


Prüfbericht-Nr.: 60266359-001 <i>Test Report No.:</i>		Auftrags-Nr.: 23870181 <i>Order No.:</i>		Seite 1 von 10 Page 1 of 10	
Kunden Referenz-Nr.: NA <i>Client Reference No.:</i>		Auftragsdatum 27-03-2019 <i>Order date:</i>			
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Prüfgegenstand: Cyble 5 868mHz <i>Test item:</i>					
Bezeichnung / Typ-Nr.: 00000436 <i>Identification / Type No.:</i>					
Auftrags-Inhalt: Test of Conformance to LoRaWAN™ Specification V1.0.2 for EU 863-870 Band <i>Order content:</i>					
Prüfgrundlage: LoRa End Device Certification EU868 Version 1.5 <i>Test specification:</i>					
Wareneingangsdatum: 12-04-2019 <i>Date of receipt:</i>					
Prüfmuster-Nr.: 00000436 <i>Test sample No.:</i>					
Prüfzeitraum: 15-04-2019 – 26-06-2019 <i>Testing period:</i>					
Ort der Prüfung: Lund, Sweden <i>Place of testing:</i>					
Prüflaboratorium: TÜV Rheinland Sweden <i>Testing laboratory:</i> AB					
Prüfergebnis: PASS <i>Test results:</i>					
Geprüft von Joel Efraimsson <i>Tested by:</i> Test Engineer		Kontrolliert von Kutbuddin Vora <i>Reviewed by:</i> Program Manager			
26-06-2019		05-07-2019			
Datum <i>Date</i>	Name / Stellung <i>Name / Position</i>	Unterschrift <i>Signature</i>	Datum <i>Date</i>	Name / Stellung <i>Name / Position</i>	Unterschrift <i>Signature</i>
Sontiges / <i>Other:</i>					
<p>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. <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>					

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Revisions <i>Revisions</i>			
Revision Revision	Datum Date	Anmerkung Remark	Verfasser Author
0	26-06-2019	Original Report	JE

Note: Latest revision report will replace all previous reports

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1 PRODUCT INFORMATION

The device under test (DUT) is a wireless Semtech Sensor Node for LoRaWAN 1.0.2 Certification testing.

General information	
Product name:	Cyble 5 868mHz
Model:	00000436
Description:	LoRa Alliance LoRaWAN compliance testing
Manufacturer SKU	00000436
Hardware version:	1.0
Software version:	1.0
Contact person:	Valentin Dupeyrot
Phone number:	+33 626819482

LoRaWAN information	
Type of DUT	End Device
LoRa Device Class	A
Geographical area of operation	Europe 868 MHz
Operating frequency	EU 863 - 870 MHz
Adaptive Data Rate (ADR) supported?	Yes
Optional data rates supported?	Yes
Activation possibilities	Over the air
Test According LoRaWAN™ Spec	V1.0.2 (with regional parameters V1.0.2 ref.B)
Output Power	Up to 14 dBm
Number / Type of Antenna(s)	1 / Embedded Shortened Monopole
Antenna Gain	-1.5 dBi
Test sample information	Production unit

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For OTA activation:	
Serial No of Device with OTAA	00000436
End-device identifier (DevEUI)	00078137000001B4
Application identifier (AppEUI)	0000000000000000
Application key (AppKey)	DAC9573AA536DDF98F0F31D2A942069D
For activation by personalization:	
Serial No of Device with ABP	
End-device identifier (DevAddr)	
Application identifier (AppSKey)	
Application key (NwkSKey)	
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	64
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 (OTA)

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2 TEST EQUIPMENT

Prüfmittel <i>Test equipment</i>	Marke <i>Brand</i>	Version <i>Version</i>
Comprehensive Testing Environment (CTE)	TÜV Rheinland Group	CTE - TMF V45.1 CTE - SIG - LoRa V3.3
Semtech Development Kit IOT868STK1-8 (Semtech Gateway) for EU863-870MHz	Semtech	SX1301-based concentrator reference design >=GW_V3.1.0
Semtech Development Kit IOT868STK1-8 (Semtech Packet Forwarder) for EU863- 870MHz Band	Semtech	>= PF_V_2.2.1
LoRa End device	Itron France	Cyble 5 868mHz

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3 SUMMARY

Verdicts of functional requirements:	Verdict
Test Mode Activation (Over the Air Activation)	PASS
Over The Air Activation	PASS
Test Application Functionality	PASS
Cryptography	PASS
Downlink Error Rate	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
Packet Error Rate RX1	PASS
Packet Error Rate RX2	PASS
RX Timing Setup Request MAC command	PASS
Link ADR Request MAC command	PASS
TxParamSetupReq MAC command	PASS

Supported optional features:	YES / No
Adaptive Data Rate (ADR)	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.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.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.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.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.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

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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	SF12BW125	5 %	1.67 %	PASS
EU863-870 2.6	Downlink window timing	-20ms	-	-	PASS
		+20ms	-	-	PASS
EU863-870 2.16	Packet Error Rate RX1	SF12BW125	5 %	3.33 %	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	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 %	1.67 %	PASS
		SF7BW125	5 %	0.00 %	PASS
		SF7BW250	5 %	0.00 %	PASS
		FSK	5 %	5 %	PASS

6 PHOTO DOCUMENTATION

Photo 1: EUT front view



Photo 2: EUT rear view

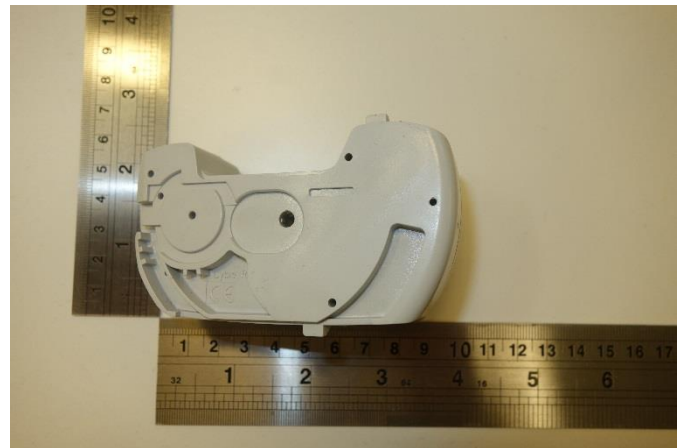


Photo 3: EUT side view



Photo 4: EUT side view

