


<b>Prüfbericht-Nr.:</b> <i>Test Report No.:</i> 50249497-001		<b>Auftrags-Nr.:</b> <i>Order No.:</i> 114081185		Seite 1 von 11 <i>Page 1 of 11</i>	
<b>Kunden Referenz-Nr.:</b> <i>Client Reference No.:</i>		<b>Auftragsdatum</b> : 22-08-2018 <i>Order date:</i>			
<b>Auftraggeber:</b> <i>Client:</i>		Zhejiang Lierda Internet of Things Technology Co.,Ltd Lierda IoT park, No.1326 Wenyi Xi Road, Hangzhou, Zhejiang Prov. China		Henry Kim +86 18067988348 jinyan@lierda.com	
<b>Prüfgegenstand:</b> <i>Test item:</i>		LSD4WN-2L817M90 module			
<b>Bezeichnung / Typ-Nr.:</b> <i>Identification / Type No.:</i>		LSD4WN-2L817M90			
<b>Auftrags-Inhalt:</b> <i>Order content:</i>		Test of Conformance to LoRaWAN™ Specification V1.0.2			
<b>Prüfgrundlage:</b> <i>Test specification:</i>		LoRa Alliance End Device Certification Requirements for EU 868MHz ISM Band Devices Version 1.5			
<b>Wareneingangsdatum:</b> <i>Date of receipt:</i>					
<b>Prüfmuster-Nr.:</b> <i>Test sample No.:</i>					
<b>Prüfzeitraum:</b> <i>Testing period:</i>					
<b>Ort der Prüfung:</b> <i>Place of testing:</i>					
<b>Prüflaboratorium:</b> <i>Testing laboratory:</i>					
<b>Prüfergebnis:</b> <i>Test results:</i>					
<b>Geprüft von</b> <i>Tested by:</i>		Justin K.C. Yu Test Engineer		<b>Kontrolliert von</b> <i>Reviewed by:</i>	
08-05-2019				Brenda S. H. Chen Project Manager	
05-09-2019					
<b>Datum</b> <i>Date</i>	<b>Name / Stellung</b> <i>Name / Position</i>	<b>Unterschrift</b> <i>Signature</i>	<b>Datum</b> <i>Date</i>	<b>Name / Stellung</b> <i>Name / Position</i>	<b>Unterschrift</b> <i>Signature</i>
<b>Sontiges /</b> <i>Other:</i> -					
<p><b>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</b>  <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark</i></p>					

Prüfbericht-Nr.: 50249497-001  
Test Report No.: 50249497-001

Seite 2 von 11  
Page 2 of 11

Revisions Revisions			
Revision Revision	Datum Date	Anmerkung Remark	Verfasser Author

Note: Latest revision report will replace all previous reports

## Table of contents

1	Product Information.....	4
	Submitted Documents: .....	5
	Remarks:.....	5
2	Test Equipment.....	6
3	Summary.....	7
	Verdicts of functional requirements: .....	7
	Supported optional features:.....	7
4	Test Case verdicts as per Test Specifications.....	8
	Test results per test case:.....	8
5	Test Results.....	10
	Detailed test results: .....	10
6	PHOTO DOCUMENTATION.....	11

Prüfbericht-Nr.: 50249497-001  
Test Report No.: 50249497-001

Seite 4 von 11  
Page 4 of 11

## 1 PRODUCT INFORMATION

The device under test (DUT) is a LSD4WN-2L817M90 for LoRaWAN Certification testing

General information	
Product name:	LSD4WN-2L817M90
Model:	LSD4WN-2L817M90
Description:	LoRa Alliance LoRaWAN compliance testing
Manufacturer SKU	-
Hardware version:	V01
Firmware version:	V02.20
Contact person:	ChaoJie Gu
Phone number:	+86 13738376523

LoRaWAN information	
Type of DUT	Module
LoRa Device Class	A
Geographical area of operation	Europe
Operating frequency	868 MHz
Adaptive Data Rate (ADR) supported?	Yes
Optional data rates supported?	DR6 (SF7BW250) and DR7 (FSK50)
Activation possibilities	Both Over the air and by personalization
Test According LoRaWAN™ Spec	V1.0.2
Output Power	<= 18.5 dBm
Number / Type of Antenna(s)	1
Antenna Gain	-
Test sample information	production unit

