



Test report No:
NIE: 2089RMV002

TEST Report

LoRa Alliance End Device Certification Requirements

| | |
|---|--|
| DUT | Eleven-x Interface Unit (XIU) |
| Type of Device | LoRaWAN Sensor Retrofit Device |
| Final FW Version | R1.1.0 |
| Hardware Version | V1.0 |
| Manufacturer | Eleven-x Inc. |
| Test method requested | LoRa Alliance Certification |
| Standard | LoRaWAN v1.0.1 |
| Test Procedures (s) | LoRa Alliance End-Device Certification Requirements for US and Canada 915MHz |
| Summary | IN COMPLIANCE |
| Approved by (name / position & signature) | Gonzalo Casado Telecom Lab Manager |
| Date of issue | 2018-Jun-22 |

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Usage of samples

Samples undergoing test have been selected by: the client

Following samples have been used:

| Control N° | Description | Model | HW version | SW version | Serial N° | Date of reception |
|------------|--------------------------------|-------------------------------|------------|------------|-----------|-------------------|
| 2081_1 | LoRaWAN Sensor Retrofit Device | Eleven-x Interface Unit (XIU) | V1.0 | R1.1.0 | 0E0067 | 2018-Mar-22 |

All Samples have undergone total or partially the test(s) specified in subclause “Test method requested”.

Test sample description

The test sample consists of LoRaWAN Sensor Retrofit Device. The Eleven-x Interface Unit (XIU) is a battery operated LoRaWAN enabled device that can connect to many different types of sensors. It addresses the massive retrofit market where there is a strong business case to connect existing, already deployed sensors to the Internet.

Identification of the client

Eleven-X INC

460 Phillip Street, Suite 300, N2L 5J2, Waterloo, Ontario, Canada

Testing period

The performed test started on 2018-May-14 and finished on 2018-May-21

The tests have been performed at DEKRA Certification, Inc. laboratory in Sterling, VA, USA.

Remarks and comments

The tests have been realized by the following technical personnel: Hemant Kocherlakota and Pallavi Mantro

Testing verdicts

As detailed in Appendix A

Means of testing identification

Following equipment was used to perform the testing:

| ITEM | US915 SETUP | |
|----------------|---------------------------------------|-----------------------|
| TEST SYSTEM | TACS4 LWPAN LORA | |
| CONTROL NUMBER | 816 | |
| HARDWARE | Equipment | Serial N° |
| | Senet Gateway | 0005863-010001F6-0716 |
| | | FCC ID X94-0005845 |
| SOFTWARE | Equipment | |
| | 1. Technology Version: LORA v5.3.0_R1 | |

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
21 test cases selected of 21 executed
21 test cases executed of 21 applicable

| Test Case ID | Date | Conf | Verdict | Observations |
|---|------------|------|---------|--------------|
| TP_A_US915_ED_MAC_BV_000 Test Mode Activation | 2018-05-14 | Yes | PASS | - |
| TP_A_US915_ED_MAC_BV_001 Over The Air Activation | 2018-05-14 | Yes | PASS | - |
| TP_A_US915_ED_MAC_BV_002 Test Application Functionality | 2018-05-14 | Yes | PASS | - |
| TP_A_US915_ED_MAC_BV_003 AES Encryption and Message Integrity | 2018-05-14 | Yes | PASS | - |
| TP_A_US915_ED_MAC_BV_004 Downlink Error Rate | 2018-05-14 | Yes | PASS | - |
| TP_A_US915_ED_MAC_BV_005 Downlink Window Timing | 2018-05-14 | Yes | PASS | - |
| TP_A_US915_ED_MAC_BV_006_A Frame Sequence Number | 2018-05-14 | Yes | PASS | - |
| TP_A_US915_ED_MAC_BV_006_B Downlink Sequence Number Rollover | 2018-05-14 | Yes | PASS | - |
| TP_A_US915_ED_MAC_BV_007 DevStatusReq MAC Command | 2018-05-14 | Yes | PASS | - |
| TP_A_US915_ED_MAC_BV_008_A MAC Commands | 2018-05-14 | Yes | PASS | - |
| TP_A_US915_ED_MAC_BV_008_B MAC Commands in App-Payload & Fopts | 2018-05-14 | Yes | PASS | - |
| TP_A_US915_ED_MAC_BV_009 NewChannelReq MAC command | 2018-05-14 | Yes | PASS | - |
| TP_A_US915_ED_MAC_BV_010 Confirmed packets | 2018-05-14 | Yes | PASS | - |
| TP_A_US915_ED_MAC_BV_011 RXParamSetupReq MAC command | 2018-05-14 | Yes | PASS | - |
| TP_A_US915_ED_MAC_BV_012 RX1 Receive window test | 2018-05-21 | Yes | PASS | - |
| TP_A_US915_ED_MAC_BV_013 RX2 Receive window test | 2018-05-14 | Yes | PASS | - |
| TP_A_US915_ED_MAC_BV_014 RXTimingSetupReq MAC command | 2018-05-14 | Yes | PASS | - |
| TP_A_US915_ED_MAC_BV_015_A LinkADRRReq MAC command | 2018-05-14 | Yes | PASS | - |
| TP_A_US915_ED_MAC_BV_015_B LinkADRRReq MAC command | 2018-05-14 | Yes | PASS | - |
| TP_A_US915_ED_MAC_BV_016 RX Oversized payload | 2018-05-14 | Yes | PASS | - |
| TP_A_US915_ED_MAC_BV_017 Maximum allowed payload | 2018-05-14 | Yes | PASS | - |

