |                   |
| TP_A_EU868_ED_MAC_104_BV_018   | RX Oversized Payload   | Pass    | 2023-07-05 |                   |
| TP_A_EU868_ED_MAC_104_BV_019A  | Maximum Allowed Payload (Part 1)                                 | Pass    | 2023-07-05 |                   |
| TP_A_EU868_ED_MAC_104_BV_019B  | Maximum Allowed Payload (Part 2)                                 | Pass    | 2023-07-05 |                   |
| TP_A_EU868_ED_MAC_104_BV_020   | MAC Command(s) in App-Payload and/or Frame Options               | Pass    | 2023-07-05 |                   |
| TP_A_EU868_ED_MAC_104_BV_021   | Mutiple MAC commands prioritization                              | Pass    | 2023-07-05 |                   |
| TP_A_EU868_ED_MAC_104_BV_022   | FPort 224 Deactivation   | Pass    | 2023-07-04 |                   |

## Appendix B – ICS

| Item | Name   | Value |
|------|--|-------|
| 1    | DUT works in EU 868MHz ISM Band                                  | TRUE  |
| 2    | DUT implements LoRaWAN v1.0.2rB certification requirements       | FALSE |
| 3    | DUT implements LoRaWAN v1.0.4 certification requirements         | TRUE  |
| 4    | DUT is a Class A Device (All End Devices)                        | 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 uplink re-transmissions for Confirmed frames        | TRUE  |
| 10   | DUT supports DIChannelReq MAC command                            | TRUE  |
| 11   | DUT supports the Lorawan-1.0.x-join-synch-issues-remedies-v1.0.0 | FALSE |
| 12   | DUT supports Over-The-Air Activation (OTAA) mechanism            | TRUE  |
| 13   | DUT permanently enabled Class C                                  | FLASE |
| 14   | DUT needs a reset after deactivating Test Mode                   | FLASE |
| 15   | DUT supports SCHC  | FLASE |
| 16   | DUT supports Trigger Join Request command in Test Mode           | TRUE  |

## Appendix C – General Parameters

| Item | Name                                    | Value                             |
|------|---|-----------------------------------|
| GW   | Default TX Antenna                      | 0                                 |
|      | List of IP address of the GWs           | 192.168.31.221;<br>192.168.31.222 |
|      | Gateway model                           | CoreCell                          |
|      | Number of supported channels in Gateway | 16 Channels                       |
|      | Default TX Power                        | 14 dBm                            |
|      | Gateway Socket Port                     | 1780                              |
|      | Gateway supports LR-FHSS                | FALSE                             |
|      | Size of the reception window            | 100                               |
|      | Number of GWs                           | 2                                 |
| TM   | General Timer                           | 90 min                            |
|      | Network Server IP Address               | 192.168.31.16                     |
|      | Verbosity level for Logs                | TRUE                              |



## Appendix D - Photo of Sample Under Testing