Prüfbericht-Nr.: 50249497-001  
Test Report No.: 50249497-001

Seite 5 von 11  
Page 5 of 11

<b>For OTA activation:</b>	
Serial No of Device with OTAA	A000792582-001
End-device identifier (DevEUI)	0095 690E 0000 0374
Application identifier (AppEUI)	1995 0708 0000 0000
Application key (AppKey)	1122 3344 5566 7788 99AA BBCC DDEE FF00
<b>For activation by personalization:</b>	
Serial No of Device with ABP	A000792582-001
End-device identifier (DevAddr)	00000001
Application identifier (AppSKey)	1122 3344 5566 7788 99AA BBCC DDEE FF00
Application key (NwkSKey)	1122 3344 5566 7788 99AA BBCC DDEE FF00
Default RX2 Window Frequency	869.525MHz
Default RX2 Window Data Rate	DR0 (SF12, 125kHz)
RECEIVE_DELAY1	1 s
RECEIVE_DELAY2	2 s (must be RECEIVE_DELAY1 + 1s)
JOIN_ACCEPT_DELAY1	5 s
JOIN_ACCEPT_DELAY2	6 s
MAX_FCNT_GAP	16384
ADR_ACK_LIMIT	63
ADR_ACK_DELAY	32
ACK_TIMEOUT	2 +/- 1 s (random delay between 1 and 3 seconds)

### Submitted Documents:

LoRa Certification Customer Questionnaire document.  
LoRa Test Environment log files.

### Remarks:

All test cases are tested with Over the Air Activation (OTAA) mode, else explicitly Activation by Personalization (ABP) to be tested.

Prüfbericht-Nr.: 50249497-001  
Test Report No.: 50249497-001

Seite 6 von 11  
Page 6 of 11

## 2 TEST EQUIPMENT

<b>Prüfmittel</b> <i>Test equipment</i>	<b>Marke</b> <i>Brand</i>	<b>Version</b> <i>Version</i>
Comprehensive Testing Environment (CTE)	4ffcom AG	CTE - TMF V45.1 CTE - SIG - LoRa V3.3
Semtech Development Kit (Semtech Gateway) for EU 863-870 Band	Semtech	SX1301-based concentrator reference design >=GW_V_3.1.0
Semtech Development Kit (Semtech Packet Forwarder) for EU 863-870 Band	Semtech	>= PF_V_2.2.0

Prüfbericht-Nr.: 50249497-001  
Test Report No.: 50249497-001

Seite 7 von 11  
Page 7 of 11

### 3 SUMMARY

Verdicts of functional requirements:	Verdict
Device Activation (Activation by Personalization)	PASS
Device Activation (Over the Air Activation)	PASS
Test Application Functionality	PASS
Over The Air Activation	PASS
Packet Error Rate RX2 default DR	PASS
Cryptography	PASS
Downlink Window Timing	PASS
Frame Sequence Number	PASS
Device Status Request MAC command	PASS
Mac Commands	PASS
New Channel Request MAC command	PASS
DIChannelReq MAC command	PASS
Confirmed packets	PASS
RX Parameter Setup Request MAC command	PASS
RX Timing Setup Request MAC command	PASS
Link ADR Request MAC command	PASS
Packet Error Rate RX1 Window	PASS
Packet Error Rate RX2 Window	PASS

Supported optional features:	YES / NO
Adaptive Data Rate (ADR)	YES
SF7BW250	YES
FSK	YES