Appendix B – ICS

| NAME | VALUE |
|--|-------|
| <i>DUT is a Class A Device (All End Devices)</i> | TRUE |
| <i>DUT works in USA 915MHz ISM Band</i> | 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 needs a reset after deactivating Test Mode | TRUE |
| DUT implements LoRaWAN v1.0.1 certification requirements | TRUE |

Appendix C – IXIT

| NAME | VALUE |
|-----------------------------------|-------------------------------------|
| Application session key (AppSKey) | '00000000000000000000000000000000'O |
| Network session key (NwkSKey) | '00000000000000000000000000000000'O |
| Application key (AppKey) | 'A1EA9F4D09E71160963E7F66AE3EF1F3'O |
| Application identifier (AppEUI) | '0000000000000000'O |
| End-device Address (DevAddr) | '70B3B514900E006C'O |

Appendix D – General Parameters

| NAME | VALUE |
|------------------------------------|--------------|
| RF Continuous Wave timer | 3600 |
| US915 RF frequency | 902.3 |
| Gateway model | Senet |
| Default Tx Antenna | 0 |
| Default Tx Power (dBm) | 0 |
| Gateway socket port | 1780 |
| Gateway IP Address | 192.168.2.80 |
| General Timer | 600 |
| AS923 RECEIVE_DELAY1 (s) | 1 |
| AS923 RECEIVE_DELAY2 (s) | 2 |
| 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 |
| EU868 RECEIVE_DELAY1 (s) | 1 |
| EU868 RECEIVE_DELAY2 (s) | 2 |
| EU868 JOIN_ACCEPT_DELAY1 (s) | 5 |
| EU868 JOIN_ACCEPT_DELAY2(s) | 6 |
| EU868 RX2 Receive window frequency | 869.525 |
| EU868 RX2 Receive window DR | SF12BW125 |
| IN865 RECEIVE_DELAY1 (s) | 1 |
| IN865 RECEIVE_DELAY2 (s) | 2 |
| IN865 JOIN_ACCEPT_DELAY1(s) | 5 |
| IN865 JOIN_ACCEPT_DELAY2(s) | 6 |
| IN865 RX2 Receive window frequency | 866.55 |
| IN865 RX2 Receive window DR | SF10BW125 |
| KR920 RECEIVE_DELAY1 (s) | 1 |
| KR920 RECEIVE_DELAY2 (s) | 2 |
| KR920 JOIN_ACCEPT_DELAY1(s) | 5 |
| KR920 JOIN_ACCEPT_DELAY2(s) | 6 |
| KR920 RX2 Receive window frequency | 921.9 |
| KR920 RX2 Receive window DR | SF12BW125 |
| US915 RECEIVE_DELAY1 (s) | 1 |
| US915 RECEIVE_DELAY2 (s) | 2 |
| US915 JOIN_ACCEPT_DELAY1(s) | 5 |
| US915 JOIN_ACCEPT_DELAY2(s) | 6 |
| US915 RX2 Receive window frequency | 923.3 |
| US915 RX2 Receive window DR | SF12BW500 |