**Overall Test Result: PASS**

#### 4 TEST CASE VERIDCTS AS PER TEST SPECIFICATIONS

##### Test results per test case (OTAA):

Test item	Description	Implementation	Result
EU863-870 2.1	Device Activation	Mandatory	PASS
EU863-870 2.2	Test application functionality	Mandatory	PASS
EU863-870 2.3	Over The Air Activation	Mandatory	PASS
EU863-870 2.4	Packet Error Rate RX2 Default DR	Mandatory	PASS
EU863-870 2.5	Cryptography	Mandatory	PASS
EU863-870 2.5.a	AES encryption	Mandatory	PASS
EU863-870 2.5.b	MIC	Mandatory	PASS
EU863-870 2.6	Downlink window timing	Mandatory	PASS
EU863-870 2.7	Frame sequence number	Mandatory	PASS
EU863-870 2.7.a	Uplink sequence number	Mandatory	PASS
EU863-870 2.7.b	Downlink sequence number	Mandatory	PASS
EU863-870 2.8	DevStatusReq MAC command	Mandatory	PASS
EU863-870 2.9	MAC Commands	Mandatory	PASS
EU863-870 2.10	New Channel Request	Mandatory	PASS
EU863-870 2.10.a	Read-only default channels	Mandatory	PASS
EU863-870 2.10.b	Addition and removal of multiple channels	Mandatory	PASS
EU863-870 2.10.c & 10.d	Addition and removal of a single channel	Mandatory	PASS
EU863-870 2.11	DL Channel Request MAC command	Mandatory	PASS
EU863-870 2.12	Confirmed packets	Mandatory	PASS
EU863-870 2.12.a	Uplink confirmed packets	Mandatory	PASS
EU863-870 2.12.b	Uplink retransmission	Mandatory	PASS
EU863-870 2.12.c	Downlink confirmed packets	Mandatory	PASS
EU863-870 2.12.d	Downlink retransmission	Mandatory	PASS
EU863-870 2.13	RXParamSetupReq MAC command	Mandatory	PASS
EU863-870 2.14	RXTimingSetupReq MAC command	Mandatory	PASS
EU863-870 2.15	Link ADR Request	Mandatory	PASS
EU863-870 2.15.a	ADR bit	Mandatory	PASS
EU863-870 2.15.b	TXPower	Mandatory	PASS
EU863-870 2.15.c	Required DataRates	Mandatory	PASS
EU863-870 2.15.d	Optional DataRates	Mandatory	PASS
EU863-870 2.15.e	ChannelMask	Mandatory	PASS
EU863-870 2.15.f	Redundancy	Mandatory	PASS
EU863-870 2.15.g	ADRACKReq bit	Mandatory	PASS
EU863-870 2.15.h	LinkADRReq commands block	Mandatory	PASS
EU863-870 2.16	Packet Error Rate RX1	Mandatory	PASS
EU863-870 2.17	Packet Error Rate RX2	Mandatory	PASS



**Test results per test case (ABP):**

Test item	Description	Implementation	Result
EU863-870 2.1	Device Activation	Mandatory	PASS
EU863-870 2.2	Test application functionality	Mandatory	PASS
EU863-870 2.4	Packet Error Rate RX2 Default DR	Mandatory	PASS
EU863-870 2.5	Cryptography	Mandatory	PASS
EU863-870 2.5.a	AES encryption	Mandatory	PASS
EU863-870 2.5.b	MIC	Mandatory	PASS
EU863-870 2.6	Downlink window timing	Mandatory	PASS
EU863-870 2.7	Frame sequence number	Mandatory	PASS
EU863-870 2.7.a	Uplink sequence number	Mandatory	PASS
EU863-870 2.7.b	Downlink sequence number	Mandatory	PASS
EU863-870 2.8	DevStatusReq MAC command	Mandatory	PASS
EU863-870 2.9	MAC Commands	Mandatory	PASS
EU863-870 2.10	New Channel Request	Mandatory	PASS
EU863-870 2.10.a	Read-only default channels	Mandatory	PASS
EU863-870 2.10.b	Addition and removal of multiple channels	Mandatory	PASS
EU863-870 2.10.c & 10.d	Addition and removal of a single channel	Mandatory	PASS
EU863-870 2.11	DL Channel Request MAC command	Mandatory	PASS
EU863-870 2.12	Confirmed packets	Mandatory	PASS
EU863-870 2.12.a	Uplink confirmed packets	Mandatory	PASS
EU863-870 2.12.b	Uplink retransmission	Mandatory	PASS
EU863-870 2.12.c	Downlink confirmed packets	Mandatory	PASS
EU863-870 2.12.d	Downlink retransmission	Mandatory	PASS
EU863-870 2.13	RXParamSetupReq MAC command	Mandatory	PASS
EU863-870 2.14	RXTimingSetupReq MAC command	Mandatory	PASS
EU863-870 2.15	Link ADR Request	Mandatory	PASS
EU863-870 2.15.a	ADR bit	Mandatory	PASS
EU863-870 2.15.b	TXPower	Mandatory	PASS
EU863-870 2.15.c	Required DataRates	Mandatory	PASS
EU863-870 2.15.d	Optional DataRates	Mandatory	PASS
EU863-870 2.15.e	ChannelMask	Mandatory	PASS
EU863-870 2.15.f	Redundancy	Mandatory	PASS
EU863-870 2.15.g	ADRACKReq bit	Mandatory	PASS
EU863-870 2.15.h	LinkADRRReq commands block	Mandatory	PASS

Prüfbericht-Nr.: 50249497-001  
Test Report No.: 50249497-001

Seite 10 von 11  
Page 10 of 11

## 5 TEST RESULTS

### Detailed test results (OTAA):

Test item	Test Case Name	DataRate/ Timing	Limit	Results	Verdict	
EU863-870 2.4	Packet Error Rate RX2 Default DR	SF12BW125	5%	0.00%	PASS	
EU863-870 2.6	Downlink window timing	-20ms	-	-	PASS	
		+20ms	-	-	PASS	
EU863-870 2.16	Packet Error Rate RX1	SF12BW125	5%	0.00%	PASS	
		SF11BW125	5%	0.00%	PASS	
		SF10BW125	5%	0.00%	PASS	
		SF9BW125	5%	0.00%	PASS	
		SF8BW125	5%	0.00%	PASS	
		SF7BW125	5%	1.67%	PASS	
		SF7BW250	5%	0.00%	PASS	
		FSK 50kbps	5%	0.00%	PASS	
EU863-870 2.17		Packet Error Rate RX2	SF11BW125	5%	0.00%	PASS
			SF10BW125	5%	0.00%	PASS
	SF9BW125		5%	0.00%	PASS	
	SF8BW125		5%	0.00%	PASS	
	SF7BW125		5%	0.00%	PASS	
	SF7BW250		5%	5.00%	PASS	
	FSK 50kbps	5%	0.00%	PASS		

**6 PHOTO DOCUMENTATION**

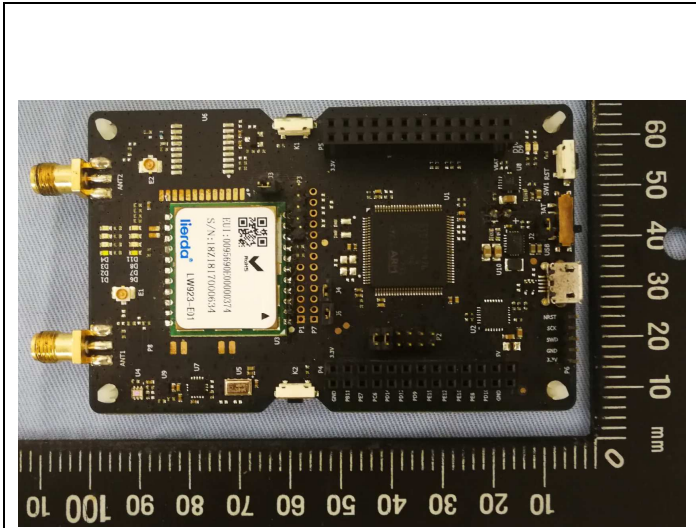


Photo 1: EUT front view

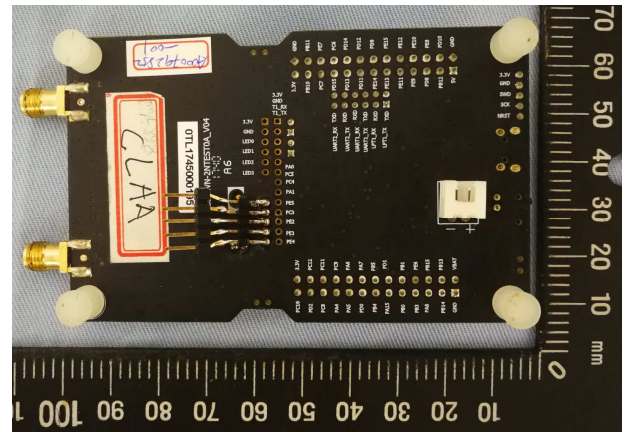


Photo 2: EUT rear view